NUEVOS RETOS DE LA NUTRICION

Nutricion temprana: una prioridad para la sociedad

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Share of the population that is undernourished

This is the main FAO hunger indicator. It measures the share of the population that has a caloric intake which is insufficient to meet the minimum energy requirements necessary for a given individual. Data showing as 5 may signify a prevalence of undernourishment below 5%.

Source: UN Food and Agriculture Organization (FAO)
Note: Developed countries are not included in the regional estimates since the prevalence is below 5%.

https://ourworldindata.org/hunger-and-undernourishment
Share of children younger than 5 who suffer from stunting

Share of children younger than 5 years that fall below two standard deviations from the median height-for-age of the WHO Child Growth Standards. When data for the indicated year is not available the closest observation is shown (within a tolerance of 5 years).

Source: World Bank – WDI
Breastfeeding rates are increasing globally

- Breastfeeding is more prolonged in LMICs
- But fastest rates of increase are in the richer strata

Breastfeeding at 12 months
Global distribution

National Rates and Wealth Related Rates of Breastfeeding 1993-2013

Victoria et al, Lancet, 2016
The number of people living in extreme poverty, 1981-2011

“Extreme poverty” is living on less than $1.25 USD per day in 2005 International Dollar

Source: World Bank, Our World in Data
Stunting and overweight in children under 5 years of age
The Double Burden of Obesity and Malnutrition

Note: The lines (with 95 per cent confidence intervals) reflect the percentages of children and the bars reflect the numbers of children.

World population: In 2050 we will be 9 Billion

Today we have

- 925 Million under-nourished people
- 2 billion (~1/3 of the world population) have a deficiency of iron, iodine, vit A, zinc, or a combination
- 1.9 billion adults were overweight
- 600 million were obese
- 80% of them live in developing countries
Secular trends and the energy flipping point

From Bluher M. Nature Reviews 2019
Environmental Impact of Food Production

Land use to produce 1 Kg of Protein

- **CHICKEN (cooked)**: 64 m²
- **BEEF (cooked)**: 192 m²
- **TOFU**: 3.5 m²

**LAND USED TO PRODUCE 1 kg OF PROTEIN**
Environmental Impact of Food Production

CO₂ generated to produce 1 Kg of Protein

http://www.thegatesnotes.com/features/future-of-food
Estimated change in crop yield – increase in 3 degrees global temperature
Climate change & Food and Nutrition

• 2° C rise in temperature –
  220 million at risk of under-nutrition from reduced agricultural output
• 3° C degree rise –
  440 million more at risk

• Changing patterns of disease
• Threat to agriculture & water availability

Intergovernmental Panel on Climate Change
NORTH AMERICAN* FOOD LOSSES AT EACH STEP IN THE SUPPLY CHAIN

*Percentages calculated collectively for USA, Canada, Australia, and New Zealand.

01. PRODUCTION LOSSES
   - GRAIN PRODUCTS: 2%
   - SEAFOOD: 11%
   - FRUITS & VEGETABLES: 20%
   - MEAT: 3%
   - MILK: 3%

02. POSTHARVEST, HANDLING AND STORAGE LOSSES
   - GRAIN PRODUCTS: 2%
   - SEAFOOD: 5%
   - FRUITS & VEGETABLES: 3%
   - MEAT: 2%
   - MILK: 25%

03. PROCESSING AND PACKAGING LOSSES
   - GRAIN PRODUCTS: 10%
   - SEAFOOD: 6%
   - FRUITS & VEGETABLES: 1%
   - MEAT: 4%
   - MILK: 5%

04. DISTRIBUTION AND RETAIL LOSSES
   - GRAIN PRODUCTS: 2%
   - SEAFOOD: 0.5%
   - FRUITS & VEGETABLES: 12%
   - MEAT: 4%
   - MILK: 25%

05. CONSUMER LOSSES**
   - GRAIN PRODUCTS: 27%
   - SEAFOOD: 39%
   - FRUITS & VEGETABLES: 28%
   - MEAT: 12%
   - MILK: 17%

**Includes out-of-home consumption

Source: Food and Agriculture Organization 2011
Food Insecurity

- Worldwide food production: 4,600 Kcal/person/day
- Available for consumption: 2,000 – 2,800

- FAO: Food production needs to increase by 70% by 2050 to feed 9.1 Billion on increasingly meat dependent diets
- Cutting food losses by ½ could equal 25% food production
TOTAL FOOD LOSS FROM RETAIL, FOOD SERVICE AND HOUSEHOLDS

(BREAKDOWN AS A PERCENTAGE OF TOTAL FOOD LOSS)

Source: Journal of Consumer Affairs, Fall 2011: 492-515.
Food Insecurity

- Worldwide food production is 4,600 Kcal/person/d
- Only 2,000 – 2,800 are available for consumption
- Cutting food losses by ½ could equal 25% food production

Food / Income distribution / Dietary preferences
Ecosystem of nutritional determinants

- Environment
- Society
- Community
- Family
- Child
The Melander family of Bargteheide
Gasto en alimentos
US $500 por semana
The Caselas family, Cuernavaca Mexico
Gasto en alimentos
US $189 por semana
The Aboubakar family of Breidjing Camp, Chad

Gasto en alimentos

US $1.23 por semana
A world with Inequality

Population
Income

In percentage of world total:
- 30%
- 20%
- 10%
- 5%
- 1%

Population
Income
Disparidades en la epidemia de obesidad

Education-related inequality in overweight

Overweight defined as BMI ≥ 25 kg/m². Education level is categorised into three groups (primary, secondary, tertiary education). On the x-axis, the relative index of inequality measures the inequality of being overweight by education level. *ECID analysis of national health survey data.
Ecosystem of nutritional determinants
Global Key Findings - Similar problems across countries, but differences in magnitude

1. Low breastfeeding rates
2. Early Introduction of Complementary Foods and Cow Milk
3. Low Fruit and Vegetable Consumption
4. High Sugar and Sweetened Beverage consumption

Excess calories and protein,
Deficient Iron
Low total fat
Excess sodium
Growth Failure and Neuro-Developmental Outcome

Developmental Course of the Human Brain

- Higher cognitive functions (prefrontal cortex)
- Receptive language area/speech production (angular gyrus/Broca's area)
- Seeing/hearing (visual cortex/auditory cortex)

Prefrontal cortex

Myelination (-2 months to 5-10 years)

Adult levels of synapses

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Prefrontal cortex
Myelination (-2 months to 5-10 years)
Adult levels of synapses

-2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 30 40 50 60 70

Months
Years
Decades

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-2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 30 40 50 60 70

Months Years Decades

Inadequate iron intake among infants

Percent of infants below the recommendations for iron intake

<table>
<thead>
<tr>
<th>Country</th>
<th>6-11.9 mo</th>
<th>12-23.9 mo</th>
</tr>
</thead>
<tbody>
<tr>
<td>São Paulo (BZ)</td>
<td>38</td>
<td>10</td>
</tr>
<tr>
<td>US</td>
<td>18</td>
<td>7</td>
</tr>
<tr>
<td>Russia</td>
<td>79.3</td>
<td>76.8</td>
</tr>
<tr>
<td>Mexico</td>
<td>61</td>
<td>1</td>
</tr>
<tr>
<td>China</td>
<td>48.2</td>
<td>16.6</td>
</tr>
</tbody>
</table>

For RU, GCR and BZ on inadequate iron intake are overestimated as based on 1 day of 24 h recall.
Economic losses from iron deficiency anemia
Cognitive and productive – as % of GDP

Bangladesh, India, Pakistan, Mali, Tanzania, Egypt, Oman, Bolivia, Honduras, Nicaragua

Horton and Ross 2003
Fortified infant cereals

% children consuming infant cereal

- China: 5 (6-8 m), 26 (9-11 m), 40 (12-23 m)
- Mexico: 3 (6-8 m), 10 (9-11 m), 7 (12-23 m)
- US: 11 (6-8 m), 49 (9-11 m), 56 (12-23 m)
- Russia: 4 (6-8 m), 13 (9-11 m), 7 (12-23 m)

*7-11 m for Russia
• Nutrition in early life sets the course for long term health
• Adequate nutrition requires a safe and affordable food supply
• Healthy diet patterns, are set very early in life...
• and they require education on food choices and feeding behaviors
Return on capital investment by age

Return per capital investment at different ages

Heckman 2008
Nutrition in the first 1,000 days is society’s greatest opportunity...

and it’s everyone’s responsibility