Effect of Food, Agriculture, and Transportation Systems on the Health of Urban Populations

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The Global Syndemic of Obesity, Undernutrition, and Climate Change

• Definition: the pandemics of obesity, undernutrition, and climate change interact in time and place, negatively affect each other, and have common economic, societal, or environmental drivers

• Considered climate change as a pandemic

• Driven by food, transport, urban design, and land use systems

• Population rather than individual focused

• Offers opportunities for double-and triple-duty solutions

Lancet 2019; 393:791
Examples of Interactions

• Obesity and stunting in the same children and same population
• LBW and adult obesity
• Car use, inactivity, obesity, and GHG emissions
• Cattle production, GHG emissions, meat consumption and obesity, diabetes, colon cancer and cvd
• GHGs, climate change, and reduced agricultural production and food nutrients, especially in marginal areas, leading to hunger and undernutrition
The Global Syndemic: Systems and Drivers

Governance

Social Determinants

Systems: Food, transport, land use, urban design

Environments

Populations

Outcomes

Power: policies, economics, norms

Obesity

Undernutrition

Climate Change
What Accounts for the Shifts in Malnutrition?

- Advent of supermarkets
- Increased consumption of ultra-processed foods
- Marketing
- Reduced physical activity?
As Countries Develop, Fast Food Takes Hold

Fast food sales are rising almost everywhere, and a trend stands out: From 2010 to 2015, available data show that countries with emerging economies (red and yellow dots) are seeing much more rapid growth.

Searcy D, Richtel M. Planet Fat. NYT Oct 2, 2017
NOVA Classification of Foods

- **Group 1:** unprocessed - fruits and vegetables, milk, nuts, yogurt with no added sugar
- **Group 2:** Group 1 with additives, like salt, sugar or oil
- **Group 3:** processed foods with additives in Group 2 plus smoking, curing, canning, freezing
- **Group 4:** ultra-processed foods made from industrial substances with little or no whole foods sugary drinks, packaged soups, noodles or snacks, cookies
Support for the Effects of Ultra-processed Foods on the Pandemic

• RCT of ultra-processed foods vs unprocessed foods
• Consistent with food patterns related to weight gain and loss
• Consistent with what we know about satiety
• Helps explain the disparities related to obesity
• Consistent with the evolution of the pandemic
Effects of a Fourteen Day Crossover Study of Diets Consisting of Either Processed or Unprocessed food

Hall K et al. Cell Metabolism 2019; 30:1-11
Ultra-processed foods are associated with weight gain over 12-20 years

Unprocessed foods are associated with increased satiety

<table>
<thead>
<tr>
<th>Factor</th>
<th>Strategy</th>
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<tbody>
<tr>
<td>Volume</td>
<td>Low energy density</td>
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<tr>
<td></td>
<td>Fruits and vegetables</td>
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<tr>
<td>Protein</td>
<td>Low fat sources meat, poultry, fish, soy</td>
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<tr>
<td>Fiber</td>
<td>Fruits and vegetables</td>
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<tr>
<td></td>
<td>Whole grains</td>
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Mozaffarian D et al. NEJM 2011; 364:2392
Foods Consumed by a Family of Four in 1951
Ultra-processed food and drink in Latin America. PAHO 2015
Healthier diets for obesity prevention

More land for sustainable agriculture

Lower GHGs from agriculture and transport

Reduce consumption of ultra-processed foods: redirect subsidies to provide low cost healthy alternatives, impose marketing restrictions, implement food labels for sustainability
Modal shifts in transport – redesigned infrastructure to support physical and public transport systems, reduced subsidies for fossil fuel production, increased gasoline tax, social marketing