

Global SSB and Sugar Consumption Patterns, Policies, Taxes, and Other Issues



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THE  WORLD IS FAT

“Over 2 billion people in the world are overweight”



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Outline: Why is This Occurring?

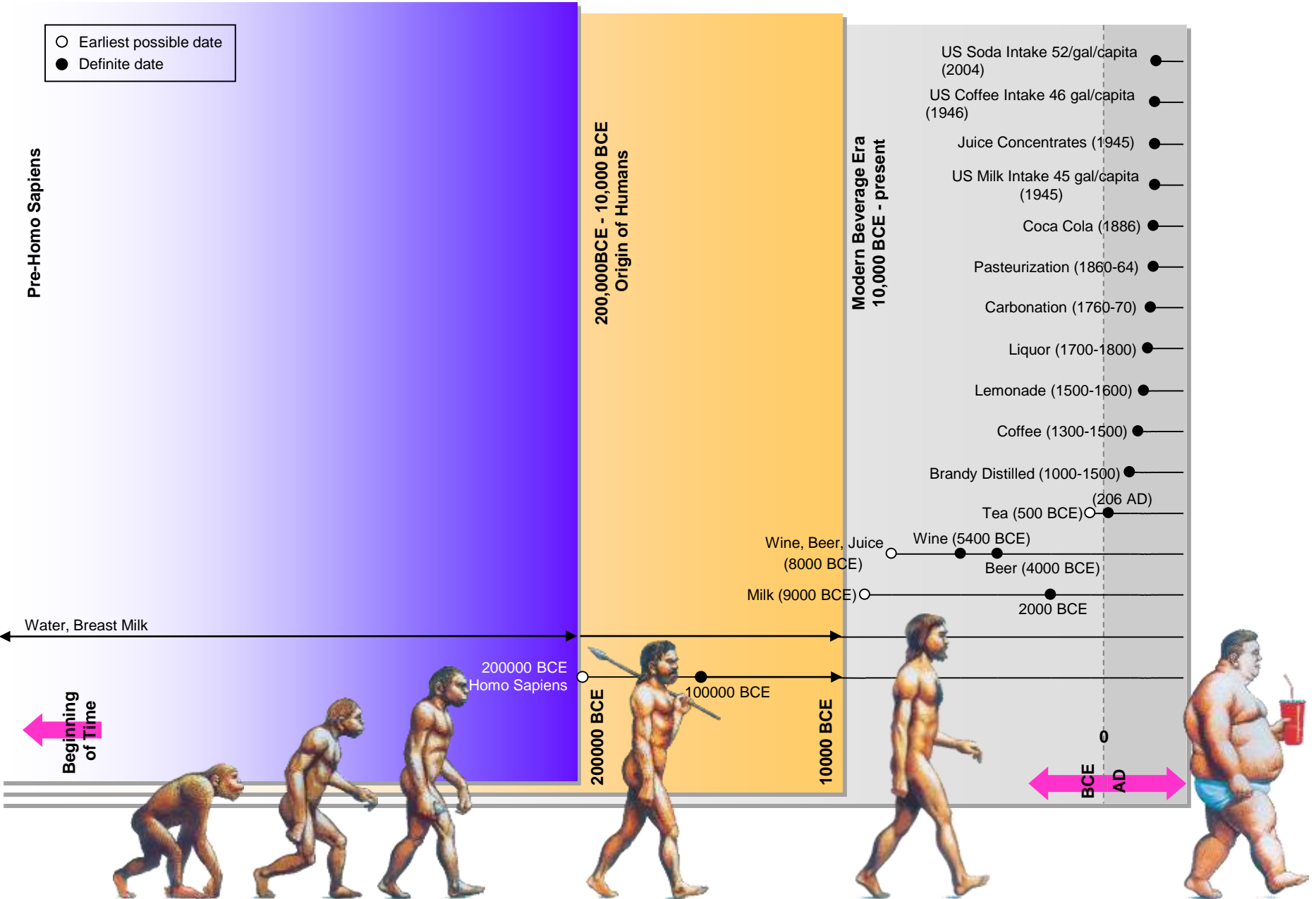
1. In-depth look first: added sugar in modern food supply,
2. Key ignored issue: the maldistribution of intake of added sugar
3. Global SSB consumption patterns
4. Fruit Juices: are they any different than SSB's in their health effects?
5. Policies being utilized: taxes, labeling, marketing controls, restrictions in selected environments
 - Mexico
 - Berkeley
 - Chile

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Remarkably Short History for Caloric Beverages: Might the Absence of Compensation Relate to This Historical Evolution?



1. Sweeteners in Our Food Supply

- About 550,000 foods and beverages exist in our consumer packaged food and beverage system in the US.
- About 100,000 have unique ingredients. Using these data from a nationally representative sample of about 60,000 households who daily scan all food purchases' bar codes, we can identify the foods with sweeteners.
- Two sets of data—older published paper on difference from US NHANES data and our data with ingredients searched.
- Then new results—in press only

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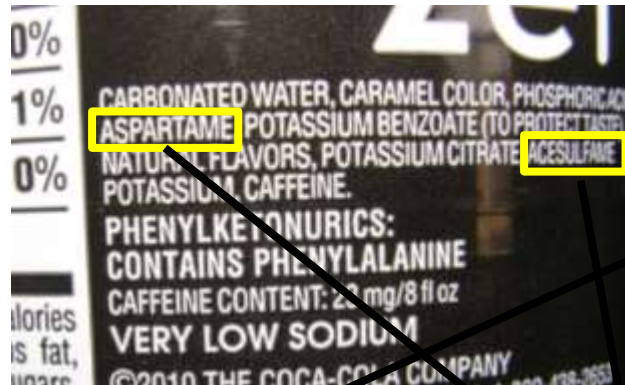


Sweeteners in Our Food Supply

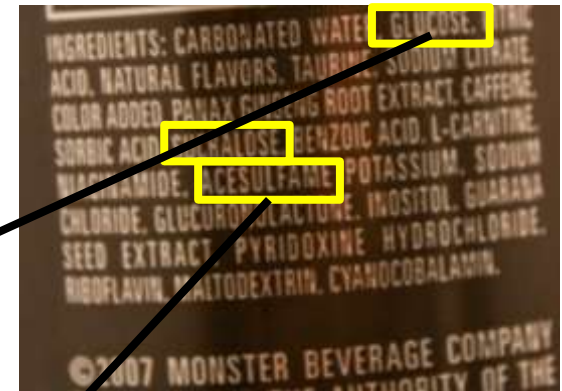
- Key word searches at the ingredient list of each product
 - Low-calorie sweeteners: artificial sweetener, aspartame, saccharin, sucralose, cyclamate, acesulfame K, stevia, sugar alcohols (i.e. xylitol) and brand name versions of each sweetener (i.e. *Splenda*)
 - Caloric sweeteners: fruit juice concentrate (not reconstituted), cane sugar, beet sugar, sucrose, glucose, corn syrup, high fructose corn syrup, agave-based sweeteners, honey, molasses, maple, sorghum/malt/maltose, rice syrup, fructose, lactose, inverted sugars



Caloric Sweetener



Low-calorie Sweetener



Sources of Sweeteners



**Caloric
sweetener**



**Low calorie
sweetener**

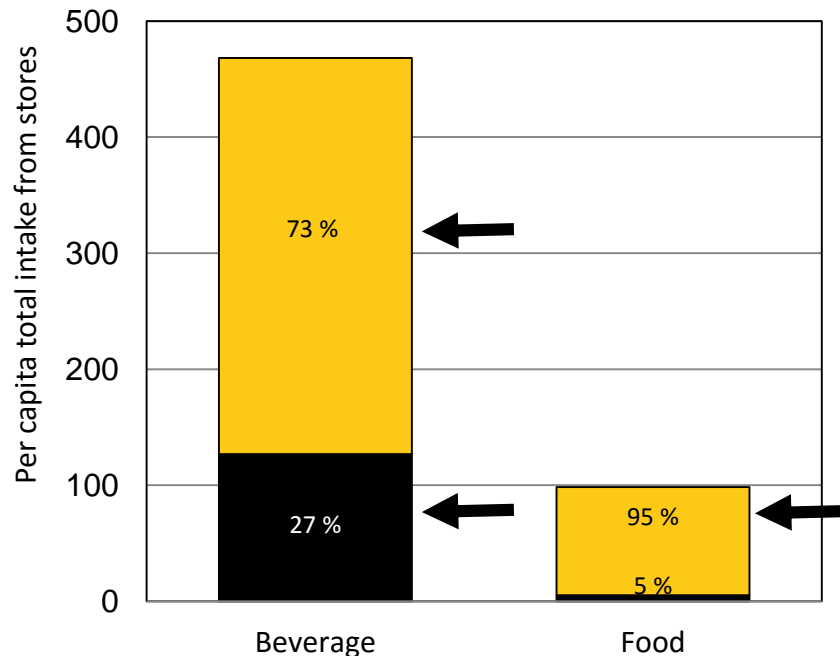


LCS and CS

All Foods and Beverages that Contain Any Sweetener

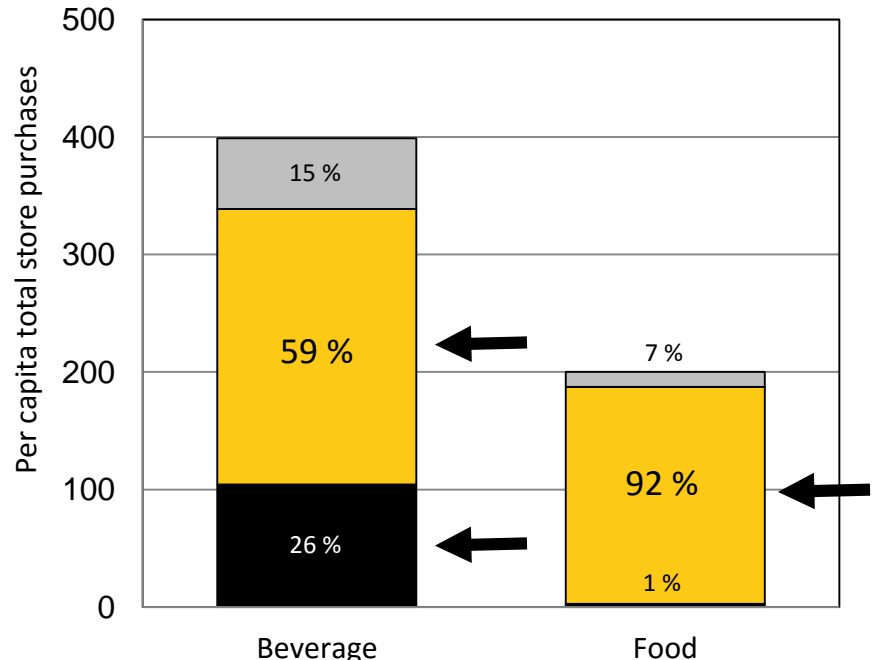
A. NHANES, 2007-2010

■ LCS ■ CS



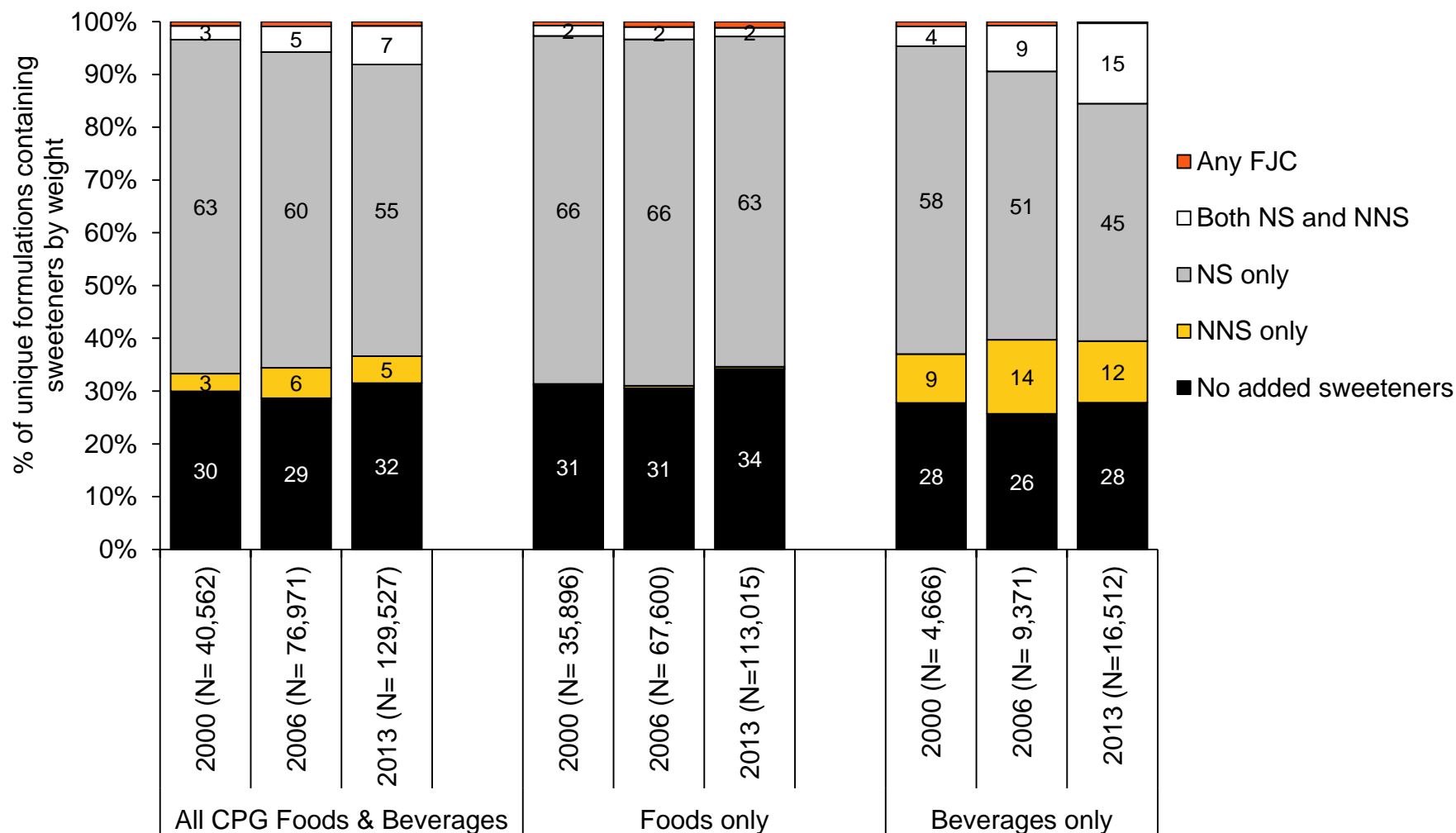
B. HOMESCAN, 2007-2010

■ LCS ■ CS ■ LCS+CS



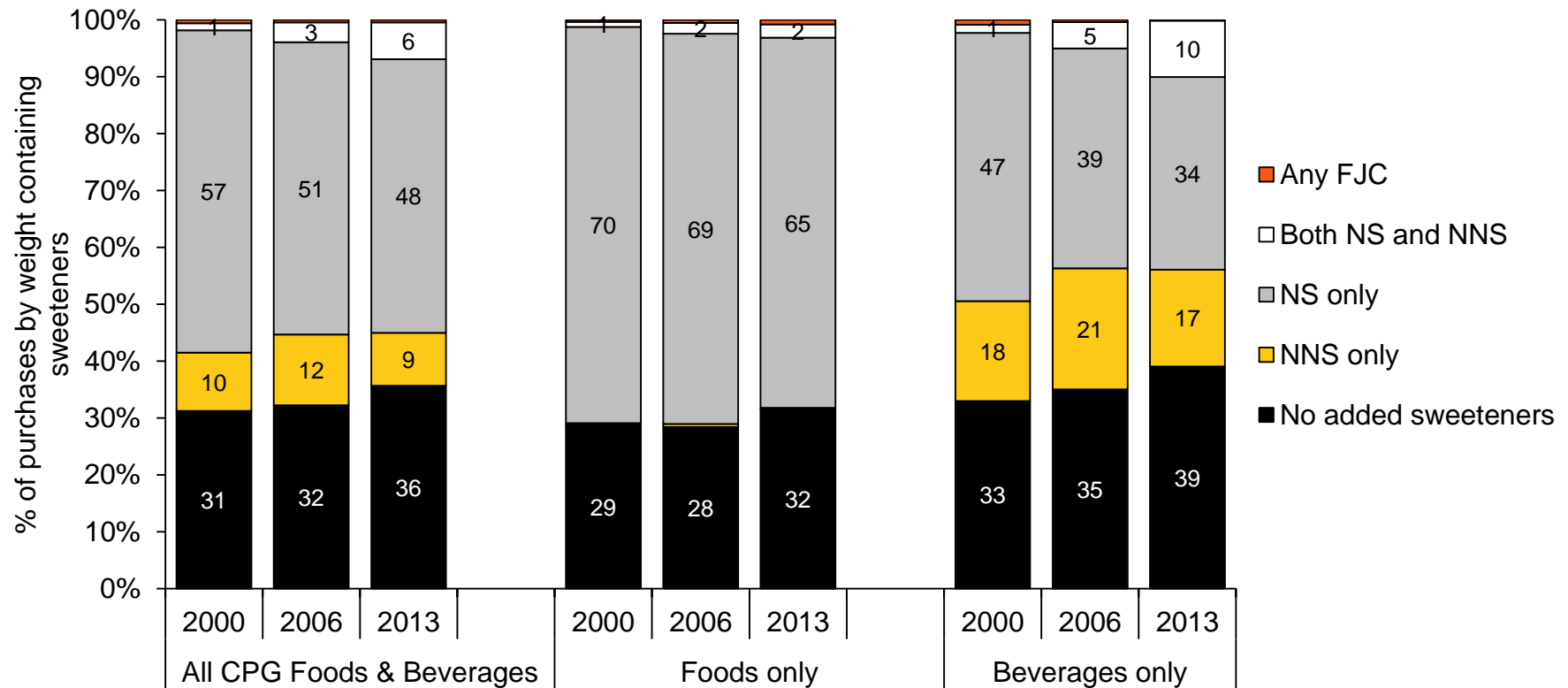
- Means per capita for beverages (mL/d) and foods (g/d). LCS, low-caloric sweetened beverages or foods; CS, caloric-sweetened beverages or foods
- Piernas et al, Pediatrics Obesity 8:294-306

The % of Uniquely Formulated Foods and Beverages in the US Food Supply Containing Sweeteners (Mutually Exclusive Categories)



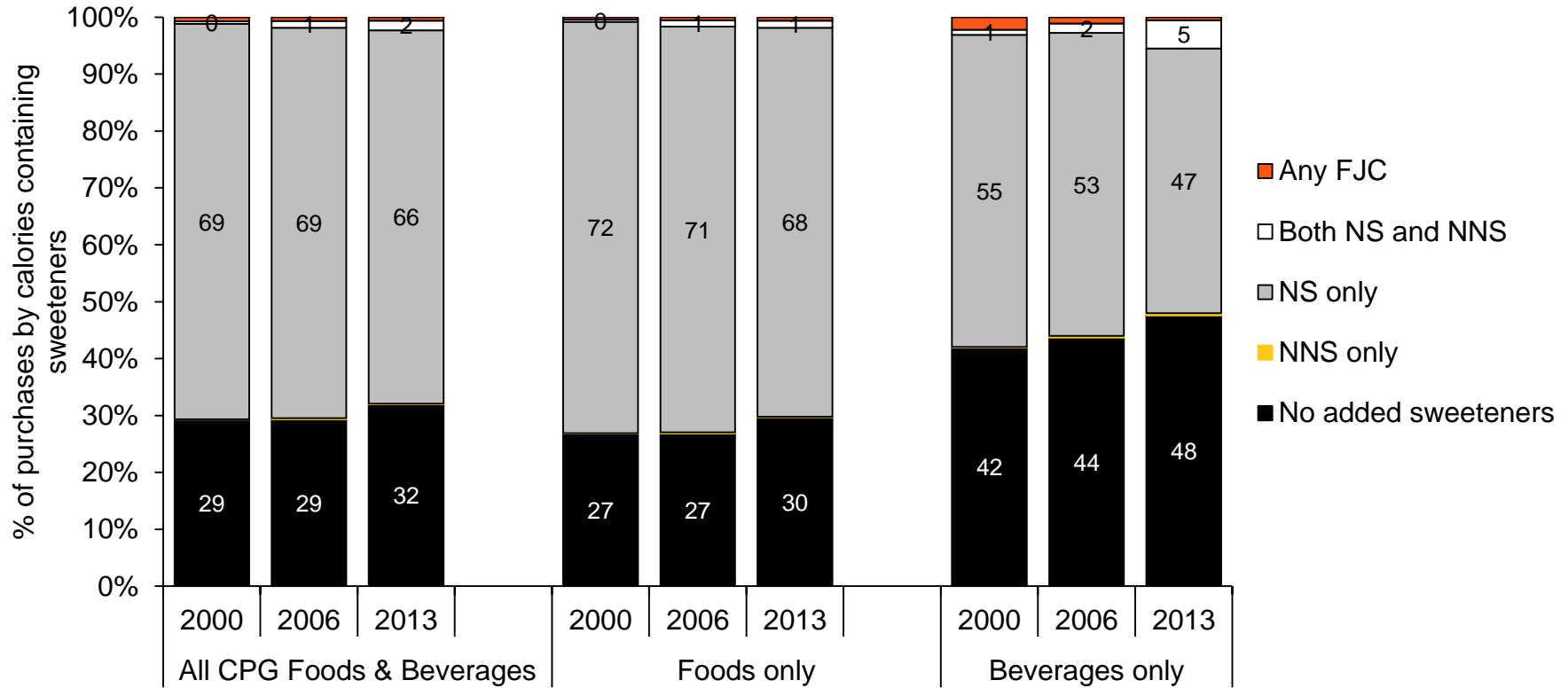
NS= Nutritive/Caloric Sweetener, NNS= Non-nutritive/non-caloric sweetener, FJC= Fruit Juice Concentrate (excluding lemon/lime and when reconstituted) (not for use or quotation) (Popkin and Hawkes, Lancet Diabetes for fall/winter)

% of Uniquely formulated CPG Purchases by Weight in Grams Containing Sweeteners (Weighted to Be Nationally Representative)



NS= Nutritive/Caloric Sweetener, NNS= Non-nutritive/non-caloric sweetener, FJC= Fruit Juice Concentrate (excluding lemon/lime and when reconstituted) (not for use or quotation) (Popkin and Hawkes, Lancet Diabetes for fall/winter)

% of CPG Purchases by Calories Containing Sweeteners Weighted to be Nationally Representative (Excludes Low Calorie Sweeteners by Using Kcal)



NS= Nutritive/Caloric Sweetener, NNS= Non-nutritive/non-caloric sweetener, FJC= Fruit Juice Concentrate (excluding lemon/lime and when reconstituted) (not for use or quotation) (Popkin and Hawkes, Lancet Diabetes for fall/winter)

2. United States: Added Sugar and Beverages: Patterns and Trends

- US trends overall
- Changes in the distribution

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Hook consumers
early, gain a
consumer for life:

“Babies who drink soda during their early formative period are much more likely to fit in during those awkward preteen and teen years”

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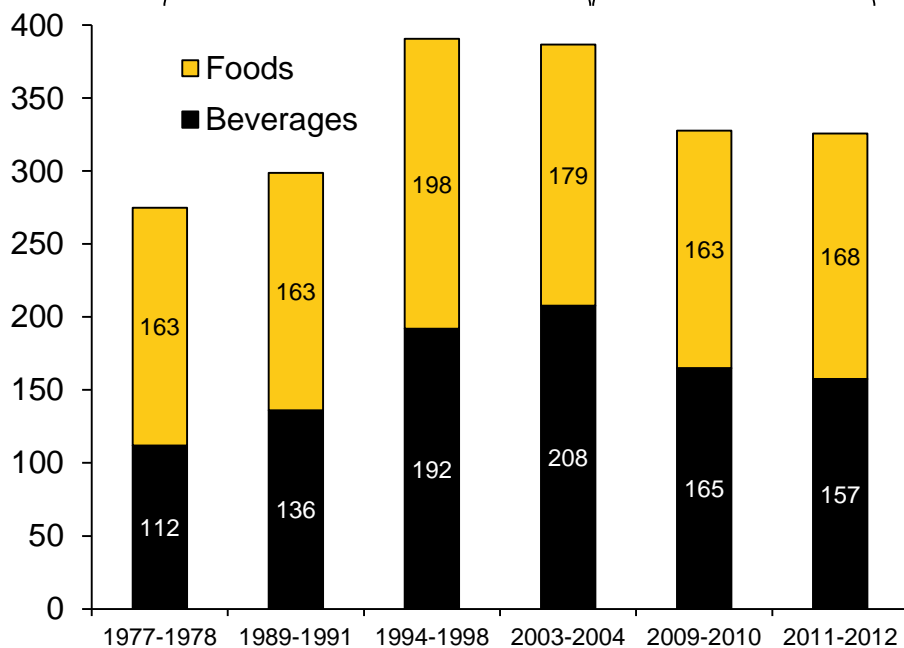
Adjusted Mean Calories of Daily Added Sugars by US Individuals for Foods and Beverages

1977 to 2003 change

- Beverages: +3.6kcal/year
- Foods: +.6kcal/year

2003 to 2012 change

- Beverages: -5.6 kcal/year
- Foods: -1.2 kcal/year



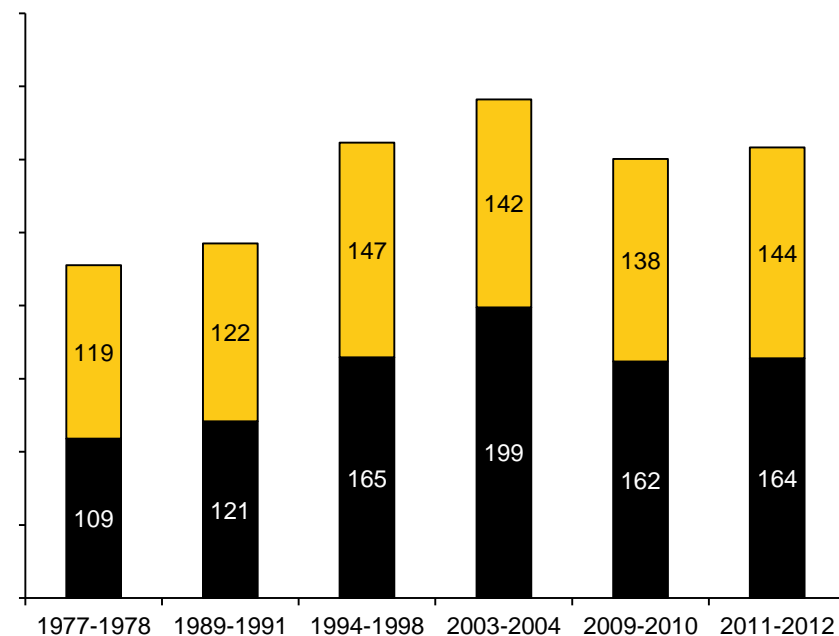
Children 2-18

1977 to 2003 change

- Beverages: +3.5kcal/year
- Foods: +.9kcal/year

2003 to 2012 change

- Beverages: -3.9 kcal/year
- Foods: -.3kcal/year

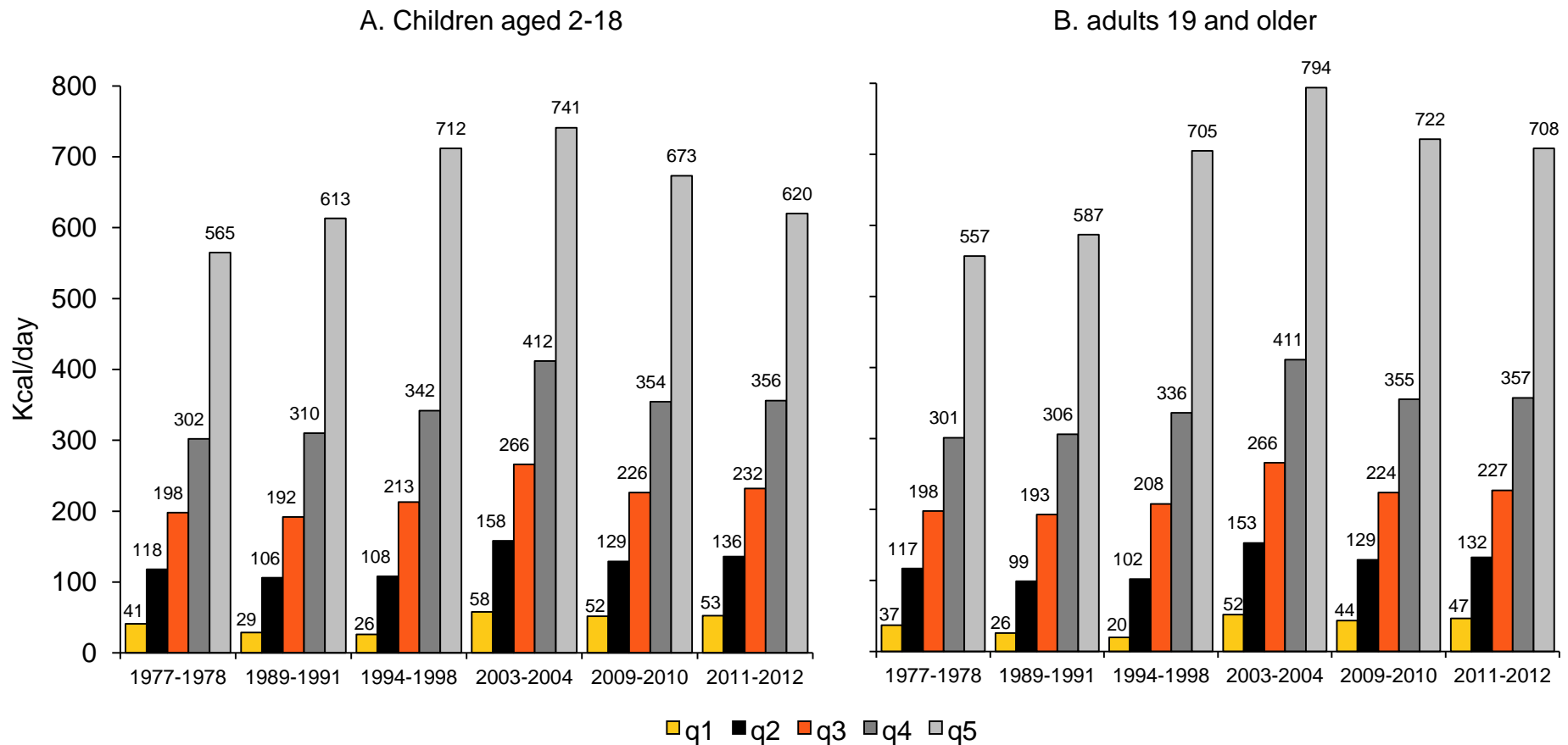


Adults 19 and Older

Adjusted by Gender, Race, Income and Education, Weighted to Be Nationally Representative

Trends in Quintiles of Added Sugar Distribution in the US (Excludes Fruit Juice Concentrate), Kcal/Day.

Note the large skewed distribution.



3. Global Trends— Both in Kcal by Region and Country and Volume

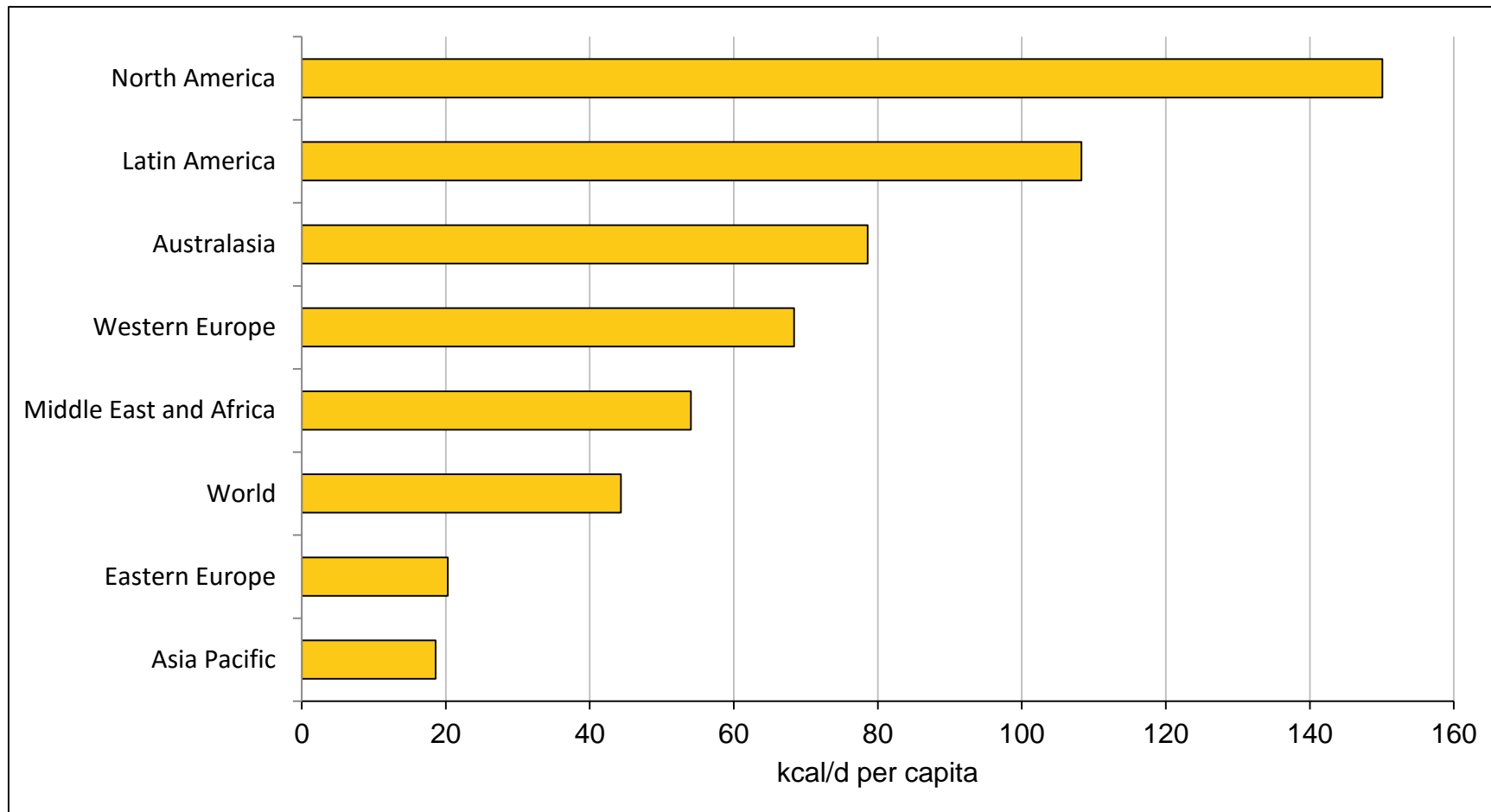
- Euromonitor passport data: excellent on trends, levels appear to be under-reported as expected as they do not obtain data from all companies. Pilot study worked with them. they obtain kcal from each country for most beverages.
- Kcals based on calories from beverages in each country. They get this off websites and nutrition facts panels. If anything, these are a major undermeasurement as many local companies underreport their kcal, total sugar and other data.

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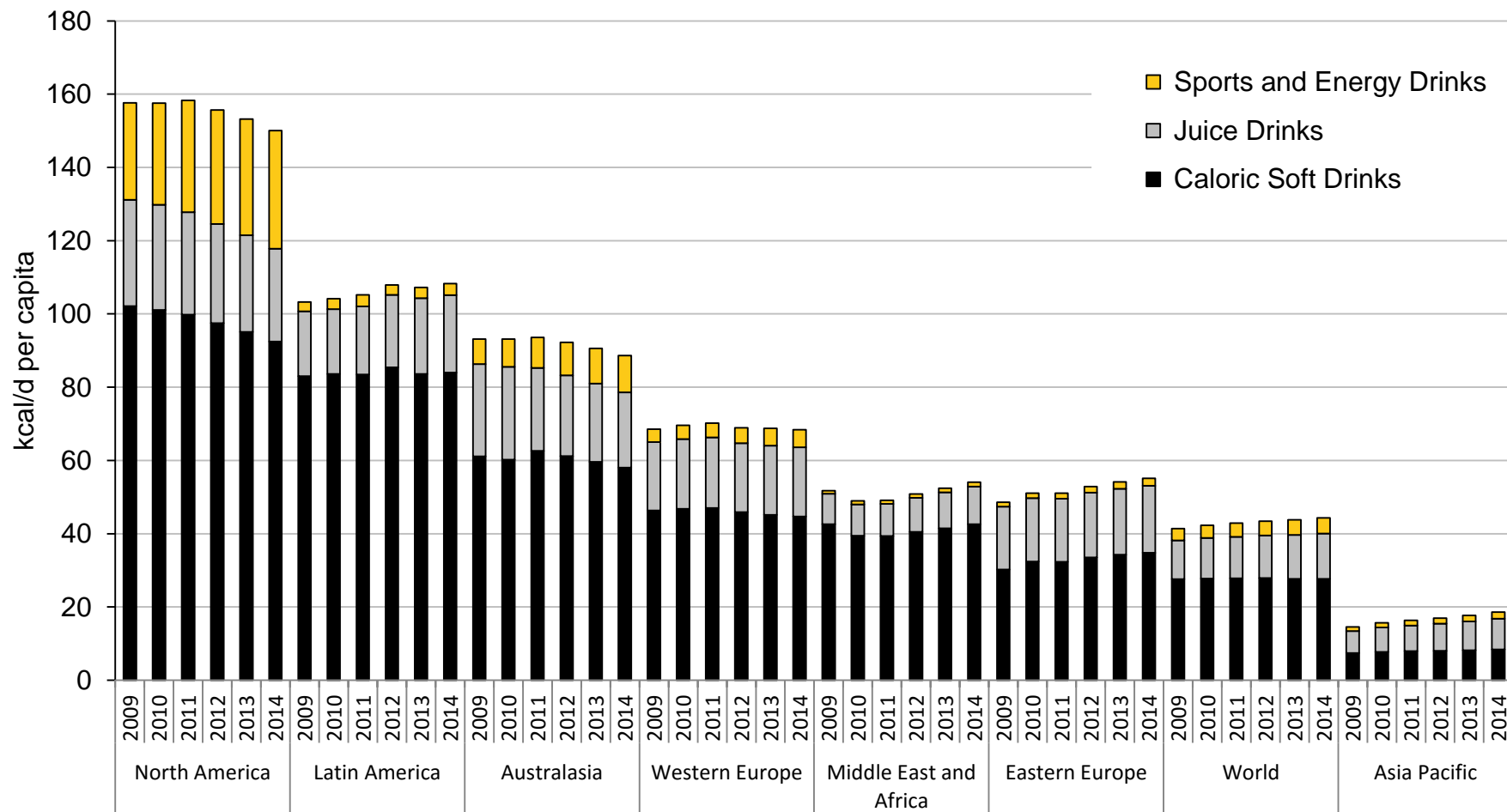
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Daily Calories Sold per Capita per Day from all Sugar-Sweetened Beverages in 2014 by Region (Weighted by Population)



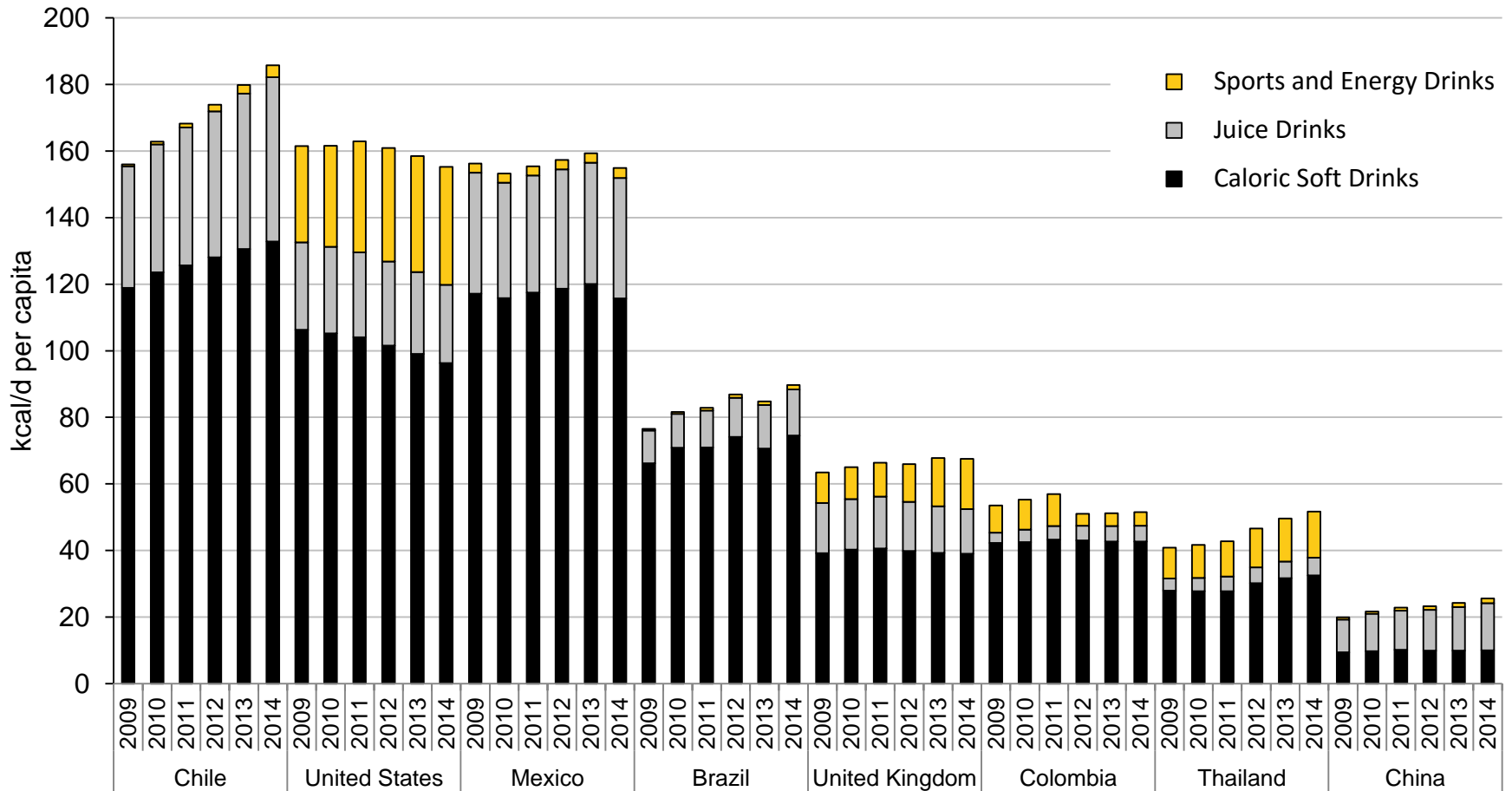
Source: Euromonitor Passport International with country-specific kcal data added (not for use or quotation) (Popkin and Hawkes, Lancet Diabetes for fall/winter)

Caloric Trends in Sugar-Sweetened Beverage Sales by Region, 2009-2014



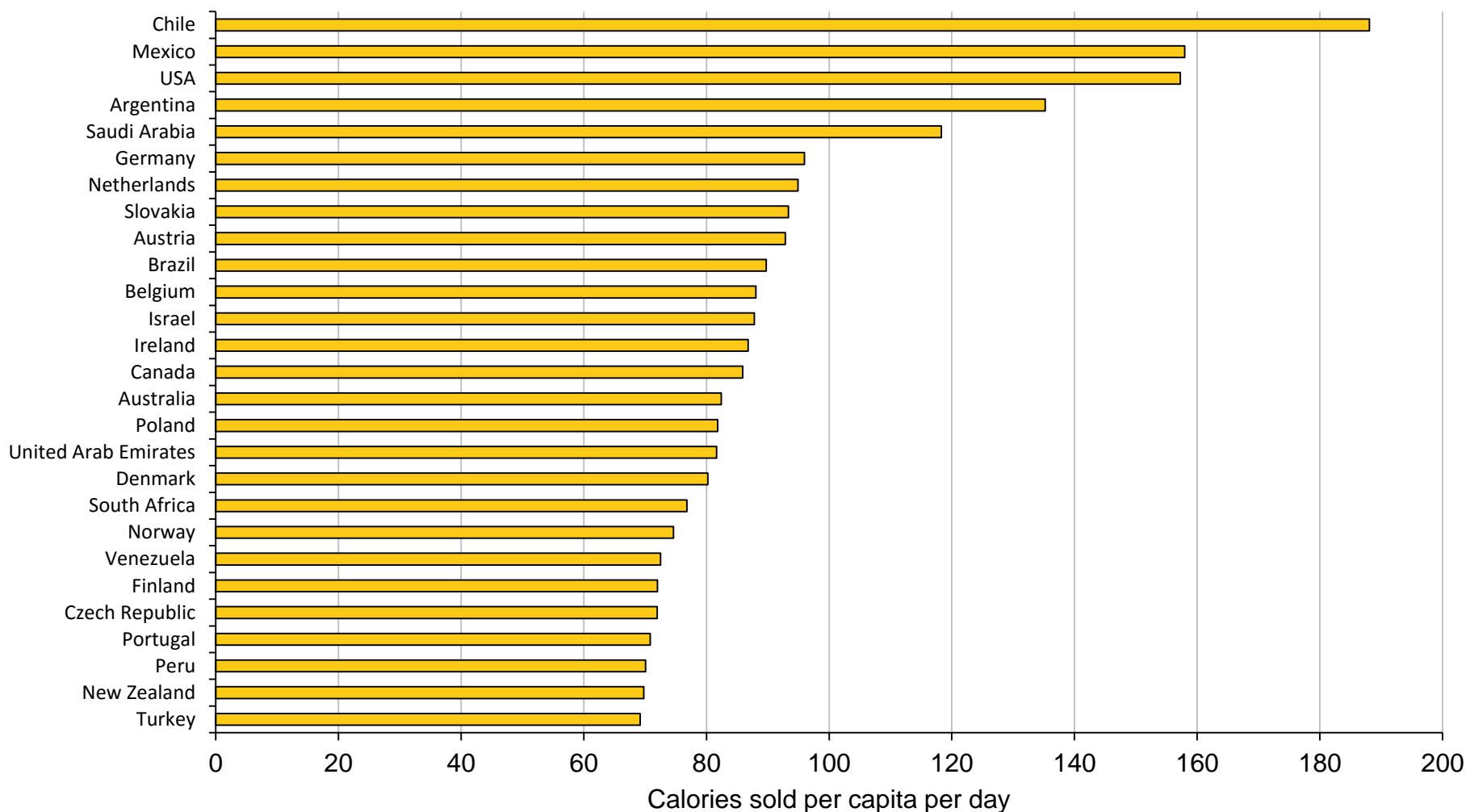
Source: Euromonitor Passport International with country-specific kcal data added (not for use or quotation) (Popkin and Hawkes, Lancet Diabetes for fall/winter)

Calories Sold per Capita per Day from Sugar-Sweetened Beverage by Country, 2009-2014



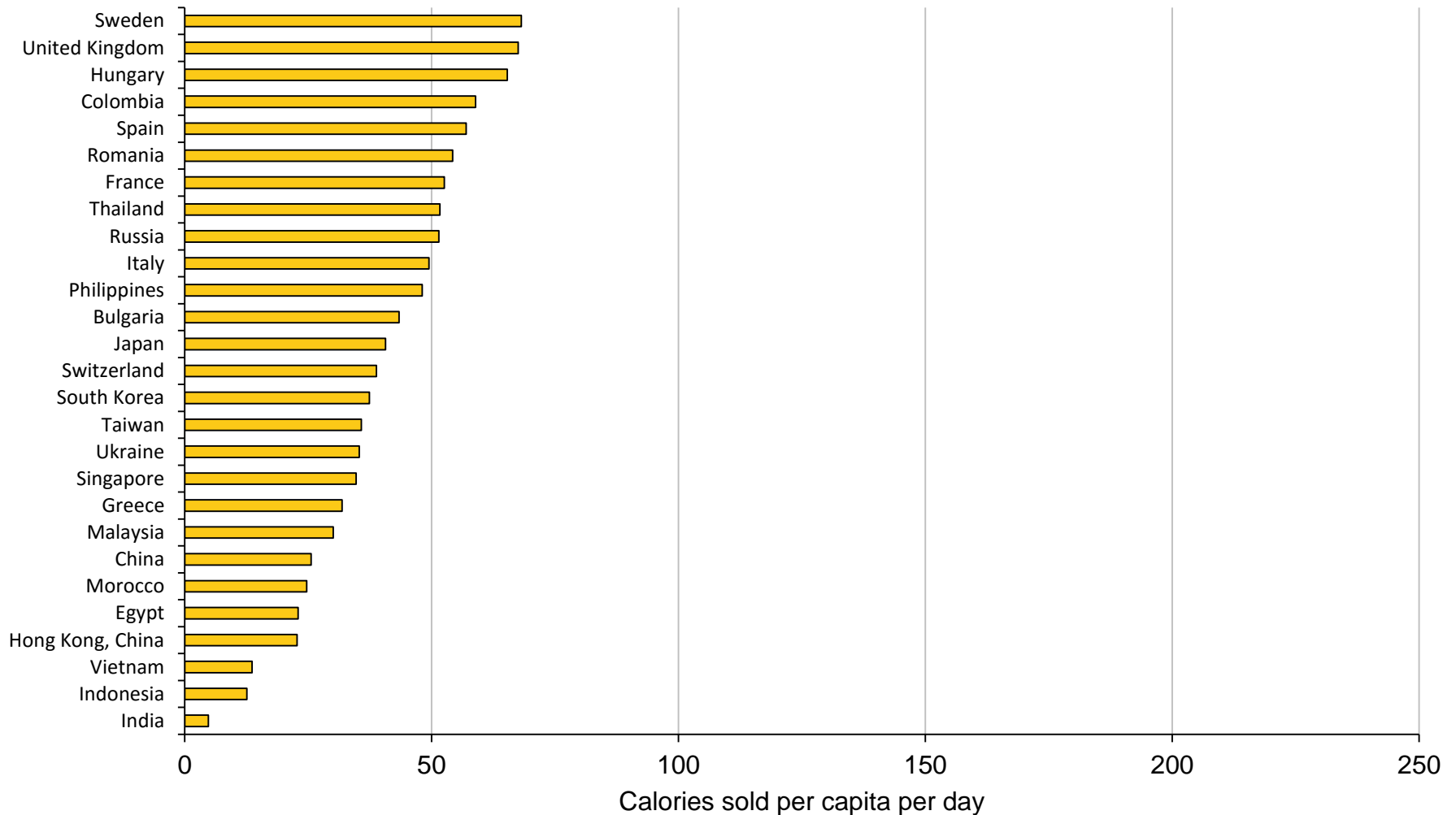
Source: Euromonitor Passport International with country-specific kcal data added (not for use or quotation)

Supplemental Figure 1. Daily Calories Sold per Capita from all Sugar-Sweetened Beverages in 2014, Highest Selling Countries



Source: Euromonitor Passport International with country-specific kcal data added (not for use or quotation) (Popkin and Hawkes, Lancet Diabetes for fall/winter)

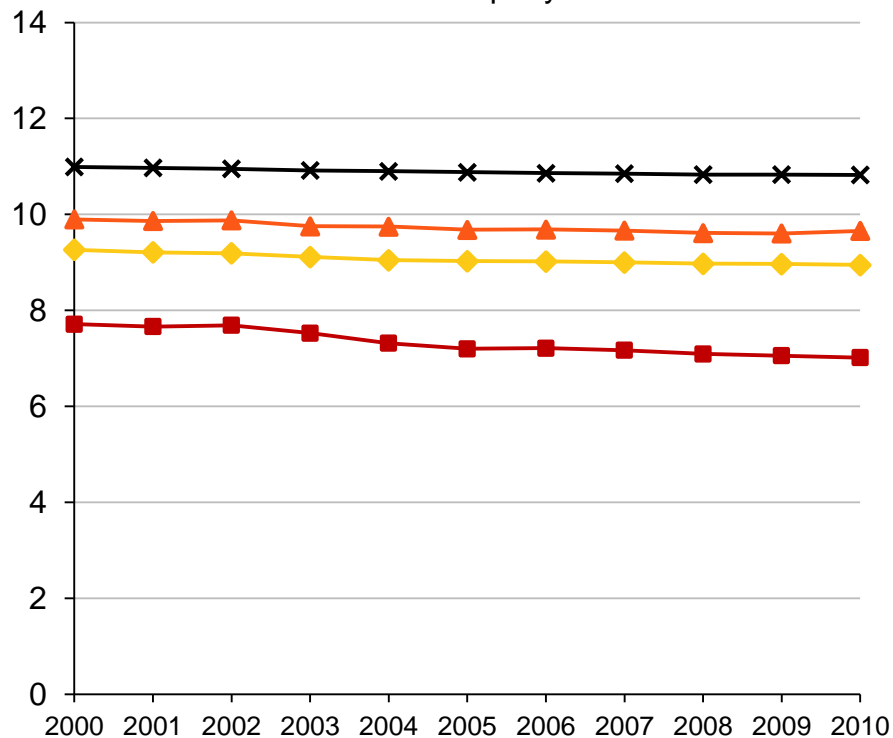
Daily Calories Sold per Capita from all Sugar-Sweetened Beverages in 2014, Lowest Selling Countries



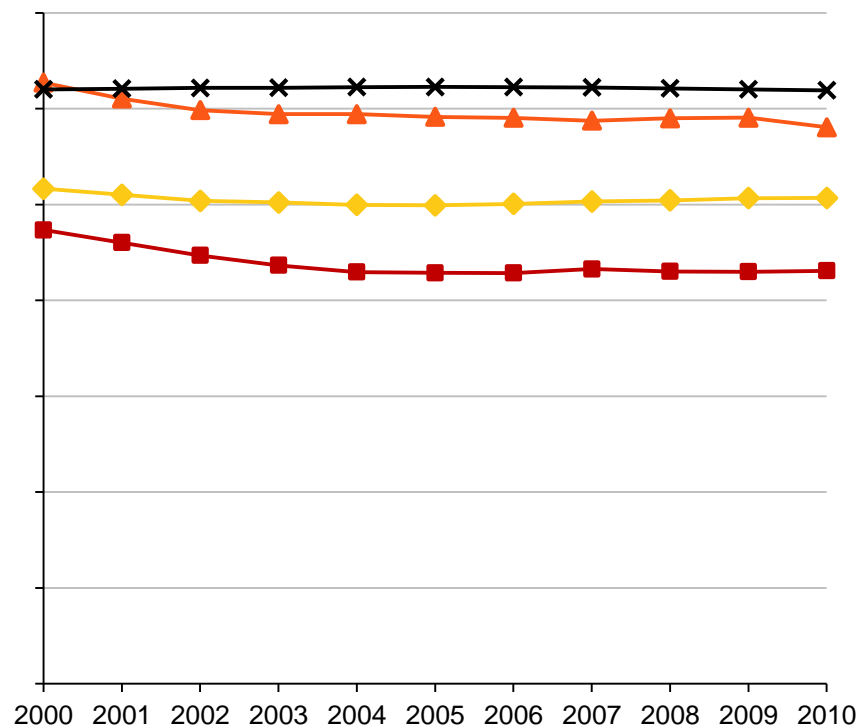
Source: Euromonitor Passport International with country-specific kcal data added (not for use or quotation) (Popkin and Hawkes, Lancet Diabetes for fall/winter)

Trends 2000-2010 in Calories per Ounce Sold: Global, the US, Brazil, and China

A. Calories per Ounce Sold
The Coca-Cola Company - Carbonates



B. Calories per Ounce Sold
PepsiCo - Carbonates



◆ World ■ US ▲ Brazil ✕ China

4. Fruit Juices: a major concern

- The biology is simple: really sugar water with little long-term research showing any benefit
- The few long-term studies with adequate sample sizes or variability of fruit juice consumption (US, Singapore, Aust., Europe) find significant effects of fruit juice intake on weight gain and particularly risk of diabetes.
- Fruit juice consumption is high among those consuming it in many countries. It has the aura of natural, healthy; however 5-a-day and all major dietary guidelines are trying to reduce intake—schools, etc allow only half portions. (4 oz or 120ml)
- Be aware: the beverage industry controls an increasing number of juice bar franchises and juice companies.
- New Zealand: high fruit juice intake now.

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5. Large-Scale Regulatory Options

- Taxation of sugar - ideal, Chile planning now.
- Taxation at the manufacturer level of kcal in SSB's
- Marketing controls
- Front-of-the-label profiling linked with marketing controls
- Controls in selected institutions, e.g. schools
- Food system changes

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Taxation

- Barbados 10% tax began Aug 1, 2015
- France and Mexico SSB: about 10% tax, Mexican evaluation strong positive results but cannot reveal details until we publish. On website showed release: .

Preliminary results show a 6 percent average decline in purchases of taxed beverages over 2014 compared to pre-tax trends. This difference accelerated over 2014 and the reduction compared to pre-tax trends reached 12% by December 2014. All socioeconomic groups reduced purchases of taxed beverages. Reductions were higher among lower socio-economic households, averaging 9% decline over 2014 compared to pre-tax trends and up to a 17% decline by Dec 2014. Results also show roughly a 4 percent increase in purchases of untaxed beverages over 2014, mainly driven by an increase in purchased bottled plain water (tap water intake is not collected).

- Hungary—no evaluation
- Chile: 8% SSB began Jan 1, 2015 coupled with marketing and FOP controls which will slowly be instituted over 4 years.
- Selected Pacific Islands

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Berkeley California: too early for impact

- US 1 cent/ounce. Implementation began March 1, 2015
- Prices: 26 supermarkets, corner stores, pharmacies and gas stations in Berkeley, CA in Dec 2014 and June 2015 for 68 beverages (751 prices in Dec 2014; 801 in June 2015) plus sales-weighted prices using retailer scanner data from Jan 2013-June 2015 of 71.9 million transactions, 9 million from beverages
- SSB price per ounce rose at large (+1.32¢) and small (+1.65¢) chain supermarkets, and chain gas stations (+2.71¢). Not implemented yet small stores.
- Scanner data: April 2015 (+0.52¢ April, +0.87¢ May, and +1.34¢ June 2015). The pass-through also occurred in neighboring cities.

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The Food Environment: Labeling and Claims

- **Front-of-the-package—confusing** GDA's of industry vs.
 - positive health food labeling: Singapore, Malaysia, Mexico, Thailand, China have or are finalizing. India is beginning. Law in Netherlands/Czech/others E Europe, Scandinavian Tick, new Healthy Stars Australia and New Zealand
 - negative logo: Ecuador exists as law (now planning implementation with its own version of negative logo) and Chile (identify foods with unhealthy levels added sugar, sodium, saturated fat, total energy).

Complex traffic lights. Negative on multiple items, positive on others.
 - ban images: Ecuador banned animal characters, cartoon personalities, celebrities to promote junk food.
- **Ideal: Link labeling with marketing and later taxation. Some countries are doing this.**

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Labeling Unhealthy Foods—just legally shifted and will be ‘Alto’ [high]

*10 % of front surface of the package
One for each high “critical nutrient”*



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The Food Environment: Marketing Controls Hampered by Big Food and Beverage Politics

- Chile: implementation of law to ban toys, control marketing of unhealthy foods high in saturated fat, energy, added sugar and sodium in all child media channels; a 3-year implementation in phases begins July 1, 2016. Will extend law all programming 6am-10pm
- Brazil: comprehensive exemplary law held up by attorney general and legal challenges
- Peru and Ecuador: strong laws, implementation not complete
- Industry voluntary self-regulation seems to be the major approach and no evaluation has shown this to be successful in any LMIC or any high income country.
- South Korea: ban for TV and internet specific food categories during kids' programs and 5-7pm.
- Thailand planning marketing ban linked with FOP labeling

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The Food Environment: School Restrictions Major Institution

- Ideal—ban/allow same healthy/unhealthy foods and beverages
- Schools: banning of junk foods/SSBs completely (Peru, Ecuador, Costa Rica, UAE, Singapore, Western Pacific), mainly (Mexico, Thailand)
- In-school marketing: banned
- Mexico: reformulation of milk from full fat to 1.5%~fat for all government programs (\approx 20 million affected).
- Brazil: most exemplary. Note below under food systems. Also ban SSB's and snacks in many states. Indonesian snack law like Brazil law.
- Philippines: banned SSB's

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Food Systems

- Brazil: most effective but needs serious impact evaluation. Schools must purchase 30% of food from local smaller family farms/cooperatives. Also 70% of food must be a basic unprocessed food. No evaluation so unclear impact.
- Singapore: put all hawkers into centers when can control the environment, have access to them for various programs.
- The push for farmers markets and farm to household sales minimal in LMIC's (a high income country phenomena mainly)
- Urban and school gardening: limited systematic efforts
- Mainly ignoring retail sector and restaurant/fast food other than the Singapore effort and the front of the package labeling efforts

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Information and Education

- To date no evidence from any country that large-scale nutrition education has affected either what people eat or drink or how they move. Thailand appears the strongest.
- Large-scale: Thailand unique effort at the village level with a focus on reducing waist circumference (Flat Belly Network), also reducing sugar and fat
- Dominant media today: food industry and retailers and food service sector. Trivial level of public health-related nutrition education
- Nutrition education in schools in many countries pushed. No focus on cooking or other skills and minimal impact shown to date.
- Few countries push for healthy food in hospitals and clinical diet and physical activity counseling (e.g. Brazil, Thailand)
- Workplace: limited efforts (e.g. Singapore)

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Special Programs for Controlling Overweight and Obesity Problems

- Sweet Enough Network
- Thai People Flat Belly Network



LMIC's Are Beginning to Take Serious Large-Scale Action

- The need and the will to take action is increasing among LMIC's
- Mexico, Ecuador, Chile, Peru, Thailand, Singapore, and the Western Pacific Islands are just the beginning of this.
- Chile most systematic: with sugar tax on top of SSB tax plus FOP and marketing controls we will learn what its impact will be of a total set of laws once all passed and evaluated. Done iteratively.
- Evidence is needed: serious push for rigorous evaluation is essential.
- A need to create one food and beverage standard and use across all controls: marketing, front-of-packing profiling, taxation

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Remarkably Short History for Caloric Beverages: Recent Transition to the Water Revolution

