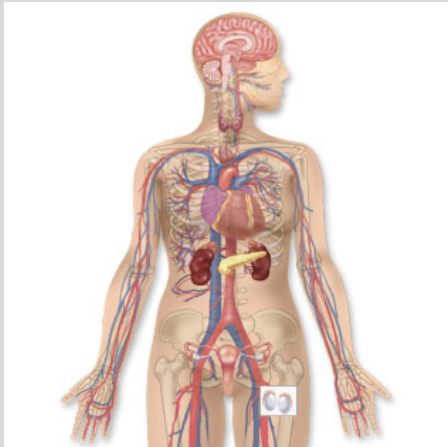


SUGAR IS TOXIC



Precept #1

**Human & Environmental Health are
One Conversation**



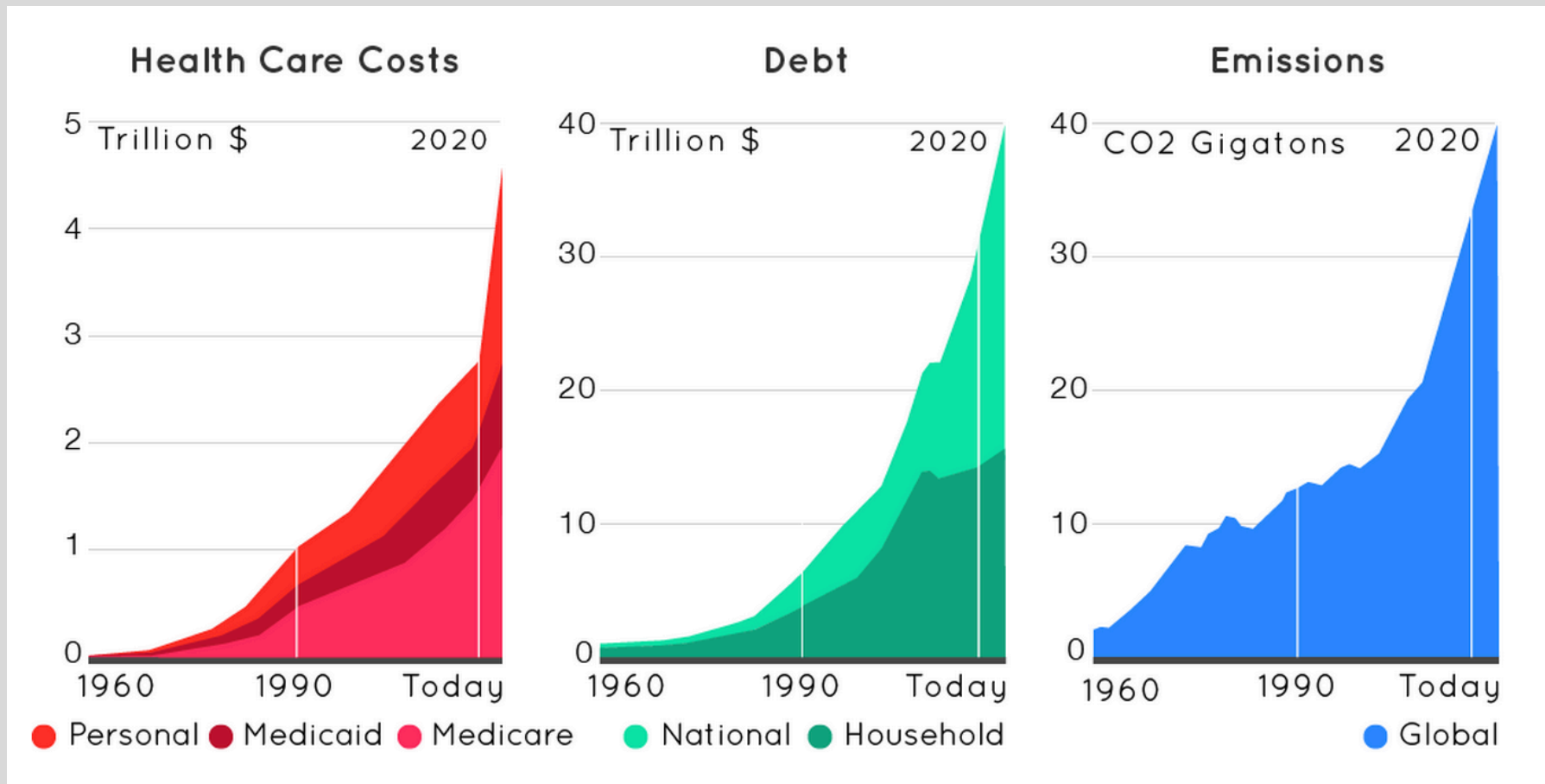
Metabolic System



EcoSystem

Both require systems thinking, preventive approaches.

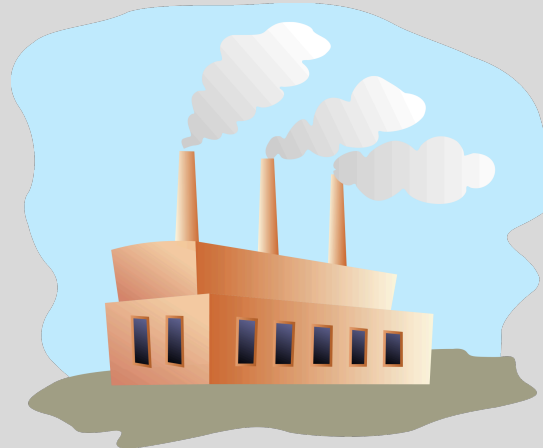
Human & Environmental Health Connected?



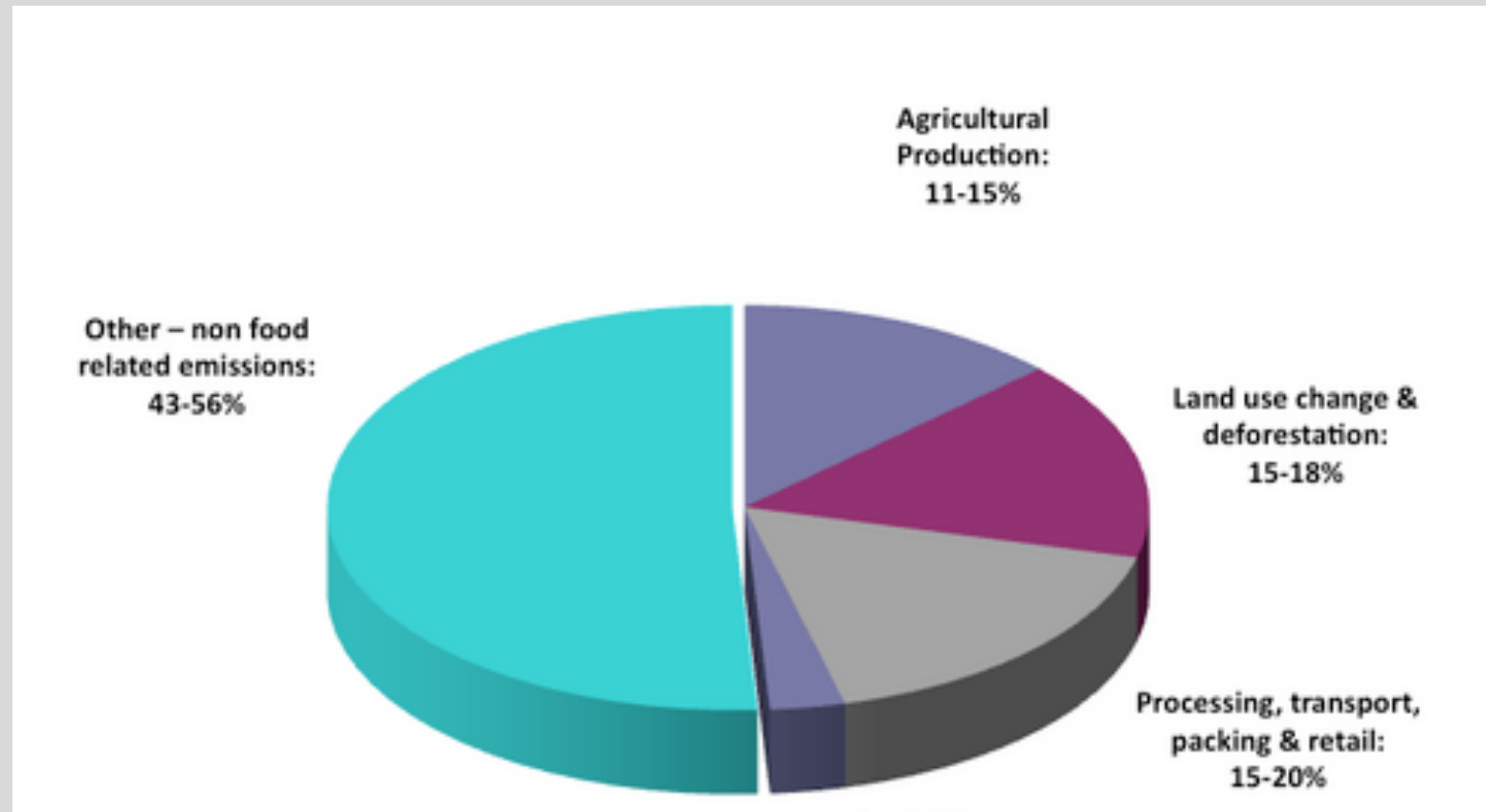
Americans face increased health care costs, debt, and environmental pollution. The correlation here is striking.

Precept #2

**Global Warming and Metabolic Disease are
Manufactured Plagues.**



The industrial food system is responsible for up to 57% of all global GHG emissions



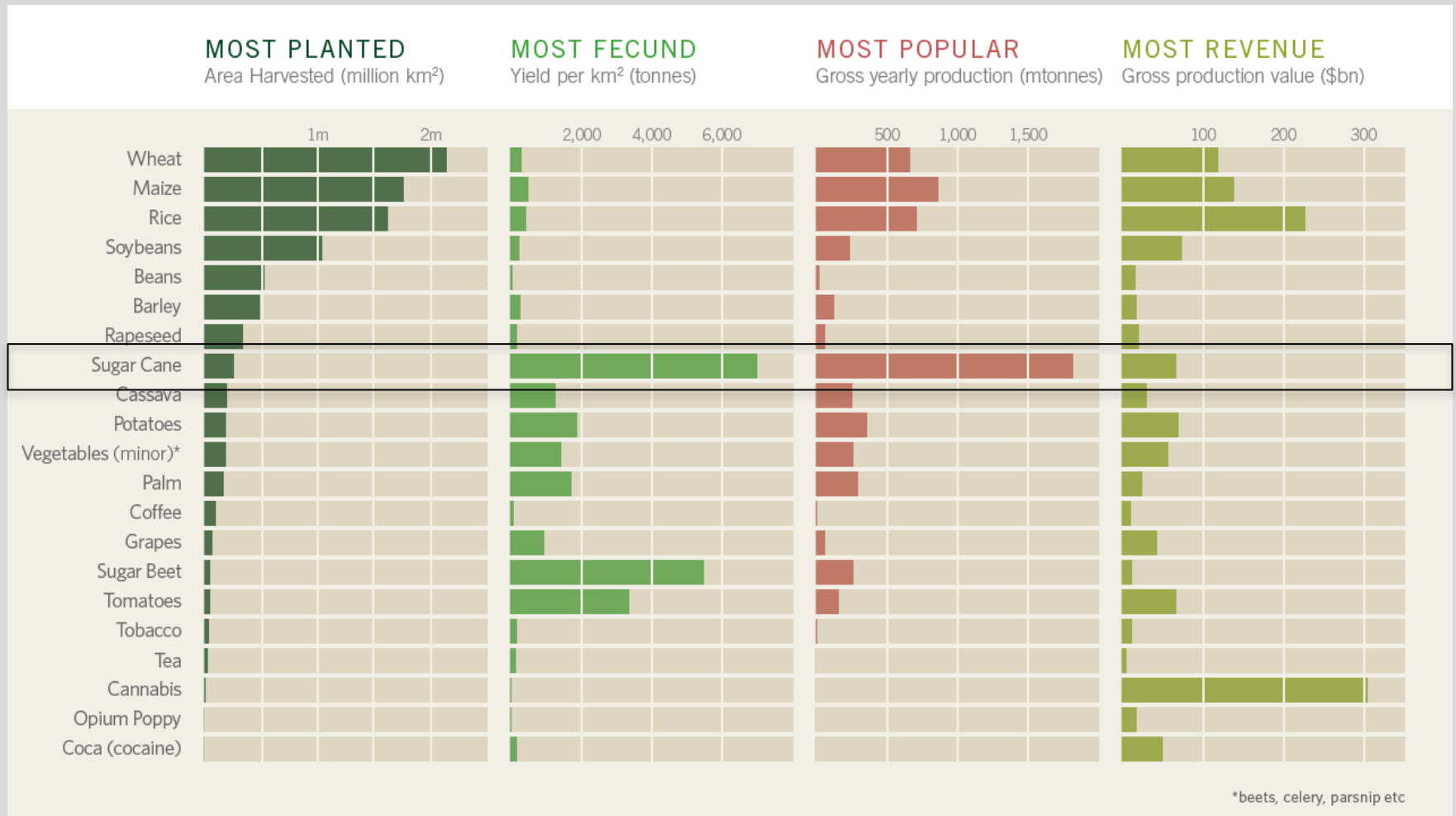
Precept #3

The ultimate solution to any environmental problem (metabolic disease, habitat destruction) involves addressing the problem at its roots.



Greenwashing unhealthy products won't work.

World's largest cash crops



Sugar Cane Leads in Yield and Tonnage

The Big Debunk

I'm going to address five myths
about nutrition that are
perpetuating diet related disease.

Myth #1

It's All About Obesity and the Energy Imbalance (Gluttony & Sloth)



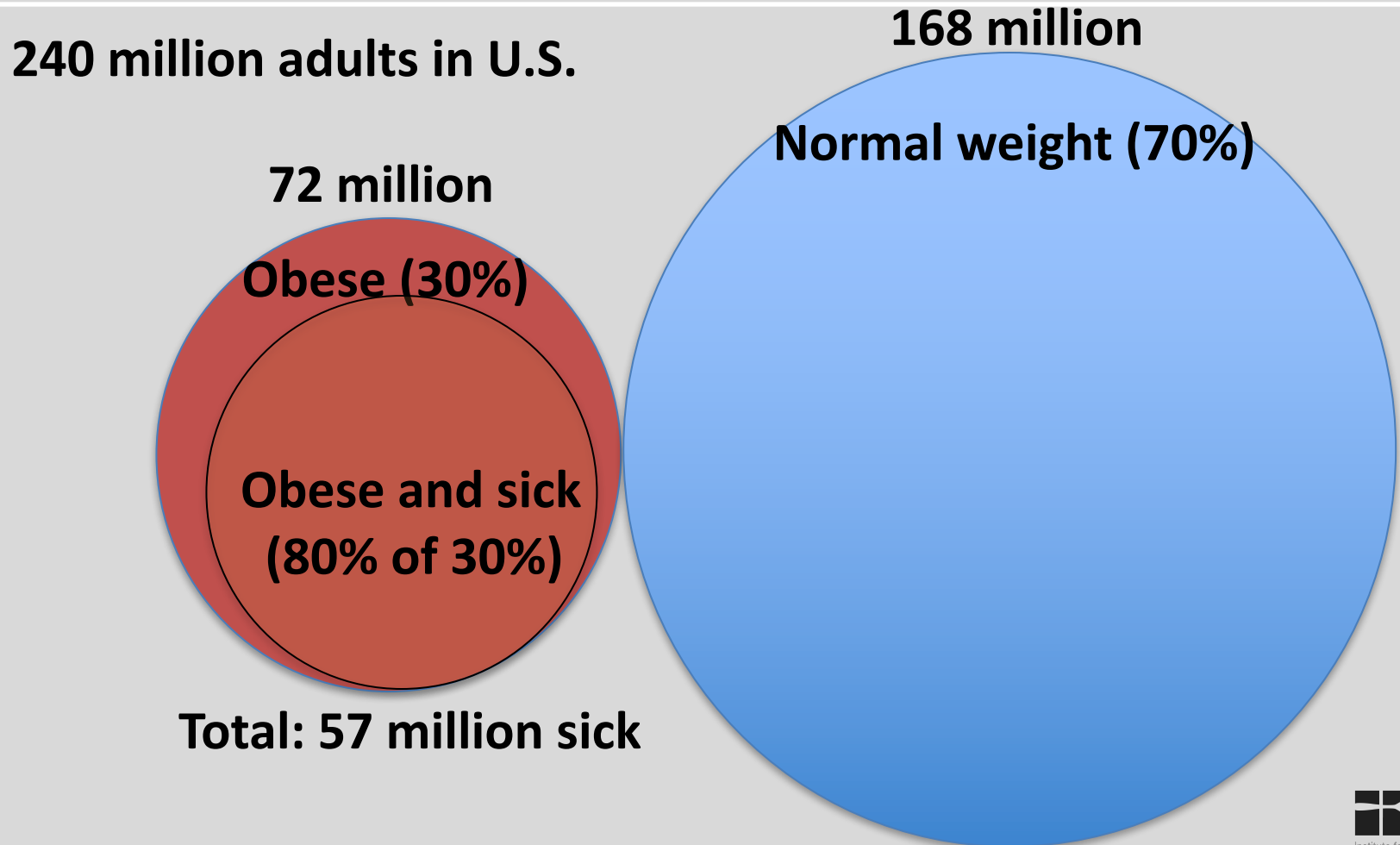
FACT

People generally don't die of obesity
(what is on the death certificate)

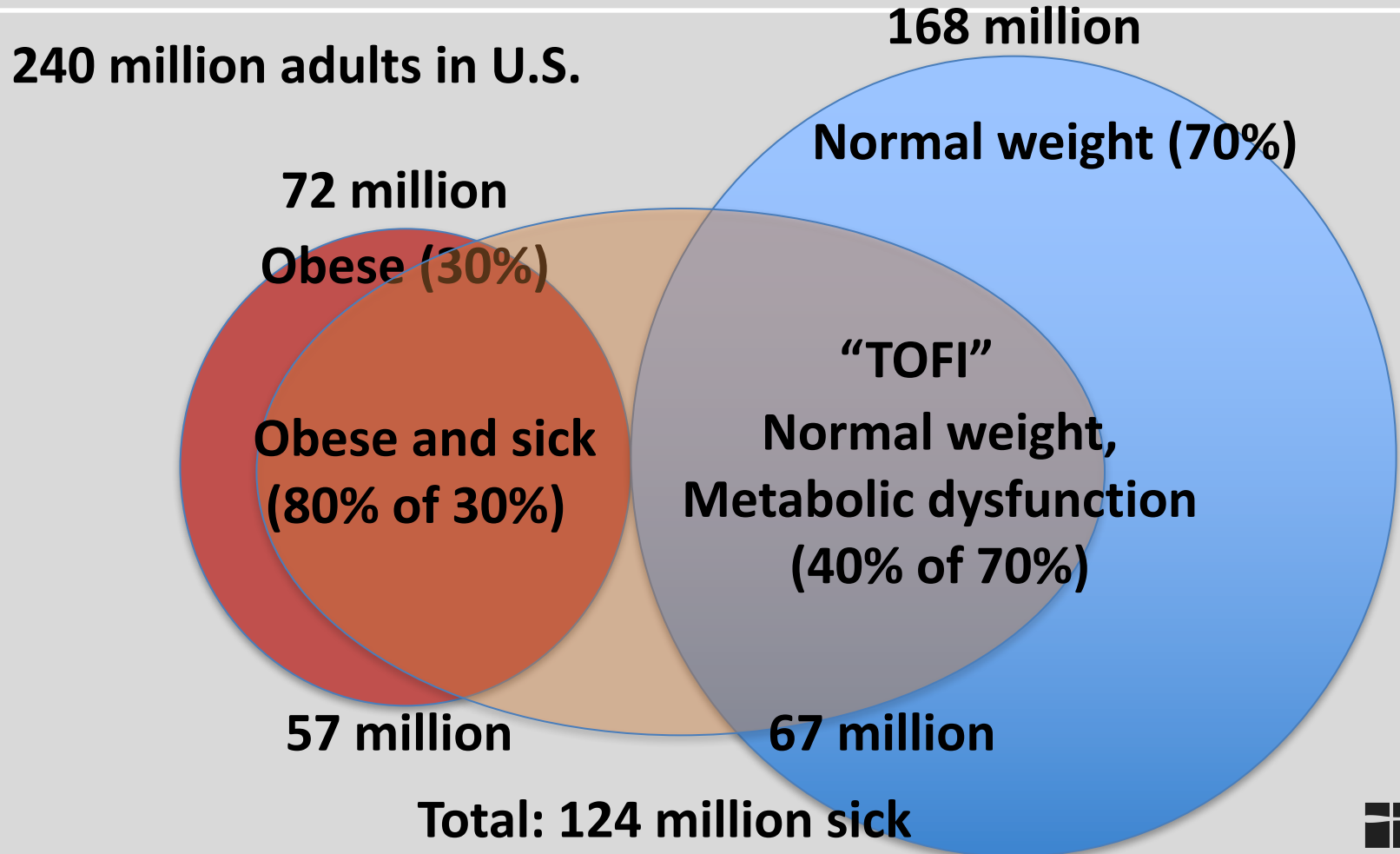
People die of
heart attack, stroke, NAFLD, type 2 diabetes:
and that's where the money goes.

Obesity is not the problem
Metabolic disease is the problem

“Exclusive” view of obesity and metabolic dysfunction

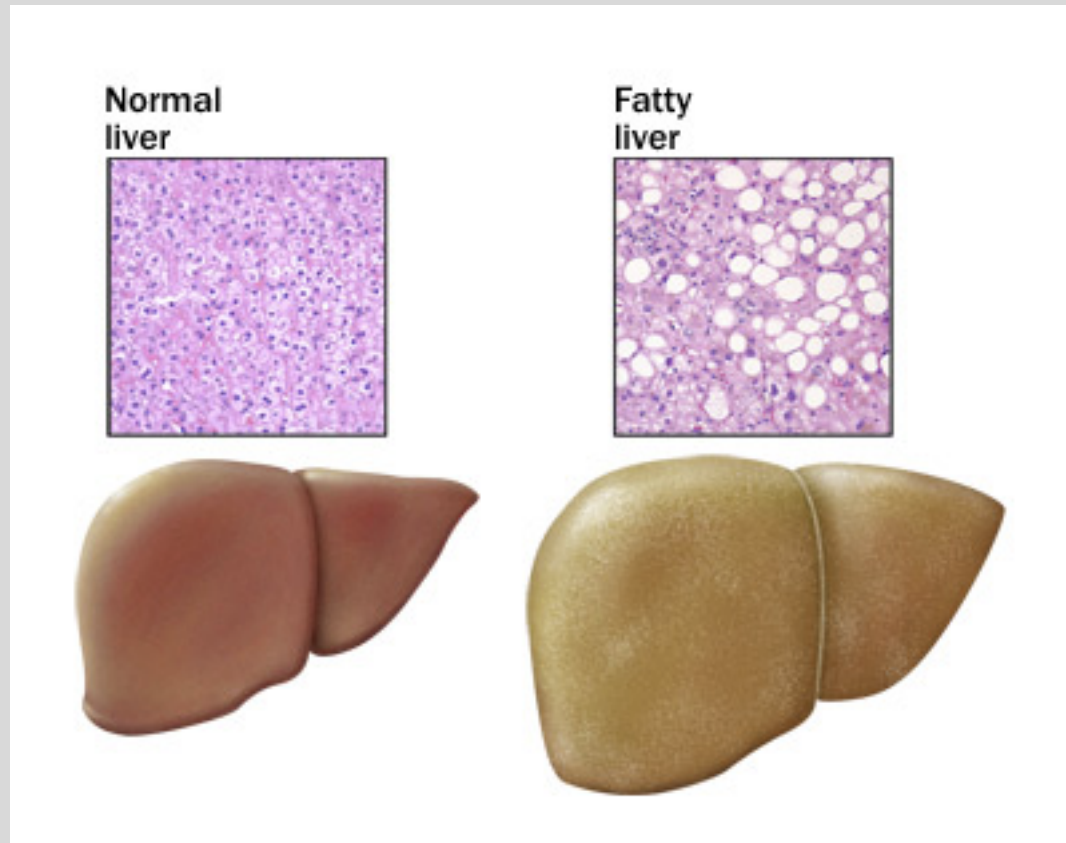


“Inclusive” view of obesity and metabolic dysfunction



FATTY LIVER DISEASE

NAFLD & Cirrhosis of the Liver look the same
Alcohol & Sugar have the same effect



Body Weight & Calories are Dumb Numbers – It's What's inside that Counts

Not Adequate

- Calorie Counting
- Body weight & BMI — thin people and gene types are at risk
- Glucose (blood sugar) — already too late?

We need Smart Metrics – What's inside?

- Nutritional Content / Values / Macro Nutrient Ratios / Fiber
- Waste circumference (for visceral fat)
- Percentage of Body Fat (PBF) / caliper test or micro-impedance scale
- Liver fat ALT @ NAFLD
- Liver ultrasound? MRI?
- Uric acid
- Fasting insulin, A1C
- Lipoprotein Particle Profile LDL – Low Density LipoProtein “particle number”, not LDL cholesterol is key
- Triglyceride/HDL ratio – predicts insulin resistance
- Need a biomarker for sugar consumption



Diet Related Disease

75% of Healthcare Dollars Spent on Diet-Related Disease

Obesity is not the problem

Metabolic (diet-driven) disease is where all the money goes
(75% of all healthcare dollars)

Diabetes

Hypertension

Lipid abnormalities

Cardiovascular disease

Non-alcoholic fatty livers disease

Polycystic ovarian disease

Cancer

Dementia

Today

25% of the global population
has metabolic disease and
347 million have diabetes.

Diabetes is NOT a subset of obesity

Obesity is increasing worldwide by 1% per year

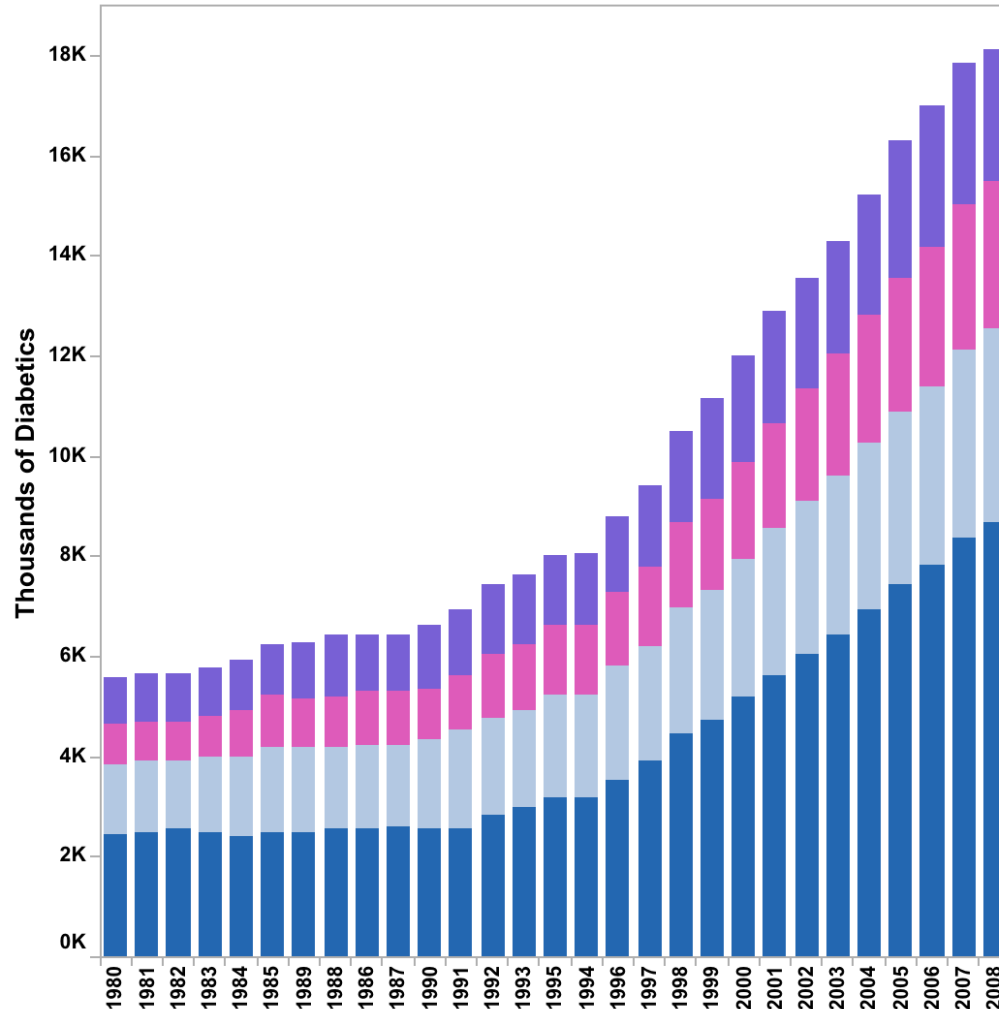
Diabetes is increasing worldwide by 4% per year

It's not about obesity —

**It's about metabolic dysfunction, of
which obesity is a result, not a cause**

The incidence of children with Diabetes has increased.

Data Source: Centers for Disease Control and Prevention



Diabetes Prevalance Among Age Groups

A CDC report estimates that the number of Americans with diabetes will range from 1 in 3 to 1 in 5 by 2050.

Proper diet and physical activity can reduce the risk of diabetes and help to control the condition in people with diabetes, the CDC said.

Who Is At Risk?

Risk factors for type 2 diabetes include older age, obesity, family history, having diabetes while pregnant, a sedentary lifestyle and race/ethnicity, according to the report.

African-Americans, Hispanics, American Indians/Alaska Natives, and some Asian-Americans and Pacific Islanders are at higher risk for the disease, the CDC said.

Lowest to Highest as of 2008

- 0 to 44 Years Old
- 75 Years Old and Up
- 65 to 74 Years Old
- 45 to 64 Years Old

Econometric Analysis of Diet & Diabetes

Total 204 countries; complete data for 154 countries (50 not different)

Controlled for: GDP per capita, % population living in urban areas, obesity, % of population over age 65, physical inactivity

Only changes in sugar availability correlated with changes in diabetes prevalence

Every 150 calories increased diabetes prevalence by 0.1%

**But if those 150 calories were a can of soda,
diabetes prevalence increased 11-fold, by 1.1%; $p > 0.001$**

**These data estimate that 25% of diabetes worldwide
is explained by sugar**

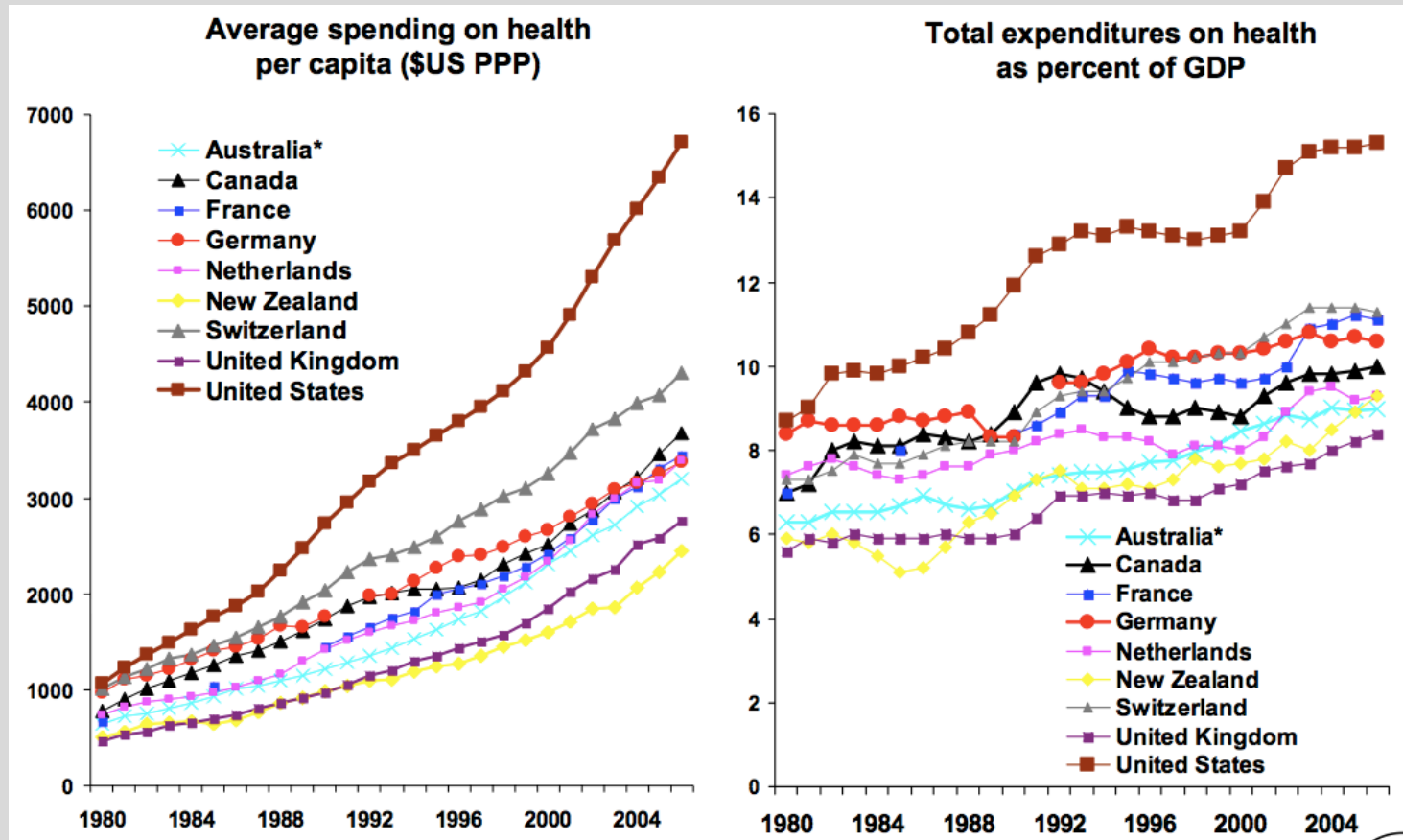
These data meet the Bradford Hill Criteria for Causal Medical Inference:

Dose, Duration, Directionality, Precedence

Basau et al, PLoS One, Feb. 27, 2013

U.S. Health Expenditures

Comparing Per Capita to Gross Domestic Product (GDP)



U.S. is the top line!

Where do health care dollars go?



97% spent on treating disease. 3% spent on preventing disease.
75 % of our health care costs are related to preventable conditions, mostly diet driven.

Myth #2

A Calorie is a Calorie



The Fictional Narrative

“Beating obesity will take action by all of us, based on one simple common sense fact:

All calories count, no matter where they come from, including Coca-Cola and everything else with calories...”

-The Coca Cola Company, “Coming Together”, 2013



The Human Body is Not a Bomb Calorimeter



Energy exchange is not as important as nutritional biochemistry (nutrient density, probiotic value, fiber, etc.).

The Science

- Some calories cause disease more than others (sugar, trans fats, etc.)
- Different calories are metabolized differently (whole grain vs. processed)
- Biochemistry, not just thermodynamics, should be used to evaluate food values
- You are what you metabolize, not what you eat.

PROCESSED FOOD
If it has a label,
consider it a warning label.



Processed Food

Too Little & Too Much

TOO LITTLE

Fiber

Omega-3 fatty acids (wild fish, flax)

Micronutrients

TOO MUCH

Trans-fats

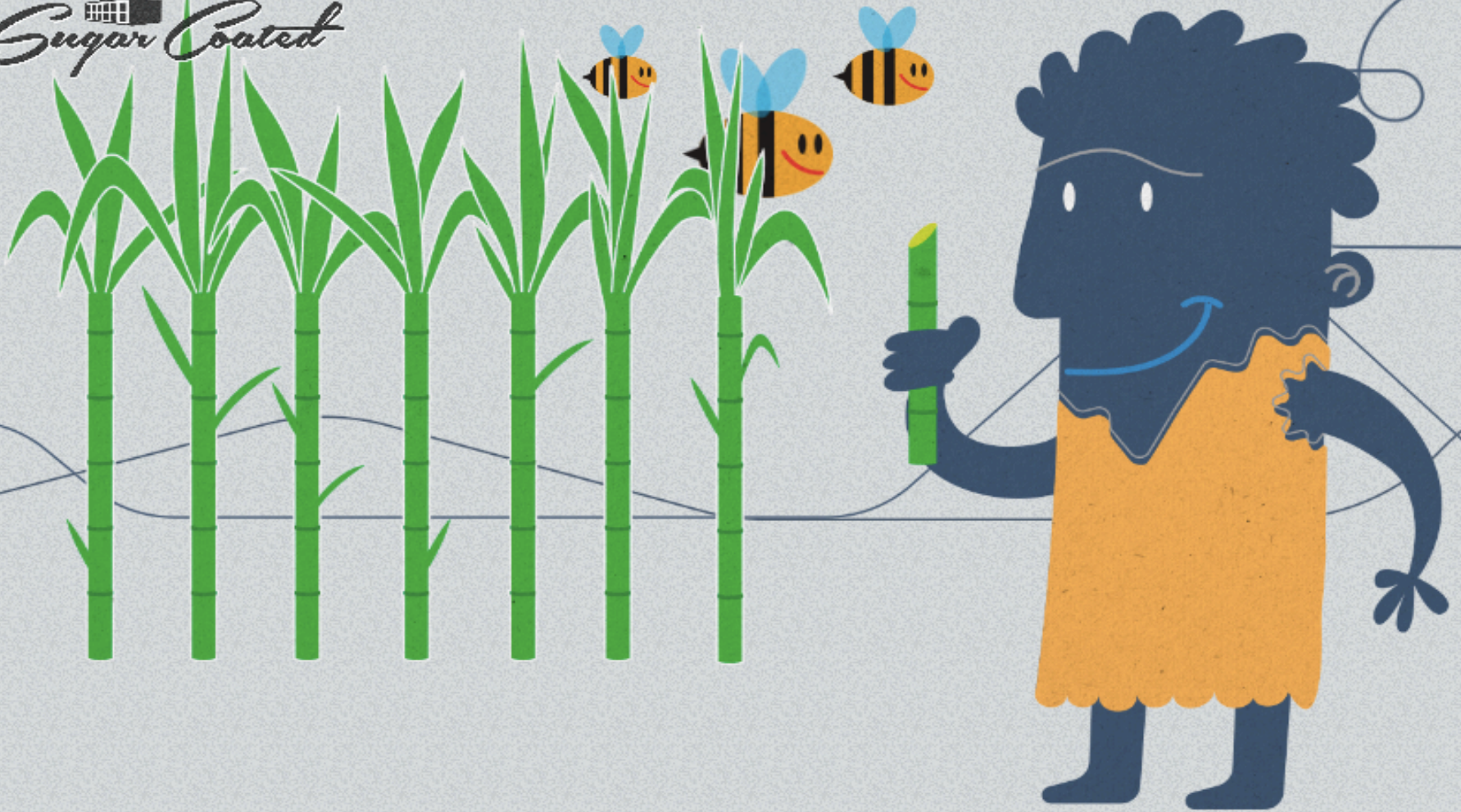
Branched chain amino acids (corn & corn fed)

Omega-6 fatty acids (plant oils, polyunsaturates)

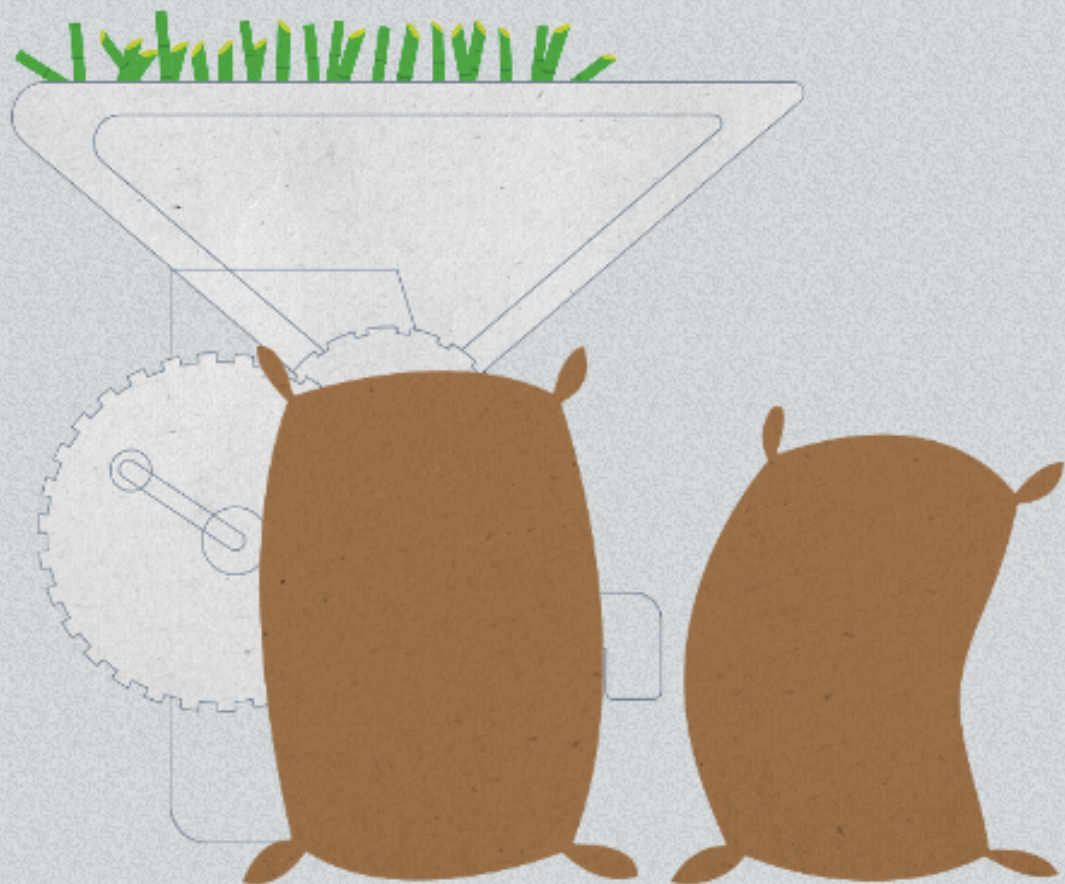
Alcohol

SUGAR!

 Sugar Coated



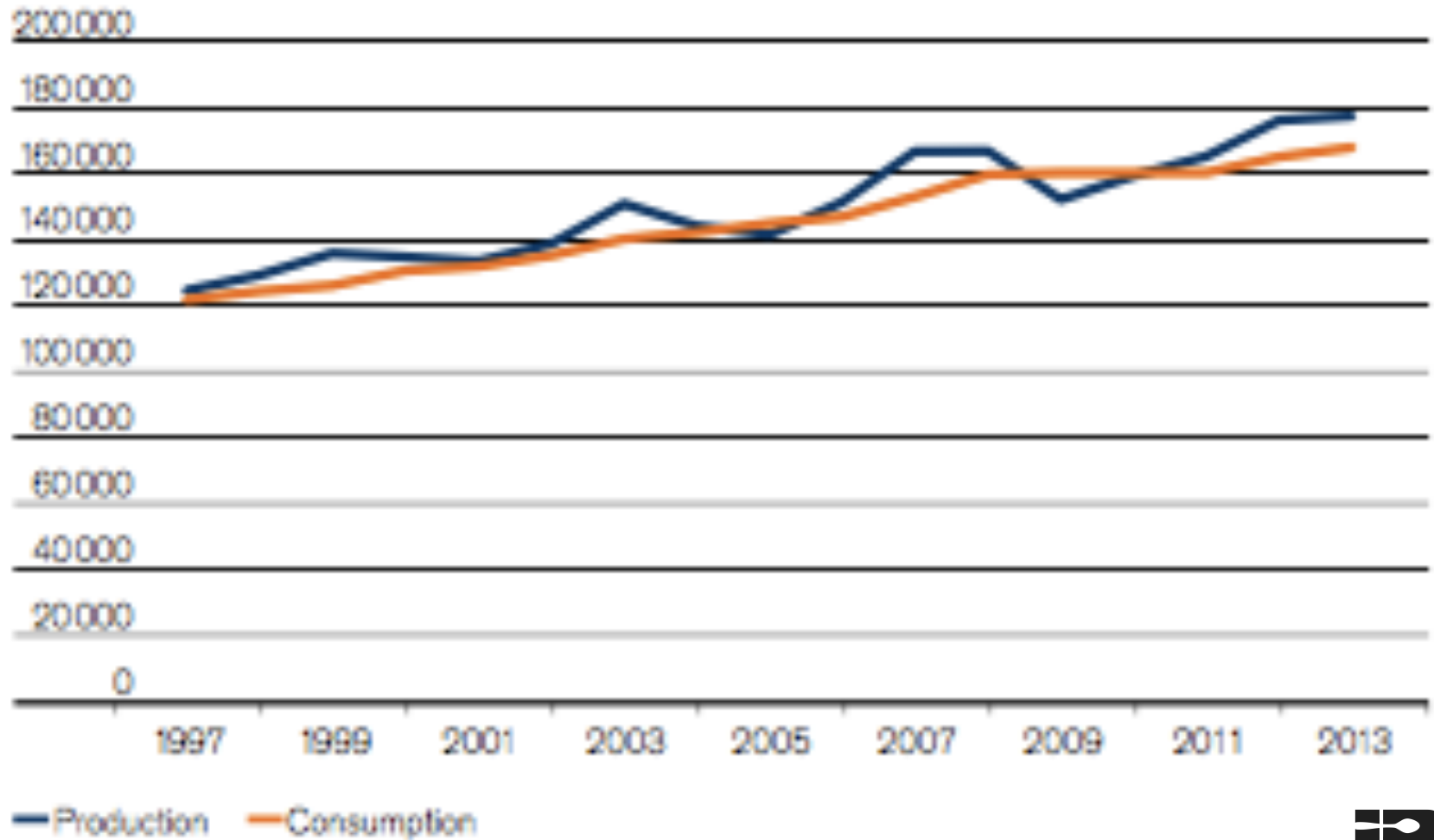
Sugar consumption has increased
dramatically in the last 30 years



Sugar production has soared

Supply/Demand of World Sugar

Source: FO Licht



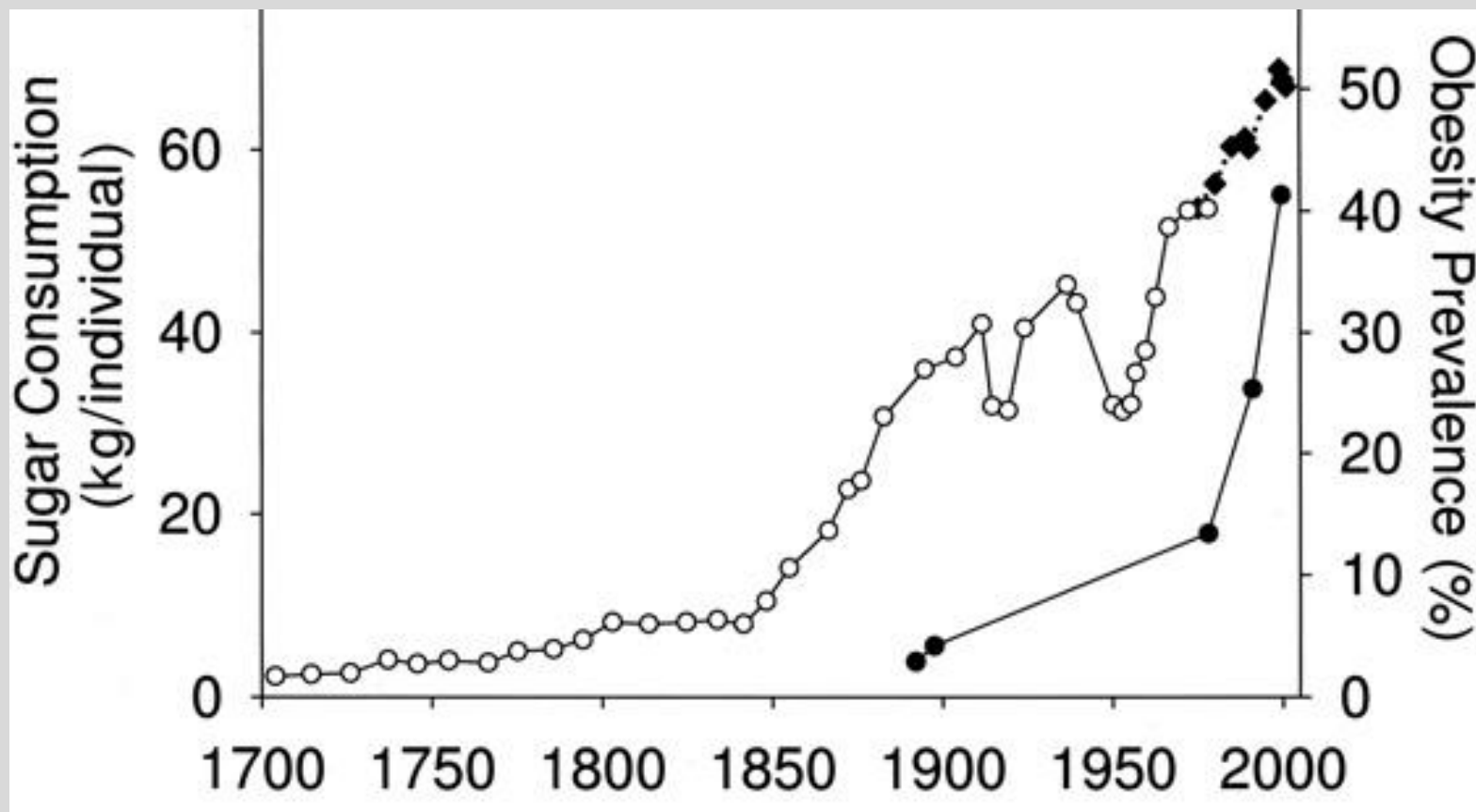
 Sugar Coated

SUPERMARKET



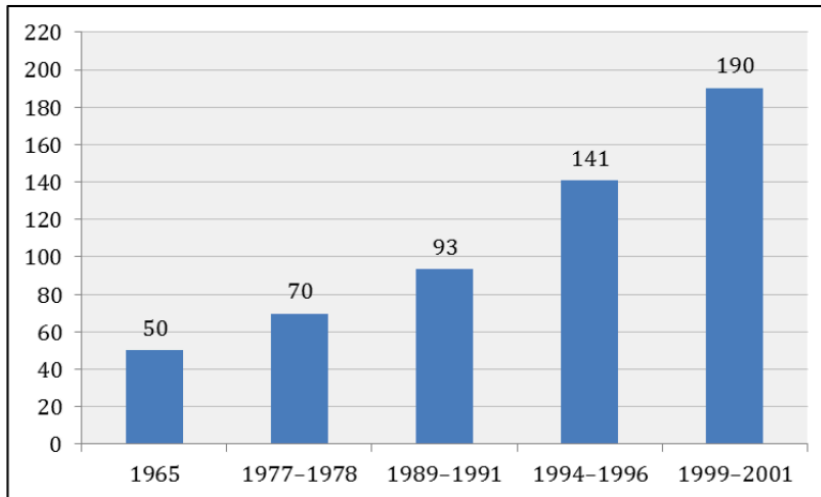
74% of U.S. Foods Have Added Sugar

Sugar Consumption Rises Along with Obesity – Long View



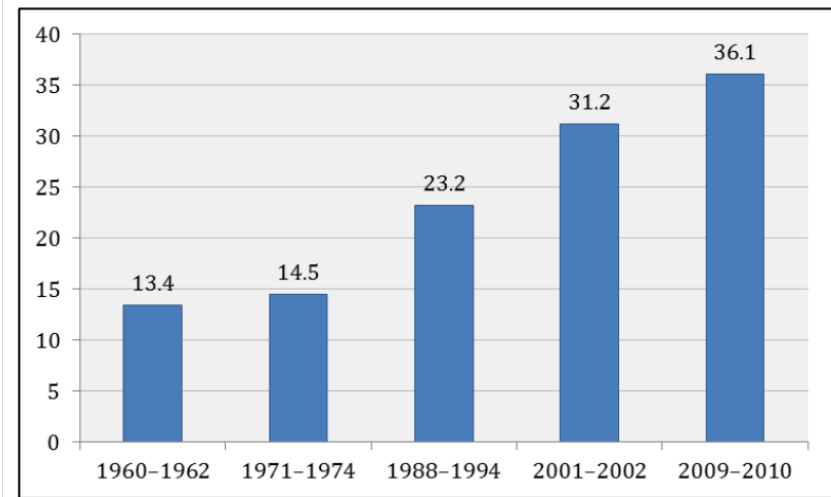
Consumption of sugar-sweetened beverages and prevalence of obesity

Graph 2: Per Capita Daily Caloric Consumption from Sugar-Sweetened Beverages in the U.S.



Data Sources: Nielsen and Popkin. Changes in Beverage Intake Between 1977 and 2001. <http://www.cpc.unc.edu/projects/nutrans/publications/Beverage%20trends-BP-Samara%202004.pdf>; Duffey and Popkin. Shifts in Patterns and Consumption of Beverages Between 1965 and 2002. <http://www.cpc.unc.edu/projects/nutrans/publications/Kiyah-beverage%20trendsOR2007.pdf>

Graph 3: Prevalence of Obesity among U.S. Adults, Aged 20-74, NHES and NHANES



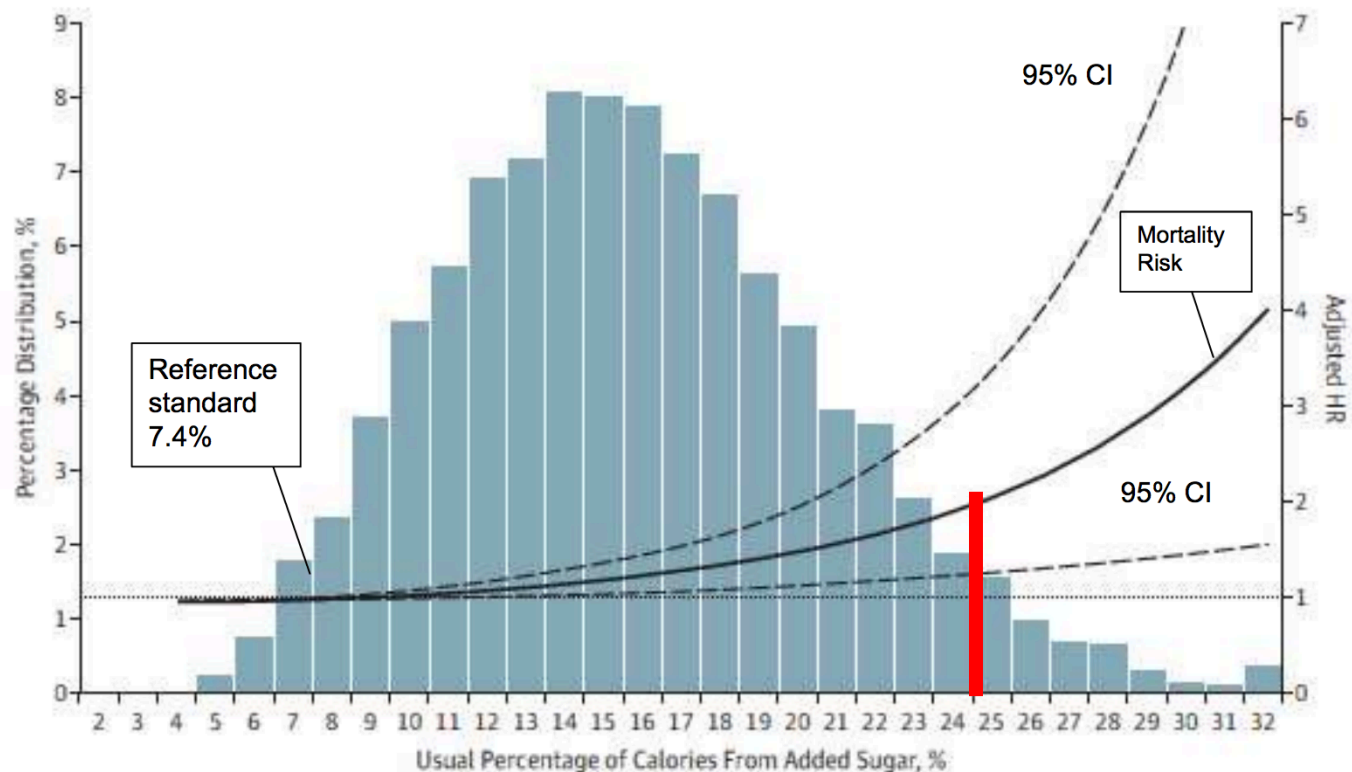
Data Source: Fryar, Carroll, and Ogden. Prevalence of Overweight, Obesity, and Extreme Obesity Among Adults: United States, Trends 1960-1962 Through 2009-2010. http://www.cdc.gov/nchs/data/hestat/obesity_adult_09_10/obesity_adult_09_10.pdf

Sugar Sweetened Beverages

Obesity – U.S. Adults

Sugar Consumption & Cardiovascular Disease

Those who consumed 25% of their calories from added sugar were 2.75 times more likely to die from cardiovascular disease (CVD) than those who consumed less than 10%.



Yang. Et al. Added Sugar & Cardiovascular Diseases Mortality Among U.S. Adults. JAMA Intern. Med. 2014 Apr 1, 174(4): 516-24



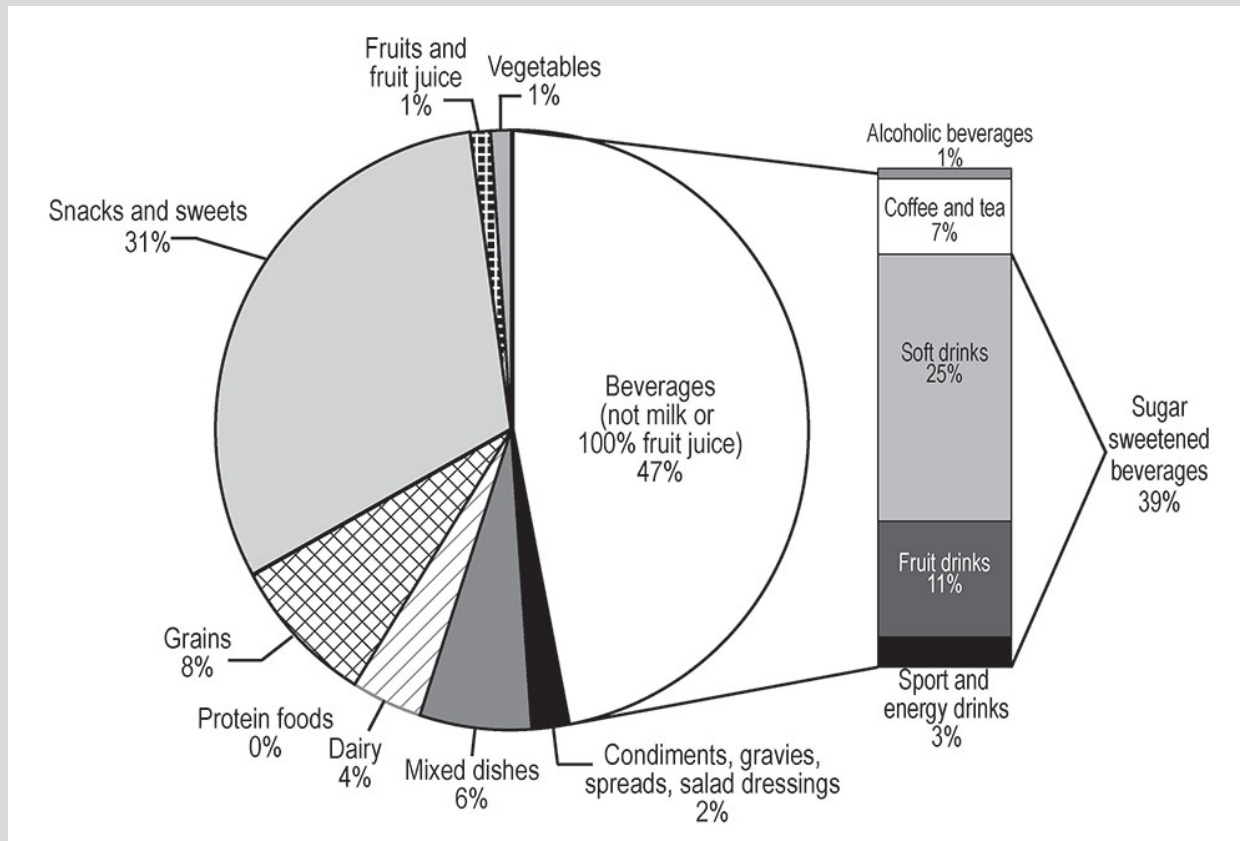
Public image of sugar is shifting...

Sugar has become the leading marker for processed food.

There are 600,000 food items in U.S. food supply and 74% have added sugar

**Once upon a time, Sugar was your pal.
Now, not so much.**

Hidden Sources of Sugar in the Diet



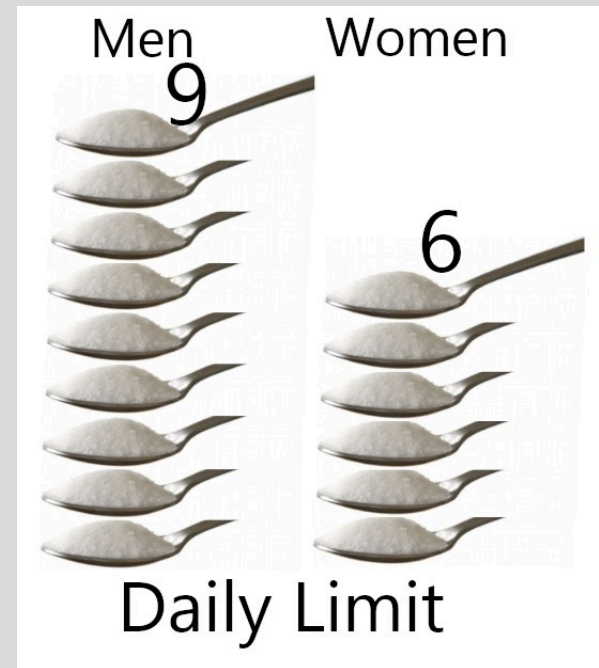
Source: What We Eat in America NHANES 2009-2010

47% Sugary Beverages
31% Snacks & Sweets
22% Other

Recommended Limits for Added Sugar

*American Heart Association & World Health Organization Agree – **no more than 10% of total calories should come from added sugar.***

Dental caries risk starts at 5%.
At 10-25%, your risk of heart attack is 30% higher. One can of soda a day puts you at 29% risk of Type 2 Diabetes.



9 1/3 teaspoons of
sugar in a can of
Coke

Myth #3

You are what you eat (e.g., fat makes you fat)



The Fat Hypothesis is Dead

There is strong evidence that total fat consumption has little impact on obesity.

After decades of low-fat foods, low-quality carbohydrates, processed food and sugar have emerged as the leading drivers of fat.

Healthy fats are bio active and essential to health.
The human organism can survive without carbohydrates, but not without protein and fat.

Turns out, fat isn't making us fat.

Simple carbs like bread and corn may not look like sugar on your plate, but in your body, they convert sugar when digested, and get stored as fat.

“A bagel is no different than a bag of Skittles to your body.”

– Dariush Mozaffarian, Harvard Epidemiologist

Processed carbohydrates and sugar are making you fat.

“Low-Fat” is Code for Sugar Added (Processed Food Marketing Scam)

The best available research suggests poor quality carbs affect the size of our waistbands at least as much as desserts.

Poor quality (low nutrient and fiber) carbohydrates are a clear risk factor for weight gain, metabolic dysfunction and diabetes.

The poorest quality carbohydrate is added sugar – it has no nutrient value, no fiber, and is toxic in sufficient quantities.

Processed carbohydrates convert readily to sugar and in excess quantities, gets stored as fat.

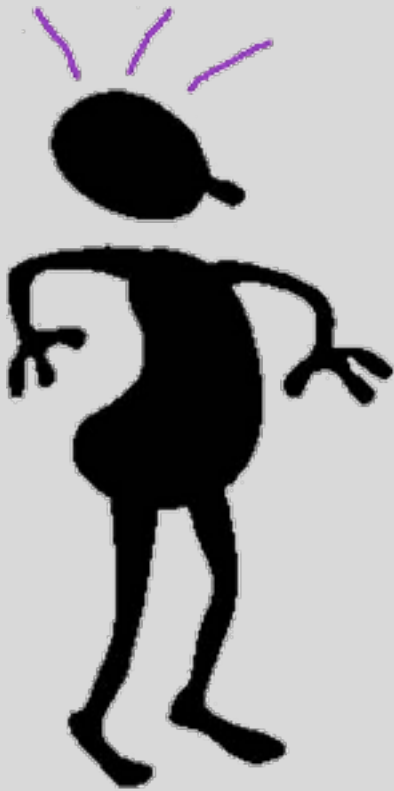


**You are what you
metabolize, not what
you eat.**

Myth #4

It's All About Personal Responsibility

Just Shut Your Pie Hole!



Sloth!



Glutton!

Blame & Shame!

“The obesity pandemic is due to our altered biochemistry, which is a result of our altered environment.”

— Dr. Robert Lustig, *Fat Chance: Beating the Odds Against Sugar, Processed Food, Obesity, and Disease*

“The obesity pandemic is entirely preventable. Thirty years ago, the prevalence of type 2 diabetes (high blood sugar) in children and adolescents was almost non-existent. Today, over 20,000 have it.”

-Wolfram Alderson, Executive Director,
Institute for Responsible Nutrition

Who is responsible?

The processed food industry says,
“Simply eat less and exercise more.”

They say consumers are to blame.
Science doesn't support this myth.

In order for us to be “responsible,”
we need

knowledge and access
to real, affordable food.

KNOWLEDGE IS POWER



**Personal
responsibility
requires
knowledge.**

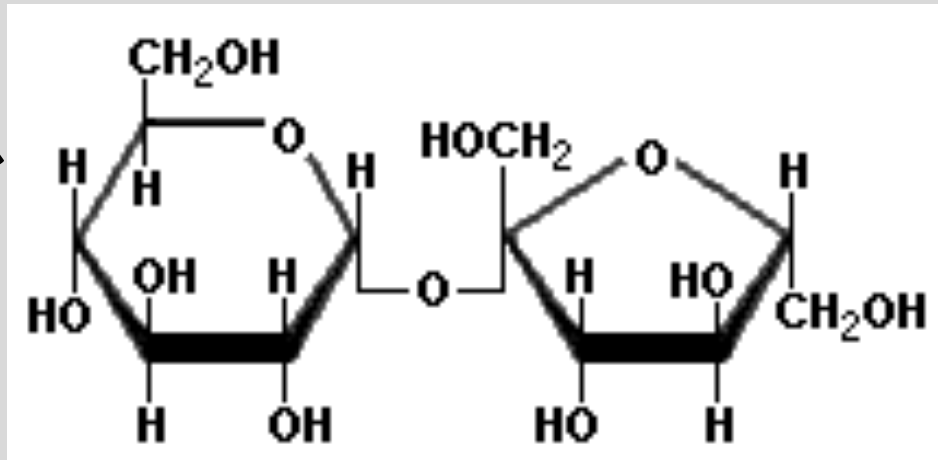
*(Not what the food
industry is promoting.)*

56 Names for Added Sugar

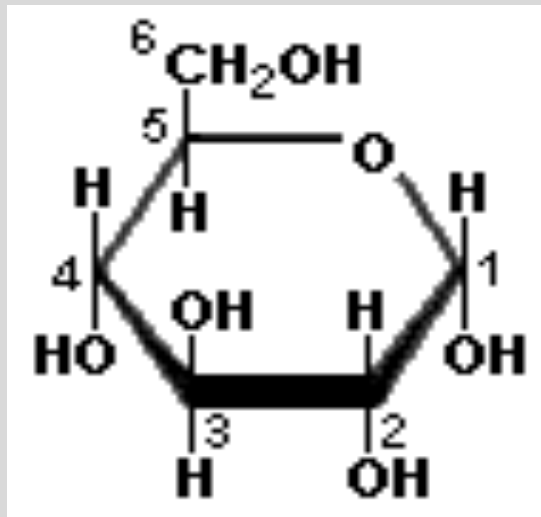
| | | | |
|----------------------|-------------------|-------------------|-----------------------|
| Agave nectar | Barbados sugar | Barley malt | Beet sugar |
| Blackstrap molasses | Brown sugar | Buttered syrup | Cane juice crystals |
| Cane sugar | Caramel | Carob syrup | Castor sugar |
| Confectioner's sugar | Corn syrup | Corn syrup solids | Crystalline fructose |
| Date sugar | Demerara sugar | Dextran | Dextrose |
| Diastatic malt | Diatase | Ethyl malitol | Evaporated cane juice |
| Florida crystals | Fructose | Fruit juice | Juice concentrate |
| Galactose | Glucose | Glucose solids | Golden sugar |
| Golden syrup | Grape sugar | HFCS | Honey |
| Icing sugar | Invert sugar | Lactose | Malt syrup |
| Maltodextrin | Maltose | Maple syrup | Molasses |
| Muscovado sugar | Organic raw sugar | Panocha | Raw sugar |
| Refiner's syrup | Rice syrup | Sorghum syrup | Sucrose |
| Agave | Treacle | Turbinado sugar | Yellow sugar |

Most added sugars are roughly
50% glucose and 50% fructose

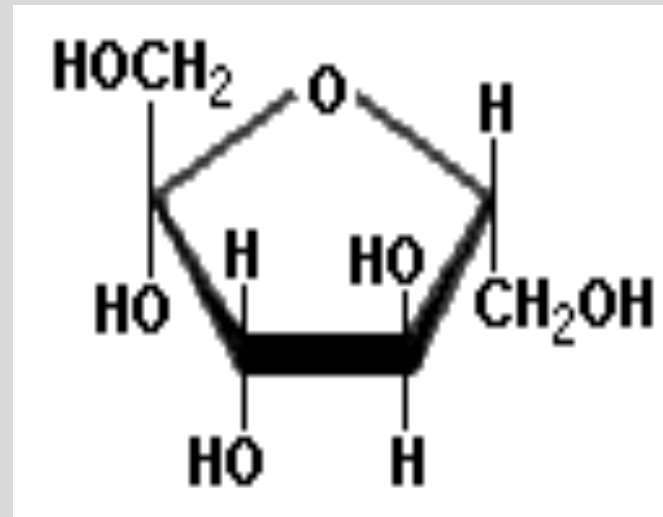
Table Sugar



Sucrose



Glucose



Fructose

Why don't they list "added sugars"?

Why is there no DRI for sugar?

- Only information on TOTAL sugars is available on the food label
- No information of "ADDED" sugars, which is a big problem
- No Dietary Reference Intake (DRI) for sugar; therefore, no upper limit.

Industry Says:

"Why would you need a DRI on something that was not a nutrient?"

Information on added ingredients is "proprietary."

| Nutrition Facts | | |
|---------------------------|-------|----------------------|
| Serving Size: 6 ounces | | |
| Servings Per Container: 1 | | |
| Amount per serving: | | |
| Calories | 160 | Calories from Fat 25 |
| % Daily Value | | |
| Total Fat | 2.5g | 4% |
| Saturated Fat | 1.5g | 8% |
| Trans Fat | 0g | |
| Cholesterol | 10mg | 3% |
| Sodium | 105mg | 4% |
| Total Carbohydrate | 26g | 9% |
| Dietary Fiber | 0g | |
| Sugars | 25g | |
| Protein | 8g | 16% |
| Vitamin A | 0% | Calcium 25% |
| Vitamin C | 0% | Iron 0% |

Personal responsibility vs. public health

Syphilis

Cholera

Lead poisoning

TB

Food-borne illnesses

Vitamin deficiencies

AIDS

Teen pregnancy

Pollution

Guns

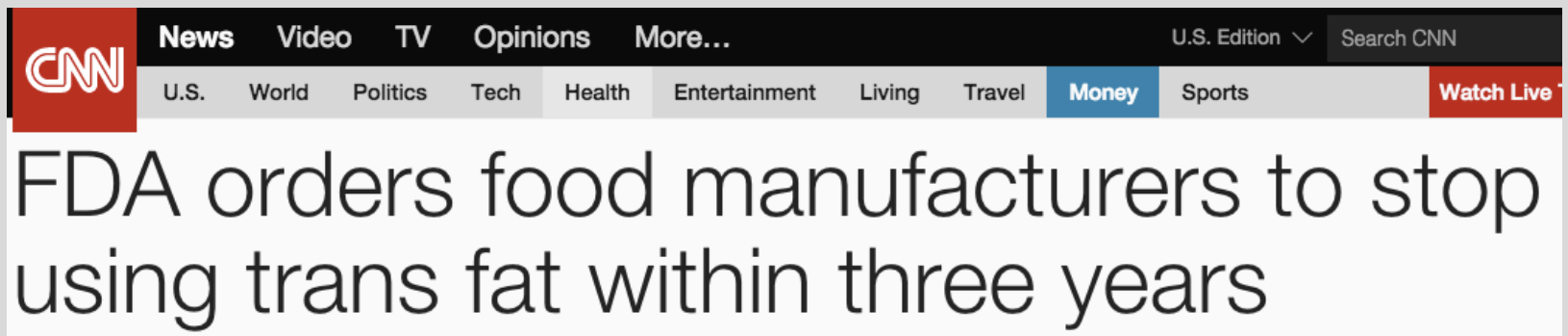
Sugar?

*Societal
intervention plays a
key role in public
health issues.*

*A continuum of
responsibility is
required – personal,
social, government,
business, etc.*

Myth #5

Industry and Government can be trusted to regulate and fix the food system and protect our health.



Ok, who in the room actually believes this myth?

Then why do we allow the status quo to continue?

Most people (want to) believe that what is on the shelf is safe for human consumption. We seem to be willing to eat just about anything...our trust level is too high.

E.g., Trans Fats – It took 60-70 years to figure out they are harmful and to remove them entirely from the diet – even the latest ruling allows 3 more years to phase them out, despite strong links to heart disease, stroke, and type 2 diabetes.

Profits and pandemics: prevention of harmful effects of tobacco, alcohol, and ultra-processed food and drink industries

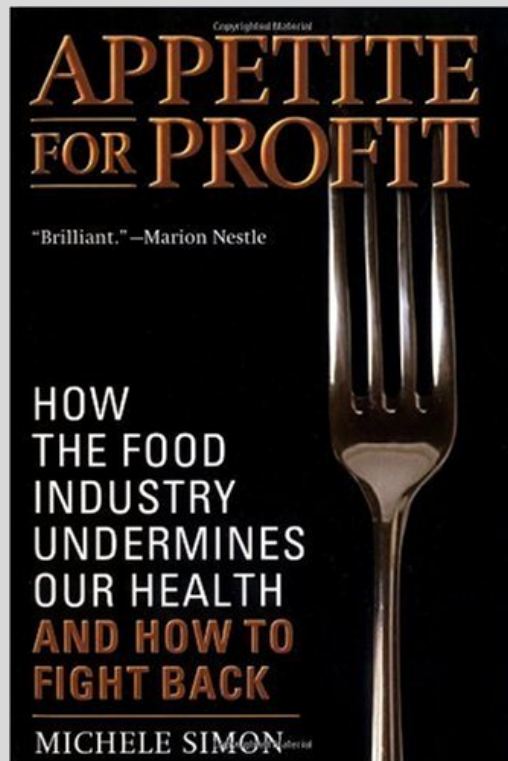
Rob Moodie, David Stuckler, Carlos Monteiro, Nick Sheron, Bruce Neal, Thaksaphon Thamarangsi, Paul Lincoln, Sally Casswell, on behalf of The Lancet NCD Action Group

Profits and Pandemics

(Past) Leading Vector of Disease
Infections & Microbes

(Present) Leading Vector of Disease
Chronic Multinational Disease Corporations

When it comes to the **food system**, and you have an **Appetite for Profit**, there are plenty of options that are **Lethal But Legal**



Essential Reading!

Research Institute

Thought leadership from Credit Suisse Research
and the world's foremost experts

Even the finance industry is concerned



Sugar
Consumption at
a crossroads

Surprisingly, **Mars, Inc.**, the world's largest candy corporation ***supports limiting & labeling sugar.***



Mars, Incorporated @MarsGlobal · 10h

We support @WHO & the US Dietary Guideline Advisory Committee's reco that people should limit added sugars intake: bit.ly/1cdxjtq



Legal Options for Intervention

The Hyderabad Statement

All significant advances in population health
require and involve the use of law.

Labeling and Limits on Added Sugar are Key.

**We need reliable information, scientific agreement
on limits and carrot & stick approaches.**

Legislative Options for Intervention

Advocacy

Attempt to apply pressure on government to *limit and label added* sugar.

USDA - DGAC Recommendations

(Supported by Mars Inc., world's largest candy company)
Legislation has long “on-ramp,” due to corporate lobbying
(e.g. Trans Fats)

Other strategies for congressional action:

Focus on low hanging fruit
(warning labels on sugary beverages)

Farm Bill

Eliminate subsidies on Sugar Cane , Corn, Beets, etc.?

Price subsidies cause market & diet distortion
Standard economic principles do not apply to addictive
and harmful substances

Action Items?

- **Education** – Learn More. IRN is involved in producing a range of engaging educational media, e.g. Sugar is Killing Us, Sweet Revenge, Sugar Coated, etc.
- **Econometric Analysis** – we need to show how sugar is impacting human & environmental health in economic terms...*we need to start sharing the same data sets.*
- **Big Sugar** will only respond to the market – how can we work together to make an impact?
- **AHA / WHO Guidelines on Sugar** (and hopefully soon the USDA). If followed, would result in a 60% reduction in added sugar consumption. How can we quantify this in terms of human AND environmental benefit?

For More Information
Institute for Responsible Nutrition

www.responsiblefoods.org



Wolfram Alderson
Executive Director
wolfram@responsiblefoods.org

Sugar Summary of Health & Environmental Concerns

| Health Concerns | Environmental Concerns |
|--|---|
| <ul style="list-style-type: none">• Sugar consumption is linked to obesity and increased risk of NCDs, in particular diabetes.• Diet related diseases consume 75% of health care costs in the U.S.• Research has linked high levels of sugar consumption to increased risk of cardiovascular disease and death, irrespective of other factors such as body mass index, activity levels and diet.• Sugar consumption is a major cause of tooth decay, which accounts for 5-10 percent of health spending in HICs.• Average person in the U.S. consumes 22.6 teaspoons of sugar per day. | <ul style="list-style-type: none">• Industrial monocropping causes soil erosion & degradation, air & water pollution, biodiversity loss & land clearance.• Sugar cane is accounts for 5 percent of global crop-driven deforestation 1990 to 2008.• Global sugar production for 2013-2014 estimated at 175 million (metric) tons. World sugar market is increasing by 2% per year.• Sugar production, distribution, and consumption contribute significantly to global warming. 241 kg of carbon dioxide equivalent are released to the atmosphere per ton of sugar produced. |