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Obesity Management

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COURSE DESCRIPTION

Designed for healthcare professionals, this interactive virtual course equips participants with comprehensive strategies for the medical treatment of obesity. The curriculum is tailored to those committed to mitigating the health impacts of obesity, such as prescribers, pharmacists, and allied health workers.

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By the end of this course, learners will be able to:

- Describe the prevalence of obesity in US adults, citing statistical data and epidemiological trends.
- Explain evidence-based treatment options for obesity, including efficacy and safety of current therapeutic interventions.
- Develop a comprehensive management plan for treatment of patients with obesity, including considerations for behavioral counseling, obesity pharmacotherapy, and surgical interventions.
- Construct a multidisciplinary team approach, integrating various healthcare professionals to support patient-centered care.

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LEARNING OBJECTIVES

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INTRODUCTION TO OBESITY

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Which of these best characterizes your beliefs about obesity treatment?

A. Obesity is a medical condition; it is the healthcare provider's responsibility to ensure that patients are counseled and receive treatment for obesity
B. Obesity is a personal issue; it is the patient's responsibility to ensure that he/she gets the help they need
C. Obesity is both a medical and personal issue; the responsibility for addressing obesity is shared between healthcare providers and patients
D. Obesity is an issue of personal responsibility and willpower; patients should take better care of themselves and not burden the healthcare system

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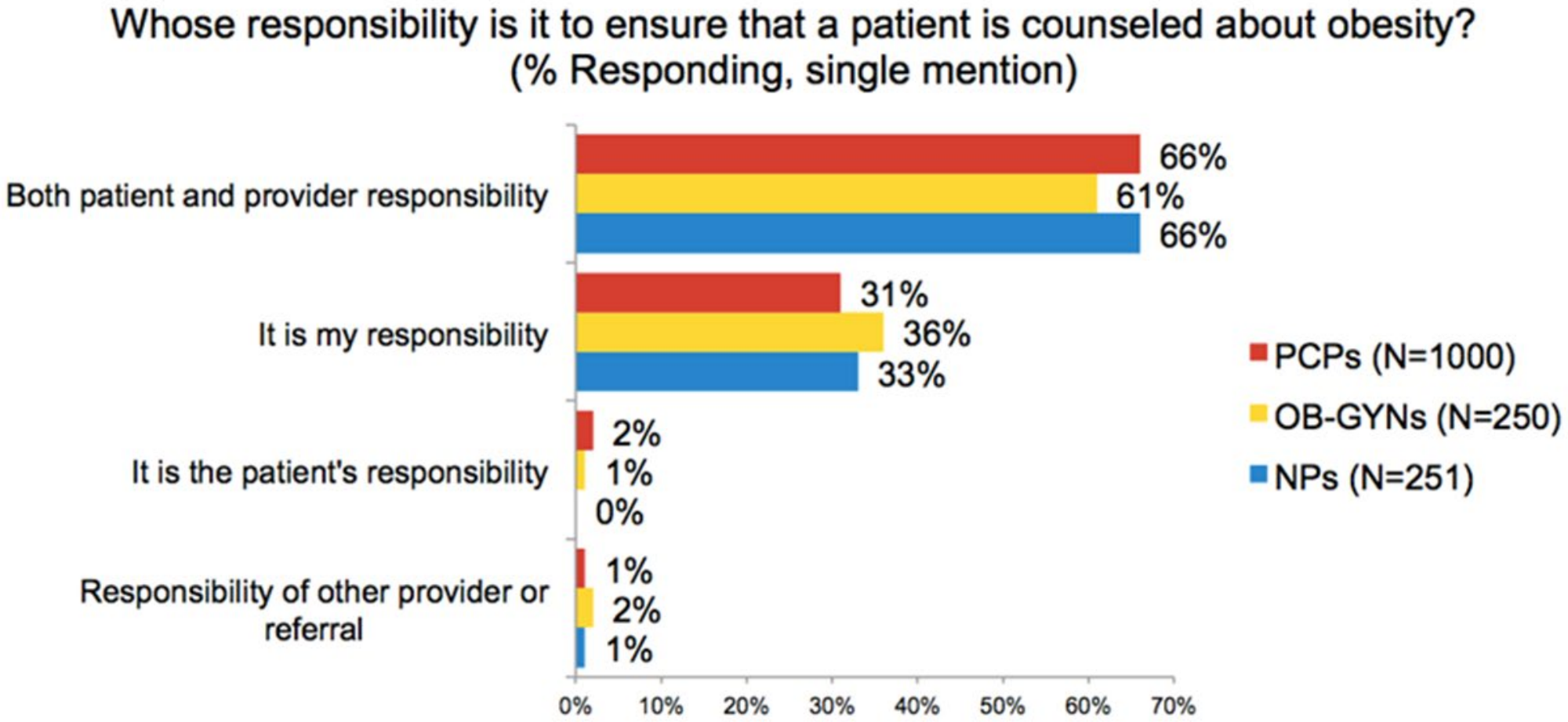
An Obesity Paradox



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Kahan & Manson, 2019

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An Obesity Paradox

When Health Care Providers (HCPs) Talk to Patients About Weight…

- 6-8x increased likelihood of correctly perceiving excess weight status
- 2-3x increased likelihood of having obesity management plan in place
- 3-4x increased likelihood of attempting weight loss
- 2x increased likelihood of losing >5% body weight
- Improved weight loss, weight loss maintenance, weight-related behaviors, weight-related comorbidities

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Kahan & Petrin 2017; Jackson 2013; Rose 2013; Bardia 2007; Pool 2014; McTigue 2003; Moyer 2012; Digenio 2009.

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Clinical Obesity Practice

- Under-diagnosis
  - BMI 30-35 kg/m^2: 10.2% diagnosed
  - BMI >50 kg/m^2 : 56.8%
- Under-documentation
  - 34% of 33,718 patients with severe obesity
- Under-discussion
  - 54% with BMI >25 kg/m^2 told of excess weight
  - 2% of PCPs discussed recorded BMI with patients
- Under-counseling
  - 67% with severe obesity receive weight loss advice
  - Weight discussions last as little as 55 seconds

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Kahan & Petrin C, 2017; Crawford 2010; Hatoum 2015; Post 2011; Antognoli 2014; Wilkinson 2014; Eaton 2002.

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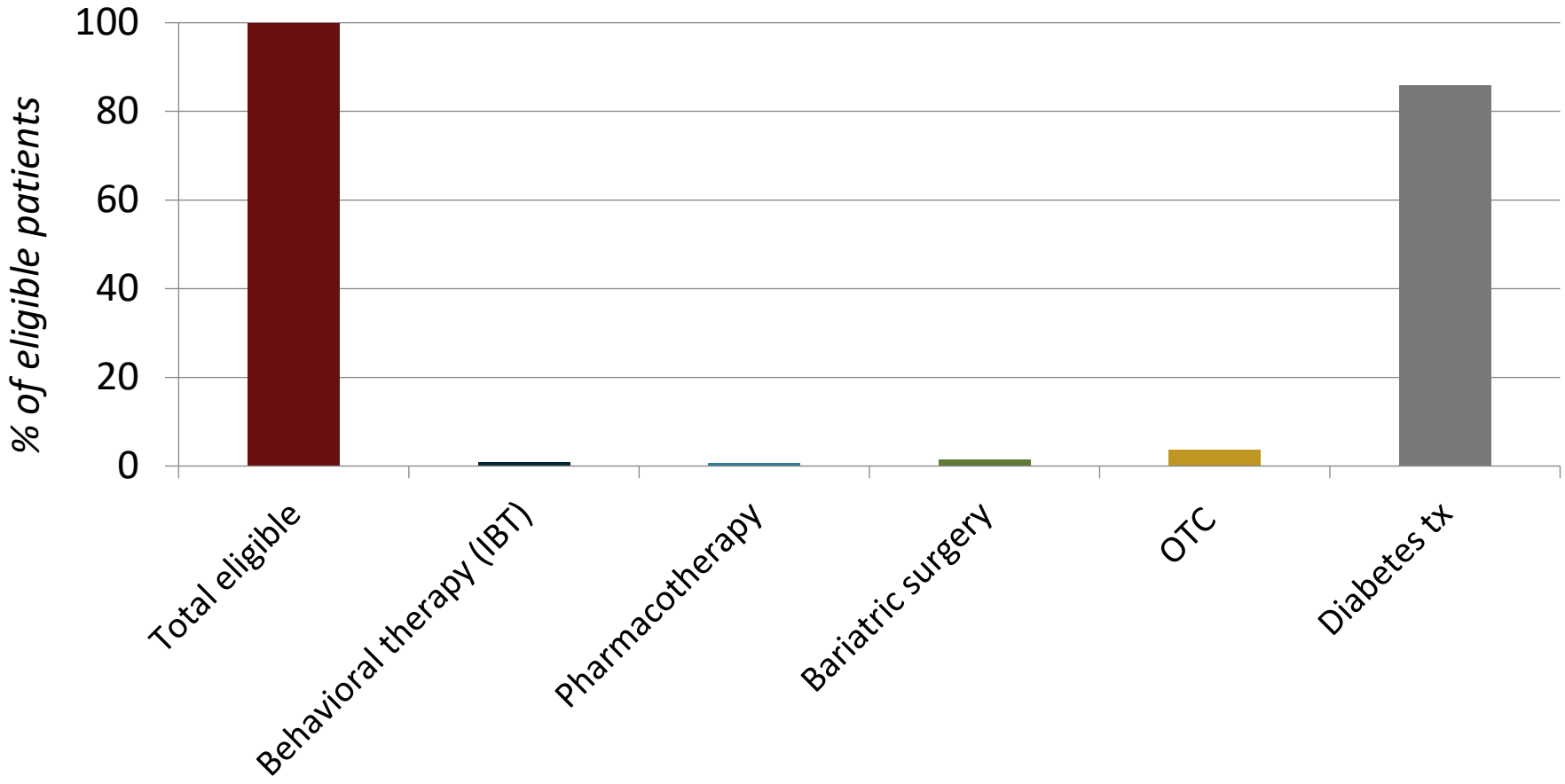
Clinical Obesity Practice



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Samaranayake et al. 2012; Zhang et al 2016; Ponce et al. 2016; Thomas et al. 2016

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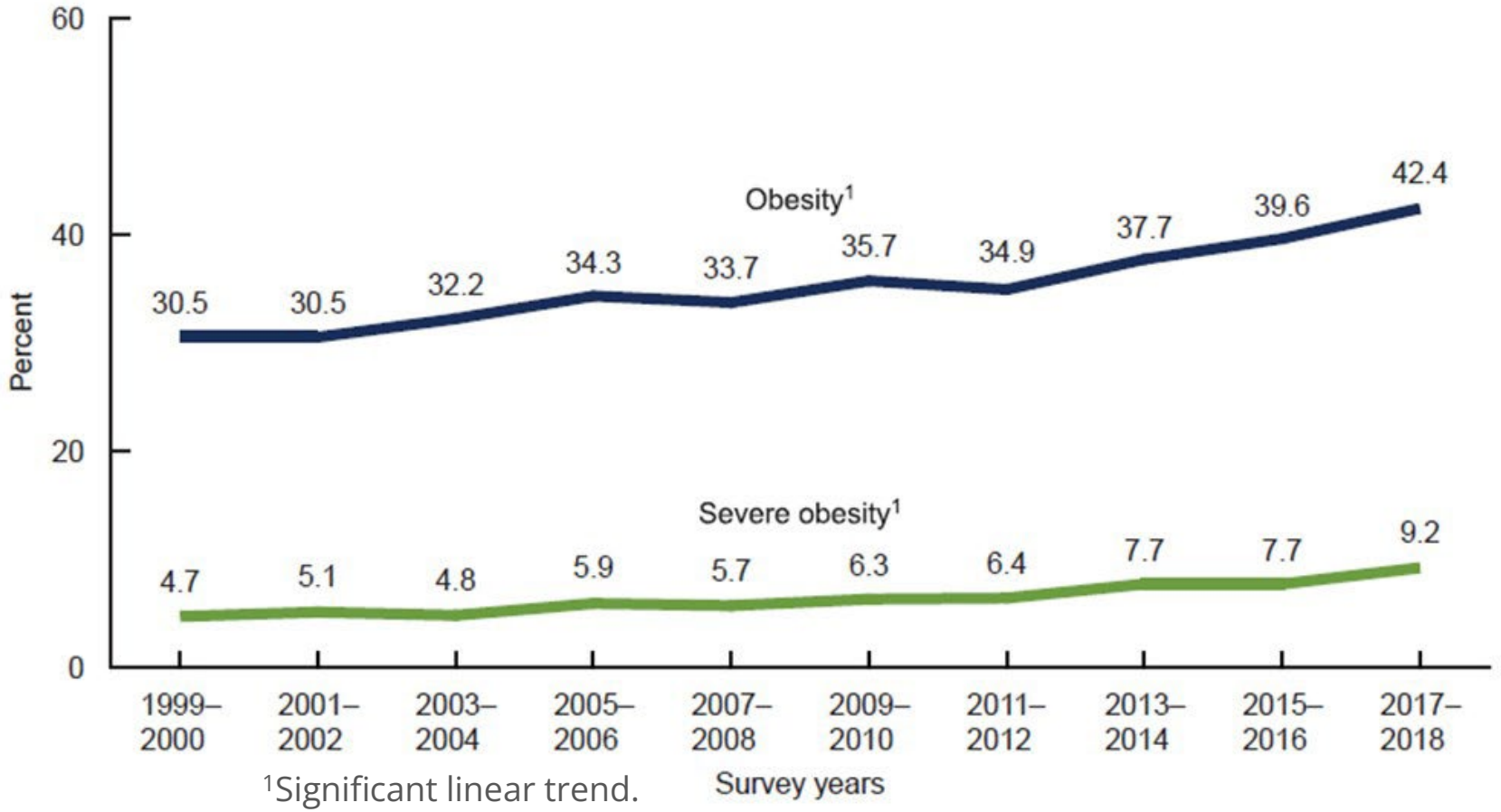
Trends in Obesity among Adults in the United States



[1]Significant linear trend.

National Institute of Diabetes and Digestive and Kidney Diseases [NIDDK], n.d.

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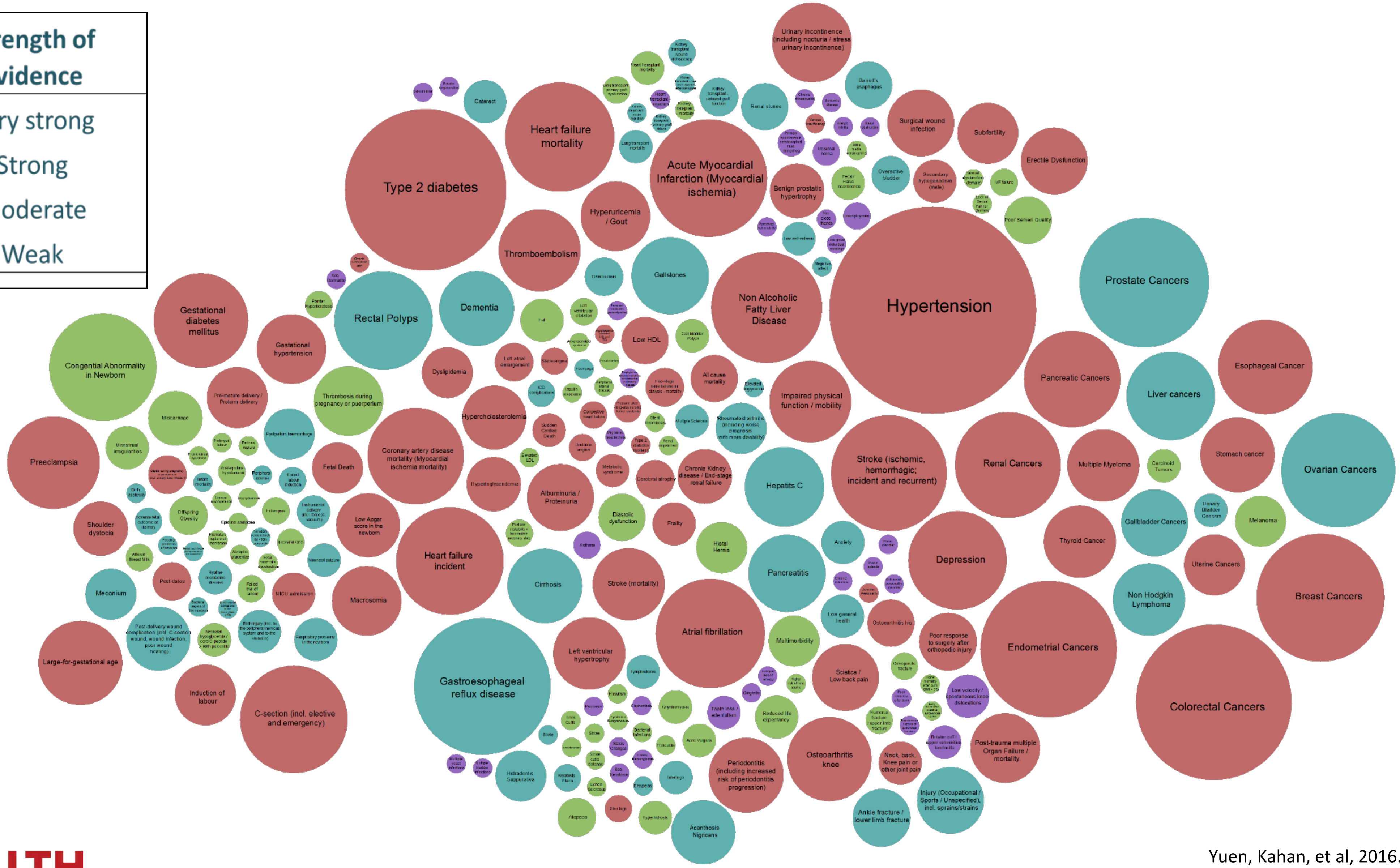
Obesity Comorbid Conditions

Color	GRADE	Strength of evidence
	4	Very strong
	3	Strong
	2	Moderate
	1	Weak



Yuen, Kahan, et al, 2016.

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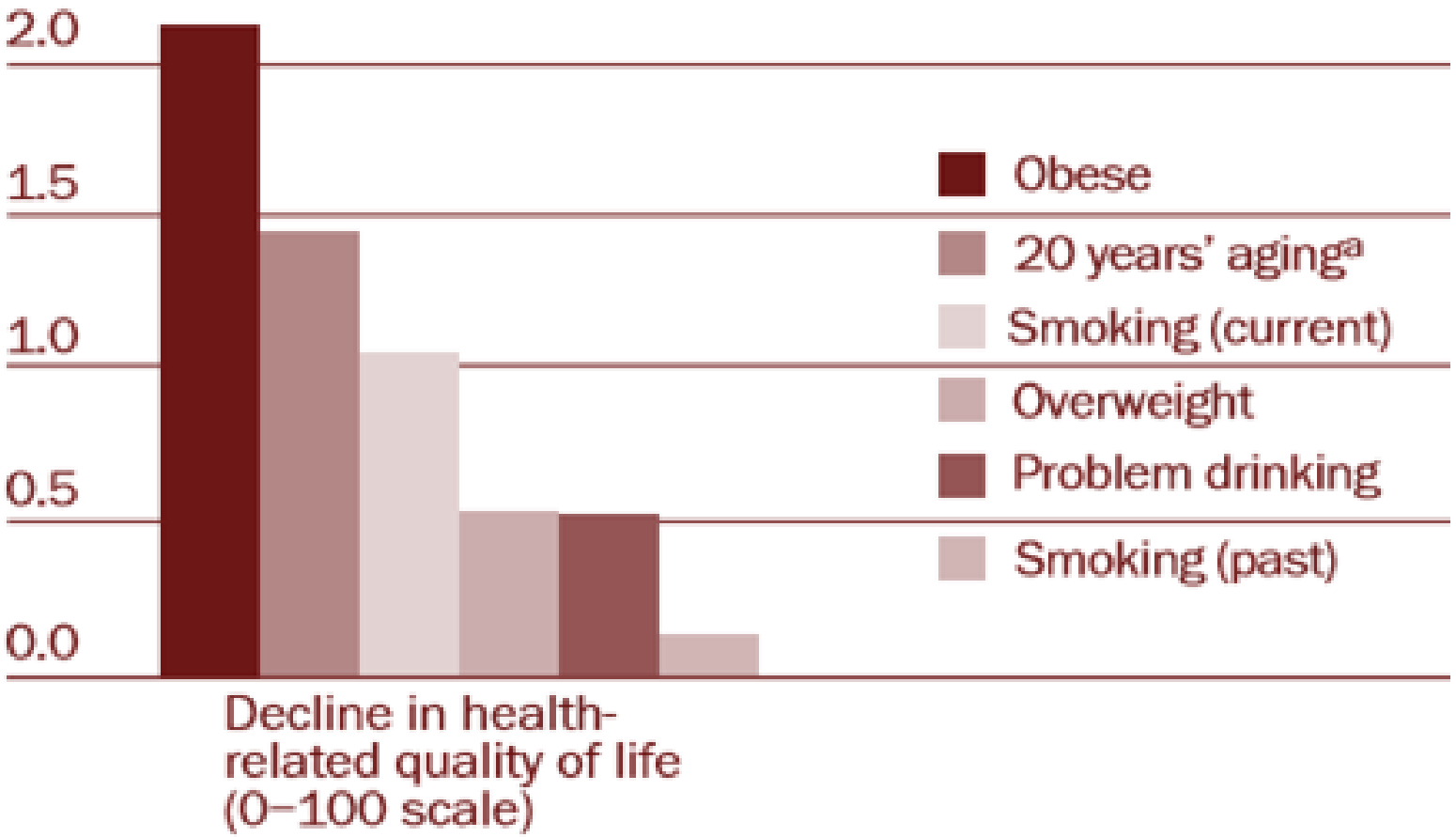
Obesity Strongly Impairs Quality of Life



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Grover et al. 2015

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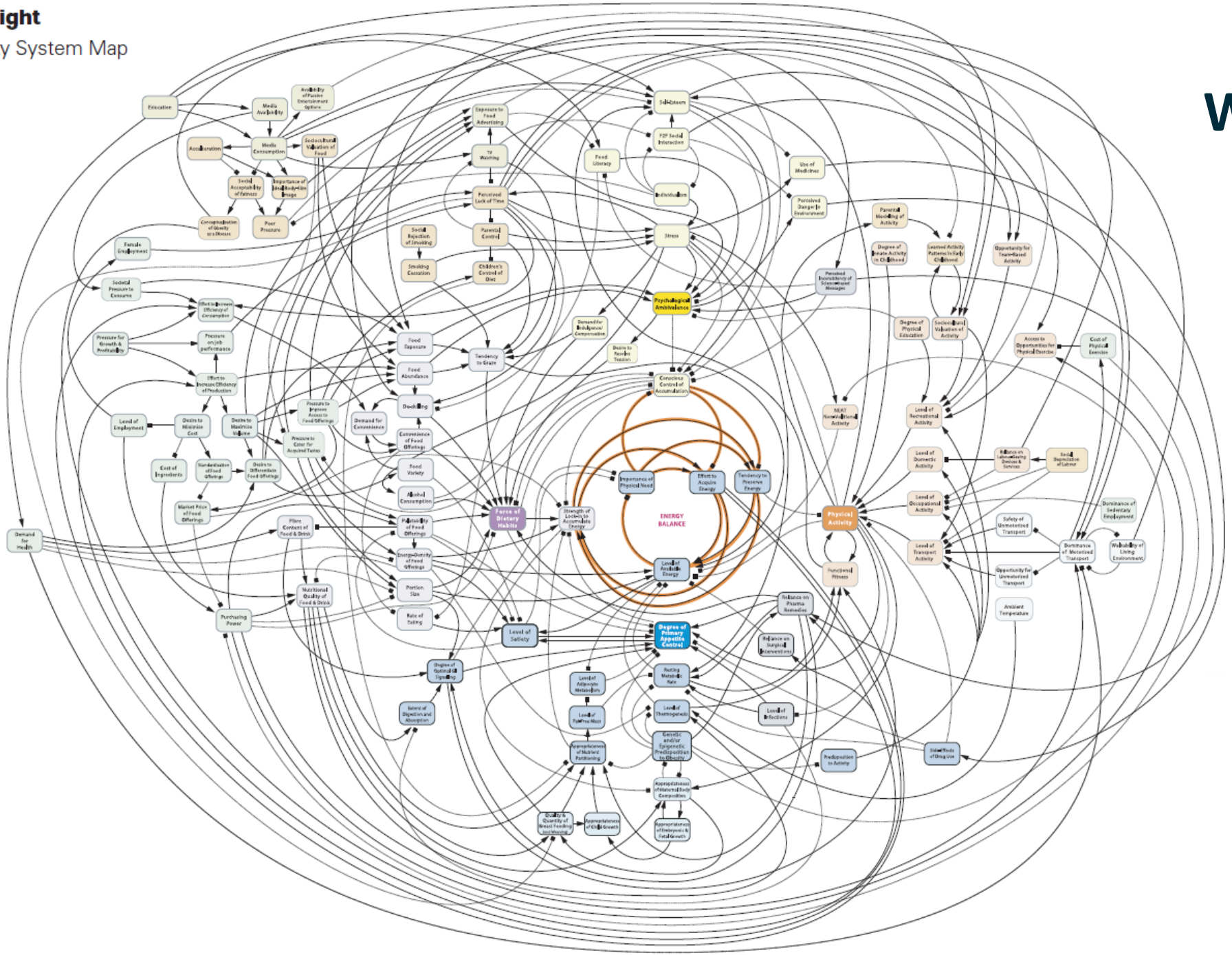
Foresight

Obesity System Map



Why Is It So Hard To Manage Weight?

Media

Social

Psychological

Economic

Food

Activity

Infrastructure

Developmental

Biological

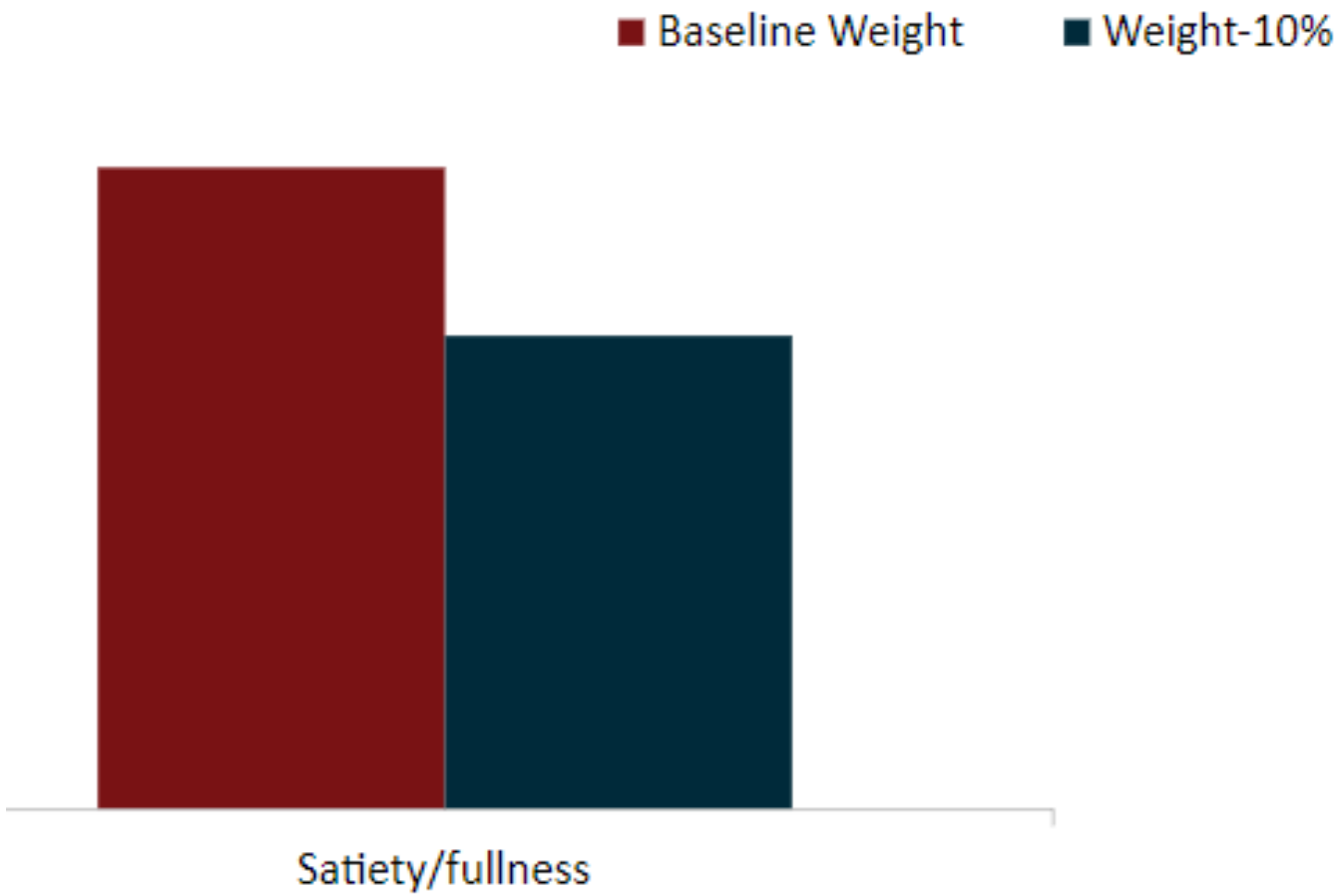
Medical

Positive Influence

Negative Influence

Kahan S, et al. 2014.

Effect of Weight Loss on Satiety



Kissileff et al., 2012.

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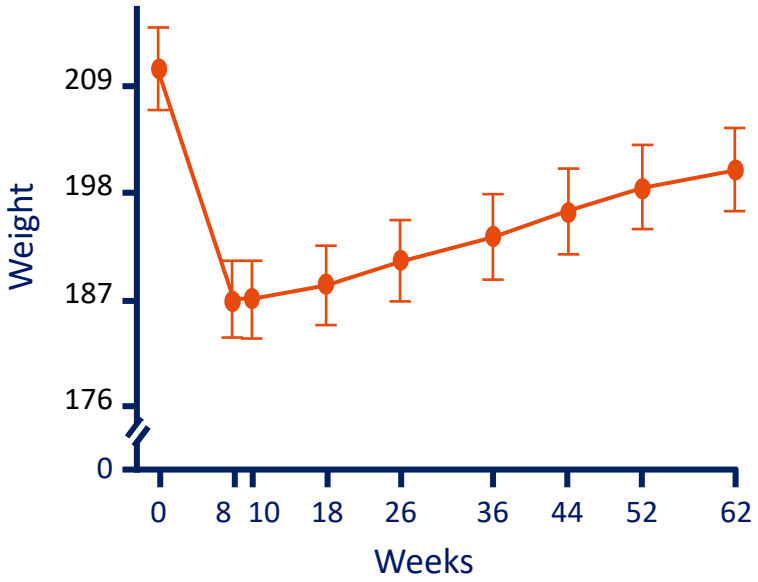
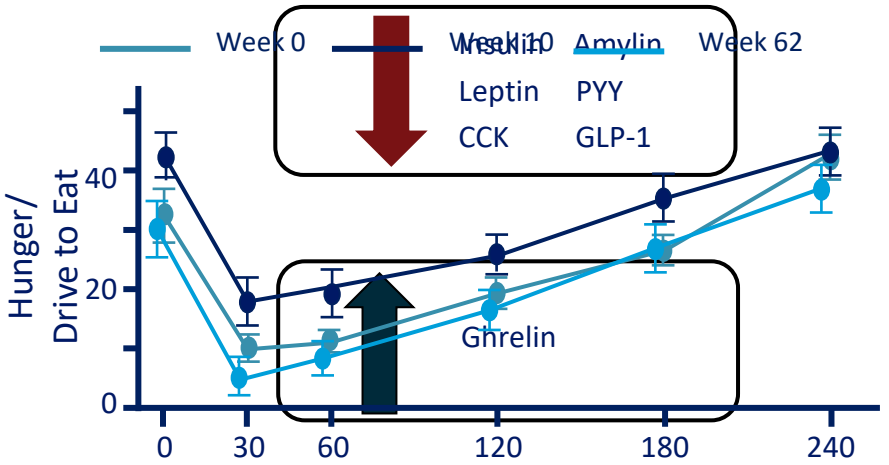
Hormone Changes and Hunger Persistently Oppose Weight Loss





Sumithran et al. 2011

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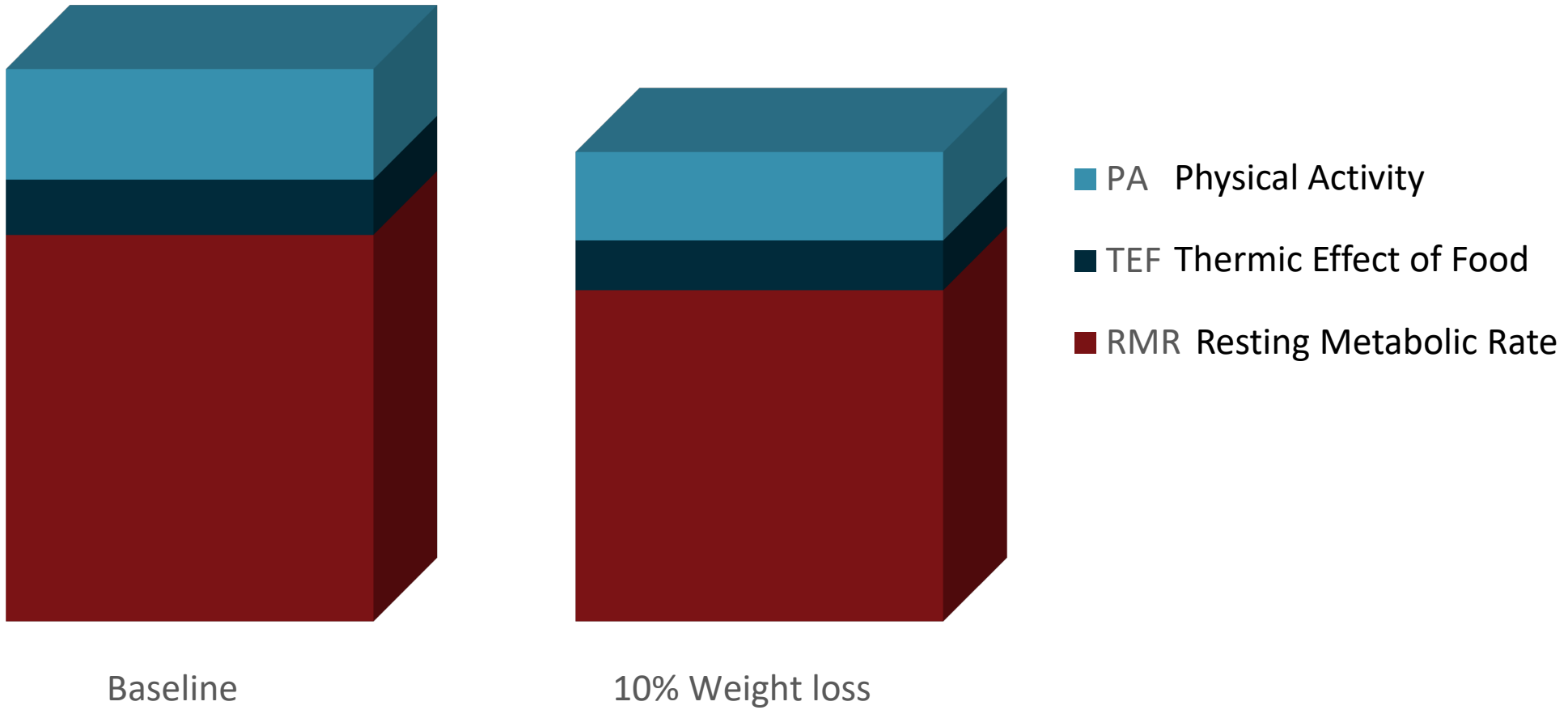
Effect of Weight Loss on Energy Expenditure (EE)



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Lam & Ravussin 2017; Lam & Ravussin 2016; Goldsmith et al. 2010.

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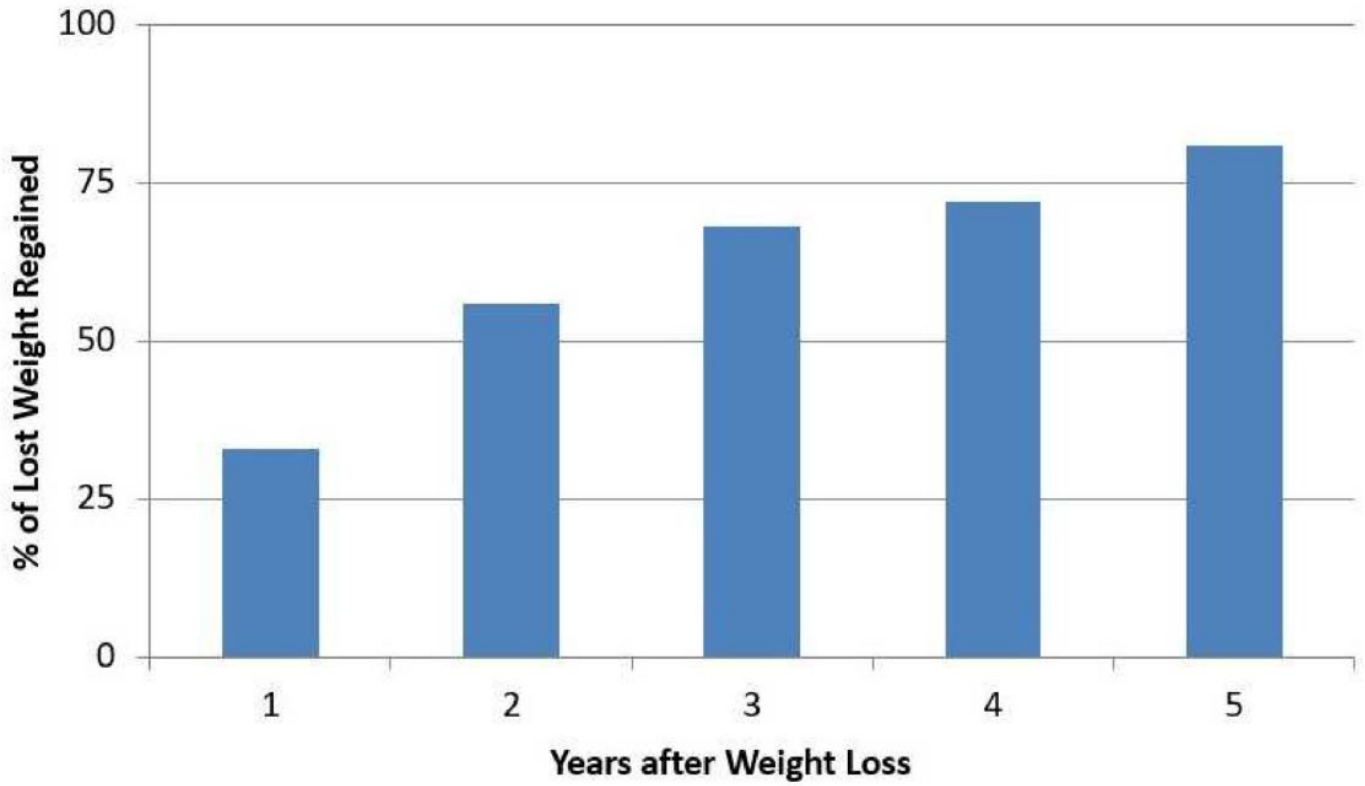
Weight Regain is Common

Meta-Analysis: Average time course of weight regain after weight loss intervention (n = 29 studies)



Hall & Kahan 2018

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ADDRESSING OBESITY

Guidelines and Benefits

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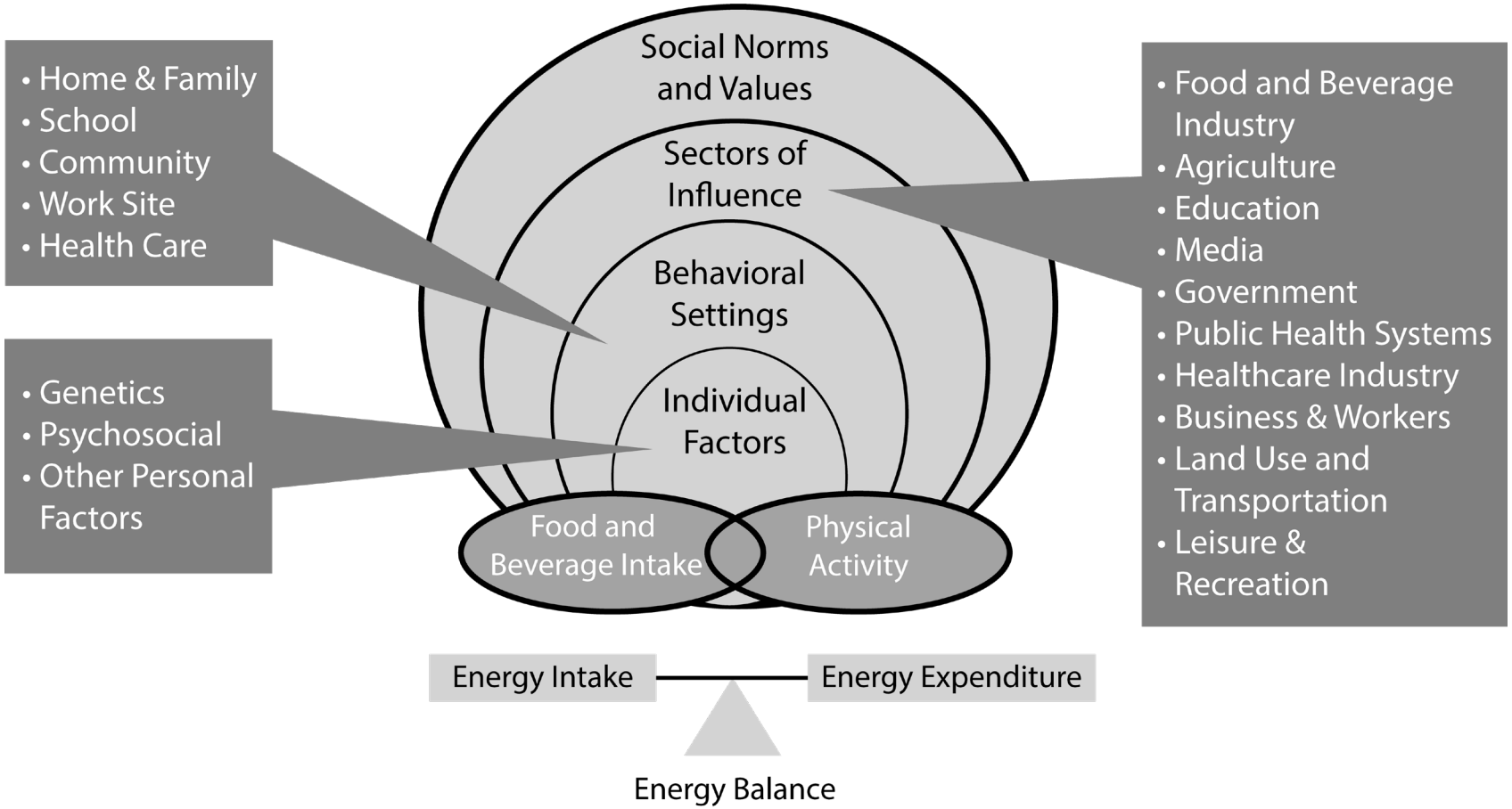
CDC Framework for Addressing Obesity



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Hill, Galloway, Goley, Marrero, Minners, Montgomery, Peterson, Ratner, Sanchez, & Aroda 2013

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Modest Weight Loss Improves Health and Health Risks

Benefits of 5–10% weight loss

- Reduced risk of T2DM
- Reduced CV risk factors
- Improved lipid profile
- Improved blood pressure
- Improved sleep apnea
- Improved quality of life

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Li et al., 2014; Warkentin et al., 2014; Wing et al., 2011; Kuna et al., 2013; Wright et al., 2013; Foster et al., 2009; Knowler et al., 2002; Dattilo & Kris-Etherton, 1992

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Modest Weight Loss Improves Health and Health Risks

Obesity Complication	% of Weight Loss for Benefit	Notes	References
T2DM Prevention	3-10%	Maximum benefit at 10%	DPP (Lancet, 2009) SEQUEL (Garvey et al, 2013)
T2DM (HbA1c)	3-15%	HA1c still decreasing at >15%	Look AHEAD (Wing, 2011)
Dyslipidemia (TG/HDL)	3-15%	TG still decreasing at >15%	Look AHEAD (Wing, 2011)
HTN	5-15%	BP still decreasing at >15%	Look AHEAD (Wing, 2011)
NAFLD	10%	Improved steatosis, inflammation, mild fibrosis	Assy et al, 2007; Dixon et al, 2004; Anish et al, 2009
Sleep Apnea	10%	Little benefit at ≤ 5%	Sleep AHEAD (Foster, 2009) Winslow et al, 2012
Osteoarthritis	5-10%	Improved symptoms and joint stress mechanics	Christensen et al, 2007 Felson et al, 1992; Aaboe et al, 2011
Stress Incontinence	5-10%		Burgio et al, 2007 Leslee et al, 2009
GERD	5-10% (F) 10% (M)		Singh et al, 2013 Tutuian R, 2011
PCOS	10-15%	Lower androgens, improved ovulation, increased insulin sensitivity	Panidis D et al, 2008 Norman et al, 2002 Moran et al, 2013

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OBESITY TREATMENT

Modalities

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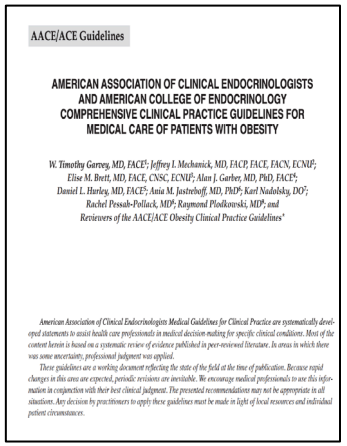
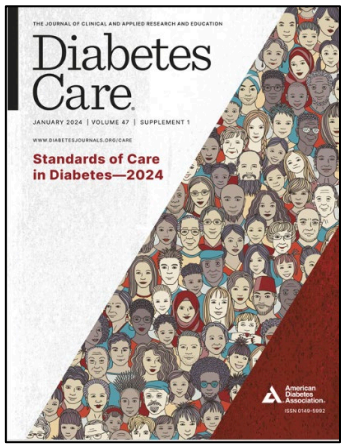
Key Obesity Guidelines

- AHA/ACC/TOS Guidelines for Managing Overweight and Obesity in Adults (2013)
- Pharmacologic Management of Obesity: An Endocrine Society Clinical Practice Guideline (2016)
- AACE/ACE Comprehensive Clinical Practice Guidelines for Medical Care of Patients with Obesity (2016)
- ADA Obesity and Weight Management for the Prevention and Treatment of Type 2 Diabetes: Standards of Care in Diabetes (2024)
- AGA Clinical Practice Guideline on Pharmacological Interventions for Adults With Obesity (2022)





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American Diabetes Association Professional Practice Committee, 2024; Endocrine Society, 2015; AHA/ACC/TOS, 2013; American College of Cardiology/American Heart Association Task Force on Practice Guidelines and The Obesity Society, 2013

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Case example: Cassie

- Cassie is a 47-year-old woman whose weight and several cardiovascular disease risk factor levels have been increasing for several years.
- Medical history includes hypertension, hyperlipidemia, metabolic syndrome, depression, obstructive sleep apnea, and GERD
- BMI: 34 kg/m^2 BP: 137/84 mmHg HR: 88 bpm Waist Circumference (WC): 35 in
- Physical exam is unremarkable
- Notable lab values:

  Glucose 118 mg/dL A1c: 6.3 mg/dL ALT: 55 U/L eGFR: >60 mL/min/1.73m^2

  LDL: 115 mg/dL TG: 122 mg/dL HDL: 53 mg/dL
- Medications: hydrochlorothiazide, metoprolol, atorvastatin, paroxetine, metformin
- She has tried numerous diets but says she doesn't lose much weight and always regains weight quickly.

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Clinical Obesity Treatment Modalities

- Intensive behavioral therapy
- Structured or medically monitored diets
- Pharmacotherapy
- Surgical therapy

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Clinical Obesity Treatment Modalities

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Guidelines For Behavioral Therapy

- Patients who need to lose weight should receive a comprehensive behavior management program for at least 6 months (Level A)
- Gold standard is **on-site**, high-intensity (14+ sessions during initial 6 months) comprehensive intervention, either individually or in a group setting, **delivered by trained interventionist** and **persisting for at least 1 year** (Level A)
- Low-moderate intensity primary care interventions have not been shown to be effective (Level A)
- Other approaches (e.g., web- or phone-based) lead to less weight loss and health improvement (Level B)

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

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Who is a Behavioral Therapy Trained Interventionist

Gold standard is on-site, high-intensity comprehensive intervention, either individually or in a group setting, delivered by trained interventionist….

*"Trained interventionists included mostly health professionals (eg, registered **dietitians**, **psychologists**, **exercise specialists**, **health counselors**, or professionals in training) who adhered to **formal protocols in weight management**. In a few cases, lay persons were used as trained interventionists; they received instruction in weight management protocols (designed by health professionals) in programs that have been validated in high-quality trials published in peer-reviewed journals."*

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AHA/ACC/TOS, 2013

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Behavioral Therapy for Obesity

Counseling	• Regular interaction via group or individual contact – Intensive initial counseling frequency
Diet	• Calorie-reduced diet – 1200-1500 kcal for <250 lb; 1500-1800 kcal for ≥250 lb
Physical Activity	• 150 minutes/week of moderate activity • Strength training desirable
Behavioral Strategies	• Structured curriculum of behavior change education, including identifying target behaviors and building skills to achieve target behaviors • Self-monitoring of food intake, physical activity, and/or weight • Goal setting, problem solving, stimulus control • Addressing barriers to change • Behavioral resources (e.g., portion-controlled meals) • Regular feedback and guidance from an interventionist • Weight maintenance strategies and relapse prevention • Nutritional supplements have not been shown to be effective for weight loss

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AHA/ACC/TOS, 2013

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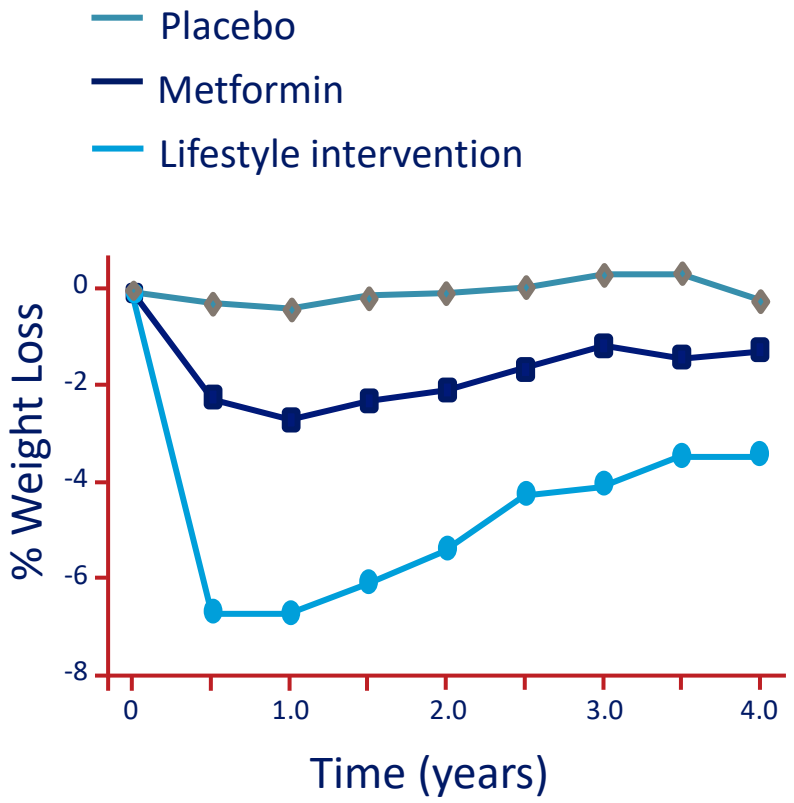
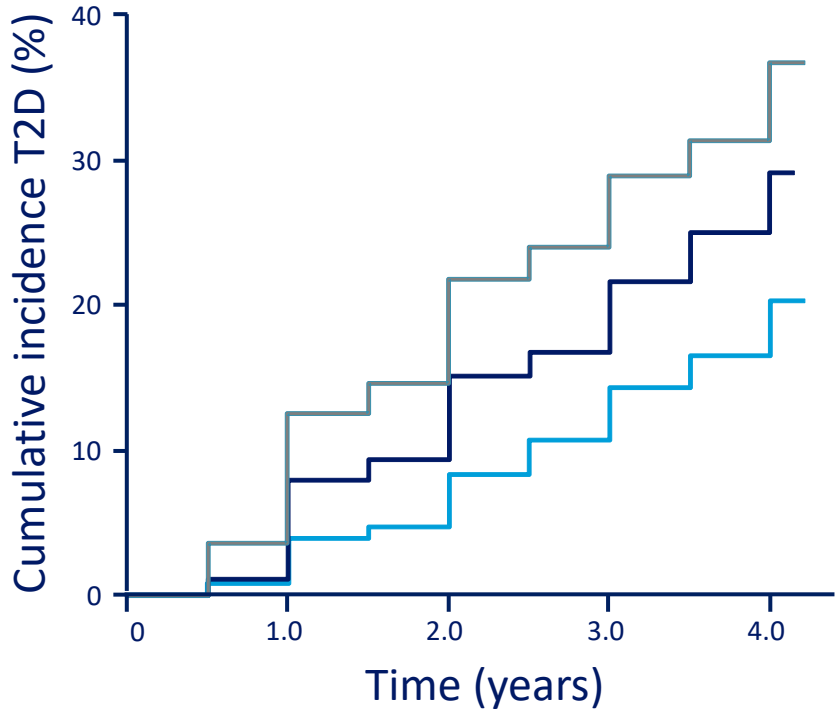
Modest Weight Loss Improves Health and Health Risks





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Knowler, et al. NEJM. 2002

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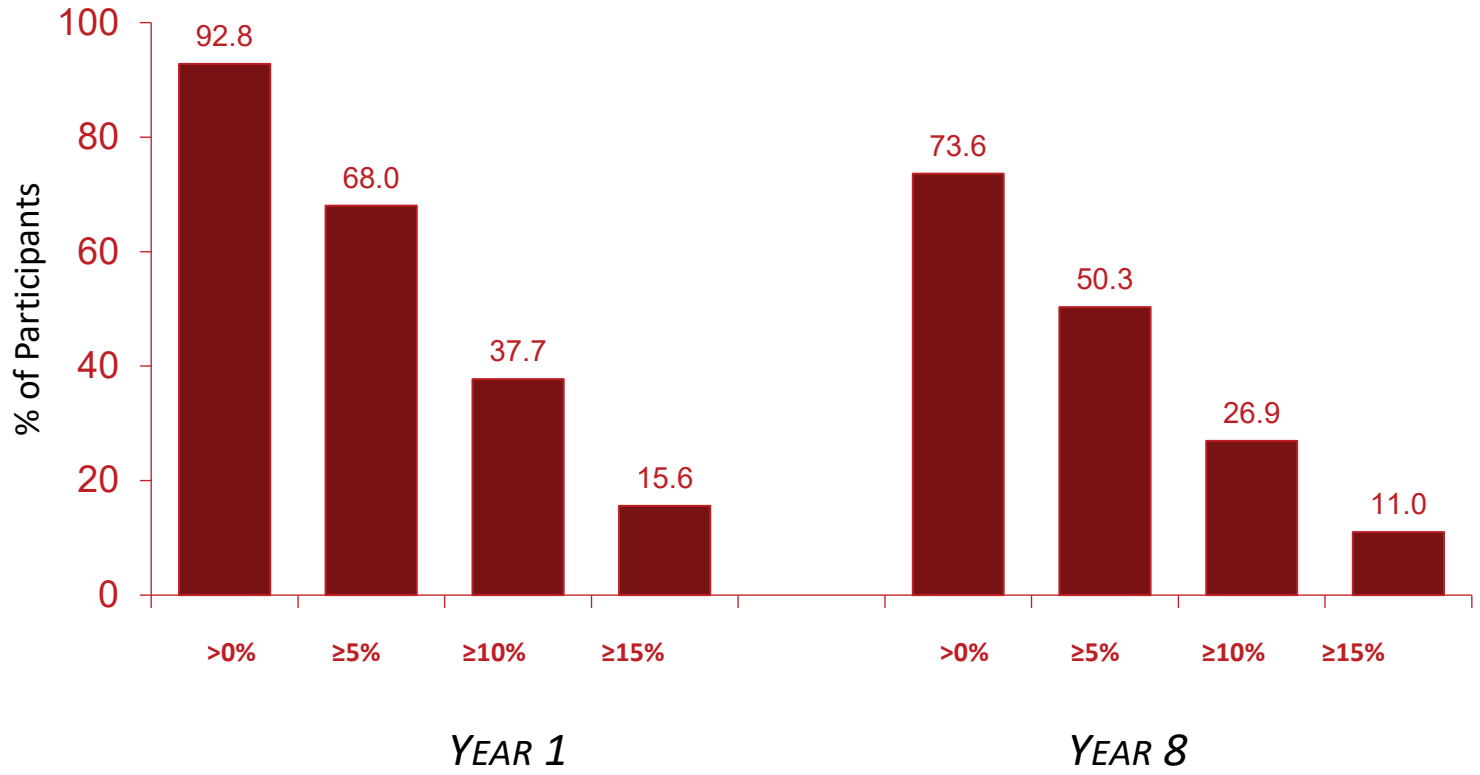
Behavioral Therapy in Patients with Obesity and Diabetes



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Look AHEAD Research Group, 2014

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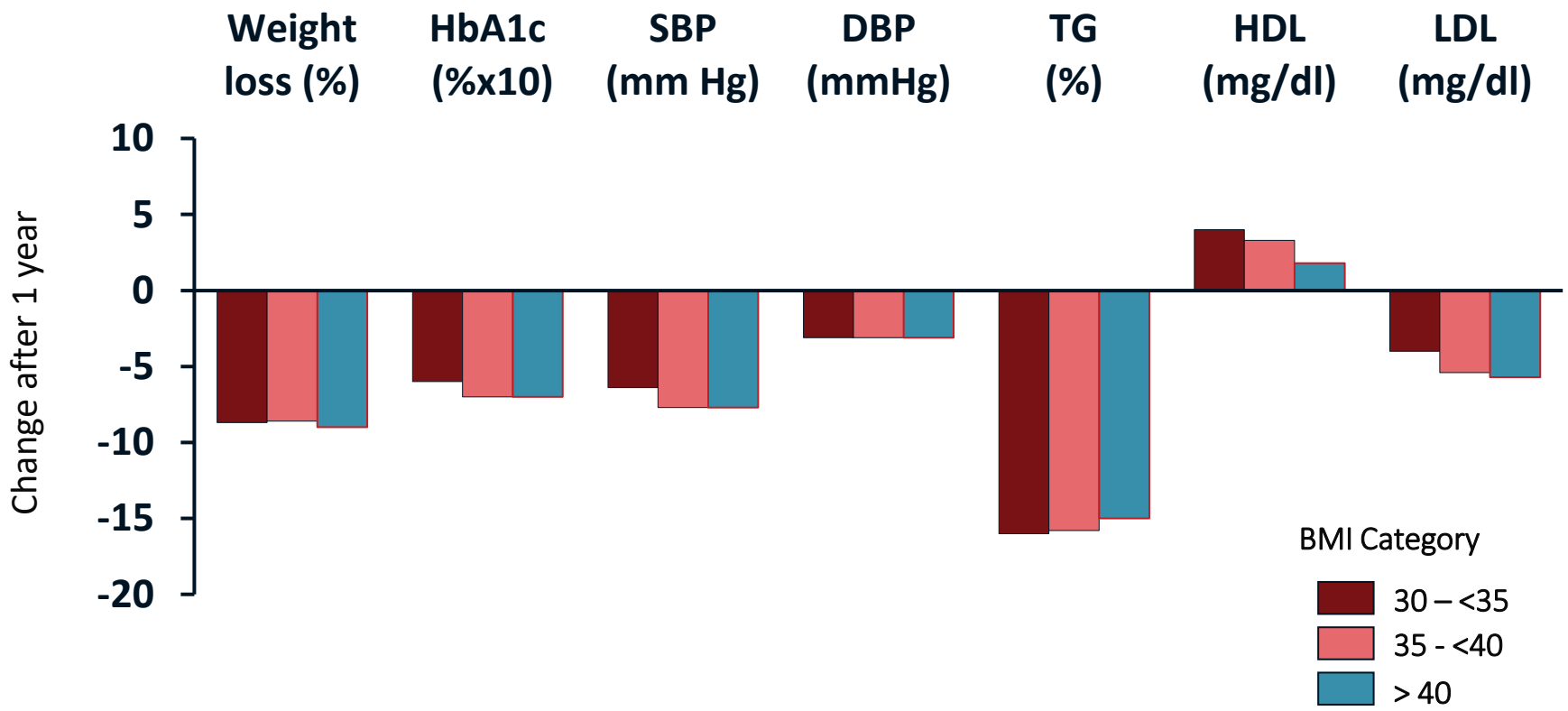
Comorbidity Improvements With Behavioral Therapy



Unick JL, et al. 2011

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Case example: Cassie, 6 months later

- Cassie continued attention to healthful dietary intake and exercise, worked one-on-one with a dietitian, and engaged at a local Diabetes Prevention Program group.
- Weight was down just 2 lbs. Blood pressure and heart rate was similar.
- Repeat labs showed glucose 111 mg/dL and A1c 6.2 mg/dL.
- She’s frustrated with the lack of weight loss and concerned that even if she loses more weight that she’ll regain it, as in past weight loss attempts.

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When Standard Behavioral Therapy Isn’t Enough

- How do we escalate treatment for those who don’t respond to standard behavioral therapy?
- How do we enhance initial weight loss for those who don’t achieve sufficient weight loss to improve health status/risks?
- How do we enhance longer-term weight maintenance and minimize regain?

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Clinical Obesity Treatment Modalities

- Intensive behavioral therapy
- **Structured or medically monitored diets**
- Pharmacotherapy
- Surgical therapy

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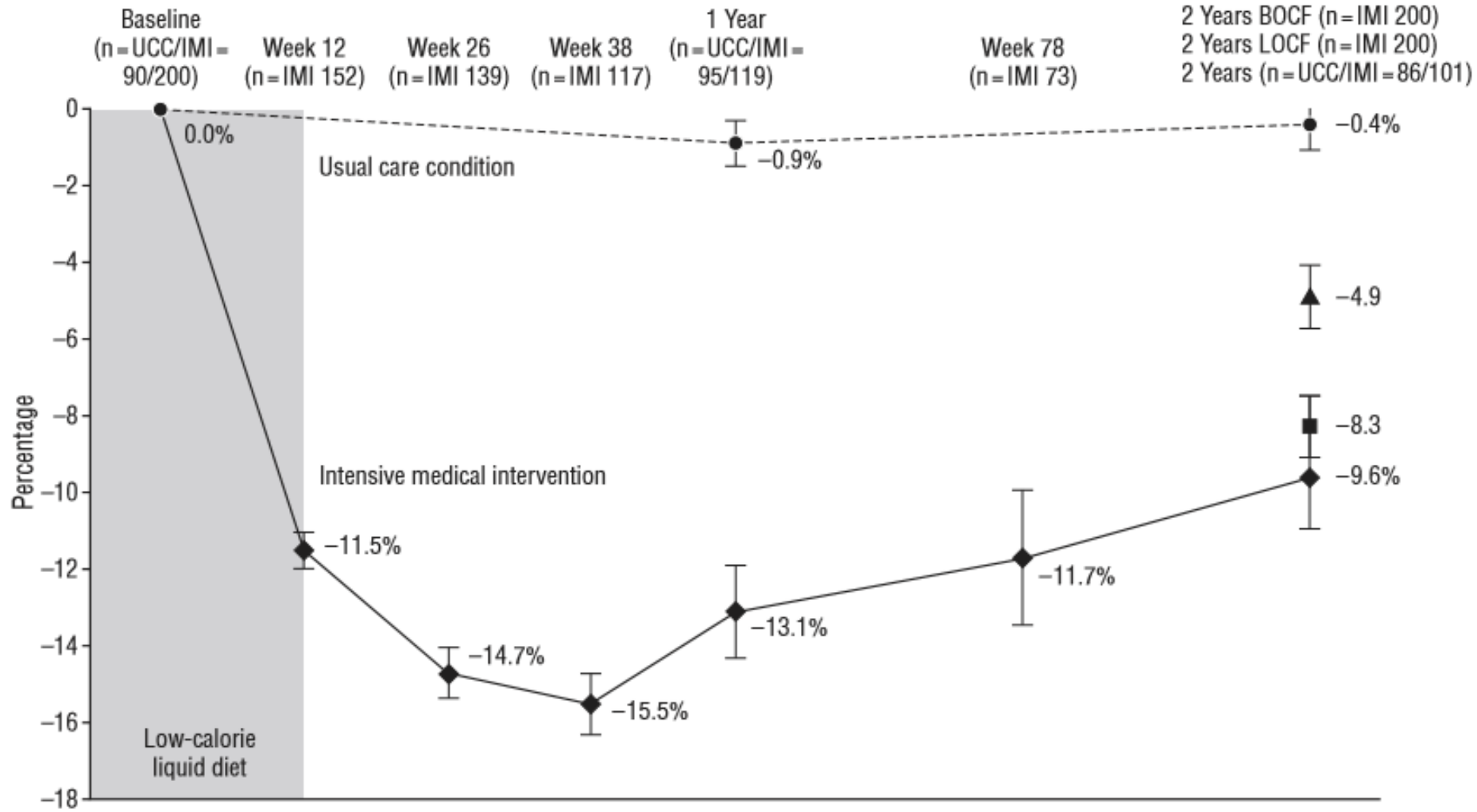
Very Low-Calorie Diet with Meal Replacement Products



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Ryan DH, et al. Arch Intern Med. 2010;170(2):146-54

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Clinical Obesity Treatment Modalities

- Intensive behavioral therapy
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- Surgical therapy

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Prioritize Weight-Losing or Weight-Neutral Medications

Whenever possible, minimize medications for comorbid conditions that are associated with weight gain.

	Weight Gain Associated With Use	Alternatives (Weight Reducing in Parentheses)
Diabetes	Insulin, sulfonylureas, TZDs, mitiglinides	(Metformin), (acarbose), (miglitol), (pramlintide), (GLP1 agonists/GIP), (SGLT2 inhibitors)
Hypertension medications	β-blocker	ACE inhibitors, calcium channel blockers, angiotensin-2 RAs
Antidepressants and mood stabilizers	Amytriptyline, doxepin, imipramine, nortriptyline, trimipramine, mirtazapine, paroxetine	(Bupropion), nefazodone, fluoxetine
Oral contraceptives	Progestational steroids	Barrier methods, intrauterine devices

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Apovian et al., 2015; American Diabetes Association. 2024

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Guidelines For Pharmacotherapy

- Use pharmacotherapy as adjunct to diet, exercise, and behavioral counseling for adults… (Level 1, strong evidence)
  - with BMI 30+; or 27+ with comorbidity;
  - who are unable to lose and successfully maintain weight;
  - who meet label indications
- Assess efficacy and safety monthly for the first 3 months, then every 3 months thereafter (Level 2, weak evidence)
- At 3 months, if loss is 5% or more, continue; if not, discontinue and seek alternative approaches (Level 1, strong evidence)
- Use medications to promote long-term weight loss maintenance (Level 2, weak evidence)
- Use weight-losing and weight-neutral medications as first and second line therapy and discuss weight effects of medications with patients (Level 1, strong evidence)

"Pharmacological Management of Obesity," 2015

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General Considerations for Pharmacotherapy

- BMI ≥30 kg/m^2 or BMI ≥27 kg/m^2 with comorbidity
- Unable to improve weight/health sufficiently with guided lifestyle changes alone
- Not pregnant, trying to conceive, or breastfeeding
- In general, without unstable cardiac disease, uncontrolled hypertension (SBP >180 mm Hg, DBP >110 mm Hg), or eating disorder
- Note specific contraindications per medication

"Pharmacological Management of Obesity," 2015

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Obesity Pharmacotherapy

- 4 FDA-approved short-term medications
  - Phentermine, benzphetamine, diethylproprion, and phendimetrazine
- 6 FDA-approved long-term medications
  - Orlistat (Xenical/Alli)
  - Phentermine/topiramate ER (Qsymia)
  - Naltrexone/Bupropion SR (Contrave)
  - Liraglutide 3.0 mg (Saxenda)
  - Semaglutide 2.4 mg (Wegovy)
  - Tirzepatide (Zepbound)

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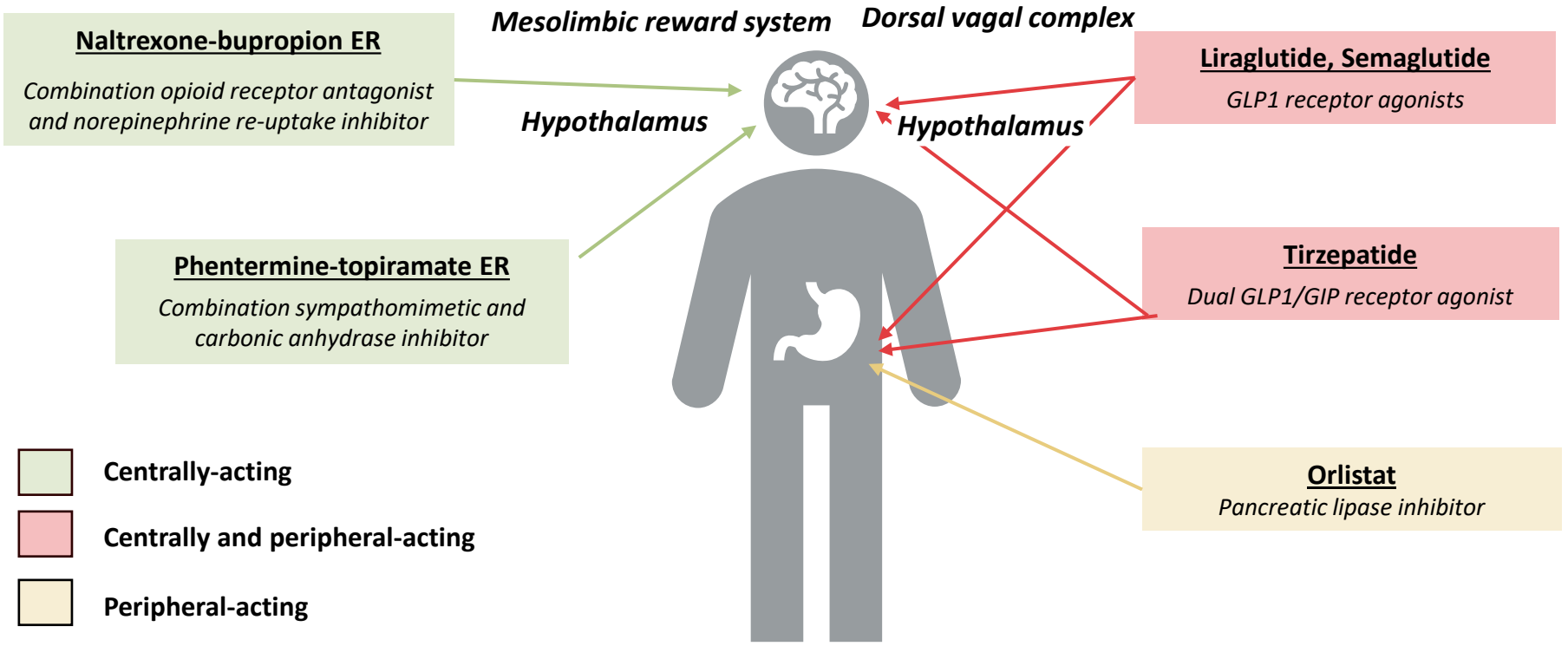
Long Term Obesity Pharmacotherapy Sites of Action



Gjermeni. 2021

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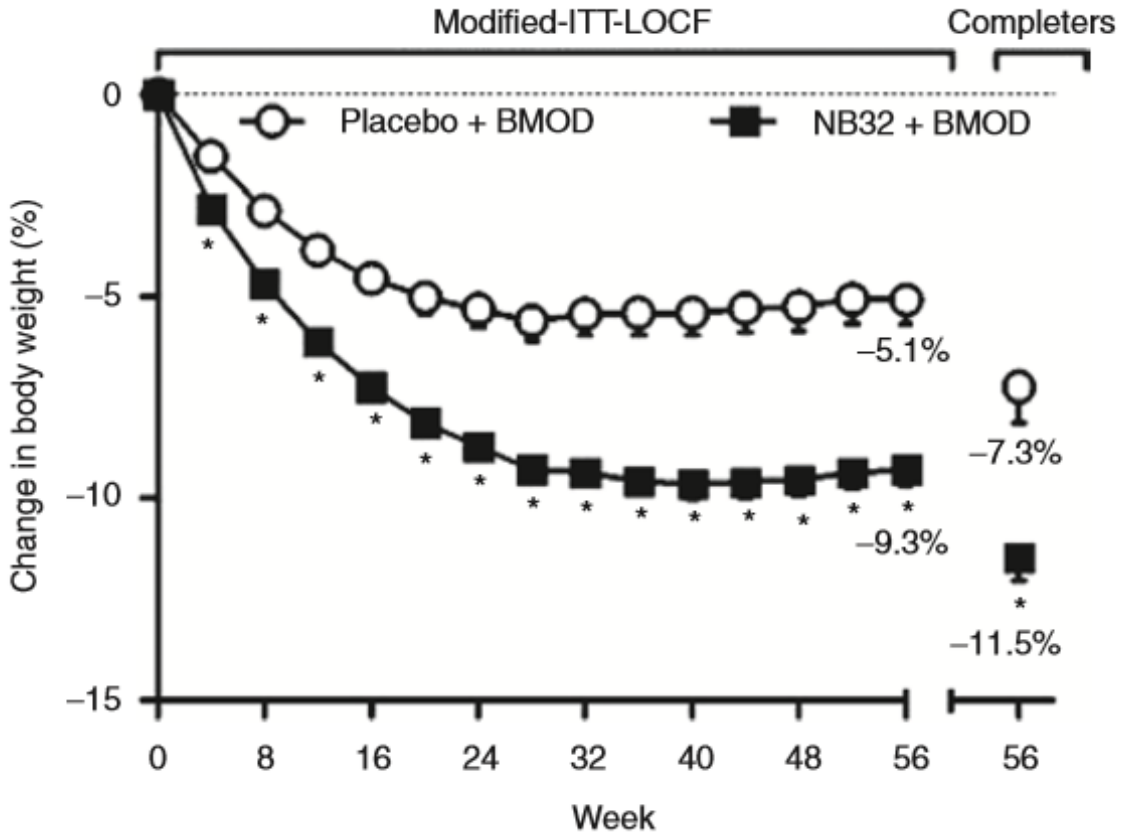
Pharmacotherapy Increases Magnitude and Likelihood of Weight Loss



Abbreviation Key:

BMOD behavior modification

LOCF last observation carried forward

ITT intent to treat

NB32 Naltrexone SR 32mg/day plus bupropion SR 360 mg/day

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Wadden et al., 2011

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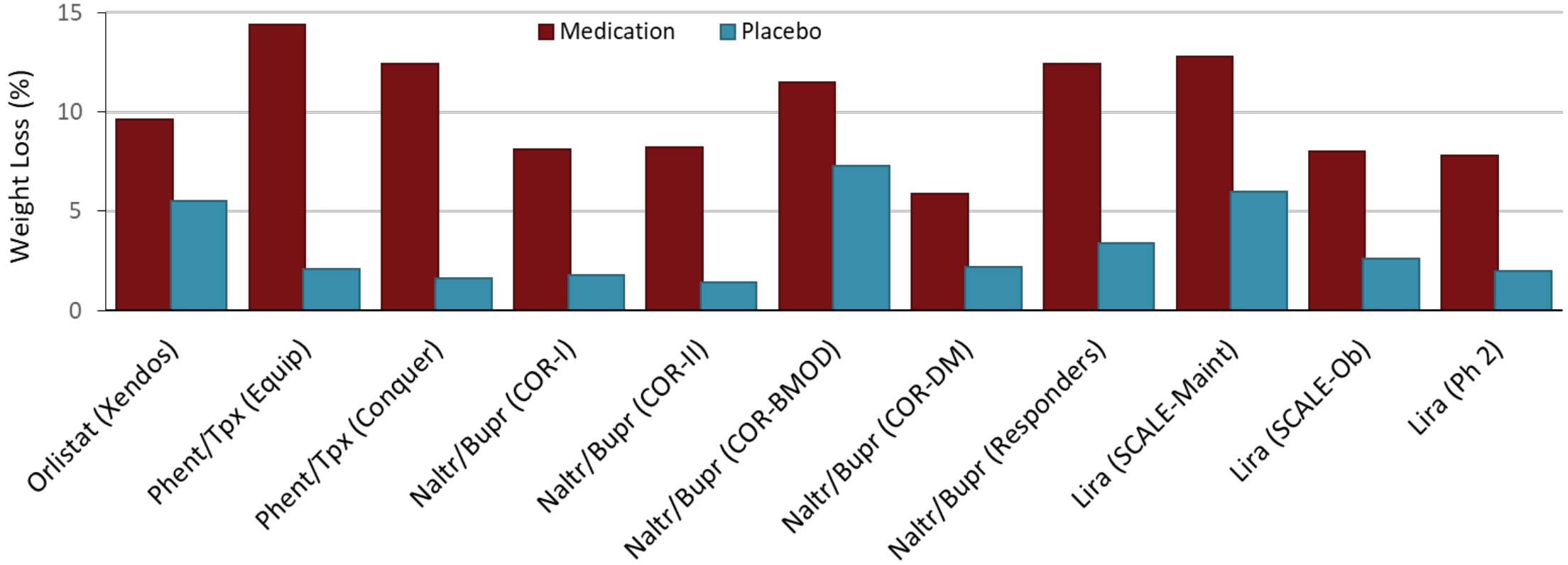
Pharmacotherapy Increases Magnitude and Likelihood of Weight Loss



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Pi-Sunyer et al., 2015; Apovian et al., 2013; Wadden et al., 2013; Hollander et al., 2013; Garvey et al., 2012; Allison et al., 2012; O'Neil et al., 2012; Fidler et al., 2011; Gadde et al., 2011; Smith et al., 2010; Greenway et al., 2010; Wadden et al., 2011; Torgerson et al., 2004

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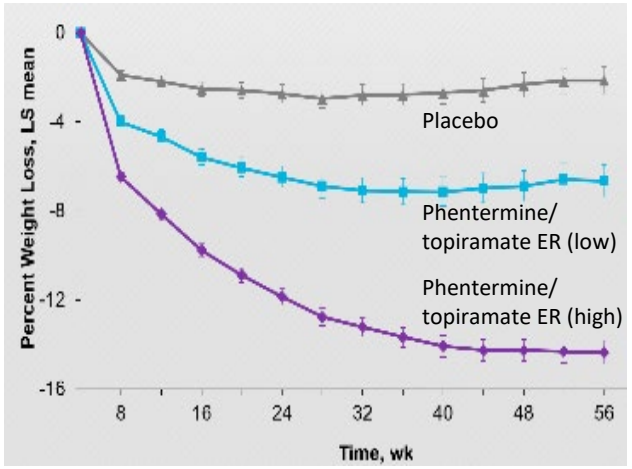
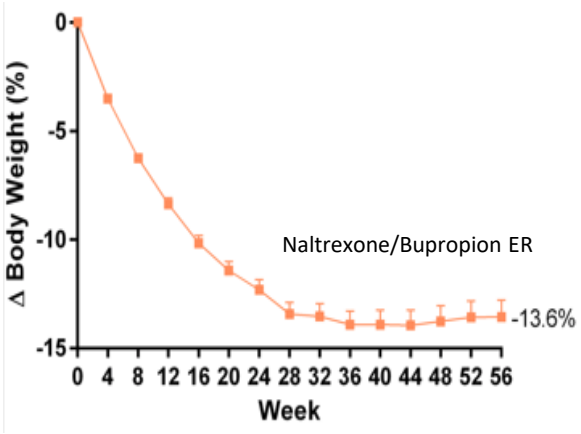
Newer Meds Lead to 10-15%+ Weight Loss in Responding Patients

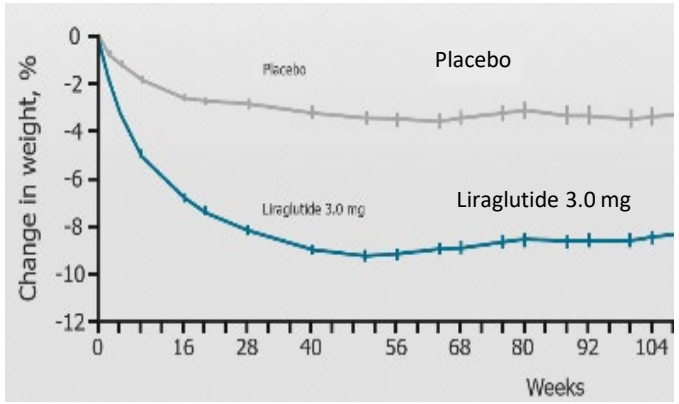
Phentermine/topiramate ER



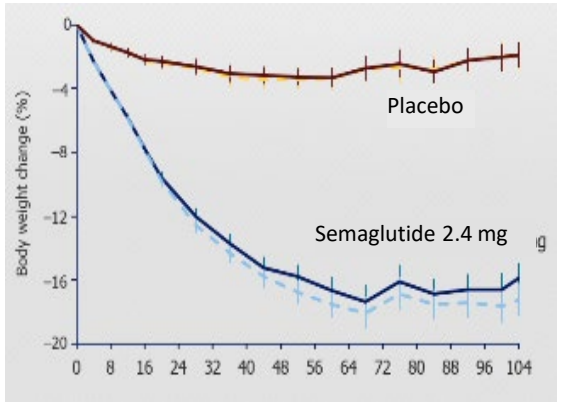
Naltrexone/bupropion ER



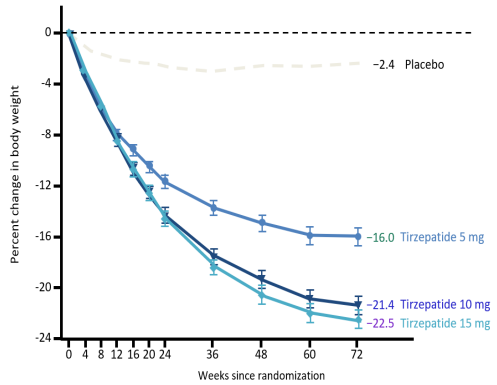
Liraglutide 3.0 mg



Semaglutide 2.4 mg



Tirzepatide



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le Roux et al., 2022; Jastreboff et al., 2022; Garvey et al., 2022; le Roux et al., 2017; Allison et al., 2012

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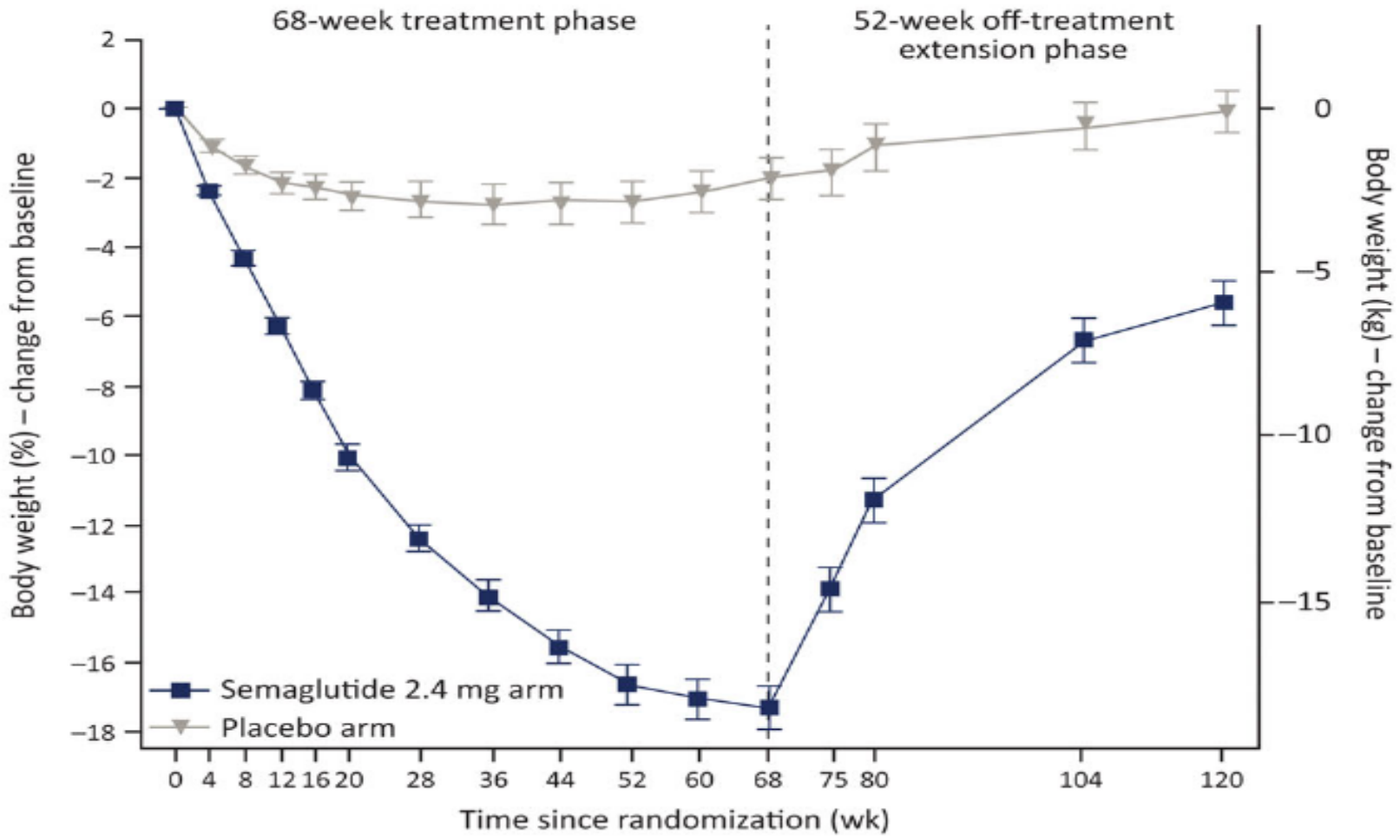
Long-Term Use Is Standard



Wilding et al. 2022

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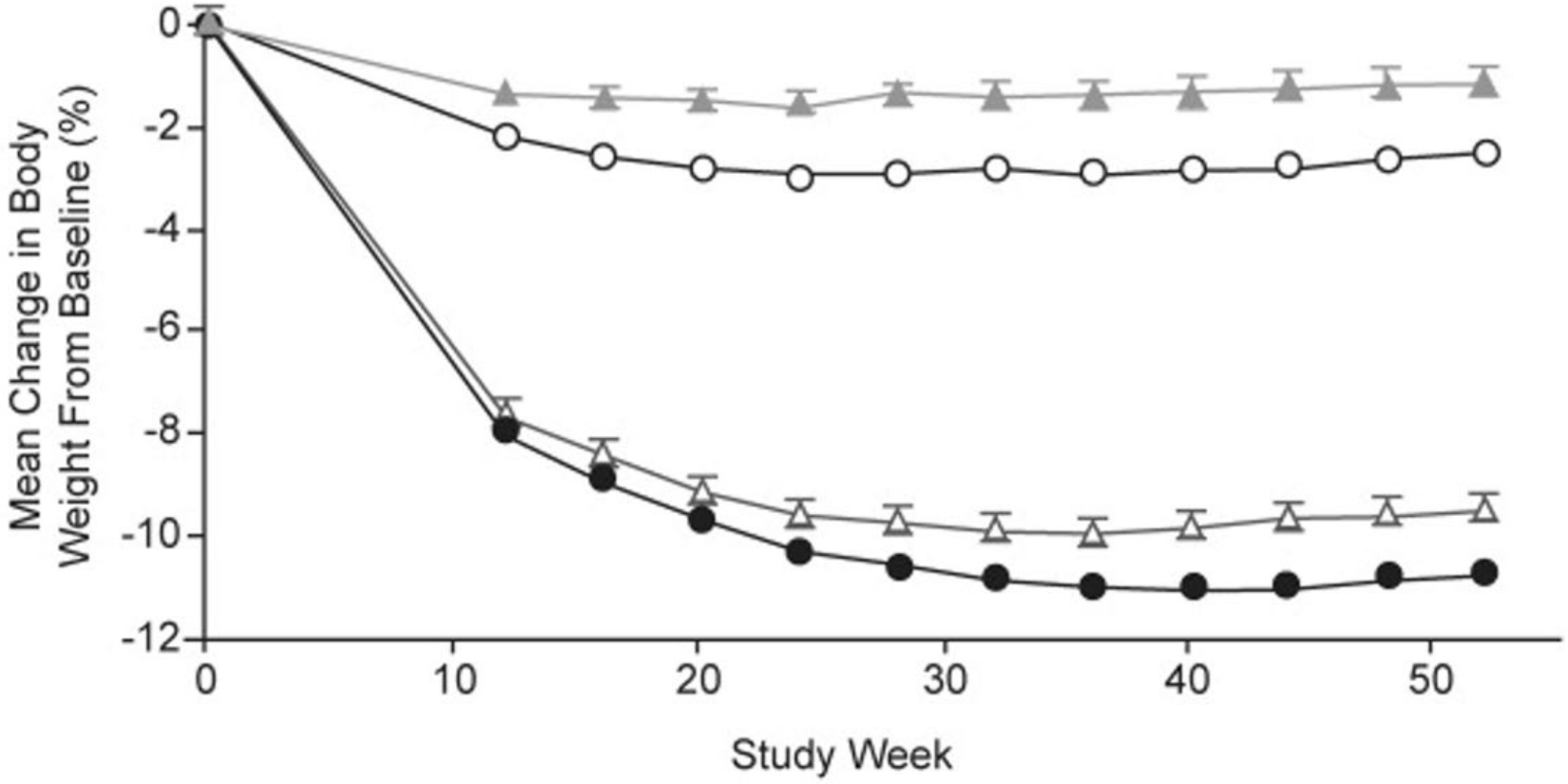
Outcomes by Responder Status



"Non-responders"

"Responders"

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Smith et al., 2014

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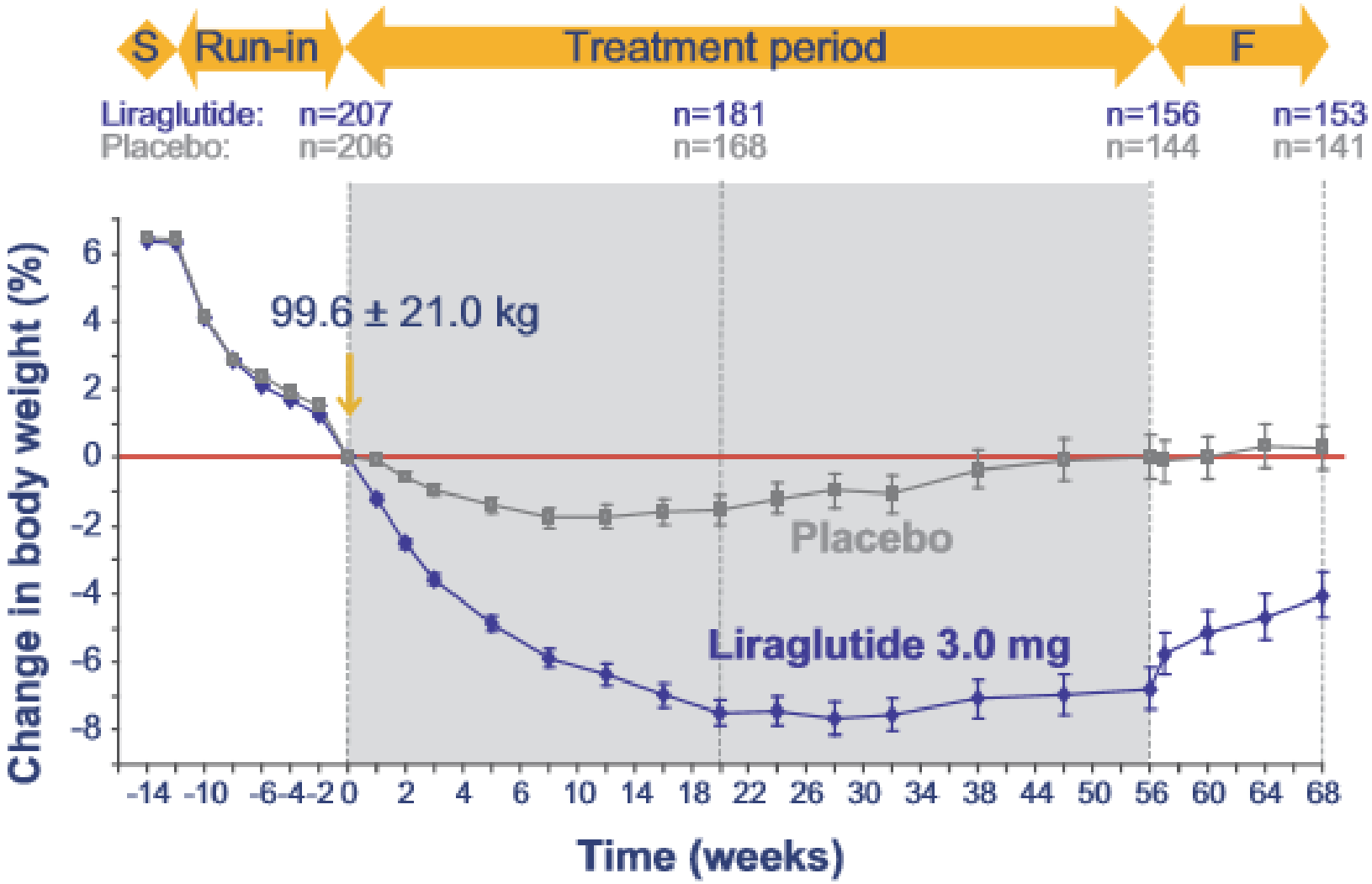
Pharmacotherapy Improves Weight Maintenance



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Wadden, et al. 2013

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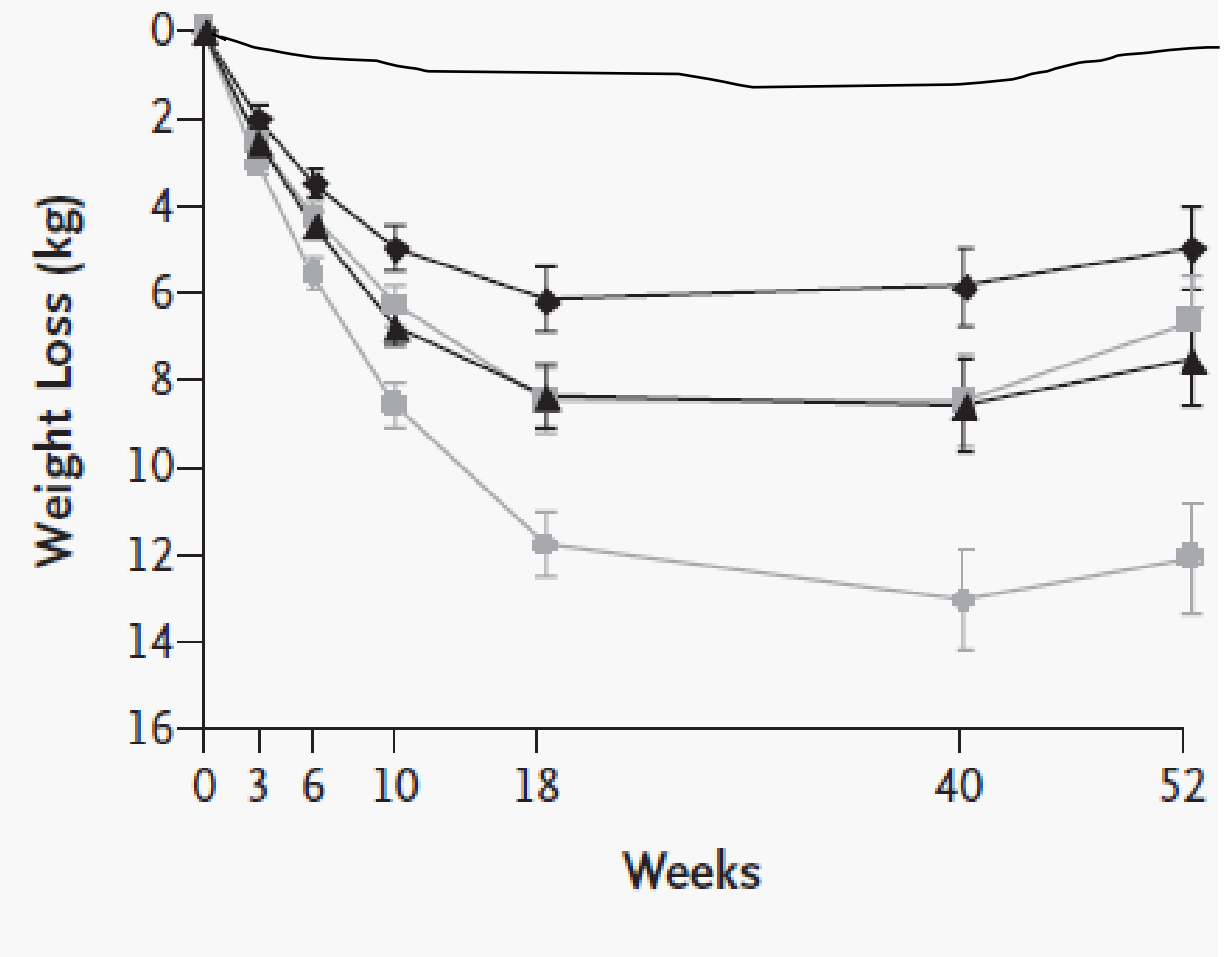
Lifestyle Modification and Pharmacotherapy



Placebo alone

Medication alone

Lifestyle modification alone

Combined therapy

Adapted from Wadden, et al. 2005

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Pharmacotherapy Improves Risk Factors and Comorbidities

	Orlistat	Phentermine/ Topiramate ER	Naltrexone/ Bupropion ER	Liraglutide 3.0 mg	Semaglutide 2.4 mg	Tirzepatide
WC	↓	↓	↓	↓	↓	↓
BP	↓	↓	↑	↓	↓	↓
HR	↓	–	↑	↑	↑	↑
LDL-C	↓	↓	↓	↓	↓	↓
HDL-C	↑	↑	↑	↑	↑	↑
TG	↓↓	↓↓	↓↓	↓↓	↓↓	↓↓
A1C	↓	↓	↓	↓↓	↓↓	↓↓
Diabetes	↓	↓	↓	↓↓	↓↓	↓↓

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Novo Nordisk Inc, 2023; Novo Nordisk Inc, 2023; Verma et al., 2021; Kushner et al., 2021; Takeda Pharmaceuticals America, Inc, 2014; Genentech, 2012; GlaxoSmithKline, 2011; Vivus, 2012

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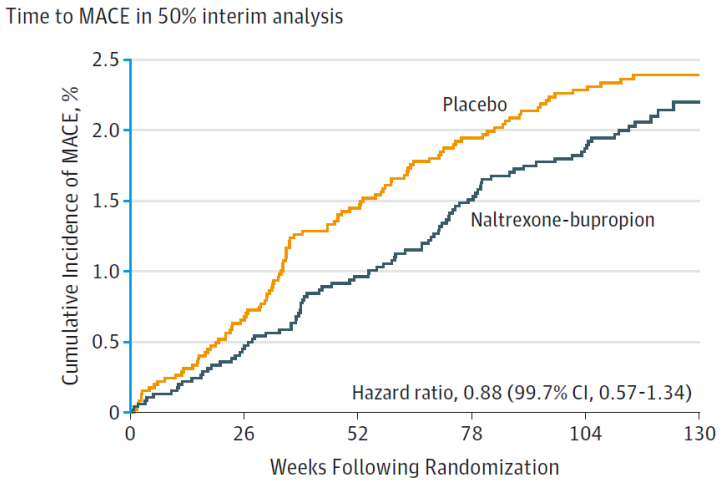
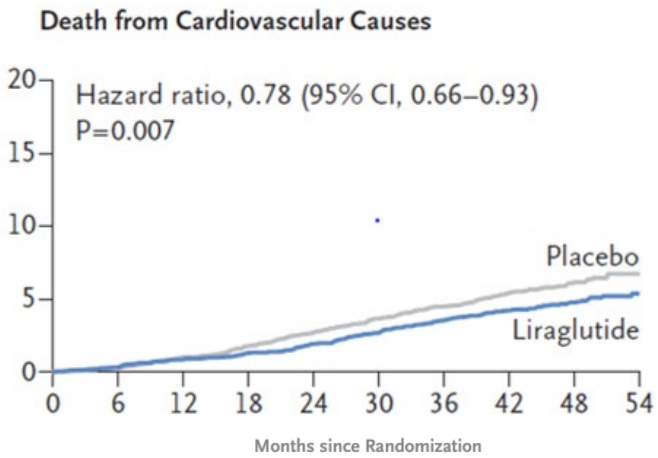
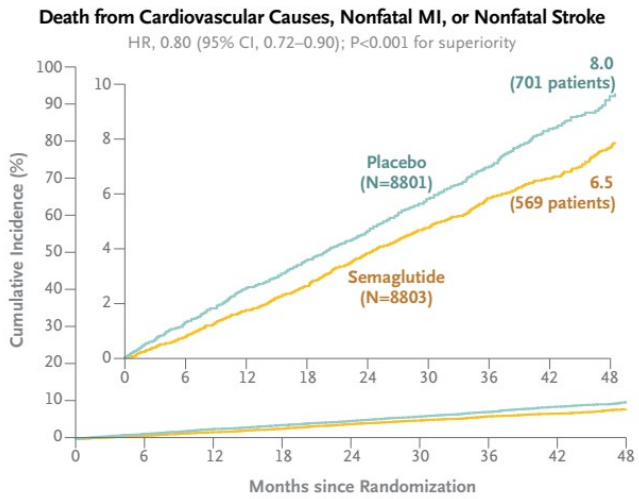
Long-Term Cardiovascular Safety







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Nissen, et al. 2016; Marso et al. 2016; Lincoff et al., 2023.

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Obesity Pharmacotherapy

- 4 FDA-approved short-term medications
  - Phentermine
  - Less commonly utilized benzphetamine, diethylproprion, and phendimetrazine
- 6 FDA-approved long-term medications
  - Orlistat (Xenical/Alli)
  - Phentermine/topiramate ER (Qsymia)
  - Naltrexone/Bupropion SR (Contrave)
  - Liraglutide 3.0 mg (Saxenda)
  - Semaglutide 2.4 mg (Wegovy)
  - Tirzepatide (ZepBound)

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Phentermine

- Sympathomimetic amine
- Approved in 1959 for short-term use (schedule IV)
- **Dosing:** 8 to 37.5 mg PO QD 2 hours after breakfast
- **Side effects:** Dry mouth, insomnia, dizziness, irritability, increased blood pressure, elevated heart rate
- **Contraindications:** pregnancy, MAOIs, glaucoma, drug abuse history, hyperthyroidism
- **Relative contraindications:** CVD, CHF, CVA, uncontrolled hypertension, tachycardia, arrhythmia

CHF = congestive heart failure; CVA = cerebrovasular accident; CVD = cardiovascular disease; MAOI = monoamine oxidase inhibitor

Alpex Pharma SA, 2011; Munro et al., 1968

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Orlistat

- Lipase inhibitor
- Approved in 1999 for long-term use
- **Dosing:** 120 mg TID PO with meals (prescribed) or 60 mg TID (OTC)
  - Use MVI with fat-soluble vitamins at bedtime
  - May affect absorption of some medications
- **Side effects:** abdominal pain, flatulence, fecal urgency
- **Contraindications:** pregnancy, chronic malabsorption syndrome, cholestasis, and severe renal impairment

MVI = multivitamin; OTC = over-the-counter; TID = 3 times daily.

Orlistat, 2022; Orlistat, 2017

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Phentermine/Topiramate ER

- Sympathomimetic amine (phentermine) and carbonic anhydrase inhibitor (topiramate)
- Approved in 2012 for long-term use (schedule IV)
- **Dosing:** Titration from 3.75/23 mg PO QAM for the 1st two weeks, to 7.5/46 mg PO QAM, titration of dosing up through week 13 to 15/92 mg PO QAM max dose titrated for WL >3% of baseline BMI
  - Discontinue if less than 3% weight loss after 12 weeks
- **Side effects:** Constipation, paresthesia, insomnia, nasopharyngitis, xerostomia, increased blood pressure
- **Contraindications:** pregnancy, glaucoma, MAOIs, hyperthyroidism

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Naltrexone/Bupropion ER

- Opioid receptor antagonist (naltrexone) and dopamine/norepinephrine reuptake inhibitor (bupropion)
- Approved in 2014 for long-term use
- **Dosing:** 32/360 mg tablet, titration from 1 PO QD to 2 PO BID over the course of 4 weeks (not to exceed 2 tablets BID)
  - Discontinue if <5% weight loss after 16 weeks
- **Warning for suicidal thoughts in adolescents**
- **Side effects:** Constipation, nausea, headache, xerostomia, insomnia, elevated heart rate and blood pressure
- **Contraindications:** pregnancy, MAOI, uncontrolled hypertension, seizure disorder, chronic opioid use

BID = twice daily.

Naltrexone/bupropion ER, ND; Nalpropion Pharmaceuticals, 2021

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Liraglutide 3.0 mg

- Glucagon-like peptide 1 (GLP-1) receptor agonist
- Approved in 2014 for long-term use
- **Daily** subcutaneous injection
- **Dosing:** weekly escalation from 0.6 mg to 3.0 mg SQ daily
  - Discontinue if <4% weight loss at 16 weeks
- **Hypoglycemia possible and more likely when combined with other diabetic agents**
- **Side effects:** Gastrointestinal side effects (nausea, vomiting, diarrhea, esophageal reflux), injection site reactions, elevated heart rate, hypoglycemia
- **Contraindications/warnings:** pregnancy, medullary thyroid carcinoma, pancreatitis

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Semaglutide 2.4 mg

- GLP-1 receptor agonist
- Approved in 2021 for long-term use
- **Once-weekly** subcutaneous injection
- **Dosing:** monthly escalation from 0.25 mg to 2.4 mg weekly
- **Hypoglycemia possible and more likely when combined with other diabetic agents**
- **Side effects:** Gastrointestinal side effects (nausea, vomiting, diarrhea, esophageal reflux), injection site reactions, elevated heart rate, hypoglycemia
- **Contraindications/warnings:** pregnancy, medullary thyroid carcinoma, pancreatitis

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Tirzepatide

- Dual GLP-1/GIP receptor agonist
- Approved in 2023 for long-term use
- **Once-weekly** subcutaneous injection
- **Dosing:** starting dose of 2.5 mg SQ weekly increased at increments 2.5 mg – 15 mg weekly till 5mg SQ once weekly, then may increase by 2.5 mg every 4 weeks up to 15 mg as needed.
- **Hypoglycemia possible and more likely when combined with other diabetic agents**
- **Side effects:** stomach pain, anxiety, bloating, blurred vision
- **Contraindications/warnings:** pregnancy, medullary thyroid carcinoma, pancreatitis

Novo Nordisk Inc., n.d.

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Case example: Cassie, 3 months later

- After starting an obesity medication, Cassie's weight has come down 13 lbs (6%) over 3 months. Blood pressure has improved and plan to repeat pertinent blood tests in the coming months.
- She feels more confident with her progress, though still feels the weight loss is slow and wonders if another medication may be better.

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Clinical Obesity Treatment Modalities

- Intensive behavioral therapy
- Structured or medically monitored diets
- Pharmacotherapy
- **Surgical therapy**

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Guidelines For Bariatric Surgery

- Advise patients with BMI $\geq$40 kg/m^2 (or $\geq$35 kg/m^2 with comorbidity) that bariatric surgery may be an appropriate option to improve health (Grade A)
- Offer referral to an experienced bariatric surgeon for consultation and evaluation (Grade A)
- Insufficient evidence to recommend for or against surgery for BMI <35 kg/m^2
- No clear guidance for medical devices

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AHA/ACC/TOS, 2013

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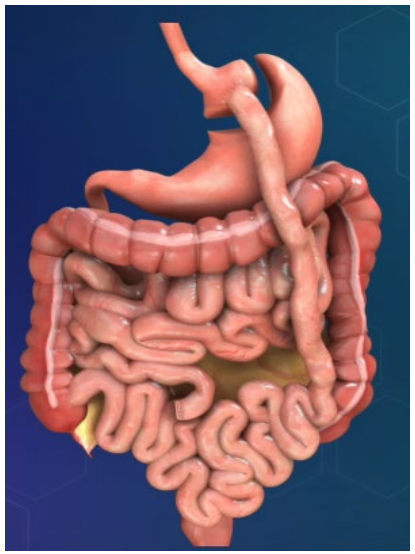
Bariatric Surgery

Gastric Band

Sleeve Gastrectomy

Roux-en-Y Gastric Bypass



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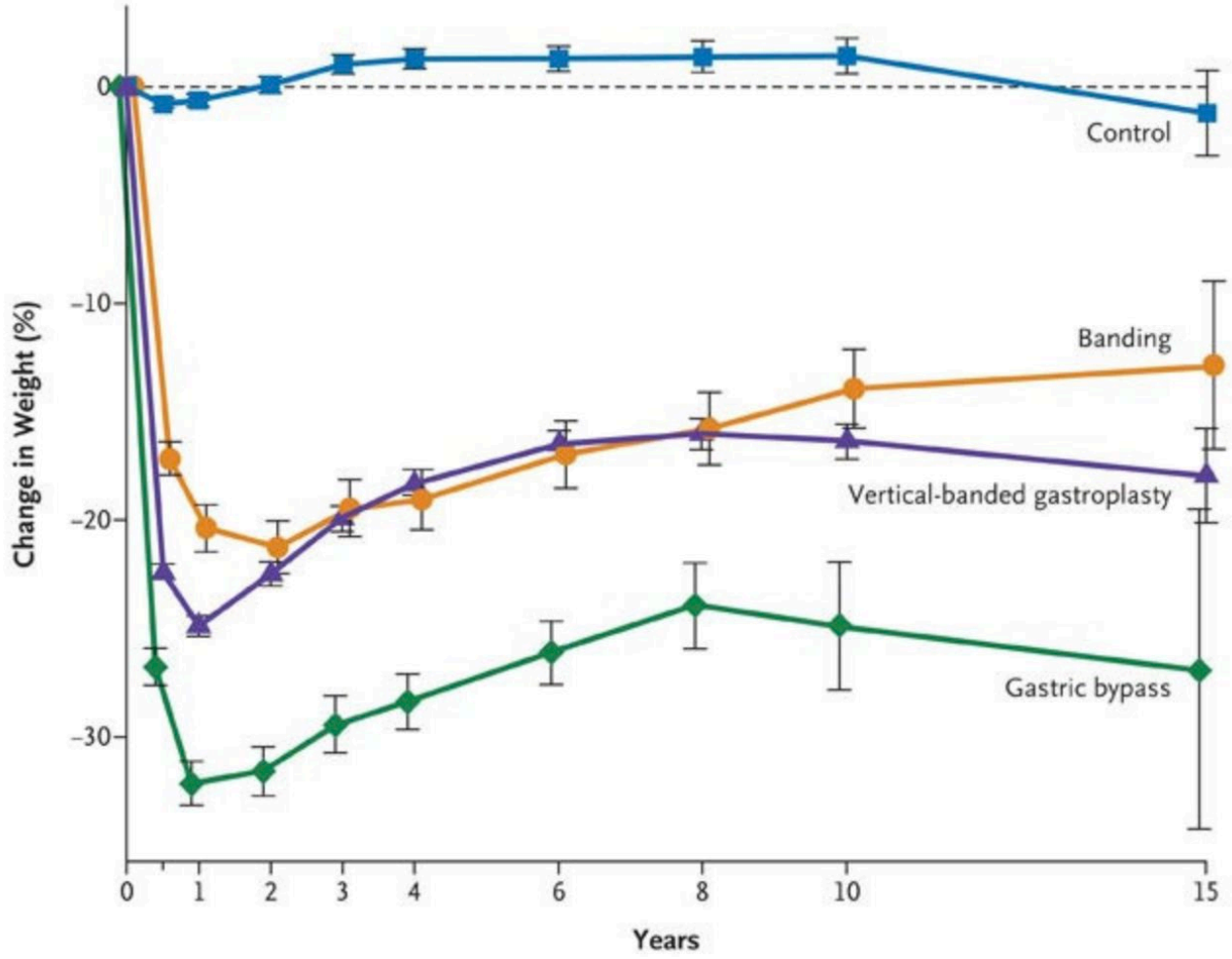
Bariatric Surgery Improves Long-term Weight Management



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Sjostrom et al., 2007

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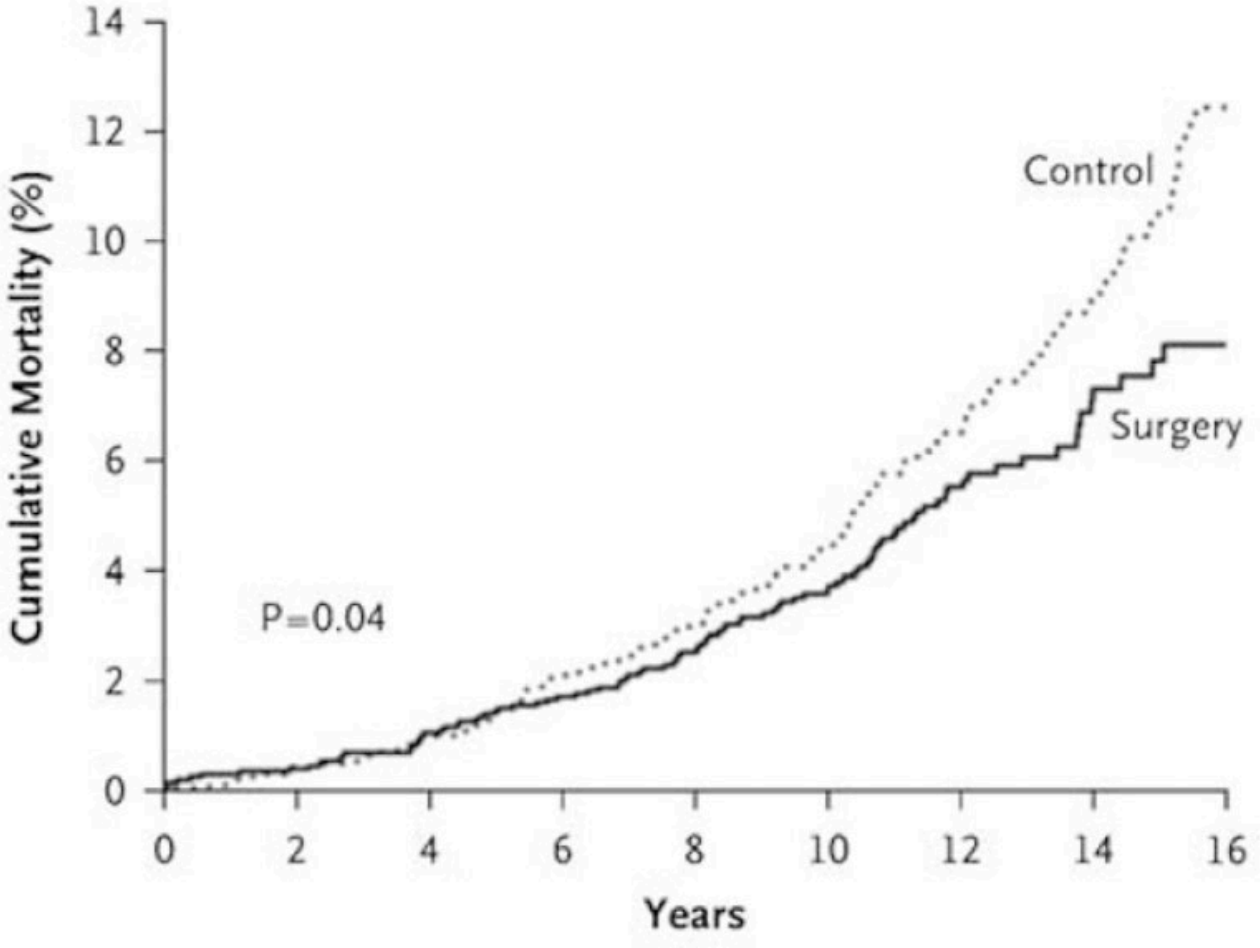
Bariatric Surgery Improves Mortality



Sjöström, 2008

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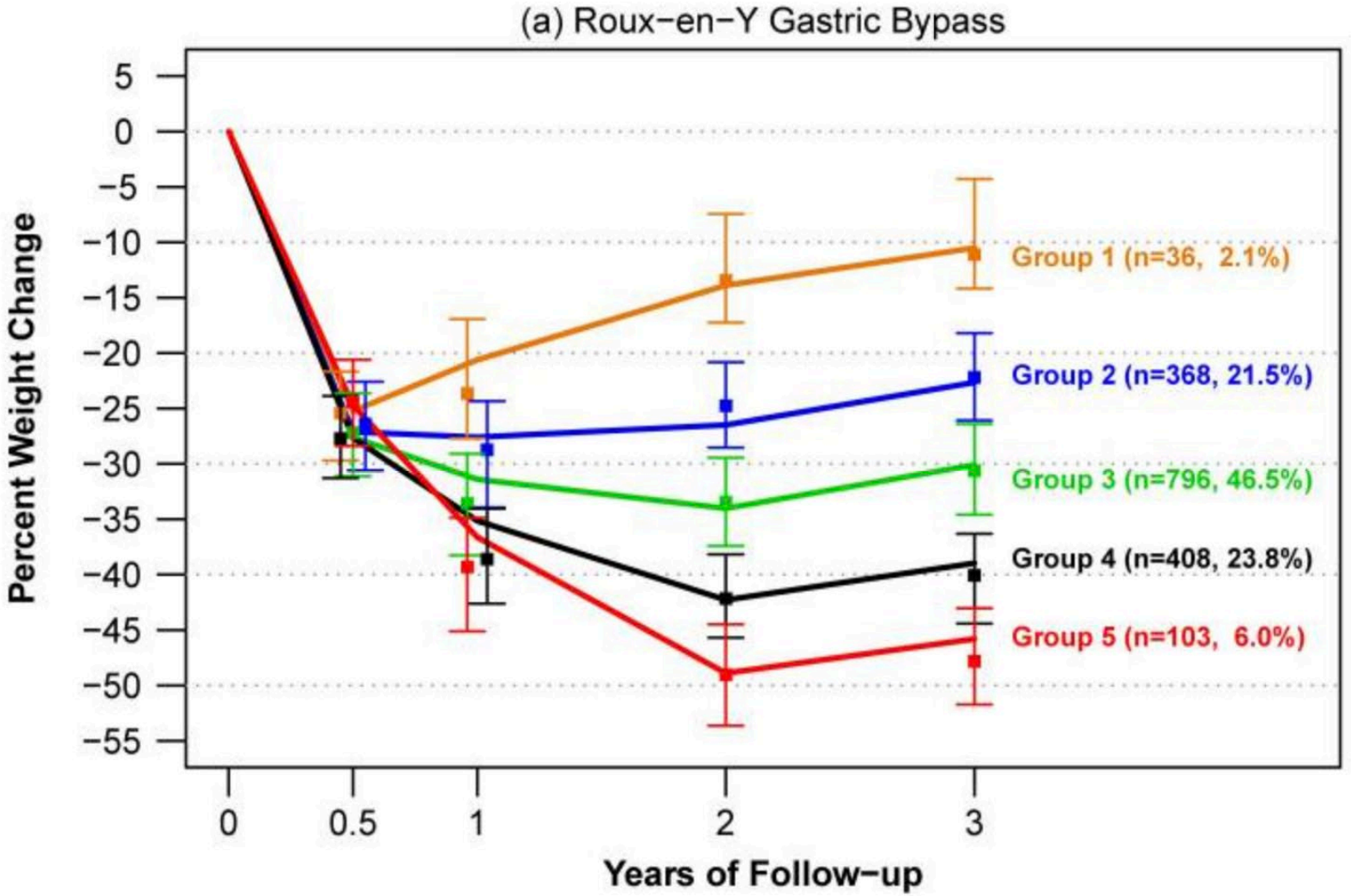
Trajectories of Weight Change After Surgery



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Courcoulis, et al., 2013

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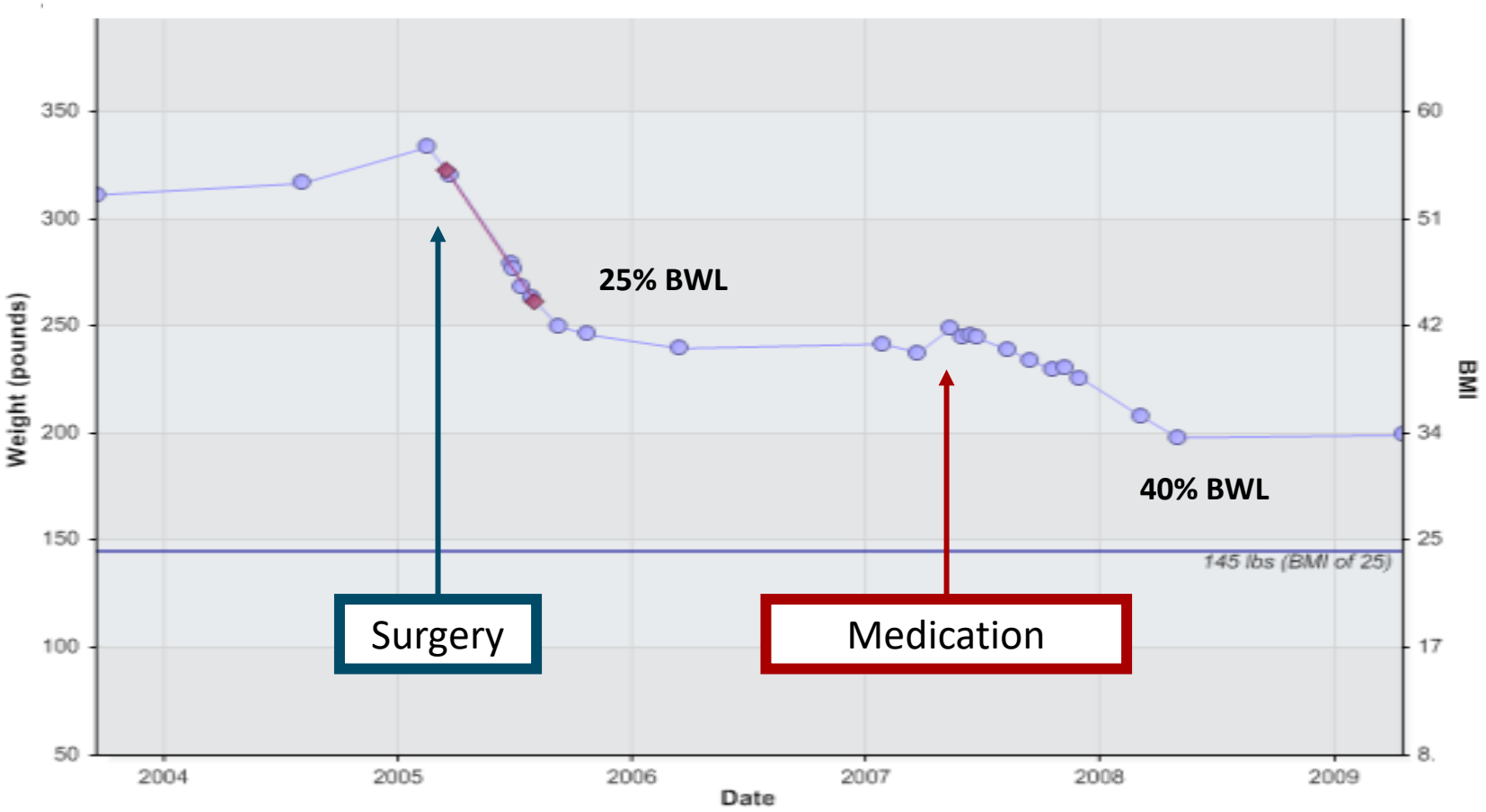
Combining Modalities Works Better



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Kahan, 2004-2009

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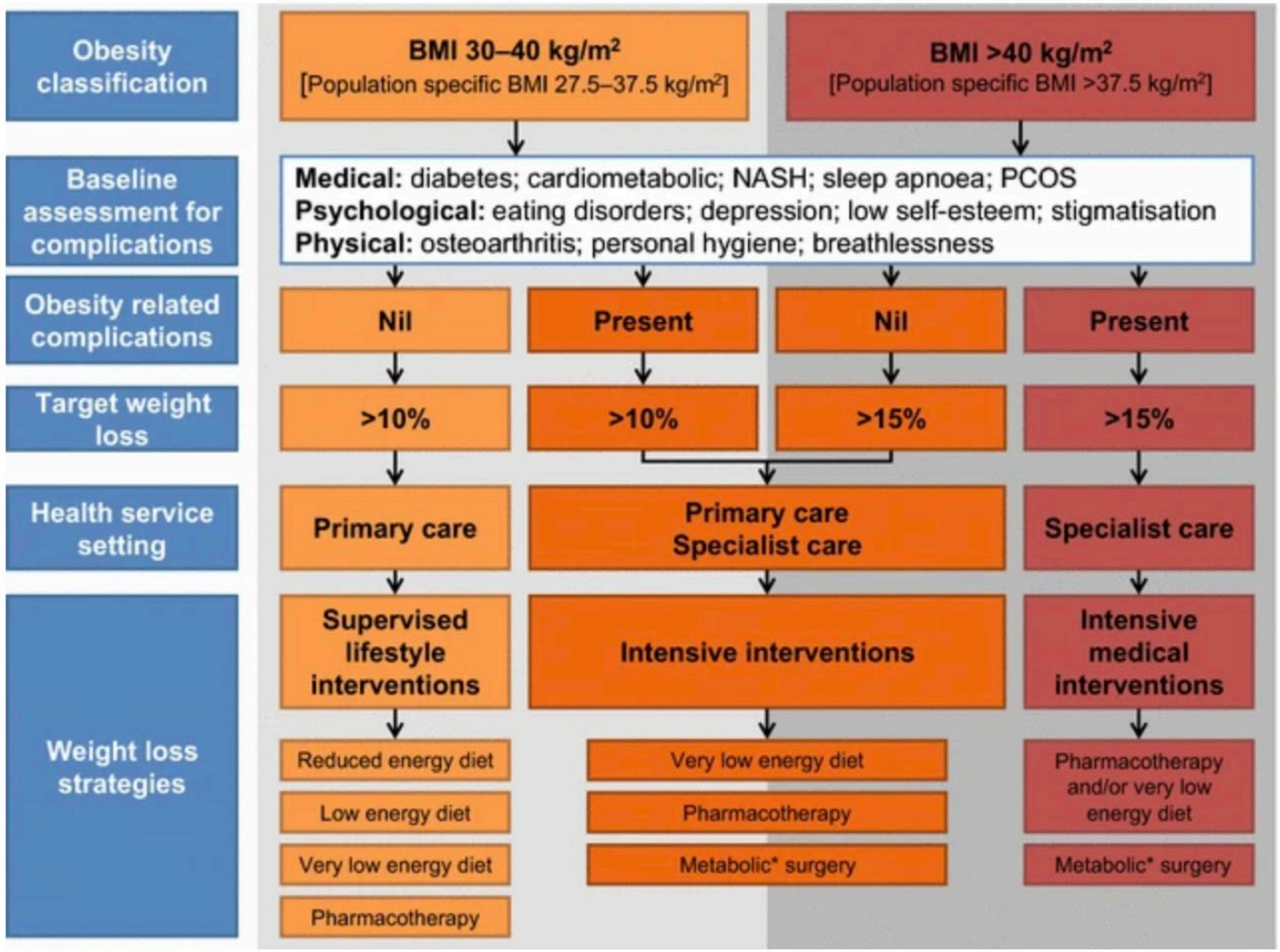
Example of Escalation of Services



Forgione, et al., 2018

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Case example: Cassie, 4 months later

- Cassie's weight is now down 25 lbs (12%), her blood pressure has normalized, and lab tests show A1c now 5.7 mg/dL and lipids much improved.
- She has restarted working with a dietitian and has also been enjoying an exercise class at local YMCA club.

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Conclusion

- **Pharmacological management of obesity** can significantly improve outcomes and reduce obesity-related complications.
- **Lifestyle intervention** is the foundation but often insufficient alone for most individuals.
- **Medications** should be considered for adults with a BMI ≥30 kg/m², or ≥27 kg/m² with weight-related complications, who do not respond adequately to lifestyle interventions.
- A **multidisciplinary team multipronged therapeutic approach** is often required to support patients in their weight loss journey.

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References

Allison DB, Gadde KM, Garvey WT, Peterson CA, Schwiers ML, Day WW. Controlled-release phentermine-topiramate in severely obese adults: a randomized controlled trial (EQUIP). Obesity (Silver Spring). 2012 Feb;20(2):330-342. doi:10.1038/oby.2011.330.

American Diabetes Association Professional Practice Committee. (2024). Obesity and weight management for the prevention and treatment of type 2 diabetes: Standards of care in diabetes–2024. *Diabetes Care, 47*(Supplement 1), S145-S153. https://doi.org

American Diabetes Association. (2023). Pharmacologic agents for diabetes and obesity. Diabetes Care 2023;47(Supplement 1).

American Gastroenterological Association. (2022). AGA clinical practice guideline on pharmacological interventions for adults with obesity.

American Heart Association/American College of Cardiology/The Obesity Society. (2013). Guideline for the management of overweight and obesity in adults. Circulation.

Antognoli, E. (2014).

Apovian CM, Aronne LJ, Bessesen DH, McDonnell ME, Murad MH, Ziemer DC. (2013). Pharmacological management of obesity: an Endocrine Society clinical practice guideline. J Clin Endocrinol Metab. 2015 Feb;100(2):342-362. doi:10.1210/jc.2014-3415.

Apovian CM, Aronne LJ, Bessesen DH, McDonnell ME, Murad MH, Ziemer DC. Pharmacological management of obesity: an Endocrine Society clinical practice guideline. J Clin Endocrinol Metab. 2015 Feb;100(2):342-362. doi:10.1210/jc.2014-3415.

Bardia, A. (2007).

Buchwald H, Avidor Y, Braunwald E, Jensen MD, Pories W, Fahrbach K, Schoelles K. Bariatric surgery: a systematic review and meta-analysis. JAMA. 2004 Oct 13;292(14):1724-1737. doi:10.1001/jama.292.14.1724.

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References

Courcoulas, A. P., Christian, N. J., Belle, S. H., Berk, P. D., Flum, D. R., Garcia, L., ... Wolfe, B. M; Longitudinal Assessment of Bariatric Surgery (LABS) Consortium. (2013). Weight change and health outcomes at 3 years after bariatric surgery among individuals with severe obesity. JAMA, 310(22), 2416-2425. DOI: 10.1001/jama.2013.280928.

Crawford, D. (2010).

Diabetes Prevention Program Research Group. (2002). Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *New England Journal of Medicine, 346*(6), 393-403. https://doi.org/10.1056/NEJMoa012512

Digenio, A. (2009).

Eaton, D. (2002).

Endocrine Society. (2015). Pharmacological management of obesity: An Endocrine Society clinical practice guideline. *Journal of Clinical Endocrinology & Metabolism, 100*(2), 342-362. https://doi.org/

Endotext. (n.d.). Pharmacologic treatment of overweight and obesity in adults. Retrieved from https://www.ncbi.nlm.nih.gov/books/NBK279038/

Fidler MC, Sanchez M, Raether B, Weissman NJ, Smith SR, Shanahan WR, Anderson CM. A one-year randomized trial of lorcaserin for weight loss in obese and overweight adults: the BLOSSOM trial. J Clin Endocrinol Metab. 2011 Sep;96(9):3067-3077. doi:10.1210/jc.2011-1256.

Forgione, N., Deed, G., Kilov, G. *et al.* Managing Obesity in Primary Care: Breaking Down the Barriers. *Adv Ther* 35, 191–198 (2018). https://doi.org/10.1007/s12325-017-0656-y

Gadde KM, Allison DB, Ryan DH, Peterson CA, Troupin B, Schwiers ML, Day WW. Effects of low-dose, controlled-release, phentermine plus topiramate combination on weight and associated comorbidities in overweight and obese adults (CONQUER): a randomised, placebo-controlled, phase 3 trial. Lancet. 2011 Apr 16;377(9774):1341-1352. doi:10.1016/S0140-6736(11)60205-5.

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References

Garvey WT, Ryan DH, Look M, Gadde KM, Allison DB, Peterson CA, Schwiers ML, Day WW. Two-year sustained weight loss and metabolic benefits with controlled-release phentermine-topiramate in obese and overweight adults (SEQUEL): a randomized, placebo-controlled, phase 3 extension study. Am J Clin Nutr. 2012 Feb;95(2):297-308. doi:10.3945/ajcn.111.024927.

Garvey WT, Mechanick JI, Brett EM, et al. (2022). Anti-obesity medications in adolescents: A clinical perspective. Nature Medicine. 2022;28(10):2083-2091. doi:10.1038/s41591-022-01957-1 (Diabetes Journals).

Genentech. (2012). *Orlistat [package insert]*. South San Francisco, CA.

Gjermeni E, Kryeziu E, Battelino S, Lechleitner M, Kopp HP, Wascher TC, Ludvik B. Biomarkers and metabolic surgery: what does the future hold?. Biomolecules. 2021 Oct;11(10):1426. doi:10.3390/biom11101426.

GlaxoSmithKline. (2011). *Orlistat [package insert]*. Moon Township, PA.

Goldsmith R, Joanisse DR, Gallagher D, Pavlovich K, Shamoon E, Leibel RL, Rosenbaum M. Effects of sibutramine on resting energy expenditure and body composition in obese African American women. Am J Physiol Endocrinol Metab. 2010 Dec;299(6)

. doi:10.1152/ajpendo.00394.2010.

Greenway FL, Fujioka K, Plodkowski RA, Mudaliar S, Guttadauria M, Erickson J, Kim DD, Phentermine/topiramate, a once-daily combination phentermine-topiramate extended release (PHEN/TPM ER) for weight loss: two phase 3 trials in overweight and obese adults. Lancet. 2011 Apr 16;377(9774):1341-52.

Hall KD, Kahan S. (2018). Maintenance of lost weight and long-term management of obesity. Med Clin North Am. 2018;102(1):183-197. doi:10.1016/j.mcna.2017.08.012.

Harry R Kissileff, John C Thornton, Migdalia I Torres, Katherine Pavlovich, Laurel S Mayer, Vamsi Kalari, Rudolph L Leibel, Michael Rosenbaum, Leptin reverses declines in satiation in weight-reduced obese humans, The American Journal of Clinical Nutrition, Volume 95, Issue 2, 2012, Pages 309-317, ISSN 0002-9165, https://doi.org/10.3945/ajcn.111.012385.

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References

Hatoum, H. (2015).

Hill, James & Galloway, James & Goley, April & Marrero, David & Minners, Regan & Montgomery, Brenda & Peterson, Gregory & Ratner, Robert & Sanchez, Eduardo & Aroda, Vanita. (2013). Scientific Statement: Socioecological Determinants of Prediabetes and Type 2 Diabetes. Diabetes care. 36. 10.2337/dc13-1161.

Hollander P, Gupta AK, Plodkowski RA, Greenway F, Bays HE, Aggarwal N, et al. Effects of naltrexone sustained-release/bupropion sustained-release combination therapy on body weight and glycemic parameters in overweight and obese patients with type 2 diabetes: a randomized controlled trial. Diabetes Care. 2013 Dec;36(12):4022-4029. doi:10.2337/dc13-0234

Horn, D. B., Pash, E., Zhou, M. S., Broffman, L., Bialonczyk, D., Doron, T., & Chiquette, E. (2023). Characteristics and weight loss practices from a cohort of 20,000 patients using direct-to-consumer telehealth: Observational cross-sectional study. JMIR Formative Research, 7, e40062. https://doi.org/10.2196/40062

Jackson, J. (2013).

Jastreboff AM, Kotz CM, Kahan S, et al. (2022). New pharmacotherapies for obesity and metabolic diseases. New England Journal of Medicine. 2022;387(3):205-216. doi:10.1056/NEJMoa2112453.

Kahan S, Manson JE. Obesity Treatment, Beyond the Guidelines: Practical Suggestions for Clinical Practice. *JAMA.* 2019;321(14):1349–1350. doi:10.1001/jama.2019.2352

Kahan S, Petrin C. (2017). Understanding and managing obesity in primary care settings. Obesity (Silver Spring). 2017;25(3):535-542. doi:10.1002/oby.21767.

Kahan S, Wilson DK, Sallis JF, Kitzman-Ulrich H. Obesity: new insights for the healthcare practitioner. Johns Hopkins University Press. 2014. Retrieved from https://www.gov.uk/government/uploads/system/uploads/obesity-map-full-hi-res.pdf

KFF. (2024). *Medicare spending on Ozempic and other GLP-1s is skyrocketing*. Centers for Medicare & Medicaid Services 2018-2022 Medicare Part D Spending by Drug.

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References

Kim JY. Optimal Diet Strategies for Weight Loss and Weight Loss Maintenance. J Obes Metab Syndr. 2021 Mar 30;30(1):20-31. doi: 10.7570/jomes20065. PMID: 33107442; PMCID: PMC8017325.

Kissileff AR, Thornton JC, Torres MI, et al. Leptin reverses declines in satiation in weight-reduced obese humans. Am J Clin Nutr. 2012;95(2):309-317. doi:10.3945/ajcn.111.012385.

Knowler WC *et al. N Engl J Med* 2002;346:393–403; Li G *et al. Lancet Diabetes Endocrinol* 2014;2:474–80; Dattilo AM, Kris-Etherton PM. *Am J Clin Nutr* 1992;56:320–8; Wing RR *et al. Diabetes Care* 2011;34:1481–6; Foster GD *et al. Arch Intern Med* 2009;169:1619–26; Kuna ST *et al. Sleep* 2013;36:641–9; Warkentin LM *et al. Obes Rev* 2014;15:169-82; Wright F *et al. J Health Psychol* 2013;18:574–86.

Kushner RF, Ryan DH, Prather M, et al. (2021). Clinical practice guidelines for comprehensive medical care of patients with obesity. Diabetes. 2021;70(Supplement 1):80-OR. doi:10.2337/db21-80-OR.

Lam YY, Ravussin E. (2016). Energy balance and weight management: The role of the gut microbiota. Molecular Metabolism. 2016;5(11):1057-1071. doi:10.1016/j.molmet.2016.07.004.

Lam YY, Ravussin E. (2017). Gut microbiota and obesity: A systems biology perspective. European Journal of Clinical Nutrition. 2017;71(3):318-322. doi:10.1038/ejcn.2016.224.

le Roux CW, Astrup A, Fujioka K, et al. Sustained weight loss with liraglutide 3.0 mg for up to 3 years in participants with overweight or obesity: the SCALE maintenance randomized trial. Lancet. 2017 Apr 15;389(10077):1399-1409. doi:10.1016/S0140-6736(17)30200-6.

le Roux CW, Astrup A, Fujioka K, et al. (2022). Sustained weight loss with liraglutide 3.0 mg for up to 3 years in participants with overweight or obesity. EClinicalMedicine. 2022;49:101436. doi:10.1016/j.eclinm.2022.101436.

Lincoff AM, Tardif JC, Neal B, et al. (2023). Cardiovascular outcomes with lorcaserin in overweight and obese patients: CAMELLIA-TIMI 61 trial. New England Journal of Medicine. 2023;379(12):1107-1117. doi:10.1056/NEJMoa1808721.

Liraglutide 3.0 mg [prescribing information]. Plainsboro, NJ: Novo Nordisk Inc; April 2023.

DC | HEALTH
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Copyright 2024 DC Health | Government of the District of Columbia

References

Look AHEAD Research Group. (2014). Obesity, 22(1), 5-13.

Marso SP, Daniels GH, Brown-Frandsen K, et al. Liraglutide and cardiovascular outcomes in type 2 diabetes. N Engl J Med. 2016 Jul 28;375(4):311-322. doi:10.1056/NEJMoa1603827.

McTigue, K. (2003).

Moyer VA. Screening for and management of obesity in adults: U.S. Preventive Services Task Force recommendation statement. Ann Intern Med. 2012;157(5):373-378. doi:10.7326/0003-4819-157-5-201209040-00475.

Munro JF, MacCuish AC, Wilson EM, Duncan LJ. (1968). Comparison of continuous and intermittent anorectic therapy in obesity. British Medical Journal. 1968;1(5588):352-354. doi:10.1136/bmj.1.5588.352.

Naltrexone/bupropion ER [prescribing information]. Deerfield, IL: Takeda Pharmaceuticals America, Inc; 2014.

National Institute of Diabetes and Digestive and Kidney Diseases. (n.d.). Overweight & obesity statistics. U.S. Department of Health and Human Services. Retrieved May 23, 2024, from https://www.niddk.nih.gov/health-information/health-statistics/overweight-obesity

Nissen, S. E., et al. (2016). JAMA.

Novo Nordisk Inc. (April 2023). Liraglutide 3.0 mg [prescribing information]. Plainsboro, NJ.

Novo Nordisk Inc. (July 2023). Semaglutide 2.4 mg [prescribing information]. Plainsboro, NJ.

DC | HEALTH
GOVERNMENT OF THE DISTRICT OF COLUMBIA

Copyright 2024 DC Health | Government of the District of Columbia

References

Novo Nordisk Inc. (Year). Wegovy [prescribing information]. Retrieved from https://www.novo-pi.com/wegovy.pdf

Obesity and weight management for the prevention and treatment of type 2 diabetes. (2024). Diabetes Care, 47(Supplement 1), S145-S153. Retrieved from https://diabetesjournals.org/care/article/47/Supplement_1/S145/153942/8-Obesity-and-Weight-Management-for-the-Prevention

Obesity and Weight Management for the Prevention and Treatment of Type 2 Diabetes: Standards of Care in Diabetes–2024. 2013

O'Neil PM, Smith SR, Weissman NJ, et al. (2012). Randomized placebo-controlled trial of lorcaserin for weight loss in type 2 diabetes mellitus: the BLOOM-DM study. Obesity (Silver Spring). 2012;20:1426-1436. doi:10.1038/oby.2011.330.

Orlistat [package insert]. CHEPLAPHARM Arzneimittel GmbH; 2022.

Orlistat [package insert]. Moon Township, PA: GlaxoSmithKline; 2011.

Orlistat [package insert]. Moon Township, PA: GlaxoSmithKline; 2017**.**

Orlistat [package insert]. South San Francisco, CA: Genentech; 2012.

Pharmacological Management of Obesity: An Endocrine Society Clinical Practice Guideline. (2015). *Journal of Clinical Endocrinology & Metabolism*.

Phentermine [package insert]. Cranford, NJ: Alpex Pharma SA; 2011.

DC | HEALTH
GOVERNMENT OF THE DISTRICT OF COLUMBIA

Copyright 2024 DC Health | Government of the District of Columbia

References

Phentermine/topiramate ER [package insert]. Mountain View, CA: Vivus; 2012.

Pi-Sunyer X, Astrup A, Fujioka K, et al. A randomized, controlled trial of 3.0 mg of liraglutide in weight management. N Engl J Med. 2015 Jul 2;373(1):11-22. doi:10.1056/NEJMoa1411892.

Ponce J, Nguyen NT, Hutter M, et al. (2016). Safety and efficacy of revisional bariatric surgery: an updated review of the literature. Surgery for Obesity and Related Diseases. 2016;12(9):1637-1645. doi:10.1016/j.soard.2016.03.030.

Pool, A. (2014).

Post, S. (2011).

Rose, M. (2013).

Rozjabek, H., Fastenau, J., LaPrade, A., & Sternbach, N. (2020). Adult obesity and health-related quality of life, patient activation, work productivity, and weight loss behaviors in the United States. *Diabetes Metab Syndr Obes*, 13, 2049-2055. https://doi.org/10.2147/DMSO.S245486

Ryan DH, Kushner R, Mark H, et al. Impact of a weight management program in adults with obesity: a randomized controlled trial. Arch Intern Med. 2010 Jan 25;170(2):146-154. doi:10.1001/archinternmed.2009.507.

Samaranayake, N. R., et al. (2012). *Annals of Epidemiology, 22*(5), 349-353.

Semaglutide 2.4 mg [prescribing information]. Plainsboro, NJ: Novo Nordisk Inc; July 2023.

DC | HEALTH
GOVERNMENT OF THE DISTRICT OF COLUMBIA

Copyright 2024 DC Health | Government of the District of Columbia

References

Sjöström L, Peltonen M, Jacobson P, et al. (2007). Effects of bariatric surgery on mortality in Swedish obese subjects. New England Journal of Medicine. 2007;357:741-752. doi:10.1056/NEJMoa066254.

Smith SR, Weissman NJ, Anderson CM, Sanchez M, Shanahan WR, Fain R, Kaufman KD. (2014). Long-term efficacy and safety of lorcaserin for weight management. Obesity. 2014;22:2137-2146. doi:10.1002/oby.20829.

Smith SR, Weissman NJ, Anderson CM, Sanchez M, Shanahan WR, Fain R, Kaufman KD. Behavioral modification and lorcaserin for overweight and obesity management (BLOOM): a randomized, double-blind, placebo-controlled trial. N Engl J Med. 2010 Jul 15;363(3):245-256. doi:10.1056/NEJMoa0909809.

Sumithran P, Prendergast LA, Delbridge E, et al. Long-term persistence of hormonal adaptations to weight loss. N Engl J Med. 2011 Oct 27;365(17):1597-1604. doi:10.1056/NEJMoa1105816.

Takeda Pharmaceuticals America, Inc. (2014). *Naltrexone/bupropion ER [prescribing information]*. Deerfield, IL.

Thomas CE, Mauer EA, Shukla AP, Rathi S, Aronne LJ. (2016). Low-fat versus low-carbohydrate diets for weight loss in patients with type 2 diabetes: a meta-analysis of randomized controlled trials. Obesity. 2016;24(9):1955-1961. doi:10.1002/oby.21572.

Torgerson JS, Hauptman J, Boldrin MN, Sjöström L. (2004). XENical in the prevention of diabetes in obese subjects (XENDOS) study: a randomized study of orlistat as an adjunct to lifestyle changes for the prevention of type 2 diabetes in obese patients. Diabetes Care. 2004;27(1):155-161. doi:10.2337/diacare.27.1.155.

Unick JL, Beavers D, Jakicic JM, et al. (2011). The long-term success of lifestyle interventions for weight loss: the Look AHEAD trial. Diabetes Care. 2011;34(10):2152-2157. doi:10.2337/dc11-0025.

Verma S, Bhatt DL, Bain SC, et al. (2021). Semaglutide in subjects with type 2 diabetes and chronic kidney disease: findings from the SUSTAIN-6 cardiovascular outcomes trial. Journal of the American College of Cardiology. 2021;77(18_Supplement_1):1608. doi:10.1016/S0735-1097(21)04092-3.

Vivus. (2012). *Phentermine/topiramate ER [package insert]*. Mountain View, CA.

DC | HEALTH
GOVERNMENT OF THE DISTRICT OF COLUMBIA

Copyright 2024 DC Health | Government of the District of Columbia

References

Wadden TA, Hollander P, Klein S, Niswender K, Woo V, Hale PM, Aronne L. Weight maintenance and additional weight loss with liraglutide after low-calorie-diet-induced weight loss: The SCALE Maintenance randomized study. Int J Obes (Lond). 2013;37(11):1443-1451. doi:10.1038/ijo.2013.120 (Haverford Scholarship) (CCJM)

Wadden TA, Volger S, Sarwer DB, et al. A two-year randomized trial of obesity treatment in primary care practice. N Engl J Med. 2005;353:2111-2120. doi:10.1056/NEJMoa050156 (CCJM)

Wadden TA, West DS, Neiberg RH, et al. (2011). One-year weight losses in the Look AHEAD study: factors associated with success. Obesity (Silver Spring). 2011;19:110-120. doi:10.1038/oby.201

Wadden TA, Volger S, Sarwer DB, et al. (2013). A two-year randomized trial of obesity treatment in primary care practice. New England Journal of Medicine. 2013;369:139-148. doi:10.1056/NEJMoa1212985.

Whitley, A., et al. (2023). *Special report: Potential strategies for addressing GLP-1 and dual GLP-1/GIP receptor agonist shortages*. *Clinical Diabetes*.

Wilding, J. P. H., et al. (2022). Diabetes, Obesity & Metabolism, 24(8)*, 1-12. [Open access under a Creative Commons BY license].*

Wilkinson, J. (2014).

Yuen M, Kahan S, et al, 2016.

Zhang S, Rinaldi M, Rozjabek H. Weight loss interventions for obese patients with type 2 diabetes: Comparing low-fat and low-carbohydrate diets. Obes Sci Pract. 2016;2(2):104-114. doi:10.1002/osp4.52.

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