

# The global context for Chilean actions to create a healthier diet and reverse the nutrition-related noncommunicable disease epidemic

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**Barry Popkin**

W. R. Kenan, Jr. Distinguished University Professor  
Department of Nutrition  
Gillings School of Global Public Health  
School of Medicine  
Department of Economics  
*The University of North Carolina at Chapel Hill*



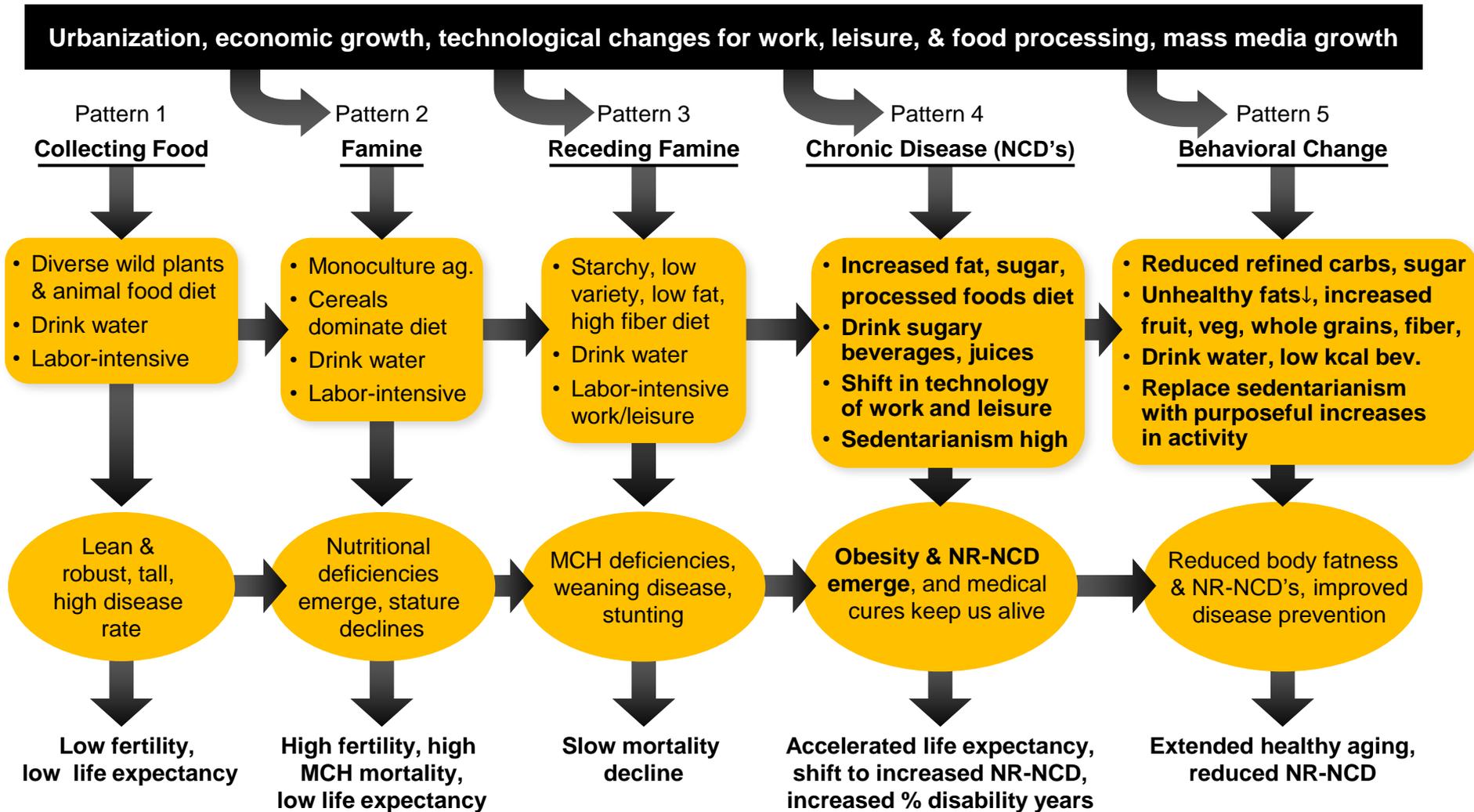
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# Outline: Why do we need large-scale changes to improve our diets?

- **Introduction:** 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.**

# Stages of the Nutrition Transition



# Role of Our History

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

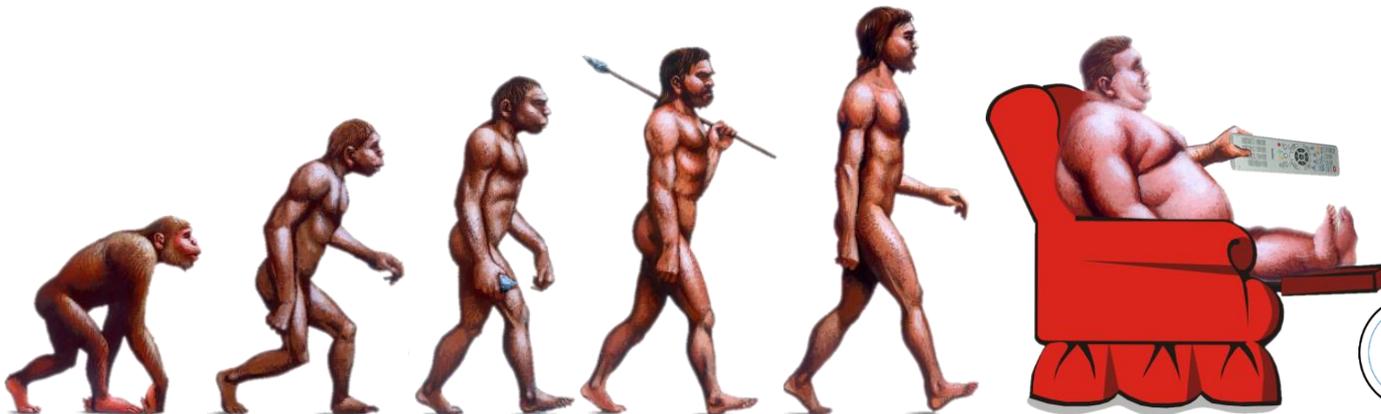
Core biochemical and physiologic processes have been preserved from those who appeared in Africa between 100,000 and 50,000 years ago.

| <b>Biology Evolved Over 100,000 Thousand Years</b>  | <b>Modern Technology has taken advantage of this biology</b>                                                |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| <b>Sweet preferences</b>                            | Cheap caloric sweeteners, food processing create habituation to sweetness                                   |
| <b>Thirst, hunger/satiety mechanisms not linked</b> | Caloric beverage revolution                                                                                 |
| <b>Fatty food preference</b>                        | Edible oil revolution — high yield oilseeds, cheap removal of oils, modern processed food/restaurant sector |
| <b>Desire to eliminate exertion</b>                 | Technology in all phases of work and movement reduce energy expenditure, enhance sedentarianism             |

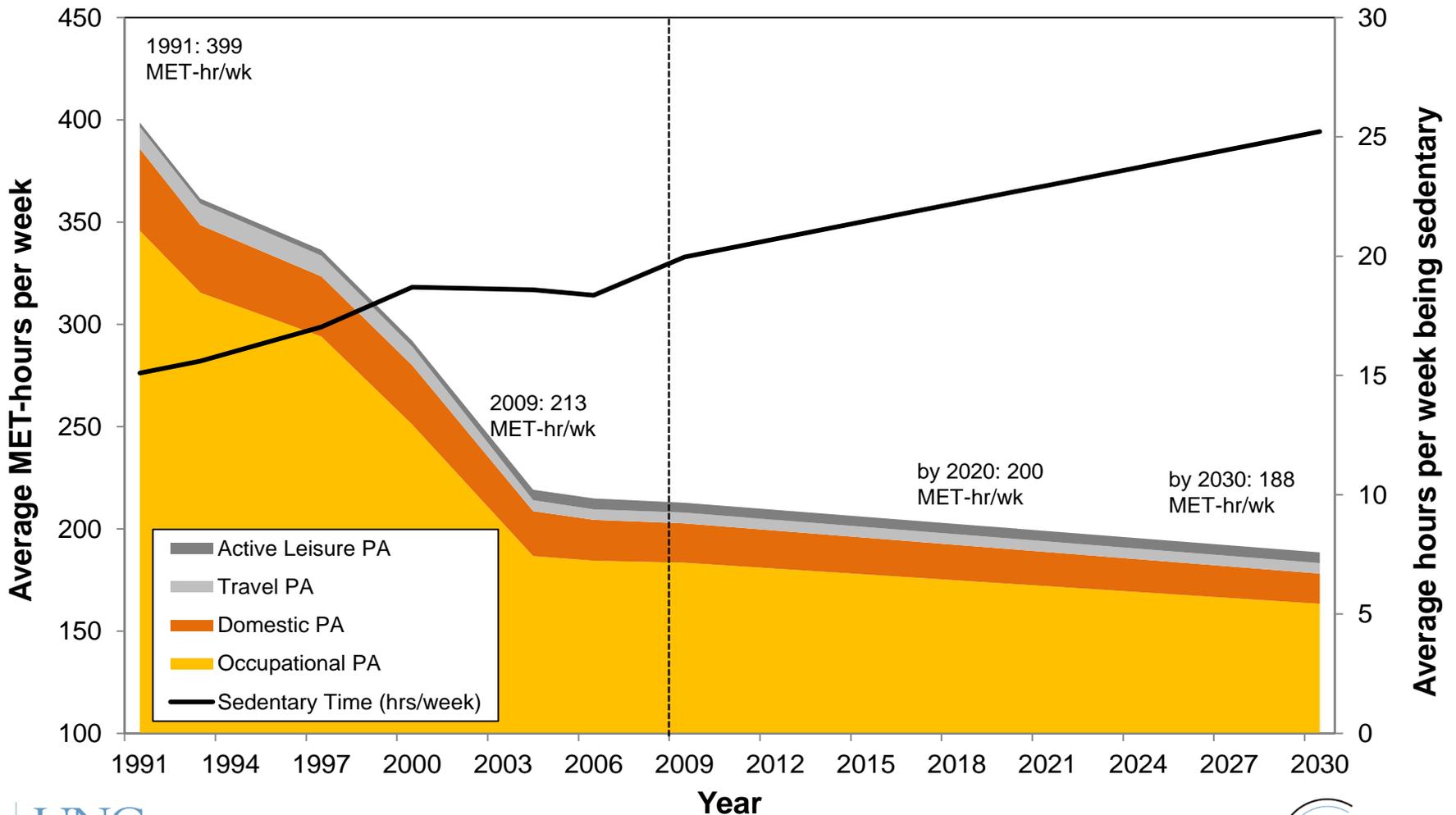




**The struggle over millennia to eliminate arduous effort could not foresee modern technology**



# Chinese Adults MET-hours/week of all physical activity, and hours/week of time in sedentary behavior: measured for 1991-2009 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

# Physical Activity: A major cause, not a solution

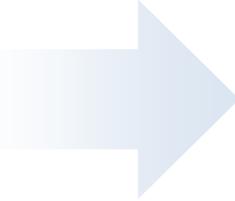
- Our work in China and elsewhere has convinced me that a major component of global obesity increase is linked with reduced physical activity at work, home, and transport along with increased sedentarianism
- At the same time, we cannot turn back the clock on technology at work, home, transportation, 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.



# 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



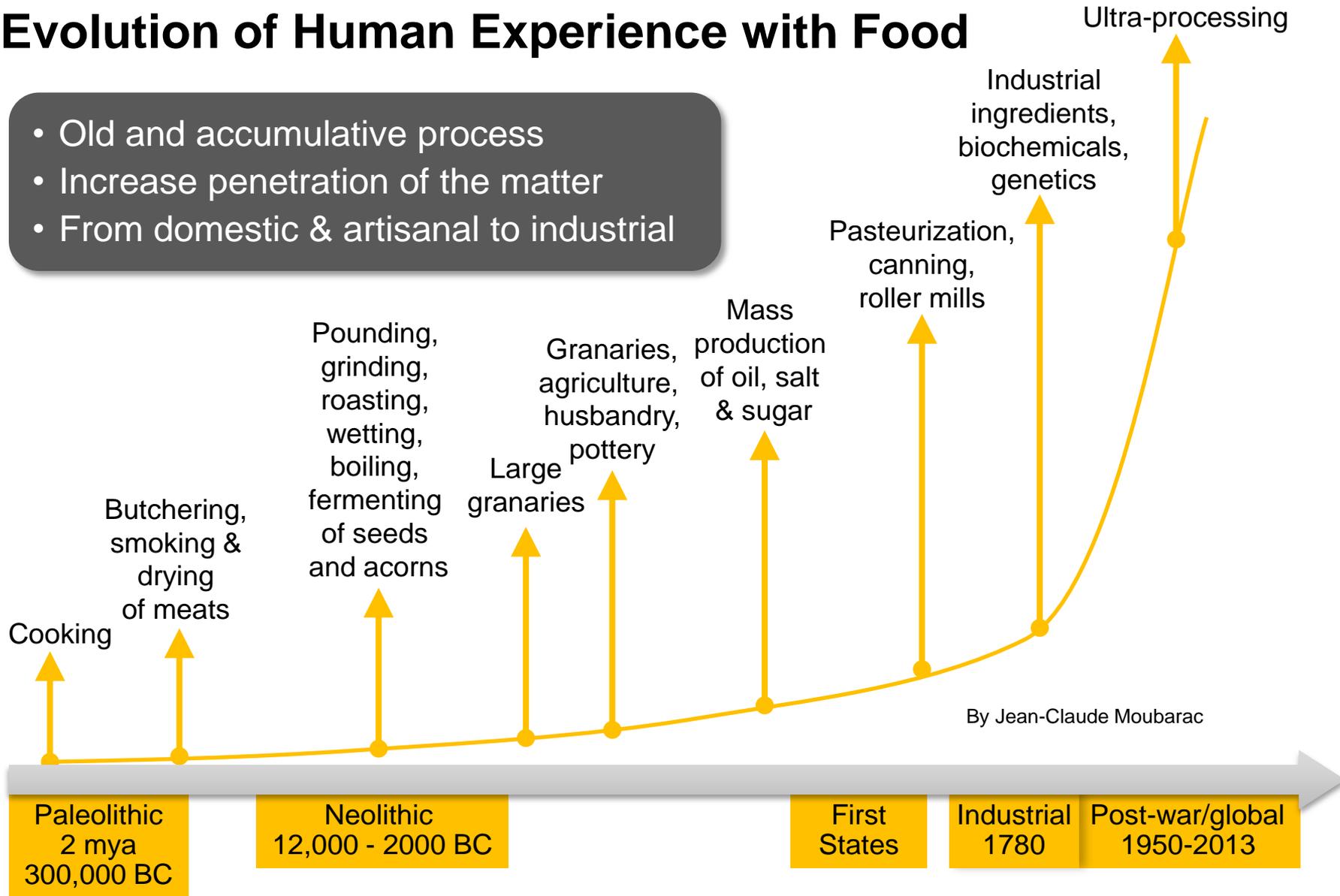
# Retail sector and processed foods are a post-WWII phenomena: The mega chains and global growth

- **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
- 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





- Income
- Culture
- Market-Based Food Systems





- Income
- Modernity
- Convenience



# Degree of processing: Classification

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



Poti J, et al.  
*Am J Clin Nutr* 2015.

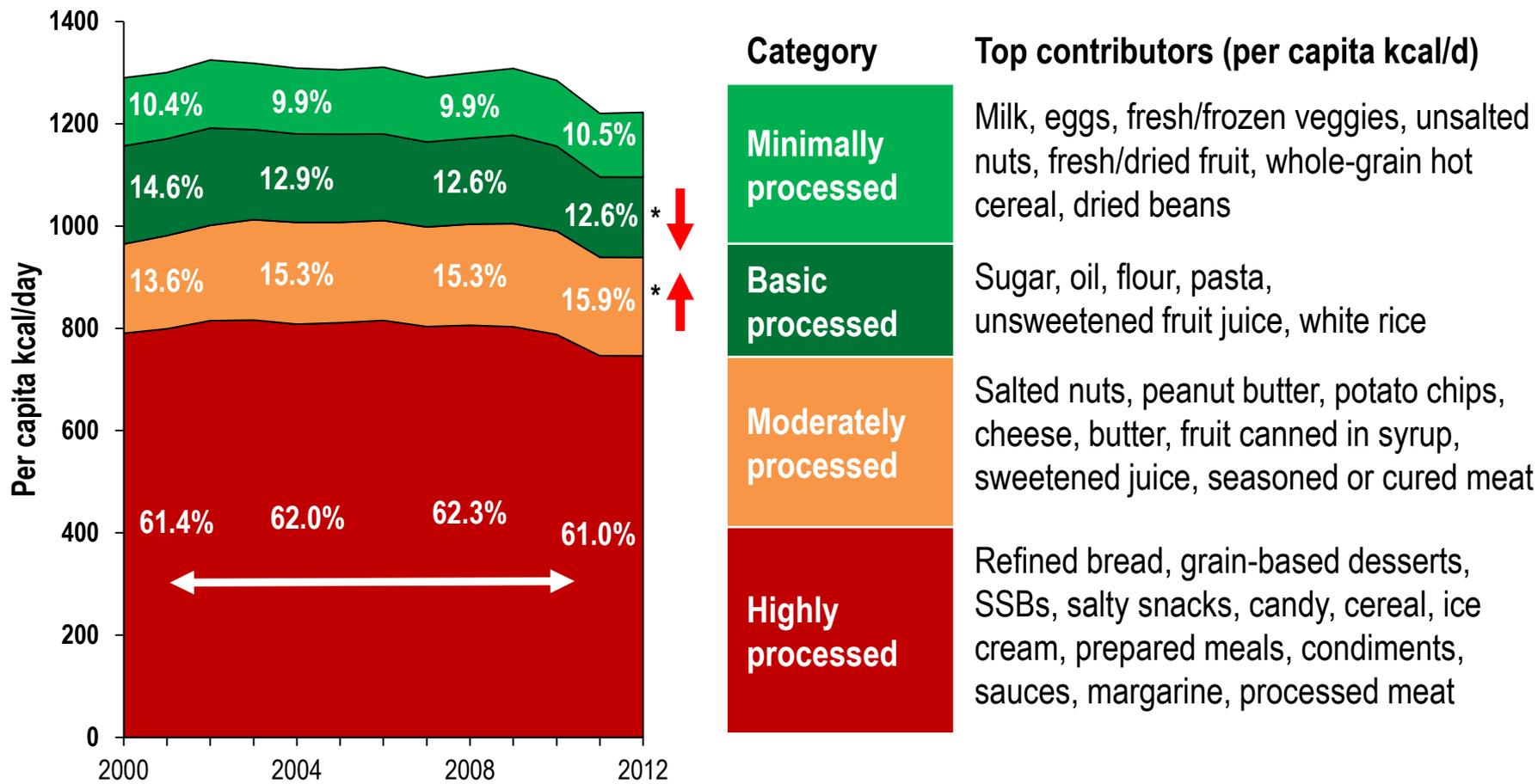


# Convenience classification

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



# Trends in CPG food and beverage purchases by degree of processing (1.4 million barcoded products)

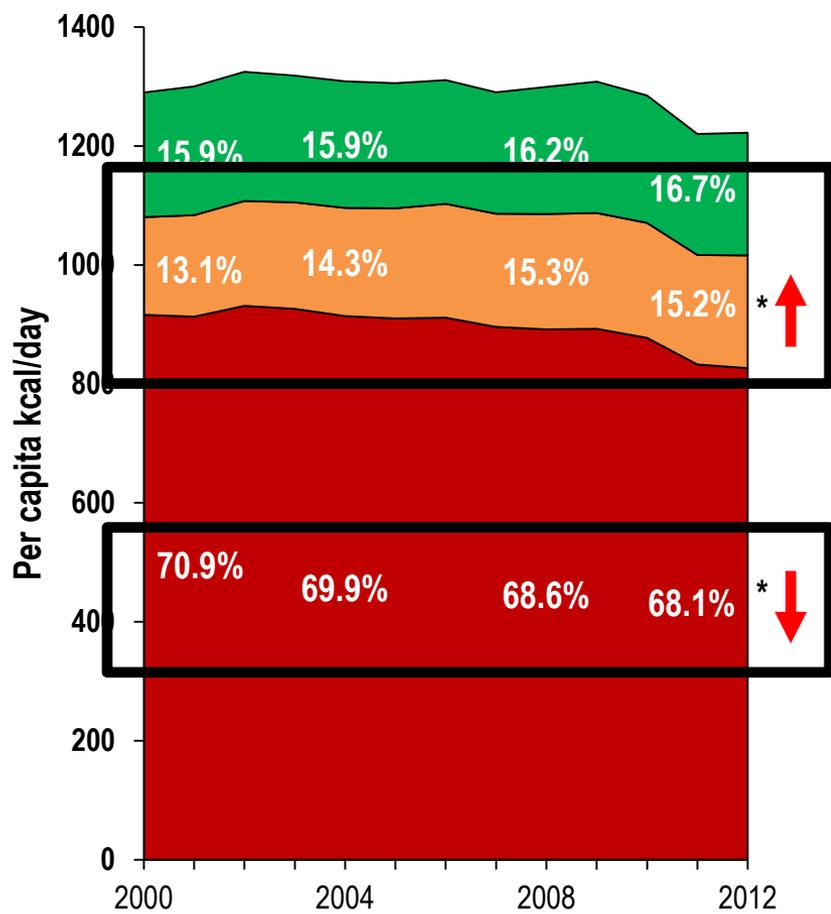


| Category             | Top contributors (per capita kcal/d)                                                                                                             |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| Minimally processed  | Milk, eggs, fresh/frozen veggies, unsalted nuts, fresh/dried fruit, whole-grain hot cereal, dried beans                                          |
| Basic processed      | Sugar, oil, flour, pasta, unsweetened fruit juice, white rice                                                                                    |
| Moderately processed | Salted nuts, peanut butter, potato chips, cheese, butter, fruit canned in syrup, sweetened juice, seasoned or cured meat                         |
| Highly processed     | Refined bread, grain-based desserts, SSBs, salty snacks, candy, cereal, ice cream, prepared meals, condiments, sauces, margarine, processed meat |

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.

Poti J, et al. *Am J Clin Nutr* 2015.

# Trends in CPG food and beverage purchases by level of convenience (1.4 million barcoded products)



| Category                            | Top contributors (per capita kcal/d)                                                                                                                                               |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Requires cooking and/or preparation | Oil, flour, pasta, eggs, grain-based dessert mixes, some fresh veggies, pancake/biscuit mixes, boxed mac-and-cheese, rice, uncooked meat                                           |
| Ready-to-heat (RTH)                 | Frozen pizza, frozen meals, prepared mixed dishes, frozen waffles or pancakes, canned soup, hot dogs, instant oatmeal                                                              |
| Ready-to-eat (RTE)                  | Salty snacks, bread, RTE grain-based desserts, milk, sugar, SSBs, candy, butter, margarine, cereal, condiments, nuts, peanut butter, ice cream, cheese, juice, fruit, some veggies |

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.

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# 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:

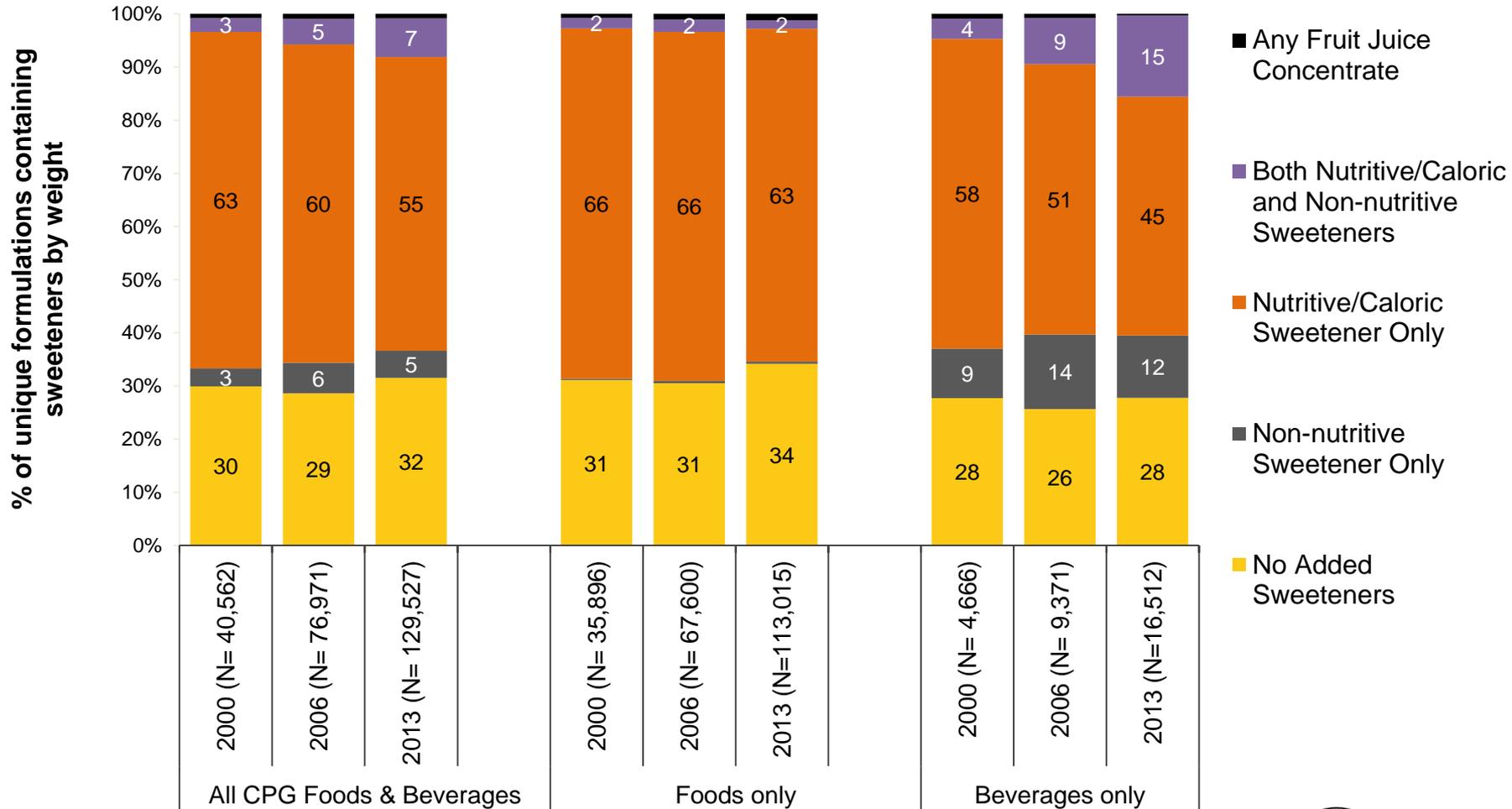
- Legumes (beans), vegetables, fruits in most countries
- Food preparation time



# First Major Global Shift: Sweetness, Added Sugars

- Always loved sweetness and as fruit provided unique source of nutrients.
- Mattes, Rolls and 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.

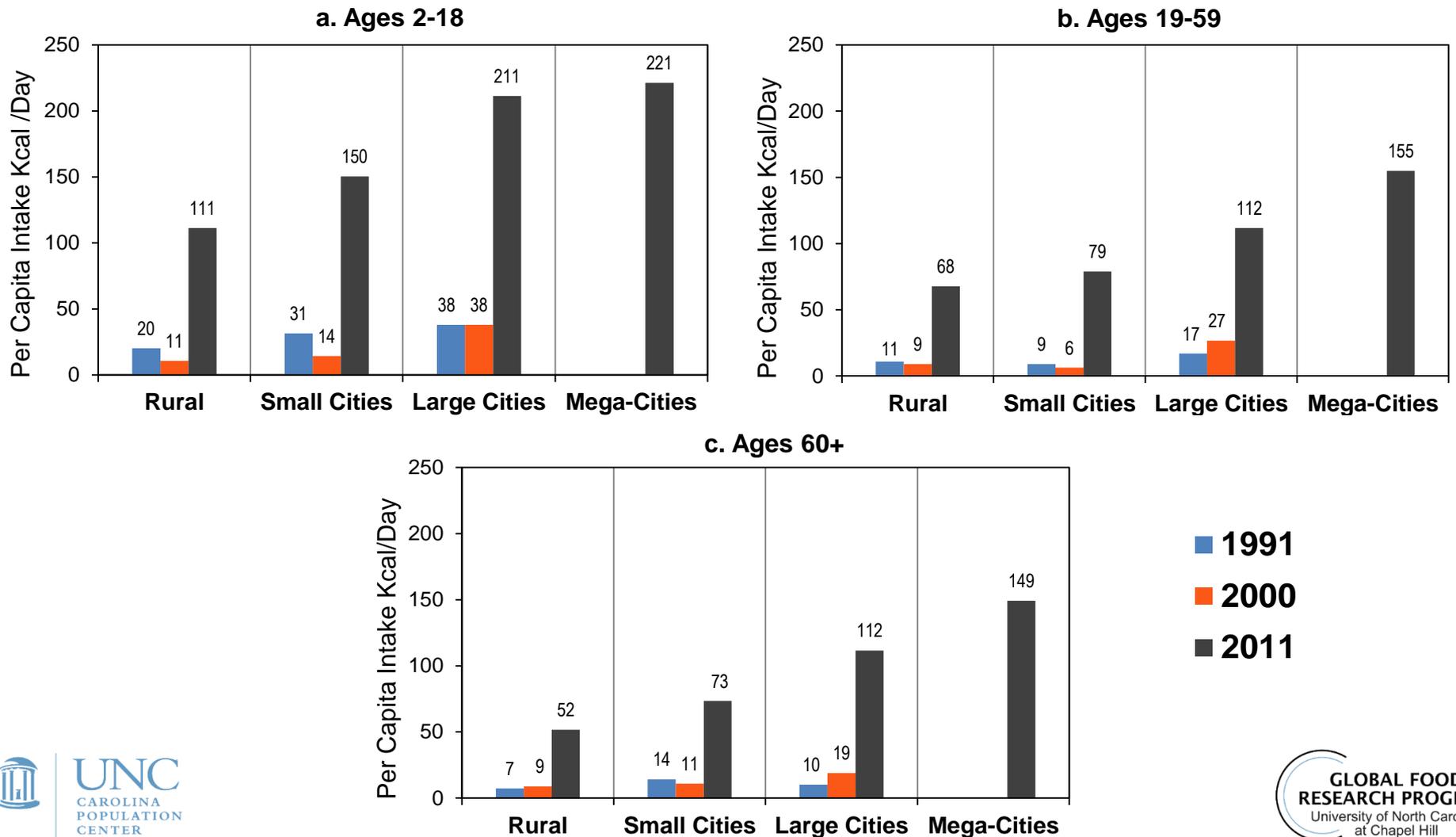
# Proportion of CPG products in the United States with unique formulations containing any sweeteners *(nationally representative; mutually exclusive categories)*



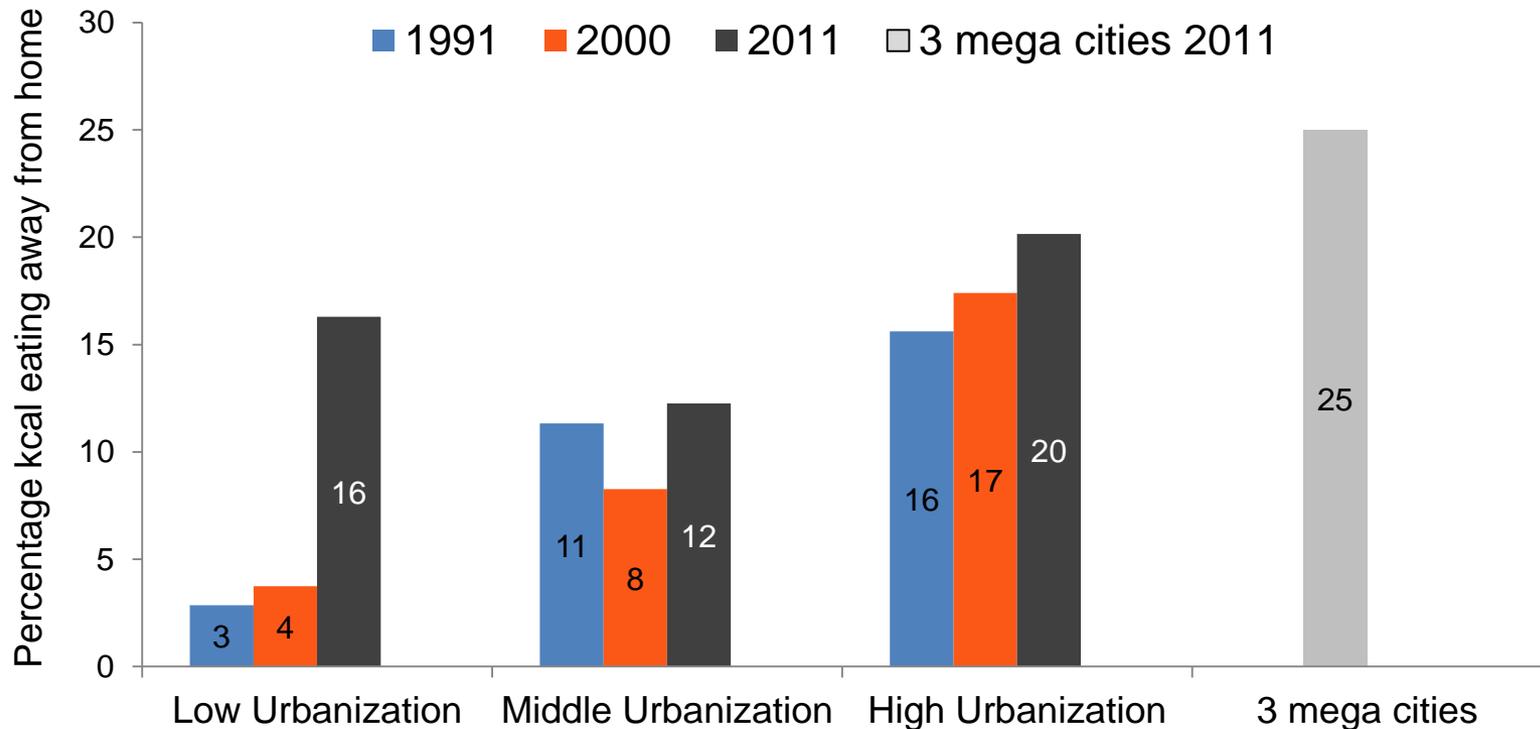
Fruit Juice Concentrate excludes lemon/lime and when reconstituted

Source: Popkin, Hawkes (2015) *Lancet Endocrinology and Diabetes* 4:174-186

## Second, Snacking: Chinese snacking is an example of the role of marketing, modern food systems. Starting to see junk food emerge.



### Third, Eating Away from Home: Associated with urbanization in China and most other low- and middle-income countries, and is rapidly shifting (Chinese example)



# 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 but then rapid child obesity increase later[now occurring in Chile]
- 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,** so much greater future health impact
- 4. Among many LMIC subpopulations:** much higher body fat proportion, visceral fat, and increased NCD susceptibility at lower BMI's



# Regulatory options

## Taxes and marketing restrictions



# Where do we go in the future?

- Challenge to create the large-scale environmental shifts to promote a healthier diet and activity pattern. Options include:
  - **Taxation** of unhealthy beverages and foods,
  - **Marketing regulation**,
  - **Front-of-the-package profiling**, and
  - **Public institution** healthy eating(schools, hospitals,etc).
- Increasing emphasis on large-scale regulatory change. Chile has unique, very critical components.
- Taxing SSB's alone is just one small step forward, and the tax in Chile is tiny compared to its role as the top global consumer per capita of SSB's
- Yes the great unknown: creating a new culture of healthy eating and actually reducing obesity prevalence.



# The Mexican tax: Leading the way so far

- **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. ( $\approx 10\%$ )
- Excludes 100% juices and flavored, milk and yoghurt.  
>35% for potable water fountains in schools.
- **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  $\geq 275\text{kcal}/100\text{g}$  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 under review, we found in purchases/capita and sales/capita a further 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) .



# 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 laws

## Strengths

- ✓ Applies to **all foods and beverages** and uses **uniform nutrition criteria** across categories
- ✓ Restrictions address both **power** of advertisements to influence (by restricting creative appeals targeting children) and **children's exposure** (by limiting advertising during children's programs or when kids are likely to be in audience)
- ✓ Includes **comprehensive in-school restrictions**.

## Gaps

- **Major gap: marketing shifted to other (unrestricted) TV shows, venues in other countries**
- Marketing restrictions do not apply in **other public institutions** or areas around/outside schools
- Identifying and enforcing bans on creative content targeting children is difficult (child appeals)
- Unclear how to enforce internet marketing controls, product placements

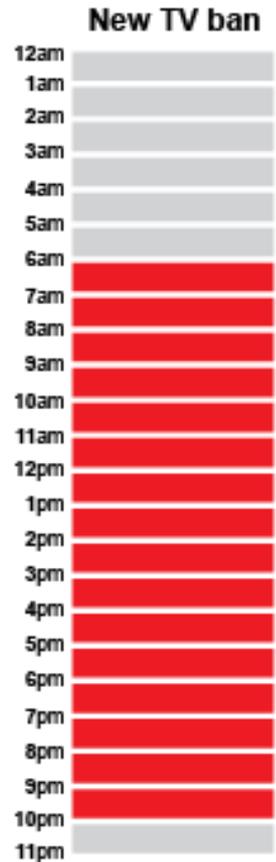


# Challenges

- **Address gaps in coverage: TV**
  - New law crucial, will help by expanding ban to 6am — 10pm
  - Remove nutritional claims if product has high nutrient (ie fat-free coke, Or vitamin C fortified coke.)
  - 25% kids watch TV after 10pm—strengthen % audience laws would be helpful to eliminate harmful advertising

## **Address gaps in coverage: other media and marketing**

- **New media:** need more robust internet restrictions, social media, mobile devices, apps, video games, advergames, viral marketing
  - **Other marketing methods:** sponsorships, billboards, in-store and point-of-sale promotions
- Restrictions on **health claims** (halo effect)

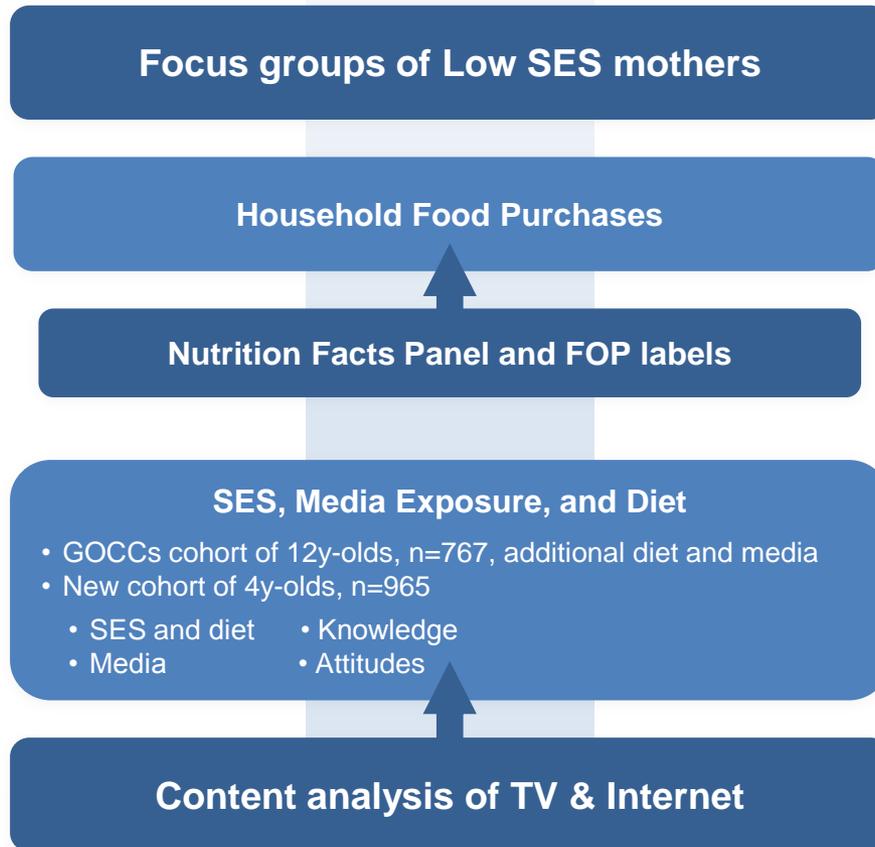


# Chile Regulatory and Tax Evaluation: INTA and GFRP UNC

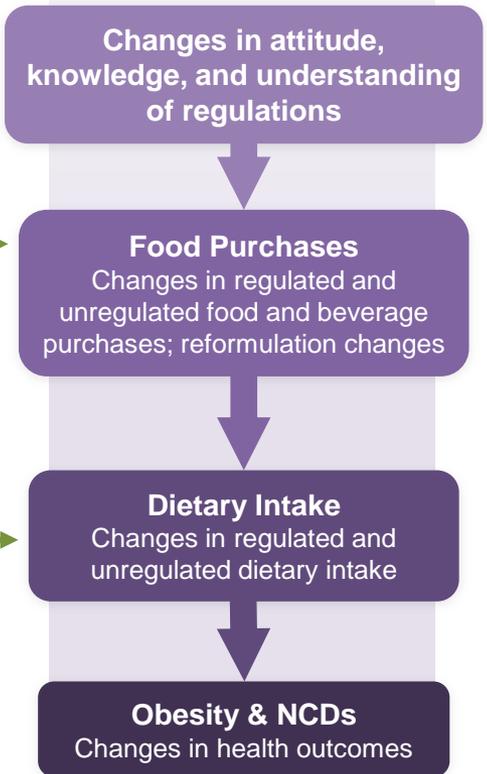
## Regulations

- 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



## Outcomes Analysis



# Where do we go in the future to reduce obesity, diabetes, and other NCD's

- **Chile: ideal example.**
  - Taxation, but too small now and only half of the SSB's
  - Kids marketing controls expanded to all ages 6am to 10pm and strengthen def'n kids tv in audience
  - Front-of-the-package profiling, soon marketing controls for all ages 6am to 10pm
  - Need a larger tax on all banned beverages and foods
- Few countries going beyond taxation or FOP profiling.  
**Chile is the only country poised to demonstrate marketing controls and what their impact will be — if the laws are implemented well and minor adjustments are made.**
- Without comprehensive marketing controls and more taxation, it's hard to envision ability to shift the culture of eating of the lower socioeconomic strata of the globe.



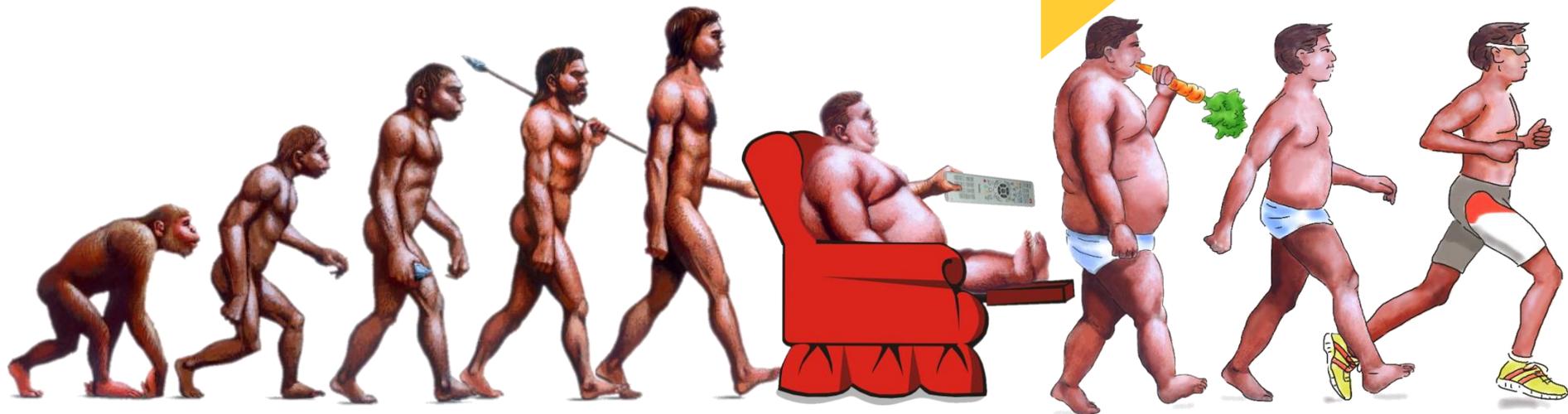
# Chile's marketing model

- Colombia, Argentina, Brazilian governments all are using the Spanish version of your law as a model for future marketing laws. They are waiting for the final implementation guidelines of the second more comprehensive law.
- South Africa and Israel are using now with Israel fully implementing in the next year.
- Several other countries with which I am working are considering the Chilean laws.





**The struggle over millennia to eliminate arduous effort could not foresee modern technology**



Thank you!



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