



Understanding the Science of Obesity

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2022, 05-25

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Acknowledgments

Some slides were inspired by or made in collaboration with numerous colleagues. I try to acknowledge throughout verbally, with citations, or on the slides. However, the content reflects my thoughts, and not necessarily these individuals, anyone else, or any organization.

Disclosures

None relevant for this talk.

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Slides are available upon request: awb1@iu.edu



Outline

- 1.The implied simplicity of obesity
- 2.Simple ideas that have not worked
- 3.Treating Obesity Seriously
- 4.Moving forward



Obesity is not simple

Obesity is not socially or professionally simple

AMERICAN MEDICAL ASSOCIATION HOUSE OF DELEGATES

Resolution: 420
(A-13)

Introduced by: American Association of Clinical Endocrinologists
American College of Cardiology
The Endocrine Society
American Society for Reproductive Medicine
The Society for Cardiovascular Angiography and Interventions
American Urological Association
American College of Surgeons

Subject: Recognition of Obesity as a Disease

RESOLVED, That our American Medical Association recognize obesity as a disease state with multiple pathophysiological aspects requiring a range of interventions to advance obesity treatment and prevention. (New HOD Policy)

<https://media.npr.org/documents/2013/jun/ama-resolution-obesity.pdf>

OBESITY
Reviews

WORLD
OBESITY

World Obesity Federation Position Statement | [Free Access](#)

Obesity: a chronic relapsing progressive disease process. A position statement of the World Obesity Federation

G.A. Bray✉, K.K. Kim, J.P.H. Wilding, on behalf of the World Obesity Federation

International Journal of Obesity www.nature.com/ijo

PERSPECTIVE [Check for updates](#)

CLINICAL RESEARCH

The simplistic view of obesity management: a curse in disguise

Nikhil V. Dhurandhar ^{1✉}



ASDAH

ASSOCIATION FOR SIZE DIVERSITY AND HEALTH

<https://asdah.org/health-at-every-size-haes-approach/>

OPINION · 2 days ago

The cure for obesity, heart disease, and anxiety? Puppies!

<http://www.foxnews.com/opinion/2018/05/05/cure-for-obesity-heart-disease-and-anxiety-puppies.html>



Obesity is not simple to study or report

WEIGHT LOSS

Poor sleep prevents dieters from keeping the weight off

MAY 6, 2022



by Study Finds

Meeting Abstract PO3.26: From press release: "Despite the important findings, the authors note that the study is observational and cannot establish causation. The authors also note that the study is observational and cannot establish causation. The authors also note that the study is observational and cannot establish causation."

Better School Lunches Blunt U.S. Kids' Weight Gain

Study: Associations between the Free or Reduced-Price National School Lunch Program and Weight Gain Before Versus After Implementation of the 2010 Free Kids A

HEALTH NEWS

✓ Fact Checked

Study Highlights Need for Tailored Weight Loss Plans to Treat Obesity

Meeting Abstract: Survey of Obesity-Related Complications and Healthcare Resource Use in Six European Countries. Need for Tailoring Neither Assessed nor Defined.



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Obesity is not simple to reverse



Probability of an Obese Person Attaining Normal Body Weight: Cohort Study Using Electronic Health Records

[Alison Fildes](#), PhD, [Judith Charlton](#), MSc, [Caroline Rudisill](#), PhD, [Peter Littlejohns](#), MD, [A. Toby Prevost](#), PhD, and [Martin C. Gulliford](#), FFPH, MA[✉]

American Journal of
**PUBLIC
HEALTH**

Initial BMI Category	Annual Probability of Attaining 5% Reduction in Body Weight	Annual Probability of Attaining Normal BMI, Estimate (95% CI)
<u>Men, kg/m²</u>		
30.0–34.9	1 in 12	1 in 210 (197, 225)
35.0–39.9	1 in 9	1 in 701 (619, 797)
40.0–44.9	1 in 8	1 in 1 290 (1023, 1651)
≥ 45.0	1 in 5	1 in 362 (300, 442)
<u>Women, kg/m²</u>		
30.0–34.9	1 in 10	1 in 124 (118, 131)
35.0–39.9	1 in 9	1 in 430 (390, 475)
40.0–44.9	1 in 7	1 in 677 (599, 769)
≥ 45.0	1 in 6	1 in 608 (527, 704)



Obesity is not simple to reverse



Probability of an Obese Person Attaining Normal Body Weight: Cohort Study Using Electronic Health Records

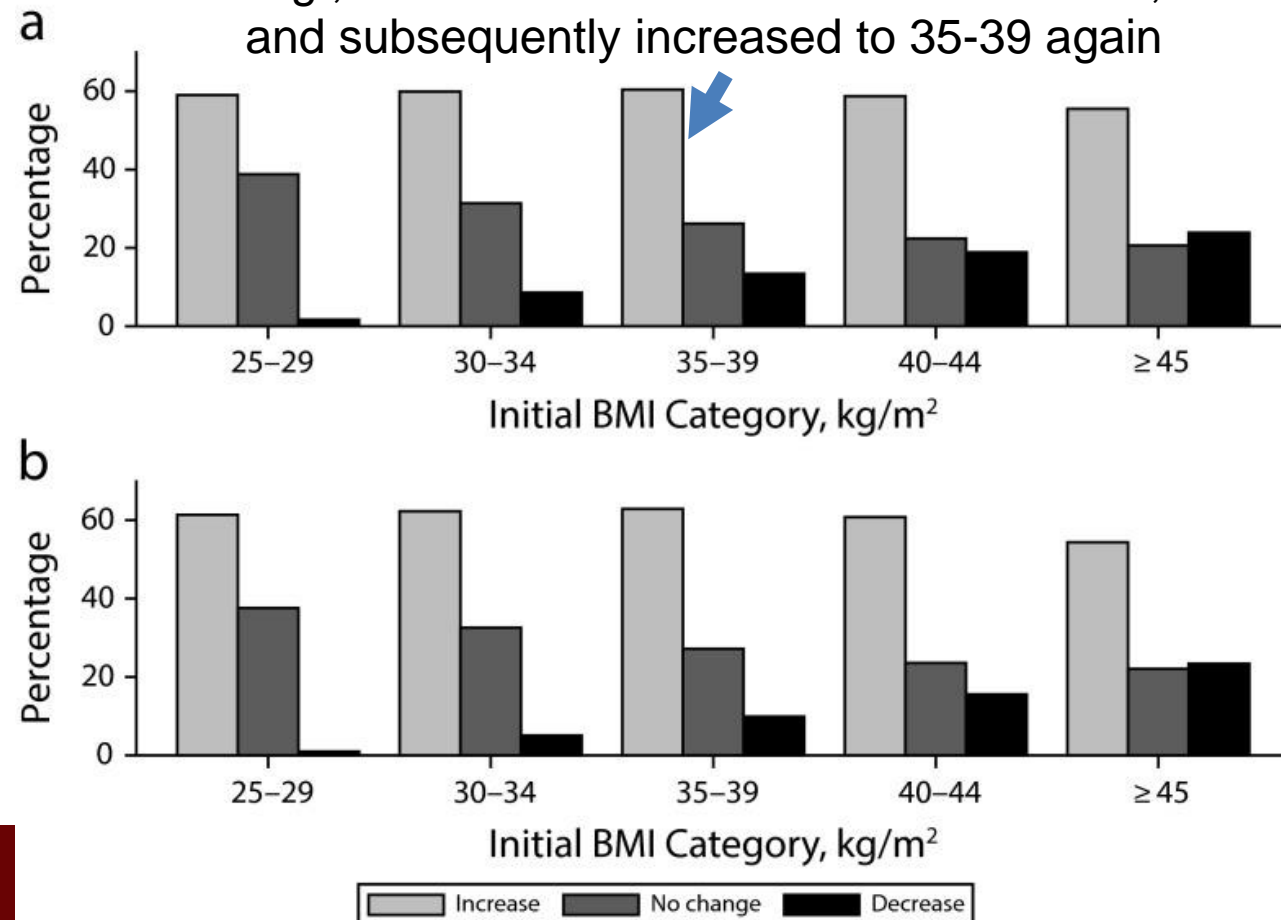
Alison Fildes, PhD, Judith Charlton, MSc, Caroline Rudisill, PhD, Peter Littlejohns, MD, A. Toby Prevost, PhD, and Martin C. Gulliford, FFPH, MA[✉]

American Journal of
**PUBLIC
HEALTH**

Data for subsequent changes in BMI category in participants who showed an initial decrease in BMI category for (a) women and (b) men

United Kingdom, 2004–2014.

E.g., if she went from 35–39 down to 30–34, and subsequently increased to 35–39 again



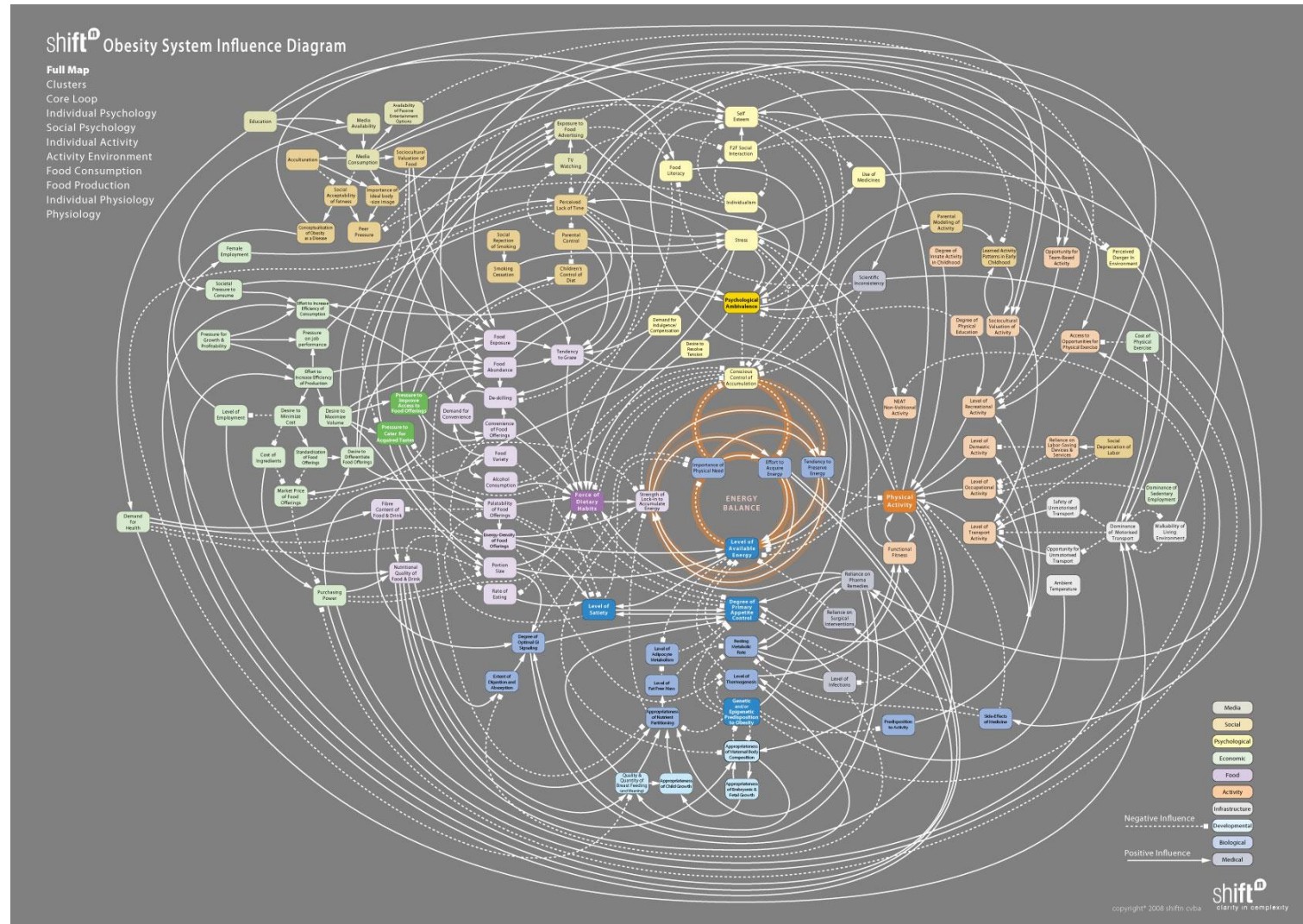
Energy Balance: Is it really this simple?

Energy stored = Energy in – Energy out

Einstein's razor: "Make things as simple as possible but no simpler."



Obesity is not simple



“The valuable capacity of the human mind to simplify a complex situation becomes dangerous when not controlled in terms of definitely stated criteria.”

– Simon Kuznets, 1934



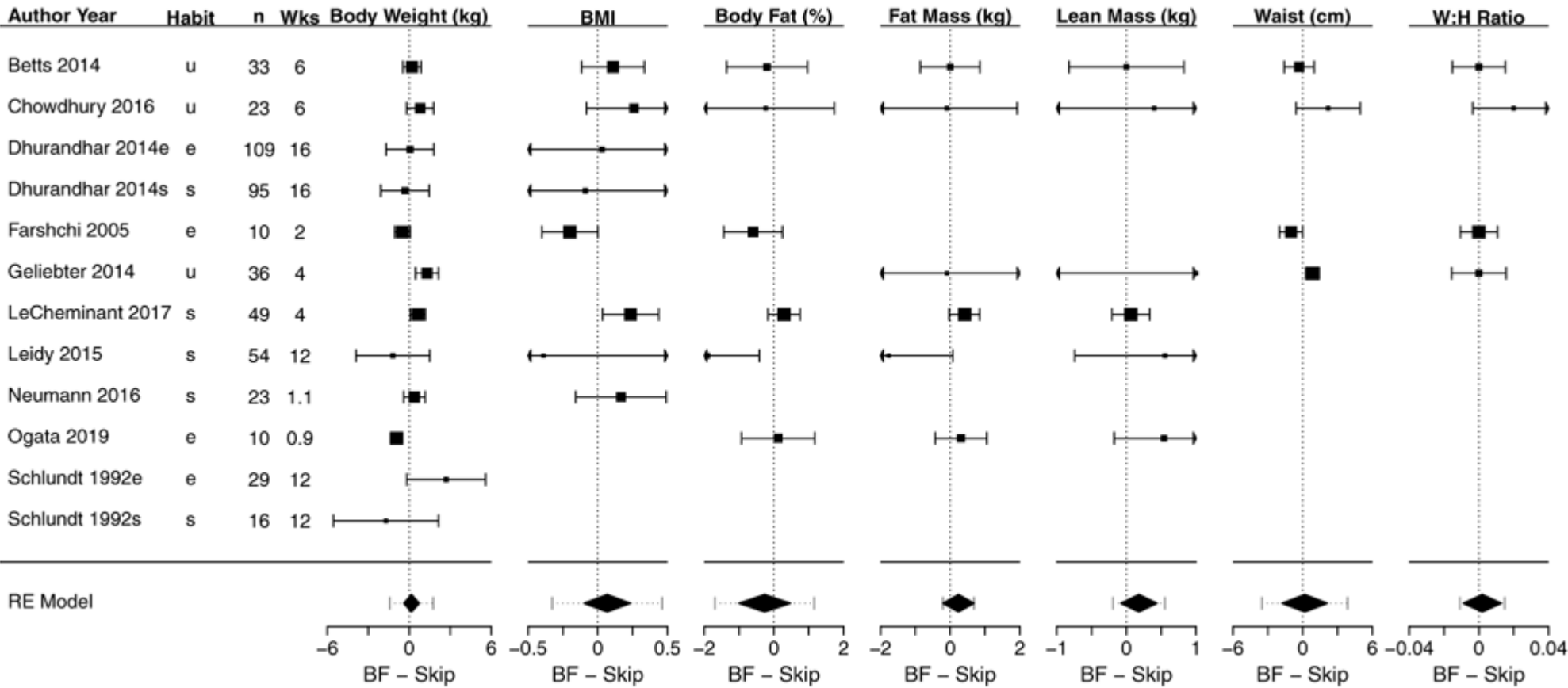
**“Simple” ideas that have
not worked**

Breakfast

Eating versus skipping breakfast has no discernible effect on obesity-related anthropometric outcomes: a systematic review and meta-analysis

Michelle M. Bohan Brown, Jillian E. Milanes, David B. Allison, Andrew W. Brown

F1000Research <https://doi.org/10.12688/f1000research.22424.3>



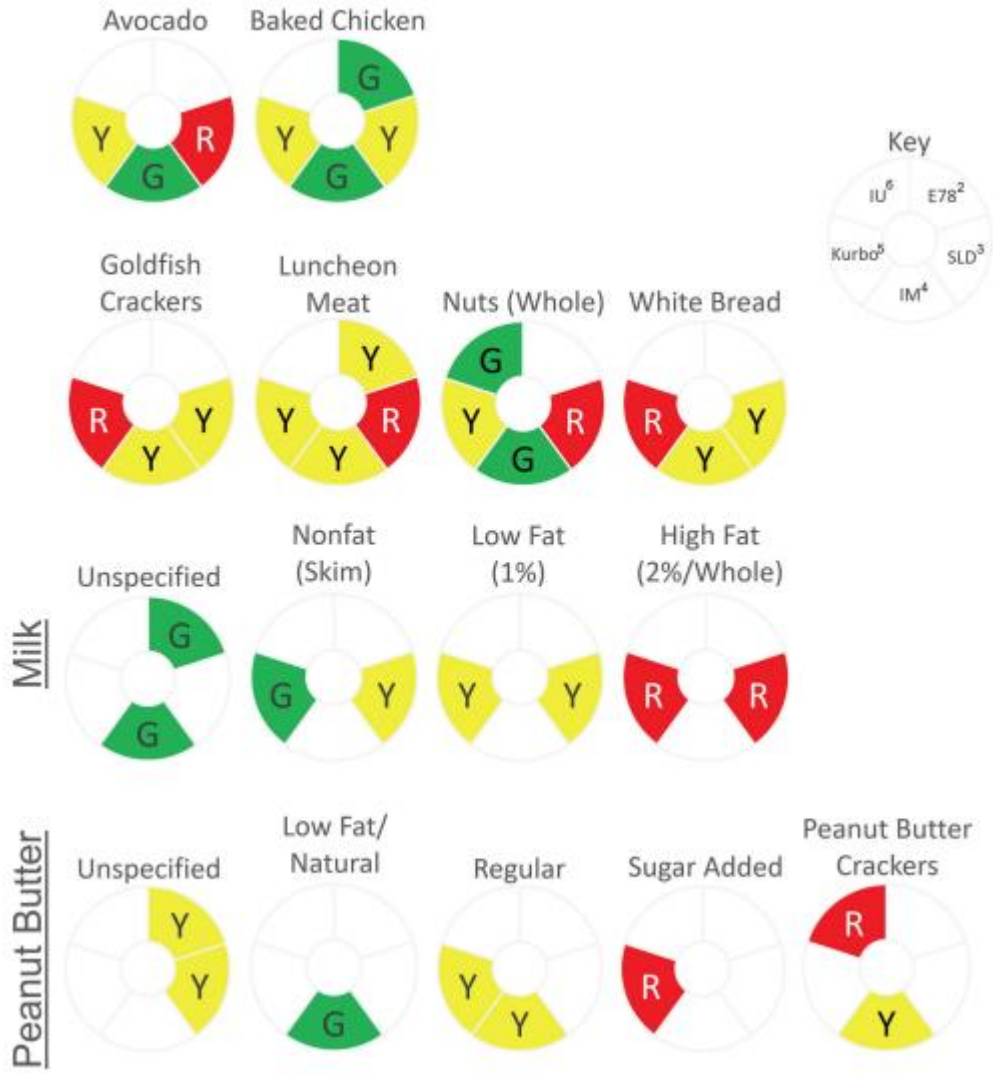
Traffic Light Labeling

Traffic Light Diets for Childhood Obesity: Disambiguation of Terms and Critical Review of Application, Food Categorization, and Strength of Evidence

Colby J Vorland,¹ Michelle M Bohan Brown,² Michelle I Cardel,^{3,4} and Andrew W Brown⁵

Current
Developments in
Nutrition

CDN



- Different sources label the same foods differently
- No studies have shown traffic light labeling in isolation is effective
- “The Traffic Light Diet is an effective **component** of a clinically supervised, multi-component childhood weight-management intervention program.” (emphasis added)

eat right Academy of Nutrition and Dietetics

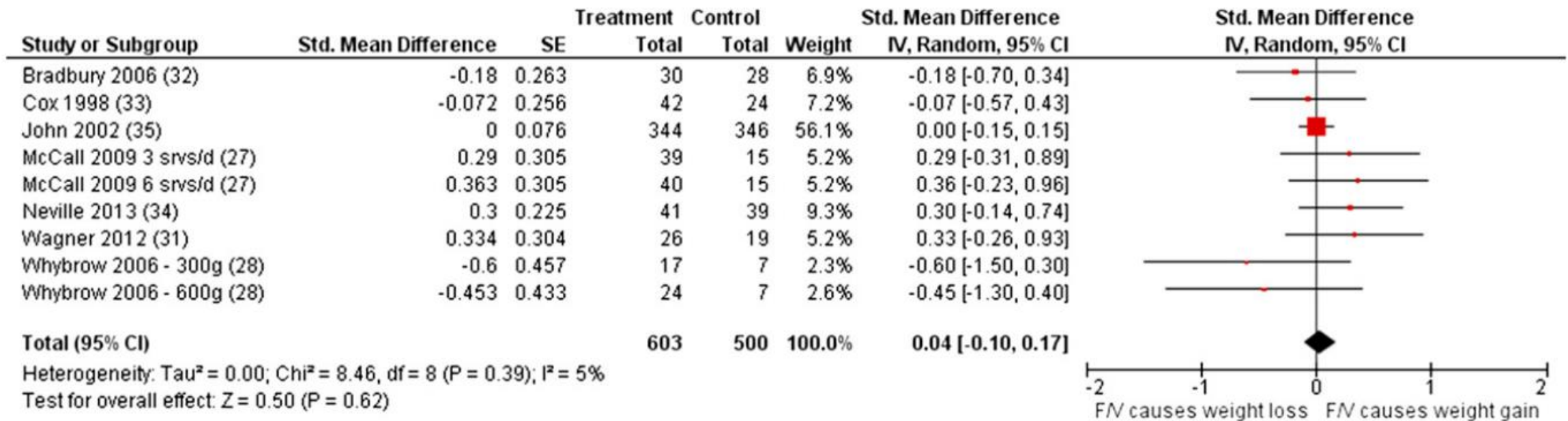
EVIDENCE ANALYSIS LIBRARY®

Fruits and vegetables

Increased fruit and vegetable intake has no discernible effect on weight loss: a systematic review and meta-analysis¹⁻⁴

Kathryn A Kaiser, Andrew W Brown, Michelle M Bohan Brown, James M Shikany, Richard D Mattes, and David B Allison

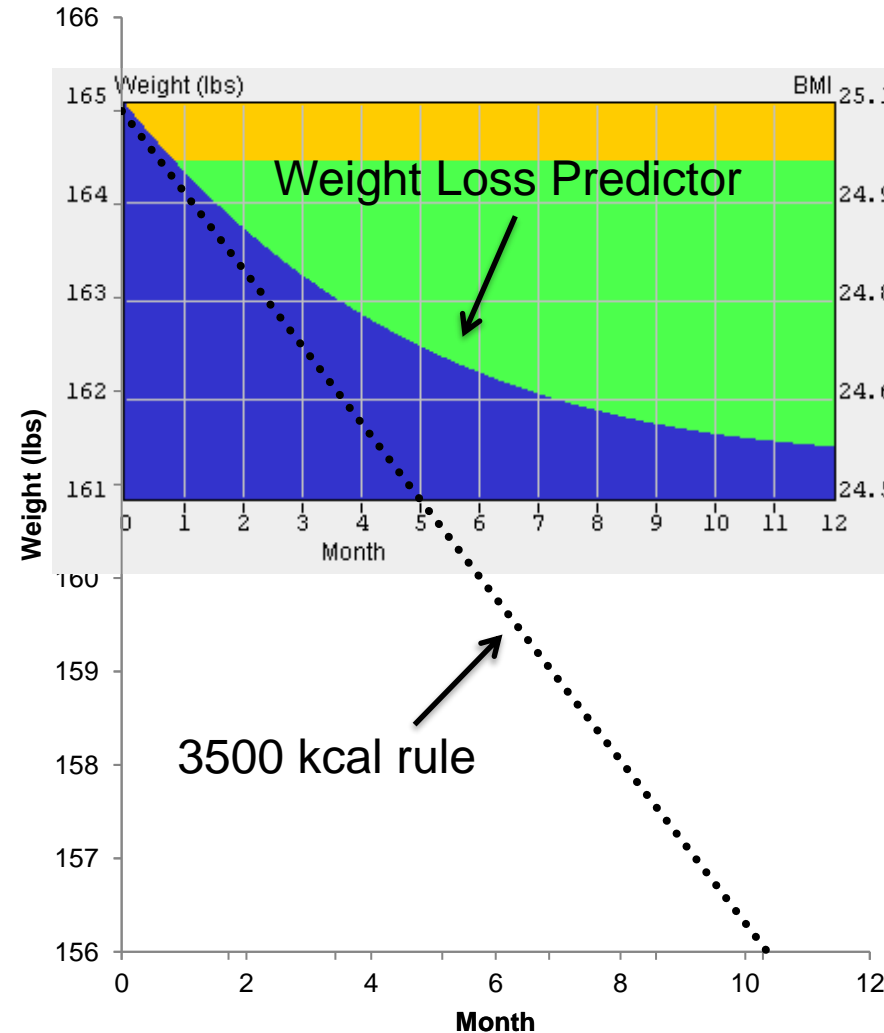
Am J Clin Nutr doi: 10.3945/ajcn.114.090548.



Will small sustained changes in energy intake or expenditure produce large, long-term weight changes?

35 year old
165 lb male
walking 1 mile/d
=
~100 kcal/d

In 10 years, he
would weigh 61
lbs by the 3500
kcal rule



VIEWPOINT Counting Calories as an Approach
to Achieve Weight Control

“Patients should be advised that eating about 3500 calories a week in excess of the amount of calories expended results in gaining 1 lb (0.45 kg) of body weight.”



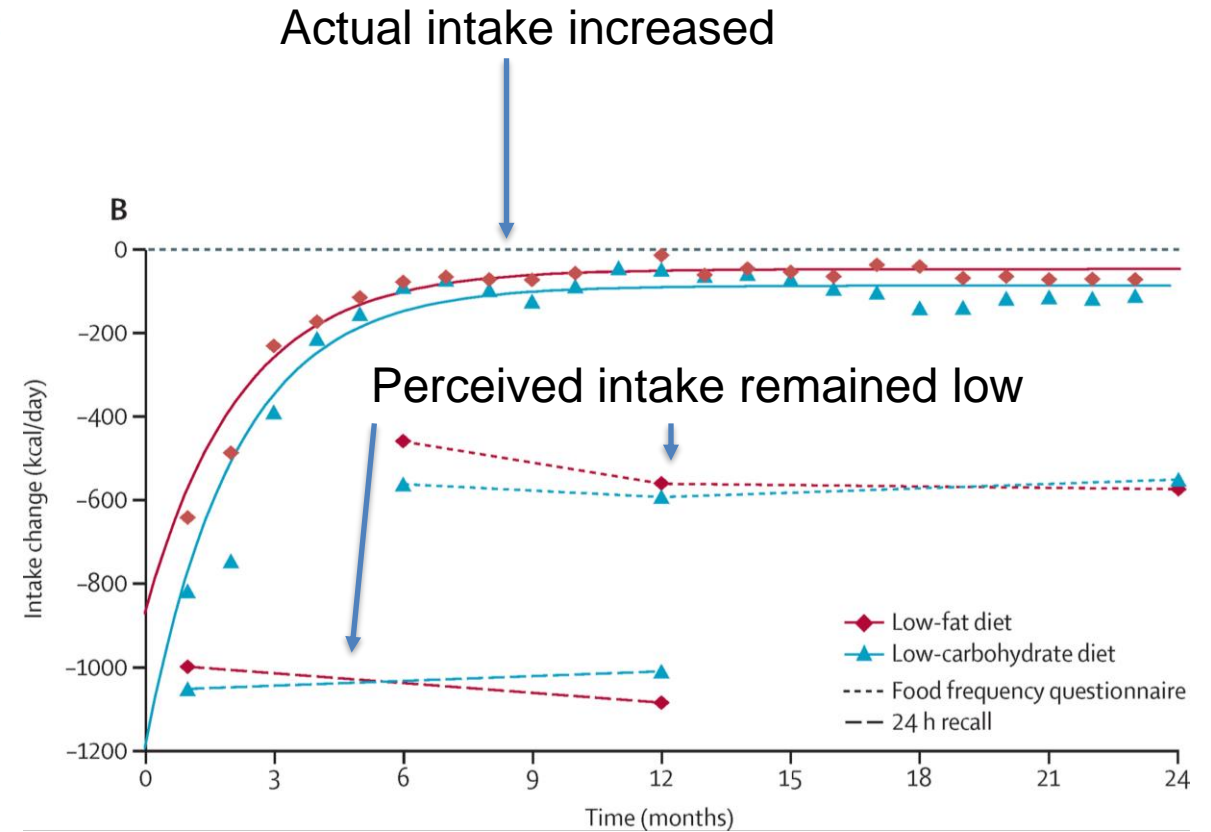
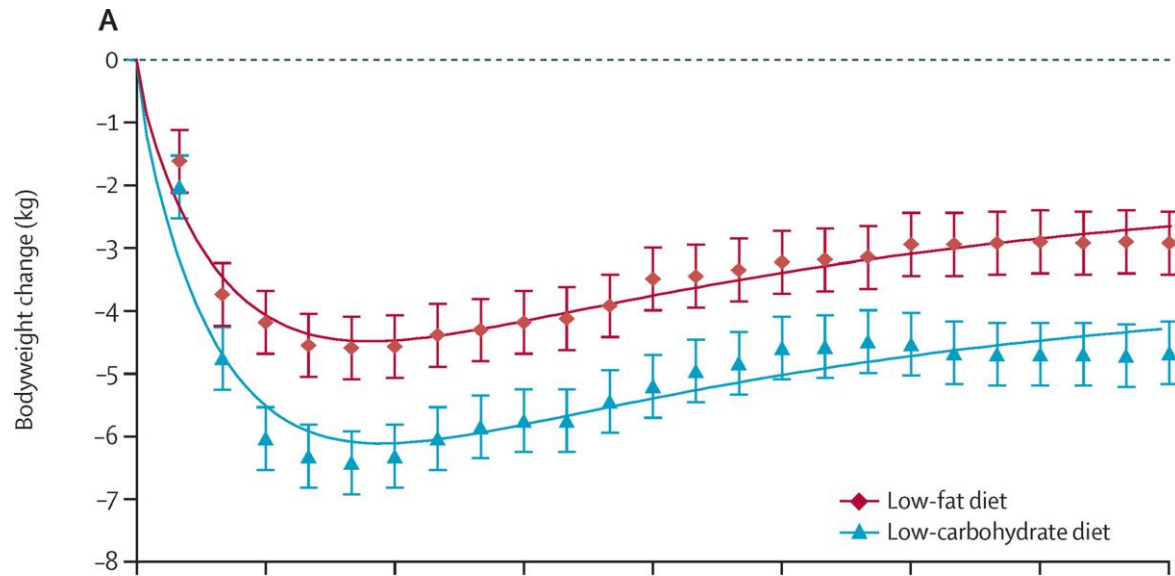
We cannot always trust our brains

THE LANCET

Volume 388, Issue 10047, 27 August–2 September 2016, Pages 849–851

Weight loss diet studies: we need help not hype

Yoni Freedhoff^a, Kevin D Hall^b✉



Weight trajectories are complicated

Starting Information Advanced Controls: OFF

Weight154.3lbs

SexMale

Age23yrs

Height5ft11infeet

Physical Activity Level1.6 Estimate Your Level

Goal Weight Lifestyle Change

Weight Goal

Goal Weight154.3lbs

I want to reach my goal in180days

OR select a date

I want to reach my goal by11/20/2022

Physical Activity Change (Optional)

Weight Change Phase

To reach my goal, I will change my physical activity by0% Calculate

Goal Maintenance Phase

To maintain my goal, I will change my physical activity by0% Calculate

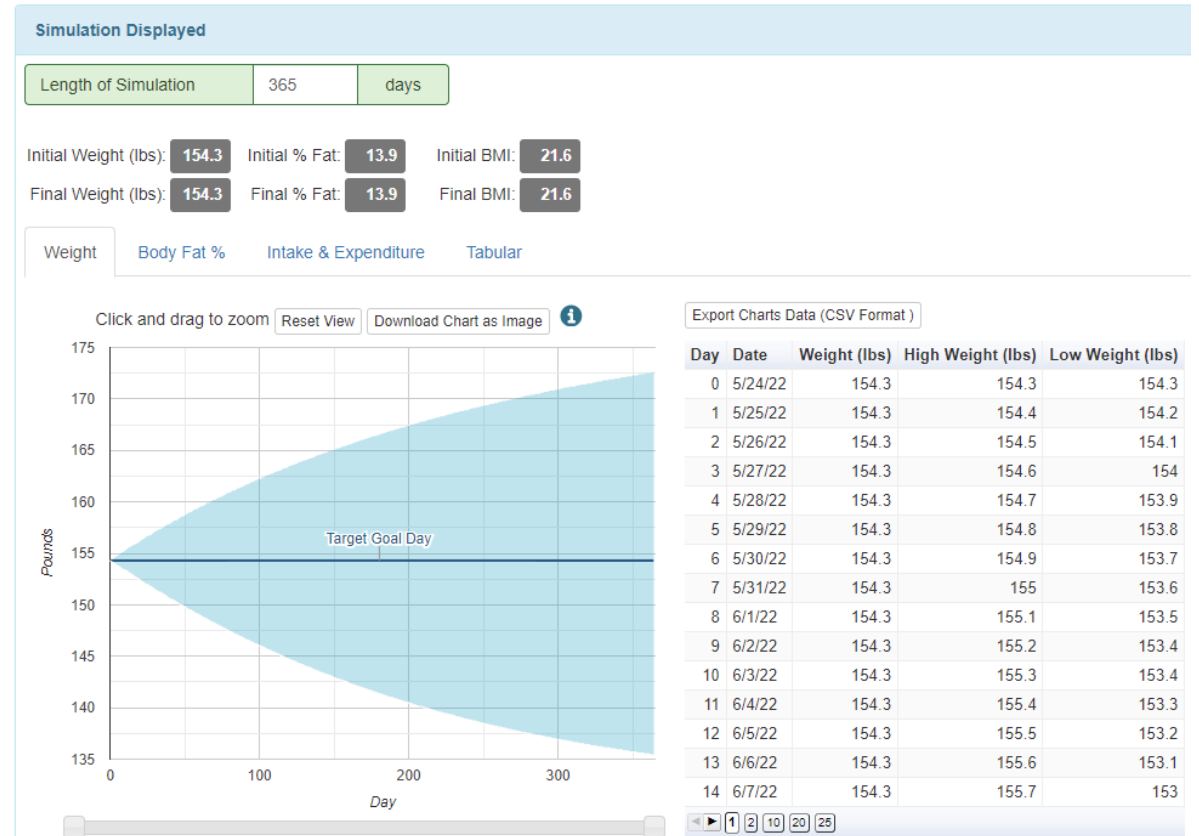
Results

CaloriesKilojoules

In order to *maintain* your current weight, you should eat:2,746 Calories/day

To *reach* your goal of **154.3 lbs in 180 days**, you should eat:2,746 Calories/day

To *maintain* your goal of **154.3 lbs**, you should eat:2,746 Calories/day



Treating Obesity Seriously

AMERICAN ASSOCIATION OF CLINICAL ENDOCRINOLOGISTS AND AMERICAN COLLEGE OF ENDOCRINOLOGY COMPREHENSIVE CLINICAL PRACTICE GUIDELINES FOR MEDICAL CARE OF PATIENTS WITH OBESITY

*W. Timothy Garvey, MD, FACE¹; Jeffrey I. Mechanick, MD, FACP, FACE, FACN, ECNU²;
Elise M. Brett, MD, FACE, CNSC, ECNU³; Alan J. Garber, MD, PhD, FACE⁴;
Daniel L. Hurley, MD, FACE⁵; Ania M. Jastreboff, MD, PhD⁶; Karl Nadolsky, DO⁷;
Rachel Pessah-Pollack, MD⁸; Raymond Plodkowski, MD⁹; and
Reviewers of the AACE/ACE Obesity Clinical Practice Guidelines**

Endocrine Practice

Volume 22, Supplement 3, July 2016, Pages 1-203

203 pages



AMERICAN ASSOCIATION OF CLINICAL ENDOCRINOLOGISTS AND AMERICAN COLLEGE OF ENDOCRINOLOGY COMPREHENSIVE CLINICAL PRACTICE GUIDELINES FOR MEDICAL CARE OF PATIENTS WITH OBESITY

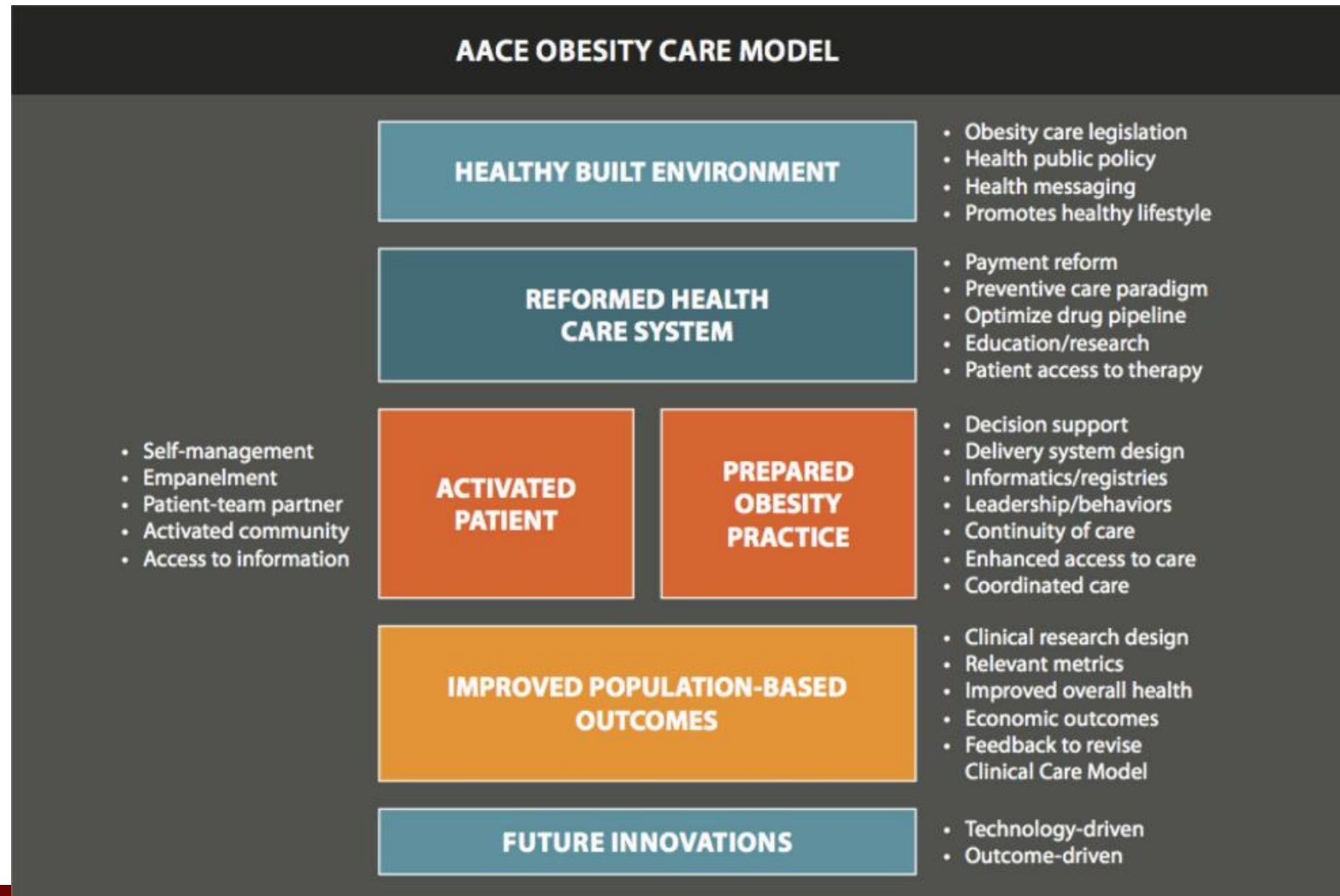


Fig. 1. The AACE/ACE Obesity Chronic Care Model*



Managing Overweight and Obesity in Adults

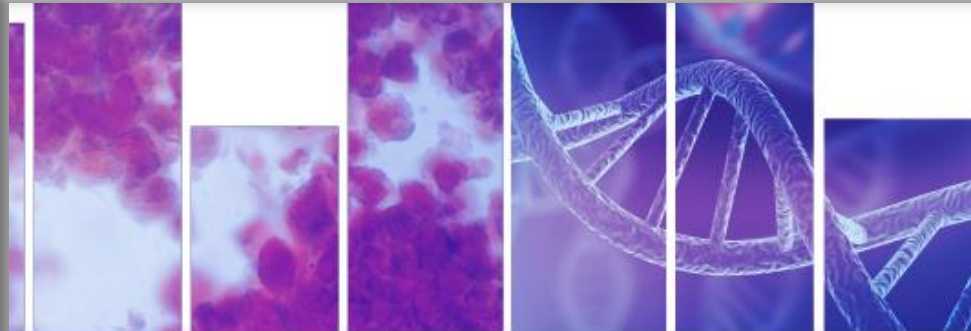
Systematic Evidence Review From
the Obesity Expert Panel, 2013

501 pages



U.S. Department of Health and Human Services
National Institutes of Health
National Heart, Lung, and Blood Institute

<http://www.nhlbi.nih.gov/guidelines>



THURSDAY, MAY 5, 2022 | 1–5 P.M. | VIRTUAL



The NIH Obesity Research Task Force presents
**Moving Beyond BMI: Exploring the
Heterogeneity of Obesity**

Comparing treatments

Weight loss at one year

The NEW ENGLAND JOURNAL of MEDICINE

REVIEW ARTICLE

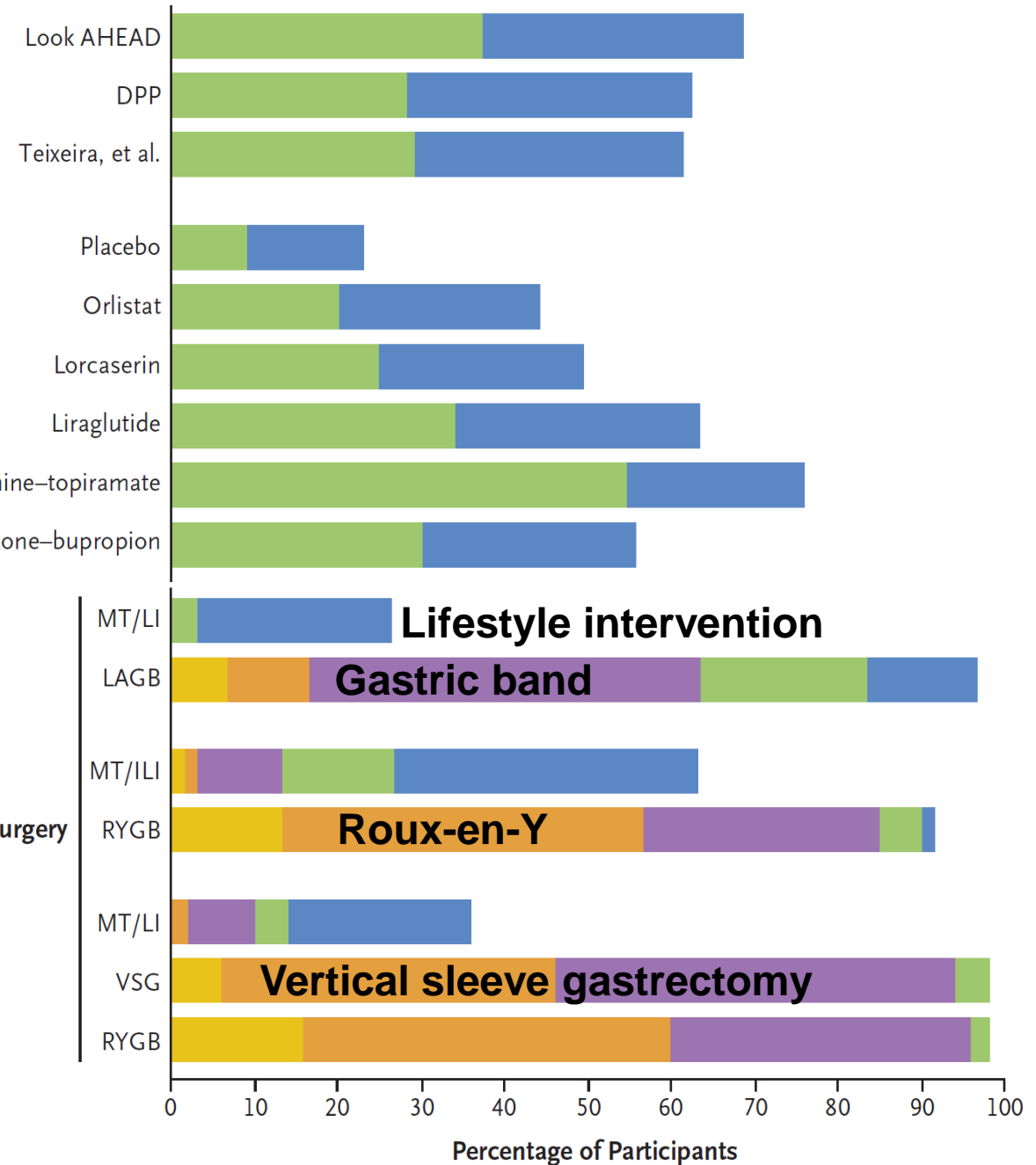
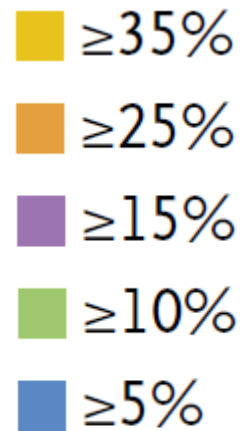
Dan L. Longo, M.D., *Editor*

Mechanisms, Pathophysiology, and Management of Obesity

Steven B. Heymsfield, M.D., and Thomas A. Wadden, Ph.D.

High-Intensity Lifestyle Intervention

Pharmacotherapy Intervention



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High-intensity, comprehensive lifestyle intervention

Table 1. Recommended Components of a High-Intensity Comprehensive Lifestyle Intervention to Achieve and Maintain a 5-to-10% Reduction in Body Weight.*

Component	Weight Loss	Weight-Loss Maintenance
Counseling	≥14 in-person counseling sessions (individual or group) with a trained interventionist during a 6-mo period; recommendations for similarly structured, comprehensive Web-based interventions, as well as evidence-based commercial programs	Monthly or more frequent in-person or telephone sessions for ≥1 yr with a trained interventionist
Diet	Low-calorie diet (typically 1200–1500 kcal per day for women and 1500–1800 kcal per day for men), with macronutrient composition based on patient's preferences and health status	Reduced-calorie diet, consistent with reduced body weight, with macronutrient composition based on patient's preferences and health status
Physical activity	≥150 min per week of aerobic activity (e.g., brisk walking)	200–300 min per week of aerobic activity (e.g., brisk walking)
Behavioral therapy	Daily monitoring of food intake and physical activity, facilitated by paper diaries or smart-phone applications; weekly monitoring of weight; structured curriculum of behavioral change (e.g., DPP), including goal setting, problem solving, and stimulus control; regular feedback and support from a trained interventionist	Occasional or frequent monitoring of food intake and physical activity, as needed; weekly-to-daily monitoring of weight; curriculum of behavioral change, including problem solving, cognitive restructuring, and relapse prevention; regular feedback from a trained interventionist



Medications for Weight Loss

Name	Action
Orlistat	Lipase inhibitor
Lorcaserin	5HT _{2c} receptor agonist
Liraglutide; Semaglutide; Tirzepatide*	GLP-1 agonist *Also GIP
Phentermine-topiramate	Norepinephrine-releasing agent; GABA receptor modulation
Naltrexone-bupropion	Opioid antagonist; dopamine/norepinephrine reuptake inhibitor

Side-effects depend on the drug and the patient.
Pregnancy is a contraindication for all of them.



Common Surgical Procedures for Weight Loss.

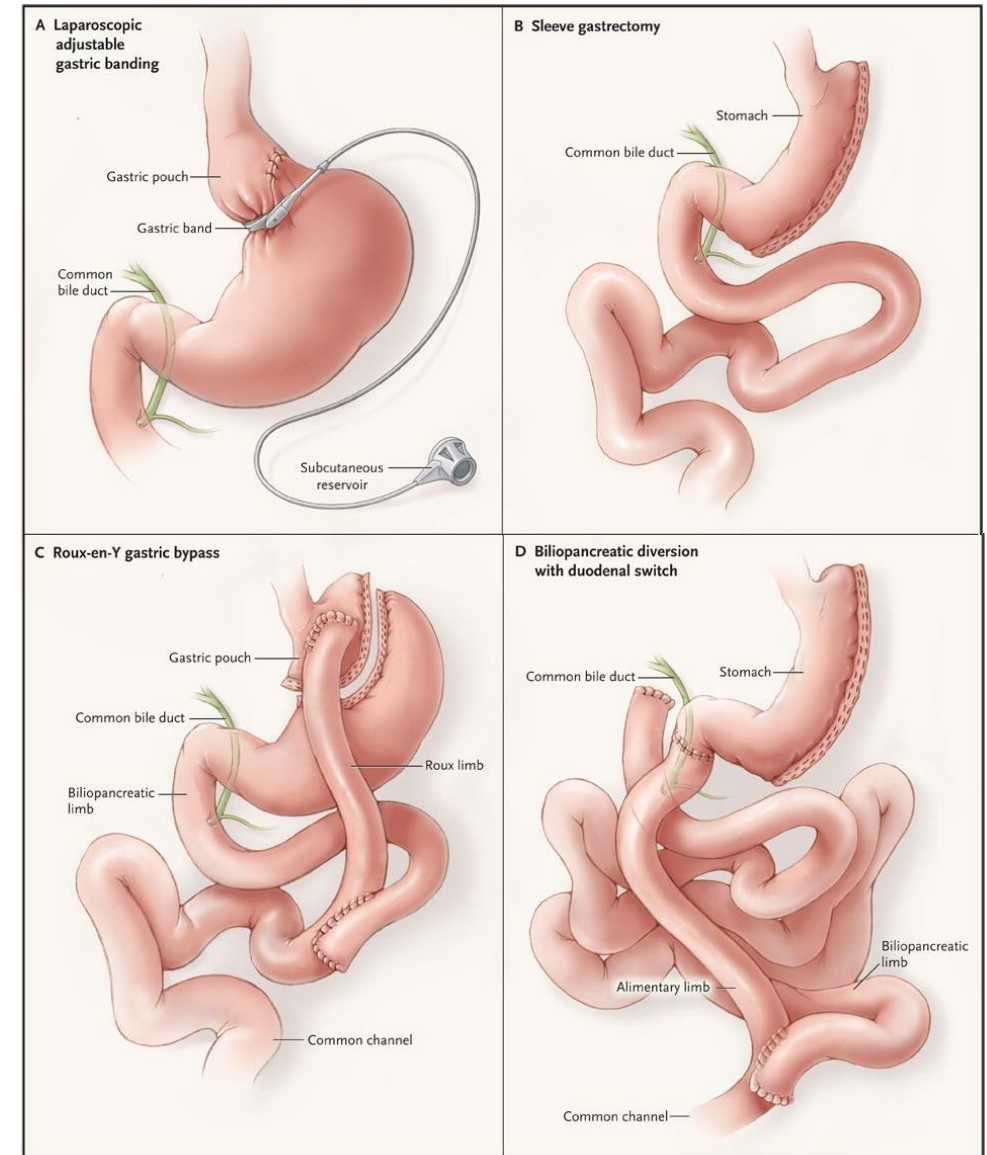
American Society for Metabolic and Bariatric Surgery Endorsed Procedures



- A. Gastric Banding
- B. Sleeve gastrectomy
- C. Roux-en-Y Gastric Bypass
- D. Duodenal Switch
- (Not shown) Intra-gastric Balloon

Condition/Disease	Remission Rate
Type 2 Diabetes	92%
Hypertension	75%
Obstructive Sleep Apnea	96%
Dyslipidemia	76%
Cardiovascular Disease	58%

<https://asmbs.org/app/uploads/2021/07/Metabolic-Bariatric-Surgery-Fact-Sheet-2021.pdf>



DeMaria EJ. N Engl J Med 2007;356:2176-2183.



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Moving Forward

Thoughts to keep in mind

- Acknowledge the complexity of the etiology of obesity.
- “First do no harm” – maintain respect for persons with obesity.
- For all claims, ask for evidence
 - Does the recommendation work?
 - In the real world, or in laboratory settings?
 - For whom?
 - For weight loss, preventing weight gain, or helping maintain weight loss?

Not every intervention needs to be about weight!



Resources



AMERICAN BOARD
of OBESITY MEDICINE



American Society for Nutrition
Excellence in Nutrition Research and Practice



INTERNATIONAL
FOOD INFORMATION
COUNCIL FOUNDATION



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