GLOBAL ECONOMIC AND HEALTH CHANGE

PROBLEMS AND SOLUTIONS

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THE WORLD IS FAT
“Over 1.6 billion people in the world are overweight”
Prevention Better than Cure

• There has been a shift in the causes of morbidity and mortality globally
• Rapid increase in the incidence and prevalence of non-communicable diseases
• Underlying causes: smoking, drinking, diet and lack of activity
• Focus: Obesity and diet, also shifts in physical activity.
• How do we proceed? Do we emphasize prevention now or face medical care costs in the future?
• Discuss the prevention options being considered in various countries

“Over 1.6 billion people in the world are overweight”
Global Estimates of Diabetes

<table>
<thead>
<tr>
<th>Measure</th>
<th>2010</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult population 20-79</td>
<td>4.1-4.3 billion</td>
<td>5.4-5.7 billion</td>
</tr>
<tr>
<td>Diabetes among adults</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Global prevalence</td>
<td>6.6%</td>
<td>7.8%</td>
</tr>
<tr>
<td>Number of adults</td>
<td>≈285 million</td>
<td>≈438 million</td>
</tr>
<tr>
<td>Impaired glucose tolerance (IGT)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Global prevalence</td>
<td>7.9%</td>
<td>8.4%</td>
</tr>
<tr>
<td>Number with IGT</td>
<td>344 million</td>
<td>472 million</td>
</tr>
</tbody>
</table>

Sources: World Diabetes Federation, WHO

“Over 1.6 billion people in the world are overweight”
# Top 10 Countries According to Number of People Aged 20-79 with Diabetes, 2010 and 2030

<table>
<thead>
<tr>
<th>Country/Territory</th>
<th>2010 Millions</th>
<th>Country/Territory</th>
<th>2030 Millions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 India</td>
<td>50.8</td>
<td>1 India</td>
<td>87.0</td>
</tr>
<tr>
<td>2 China</td>
<td>43.2</td>
<td>2 China</td>
<td>62.6</td>
</tr>
<tr>
<td>3 United states of America</td>
<td>26.8</td>
<td>3 United states of America</td>
<td>36.0</td>
</tr>
<tr>
<td>4 Russian Federation</td>
<td>9.6</td>
<td>4 Pakistan</td>
<td>13.8</td>
</tr>
<tr>
<td>5 Brazil</td>
<td>7.6</td>
<td>5 Brazil</td>
<td>12.7</td>
</tr>
<tr>
<td>6 Germany</td>
<td>7.5</td>
<td>6 Indonesia</td>
<td>12.0</td>
</tr>
<tr>
<td>7 Pakistan</td>
<td>7.1</td>
<td>7 Mexico</td>
<td>11.9</td>
</tr>
<tr>
<td>8 Japan</td>
<td>7.1</td>
<td>8 Bangladesh</td>
<td>10.4</td>
</tr>
<tr>
<td>9 Indonesia</td>
<td>7.0</td>
<td>9 Russian Federation</td>
<td>10.3</td>
</tr>
<tr>
<td>10 Mexico</td>
<td>6.8</td>
<td>10 Egypt</td>
<td>8.6</td>
</tr>
</tbody>
</table>

Sources: World Diabetes Federation, WHO

*Over 1.6 billion people in the world are overweight*
Prevalence of Diabetes among Persons Aged 20-79 in 2010 (percentage)

“Over 1.6 billion people in the world are overweight”
Prevalence of Diabetes among Persons Aged 20-79 in 2030 (Percentage)

“Over 1.6 billion people in the world are overweight”
Figure 1. Stages of the Nutrition Transition

Urbanization, economic growth, technological changes for work, leisure, and food processing, mass media growth

Pattern 1
Paleolithic man/
Hunter-gatherers

- Wild plants and animals
- Water
- Labour intensive

Lean and robust, high disease rate

Low fertility
Low life expectancy

Pattern 2
Settlements begin/
Monoculture period/
Famine emerges

- Cereals dominate
- Water
- Labour-intensive

Nutritional deficiencies emerge, stature declines

High fertility
High MCH mortality
Low life expectancy

Pattern 3
Industrialization/
Receding famine

- Starchy, low variety, low fat, high fiber
- Water
- Labour-intensive work job/home

MCH deficiencies, weaning disease, stunting

Slow mortality decline

Pattern 4
Non-communicable
disease

- Increased fat, sugar, processed foods
- Caloric beverages
- Shift in technology of work and leisure

Obesity emerges, range of other NR-NCD’s

Rapid rise in life expectancy
Rising mortality from NCDs
Longer time in disability

Pattern 5
Desired societal/
Behavioural change

- Reduced fat, increased fruit, veggies, CHO, fiber
- Increase water, reduce caloric beverage intake
- Replace inactivity with purposeful activity

Reduced body fatness, Reduced mortality from NCD’s

Extended healthy life Reduced mortality from NCDs

High-income vs. transitional and low-income countries

- In high-income countries, BMI has been increasing for a century, but the rise accelerated since the 1980s.
- In most developing countries, there was minimal obesity until the late 1980’s but rapid increases have occurred over the past 20 years.
- Changes since the late 1980’s have affected adults in all countries and regions: rich and poor, north and south, urban and rural.
- Among children, the changes have universally occurred only in the past 10 to14 years.

“Over 1.6 billion people in the world are overweight”
Mismatch: The biology that has evolved over millennia is ill adapted to modern technology and food supply

<table>
<thead>
<tr>
<th>Biology</th>
<th>Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweet preferences</td>
<td>Cheap caloric sweeteners, benefits of food processing</td>
</tr>
<tr>
<td>Thirst, hunger and satiety</td>
<td>Caloric beverage revolution</td>
</tr>
<tr>
<td>mechanisms are not linked</td>
<td></td>
</tr>
<tr>
<td>Fatty food preference</td>
<td>Edible oil revolution: High yielding oilseeds and cheap removal of oils</td>
</tr>
<tr>
<td>Desire to eliminate exertion</td>
<td>Technology reduces movement and exertion</td>
</tr>
</tbody>
</table>

“Over 1.6 billion people in the world are overweight”
El 54% de los uruguayos tiene sobrepeso u obesidad.
Prevalence of overweight and underweight in women aged 20-49 in 36 developing countries ranked by per capita Gross National Income around 2000

Urban Women

Rural Women

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

Mendez, Monteiro, Popkin (2005): AJCN
Current Prevalence and Changes in Obesity Prevalence Among Women in Middle and Low Income Countries Ranked by Gross Domestic Product (GDP)

Ng, Jones-Smith and Popkin, unpublished not for us or quotation
Absolute Annual % Point Change in Prevalence in Women in Developing Countries
Ranked by Gross Domestic Product (GDP) Per Capita in 2009 Dollars

Ng, Jones-Smith and Popkin, unpublished not for use or quotation
Relative Annual Rate of Change in Prevalence in Women in Developing Countries Ranked by Gross Domestic Product (GDP) Per Capita in 2009 Dollars

Ng, Jones-Smith and Popkin, unpublished not for use or quotation
Percentage Overweight and Obese According to Nationally Representative Samples

- <10%
- 10-20%
- 21-30%
- 31-40%
- 41-50%
- >51%
What are the implications of eating food and drinking water on energy balance?

<table>
<thead>
<tr>
<th>General Properties</th>
<th>Food</th>
<th>Water</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hunger – Feeding</strong></td>
<td>Sensations that promote attainment of minimal food energy needs</td>
<td><strong>Thirst – Drinking</strong></td>
</tr>
<tr>
<td><strong>Energy Excess</strong></td>
<td>Stored</td>
<td><strong>Water Excess</strong></td>
</tr>
<tr>
<td><strong>Energy Deficit: Die in 1-2 months</strong></td>
<td></td>
<td><strong>Water Deficit: Die in 3-7 days</strong></td>
</tr>
</tbody>
</table>

“Over 1.6 billion people in the world are overweight”
The history of caloric beverages is remarkably short: Might the absence of compensation relate to this historical evolution?
Global trends in beverage intake patterns

- The published data on the issue are minimal
- Increased caloric beverage intake is found in all countries having good data.
- Major increases in calories in all the Americas, Europe, North Africa and the Middle East, all of Asia. Great variability in the patterns exists

“Over 1.6 billion people in the world are overweight”
Daily Beverage Consumption Trends Among Mexican Children, 1999-2006

Note: Sweetened juice drinks include 100% fruit juice with sugar added and agua fresca (water, juice, sugar). Sodas include carbonated and noncarbonated sugar bottled beverages.

Beverage consumption trends among Mexican adolescents and adult women, 1999 and 2006

Note: High sugar is composed of mainly soft drinks, sweetened juices, agua frescas and alcohol. High calorie and low benefit is mainly whole milk. Low calories are slightly sweetened coffee and skim milk.

Water and Health

• Four epidemiological studies suggest that replacing caloric beverages with water would reduce over 200 kcals.
• A controlled trial in Germany found that replacing vending machines for caloric beverages with filtered water fountains and water education reduced the risk of overweight by 31%.
• A small study in Britain found that education alone reduced caloric beverage consumption and led to about an 8% difference in the prevalence of overweight.
• One systematic review suggests water has unique benefits.

“Over 1.6 billion people in the world are overweight”
The Likelihood of Snacking Across All Individuals Aged 2 and Older, China 1991-2006

Consumption of edible oil is still rising in China (daily grams per capita)

<table>
<thead>
<tr>
<th>Year</th>
<th>1989</th>
<th>1997</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poorest (lowest income tertile)</td>
<td>11.8</td>
<td>26.5</td>
<td>30.8</td>
</tr>
<tr>
<td>Middle income tertile</td>
<td>15</td>
<td>29.7</td>
<td>30.9</td>
</tr>
<tr>
<td>Richest (highest income tertile)</td>
<td>17.4</td>
<td>31.3</td>
<td>30.9</td>
</tr>
<tr>
<td>Average for total adult population</td>
<td>14.8</td>
<td>28.9</td>
<td>30.9</td>
</tr>
<tr>
<td>Percentage of all calories from edible oil per capita</td>
<td>4.9</td>
<td>11.2</td>
<td>12.4</td>
</tr>
</tbody>
</table>

“Over 1.6 billion people in the world are overweight”
Price elasticities for demand of meat: Price policies are a great option!

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef</td>
<td>-.90</td>
<td>-1.04</td>
<td></td>
<td>-.49</td>
<td>-1.63</td>
</tr>
<tr>
<td>Pork</td>
<td>-.21</td>
<td>-.98</td>
<td>Livestock -.68</td>
<td>-.57</td>
<td>NA</td>
</tr>
<tr>
<td>Poultry</td>
<td>-.75</td>
<td>-.53</td>
<td></td>
<td>-1.07</td>
<td>-1.26</td>
</tr>
<tr>
<td>Fish</td>
<td>-.37</td>
<td>-.81</td>
<td>NA</td>
<td>-.34</td>
<td>-.17</td>
</tr>
</tbody>
</table>


“Over 1.6 billion people in the world are overweight”
Real world prices in 1990 US Dollars

- 100 kg Beef
- 1 MT Maize

AIDS Demand Models Various Sources Cited in Delgado & Courbois 1998
Increasing physical inactivity

- Shifts in the composition of occupations and the activity within each occupation
- Shifts in production at home: new assets, reduced time in all activities
- Shifts in the ways we travel
- Shifts in leisure

“Over 1.6 billion people in the world are overweight”
From Traditional to Modern Household Production
From Traditional to Modern Economic Work at Home
From Traditional to Modern Leisure
Shift in MET Hours per Week by Type of Activity
Among Chinese Women Aged 18-55

The Diabetes Prevention Programme

A randomized clinical trial testing several interventions to prevent type 2 diabetes in persons at high risk, which has been duplicated in four countries

“Over 1.6 billion people in the world are overweight”
Mean Weight Change

-8 -7 -6 -5 -4 -3 -2 -1 0 1

Weight change (kg)

00 . 511 . 522 . 533 . 54

Years from randomization

lifestyle  metformin  placebo
Foresight Obesity Project
Tackling Obesity: Future Choices

Led by Prof Sir David King, Government Chief Scientist

To produce a long term vision of how we can deliver a sustainable response to obesity in the UK over the next 40 years
Societal influences

Individual psychology

Biology

Food production

Food consumption

Individual activity

Activity environment

Food consumption

Food production

Biology
A £372m Investment in Tackling Obesity

**Children**
- National programme to **weigh and measure all 4 and 11 year olds**
- Ads for unhealthy food banned around children’s TV and other media

**Healthier Food**
- Widespread **front of pack labelling** on food in stores
- Powers to restrict proliferation of fast food restaurants near schools and parks
- Project to supply **fresh fruit and vegetables in stores in deprived areas**

**Physical Activity**
- Be Active, Be Healthy National Physical Activity Plan setting the goal of increasing activity in 2 million more adults by 2012
- £30m invested in nine 'Healthy Towns,' which lead the way in improving the built environment

**Incentives & Workplace**
- Business HealthCheck Tool to promote boardroom reporting of staff health and wellbeing; get 75% of large firms to sign up

**Personal Advice & Care**
- £66m in local allocations to support local action on overweight and obesity
- National contract of child weight management providers
- All adults aged 40-74 to have BMI assessed as part of vascular risks
And by leveraging wider policies and funding on prevention e.g. for children

**Schools**
- All schools have a **legal duty to promote pupils wellbeing**, including health
- School **assessment** takes account of wellbeing indicators
- The voluntary **Healthy Schools Programme** is very popular with heads: 98% of schools participate, 75% have been accredited

**Healthier Food**
- £650m 2005-11 to support **food in schools**
- Growing popularity of **breakfast clubs** as part of schools extended services
- **Cooking is compulsory** in primary schools

**Physical Activity**
- £783m 08-11 to support **PE/Sports Strategy** – 5 hours per week
- £235m 08-11 to create/regenerate **3,500 play spaces** in parks/public spaces
- **Cycling/school transport**

**Early Years**
- New national **Sure Start Children’s Centres** – one-stop shop for advice on parenting, health, childcare, employment (full network of 3,500 by spring 2010)
- Developing authoritative, evidence-based **messages on eating and active play for children under five**
- **Healthy Child Programme** for children under five
Existing Laws and Regulations

- The United Kingdom has banned TV commercials for less-healthy foods aimed at children under 16.
- France has a complete ban on such on less-healthy food commercials

“Over 1.6 billion people in the world are overweight”
Existing Laws and Regulations

Epode anti-obesity campaigns in small towns in France

- Information disseminated through public meetings, media coverage, posters, pamphlets
- Training for health professionals and teachers
- School and town activities that promote healthier eating and physical activity

“Over 1.6 billion people in the world are overweight”
“Over 1.6 billion people in the world are overweight”

Existing Laws, Regulations or Programmes

School bans on soft drinks, either by law or by agreement with companies, are in effect in some states of the United States and in Australia, France, UK, Greece, Iran, Japan, Malaysia, and New Zealand.

- Diet and sports drinks are allowed in some countries
- Juice is banned in a few countries, expansion expected
- Whole milk is being replaced with reduced fat milk (nonfat or 1%) in many countries
Existing Laws and Regulations

France requires that government nutrition messages are included in all food ads on TV

• Captions are used for food ads geared to adults and verbal announcement for ads aimed at children OR

• The company must pay the government 1.5% of the cost of advertising time, which the Government uses for educational messages on nutrition

“Over 1.6 billion people in the world are overweight”
The orientation of the agricultural-food sector may be the key to food policy

- In the 1880’s: First research stations on sugar were set up.
- Slow evolution of research, subsidies and funding but its underpinnings emerged over the 20th century
- In Japan, the Republic of Korea, Europe and the US, the big agricultural sector focused on basic staples and animal-source foods for economic well-being, nutrition, and employment. This approach continues across the globe
- Despite shifts and changes in trade and internal subsidies across the globe, the same orientation prevails

“Over 1.6 billion people in the world are overweight”
Economic Policies Might Work

- Examples show the potential
- However, there are no examples where taxing unhealthy foods show an effect on diet or other measures of health
- Taxes have been shown to reduce the consumption of tobacco

“Over 1.6 billion people in the world are overweight”
Mexico’s Initiative on Beverages

- In government programmes, Mexico has stopped using whole milk, uses only 1.5%-fat milk and will shift fully to skim milk.
- In schools, sugar-sweetened beverages are banned, safe drinking water is provided and the sale of water and low-fat milk is allowed.
- Mexico is considering taxing added sugars in beverages per gram and fat in milk.

“Over 1.6 billion people in the world are overweight.”
Over 1.6 billion people in the world are overweight.

US example: similar ones from Mexico and the UK now. Adult health significant improvement with a 10% change in the price of soda.

- Total Energy: -1.1
- Body Weight: -0.3
- HOMA-IR: -1.9

Source: Duffey et al, Archives of Internal Medicine, 2010

“Over 1.6 billion people in the world are overweight”
Consequences of China’s Accession to WTO

• China eliminated a quota and replaced it with a 10% tariff
• The production of edible oil began to compete with imports, the number of factories fell by half and a transition to modern huge factories in ongoing.
• Imports are still very important and expected to rise
• The decline in prices of edible oils will accelerate with imports
• These changes portend large increases in oil intake

“Over 1.6 billion people in the world are overweight”
Real prices of selected food items, China, 1991-2004

- Fatty pork price (yuan / kg)
- Cheapest plant oil price (yuan/ liter)
- Egg price (yuan / dozen)
- Common flour price (yuan / kg)
- Common rice price (yuan / kg)

Source: China Health and Nutrition Survey 1991 to 2004
The Global Food Industry

• The global food industry is **NOT** as omnipresent as believed. In almost all countries, at least 50-60% of all processed foods are locally produced.

• **The good**: Global producers have great technology, are willing to make changes and have the means to do so. But, there have not yet been major reductions of kcal.

• **The bad**: Without government regulations, truly meaningful agreements are not possible.

• **The ugly**: The multitude of local unfettered manufacturers or small regional distributors

“Over 1.6 billion people in the world are overweight”
Label on the Front of the Package

- There are a number of initiatives across the globe
- UK: traffic likes Generally good but some confusion
- Mexico: Choices International type of front logo-- being worked out under scientific and government leadership
- Europe (several countries such as Netherlands, Poland), Israel, India, other countries: Choices International is implemented partially or fully

“Over 1.6 billion people in the world are overweight”
Nutrition Criteria by Category

- **Nutrients that should be limited**: Total fat, saturated fat, trans-fat, added sugars and added sodium
- **Nutrients that should be promoted**: Whole grains (Europe, Mexico)
- **Food groups to promote**: Fruits, vegetables, whole grains, legumes, fat-free/low-fat dairy

“Over 1.6 billion people in the world are overweight”
“Over 1.6 billion people in the world are overweight”
Summary

- Concern of major increases in potentially obesity-promoting eating and drinking behaviors
- Concern continued increase, even acceleration of obesity among the poor
- Government actions are spotty and selective in most countries and many ignore this issue
- Food policy. Many major concerns but food policy too often ignores health and development concerns
- Food industry: focus typically is on the global multinationals. Need more research and understanding of the vast array of domestic companies

“Over 1.6 billion people in the world are overweight”