

2023 INTERNATIONAL CONGRESS OF ACTUARIES



BRIDGE TO TOMORROW

28 MAY – 1 JUNE 2023 • SYDNEY



International Actuarial Association
Association Actuarielle Internationale



The Growing Global Obesity Risk: Implications and Strategies

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May 30, 2023

*This presentation has been prepared for the 2023 International Congress of Actuaries.
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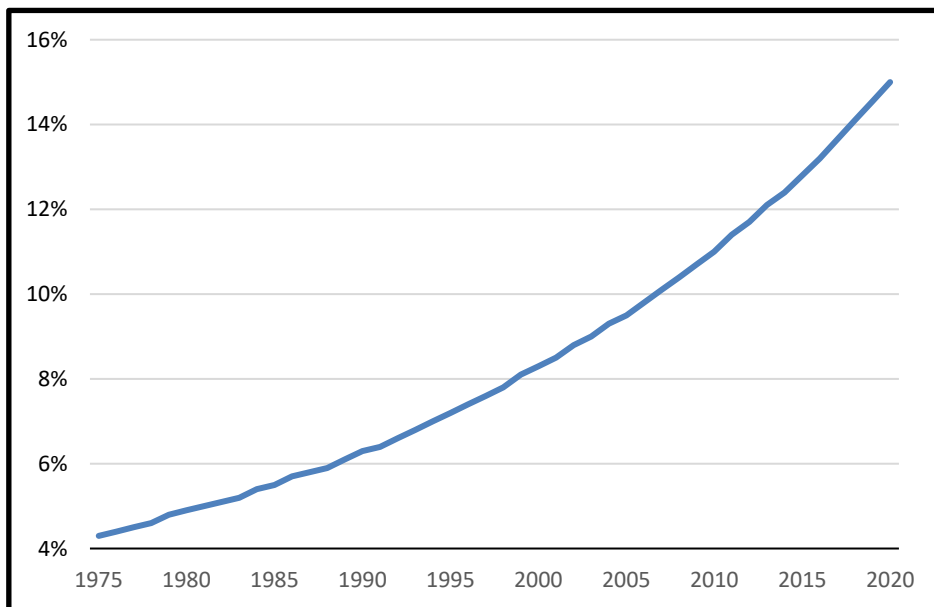


A GLOBAL PANDEMIC



A Pandemic of Obesity

Global obesity rate has more than tripled over the last 40+ years



Current global obesity > 15%

USA 42%

Mexico 36%

Saudi Arabia 35%

New Zealand 34%

Australia 31%

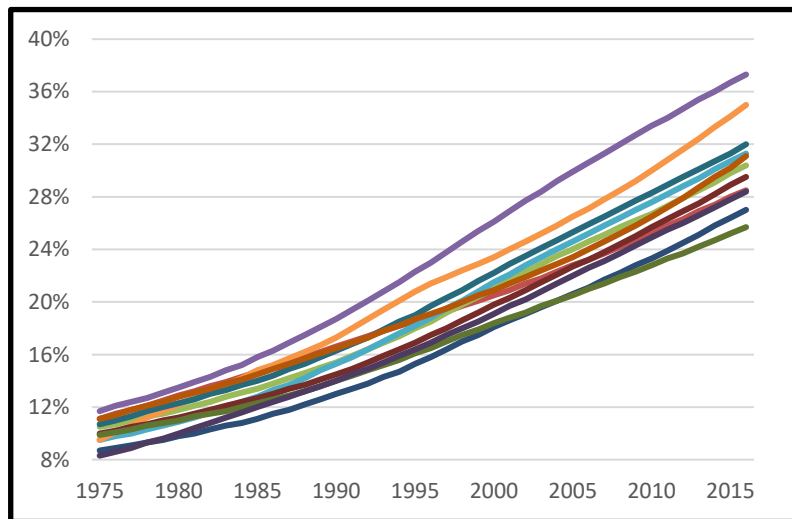
Canada 27%

UK 26%



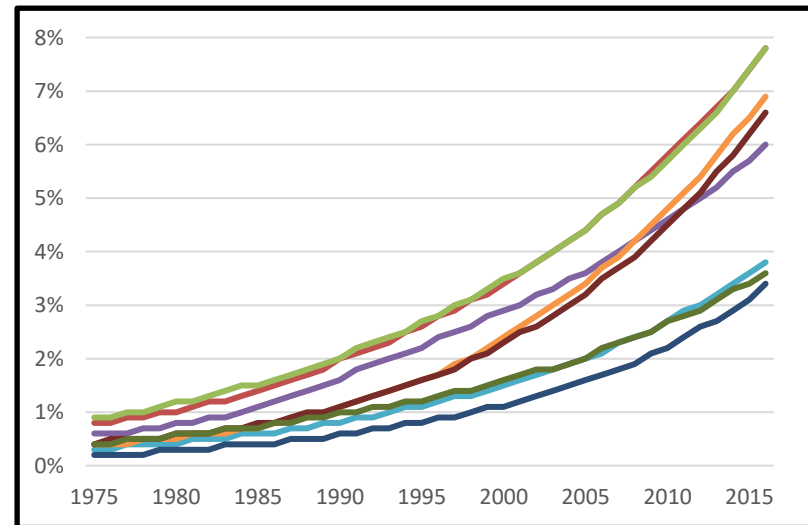
Obesity in Selected Countries

**Countries where obesity was relatively high
40 years ago: average increase = 186%**



USA, Saudi Arabia, New Zealand, Canada, Egypt,
Australia, UK, Argentina, Mexico, South Africa, Germany
(countries listed in decreasing order of 2016 obesity prevalence)

**Countries where obesity was relatively rare
40 years ago: average increase = 1,116%**



Pakistan, Nigeria, Indonesia, China, Philippines,
India, Ethiopia, Bangladesh
(countries listed in decreasing order of 2016 obesity prevalence)



What are the implications of obesity?

Increased Morbidity	
Type 2 Diabetes	600% increased risk
Musculoskeletal disorders (#1 source of pain and disability)	163% increased risk of knee osteoarthritis
Alzheimer's / Dementia	93% increased risk*

*Obesity at midlife: #1 modifiable risk factor for Alzheimer's in U.S., #2 in Australia



What are the implications of obesity?

(continued)

Increased Mortality	
All-Causes	64%
Cardiovascular (Heart) Disease	107%
Stroke	64%
Cancer	41%
COVID-19	42% (154% higher for 65+ age group)



What are the implications of obesity?

(continued)

Increased Cost	
Obesity (BMI>30)	52%
Severe Obesity (BMI>35)	74%

For risk-bearing entities:

- Inadequate pricing/reserving (life/disability/long term care products)
- Unsustainable rate increases or politically infeasible tax increases (health coverages)

BMI = Body Mass Index = body mass (kg) / height (m)²



HOW HAS OBESITY BEEN ADDRESSED ...AND WHY HASN'T IT WORKED?



Five Common (Unsuccessful) Strategies to Address Obesity

- **Count Calories / Eat Less**
- **Eat More Fruits and Vegetables**
- **Eat Less Sugar**
- **Bariatric Surgery**
- **Exercise More**



Failed Strategy #1: Count Calories/Eat Less

- Counting calories is difficult, time consuming and in many cases impossible
- Calorie labeling on packages and in restaurants has not influenced calories consumed
- Advice to eat less is vague, uses scientific language, often doesn't reference specific foods
 - World Health Organization – *“limit energy intake from total fats”*
 - U.S. Dietary Guidelines – *“limit saturated fat to less than 10% of calories”* and *“consume smaller portions”*
- Eating less is not sustainable - works against human nature - people need to be satisfied to maintain anything long-term
 - “Numerous studies show that individuals have a strong tendency to eat a consistent weight of food over a day and therefore strategies that rely on maintaining smaller portions of all foods are unlikely to be optimal or sustainable.” – Rolls (2014)*



Failed Strategy #2: Eat More Fruits/Vegetables

- Eating more fruits and vegetables is great advice and everyone should do it, but does not address underlying cause of obesity
- Average calories consumed from fruit and vegetables increased 30% over the past 40 years
- Provides an excuse for eating obesity-causing food (*"It's OK, I had an extra carrot"*)



Failed Strategy #3: Eat Less Sugar

- Global consumption of sugar has only increased 7% over the last 40 years
- Sugar is now a smaller proportion of the overall diet than 40 years ago (8% of total calories)
- Distracts from the addressing an individual's entire dietary intake
- In the U.S., sugar consumption declined 15% while obesity is up 60% over the past 20 years



Failed Strategy #4: Bariatric Surgery

- Side effects are numerous and significant:

Complications of surgery	17%
Reoperation after initial surgery	7%
Death	0.3%

- Expensive: about \$25,000 USD
- Ineffective: after 5 years, only 40% of the initial excess weight was lost



Failed Strategy #5: Exercise More

- Everyone should exercise more, but lack of exercise does not address root cause of obesity
- Insufficient levels of exercise have not changed since 2001, obesity up 50%+ since then
- Not enough time in the day to compensate for foods that are being regularly consumed

Food	Minutes of walking to burn off calories
Sirloin steak	80
2 slices cheese pizza	78
Grilled chicken sandwich	62
Salmon filet	55
Ice cream cone	48

- Even if someone could exercise this much, after an initial adjustment period, humans burn about the same number of calories per day regardless of physical activity levels



Failed Strategy #5: Exercise More

(continued)

Constrained Total Energy Expenditure Research

- At higher levels of physical activity the body compensates and conserves energy by reducing the calories used for other bodily processes
Example: very active hunter-gatherer societies burn about the same number of calories as similar sized sedentary individuals in Western societies
- *“Increasing daily activity through exercise or other programs will ultimately have little effect on the calories burned per day.” – Pontzer (2021)*



THE SOLUTION TO THE OBESITY PANDEMIC



What is the Root Cause of Obesity?

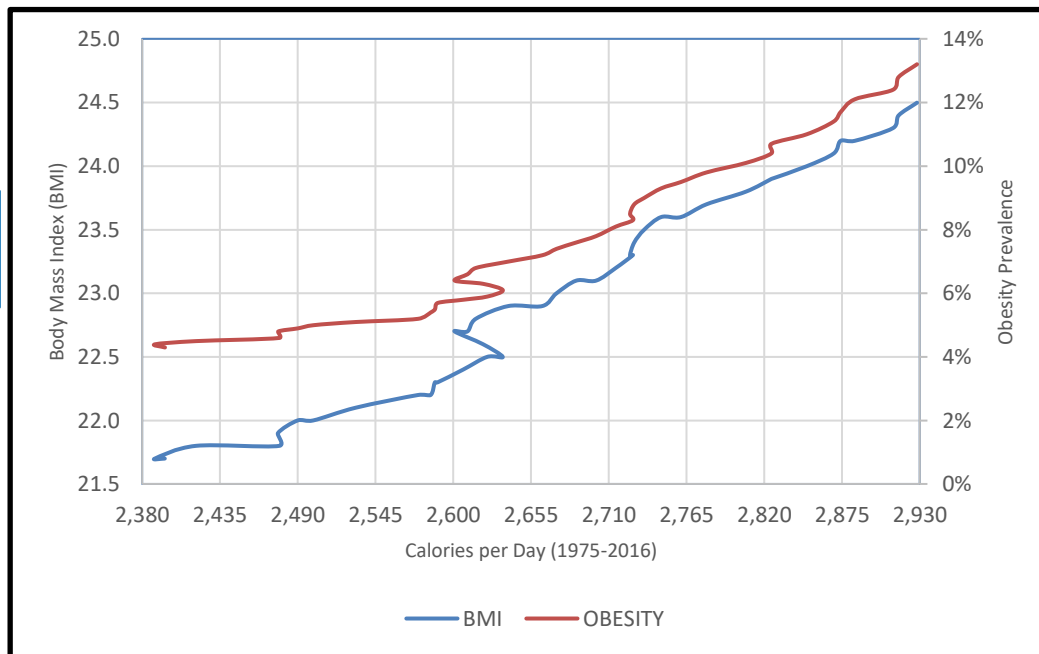
Excess Calories

- **Calories available have increased 22% over the past 40 years**
- **Both Obesity and BMI are almost perfectly correlated with calories**



Excess Calories: Feeding the Obesity Pandemic

Calories & BMI
Correlation: $\rho = .99$

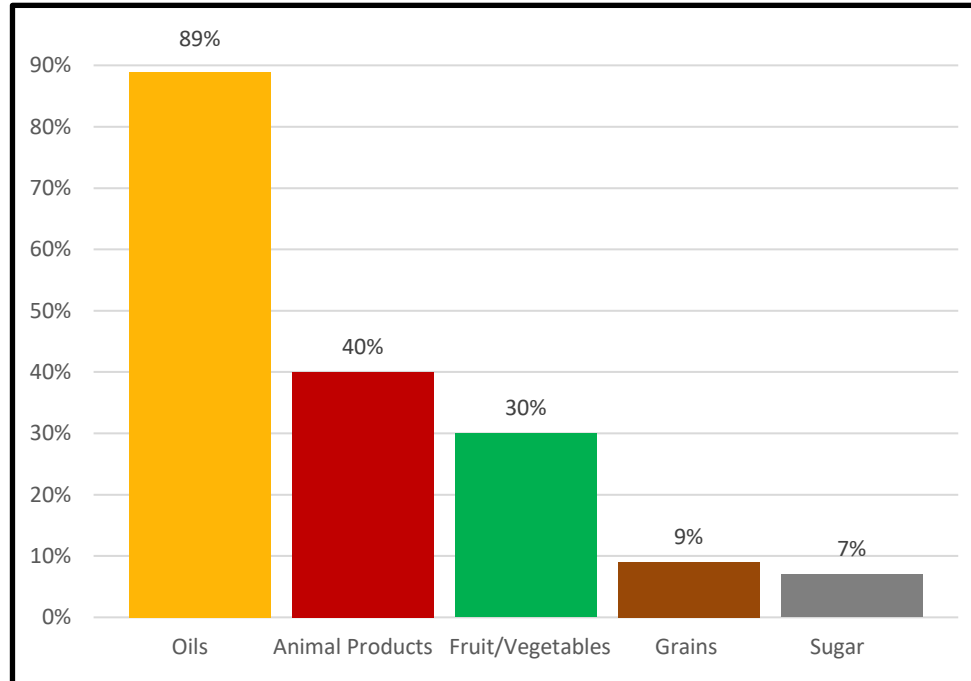


Calories & Obesity
Correlation: $\rho = .97$



Source of the Excess Calories

% Change in Calories over the past 40 years





Oils and animal products: Driving the growth in excess calories

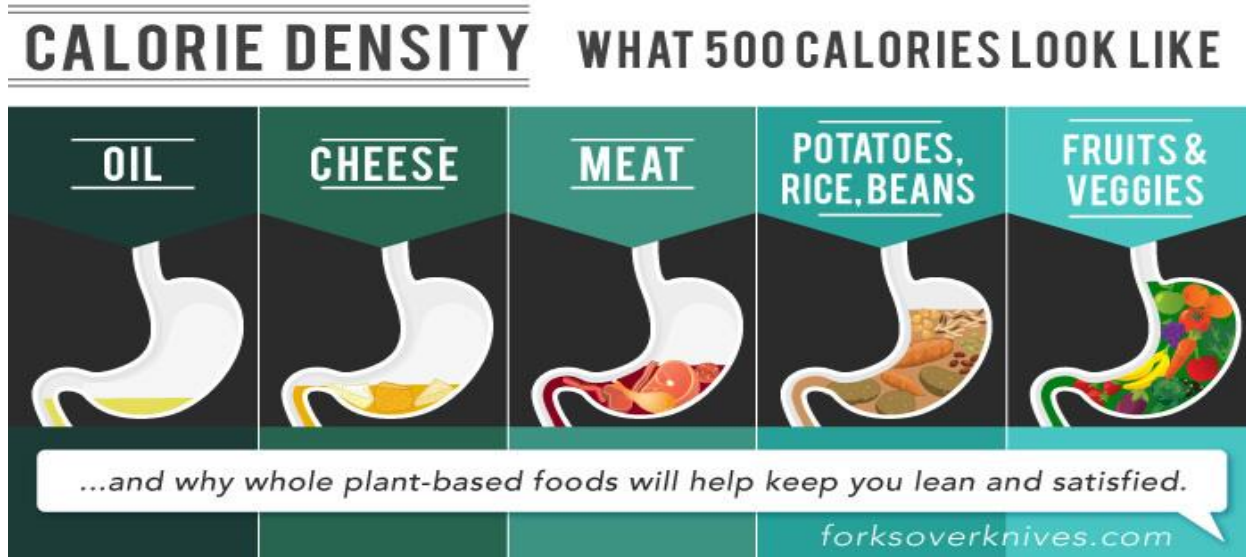
Item	Growth in amount consumed over last 40 years*	Calories per 100g serving
Oil	89%	884
Beef	-20%	150-250
Chicken	236%	165-230
Processed Meat	152%	150-400
Cheese	175%	200-400

For comparison, the calories per 100g of common fruits and vegetables are substantially lower: broccoli (34), apple (52), sweet potato (92), brown rice (112)

**Processed meat and cheese are slightly different time frames than 40 years than the other foods shown due to data availability.*



Impact of Calorie Density on Obesity



Obesity spiral: as the proportion of the diet based on animal products and oils increases, the amount of calories to feel satisfied increases.



Whole Food Plant-Based Nutrition:

What does it look like in practice



The Simple Solution to Eliminate Obesity

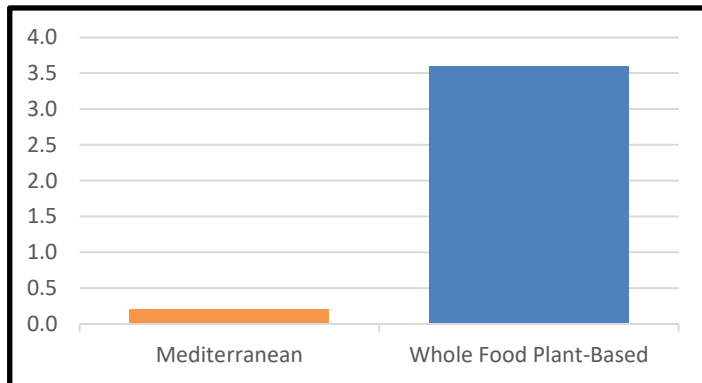
- Include all minimally processed plant foods: whole grains, legumes (beans), vegetables, fruits
- Exclude all oils (present in almost all highly processed foods)
- Exclude all animal products: meat (beef, chicken, fish, turkey, pork etc.), dairy products, eggs
- Eat until satisfied - don't count calories or portions
- Enjoy your food!



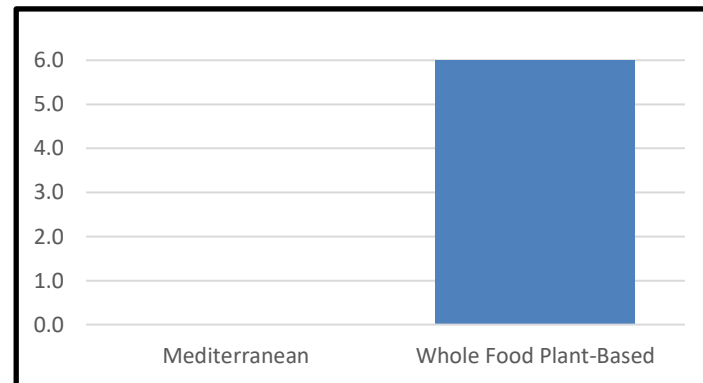
What about the popular Mediterranean Diet?

Randomized Crossover Trial Among Obese Individuals – No limits on calories – 36 week duration

Body Fat Loss (kg)



Weight Loss (kg)



- Mediterranean diet includes whole plant-based foods and discourages processed foods, but also includes substantial calories from meat, dairy products, oil
- No evidence from this or other studies that a Mediterranean diet will reduce obesity, unless subject to strict calorie restriction



Whole Food Plant-Based Nutrition: The Solution to the Obesity Pandemic

Reasons Why This Approach Has Been Successful for Treating Obesity

- **No willpower necessary:** eat until satisfied and if hunger occurs, simply eat more
- **Sustainable:** positive results are achieved quickly, motivation to continue is high
- **Adaptable** to any cultural preference, no specialty or expensive foods required
- **Infinite variety** and combinations of different flavors/textures to suit any taste preference
- **Whole and minimally processed plant-based foods** are very affordable



Whole Food Plant-Based Nutrition Addresses Many of Obesity's Comorbidities

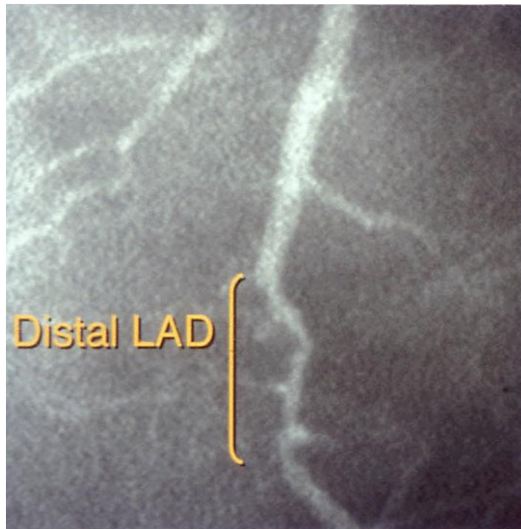
Example: Heart Disease (obesity increases risk > 100%)

- **World's #1 killer**
- **Heart disease has killed millions more people than COVID since 2020**
- **Whole food plant-based nutrition has reversed heart disease as demonstrated in randomized clinical trials (no other treatment has done this)**

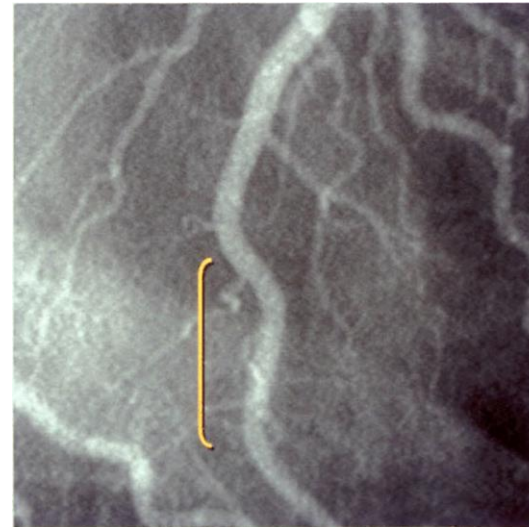


Reversal of Heart Disease Using Whole Food Plant-Based Nutrition

27 November 1996



22 July 1999





Positive Side Effects of Treating Obesity with Whole Food Plant-Based Nutrition

Has effectively treated and often reversed all of the following:

<p>Cardiovascular (Heart) Disease</p> <p>Diabetes</p> <p>High Blood Pressure</p> <p>Osteoarthritis / Rheumatoid Arthritis</p> <p>Erectile Dysfunction</p> <p>Multiple Sclerosis</p> <p>Lupus</p> <p>Chronic Kidney Disease</p>	<p>Cancer (some forms)</p> <p>Constipation/IBS</p> <p>Acid Reflux/GERD</p> <p>Dementia/Alzheimer's</p> <p>Asthma</p> <p>Kidney Stones</p> <p>Crohn's / Ulcerative Colitis</p> <p>Acne</p>
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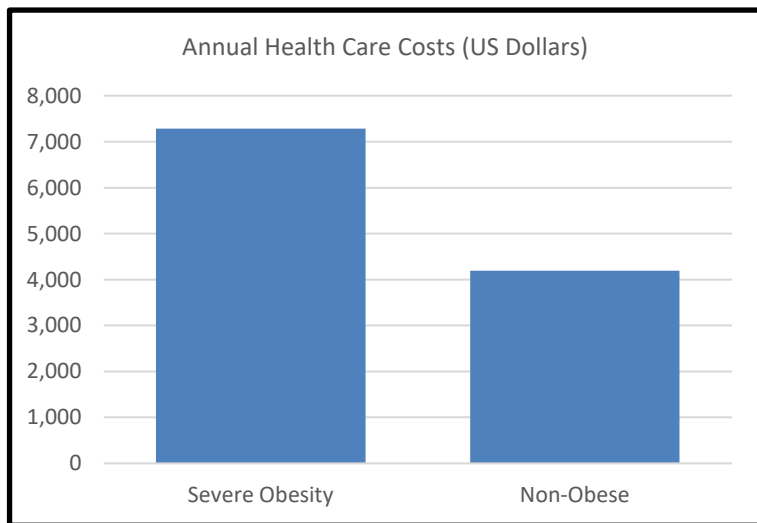


STRATEGIES TO IMPLEMENT THE WHOLE FOOD PLANT-BASED SOLUTION AND HOW ACTUARIES CAN PLAY A ROLE



Financial Incentive Strategy #1: Providers

Health care providers receive cash payments for educating patients about whole food plant-based treatment for obesity



- Reversal of severe obesity in one patient generates significant reductions in health care costs
- A portion of this savings is paid to the responsible health care provider
- Payments would continue on an annual basis if improved BMI is maintained



Financial Incentive Strategy #2: Facilities

Health care facilities (e.g. hospitals) reimbursement is contingent upon foods served to patients

Without financial incentives, most health care facilities have not acted on the following:

- **2015 World Health Organization (WHO) determination: processed meats cause cancer**
- **2017 resolution by American Medical Association:**
Hospitals should provide plant-based meals and eliminate processed meats from menus.
- **2018 position statement by Australian Medical Association:**
Food provided in health care settings should include options that are plant-based.
- **2019 Canada eliminated dairy as a food group from its Food Guide**

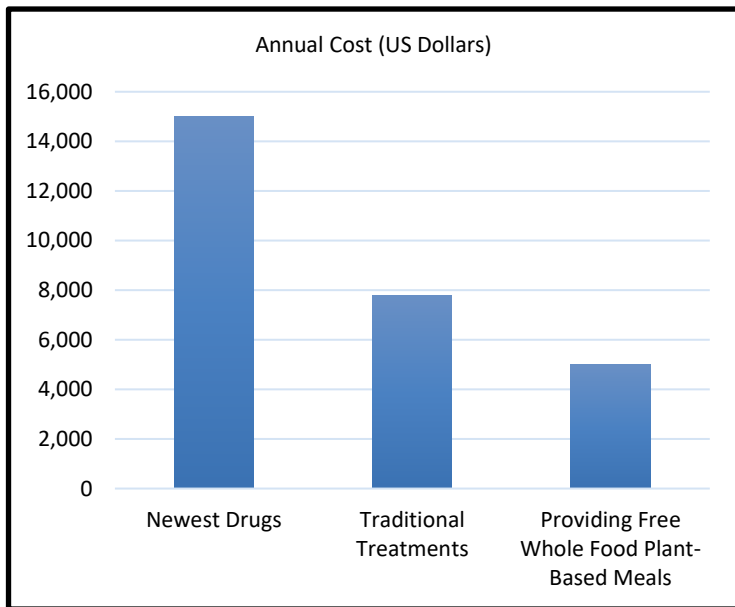
Reimbursement Example: Heart bypass surgery

Health Care Facility Meals	Payment to Facility
Default meal = whole food plant-based	\$100,000
Whole food plant-based options	\$50,000
Meal options include processed meat	\$25,000



Financial Incentive Strategy #3: Patients

Provide whole food plant-based meals to obese patients



- **Newest drugs to treat obesity have unsustainable costs and numerous side effects**
- **Drug treatments require a lifetime of expense**
- **Meals provided for an introductory period only**
- **Free meals help facilitate patient transition to and permanent adoption of new dietary lifestyle**



Role of Actuaries:

Making Financial Incentives to Reduce Obesity Practical, Sustainable and Effective

- Advise health care payers (government, employers, insurers) who fund financial incentives
- Quantify expected cost savings for BMI reduction and proportion of savings shared with health care providers
- Develop reimbursement system based on health care facility meals
- Demonstrate to payers that providing plant-based meals to obese patients is more cost-effective than a drug-based treatment approach
- Monitor cost savings from supplying plant-based meals and analyze patient adherence



Summary

- Attempts to address obesity pandemic have failed: none have addressed its root cause
- Excess calories are the driving force of the obesity pandemic
- Successful strategy must address excess calories and NOT require less food be consumed
- Whole food plant-based nutrition: satisfying and sustainable solution based on decades of research without negative side effects or added cost (we all have to eat)
- Actuaries have responsibility to the public to do more than quantify increased cost of obesity: develop incentives to increase use of this approach to treat obesity and other conditions
- Try it for yourself: even if you have no current health conditions consider adopting a whole food plant-based way of eating for 30 days and evaluate your own results



QUESTIONS?

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Additional Resources



Actuaries for Sustainable Health Care
actuariessustainablehealthcare.org



Plantrician Project
plantricianproject.org



Lifestyle Medicine Global Alliance
lifestylemedicineglobal.org



NutritionFacts.org
NutritionFacts.org



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 Mexico: <https://www.reuters.com/world/americas/mexicos-obesity-epidemic-2021-06-16/>
 Saudi Arabia: <https://onlinelibrary.wiley.com/doi/full/10.1111/obr.13448>
 New Zealand: <https://www.health.govt.nz/nz-health-statistics/health-statistics-and-data-sets/obesity-statistics>
 Australia https://www.health.gov.au/sites/default/files/documents/2022/03/national-obesity-strategy-2022-2032_0.pdf
 Canada: <https://www150.statcan.gc.ca/n1/pub/82-625-x/2019001/article/00005-eng.htm>
 UK: <https://digital.nhs.uk/data-and-information/publications/statistical/health-survey-for-england/2021/health-survey-for-england-2021-data-tables>
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 Source of calories:
 Sirloin Steak: <https://nutritiondata.self.com/facts/beef-products/3589/2>
 Cheese Pizza: <https://nutritiondata.self.com/facts/fast-foods-generic/9298/2>
 Grilled Chicken: <https://nutritiondata.self.com/facts/fast-foods-generic/9933/2>
 Salmon: <https://nutritiondata.self.com/facts/finfish-and-shellfish-products/4259/2>
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