Critical Thinking About Nutrition, Obesity, and Health

Ted Kyle, RPh, MBA
Disclosures

• Professional fees
  – 3D Communications
  – Eisai
  – EnteroMedics
  – Novo Nordisk
  – Nutrisystem

• Personal biases that favor:
  – Evidence-based interventions, both prevention and treatment
  – Respect for people living with obesity
  – Critical thinking about all evidence
Presentation Objectives

• Identify key issues of critical thinking in obesity, nutrition, and health

• Describe their importance

• Identify potential solutions
Disclaimer
I am a pharmacist and patient advocate, not a dietitian or public health professional
Four Key Issues for Today

• Pervasive bias
• Myths, presumptions, and facts
• Correlation and causality
• Errors in the scientific literature
Critical Thinking About Nutrition, Obesity, and Health

A Perspective on Bias in Nutrition and Obesity
What Is This Bias of Which I Speak?

Bias is an inclination or outlook to present or hold a partial perspective, often accompanied by a refusal to consider the possible merits of alternative points of view. Biases are learned implicitly within cultural contexts. People may develop biases toward or against an individual, an ethnic group, a nation, a religion, a social class, a political party, theoretical paradigms and ideologies within academic domains, or a species.

– Adapted from *Psychology: Contemporary Perspectives*
  Paul Okami
Two Kinds of Bias Are Pervasive in Nutrition and Obesity

• Intellectual bias favoring personal convictions
• Weight bias directed at people with obesity

God Judging Adam, Etching by William Blake / WikiArt
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How Does Bias Affect Research & Policy?
The Impact of Bias Starts with Research & Scientific Literature

• Observational studies
• Short-term endpoints
• Surrogate endpoints
• Publication bias
• Repetitive studies build a bias of familiarity

“Many conjectures commonly advanced as recommendations to reduce weight gain or promote weight loss – ‘eat breakfast every day,’ ‘eat more fruits and vegetables’, ‘eat more meals with family members’, ‘reduce fast food availability’ ‘eliminate vending machines from schools,’ etc. – could be tested and we should challenge ourselves to do so more often.”

Casazza and Allison:
Stagnation in the clinical, community and public health domain of obesity
Myths and Presumptions Presented as Facts

**Myths**
- Small energy changes add up to big weight loss
- Realistic goals yield better weight outcomes
- Slow weight loss is best
- Readiness to change matters
- PE prevents childhood obesity
- Breastfeeding prevents obesity
- Sex burns 100-300 calories

**Presumptions**
- Breakfast prevents weight gain
- Early exercise and eating habits shape weight for life
- Eating fruits and veggies will reduce weight or prevent gain
- Snacking causes obesity
- Sidewalks and parks prevent obesity

Source: Casazza et al, 2013.01, NEJM
Presumptions Triumph Over Scientific Complexity
“I believe we have a pretty good idea of how to curb childhood (& adult) obesity. However, the challenge is in practical implementation within a social context that does not foster needed changes in the sociopolitical arena.”

– Comment on Spinning for a Noble Purpose Defeats the Purpose
July 2017
Correlations Can Become Foundations for Policy

Donald J. Trump ✔️
@realDonaldTrump

I have never seen a thin person drinking Diet Coke.
1:43 PM - 14 Oct 2012

98,923 Retweets 101,801 Likes
Correlations Can Become Foundations for Policy

Nonnutritive sweeteners and cardiometabolic health: A systematic review and meta-analysis of randomized controlled trials and prospective cohort studies

Observational Studies
“We found that consumption of nonnutritive sweeteners was associated with modest long-term weight gain in observational studies.”

Randomized Trials
“Previous reviews concluded that, although data from RCTs support weight-loss effects from sustained nonnutritive sweetener interventions, observational studies provide inconsistent results. Building on these findings, we included new studies and found that consumption of nonnutritive sweeteners was not generally associated with weight loss among participants in RCTs, except in long-term (≥12 mo) trials with industry sponsorship.”

Conclusion
Given the widespread and increasing use of nonnutritive sweeteners, caution is warranted until the long-term risks and benefits of these products are fully characterized.

Source: Azad et al, 2017.07, CMAJ
Correlations Can Become Foundations for Policy

Surprised by diet soda tax, some health experts say: Why not?

Updated: JUNE 11, 2016 — 1:07 AM EDT

by Don Sapatkin, Staff Writer

Philadelphia City Council’s decision to include diet drinks in a proposed beverage tax took public.

If You’re Trying to Lose Weight, Avoid This One Food at All Costs

Toss out those Splenda packets, stat! They won’t move the scale in the right direction.

by BROOKE NELSON
Bias Drives Policy Decisions That Affect Clinical Care

“Prevention obviously has to be the primary strategy for dealing with obesity, because there’s just too much obesity to treat.”
Bias Leads to Confusion Between Personal Convictions and Scientific Evidence

What the Health: A low-fact vegan manifesto

- Wobbly factoids
  - Processed meats as dangerous as cigarettes
  - Eggs similarly dangerous
  - Drinking milk causes cancer
  - Fish will poison you

- Science, documentaries, and propaganda comprise a spectrum

Bias Directed at People with Obesity
Weight Bias Flows from
Common Assumptions About People with Obesity

Untitled, photograph by Boohoomian / flickr

Photograph courtesy of the UCONN Rudd Center
Weight Bias Flows from Common Assumptions About People with Obesity

Untitled, photograph by Boohoomin / flickr

Photograph courtesy of the UCONN Rudd Center
Health Professionals Harbor Bias Against Patients with Obesity

- Non-compliant
- Lazy
- Lack self-control
- Awkward
- Weak-willed
- Sloppy
- Unsuccessful
- Unintelligent
- Dishonest

Ferrante et al., 2009; Campbell et al., 2000; Fogelman et al., 2002; Foster, 2003; Hebl & Xu, 2001; Price et al., 1987; Puhl & Heuer, 2009; Huizinga et al., 2010.
Historical Bias About Obesity

The best place to start is by simply telling the patient the truth.
“Sir or Madam, it’s not OK to be obese. Obesity is bad. You are overweight because you eat too much. You also need to exercise more. Your obesity cannot be blamed on the fast food or carbonated beverage industry or on anyone or anything else.

You weigh too much because you eat too much.
Your health and your weight are your responsibility.”

Robert Doroghazi, MD
AJM, Mar 2015
Self-Care Is Often the Only Option Available for Obesity
Evidence-Based Care Is Mostly Out of Reach for People with Obesity

- Self-Care
- Professional Lifestyle Therapy
- Pharmacotherapy
- Surgical Care
- Post Surgery Care
For Obesity
The Standard of Care Is No Care

• Most PCPs do not routinely address obesity
• If they do, they merely instruct the patient to lose weight
  – Referral to IBT is uncommon
  – Most physicians will not consider drug therapy
  – Few are considered for surgery
Only 37 Clinics for 5 Million Children with Severe Obesity

Source: http://conscienhealth.org/2017/02/childhood-obesity-treatment-programs-serve-many/
Why So Few Clinics?

“I spend much of my work week raising money and fighting for funding. Our excellent adult program makes money. But we struggle due to insurance reimbursement. And the population we serve is lower income.”

– Pediatric Program Medical Director
Critical Thinking About Childhood Obesity

Trends: Up, Down, or Sideways?
Prevalence of Obesity
Among U.S. Children Aged 2-17 Years

Prevalence

Class I Obesity

Class II Obesity

Class III Obesity

Source: Skinner et al, Obesity 2016.04
Growth in Severe Childhood Obesity Is Setting the Stage for a Health Crisis

Increase in Childhood Obesity Between 1999 and 2014

Class I: + 19%
Class II: + 58%
Class III: + 167%

Source: Skinner et al, Obesity 2016.04
Prevalence of Obesity
Among U.S. Children Aged 2-5 Years

Prevalence


Source: Skinner et al, Obesity 2014.04
Prevalence of Obesity
Among U.S. Children Aged 2-5 Years

Source: Skinner et al, Obesity 2016.04
Prevalence of Obesity
Among U.S. Children Aged 2-5 Years

Prevalence

Sources: CDC/NCHS and Skinner et al, Obesity 2016.04

Childhood Obesity
Trends By Socioeconomic Quintiles

Conclusions

- Obesity decreased in children with higher SES
- But increased in children with lower SES
- News of static trends must be interpreted cautiously
- Need to understand the drivers of disparities

Source: Datar and Chung, 2015.05. JAMA Ped
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Myths, Presumptions, and Facts
Some Myths to Discard

• Obesity is primarily the result of bad choices
• Promoting breastfeeding prevents obesity
• Skipping breakfast causes weight gain

Wolf moon, photograph © Bill Dickinson / flickr
Obesity Is Primarily the Result of Bad Choices?

- Environment • Choices • Genes

- 70%
- 20%
- 10%
Obesity Is Primarily the Result of Bad Choices?

- Genetic Risk 70%
- Environmental Triggers 20%
- Personal Choices 10%
Obesity: Well-Understood as a Highly Heritable Disease

Body Mass in Twins

Monozygotic Twins (Intrapair Correlation = 0.66)

Dizygotic Twins (Intrapair Correlation = 0.26)

Source: Borjeson M, The aetiology of obesity in children, 1976
“Obesity is, like essential hypertension, a complex multifactorial disease where genetic factors promote sensitivity or resistance to obesity in a toxic environment. This concept of a genetic resistance versus sensitivity to obesity helps explain why many people remain thin in a toxic environment whereas others develop profound obesity.” – Allyn Mark, *Dietary Therapy for Obesity*, 2008
Promoting Breastfeeding Prevents Obesity?

• Meta-analyses show only a small effect at best
• Studies are confounded by longer breastfeeding mainly in families with higher
  o Income
  o Education
  o Social status
• Publication bias is also a problem
• “If you’re not my baby, I don’t want to hear your opinion about my breastfeeding.”
  – Emily Kaye Lazzaro
Skipping Breakfast Causes Weight Gain?

• Two well-controlled, randomized studies
  – Dhurandhar et al, The Effectiveness of Breakfast Recommendations on Weight Loss, 2014

• No effect on weight
Source: Conscienhealth, Now Can We Stop Pushing Breakfast? 2014
Some Presumptions to Test

- Taxes on SSBs and junk food will prevent obesity
- Low-fat dairy leads to better health outcomes
- Promoting fruits and vegetables reduces obesity
Taxes on SSBs and Junk Food?

• Aggressive taxes on soda & junk food in Mexico may cut soda sales
• No impact yet on obesity
• Unlike tobacco, food options are many and diverse
• Declines in SSBs have not yet sparked declines in obesity

Source: Brand-Miller and Barclay, Declining Consumption of Added sugars and Sugar-Sweetened Beverages in Australia, 2017

Public health hazard?
Low-Fat Dairy Leads to Better Health Outcomes?

• Recent studies link full-fat dairy to better health outcomes
• But not low-fat dairy
• “While evidence remains insufficient to definitively recommend only whole-fat dairy, it certainly is robust enough not to recommend only low-fat dairy.”

Promoting Fruits and Veggies Reduces Obesity?

• Americans have been eating more fruits and veggies
• Obesity rates keep growing
• All types of food are more available and affordable than ever

Source: An and Sturm, Five Myths About American Obesity, 2017
Some Facts to Rely Upon

• Inheritance is not destiny
• Healthy dietary patterns matter more than individual foods
• You can’t outrun a bad diet
Inheritance Is Not Destiny

• Genetic obesity risk is a fact to confront
• Behaviors and environment can moderate risks
• Example: sleep patterns
• Personalized prevention and care might help

Source: ConscienHealth, Obesity Risk Sleeping in Your Genes, 2017
Healthy Dietary Patterns
Matter More Than Individual Foods

• Popular diet advice often focuses on “good” and “bad” foods
• 2015 Dietary guidelines emphasize overall eating patterns
• The Mediterranean diet offers a good example

Source: ConscienHealth, Finding Healthy Food: Michelangelo and the FDA, 2017
You Can’t Outrun a Bad Diet

• Popular culture promotes exercise for weight loss
• Actual effect on weight is minimal
• Discouragement results

Source: ConscienHealth, Exercise: Separating Helpful Aspirations from Wishful Thinking, 2015

How strongly do you agree or disagree? Exercise is a very effective way to lose weight.

Results for respondents with demographics. Weighted by Age, Gender, Region. (941 responses)

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Correlations and Causality
Dietary Guidance Sometimes Relies Upon Observational Evidence

“Some researchers consider RCTs as the be-all and end-all of causal inference. This sentiment may be appropriate in the pharmaceutical industry, but the drug trial paradigm cannot be readily translated for use in the nutritional sciences.”

Satija et al, 2015, AdvNutr
Understanding Nutritional Epidemiology and Its Role in Policy
Standards of Evidence

- Meta Analyses
- Systematic Reviews
- Randomized Controlled Trials
- Cohort Studies
- Case-Control Studies
- Case Reports & Series
- Expert Opinion
- Animal Research
Establishing Causality

Bradford Hill Criteria

- Temporality
- Plausibility
- Consistency
- Strength
- Dose-Response
- Specificity
- Reversibility
- Coherence
- Analogy

Criteria for evaluating causality
- Useful in cases where direct experimentation is impossible
- Widely accepted
- Though still debated

Source: Austin Bradford Hill, The Environment and Disease – Association or Causation, 1965
Correlations with Unproven Causality

- High fat diets and obesity
- Food deserts and obesity
- Potatoes and diabetes

Any Questions? Photograph © Matthias Ripp / flickr
If the members of the American medical establishment were to have a collective find-yourself-standing-naked-in-Times-Square-type nightmare, this might be it. They spend 30 years ridiculing Robert Atkins, author of the phenomenally-best-selling "Dr. Atkins' Diet Revolution" and "Dr. Atkins' New Diet Revolution," accusing the Manhattan doctor of quackery and fraud, only to discover that the unrepentant Atkins was right all along. Or maybe it's this: they find that their very own dietary recommendations -- eat less fat and more carbohydrates -- are the cause of the rampaging epidemic of obesity in America. Or, just possibly this: they find out both of the above are true.
Targeting Food Deserts Has Done Little to Reduce Obesity

- Food deserts are found in areas of high obesity
- But many variables confound the relationship
- Reverse causation is a distinct possibility
Evidence Is Lacking to Vilify Potatoes

- Observational study links potatoes with weight gain and diabetes
- More recent systematic review says no:

  “The identified studies do not provide convincing evidence to suggest an association between intake of potatoes and risks of obesity, T2D, or CVD. French fries may be associated with increased risks of obesity and T2D although confounding may be present.

Source: ConscienHealth, Time to Stop Dumping on Potatoes, 2016
Health Correlations Proven to Be Cause and Effect

- Trans fats
- Saturated fats
- Whole grains
Trans Fats Now Banned from the Food Supply

- **1902**: Crisco launched
- **1911**: Activists target animal fats
- **1986**: McDonald's uses trans fats
- **1990**: Link to 20,000 U.S. deaths/yr
- **1994**: Labeling required
- **2003**: NYC Ban
- **2007**: Crisco reformulated
- **2015**: FDA Ban
Replacing Saturated Fats with Unsaturated Fats Improves Health

- Swapping fats helps
- “Low-fat” recommendations led to more refined carbs
- Real world tradeoffs make a big difference

Source: ConscienHealth, Mangled Messages about Saturated Fats, 2016
Whole Grains Lead to Better Health Outcomes

• Better energy balance, fullness, and satisfaction
• Favorable impact on gut microbiota

Source: ConscienHealth, Whole Grains Are the Real Deal for Metabolic Health, 2017
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Errors in the Scientific Literature
Sources of Errors

• Honest mistakes
• Personal bias
• Scientific misconduct

Perhaps Personal Bias Explains This Case of a Retracted Study

- A gardening & cooking obesity program
- Published, then retracted from *Obesity*
- Efficacy claim “not supported” by the data
- Republished with the same claims in *Pediatric Obesity*
- Authors say peer review “prevents the entire story from being told”

Source: ConscienHealth, Biostatisticians Are Frustrating When Data Are Weak, 2017
Summary and Conclusions

• Bias harms both scientific rigor and people living with obesity
• Distinguishing among myths, presumptions, and facts requires critical thinking
• Distinctions between correlation and causation are often missed
• Bias and human fallibility allow errors into scientific literature
Opportunities

• Acknowledge evidence gaps
• Build a stronger evidence base
• Translate evidence into common knowledge and practice
• Improve awareness of bias
• Use sound evidence to inform policymaking

Targets of Opportunity, photograph by Randy Robertson / flickr
More Information

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