
Obesity
and
Dementia
BRAIN HEALTH
ACADEMY
UsAgainstAlzheimer's
May 17, 2023

Acknowledgements

This course is presented and developed in partnership with the American College of Lifestyle Medicine.

Presenters

Nina Crowley, PhD, RD, is a Dietitian, Health Psychologist and Advocate. Nina holds her doctorate in Health Psychology from Walden University, MS in Health Care Policy and Management from the State University of New York at Stony Brook, and BS in Nutrition Science from Cornell University. After leading the Medical University of South Carolina's Metabolic/Bariatric Surgery Program, she has joined seca's Medical Body Composition and Bioimpedance Analysis Division as the Professional Affiliations and Education Manager.

Course Description

Obesity is a major health problem that affects every part of the body, including the brain. In fact, it is among the top risk factors for dementia. This course provides strategies to address obesity and use that information to help individuals prevent and treat obesity to build cognitive resilience.

Learning Objectives

- Participants will be able to list 6 or more modifiable risk factors for dementia.
- Participants will be able to summarize the link between obesity and dementia.
- Participants will be able to identify effective interventions and strategies to address obesity
- Participants will be able to identify special considerations for high-risk populations.

Alzheimer's & Dementia Facts

Scope of the Epidemic (U.S.)[1]

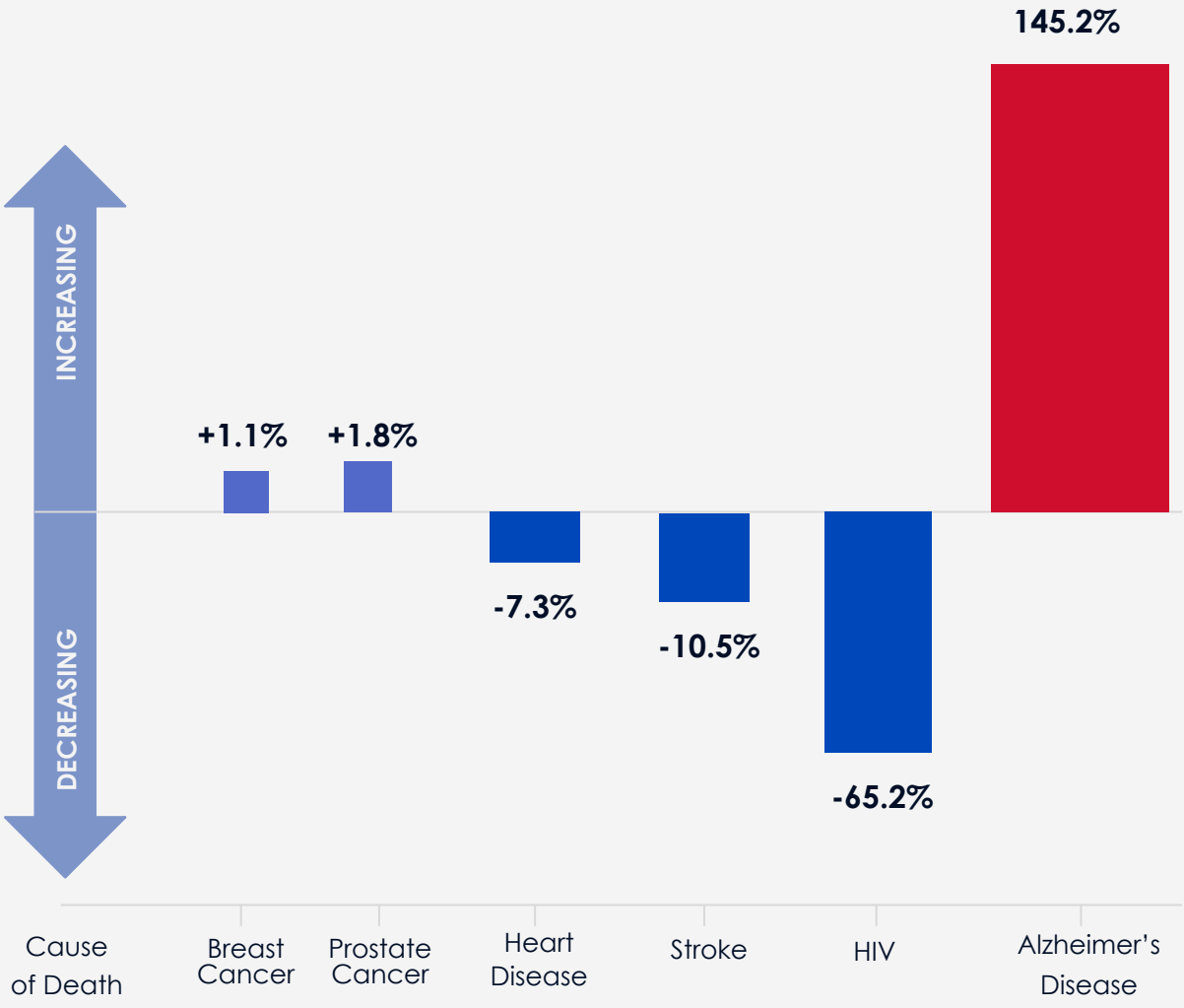
6.5 million adults

1 in 9 adults age ≥65

1 in 3 adults age ≥85

2/3 are women

Alzheimer's deaths increased 145% from 2000-2019, while other top causes of death have declined



(BAR GRAPH NOT TO SCALE)

Inequities in Brain Health[2, 3, 4]

African American people are
2X AS LIKELY
to have Alzheimer's

Latino people are
1.5X AS LIKELY
to have Alzheimer's

Less likely than White patients to receive a timely diagnosis;

More likely to report experiencing racial discrimination along their patient and caregiver journeys;

Less likely to be enrolled in cutting-edge Alzheimer's and brain health research.

Modifiable Risk Factors for Dementia

Alzheimer's: Non-Modifiable Risk Factors [6, 1, 7, 8]

Age

- Number one risk factor is advancing age.
- Risk doubles every 5 years after age 65.

Family History

- Genetics vs environmental factors.

Education

- Fewer years of formal education and lower levels of cognitive engagement may be risk factors.

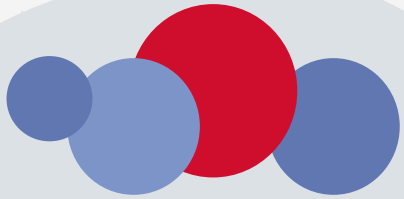
Sex

- 2/3 of those with Alzheimer's are women.
- 16% of women age ≥ 71 (11% of men).
- After age 65, have more than 1 in 5 chance (1 in 11 for men).

Modifiable Risk Factors [9]

40%

of dementia cases could be prevented by addressing these lifestyle factors



INCREASE

- Healthy Diet
- Physical Activity
- Mental Activity
- Cognitive and social activity

DECREASE

- Hypertension
- High cholesterol
- Uncontrolled diabetes
- Obesity
- Smoking
- Depression
- Excessive Alcohol Intake
- Head Injury
- Air Pollution
- Hearing Loss

The Lancet Report

- Updated 12 risk factor life-course model of dementia prevention

	Relative risk for dementia (95% CI)	Risk factor prevalence	Communality	Unweighted PAF	Weighted PAF*
Early life (<45 years)					
Less education	1·6 (1·3–2·0)	40·0%	61·2%	19·4%	7·1%
Midlife (age 45–65 years)					
Hearing loss	1·9 (1·4–2·7)	31·7%	45·6%	22·2%	8·2%
TBI	1·8 (1·5–2·2)	12·1%	55·2%	9·2%	3·4%
Hypertension	1·6 (1·2–2·2)	8·9%	68·3%	5·1%	1·9%
Alcohol (>21 units/week)	1·2 (1·1–1·3)	11·8%	73·3%	2·1%	0·8%
Obesity (body-mass index ≥30)	1·6 (1·3–1·9)	3·4%	58·5%	2·0%	0·7%
Later life (age >65 years)					
Smoking	1·6 (1·2–2·2)	27·4%	62·3%	14·1%	5·2%
Depression	1·9 (1·6–2·3)	13·2%	69·8%	10·6%	3·9%
Social isolation	1·6 (1·3–1·9)	11·0%	28·1%	4·2%	3·5%
Physical inactivity	1·4 (1·2–1·7)	17·7%	55·2%	9·6%	1·6%
Diabetes	1·5 (1·3–1·8)	6·4%	71·4%	3·1%	1·1%
Air pollution	1·1 (1·1–1·1)	75·0%	13·3%	6·3%	2·3%

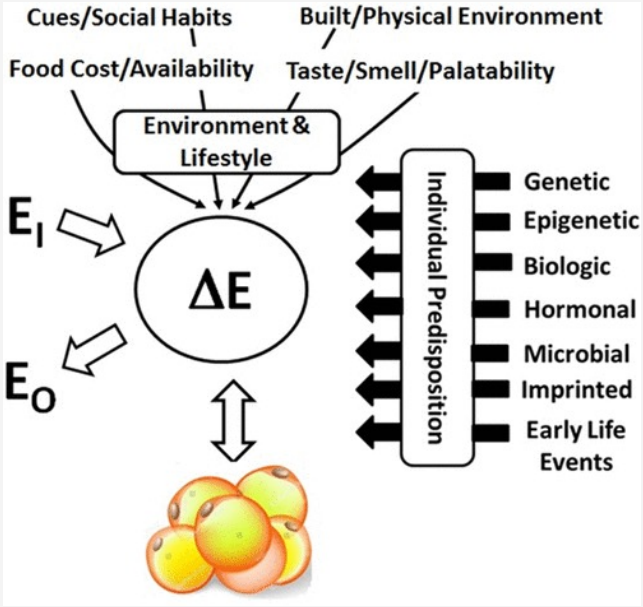
Data are relative risk (95% CI) or %. Overall weighted PAF=39·7%. PAF=population attributable fraction. TBI=traumatic brain injury. *Weighted PAF is the relative contribution of each risk factor to the overall PAF when adjusted for communality.

Table 1: **PAF for 12 dementia risk factors**

Understanding Obesity

Obesity is not a Behavior/Lifestyle Factor [12]

- BMI is a **physical characteristic** and a **marker for metabolic disease**
- BMI itself is **neither a behavior nor a lifestyle**, even though health behaviors and lifestyle factors can influence BMI
- Treating BMI as a lifestyle behavior **obscures the complex etiologies** that contribute to the metabolic disease of obesity
- Obesity is a fundamentally **heterogeneous process** with numerous underlying **mechanisms and etiologies**, each requiring **unique prevention and treatment modalities**



Viewing obesity as behavior can be harmful [11, 12, 13]

- Viewing obesity as a **health behavior rather than as a complex disease** can contribute to **weight bias and stigma**
  - Promotes a **mistaken notion** that obesity is a condition that **patients choose for themselves through behaviors they elect**
  - People with obesity **already face bias and discrimination** in employment, health care, and interpersonal relationships
  - Belies the very **real struggle** that people with obesity face in **addressing actual health behaviors** and seeking the appropriate tailored approaches to manage their weight.
  - **Weight bias** is well documented to **harm both health and quality of life** for people living with obesity
  - Can **promote the progression of obesity** and discourage patients from seeking appropriate medical care
- Viewing BMI as a health behavior also promotes a very narrow view of obesity and strongly limits public knowledge of the myriad treatments that exist and are yet to come

Understanding Obesity [14]

What is Obesity & Severe Obesity?

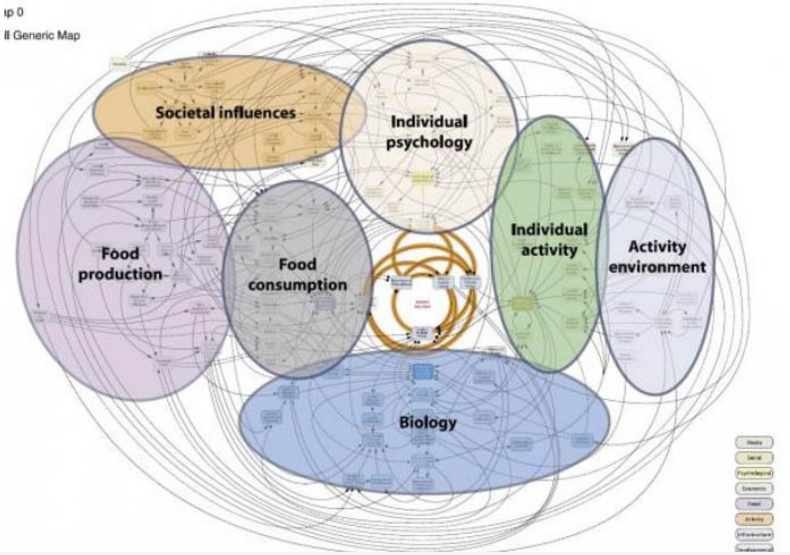
Obesity is a treatable disease that is a worldwide health concern associated with having an excess amount of body fat. It is caused by genetic and environmental factors and can be difficult to control through dieting alone. Obesity is diagnosed by a healthcare provider and is classified as having a body mass index (BMI) of 30 or greater. Nearly 40 percent of Americans have obesity.

Obesity Is

- A disease.
- A worldwide health concern.
- Caused by many factors.
- Treatable and manageable.

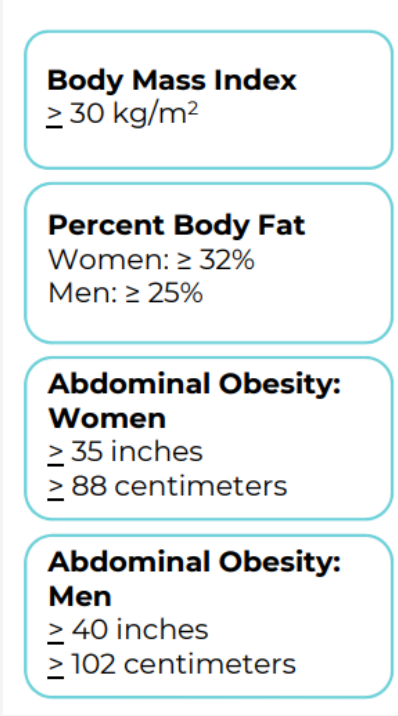
Obesity Is Not

- Your fault.
- Yours to manage alone.
- Just about food.
- Cured by a miracle treatment.



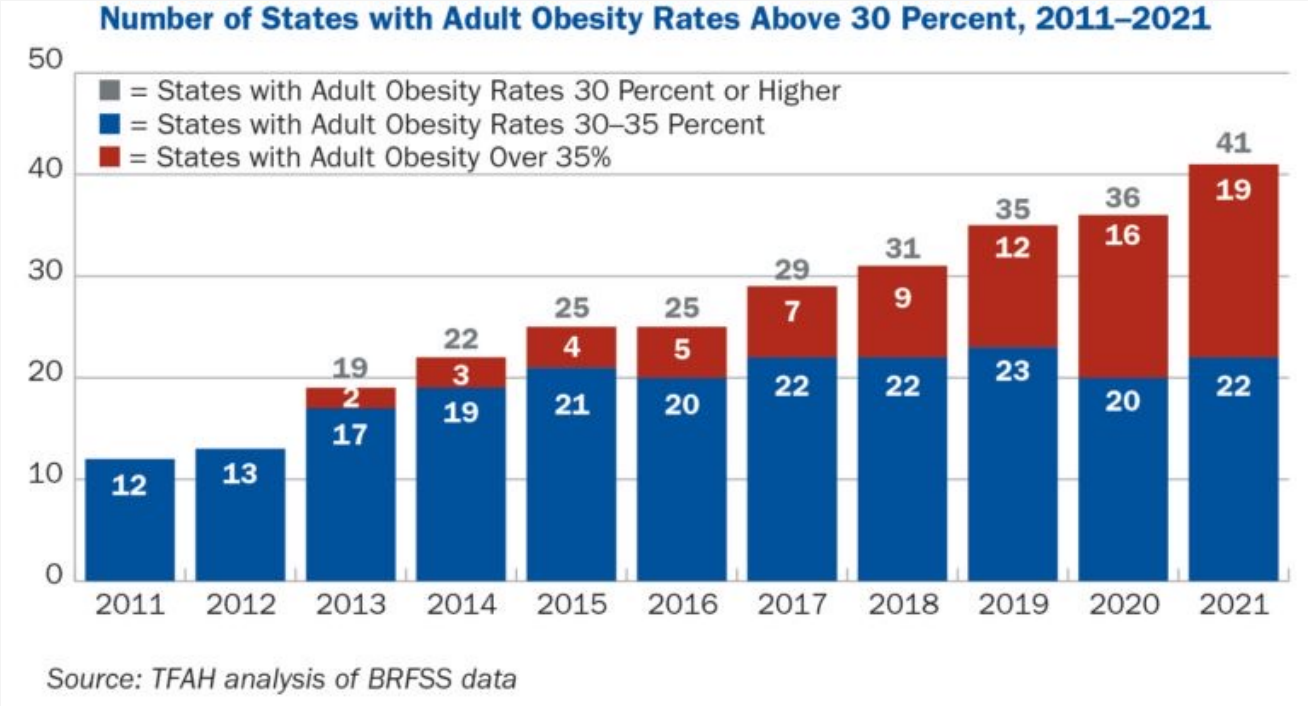
Obesity Classification [15]

- For the general population, **BMI > 25 kg/m^2 is considered overweight**; **BMI > 30 is considered obesity**
- BMI has **limitations in assessing adiposity** in individuals with increased or decreased muscle mass, men vs women
- For individuals, accurately determining **% body fat, android fat, and visceral fat** is a better assessment of adiposity compared to BMI alone
- **Central obesity** is defined as **waist circumference > 40 in for men and > 35 in for women**
  - Waist circumference is correlated with the risk of metabolic and cardiovascular disease



Obesity Algorithm®, ©2023 Obesity Medicine Association

Obesity Prevalence Statistics [16]



Racial/Ethnic Disparities in Obesity [16]

- NHANES (2017-2020) BMI:
  - 41.9% of Adults
    - 49.9% Black
    - 45.6% Hispanic
    - 41.4% White
    - 16.1% Asian
- Obesity has disparate effects on racial/ethnic minorities
  - Weight bias amplifies health disparities (more obesity, more complications, less access to care)
- Generally, adults with lower incomes and lower education levels were more likely to have obesity
  - In individuals with incomes just above the federal poverty level, the adult obesity rate was 42.6%, compared with 29.7% in people with income levels at or above 400% of the federal poverty level
  - Similarly, the adult obesity rate was 35.6% in adults who had less than a high school education, but only 22.7% in college graduates.

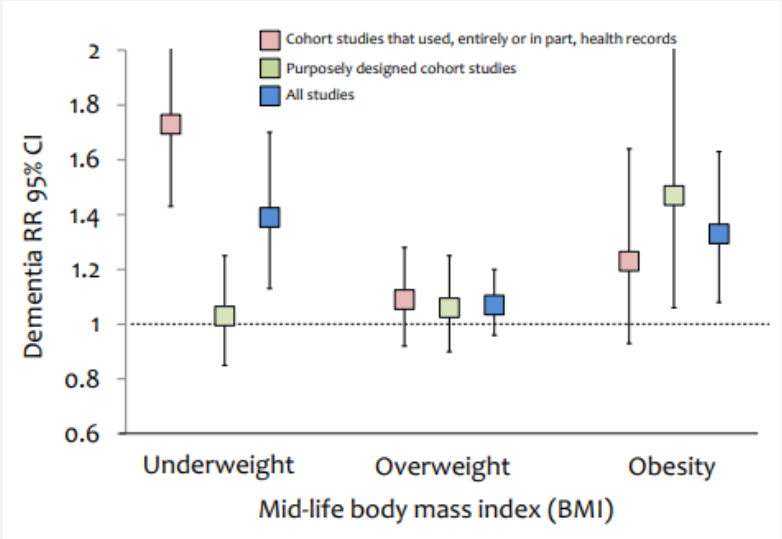
The link between Obesity to Alzheimer's and related dementias

Increased BMI and central obesity increase risk for developing dementia [17]

- In a representative sample of English older adults >50 yo (N=6582), 6.9% developed dementia over 15 years
- **Obesity (BMI>30) and central adiposity (WC> 35 in women, >40 in men) were associated with increased dementia** incidence independent of demographics, lifestyle behaviors, apolipoprotein E-e4, hypertension and diabetes
  - People with **BMI>30** had **35% greater risk** of dementia vs BMI <25
  - Women with **central obesity** (WC>35 in) had a **39% greater risk** of dementia compared with women without central obesity (WC<35 in)
  - Group with **BMI>30 and WC>35/40** had **28% higher risk** of dementia than the group with BMI<30 and WC<35/40

Midlife obesity is associated with late-life dementia [20]

- Systematic review of 19 longitudinal studies including 589,649 people aged 35 to 65 years, followed up for up to 42 years
- **Obesity (BMI ≥30)** *but not overweight (BMI 25–30)* **in midlife was associated with late-life dementia**
- Across cohort studies there was a significant and consistent **47% higher dementia risk associated with obesity in midlife** compared with normal BMI
- **Excess body weight in midlife may contribute to vascular and neurodegenerative damage** that underpins dementia through vascular and dysmetabolic pathways and directly through cell-signaling proteins secreted by the adipose tissue (e.g., leptin and adiponectin)



Obesity and cognitive deficits

- Obesity has been linked to **cognitive deficits, impaired long-term potentiation and synaptic plasticity, and a smaller brain volume**, increasing the probability of developing Alzheimer's disease (AD) and other dementias

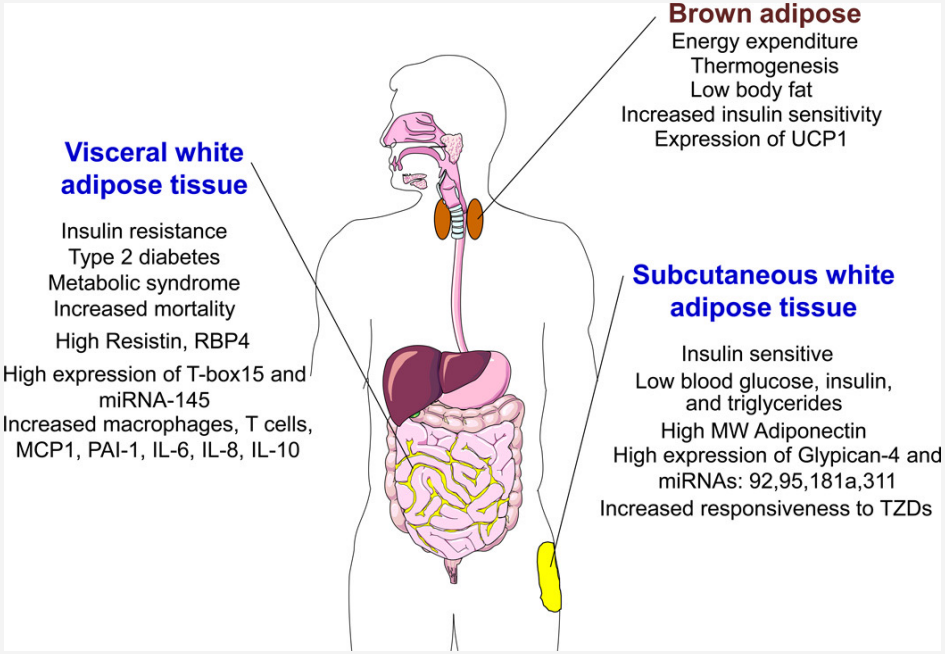
- People with obesity have **greater risk** for developing:
  - Age-related cognitive decline
  - Vascular dementia
  - Mild cognitive impairment (MCI)
  - Alzheimer's disease
  - Parkinson's disease
  - Huntington's disease

Inflammation [18]

- Alzheimer's Disease can be defined as a progressive neurodegenerative disease whose distinctive histopathological characteristics are the **extracellular amyloid plaques and intracellular neurofibrillary tangles**
- Obesity and diabetes are significant risk factors for developing the disease because a key **mediator of the disease progression is insulin resistance** within the brain that contributes to the **creation of the neurofibril tangles and necrosis**
- The immune system plays a role as well through the central nervous system inflammation, Toll-like Receptor (TLR) activation, and certain gut microbiota
- The hypothalamus regulates metabolic homeostasis and determines energy intake stimulation (e.g., hunger) through hormones like leptin and ghrelin

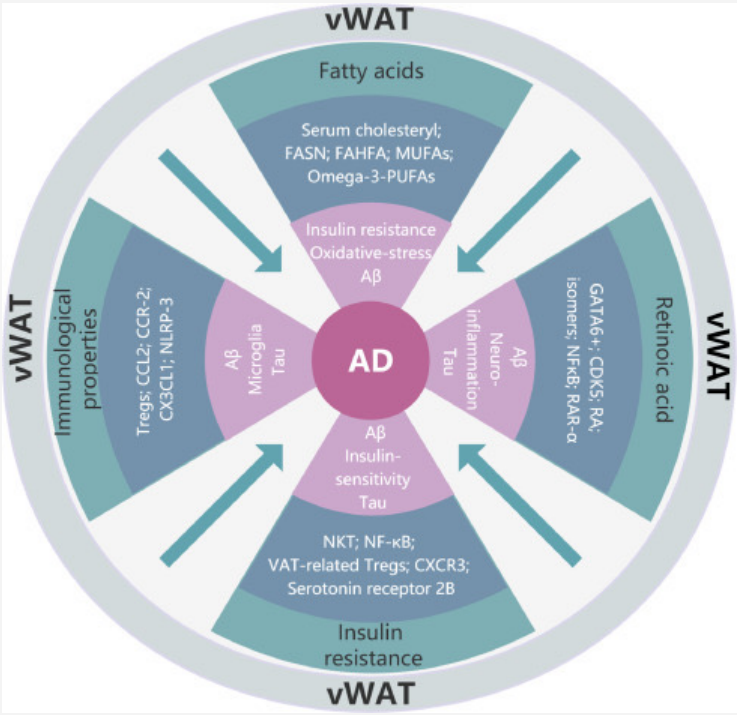
Adipose tissue [19]

- Obesity causes a state of **low-grade chronic inflammation in adipose tissue** that leads to the dysregulation of homeostatic systems, which in turn leads to the development of various diseases, including those related to **neurodegeneration**
- Adipose tissue as an **endocrine organ secreting pro-inflammatory adipokines and cytokines** that can trigger inflammation, oxidative stress and insulin resistance



Visceral White Adipose Tissue (vWAT) and Alzheimer's Disease (AD) [21]

- The visceral WAT has the potential to influence **amyloid beta metabolism, tau metabolism, microglial activation and neuroinflammation** via several pathways including:
  - vWAT-derived **fatty acids**
  - **immunological properties** of vWAT
  - **retinoic acid** derived from vWAT
  - vWAT-regulated **insulin resistance**
- Adults with higher vWAT index have more pronounced memory loss, subcortical gray matter atrophy and hippocampal atrophy



Skeletal Muscle Mass and Aging [22]

- Skeletal muscle mass loss occurs during aging and is caused by **atrophy of muscle fibers** and a **decrease in the number of myofibers**
- After age 30, **muscle mass declines at a rate of approximately 3%–8% per decade** and accelerates from 60 years onwards
- Aging is linked to alterations in **protein synthesis, degradation, folding, and trafficking**
- **Low skeletal muscle mass** is associated with **cognitive impairment** and **dementia** in older adults

- Purported molecular mechanisms that connect **loss of muscle mass with cognitive decline** include:
  - altered myokine secretion
  - Inflammation
  - insulin resistance
  - abnormal protein accumulation
  - oxidative stress
  - mitochondrial dysfunction

Muscle and cognitive function [22]

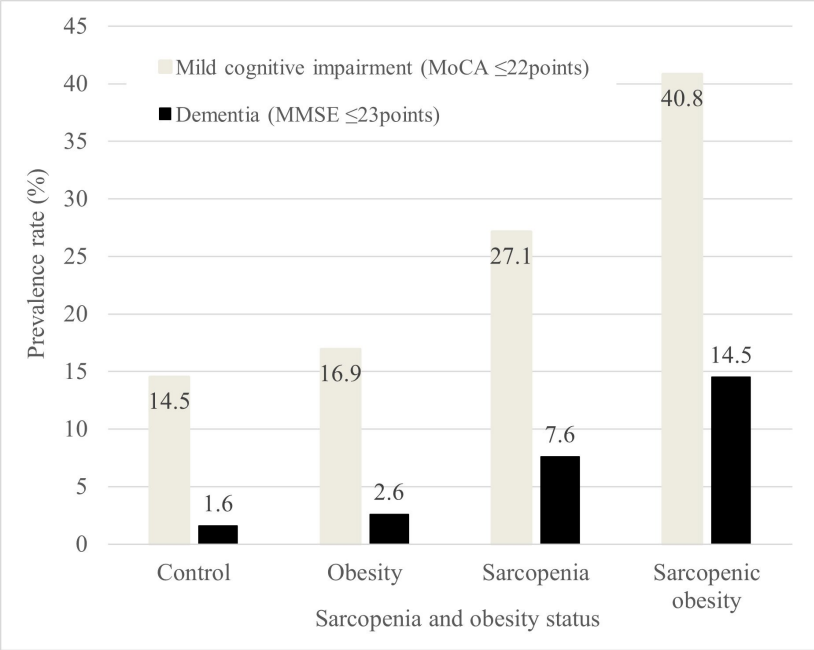
- **Sarcopenia** is associated with an increased likelihood of **cognitive impairment and cognitive dysfunction**
- Cross-sectional studies support an association between **muscle strength and cognitive function** in general and specific domains
- Some longitudinal studies indicate a bi-directional association between **poor muscle strength and poor cognitive function**
- Cross-sectional studies suggest that **gait speed** is associated with **cognitive function** (executive function, visuospatial ability and psychomotor function)
- **Low handgrip strength and low muscle mass** are independent risk factors for **cognitive decline** in community-dwelling older individuals
- Lifestyle factors are likely to **mediate the association between sarcopenia and cognitive impairment:** physical inactivity, poor diet, smoking, alcohol consumption,

Sarcopenia and health and dementia [23, 24]

- Individuals with **sarcopenia or frailty** frequently show a **decline in physical function, associated with lower skeletal muscle mass, low muscle strength and endurance, balance dysfunction, and gait variability, as well as falls and fractures**
- **Diagnostic measures of sarcopenia** in older adults (low skeletal muscle mass, muscle strength, and physical performance) are associated with **detrimental health outcomes and morbidity** (falls and fractures, caregiver dependence in activities of daily living, diabetes, and cognitive decline/impairment)
- Prevalence of **sarcopenia** in older community-dwelling individuals with **dementia** is more than **3 times higher** than individuals without dementia
- **Sarcopenia and frailty** may also be related to increased **depression and psychologically affect quality of life**

Sarcopenic Obesity [25, 26]

- Sarcopenic obesity is the co-existence of low muscle mass/function and excess adiposity
- Many dementia patients not only face **skeletal musculature loss** (sarcopenia) but also face **accumulation of body fat** (excess adiposity/obesity)
- Japanese study of 1615 older adults (65-84 yo) and looked at sarcopenia (handgrip strength) and obesity (BMI) on MCI and dementia
- After multivariate adjustment, **sarcopenic obesity was independently associated with increased odds of MCI and dementia** compared with the control



Intervention recommendations

Impact of the pro-inflammatory Western Diet [27,28]

- **Pro-inflammatory diets** cause an increase in reactive oxygen species (ROS), insulin resistance (IR), and dysregulation in the activation of the sympathetic nervous system (SNS) and the renin–angiotensin–aldosterone system (RAAS) that **contributes to the increase in obesity and related conditions**
- Disturbances in **hypothalamic–pituitary–adrenal axis regulation** starts the cycle that creates obesity and related cognitive problems
- Hippocampus handles memory, but it also plays a role in decision making and the western diet-induced disturbances **lower the ability of the hippocampus to regulate food intake, leading to overeating**
- Hippocampal disturbance and the **addictive behaviors** stimulated by the high-fat, sugary foods are a powerful combination that perpetuates obesity

Diet/Lifestyle Factors [29]

- Create a **calorie deficit**
- **Cut out high-fat, processed, and sugary food**
- Consume a **plant-based diet** with **antioxidant-rich foods,** omega-3 polyunsaturated fatty acids, curcumin, flavonoids, calcium, magnesium, potassium and drink caffeine to reduce inflammation
- Increase **physical activity** to improve glycemic control, reduce dyslipidemia, and decrease Aβ aggregates associated with cognitive decline and AD

A Comparison of the Western and Mediterranean Diets

Western Diet

-Defined by high amounts of sugar, carbohydrates, fat, salt

-Trans fat predominates

-Red meats

-Sparse consumption of vegetables

-Omega 6:3 imbalance

-Creates a pro-inflammatory environment

-Highly palatable, addictive foods

-Perpetuates obesity and diabetes

-Induces oxidative stress and insulin resistance

Mediterranean Diet

-Low amounts of processed sugars and foods

-Unsaturated fats (e.g., olive oil)

-Lean meats (e.g., chicken)

-Limited red meats

-Predominately made up of plant-based foods

-Creates an anti-inflammatory environment

-Combats obesity and diabetes

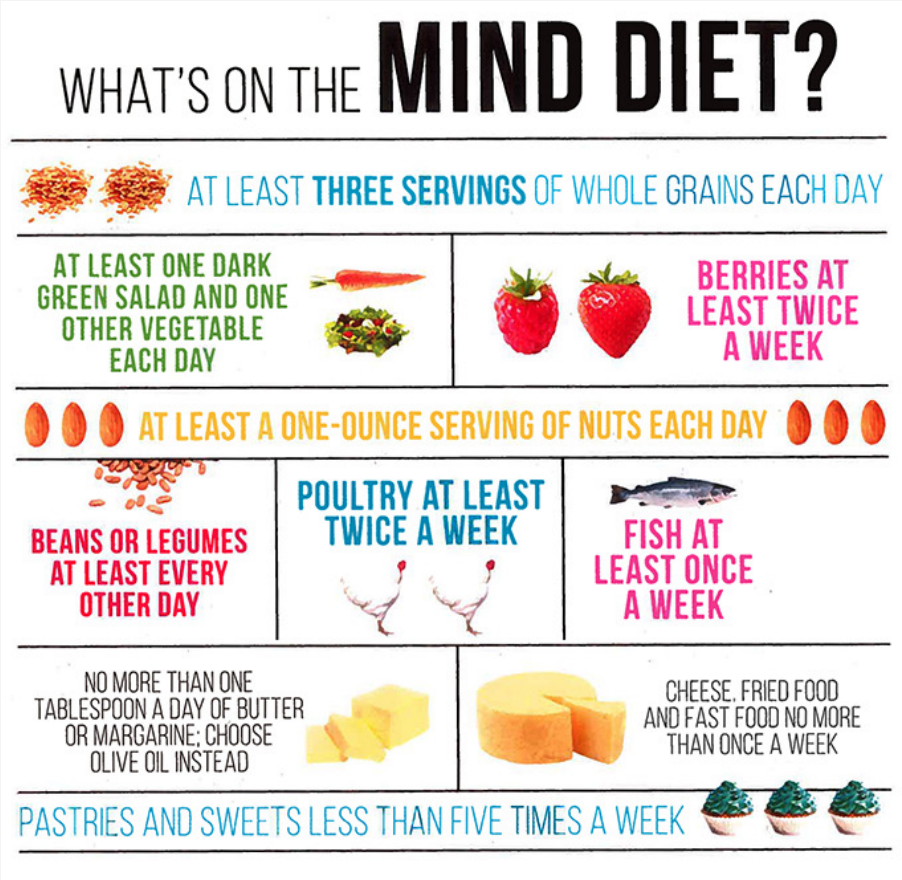
-Associated with high levels of anti-oxidants

Dietary Interventions for Dementia [31, 32, 33]

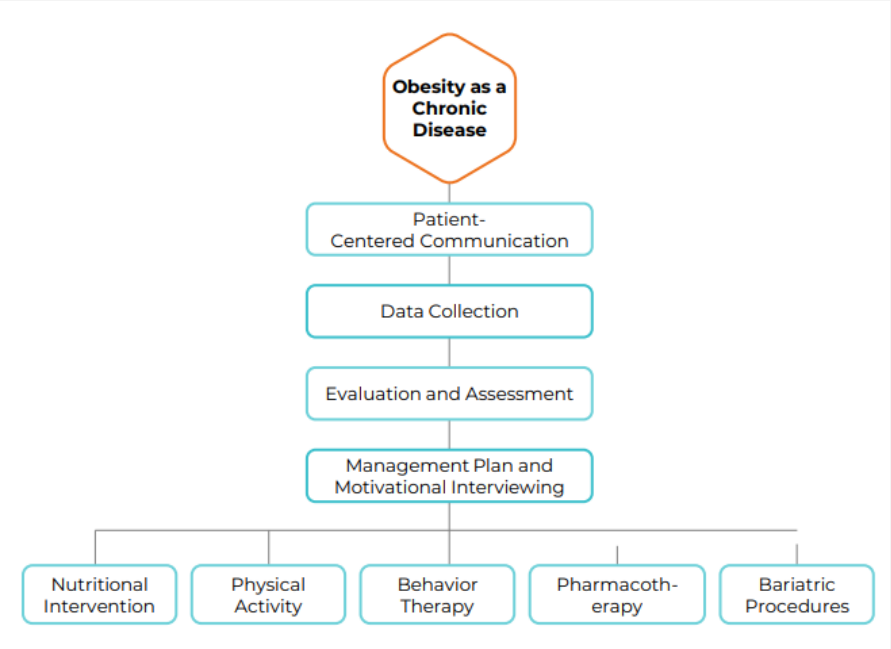
- Observational studies on **protective factors**
  - folate, B vitamins, Vitamins C, D, E, selenium
- **Lower saturated fat**
  - In the Women's Health Study, saturated fat intake was associated with a faster decline in memory by 70%. Women with the lowest saturated fat intake had the brain function of women six years younger
- Whole diets/Plant-based diets to reduce cognitive decline and dementia
  - **Mediterranean diet** (high in vegetables, legumes, fruits, nuts, cereals, olive oil and low intake of saturated fat and meat)
  - WHO guidelines recommend a Mediterranean diet to **reduce the risk of cognitive decline or dementia**
  - A **plant predominant diet** such as the **Mediterranean, DASH** (dietary approaches to stop hypertension), and the hybrid thereof, the **MIND (Mediterranean and DASH Intervention for Neurodegenerative Delay)** diet has been associated with **significant prevention of cognitive decline**

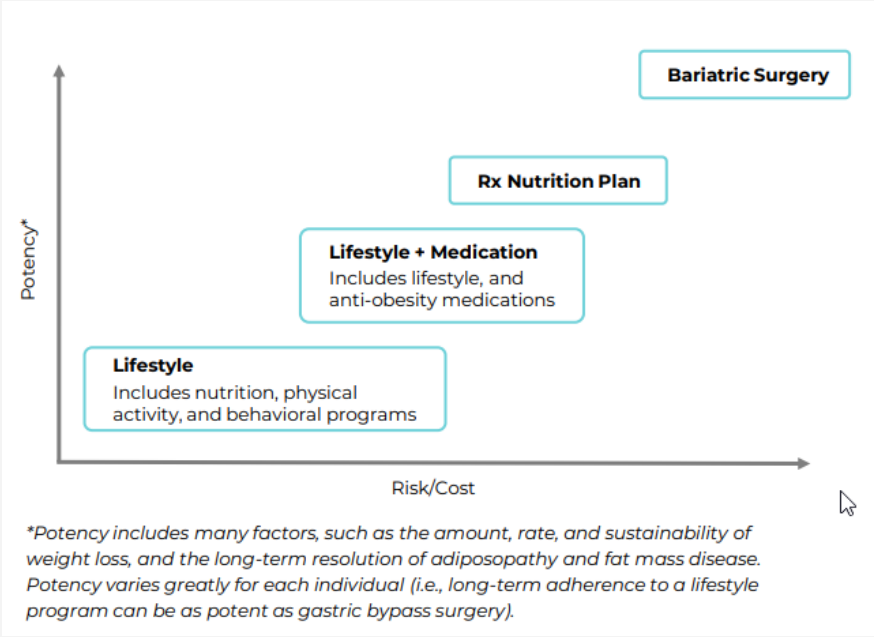
MIND (Med + DASH)[34]

- Rush University Memory and Aging Project (N = 923, 58-98 yo)
- Emphasizes foods to support a healthy brain and recommends limiting potentially damaging choices
- **Strict adherence** to the MIND diet resulted in a **53% reduction in risk** for Alzheimer's
- **Moderate adherence** to the diet was associated with a **35% risk reduction**
- Those with **high adherence** had **cognitive functioning** equivalent to a person who was **7 ½ years younger!**



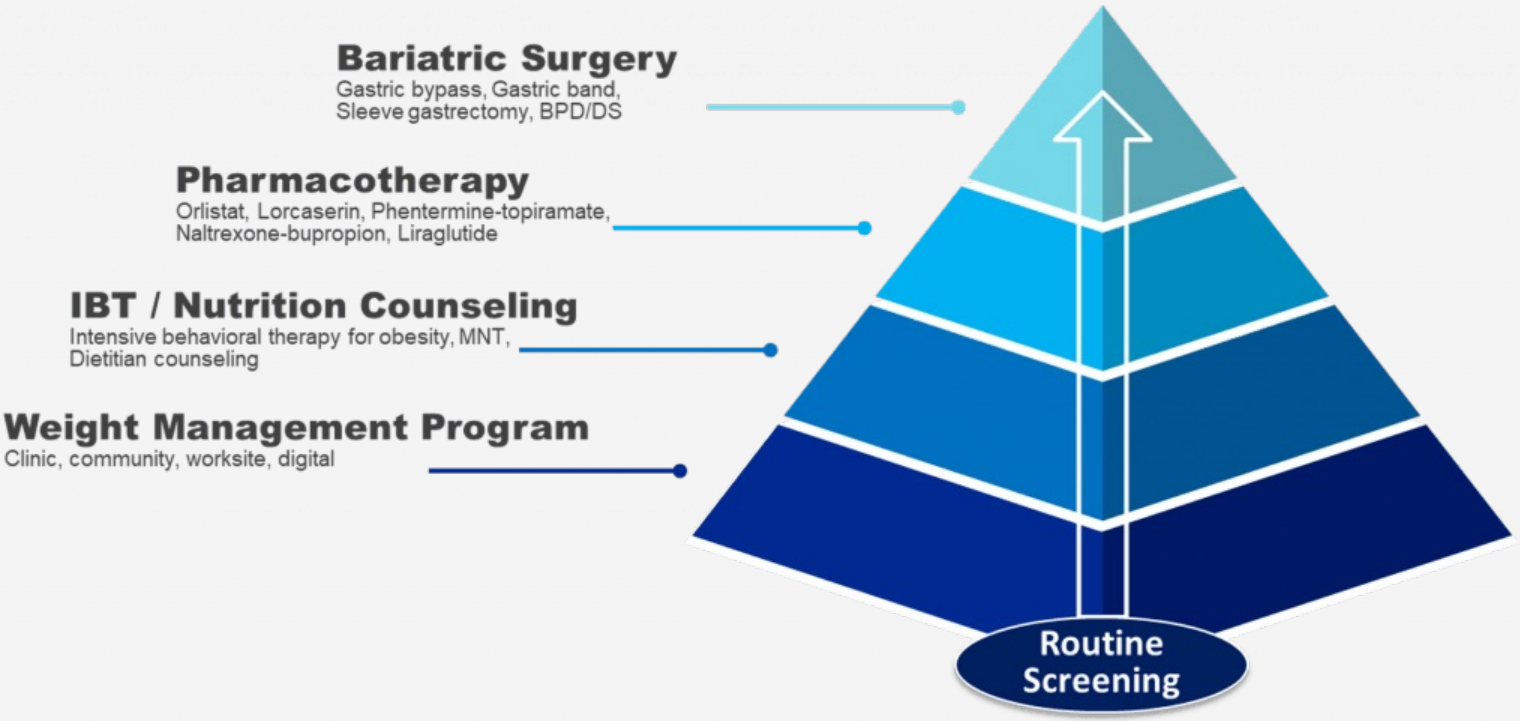
Treating Obesity as a Chronic Disease [15]



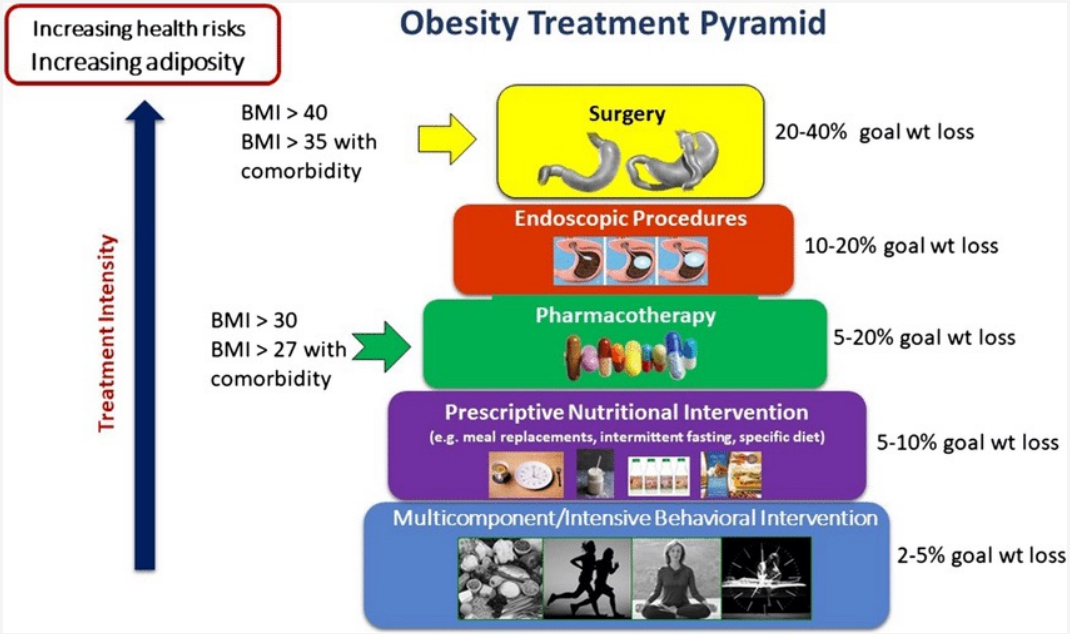


Obesity Algorithm®, ©2023 Obesity Medicine Association

Treatment for obesity [30]



Obesity Treatment Pyramid [35]



Treatment approaches [11]

AHA/ACC/TOS Prevention Guideline

OPEN

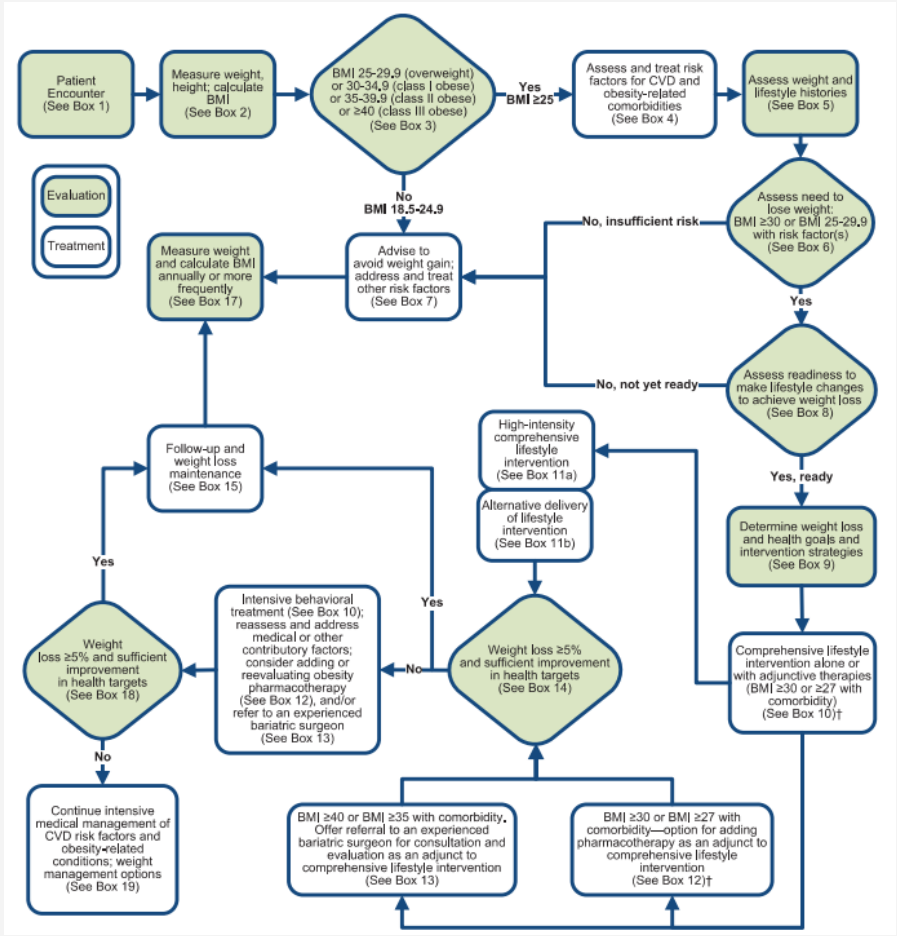
2013 AHA/ACC/TOS Guideline for the Management of Overweight and Obesity in Adults

A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and The Obesity Society

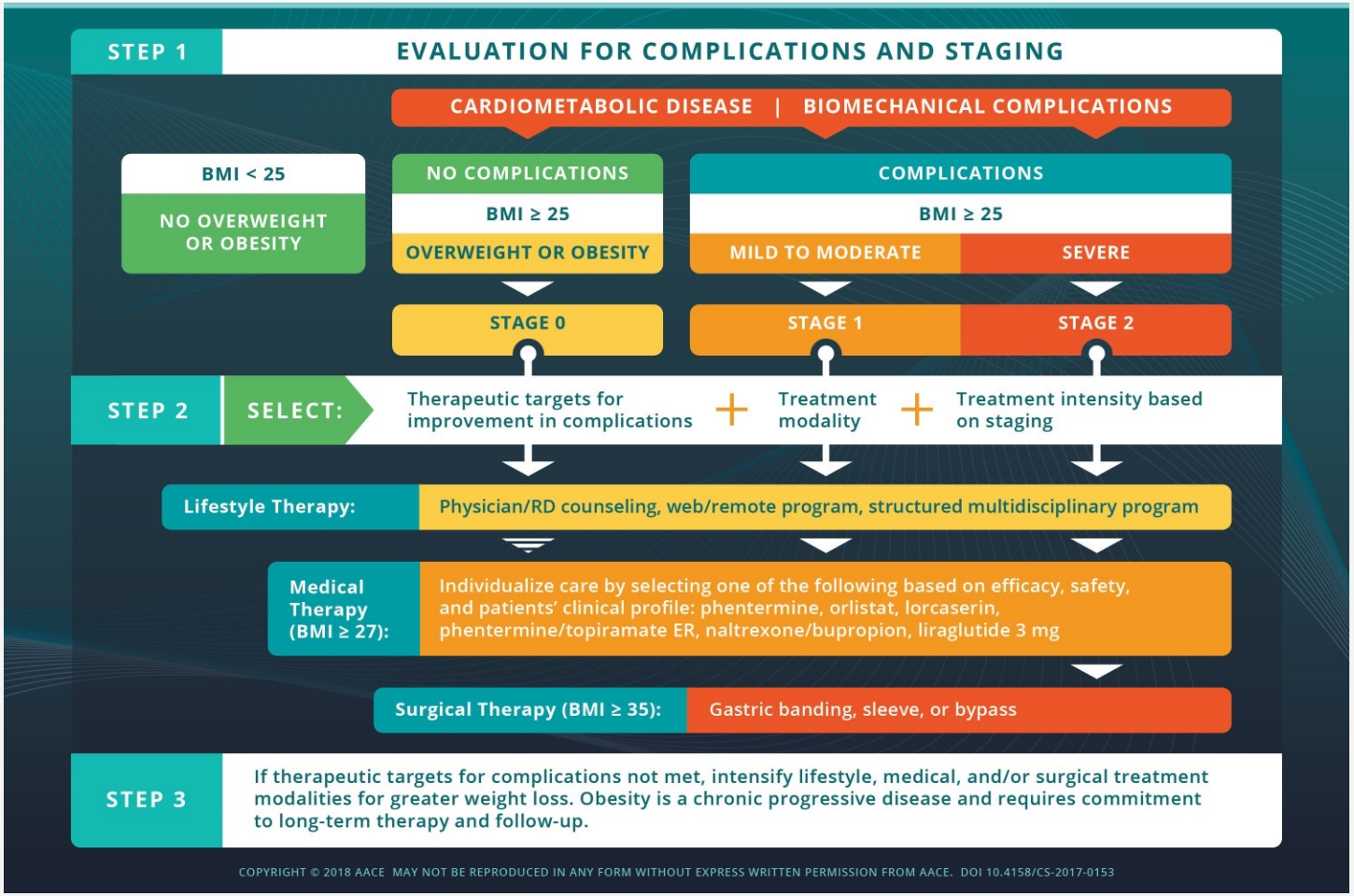
Endorsed by the American Association of Cardiovascular and Pulmonary Rehabilitation, American Pharmacists Association, American Society for Nutrition, American Society for Parenteral and Enteral Nutrition, American Society for Preventive Cardiology, American Society of Hypertension, Association of Black Cardiologists, National Lipid Association, Preventive Cardiovascular Nurses Association, The Endocrine Society, and WomenHeart: The National Coalition for Women With Heart Disease

EXPERT PANEL MEMBERS

Michael D. Jensen, MD, Co-Chair; Donna H. Ryan, MD, Co-Chair; Caroline M. Apovian, MD, FACP; Jamy D. Ard, MD; Anthony G. Comuzzie, PhD; Karen A. Donato, SM*; Frank B. Hu, MD, PhD, FAHA; Van S. Hubbard, MD, PhD*; John M. Jakicic, PhD; Robert F. Kushner, MD; Catherine M. Loria, PhD, FAHA*; Barbara E. Millen, DrPH, RD; Cathy A. Nonas, MS, RD; F. Xavier Pi-Sunyer, MD, MPH; June Stevens, PhD; Victor J. Stevens, PhD; Thomas A. Wadden, PhD; Bruce M. Wolfe, MD; Susan Z. Yanovski, MD*



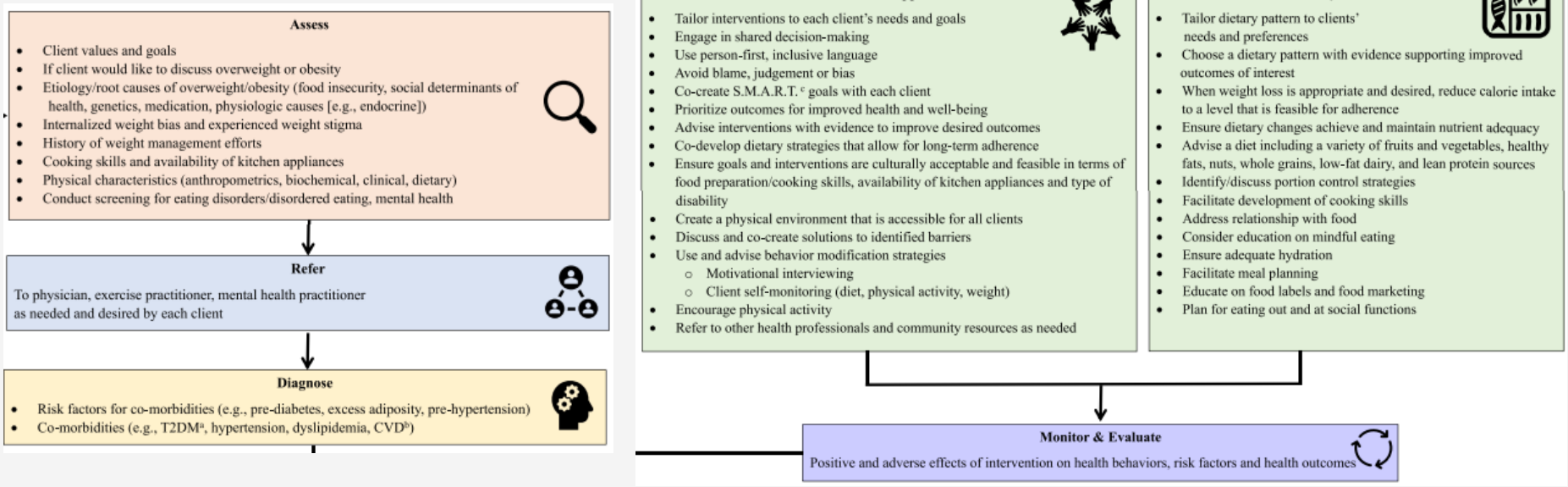
Complications-Centric Model for Care of the Patient with Overweight/Obesity



Academy of Nutrition and Dietetics Adult Weight Management 2022 Evidence-Based Nutrition Practice Guideline [36]

- MNT Approach for Adults with Overweight or Obesity
  - Utilize the Nutrition Care Process
  - Provide Medical Nutrition Therapy
  - Adapt Goals and Interventions
  - Minimize Weight Bias and Stigma
- Coordination of Care
  - Collaborate with Interprofessional Healthcare Team
  - Coordinate Care in a Variety of Settings
- MNT Amount
  - Number and Frequency of Interactive Contacts
  - Intervention Duration
  - Follow-Up Contacts
- Delivery of MNT
  - Telehealth and In-Person Care
  - Group and Individual Contacts
- Payment for Services
- Dietary and Lifestyle Intervention Approaches
  - Dietary Patterns
  - Components of a Comprehensive Intervention
- Special Populations
  - Co-Morbidities
  - Pharmacotherapy and Metabolic and Bariatric Surgery
  - Members of Groups Disproportionately Affected by Overweight or Obesity and Under-Resourced Communities

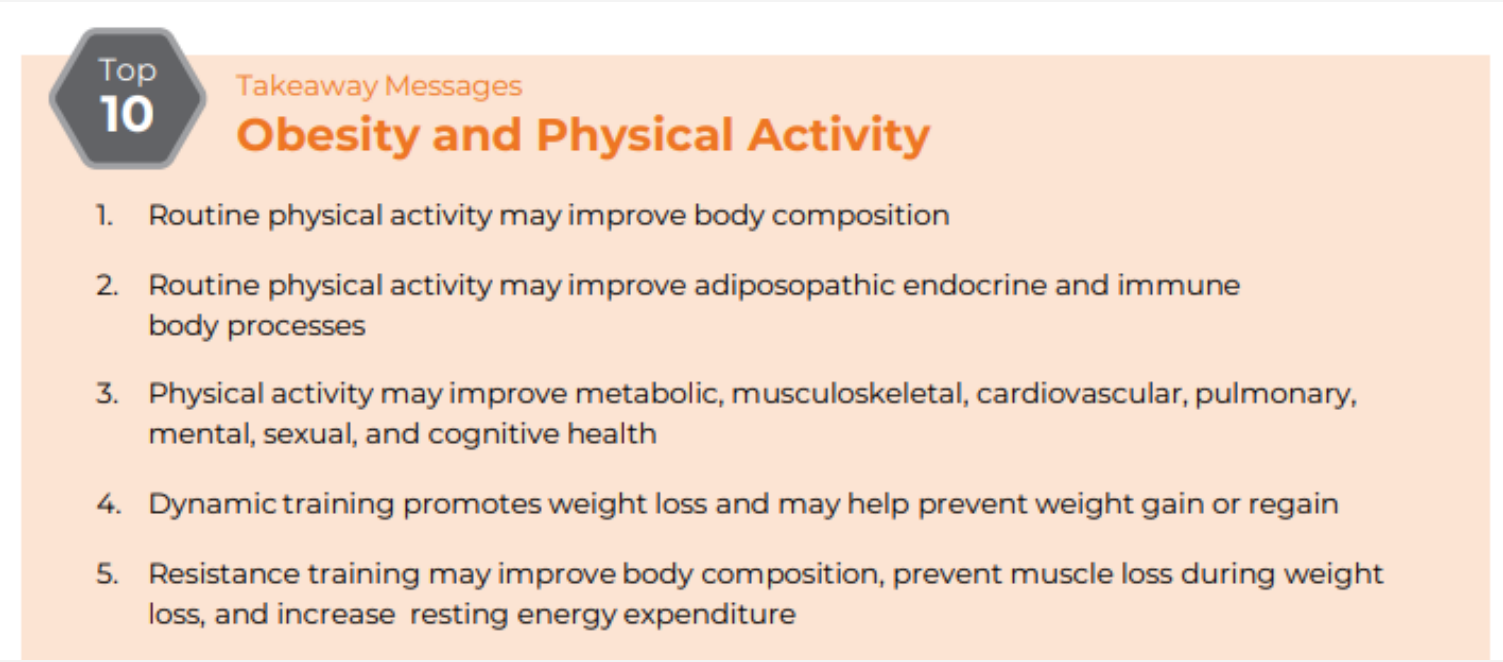
Key elements of medical nutrition therapy provided by dietitians for adults with overweight or obesity [36]



Dietary approaches to consider [36]

Diet	Description
Calorie reduction for weight loss, when appropriate and desired	
Dietary Approaches to Stop Hypertension (DASH) diet[162]	Rich in fruits and vegetables, legumes and nuts, whole grains, and low-fat dairy. Limit foods high in saturated fat, sweets, and sugar-sweetened beverages. Number of servings per food group to consume is usually provided to assist with calorie reduction.
Higher-protein diet[163]	25% of total calories from protein, 30% of total calories from fat, and 45% of total calories from carbohydrate
Higher-protein zone—type diet[162–164]	5 meals/d, each with 40% of total calories from carbohydrate, 30% of total calories from protein, and 30% of total calories from fat
Lacto-ovo-vegetarian—style diet[163]	Fruits and vegetables, eggs, plant-based proteins, and dairy products; no meat
Low-carbohydrate diet[162,164],	Initially <20 g/d carbohydrate , increasing to <130 g/d
Low-fat vegan—style diet[163]	10% to 25% of total calories from fat
Low-fat diet[162,163]	20% of total calories from fat
Lower-fat, high-dairy/calcium with added fiber and low-glycemic index foods [163]	≤30% fat 4 servings/d dairy With or without increased fiber and/or low-glycemic-index (low glycemic load) foods
Macronutrient-targeted diets[162,163]	15% or 25% of total calories from protein; 20% or 40% of total calories from fat; 35%, 45%, 55%, or 65% of total calories from carbohydrate
Meal replacement[163]	Liquid or bar meal replacements
Mediterranean-style diet[162–164]	No agreed upon guidance, but generally higher in fruits and vegetables, low in red meats, higher use of plant-based proteins and seafood and use of olive oil as a fat source. Number of servings per food group to consume is usually provided to assist with calorie reduction.
Moderate-protein diet[163]	12% of total calories from protein, 58% of total calories from carbohydrate, and 30% of total calories from fat
MyPlate[161]	Guidance from the US Department of Agriculture to promote inclusion of all food groups and intake of a variety of nutrients. Suggests filling half of one's plate with fruits and vegetables, making half of grains whole grains, varying proteins, and moving to lower-fat dairy products.
Ornish diet[162,164]	<10% calories from fat
The American Heart Association—style Step 1 diet[163]	Prescribed energy restriction of 1,500 to 1,800 kcal/d, <30% of total calories from fat, <10% of total calories from saturated fat

Physical Activity [15]



Physical Activity [15]

6. In addition to physical exercise, increased energy expenditure can be achieved via increased leisure time physical activity and non-exercise activity thermogenesis (NEAT)
7. A common physical exercise prescription (FITTE) includes frequency, intensity, time spent, type, and enjoyment
8. Metabolic equivalent tasks (METS) are used to assess the intensity of physical exercise, with one MET equal to the amount of energy expended for one minute while lying down at rest [equal to 3.5 milliliters of oxygen consumption per kilogram of bodyweight per minute (3.5 ml/kg/min)]
9. Standing = 2 METS; walking 4 miles per hour = 4 METS; running 10 miles per hour = 16 METS
10. Progress can be measured through tracking activity patterns over time via various activity logs, or can be measured by using a reliable technique to measure body composition

Behavioral Therapy [15]

- Eating behavior in patients with increased body fat often reflects the **imbalance in physiologic forces that strongly resist weight reduction** and weakly resist weight gain.
- Eating behavior can be affected by:
  - genetic predisposition
  - mental stress
  - Emotions
  - habitual time cues
  - Environment
  - information gap
  - reward factors
  - psychiatric disease
  - eating disorders (e.g., binge-eating disorder, bulimia nervosa, sleep-related eating disorder and night-eating syndrome)

Behavioral Therapy [15]

- Behavior related to weight regain may be related to **personal and physiologic priority imbalances** (i.e., "lack of time") as well as **physiologic changes** of a weight reduced state
- Behavior therapy elements for optimal success include **promoting behaviors that are doable, efficacious, measurable, and which engage self-ownership**
- Behavior therapy implementation optimally includes **frequent encounters with qualified medical professionals, education, stimulus control, cognitive restructuring, goal setting, self monitoring, behavioral contracting, problem solving, social support, etc.**
- For patients ready for change, healthful nutrition and physical activity may be aided by **weight management technologies, access to healthful nutrition and physical activity resources and/or knowing the existence of social media resources**
- The relationship between **obesity and depression is bidirectional**. Obesity is a risk factor for mood disorders; mood disorders are a risk factor for obesity

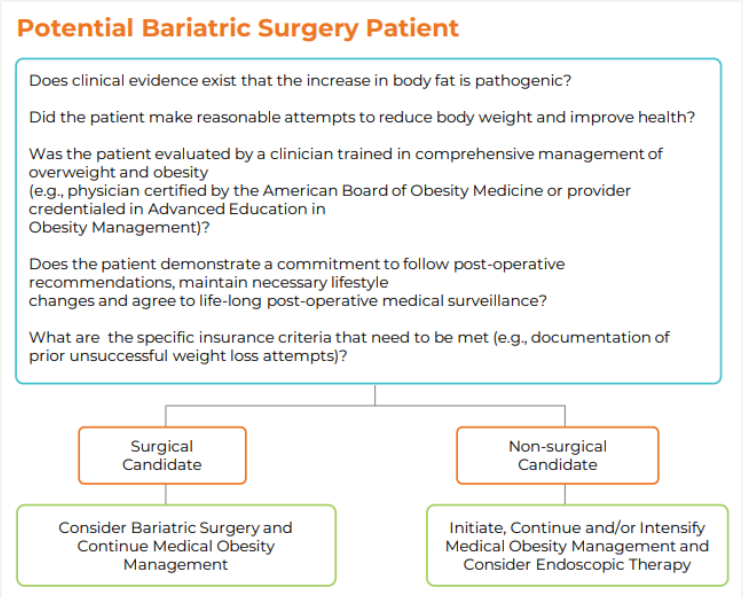
Pharmacotherapy [15]

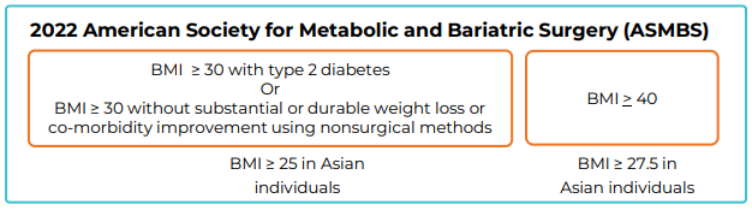
- **Adjunct** to Nutritional, Physical Activity, and Behavioral Therapies
- Objective is to **treat disease of excess adiposity**
- **Facilitate management of eating behavior**
- **Slow progression** of weight gain/regain
- **Improve the health, quality of life, and body weight of the patient with overweight or obesity**

Anti-obesity /medications Approved for Short-term Use	Anti-obesity Medications Approved for Chronic Use
• Phentermine	• Phentermine HCl/topiramate extended release
• Diethylpropion	• Naltrexone HCl/bupropion HCl extended release
• Phendimetrazine	• Liraglutide
• Benzphetamine	• Orlistat
	• Semaglutide

Obesity Algorithm®, ©2023 Obesity Medicine Association

Surgical Weight Loss [15]





	Pros	Cons	Expected EBWL at two years	Optimally suited for patients with:	Other comments
Roux-en-Y Gastric Bypass	Greater improvement in metabolic disease and GERD	Increased risk of malabsorptive complications over sleeve	60-75%	Higher BMI, GERD, Type 2 DM	Largest data set
Vertical Sleeve Gastrectomy	Improves metabolic disease; micronutrient deficiencies infrequent	Can worsen GERD and Barrett's esophagus	50-70% (*3- year data)	Metabolic disease	Currently most common procedure performed
Laparoscopic Adjustable Gastric Banding	Least invasive; removable	Limited efficacy and any metabolic benefits achieved are dependent on weight loss	30-50%	Lower BMI; no metabolic disease	Performance has declined and removal rate of at least 25 percent at five years
Biliopancreatic Diversion with Duodenal Switch	Greatest amount of weight loss and resolution of metabolic disease	Increased risk macro- and micronutrient deficiencies over bypass	70-80%	Higher BMI, Type 2 DM	Most technically challenging

Obesity Algorithm®, ©2023 Obesity Medicine Association

Other considerations when addressing Obesity

People First Language

- "People-first" language recognizes the potential **hazards of referring to or labeling individuals by their disease**
- **"Patient who has obesity" or "patient with overweight or obesity"** is preferred over "obese patient"
- **Standard with other diseases**, such as cancer, wherein "patient with cancer" is preferred over "cancerous patient"
- Respectful communication using 'People-First Language' creates **positive, productive discussions in health care settings about weight and health**

Encouraged Terms	Discouraged Terms
Weight	Morbidly obese
Excess weight	Obese
Unhealthy weight	Fat
Overweight	Heavy
Body mass index	Large size
Affected by obesity	
Living with obesity	

Social Determinants of Health (SDoH)

- Understand your own position and role of **implicit bias**
- **Patient-centered care** means looking at all perspectives
- Consider **feasibility of recommendations** for eating, moving, and access to care
- Ask about **safety and availability**
- Consider **social/community context** and support for lifestyle recommendations
- Inquire **about financial implications and stress**

Evaluating Obesity Treatment for Outcomes that matter

- Weight/BMI change
- Body composition
  - Central obesity
  - Visceral adiposity
  - Fat mass/body fat %
- Sarcopenia
  - Skeletal Muscle Mass
- Other health conditions (diabetes, heart disease)
- Mental Health
  - Quality of life

Address modifiable risk factors and obesity

- Consider **complex problems** exist in many domains
- Provide interventions that are **individualized and holistic**
- Focus on **wellbeing, quality of life, mental health**
- Tailor psychosocial interventions to the **patient's needs**
- Consider treating **co-occurring conditions** such as diabetes, hypercholesterolemia, hypertension
- Monitor for sarcopenia, sarcopenic obesity, frailty and other **muscle-related parameters**
- Check in about **physical activity, cognitive and social activity**

Higher weight protective later in life?

- While much of midlife is where interventions take place, consider the research showing higher weight may be protective later in life
  - **Higher BMI** later in life (>65 yo) is associated with **better cognition**
  - **Weight loss** in old age, are related to **cognitive decline** and increased risk of developing AD

- As the disease develops before the appearance of cognitive symptoms, it is suggested that **low weight in old age** may be a manifestation of this **early stage of the disease** and a sign of premature brain dysfunction

- Consider focus on **protecting and building lean muscle mass during midlife**, and less focus on weight/BMI/adiposity during older age?

Conclusions

- Obesity is a fundamentally **heterogeneous process** with numerous underlying mechanisms and etiologies, each requiring unique prevention and treatment modalities
- Treating the **disease of obesity and the intersection** with inflammation, adipose tissue, cognitive functioning, dementia and Alzheimer's Disease is **nuanced and complex**
- Treatment should focus on **reducing weight during midlife** with a focus on **preserving/building muscle mass** to protect against sarcopenia later in life
- Obesity treatment modalities require a **comprehensive approach** with nutrition, physical activity, behavior, and pharmacology/surgery when indicated
- Assessment and monitoring should include **body composition assessment** of central obesity, visceral adiposity, fat mass, muscle mass, and metrics to assess co-occurring health conditions

Tools and resources for health professionals

Resources for Providers & Patients

- Obesity Action Coalition - https://www.obesityaction.org/
- Obesity Medicine Association - https://obesitymedicine.org/
- Academy of Nutrition and Dietetics - https://www.eatright.org/
- American Board of Obesity Medicine - https://www.abom.org/
- Stop Obesity Alliance - https://stop.publichealth.gwu.edu/resources
- Communicating Brain Health Messaging with the African American and Latino Communities - https://www.usagainstalzheimers.org/sites/default/files/2022-04/BrainHealthEquity_PracticalGuide_Final_Digital.pdf
- BrainGuide by UsAgainstAlzheimer's - https://mybrainguide.org/

Thank you!

This presentation and related resources are available at:
https://www.usagainstalzheimers.org/nutrition-and-dementia

Please register for additional courses at:
https://www.usagainstalzheimers.org/brain-health-academy

For more information, contact:
Kelly O'Brien
UsAgainstAlzheimers
kobrien@usagainstalzheimers.org

References

1 Alzheimer's Association. (2022). *2022 Alzheimer's Disease Facts and Figures*. Alzheimer's Association. https://www.alz.org/media/Documents/alzheimers-facts-and-figures.pdf

2 Aranda, Maria P., Vega, William A., Richardson, Jason R., Resendez, Jason. (2019). Priorities for Optimizing Brain Health Interventions Across the Life Course in Socially Disadvantaged Groups. Florida International University and UsAgainstAlzheimer's.

3 Tsoy E, Kiekhofer R.E., Guterman E.L., et al. (2021). Assessment of Racial/Ethnic Disparities in Timeliness and Comprehensiveness of Dementia Diagnosis in California. JAMA Neurol. https://doi.org/10.1001/jamaneurol.2021.0399

4 Development. of an NIA Practice-Based Research Network to Conduct Alzheimer's and Related Dementias Clinical Research. (2021). National Institute on Aging

5 Mudrazija, S., Vega, W., Resendez, J., & Monroe, S. (2020, November 15). Place & Brain Health Equity: Understanding the County-Level Impacts of Alzheimer's. UsAgainstAlzheimer's. www.usagainstalzheimers.org/sites/default/files/2020-11/Urban_UsA2%20Brain%20Health%20Equity%20Report_11-15-20_FINAL.pdf

6 Alzheimer's Association. (2022). *Causes and Risk Factors for Alzheimer's Disease.* Alzheimer's Association. https://www.alz.org/alzheimers-dementia/what-is-alzheimers/causes-and-risk-factors

7 Alzheimer's Association. (2022). *Younger/Early-Onset Alzheimer's.* Alzheimer's Association. https://www.alz.org/alzheimers-dementia/what-is-alzheimers/younger-early-onset

8 Podcasy, J. L., & Epperson, C. N. (2016). Considering sex and gender in Alzheimer disease and other dementias. *Dialogues in clinical neuroscience*, *18*(4), 437.

9 Livingston, G., Huntley, J., Sommerlad, A., Ames, D., Ballard, C., Banerjee, S., ... & Mukadam, N. (2020). Dementia prevention, intervention, and care: 2020 report of the Lancet Commission. *The Lancet*, *396*(10248), 413-446.

10 Risk reduction of cognitive decline and dementia: WHO guidelines. Geneva: World Health Organization; 2019. Licence: CC BY-NC-SA 3.0 IGO. https://apps.who.int/iris/bitstream/handle/10665/312180/9789241550543-eng.pdf

11 Jensen, M. D., Ryan, D. H., Apovian, C. M., Ard, J. D., Comuzzie, A. G., Donato, K. A., ... & Shen, W. K. (2014). 2013 AHA/ACC/TOS guideline for the management of overweight and obesity in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and The Obesity Society.

12 Gordon-Larsen, P., & Heymsfield, S. B. (2018). Obesity as a disease, not a behavior. *Circulation*, *137*(15), 1543-1545.

13 Kyle TK, Nadglowski JF, Stanford FC. Weight Management and Healthy Lifestyles. *JAMA Intern Med.* 2020;180(10):1403. doi:10.1001/jamainternmed.2020.2743

14 Vandenbroeck IP, Goossens J, Clemens M. *Foresight Tackling Obesities: Future Choices—Building the Obesity System Map*. Government Office for Science, UK Government's Foresight Programme. 2018. Available from: https://www.gov.uk/government/publications/reducing-obesity-obesity-system-map

15 Tondt J, Freshwater M, Christensen S, Iliakova M, Weaver E, Benson-Davies S, Younglove C, Afreen S, Karjoo S, Khan N, Thiara D, Whittle C. Obesity Algorithm eBook, presented by the Obesity Medicine Association. www.obesityalgorithm.org. 2023. https://obesitymedicine.org/obesity-algorithm/ (Accessed = 5/10/2023)

16 Taylor, P., Funk, C., & Craighill, P. (2006). Americans see weight problems everywhere but in the mirror. *Philadelphia: Pew Foundation Social Trends Report*.

17 Ma, Y., Ajnakina, O., Steptoe, A., & Cadar, D. (2020). Higher risk of dementia in English older individuals who are overweight or obese. *International journal of epidemiology*, *49*(4), 1353-1365.

18 Flores-Cordero, J. A., Pérez-Pérez, A., Jiménez-Cortegana, C., Alba, G., Flores-Barragán, A., & Sánchez-Margalet, V. (2022). Obesity as a risk factor for dementia and Alzheimer's disease: the role of leptin. International Journal of Molecular Sciences, 23(9), 5202.

19 Tran, T. T., & Kahn, C. R. (2010). Transplantation of adipose tissue and stem cells: role in metabolism and disease. *Nature Reviews Endocrinology*, *6*(4), 195-213.

20 Albanese, E., Launer, L. J., Egger, M., Prince, M. J., Giannakopoulos, P., Wolters, F. J., & Egan, K. (2017). Body mass index in midlife and dementia: systematic review and meta-regression analysis of 589,649 men and women followed in longitudinal studies. *Alzheimer's & Dementia: Diagnosis, Assessment & Disease Monitoring*, *8*, 165-178.

References

21 Huang, X., Wang, Y. J., & Xiang, Y. (2022). Bidirectional communication between brain and visceral white adipose tissue: Its potential impact on Alzheimer's disease. *EBioMedicine*, *84*, 104263

22 Skeletal Muscle Health and Cognitive Function: A Narrative Review https://www.mdpi.com/1422-0067/22/1/255

23 Matsumoto, H.; Tanimura, C.; Tanishima, S.; Osaki, M.; Noma, H.; Hagino, H. Sarcopenia is a risk factor for falling in independently living Japanese older adults: A 2-year prospective cohort study of the GAINA study. Geriatr. Gerontol. Int. 2017, 17, 2124–2130.

24 Yeung, S.S.Y.; Reijnierse, E.M.; Pham, V.K.; Trappenburg, M.C.; Lim, W.K.; Meskers, C.G.M.; Maier, A.B. Sarcopenia and its association with falls and fractures in older adults: A systematic review and meta-analysis. J. Cachexia Sarcopenia Muscle 2019, 10, 485–500.

25 2022 ESPEN & EASO Consensus StatementvDonini, L. M., Busetto, L., Bischoff, S. C., Cederholm, T., Ballesteros-Pomar, M. D., Batsis, J. A., Bauer, J. M., Boirie, Y., Cruz-Jentoft, A. J., Dicker, D., Frara, S., Frühbeck, G., Genton, L., Gepner, Y., Giustina, A., Gonzalez, M. C., Han, H. S., Heymsfield, S. B., Higashiguchi, T., Laviano, A., & Barazzoni, R. (2022). Definition and Diagnostic Criteria for Sarcopenic Obesity: ESPEN and EASO Consensus Statement. Obesity facts, 15(3), 321–335. https://doi.org/10.1159/00052124

26 Someya, Y., Tamura, Y., Kaga, H., Sugimoto, D., Kadowaki, S., Suzuki, R., ... & Watada, H. (2022). Sarcopenic obesity is associated with cognitive impairment in community-dwelling older adults: The Bunkyo Health Study. *Clinical Nutrition*, *41*(5), 1046-1051.

27 Kopp, W. How Western Diet And Lifestyle Drive The Pandemic Of Obesity And Civilization Diseases. Diabetes, Metab. Syndr. Obes. Targets Ther. 2019, 12, 2221–2236. [CrossRef] [PubMed]

28 López-Taboada, I.; González-Pardo, H.; Conejo, N.M. Western Diet: Implications for Brain Function and Behavior. Front. Psychol. 2020, 11, 564413. [CrossRef] [PubMed]

29 Selman, A., Burns, S., Reddy, A. P., Culberson, J., & Reddy, P. H. (2022). The Role of Obesity and Diabetes in Dementia. *International journal of molecular sciences*, *23*(16), 9267.

30 Jannah, N., Hild, J., Gallagher, C., & Dietz, W. (2018). Coverage for obesity prevention and treatment services: analysis of Medicaid and state employee health insurance programs. *Obesity*, *26*(12), 1834-1840.

31 Pistollato F, Iglesias RC, Ruiz R, et al. Nutritional patterns associated with the maintenance of neurocognitive functions and the risk of dementia and Alzheimer's disease: a focus on human studies. Pharmacol Res 2018; 131: 32–43.

32 WHO. Risk reduction of cognitive decline and dementia: WHO guidelines. Geneva: World Health Organization, 2019.

33 Okereke, Olivia I., et al. "Dietary fat types and 4-year cognitive change in community-dwelling older women." *Annals of neurology* 72.1 (2012): 124-134.

34 Morris, et al. (2015). Alzheimer's & Dementia, 11(9), 1007–1014.

35 Tucker, S., Bramante, C., Conroy, M., Fitch, A., Gilden, A., Wittleder, S., & Jay, M. (2021). The most undertreated chronic disease: addressing obesity in primary care settings. *Current obesity reports*, *10*, 396-408.

36 Morgan-Bathke, M., Raynor, H. A., Baxter, S. D., Halliday, T. M., Lynch, A., Malik, N., ... & Rozga, M. (2023). Medical Nutrition Therapy Interventions Provided by Dietitians for Adult Overweight and Obesity Management: An Academy of Nutrition and Dietetics Evidence-Based Practice Guideline. *Journal of the Academy of* Nutrition and Dietetics, 123(3), 520-545.

37 Garber, A. J., Handelsman, Y., Grunberger, G., Einhorn, D., Abrahamson, M. J., Barzilay, J. I., ... & Umpierrez, G. E. (2020). Consensus statement by the American Association of Clinical Endocrinologists and American College of Endocrinology on the comprehensive type 2 diabetes management algorithm–2020 executive summary. *Endocrine Practice*, *26*(1), 107-139.