The Nutrition Transition and Global Food System Dynamics: The Accelerating Speed of Change and Global Challenges We Face for Creating a Healthier Global Diet

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Outline: Why Do We Need Large-Scale Changes to Improve Our Diets?

• **Introduction**: the nutrition transition and major mismatches: modern technology vs. inherited biological preferences

• **Physical activity**: a major concern but not the solution

• **The modern food system** and how it has shaped our diet

• **Major dietary shifts** of the past 2-3 decades

• **Regulatory and tax options**: global lessons from Chile and Mexico

• Chile may be the first country to reverse obesity and all the diet and obesity-related NCDs, but there are key gaps to fill.
Core biochemical and physiologic processes have been preserved from those who appeared in Africa between 100,000 and 50,000 years ago.

### Mismatch: Biology which has evolved over the millennia clashes with modern technology

<table>
<thead>
<tr>
<th>Biology Evolved Over 100,000 Years</th>
<th>Modern Technology has taken advantage of this biology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweet preferences</td>
<td>Cheap caloric sweeteners, food processing create habituation to sweetness</td>
</tr>
<tr>
<td>Thirst, hunger/satiety mechanisms not linked</td>
<td>Caloric beverage revolution, sweetening of beverages consumed</td>
</tr>
<tr>
<td>Fatty food preference</td>
<td>Edible oil revolution — high yield oilseeds, cheap removal of oils, modern processed food/restaurant sector</td>
</tr>
<tr>
<td>Desire to eliminate exertion</td>
<td>Technology in all phases of work and movement reduce energy expenditure, enhance sedentarianism</td>
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</tbody>
</table>
Stages of the Nutrition Transition

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

Pattern 1
Collecting Food
- Diverse wild plants & animal food diet
- Drink water
- Labor-intensive

Lean & robust, tall, high disease rate
Low fertility, low life expectancy

Pattern 2
Famine
- Monoculture ag.
- Cereals dominate diet
- Drink water
- Labor-intensive

Nutritional deficiencies emerge, stature declines
High fertility, high MCH mortality, low life expectancy

Pattern 3
Receding Famine
- Starchy, low variety, low fat, high fiber diet
- Drink water
- Labor-intensive work/leisure

MCH deficiencies, weaning disease, stunting
Slow mortality decline

Pattern 4
Chronic Disease (NCD's)
- Increased fat, sugar, processed foods diet
- Drink sugary beverages, juices
- Shift in technology of work and leisure
- Sedentarianism high

Obesity & NR-NCD emerge, and medical cures keep us alive
Accelerated life expectancy, shift to increased NR-NCD, increased % disability years

Pattern 5
Behavioral Change
- Reduced refined carbs, sugar
- Unhealthy fats ↓, increased fruit, veg, whole grains, legumes
- Drink water, low kcal bev.
- Replace sedentarianism with purposeful increases in activity

Reduced body fatness & NR-NCD’s, improved disease prevention
Extended healthy aging, reduced NR-NCD

Source: © (copyright) Barry M. Popkin, 2015
The Struggle Over the Millennia to Eliminate Arduous Effort Could Not Foresee Modern Technology
US Adults MET-hours/Week of All Physical Activity, and Hours/Week of Time in Sedentary Behavior: Measured for 1965-2009 and Forecasted for 2010-2030

Source: Ng S.W. & Popkin B.M. Time use and physical activity: A shift away from movement across the globe. Obesity Reviews 13 (8):659-80
**Chinese Adults** Met-hours/Week of Physical Activity & Hours/Week of Time in Sedentary Behavior: Measured for 1991-2009 and Forecasted for 2010-2030

![Graph showing changes in physical activity and sedentary behavior from 1991 to 2030 for Chinese adults.](image)

- **1991:** 399 MET-hr/week
- **2009:** 213 MET-hr/week
- **Forecasted by 2020:** 200 MET-hr/week
- **Forecasted by 2030:** 188 MET-hr/week

Source: Ng S.W. & Popkin B.M. Time use and physical activity: A shift away from movement across the globe *Obesity Reviews* 13 (8):659-80
Global TV Viewing Time of Adults

Source: Ng S.W. & Popkin B.M. Time use and physical activity: A shift away from movement across the globe *Obesity Reviews* 13 (8):659-80
Physical Activity: A Major Cause, Not a Solution

- Our work in China and elsewhere has convinced me that a major component of global obesity increase is linked with reduced physical activity at work, home, and transport along with increased sedentarianism.

- At the same time we cannot turn back the clock on technology at work, home, transportation, leisure.

- Thus the need is to create new activity—marginal gains at work and home, but major increased activity must come from purposeful recreational movement, energy expenditure. Very hard to offset modern diets’ effects.
Diet: Major Conflict among Diet People

- Most dietary guidelines focus on increased produce, whole grains, minimal red meat, healthy fats, more plant food.
- Monteiro, PAHO guidelines, others pushing the same, possibly could interpret PREDIMED results similarly as a push for minimally or unprocessed food-based diet.
- The reality: the enormous rapid shift in our food system discussed next runs completely counter to these pushes.
- Unanswered question: Can we have any type of highly processed foods as part of a healthy diet? Or does such a diet with excessive highly processed food even exist?
- All this is being played out in nutrient profiling and FOP policies will note later but seeing negative and positive logos as separate but joint efforts emerging finally to address both sides of this issue—remove junk food, promote truly healthy food.
What is driving our increased obesity globally

• The modern agricultural and entire food system has changed remarkably not only in the US and higher income countries but globally.

• Every village, location in the world now faces many of the same packaged and processed junk foods and beverages
**Stages of Modern Global Agricultural and Food System’s Development**

**Stage 1**
1800’s mainly scientific underpinnings
- Science and institution building
- Fossil energy, modern genetics, fertilizer, beginning agricultural science and experimental work, & land grant/agricultural universities
- Farming remains the major source of the food supply; industrial/large-scale monoculture initiated

**Stage 2**
1900-1944
- Expansion of science; develop reaper; many other technologies
- Farming systems developed; underpinnings post WWII revolution added modernization of agricultural production inputs and machinery

**Stage 3**
Post WWII massive investments modern system
- Create the modern food system focused on staples, animal source foods, and cash crops
- Extensive funding for major infrastructure, systems, input and enhanced seeds, and major technology development

**Stage 4**
Systematically transmitted globally (1955-2008)
- Farm research, extension systems, and education mirror those of the West
- High income countries see rapid mechanization; development of new food processing technologies (e.g. extraction of edible oils from oilseeds); and investment in transportation/irrigation/electrification/modernization of agriculture

**Stage 5**
Commercial sector shifts major drivers of system change (present)
- Retailers, agricultural input & processing, businesses, and food manufacturers dominate farm-level decision-making
- Food industry farm links drive production and marketing decisions, incentives and economic drivers change
- Production linked to the needs of food manufacturers and retailers, ignoring climate, sustainability, and health concerns

**Stage 6**
Healthier food supply
- Investments in infrastructure and training
- Reduced noncommunicable diseases, reduced climate footprint, achieve total sustainability, fewer animal source foods consumed

**Source:** © (copyright) Barry M. Popkin, 2015
Major Food System Changes

Occurred Different Times, Similar Now

Four big players drive food and agricultural systems in LMICs and the US:
(agricultural economists have documented)

- Global agribusinesses
- Retailers
- Food manufacturers
- Large restaurant chains

- Trend in disappearing fresh markets being replaced by small stalls, convenience stores and supermarkets → all selling ultra-processed foods and beverages

- **Mexico and China:** packaged foods with bar codes based on nationally representative 24-hour recalls surveys with questions probing this issue
  - **58% of kcal Mexico in 2012** and **29% in China in 2011** (growing by 50%/year)

- **Latin America/Gulf states:** first major growth, now Asia and urban Africa; high penetration into all African and Middle East communities now

- Major shifts in types of foods and integrated marketing strategies used by food industry sectors across global regions with Latin America being penetrated most completely and earlier than Africa and Asia

Retail Sector and Processed Foods are a Post-WWII Phenomena: The Mega Chains and Global Growth

- **Walmart**: completely post-WWII phenomena with all growth from 1970 onwards
- **Carrefour**: 1960’s onward
- **Ahold**: (began as Albert Heijn) and expanded in early 1900’s, as did Tesco with basic foods.
- Most major growth as chains occurred after WWII
- Our focus is not only on these global chains but all the domestic clones across the globe in low and middle income countries
- Packaged processed food growth, especially highly or ultra-processed food is mainly a recent phenomena of the last 30-50 years with modern food science and related food manufacturer revolution.
Evolution of Human Experience with Food

- Old and accumulative process
- Increase penetration of the matter
- From domestic & artisanal to industrial

Butchering, smoking & drying of meats
Pounding, grinding, roasting, wetting, boiling, fermenting of seeds and acorns
Granaries, agriculture, husbandry, pottery
Large granaries
Mass production of oil, salt & sugar
Pasteurization, canning, roller mills

By Jean-Claude Moubarac

Paleolithic
2 mya
300 000 BC
Neolithic
12 000 - 2000 BC
First States
Industrial
1780
Post-war/global
1950-2013

From Jean-Claude Moubarac
- Income
- Culture
- Market-Based Food Systems
• Income
• Modernity
• Convenience
## Degree of processing: Classification

<table>
<thead>
<tr>
<th>Category</th>
<th>Definition</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unprocessed/minimally processed</td>
<td>Single foods, no/very slight modifications</td>
<td>Fresh or frozen produce, milk, eggs, fresh meat</td>
</tr>
<tr>
<td>Basic processed</td>
<td>Single foods, processed – A) isolated food components or B) modified by preservation methods</td>
<td>Sugar, oil, flour, pasta, white rice, unsweetened canned fruit, veggies canned without salt</td>
</tr>
<tr>
<td>Moderately processed</td>
<td>Single foods with addition of flavor additives</td>
<td>Salted nuts, fruit canned in syrup, veggies canned with added salt, whole-grain breads/cereals with no added sugar</td>
</tr>
<tr>
<td>Highly processed</td>
<td>Multi-ingredient industrially formulated mixtures</td>
<td>Refined-grain breads, cookies, sugar-sweetened beverages, salty snacks, candy, ready-to-eat cereal, ketchup, margarine, pre-prepared mixed dishes</td>
</tr>
</tbody>
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## Convenience classification

<table>
<thead>
<tr>
<th>Category</th>
<th>Definition</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Requires cooking and/or preparation</td>
<td>Not consumed as purchased, requires significant input of consumer’s time, culinary skill, energy, or attention to cook/prepare</td>
<td>Flour, dry pasta or rice, oil, eggs, fresh potatoes, uncooked meat, mixes for grain-based desserts or pancakes, some fresh veggies</td>
</tr>
<tr>
<td>Ready-to-heat (RTH)</td>
<td>Not consumed as purchased, requires only a small amount of consumer’s time or effort during prep (e.g., by microwaving)</td>
<td>Frozen dinners or pizza, frozen waffles, canned soup, hot dogs, instant oatmeal, canned or frozen vegetables</td>
</tr>
<tr>
<td>Ready-to-eat (RTE)</td>
<td>Can be consumed immediately with no preparation</td>
<td>Bread, salty snacks, milk, candy, pre-made cookies, most fresh fruit, canned fruit, baby carrots, sugar-sweetened beverages, ready-to-drink beverages</td>
</tr>
</tbody>
</table>
Trends in CPG Food and Beverage Purchases by Degree of Processing (1.4 million barcoded products)

Nationally representative weighted unadjusted mean kcal/d per person and % kcal/d of food and beverage purchases from each category defined by degree of processing or convenience among US households.

Trends in CPG food and Beverage Purchases by Level of Convenience (1.4 million barcoded products)

Nationally representative weighted unadjusted mean kcal/d per person and % kcal/d of food and beverage purchases from each category defined by degree of processing or convenience among US households.

Sources of Major Global Dietary Shifts

Global increases in:

• Use of added caloric sweeteners, especially beverages but increasingly all packaged foods consumed
• Refined carbohydrates, ultra-refined highly processed foods.
• Animal source foods
• Convenience foods for snacking, away-from-home eating, precooked/uncooked ready-to-heat food
• Large increase in edible oil used to fry foods (unique to LMICs)

Global decreases in:

• Legumes, vegetables, fruits in most countries
• Food preparation time
First Major Global Shift: Sweetness, Added Sugars

- Always loved sweetness and as fruit provided unique source of nutrients.
- Mattes, Rolls others showed the way on what we drink affects us differently than sugar in food.
- Amount of added sugar in our food supply is surprising—not only for taste but also other properties.
The Proportion of CPG Products with Unique Formulations by Weight Containing Any Sweeteners in the United States (nationally representative sample of food purchases)

Second, Snacking: Chinese Snacking Is an Example of the Role of Marketing, Modern Food Systems

a. Ages 2-18

- Rural
- Small Cities
- Large Cities
- Mega-Cities

b. Ages 19-59

- Rural
- Small Cities
- Large Cities
- Mega-Cities

c. Ages 60+

- Rural
- Small Cities
- Large Cities
- Mega-Cities
Fat Preference Key for Survival: Technology, Marketing Have Utilized This Preference for Fatty Food
Third Major Shift: Fatty Foods and Edible Oils in Particular, Unsure of Weight and Health Effects

- Fatty foods: smoother, affects taste in many ways
- Shifts largest in Africa, Middle East and Asia but also in the Americas
- Oils have and will continue to face many challenges regarding trans fat content (e.g. India’s Vanaspati; possibly palm oil) and unhealthful fatty acid components
- Possibly the biggest early caloric driver in the developing world, but rapidly being replaced by SSB’s, junk food
**Vegetable Oils: The Third Leg**
Edible Oil Consumption Still Rising in China and the Proportion of Fried Food Is Rapidly Rising
(Grams per Day per Capita)

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<tbody>
<tr>
<td>Poorest (lowest income tertile)</td>
<td>11.8</td>
<td>19.4</td>
<td>26.5</td>
<td>30.8</td>
<td>37.9</td>
</tr>
<tr>
<td>Middle income tertile</td>
<td>15</td>
<td>22.4</td>
<td>29</td>
<td>35.4</td>
<td>39.2</td>
</tr>
<tr>
<td>Richest (highest income tertile)</td>
<td>17.4</td>
<td>26.9</td>
<td>32.2</td>
<td>33.9</td>
<td>41.1</td>
</tr>
<tr>
<td>Average for total adult population</td>
<td>14.8</td>
<td>22.9</td>
<td>29.2</td>
<td>33.4</td>
<td>39.6</td>
</tr>
<tr>
<td>% of all calories per capita from edible oil</td>
<td>4.9</td>
<td>7.8</td>
<td>11.3</td>
<td>13.2</td>
<td>15.4</td>
</tr>
</tbody>
</table>

Oil added during cooking of rice can retrograde the rice and significantly decrease the glycemic index
Fourth Major Shift: Daily Intake of Animal Source Foods in China (Grams/day), 1991-2009*

A. Children Aged 2-18
B. Adults Aged 19 and Older

*Adjusted for age and gender Megacities: Beijing, Shanghai, Chongqing

Fifth major shift: Eating Away from Home Is Associated with Urbanization in China, Most Other Low- and Middle-Income Countries

Percentage kcal eating away from home

- Low Urbanization
- Middle Urbanization
- High Urbanization
- 3 mega cities


Total Caloric Intake Is a Combination of Three Components

- Total caloric intake = f(Meal Size(G) x Eating Frequency(#) x energy density of the meal (kcal/g))
- Meal sizes ↑: US, UK, Germany, other countries
- Eating Frequency ↑↑: large increase documented in few countries, seeing new global increases. Snacks are significantly greater energy density
- Energy density ↑↓: biggest shift toward higher number & size snacks of higher energy density and excessive added sugar and refined carbs; caloric beverages increased also in total volume with comparable results for children

Mathematical Decomposition of the Change in Total Calorie Intake

• Use classic total derivative approach by creating partial derivatives for each component and using them to create total derivative

• Major finding was that the increases in energy intake in the last century were driven more by increased eating frequency than meal portion size (note we looked at total meal portion size and not one dish).
Annualized Energy Contribution of Portion Size, Energy Density, and Eating Occasions to Changes in Total Energy Intake*

*Values represent the annualized energy (kcal) contribution of changes in the number of eating occasions, portion size or energy density of each eating occasion to changes in total daily energy (kcal) intake.

Nationally representative data. Duffey & Popkin (2011) Plos Medicine
Sodium Intake

China and many low and middle income countries: Sodium intake from salt continues to dominate. The proportions of sodium from processed food and MSG small in absolute terms, but increasing. No solid data from Latin America and Africa.

What Does All This Mean for Global Obesity?

1. Adult obesity precedes child obesity: conjecture relates to the rapid decline in adult activity along with the more recent food system shifts

2. Rightward shift in BMI at all ages—age-period-cohort and other research suggests 8-10 kg increase over past 10-20 years (e.g. Jaacks et al, IJE 42:828-837)

3. Waist circumference at each BMI level is increasing

4. Remember much higher body fat proportion, visceral fat among many LMIC subpopulations. Also increased NCD susceptibility at lower BMI’s
Waist Circumferences Are Going up Globally at the Same BMI, for most countries globally.  Just one example for Hispanic Women (mean WC over time for females aged 20 years and BMI=25 kg/m$^2$)

- $6.6 \text{ cm}$
- $2.0 \text{ cm}$

**•** $p<0.0001$, comparing predicted WC in most recent survey year to predicted WC in earlier survey year for Mexican women and Mexican-American women.

**•** All models adjusted for age, BMI, BMI-squared, and survey year in linear regression analyses.

**•** Age centered to age 20 years and BMI centered to BMI=25 kg/m2

Diabetes Prevalence Is Higher at Each BMI level for US Mexican Americans and US Non-Hispanic Blacks, Despite Adjustment for Socioeconomic and Demographic Factors

* \( p < 0.05 \), compares diabetes prevalence among non-Hispanic blacks and Mexican-Americans to non-Hispanic white referent group within BMI categories and within survey years

Source: Albrecht, Mayer-Davis and Popkin (2017) from nationally representative NHANES data
Regional Percent Underweight and Overweight in Most Recent Available Survey among Women Aged 19-49 by Urban and Rural Residence, Weighted by 2010 Population

<table>
<thead>
<tr>
<th>Region</th>
<th>Rural Underweight</th>
<th>Rural Overweight</th>
<th>Urban Underweight</th>
<th>Urban Overweight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-Saharan Africa</td>
<td>14</td>
<td>28</td>
<td>3</td>
<td>24</td>
</tr>
<tr>
<td>East Asia and Pacific</td>
<td>7</td>
<td>3</td>
<td>9</td>
<td>24</td>
</tr>
<tr>
<td>Eastern Europe and Central Asia</td>
<td>3</td>
<td>50</td>
<td>3</td>
<td>52</td>
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<tr>
<td>Latin America and the Caribbean</td>
<td>4</td>
<td>50</td>
<td>3</td>
<td>52</td>
</tr>
<tr>
<td>Middle East and North Africa</td>
<td>2</td>
<td>64</td>
<td>1</td>
<td>76</td>
</tr>
<tr>
<td>South Asia</td>
<td>9</td>
<td>22</td>
<td>27</td>
<td>33</td>
</tr>
</tbody>
</table>

Source: Jaacks and Popkin, J Nutr 2015
Sample size: 290,278 rural, 232,581 urban
Regional Annualized Change Absolute Change in Percent Underweight and Overweight in the Most Recent Period in Percent Underweight and Overweight among Women Aged 19-49 by Urban and Rural Residence, Weighted by 2010 Population

Source: Jaacks and Popkin, J Nutr 2015
The Focus is on Food system And Dietary Change

• Major Tools considered to date for obesity prevention at the macro/regulatory level:
  – Economic tools: prices(taxation), subsidies?, trade controls?
  – Labeling: FOP labeling approaches being used; considering claims restrictions-ideally linked with marketing controls
  – Marketing controls and restrictions: kids only vs overall
  – Restrict foods in selected institutions(e.g. schools, hospitals, etc) but really minimal evidence in any country of major impact of major feeding changes and their impact (especially LMIC’s)

• Other aspects of our food system not addressed to date:
  – Retailer change only via changes noted above to date
  – Neglect of restaurant/fast food/stall sector
  – Other farm system/sector changes: no sense of potential impact.
  – To date, know traditional nutrition education efforts small, not possible without major marketing controls, but no sense of modern mass media/social media efforts.
Our ultimate goal: How to use multiple approaches to change BOTH supply and demand?

Spectrum of approaches for changing behaviors

- Fiscal Measures (e.g., tax)
- Marketing/ advertising controls/FOP
- Labeling regs: Menu, Package
- Food service & other regulations
- Industry’s voluntary efforts
- Social marketing/ nutrition education
- Modify choice architecture
- Cultural/ societal norms for healthy eating

Behaviors (measurable) as proxies for norms (non-measurable)

Effectiveness potential (at population level)

Individuals, communities, food manufacturers, retailers, food service, policymakers, regulatory agencies all have roles to play but to date little evidence industry will play a significant role without regulatory efforts

From Shu Wen Ng
Mexico: History All Linked to National Institute of Public Health

- Mexican Beverage panel 2007-8: recommended taxing sugary beverages; got all medical societies to sign on and publish document
- Series of meetings on ways to reduce added sugar, bad fats, sodium
- National Prevention Plan
- Front-of-the-package profiling: MOH, MinFinance, Mex FDA — I chaired
- New elections, new President, Min of Health with strong industry ties and Bloomberg involvement with major public campaign
- 2 taxes instituted, fought off attempts to cut, constant battles with industry over SSB tax. Surprisingly little over junk food tax.
Campaign Strategy

- **Media strategy**: Create public debate through press conferences (1xweek), public actions/performances (1xmonth) and newspaper ads (2xweek in Oct.)

- **Engagement with decision-makers and lobbying**:
  - Actor mapping
  - Identification of champion(s)
  - Relationship building across parties, ministries and Congressional committees
  - Mini public campaign targeting Congress
  - Tracking industry lobbying (responding or exposing as necessary)

- **International support**: WHO recommendations, PAHO, IASO/IOTF and other allied INGO’s, health advocates in the US
The Mexican SSB Tax Timeline

- **NEW PRESIDENT TAKES OFFICES**
- **COLLECT SIGNATORIES TO SSB TAX BILL**
- **SSB TAX BILL INTRODUCED IN SENATE – “TABLED” UNTIL FISCAL REFORM**
- **ACADEMIA LAUNCH OF POLICY RECOM’S**
- **OBESIDAD-MEXICO**
- **KEY DIALOGUE WITH MINISTRY OF FINANCE**
- **INTENSE LOBBYING**
- **PEÑA NIETO ANNOUNCES SODA TAX IN FISCAL REFORM**
- **SSB TAX PASSED**

**CAMPAIGNS**
- “FIRST CAME OBESITY, THEN DIABETES”
- “12 SPOONFULS OF SUGAR”
- “A HEALTHIER MEXICO”
- “SUGARY DRINKS”
- “WATER IS LIFE”

**INDUSTRY CAMPAIGNS**

**COALITION BUILDING**

**EARNED MEDIA**

**EXPERT FORUMS**
The Mexican tax: Leading the Way So Far and Used to Build Basis for Taxes in Many Countries, Cities

- **Passed Oct 31, 2013**
- **Sugar-sweetened beverages (SSB):** All flavored waters (including concentrates, powders or syrups used to prepare flavored waters) that have added sugars will be subject to a tax of $ one peso per liter. (≈10%)
- **Junk food:** All non-basic foods (chips and snacks; candies; chocolate and cacao based products; puddings; fruit-made and vegetable-made sweets; peanut and hazelnut butters; milk and caramel-based sweets; cereal-based products; ice-cream and ice-pops) with an energy density ≥275kcal/100g will be subject to a tax of 8%.
The Mexican Tax: Leading the Way So Far

- Evaluation of price, marketing, food purchase shifts underway led by INSP with UNC major collaboration
- To date, price increases are being passed along.
- First year of taxes saw overall 6% decline, with 12% by month 12.
  - Lowest SES group (most affected by diabetes that is untreated) saw a 17% decline.
  - Water purchases significantly increased.
- Year 2 Found an additional 4% decline
- Nonessential food taxes equally impactful in similar fashion with a much larger year 2 decline (4.4% in first year, 16.6% in second year).
- Fought off repeated industry legal, political and extralegal efforts to stop these efforts
Chile’s Laws: Marketing to Children

- Chile has the most comprehensive set of marketing restrictions to date → evaluating their impact will be crucial for learning what is working to create healthier eating patterns.
Chile Law Evaluation: UNC Working with Strong University of Chile Collaborators

Strengths: 2015-16 TV where kids 22% or more of audience
- Applies to all foods and beverages and uses uniform nutrition criteria across categories
- Includes comprehensive in-school restrictions.
- Restricts all characters on food packages deemed unhealthy based on a very comprehensive set of guidelines
- Strong negative logos on junk foods/beverages high in added sodium, added sugar, added saturated fats, energy density (separate for each) (junk food—about 50% of what retailers sell)

Strengths: new law 2017 and implementation guidelines ban 6am to 10pm
- Builds on current law and adds total ban during those hours
- Adds negative warning message to any media with ads for foods and beverages with negative logos.

Planning: year later mega possibly 18% tax on all banned food-bev—still unclear.
Chile Regulatory and Tax Evaluation: INTA and GFRP UNC

**Regulations**
- 5% Sugar-sweetened beverages tax
  - Jan 1, 2015
- Front-of-package warning labeling
  - July 1, 2016
- Marketing & Advertising Restrictions
  - children 0-14y
    - July 1, 2016
  - all ages 6am to 10pm
    - July 1, 2017

**Data sources**
- Focus groups of Low SES mothers
- Household Food Purchases
- Nutrition Facts Panel and FOP labels
- SES, Media Exposure, and Diet
  - GOCCs cohort of 12y-olds, n=767, additional diet and media
  - New cohort of 4y-olds, n=965
  - SES and diet
  - Media
  - Knowledge
  - Attitudes
- Content analysis of TV

**Outcomes Analysis**
- Changes in attitude, knowledge, and understanding of regulations
- Food Purchases
  - Changes in regulated and unregulated food and beverage purchases; reformulation changes
- Dietary Intake
  - Changes in regulated and unregulated dietary intake
- Obesity & NCDs
  - Changes in health outcomes
The Future: Large series of countries globally instituted or seeking similar tax and other regulatory changes

- SSB taxes: Pacific & Caribbean Islands, S Africa, Thailand, Phil., others
- Except Chile and Mexico—no exploration of other taxes
- Will reducing junk food/beverages be enough? I doubt it
- Marketing/FOP: Chile the leader, others are following
- FOP: few countries combining negative Argentinean with push for Keyhole/choices type real healthy food
- Ultimately we must figure a way to get to a healthy diet to truly succeed.
Our Goal is to find a way to create effective public health nutrition efforts and policies in our initiatives.

**Short-term outcomes**
Changes in food purchases or diets (overall, by subpops)

**Longer-term outcomes**
Changes in health outcomes (overall, by subpops)

Focus on packaged food sector and need to expand ultimately

From Shu Wen Ng
Our ultimate goal: How to use multiple approaches to change BOTH supply and demand?

Effectiveness potential (at population level)

- Fiscal Measures (e.g., tax)
- Marketing/advertising controls/FOP
- Food service & other regulations
- Labeling regs: Menu, Package
- Industry’s voluntary efforts
- Social marketing/nutrition education
- Modify choice architecture

Cultural/societal norms for healthy eating Behaviors
(measurable) as proxies for norms (non-measurable)

Gov’t led

Individuals, communities, food manufacturers, retailers, food service, policymakers, regulatory agencies all have roles to play but to date little evidence they will without regulatory efforts

From Shu Wen
The Struggle Over the Millennia to Eliminate Arduous Effort Could Not Foresee Modern Technology