Dynamics of the Global Nutrition Transition

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I. Introduction: Background

♦ What is the nutrition transition?

♦ Background: obesity, diet, activity dynamics – shifting to the poor, begins with adults, global acceleration

♦ Underlying dynamics: Key demographic factors (age structure, urbanization), economic (price, income), and technological factors are changing!
Later Stages of the Nutrition Transition

Urbanization, economic growth, technological changes for work, leisure, 
& food processing, mass media growth, global capital flows

Pattern 3  Receding Famine
- starchy, low variety, low fat, high fiber
- labor-intensive work/leisure

MCH deficiencies, weaning disease, stunting

Slow mortality decline

Pattern 4  Degenerative Disease
- increased fat, sugar, processed foods
- shift in technology of work and leisure

obesity emerges, bone density problems

accelerated life expectancy, shift to increased Nutrition-Related NCD, increased disability period

Pattern 5  Behavioral Change
- Improved fat quality
- Increased whole grain, Fruit & vegetable intake
- reduced sedentarianism, increased overall activity

reduced body fatness, improved bone health

extended health aging, reduced Nutrition-Related NCD

Obesity Dynamics

- Adult increases seem to emerge earlier than child ones. Unclear why?
- Shifts occurring in both urban and rural areas.
- Poor assuming the burden of obesity and noncommunicable diseases
El 54% de los uruguayos tiene sobrepeso u obesidad.
Overweight more than tripled among Chinese men and doubled among women. The 11-Year Change in the BMI Distribution for a Cross-Section of Chinese Adults 20-45.

Overweight and Underweight Prevalence in Women 20-49y
in 36 Developing Countries Ranked by Gross National Income (GNI) Per Capita

(1a) Urban Women
(1b) Rural Women

Overweight = BMI ≥ 25; underweight = BMI < 18.5.

Mendez, Monteiro, Popkin (2005): AJCN
From Traditional to Modern Meals
From Traditional to Modern Snacking
From Traditional to Modern.....
Marketing of Food
The Key Diet-Related Changes

Major shifts in diet are taking place:

♦ Major nutrient profiles: shift toward large energy density and refined carbohydrate increases. For example, in a decade the energy density of food consumed by Chinese adults aged 20-45 increased by over 13%.

♦ Added caloric sweeteners (mainly sugar and High Fructose Corn Syrup) increases across the developing world are equally dramatic, with an extra 100-300 kcals per day among all individuals in each low and moderate income country over the past 25 years.

♦ Large increases in edible oil and animal food source intake, and reductions in fiber and total fruit and vegetable intake.
Total Fat Intake

- For every 10% increase in income, intake of the proportion of energy from fat is increasing greater among the poor than the rich in China. Most importantly there are significant changes found in all income groups.


- Log-log Longitudinal model: this one fixed effects with income-time interactions
### CHNS Edible Oil Consumption Still Rising
(daily grams per capita of intake)

<table>
<thead>
<tr>
<th>Year</th>
<th>1989</th>
<th>1997</th>
<th>2000</th>
<th>2004</th>
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<tbody>
<tr>
<td>Poorest (lowest income tertile)</td>
<td>11.8</td>
<td>29.8</td>
<td>29.4</td>
<td>33.6</td>
</tr>
<tr>
<td>Middle income tertile</td>
<td>15.0</td>
<td>30.6</td>
<td>34.0</td>
<td>32.6</td>
</tr>
<tr>
<td>Richest (highest income tertile)</td>
<td>17.4</td>
<td>33.0</td>
<td>38.8</td>
<td>39.4</td>
</tr>
<tr>
<td>Average for total adult population</td>
<td>14.8</td>
<td>31.0</td>
<td>34.1</td>
<td>35.1</td>
</tr>
<tr>
<td>% of all calories per capita from edible oil</td>
<td>4.9</td>
<td>12.2</td>
<td>12.2</td>
<td>13.7</td>
</tr>
</tbody>
</table>


Ref: Ng, et al, (in press) impact of China’s edible oil pricing policy on nutrition. SS & Med

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**The Nutrition Transition Program**

*The University of North Carolina at Chapel Hill*
The Beverage dimension of the sugar issue is particularly important for obesity

- Studies of appetitive sensations (e.g., hunger, fullness, prospective consumption) support the view that fluids are less satiating than solid foods. In fact, beverages are not satiating at all during a specific meal and there is no energy adjustment.

- Further dietary compensation (energy intake adjustments made during the day to compensate for earlier intake) have been studied with solid, semisolid, and fluid foods. For fluids, compensation is very high in the sense that minimal calorie reduction in other foods occurs.
Dynamics of the Food Sector

♦ Supermarkets: a new actor in the process!
♦ What about away-from-home consumption?
♦ McDonald’s and friends: what role? Heterogeneity
♦ Agribusinesses: production of livestock, other commodities is changing rapidly!
♦ Then what about the international food companies – Nestle’s, Unilever, Kraft General Foods, etc.?
Supermarkets: a new actor in the process!

♦ In 1990 15-20% of food sold in supermarkets in Latin America. Now this is 60% of the average population share. They are becoming the main buyers in the supply chains for processed foods.

♦ Top 5 chains control two-thirds of the supermarket sector in Latin America (Walmart, Carrefour, Ahold).

♦ Asia, urban Africa, Middle East are experiencing similar change now.
Real World Prices, 1990 US$

100 kg Poultry
80-82

100 kg Beef
70-72

1 MT Maize
94-96

AIDS Demand Models Various Sources Cited in Delgado & Courbois 1998
Key issue is relative price changes
Real Prices of Select Food Items from 1991-2004 in China

Source: China Health and Nutrition Survey 1991 to 2004
Ng et (in press) Impact of China’s edible oil pricing policy on nutrition. Social Science & Medicine