ORANGES & TUNA: SECURING NUTRITION DURING A PANDEMIC

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Director, E3 Nutrition Lab

Open Classroom
May 7, 2020
Presentation Outline

1. Introduction
   • E3 Nutrition Lab
   • Why oranges & tuna?

2. The Problem: hunger & infection
   • Cells to society
   • Nutrition disparities & vulnerabilities

3. The Solution: nutrition security
   • Programs – MCN, school feeding

4. Conclusion
   Your grocery bag

https://www.medicalnewstoday.com/articles/272782
https://oceana.org/blog/whats-can-4-things-consider-when-buying-canned-tuna
E3 Nutrition Lab

Research to identify interventions that promote healthy growth and development in the most vulnerable populations globally, with the following criteria:

- **Economically affordable**
- **Evolutionarily appropriate**
- **Environmentally sustainable**
Why Oranges & Tuna?

1) Nutrition & Infection
   Contain nutrients to protect body from infection (vit A, C, zinc)

2) Healthy balanced diet
   Food/Diet matrix (not nutrient supplements)

3) Nutrition disparities – who are vulnerable
   Relatively more affordable healthy foods
Why “Nutrition Security” and not “Food Security”

• Food security (availability, access, utilization) generally refers to calories

• Our concern should be for limiting nutrients

• Nutrition security = Diet quality
Figure 2 The malnutrition overlap.
Global
Hunger & Infection

THE PROBLEM
Defining Nutrition

Nutrition is the process by which an organism uses food or anything ingested through digestion, absorption, transport, storage, or elimination for the purpose of maintenance of life, growth, and normal functioning.
The Biology of Nutrition

1) INTAKE
2) ABSORPTION
3) TRANSPORT
4) METABOLISM
5) STORAGE
6) ELIMINATION
Nutrients

Essential nutrients are constituents in the diet required for growth, health, and survival (not endogenously produced)

- Macronutrients – protein/amino acids, carbohydrates, fatty acids (linoleic, α-linolenic), fiber

- Micronutrients
  - Vitamins (organic) – A (β-carotene, retinol), B (thiamin, riboflavin, niacin, pyridoxine, cobalamin, pantothenic acid, folate), C (ascorbic acid), D (calciferol), E (α-tocopherol), K, choline
  - Minerals/elements/trace minerals (inorganic) – calcium, iron, zinc, iodine, selenium, copper, fluoride, phosphorus, magnesium, manganese

- Water & electrolytes – sodium, chloride, potassium, inorganic sulfate
Food matrix

Nutrition & Infection

• Long history
  – 1810 lymphoid tissue atrophy and malnutrition (Beisel J Nutr 1992)
  – 1753 Treatise of the Scurvy vitamin C and sailors (James Lind)
  – 1960s Nutritionally Acquired Immune Deficiency Syndromes (NAIDS)

• Nutrition primarily adaptive immune system – T cell response
  – WHO recommends zinc ajuvant therapy with ORS
Nutrient contributions to Immunity

• Innate Immunity
  – Physical barriers: epithelial tissue in respiratory tract (vit A, C, D…)
  – Innate cells: macrophages (iron), others (vit A, D, C, E, B6, B12, folate, Zn, Cu, Se, Mg)

• Adaptive (acquired) Immunity
  – T cell response (Zn, Cu, Se, vit A, B12, C, D, E…)
  – Immunoglobins/antibodies– IgG, IgM, IgA (vit A, C, B12, D, E zinc, folate)

• Inflammatory Response
  – Oxidative stress (vit E, C, selenium), omega-3 FA ….

Pathogens need nutrients too! For example, iron, vitamin A, and zinc sequestered during infection.
Malnutrition: prevalence

Malnutrition in young children
150.8 million stunted growth; 250 million stunted development
50.5 million wasted
38.3 million overweight/obese

Hidden hunger globally
33% children vitamin A deficient
18% children & 19% women anemic
17.3% world zinc deficient;
28% world iodine deficient

3.1 million (45%) of deaths to children <5 yr
(Black et al. Lancet 2013)
Food deserts – St. Louis region
2-1-1 helpline requests for food assistance have increased dramatically (Focus-19, HCRL)
Disruptions in Food Systems

• Global interconnected food system – production, processing, distribution, to consumption

• Meat and poultry processing facilities – 4,913 cases across 115 facilities, 20 deaths (CDC MMWR May 1, 2020)
  – Triumph Foods (St. Joseph, MO) pork processing plant confirms 373 cases (13%)

• Essential workers: grocery store clerks, migrant workers, etc. across food system

https://www.wynlenhouse.com/village-farmer-blog/the-importance-of-local-food-systems-part-1
Nutrition in the Life Cycle (UN Standing Committee on Nutrition, SCN)
Nutrition Security for All

THE SOLUTION:
Actors

• Global
  – NGOs: CARE, Save the Children, CRS, etc.

• National
  – Government - USDA school lunch/breakfast program, FDA
  – Nongovernmental – Feeding America, Bread for the World, Action Against Hunger, Share our Strength, etc.

• Local
  – St. Louis Area Food Bank, Operation Food Search, Catholic Charities, St. Louis Food Angels, etc.
  – Nursing homes, schools, child care facilities, prisons, hospitals
Nutrition programming

• **Coronavirus programs/policies**
  – *Coronavirus Aid, Relief, and Economic Security Act (CARES)* - $15.8 million for SNAP, and 8.8 million for child nutrition
  – *Families First Coronavirus Response Act* (misses undocumented immigrants, those under other programs)

• **School Feeding**
  – Largest public investment in nutrition globally. In US, up to 2/3 of nutritional need (Dunn et al. NEJM 2020)
  – Reduce time/transport: multiple days of meals, drive-by

• **Food aid**
  – Title II, Supplemental Nutrition Assistance Program (SNAP), Child and Adult Care Food Program, Food stamps
  – Fortified foods
Let’s be ready….

- **Emerging infectious diseases**
  - Every 6-12 months
  - SARS Cov-2, SARS, MERS, Ebola, Zika, chikungunya, avian influenza, HIV, Lyme disease, Escherichia coli O157:H7 (E. coli), hantavirus, dengue fever, West Nile virus

- **Re-emerging infectious diseases**
  - malaria, tuberculosis, cholera, pertussis, influenza, pneumococcal disease

Public Health Nutrition – UN Development Goals

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<th>TARGET</th>
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<tr>
<td>1. 40% reduction in the number of children under 5 who are stunted</td>
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<td>2. 50% reduction of anemia in women of reproductive age</td>
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<td>3. 30% reduction in low birth weight</td>
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<td>4. No increase in childhood overweight</td>
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<td>5. Increase the rate of exclusive breastfeeding in the first 6 months up to at least 50%</td>
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<tr>
<td>6. Reduce and maintain childhood wasting to less than 5%</td>
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<tr>
<th>BASELINE 2012</th>
<th>TARGET FOR 2025</th>
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<tr>
<td>162 million</td>
<td>≈100 million</td>
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<tr>
<td>29%</td>
<td>15%</td>
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<tr>
<td>15%</td>
<td>10%</td>
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<tr>
<td>7%</td>
<td>≤7%</td>
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<tr>
<td>38%</td>
<td>≥50%</td>
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<tr>
<td>8%</td>
<td>&lt;5%</td>
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E3 Nutrition Lab - Research

- **Haiti**
  - *Ze Lekol*
  - Nutrition Determinants of Infection
  - *Grandi Byen*

- **Kenya**
  - Secure Fish
  - *Samaki Salama*

- **Ecuador**
  - The *Lulun* Project
  - *Mikhuna* Evolutionary Nutrition
Conclusions: your grocery bag

• Importantly, wear a mask to the grocery store, use hand sanitizer, avoid weekends if possible, protect workers

• Consider food matrix/dietary mix, nutrition for immunity, and the nutritionally vulnerable in your household and community

• Diverse, balanced mix of foods
  – Animal source foods (fish, eggs, milk etc.) for children, pregnant/lactating women, elderly
  – Variety of fruits and vegetables
  – Beans/legumes, potatoes/other tubers, nuts
  – Avoid ultra-processed foods (but indulge here and there!)

https://idahofoodbank.org/grocery-bag/
And of course…..oranges & tuna!

https://www.medicalnewstoday.com/articles/272782

https://oceana.org/blog/whats-can-4-things-consider-when-buying-canned-tuna
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