Brigham and Women's Hospital
Founding Member, Mass General Brigham

Dietary Approaches to Obesity Management

Chika V. Anekwe, MD, MPH
Obesity Medicine Clinical Director, Massachusetts General Hospital Weight Center
Instructor in Medicine, Harvard Medical School

CONTINUING MEDICAL EDUCATION
DEPARTMENT OF MEDICINE

MGH 1811 MASSACHUSETTS GENERAL HOSPITAL
WEIGHT CENTER

HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Chika V. Anekwe, MD, MPH

Obesity Medicine Clinical Director, Massachusetts General Hospital Weight Center; Preventive Medicine and Obesity Medicine Physician; Instructor, Harvard Medical School

Chika V. Anekwe, MD, MPH is board-certified in General Preventive Medicine and Public Health as well as Obesity Medicine. She is also certified by the National Board of Physician Nutrition Specialists. Dr. Anekwe is the Obesity Medicine Clinical Director at the Massachusetts General Hospital Weight Center in Boston, Massachusetts. Her professional interests are in the areas of clinical nutrition, obesity, nonsurgical weight management, pre- and post-operative bariatric weight management, health policy, and community health outreach, with a special interest in underserved communities. She has authored numerous manuscripts, book chapters and blog posts on the topics of obesity and weight management.

Disclosures

- **I have no relevant financial relationships with ineligible companies.**

Mass General Brigham

MASSACHUSETTS GENERAL HOSPITAL
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Objectives

- Recognize dietary intake as a key lifestyle component for treating obesity
- Become familiar with the scope of dietary strategies for treating obesity
- Review approaches for targeting barriers to dietary change in patients with obesity

Diets by the Decades

1920s

1930s

1940s

1950s

1960s

1970s

1980s

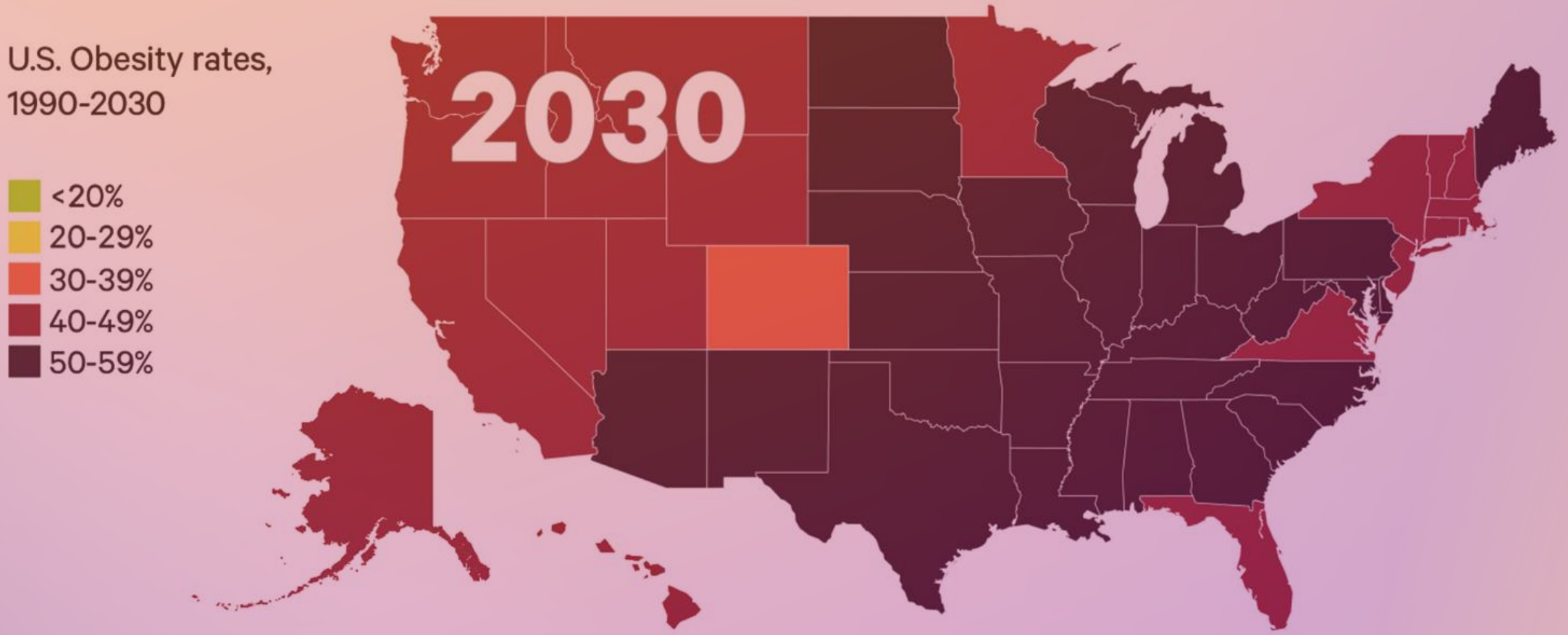
1990s

2000s

2010s

Nearly half of Americans will have obesity by 2030

U.S. Obesity rates, 1990-2030

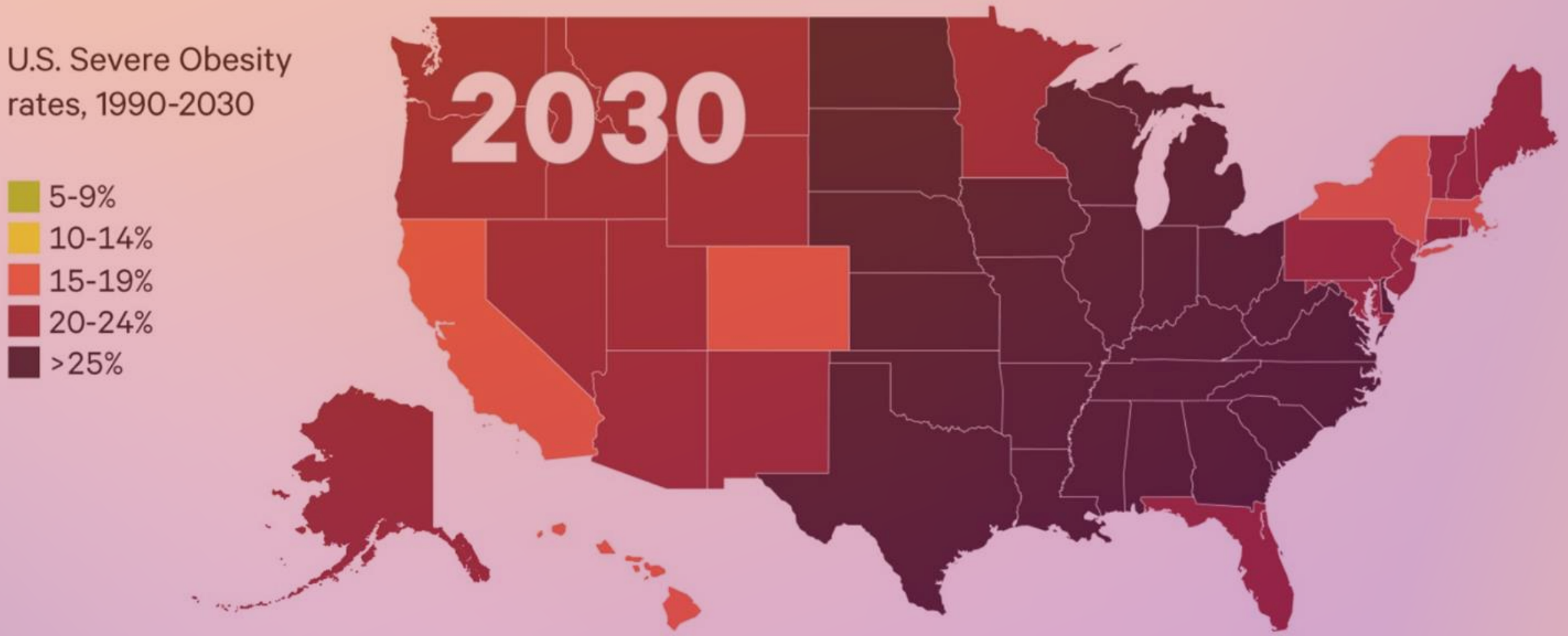


CHOICES | Childhood Obesity Intervention Cost-Effectiveness Study

Ward ZJ, Bleich SN, Cradock AL, Barrett JL, Giles CM, Flax CN, Long MW, Gortmaker SL. Projected U.S. State-Level Prevalence of Adult Obesity and Severe Obesity. N Engl J Med. 2019;381:2440-50. doi: 10.1056/NEJMsa1909301

Nearly a quarter of Americans will have severe obesity by 2030

U.S. Severe Obesity rates, 1990-2030



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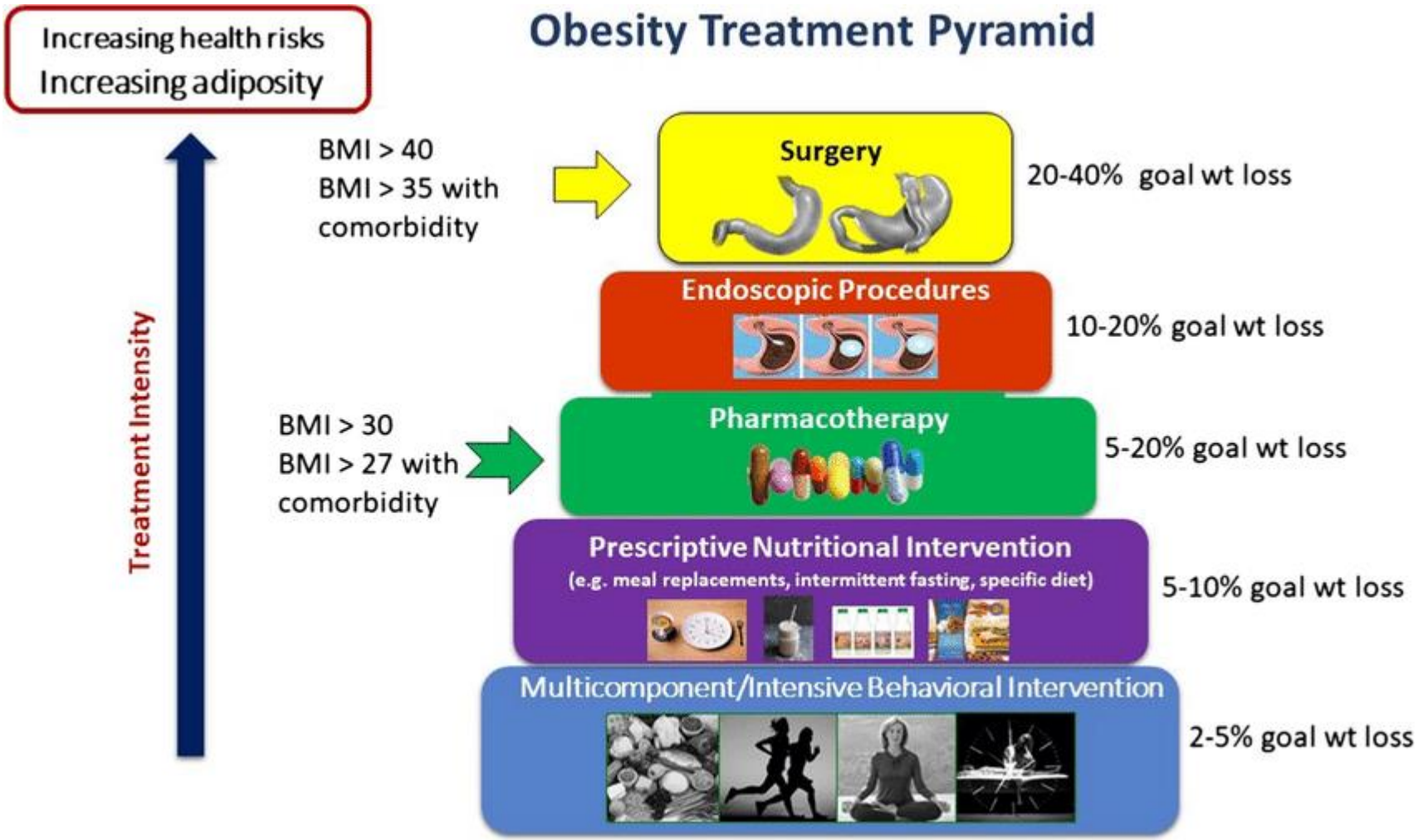
Introducing Interventions for Treating Obesity



Tucker S, et al. *Curr Obes Rep*. 2021;10(3):396-408.

Dietary patterns with weight loss data

- Low-fat
- Low carb/ low glycemic index
- High-protein
- Mediterranean
- Plant-based/vegetarian/vegan
- Meal replacement
- Intermittent fasting

LOW FAT DIET

- Lean proteins
- Fruits & vegetables
- Whole grains
- Low-fat dairy

- Fried foods
- Fatty meats
- Full-fat dairy

Low Fat Diet (LFD)

- < 30% calories fat
- Several large, multicenter, randomized trials — (DPP, Look AHEAD) have shown efficacy of LFDs for losing weight and improving comorbid conditions as compared with usual care.
- Long-term effect of low-fat diets on body weight depends on the intensity of intervention in the comparison group
- Low-fat interventions → greater weight loss only when compared with usual diet
- Efficacy of LFD w/o caloric restriction is uncertain

Chau et al. *Dietary interventions for obesity: clinical and mechanistic findings. TJ Clin Invest. 2021;131(1):e140065.*
Tobias et al. Lancet Diabetes Endocrinol. 2015 Dec. Effect of Low-Fat vs. Other Diet Interventions on Long-Term Weight Change in Adults: A Systematic Review and Meta-Analysis

Mechanism of LFD

- Less fat = less flavor, less palatability, less rewarding
- Fat is less satiating than carbs/protein due to higher energy density for lower volume of food
- Decreasing fat typically allows patients to eat a greater volume of food, which facilitates satiation and decreases overall energy intake.

Low Carb Diet

- 60–130 g of carbohydrate per day (≤20%–45% of daily energy intake)
- Very-low-carbohydrate: <60 g of carbohydrate per day
- (non-carb-restricted diet = 45%-60% carb)

Low Carb Diet

- LCDs generally produce greater short-term (<6 months) weight losses than LFDs, with roughly equivalent long term (>12 months) weight losses between approaches.
  - Ex: at 6 months, participants assigned to a low-carbohydrate, high-protein, high-fat diet lost 7.0% of body weight, which was significantly more than the 3.2% produced by a low-calorie, high-carbohydrate, low-fat regimen. However, at 12 months, differences between groups were no longer significant (–4.4 vs. –2.5% of initial body weight, respectively)
- Greater short-term weight loss than non-carbohydrate–restricted diets and a longer-term favorable effect on CV risk factors (HDL and TG profiles).
- Potential consequences of raised LDL and total cholesterol in the long-term

Foster GD, et al. A randomized trial of a low-carbohydrate diet for obesity. N Engl J Med. 2003;348(21):2082–2090.
Silverii et al. Effectiveness of low-carbohydrate diets for long-term weight loss in obese individuals: A meta-analysis of randomized controlled trials. Deabetes, Obesity and Metabolism. Apr 2022.
Chawla et al. The Effect of Low-Fat and Low-Carbohydrate Diets on Weight Loss and Lipid Levels: A Systematic Review and Meta-Analysis. Nutrients. Oct 2020.

Mechanism of Low Carb Diet

- Arguments that favor decreasing carbohydrate pertain to the effects of high-glycemic foods, including refined starches and sugar.
- According to the carbohydrate-insulin model, diets high in carbohydrate increase postprandial glucose and insulin secretion and direct metabolic fuels away from oxidation and toward storage in adipose tissue, decreasing energy expenditure and increasing hunger.
- Some studies show that LCDs are associated with suppression of appetite-stimulating hormones such as insulin and ghrelin. Postprandial secretion of the satiety hormones GLP-1 and PYY also tends to increase more with low-carbohydrate/high-fat meals than with isocaloric low-fat/high-carbohydrate meals.
- However, one study found that compared with a ketogenic LCD, a plant-based LFD with a higher glycemic load and postprandial glucose and insulin response resulted in less energy intake and no significant differences in hunger.
- Low-carbohydrate foods may also reduce caloric intake by decreasing cravings and preference for high-carbohydrate and high-sugar foods

High Protein Diet

- ≥25% of calories from protein or ≥1.6g of protein per kg of body wt

OR > 1g/kg BW (>20% total daily EE)

- RDA to avoid protein deficiency: 0.80 g/kg body wt (BW)/day

  = ~48–56 g/day (10%–15% of the total daily energy expenditure)

Protein Requirement for Wt Loss in Obesity:

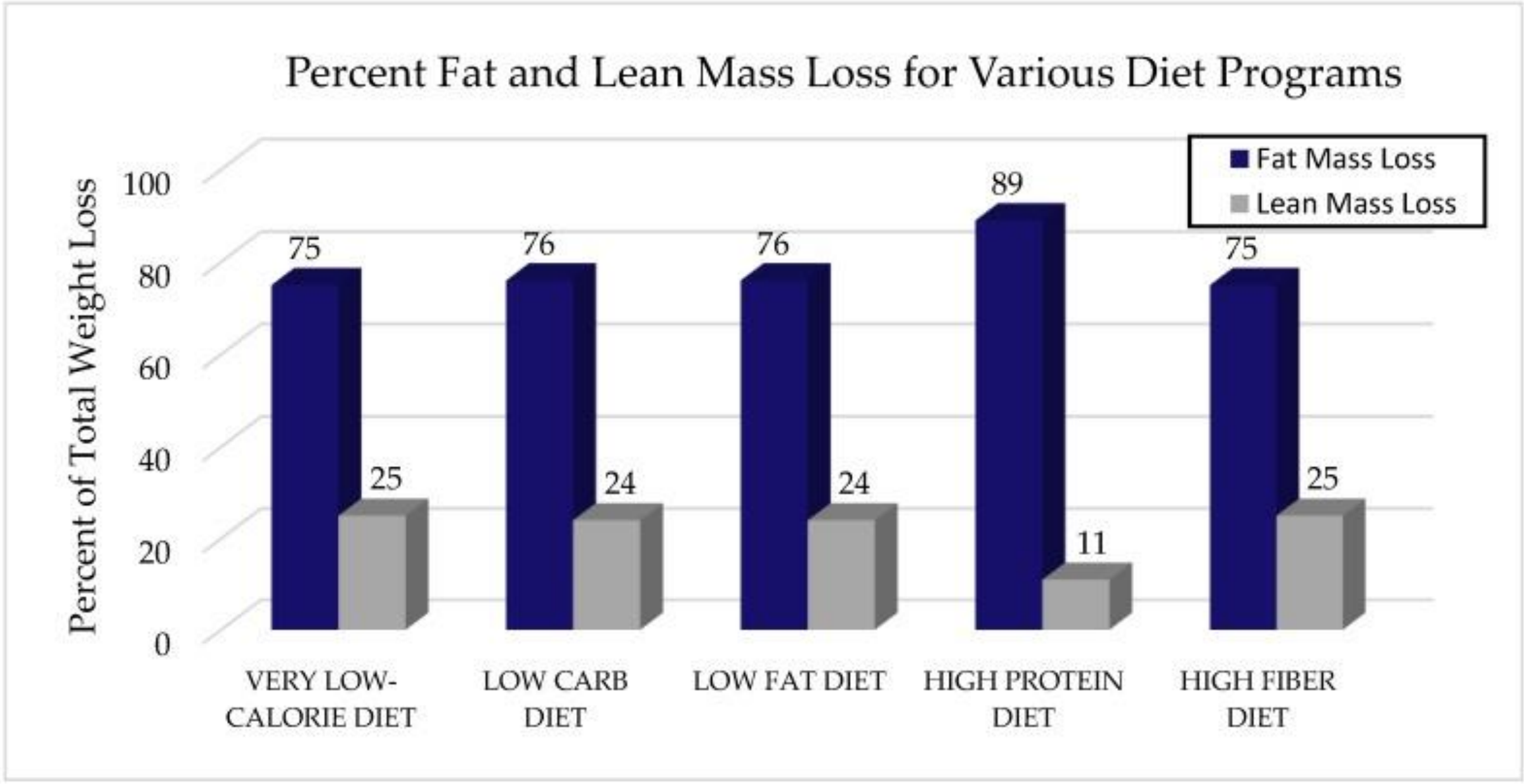
- 1.2 g/kg body wt (1.9 g/kg FFM)

Moon, J and Koh, G. Clinical Evidence and Mechanisms of High-Protein Diet-Induced Weight Loss. Journal of Obesity Met Synd. 2020.
Weijs, PJM et al. Exploration of the protein requirement during weight loss in obese older adults. Clin Nutr. 2016 Apr.

Mechanism of High Protein Diet

- Protein is more satiating than carbohydrate or fat, which may result in weight loss through reduced caloric intake
- Increased protein intake above RDA reduces body weight and enhances body composition by decreasing fat mass while preserving fat-free mass (FFM) in both low-calorie and standard-calorie diets.

Moon, J and Koh, G. Clinical Evidence and Mechanisms of High-Protein Diet-Induced Weight Loss. Journal of Obesity Met Synd. 202
Weijs, PJM et al. Exploration of the protein requirement during weight loss in obese older adults. Clin Nutr. 2016 Apr.



Willoughby et al. Nutrients. Dec 2018.

Mediterranean Diet

- a dietary pattern common in olive-growing areas of the Mediterranean region.
- Includes high consumption of vegetables, fruits, legumes, and grains; moderate consumption of red wine and dairy products; and relatively low intake of meat and meat products.

Mediterranean Diet

- Useful tool to reduce body weight, especially when it is energy-restricted, associated with physical activity, and more than 6 months in length.
- Does not cause weight gain, despite relatively high fat content.
- Similar weight loss and CV risk factor level reduction as comparator diets in individuals with overweight or obesity trying to lose weight

Esposito et al. Mediterranean Diet and Weight Loss: Meta-Analysis of Randomized Controlled Trials. Metab Syndr Relat Disord. 2011;9(1):1–12.
Mancini et al. Systematic Review of the Mediterranean Diet for Long-Term Weight Loss. Am J Med. 2016.

Mediterranean Diet - Mechanisms

- Mechanisms associated with the effects of the Mediterranean diet have not been well investigated.
- The Mediterranean diet does not put a particular emphasis on macronutrients, an approach that may be helpful for individuals desiring flexibility.
- Individual components of the Mediterranean diet, such as nuts, have positive effects on decreasing hunger.
- Important to monitor portion sizes, as many of the foods recommended in the Mediterranean diet are energy dense.
- Some patients may have difficulty accessing these foods owing to lack of availability and cost, which could limit adherence.

Vegan/Plant Based Diet

Diabetes Metab Syndr Obes. 2020; 13: 3433–3448.
Published online 2020 Sep 30. doi: 10.2147/DMSO.S272802

Effects of Plant-Based Diets on Weight Status: A Systematic Review

Elisabeth Tran,[1] Hanna Fjeldheim Dale,[1,2,3] Caroline Jensen,[1] and Gülen Arslan Lied[1,2,3]

- Evaluate intervention studies assessing the effects of different plant-based diets on body mass index and weight.
- 22 publications from 19 studies were included.
- The majority were RCTs comparing a low-fat vegan diet to an omnivore diet in participants with overweight, type 2 diabetes mellitus and/or cardiovascular disease.

Vegan/Plant Based Diet

- All studies reported weight reductions
- Among the RCTs:
  - 7 - significant differences
  - 4 - non-significant differences between the intervention and the control groups.
- Due to restrictions in fat intake in many studies, followed by reduced energy intake, the effects of the different interventions differ depending on the specific plant-based diets investigated.
- Results suggest that plant-based diets may improve weight status in some patient groups.

Vegan/Plant Based Diet - Mechanisms

- Increased intake of fiber, polyunsaturated fats and plant proteins
- Reduced intake of saturated fats and overall energy
- Promotes satiety and reduces overall energy consumption without the need for strict calorie counting

Meal replacements

Pros
- Convenient
- Portion-controlled
- Nutritionally complete
- Eliminate decision fatigue

Cons
- Processed
- Lack fiber
- Lack social element

Meal replacements

OBESITY TREATMENT

WILEY obesityreviews

A systematic review and meta-analysis of the effectiveness of meal replacements for weight loss

Nerys M. Astbury[1,2] | Carmen Piernas[1] | Jamie Hartmann-Boyce[1,2] | Sophia Lapworth[1] | Paul Aveyard[1,2] | Susan A. Jebb[1,2]

- 23 studies with 7884 adult participants with BMI > 25 kg/m^2
- RCTs of interventions incorporating the use of one or more MR daily, as part of a hypocaloric diet intended for weight loss
- Excluded interventions in which daily energy intake was restricted to < 3347 kJ (800 kcal)/ day

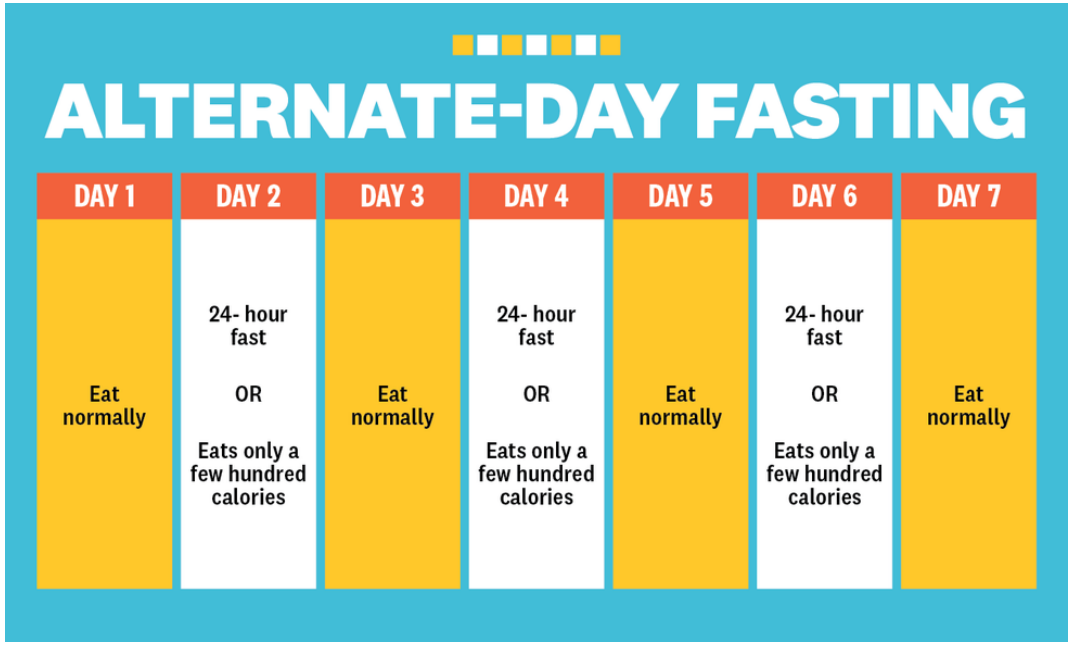
Meal replacements

- Programs incorporating meal replacements led to greater weight loss at 1 year than comparator weight loss programs and should be considered as a valid option for management of overweight and obesity in community and health care settings.

Meal replacements - Mechanisms

- Reduces complexity related to planning and preparing foods
- Decreases cognitive demands and decision making
- Reduces cues for overeating
- May support adherence to calorie goals through sensory-specific satiety

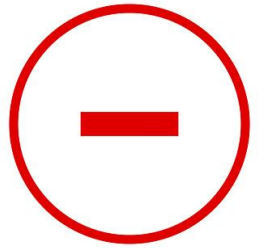
Intermittent Fasting



Intermittent Fasting

- Pros
  - Removes emphasis on specific foods types and amounts (no macronutrient or calorie monitoring)
  - May increase longevity
  - May help improve glucose control

- Cons
  - Increased hunger during fasting period
  - May promote overeating
  - Lack of emphasis on nutrition
  - May not be sustainable long term



Intermittent Fasting (IF)

- Mild to moderate weight loss (3–8% loss from baseline) over short durations (8–12 weeks).
  - on a par with traditional dieting approaches (daily calorie restriction).
- The ability of these intermittent fasting protocols to help to manage weight long-term is still poorly understood
  - majority of studies to date have run for short durations.
- 2026 Cochrane review showed little to no difference in percentage change from baseline weight
- Some studies show that IF improves cardiometabolic risk factors such as blood pressure, LDL cholesterol and triglycerides, insulin resistance and HbA1C, while others show no benefit on these parameters.
- Intermittent fasting is generally safe and produces few gastrointestinal, neurological, hormonal or metabolic adverse effects.

Varady, Krista et al. Clinical application of intermittent fasting for weight loss: progress and future directions. Nature Rev Endo. 2022.
Garegnani et al. Intermittent fasting for adults with overweight or obesity. Cochrane Database of Systematic Reviews. Feb 2026.

IF - Mechanisms

- Less behavioral fatigue and dietary monotony compared with continuous energy restriction
- only requires individuals to limit their intake for defined days, which may be easier for some to adhere to than continuous energy restriction
- Investigators have hypothesized that intermittent energy restriction improves resting energy expenditure and metabolic flexibility

Group 1
Unprocessed or Minimally Processed Foods

Fresh, dry, or frozen vegetables or fruit, grains, legumes, meat, fish, eggs, nuts and seeds.

Processing includes removal of inedible/unwanted parts. Does not add substances to the original food.

Group 2
Processed Culinary Ingredients

Plant oils (e.g., olive oil, coconut oil), animal fats (e.g., cream, butter, lard), maple syrup, sugar, honey, and salt.

Substances derived from Group 1 foods or from nature by processes including pressing, refining, grinding, milling, and drying.

Group 3
Processed Foods

Canned/pickled vegetables, meat, fish, or fruit, artisanal bread, cheese, salted meats, wine, beer, and cider.

Processing of foods from Group 1 or 2 with the addition of oil, salt, or sugar by means of canning, pickling, smoking, curing, or fermentation.

Group 4
Ultra-Processed Foods

Sugar sweetened beverages, sweet and savory packaged snacks, reconstituted meat products, pre-prepared frozen dishes, canned/instant soups, chicken nuggets, ice cream.

Formulations made from a series of processes including extraction and chemical modification. Includes very little intact Group 1 foods.

Increasing Level of Processing

Avoidance of Ultra-Processed Foods

Cell Metabolism
Clinical and Translational Report

Ultra-Processed Diets Cause Excess Calorie Intake and Weight Gain: An Inpatient Randomized Controlled Trial of *Ad Libitum* Food Intake

Kevin D. Hall,[1,5,*] Alexis Ayuketah,[1] Robert Brychta,[1] Hongyi Cai,[1] Thomas Cassimatis,[1] Kong Y. Chen,[1] Stephanie T. Chung,[1] Elise Costa,[1] Amber Courville,[2] Valerie Darcey,[1] Laura A. Fletcher,[1] Ciaran G. Forde,[4] Ahmed M. Gharib,[1] Juen Guo,[1] Rebecca Howard,[1] Paule V. Joseph,[3] Suzanne McGehee,[1] Ronald Ouwerkerk,[1] Klaudia Raisinger,[2] Irene Rozga,[1] Michael Stagliano,[1] Mary Walter,[1] Peter J. Walter,[1] Shanna Yang,[2] and Megan Zhou[1]

- Investigated whether people ate more calories when exposed to a diet composed of UPFs compared with a diet composed of unprocessed foods
- Diets matched for daily calories, sugar, fat, fiber, and macronutrients
- → **people consumed more calories when exposed to the UPF diet as compared to the unprocessed diet. Furthermore, people gained weight on the UPF diet and lost weight on the unprocessed diet.**

Health Risks of Ultra-Processed Foods

- Ultra-processed foods associated w major health outcomes:
  - All-cause and cause-specific mortality
  - Cardiovascular disease
  - Overweight and obesity
  - Unfavorable body composition and fat deposition
  - Diabetes
  - Cancer
  - GI and other diseases
- Potential mechanisms: nutrient displacement, factors that influence adiposity, and processing

Zhang, Y and Giovannucci EL. Ultra-processed foods and health: a comprehensive review. Crit Rev Food Sci Nutr. 2022.

Cultural Acceptability

Am J Lifestyle Med. 2009 ; 3(1): 64S–68S. doi:10.1177/1559827609335552.

Culturally tailored foods and CVD prevention

Donna M. Winham, DrPH
Department of Nutrition, Arizona State University

Abstract

Culture plays an integral role in people's food choices and lifestyle decisions. Health care messages may conflict with cultural beliefs for many immigrant, minority, and low income populations. The multiple ways that culture can positively and negatively affect disease risk must be utilized in the development of 'culturally tailored' messages or interventions. Only through the creation of interventions that are meaningful and culturally-relevant can successful behavior stability or change occur. The recognition of current health-promoting factors is important to develop rapport and credibility with individuals and population groups in order to reduce the risk of CVD and other lifestyle-based chronic diseases for optimal health.

Cultural Acceptability

- Culturally tailoring, or adapting a dietary message, can promote acceptance of a dietary change to reduce CVD risk

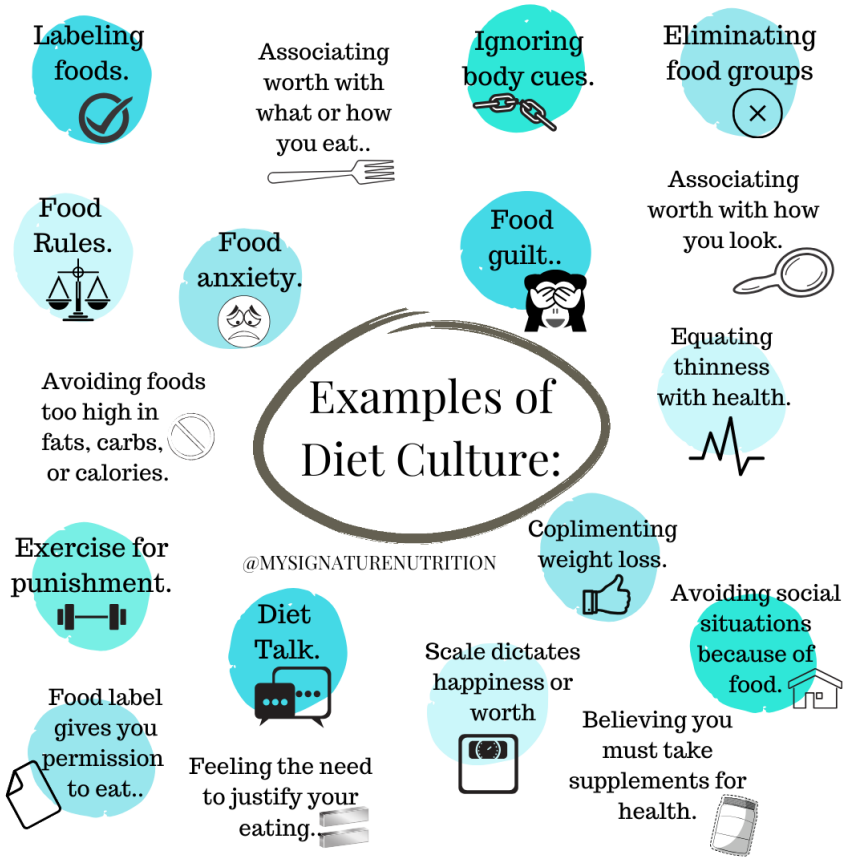
- The use of positive health-promoting foods and dietary practices already in place, can boost the success of dietary changes

Winham, D. Culturally tailored foods and CVD prevention. Am J Lifestyle Med. 2009 ; 3(1): 64S–68S.

Dietary Patterns *Without* Data for Weight Loss

- GOLO diet
- Detox diets
- Blood-type diet
- Cabbage soup and grapefruit diet
- hCG diet
- Bullet proof coffee diet

Avoid “Diet Culture”



Examples of Diet Culture

- Labeling foods as good or bad
- Exercising to “burn off” a specific amount of calories or to “earn a treat”
- Limiting/avoiding entire food groups for being “bad” (e.g., carbohydrates, dairy, sugar)
- Feeling guilt or shame for eating
- Attempting to suppress your appetite with caffeine, nicotine, skinny teas, or water
- Avoiding certain situations to avoid eating
- Worshiping thinness and weight loss
- Assuming that your body is responsible for good or bad things happening
- Engaging in fat shaming or body shaming
- Feeling envious of others for their weight or perceived self-control

Adapted from https://www.choosingtherapy.com/diet-culture/

Best Diet for Weight Loss?

What characterizes the best diet for treating obesity?

- Sustainable
- Culturally acceptable
- Reduced energy
- Nutrient dense
- High quality
- Whole food
- Plant predominant
- Sufficient protein
- Minimally processed
- Minimal added sugars

Eat real food.

Mostly plants.

Not too much.

Questions and Comments?

Chika V. Anekwe, MD, MPH

canekwe@mgh.harvard.edu

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