OBESITY MANAGEMENT IN PRIMARY CARE TRAINING AND CERTIFICATE PROGRAM

Managing Patients with Obesity-related Complications

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Obesity Management Specialist
Integrated Learning Partners
Integrative Medical Weight Management

Scott Kahan, MD, MPH
Director, National Center for Weight and Wellness

AAPA THE OBESITY SOCIETY NACE

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Commercial Support

This activity was sponsored by an educational grant from Novo Nordisk.

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Faculty and Disclosure Statement

Sandra Christensen is a board-certified nurse practitioner and has specialized in obesity treatment since 2005. She owns Integrative Medical Weight Management, in Seattle, Washington, where she provides personalized, comprehensive obesity treatment. She holds the Certificate of Advanced Education in Obesity Medicine from the Obesity Medicine Association (OMA).

Ms. Christensen speaks on the topic of obesity at national, state, and local conferences and webinars and is involved in projects and initiatives that educate clinicians about obesity treatment and advocate for access to care. She serves as a trustee on the OMA Board of Trustees and is a contributing author of the OMA Obesity Algorithm.

Ms. Christensen has dedicated herself to educating others about the complexities of obesity. Through clinical practice, speaking, writing, mentoring, and advocacy, she empowers clinicians to address obesity with knowledge and compassion.

Novo Nordisk: speakers' bureau for obesity; **Gelesis:** advisor for obesity; **Author royalties:** "A Clinician's Guide to Discussing Obesity with Patients"

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Faculty and Disclosure Statement

Scott Kahan, MD, MPH, is a physician trained in clinical medicine and public health. His clinical practice focuses on obesity and weight-related health conditions and his public health practice focuses on obesity and diabetes prevention, health services research, and chronic disease nutrition.

Dr. Kahan is the Director of the National Center for Weight and Wellness in Washington, DC and Medical Director for the Strategies To Overcome and Prevent (STOP) Obesity Alliance at George Washington University, a health policy think-tank and coalition of more than 100 clinical, research, government, and advocacy organizations. He has faculty appointments at the Johns Hopkins Bloomberg School of Public Health, George Washington University Schools of Medicine and Public Health, and George Mason University College of Health and Human Services. He serves on the Boards of Directors for the American Board of Obesity Medicine, The Obesity Society, and Obesity Action Coalition. He is a Fellow and past-Chair of the Clinical Committee for The Obesity Society and serves on The Endocrine Society's Advocacy and Public Outreach Core Committee and the American Diabetes Association's Professional Practice Committee, which is responsible for writing and updating the ADA's Standards of Medical Care in Diabetes.

Dr. Kahan has received numerous awards for his clinical work and advocacy, including the Clinician of the Year from The Obesity Society, Outstanding Contribution Award from the Academy of Nutrition and Dietetics, and Healthcare Provider Advocate of the Year from the Obesity Action Coalition.

Vivus: consultant for obesity; **Pfizer:** consultant for obesity; **Gelesis:** consultant for obesity; **Eli Lilly and Company:** consultant for obesity

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Objectives

Explain	Explain the pathophysiologic mechanisms by which excess adiposity causes obesity-related complications.
Evaluate	Evaluate obesity-related complications and comorbidities that may require treatment or referral.
Develop	Develop an individualized treatment plan based on a patient's obesity-related complications and comorbidities.
Adjust	Adjust obesogenic medications in a patient's current medication regimen when clinically appropriate.

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How do we treat patients with obesity and obesity-related complications?

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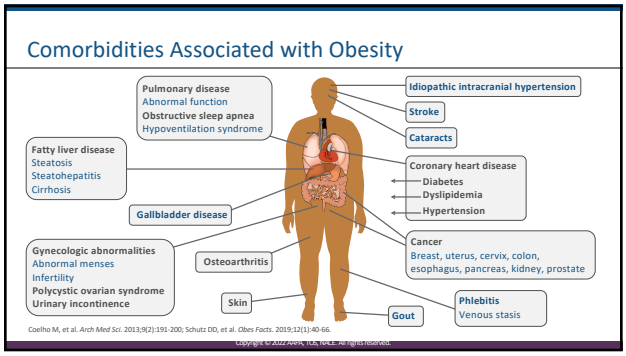
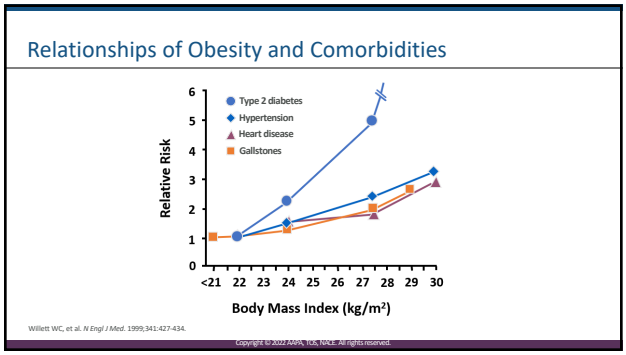
PRIORITY
We treat obesity first
Complications improve or resolve
In the complications-centric approach, the primary endpoint is improvement in adiposity-related complications, not a preset decline in body weight.[1]
BMI = body mass index.
Garvey WT, et al. Endocr Pract. 2016;22(suppl 3):1-205.

7

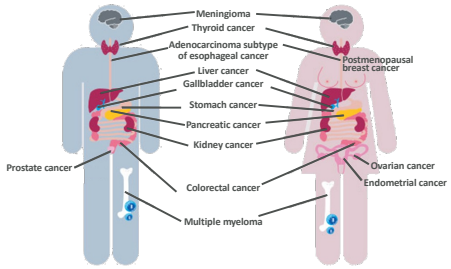

Comorbidities Associated with Obesity
Pulmonary disease
Abnormal function
Obstructive sleep apnea
Hypoventilation syndrome
Fatty liver disease
Steatosis
Steatohepatitis
Cirrhosis
Gallbladder disease
Gynecologic abnormalities
Abnormal menses
Infertility
Polycystic ovarian syndrome
Urinary incontinence
Osteoarthritis
Skin
Gout
Idiopathic intracranial hypertension
Stroke
Cataracts
Coronary heart disease
Diabetes
Dyslipidemia
Hypertension
Cancer
Breast, uterus, cervix, colon, esophagus, pancreas, kidney, prostate
Phlebitis
Venous stasis
Coelho M, et al. Arch Med Sci. 2013;9(2):191-200; Schutz DD, et al. Obes Facts. 2019;12(1):40-66.

8


Relationships of Obesity and Comorbidities
Relative Risk
Type 2 diabetes
Hypertension
Heart disease
Gallstones
0
1
2
3
4
5
6
<21
22
23
24
25
26
27
28
29
30
Body Mass Index (kg/m²)
Willett WC, et al. N Engl J Med. 1999;341:427-434.

9

Obesity is Related to 40% of Cancers in US



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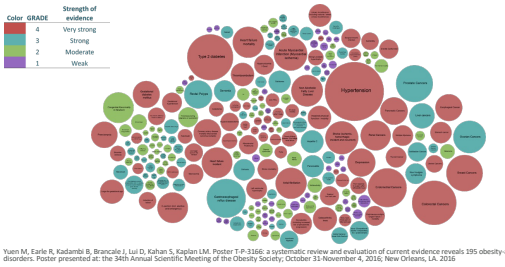
Obesity Associated with 236 Discrete Disorders



Yuen M, Earle R, Kadambi B, Brancale J, Lui D, Kahan S, Kaplan LM. Poster T-P-3166: a systematic review and evaluation of current evidence reveals 195 obesity-associated disorders. Poster presented at: the 34th Annual Scientific Meeting of the Obesity Society; October 31-November 4, 2016; New Orleans, LA. 2016

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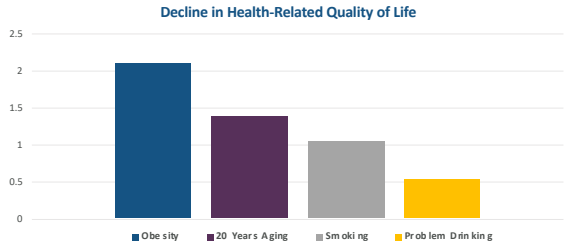
Impaired Quality of Life



Sturm R. *Health Affairs*. 2002;21(2):245-253.

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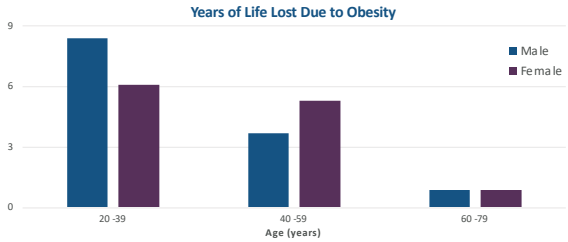
Obesity Associated With 320,000 Deaths/Year



Allison DB, et al. *JAMA*. 1999;282(16):1530-1538; Grover SA, et al. *Lancet Diab Endocrinol*. 2015;3(2):114-122.

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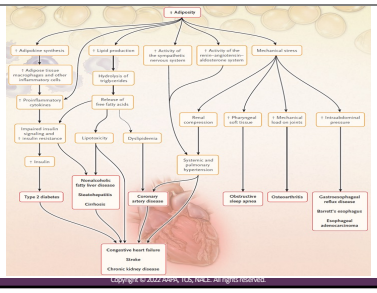
How Does Obesity Contribute to Disease?



Heymsfield SB, et al. *NEJM*. 2017; 376(3):254-266.

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How Does Obesity Contribute to Disease?

Biomechanical effects

- Arthritis of weight-bearing joints (knees, hips, etc.)
- Other musculoskeletal disease (plantar fasciitis, degenerative disc disease)
- Obstructive sleep apnea
- Gastroesophageal reflux disease
- Urinary incontinence
- Others

Psychosocial effects

- Weight stigma
- Internalized weight stigma
- Lower quality of healthcare

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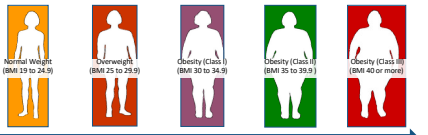
Traditional Severity Staging

A Guide to Selecting Treatment					
	BMI category				
Treatment	25-26.9	27-29.9	30-34.9	35-39.9	≥40
Diet, physical activity, and behavior therapy	With comorbidities	With comorbidities	+	+	+
Pharmacotherapy		With comorbidities	+	+	+
Surgery			With comorbidities		



Increasing benefit? Increasing risk, risk acceptance?

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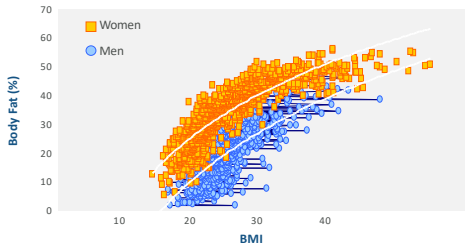
BMI Doesn't Optimally Predict Body Fat



Gallagher D, et al. *Am J Clin Nutr.* 2000;72(3):694-701.

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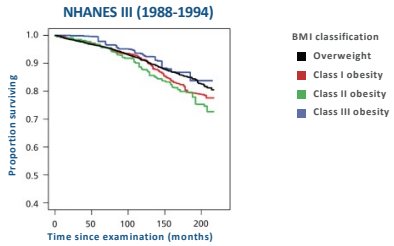
BMI Doesn't Predict Health Outcomes



NHANES = National Health and Examination Survey.
Padwal R, et al. *CMAJ.* 2011;183(14):E1059-E1066.

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Severity and Patient Experiences Vary

Absent/Benign	Severe
No impairment of well-being	Severely impaired well-being
No physical symptoms	Severe/debilitating physical symptoms
No functional limitations	Severe/debilitating functional limitations
No adverse metabolic effects	Severe/end-stage metabolic effects
No obesity-related risk factors	Many obesity-related risk factors
No obesity-related comorbidities or medical complications/consequences	Severe obesity-related comorbidities, complications, consequences
No psychological/psychosocial symptoms	Disabling psychological symptoms
No experiences of discrimination, bias	Severe experiences of discrimination
Full QOL	Severely impaired QOL
No lost years of life	Significantly reduced survival

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Stratify by Severity/Risk

Obesity and "well":	Obesity with risk factors:	Obesity and "sick":
Excess weight, but no comorbidities, risk factors, or impaired functioning	Excess weight, no overt health consequences, but measurable risk factors for comorbidities/ impairments	Excess weight and obesity-attributable comorbidities and impairments

Kahan S, et al. *Curr Obes Rep*. 2013;5(2):291-297.

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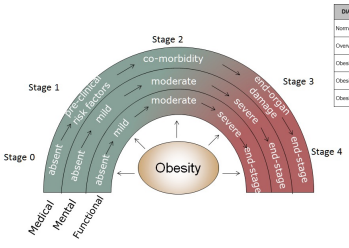
Proposed Obesity Staging Systems



DIAGNOSIS	ANTHROPOMETRIC COMPONENT	CLINICAL COMPONENT	PREVENTION/ TREATMENT
Normal Weight	BMI < 25 kg/m2		Primary
Overweight	BMI ≥ 25 – 29.9 kg/m²	No obesity-related complications	Secondary
Obesity	BMI ≥ 30 kg/m²	No obesity-related complications	
Obesity Stage 1	BMI ≥ 25 kg/m²	Presence of one or more mild-to-moderate obesity related complications	Tertiary
Obesity Stage 2	BMI ≥ 25 kg/m²	Presence of one or more severe obesity related complications	

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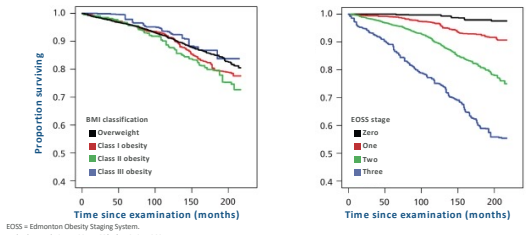
Staging Better Predicts Outcomes



EOSS = Edmonton Obesity Staging System.
Padwal R, et al. *CMAJ*. 2011;183(14):E1059-E1066.

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Staging Impacts Treatment Considerations

Stage 0

- Feels good
- Physically active
- No known risk factors
- No functional limitations
- No mental health issues

Is aggressive treatment worthwhile?
Is any treatment indicated?

Stage 2

- Hypertension
- Diabetes
- Sleep apnea
- Osteoarthritis
- Depression

Consider:
- Intensive counseling or referral
- Pharmacotherapy
- Bariatric surgery

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Obesity Treatment Goals

Prevent further weight gain/ induce weight loss → Prevent complications → Improve or resolve complications → Improve quality of life

A 5-10% loss can significantly improve health and reduce health risks

Centers for Disease Control and Prevention. https://www.cdc.gov/healthyweight/losing_weight/index.html. Accessed July 30, 2021.

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Magnitude of Weight Loss for Benefit

Diabetes Prevention	3 - 10%	*Lancet*, 2009; Garvey et al. 2013
Hypertension	5 – (>)15%	Wing 2011
Dyslipidemia	3 - (>)15%	Wing 2011
Hemoglobin A1c	3 - (>)15%	Wing 2011
NAFLD	10%	Assy et al. 2007; Dixon et al. 2004
Sleep Apnea (AHI)	10%	Foster 2009; Winslow et al. 2012
Osteoarthritis	5-10%	Christensen et al. 2007; Aaboe et al. 2011
Stress Incontinence	5-10%	Burgio et al. 2007; Leslee et al. 2009
GERD	5-10%	Singh et al. 2013; Tutujian R. 2011
PCOS	5-15%	Panidis D et al. 2008; Moran et al. 2013

GERD = gastroesophageal disease; NAFLD = nonalcoholic fatty liver disease; PCOS = polycystic ovarian syndrome.

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Iatrogenic Weight Gain

Category	Drugs That May Cause Weight Gain	Possible Alternatives
Neuroleptics	Thioridazine, olanzapine, quetiapine, risperidone	Ziprasidone, aripiprazole
Antidiabetics	Insulin, sulfonylureas, thiazolidinediones	GLP1, SGLT2, metformin
Steroid hormones	Glucocorticoids, progestational steroids	Barrier methods, NSAIDs
Antidepressants	Mirtazapine, MAOIs, TCAs, paroxetine	Bupropion, fluoxetine, sertraline
Anticonvulsants	Valproate, carbamazepine, gabapentin, pregabalin	Topiramate, lamotrigine, zonisamide, felbamate
Antihistamines	Cyproheptadine	Inhalers, decongestants
Antihypertensives	β-blockers, doxazosin	ACEIs, CCBs

ACEI = angiotensin converting enzyme inhibitor; CCB = calcium channel blocker; GLP = glucagon-like peptide; MAOI = monoamine oxidase inhibitor; NSAID = nonsteroidal anti-inflammatory; SGLT = sodium-glucose cotransporter; SSRI = selective serotonin reuptake inhibitor; TCA = tricyclic antidepressant.

Apovian CM, et al. *J Clin Endocrinol Metab.* 2015;100:342-362. Kahan S. In: Morton J, et al, eds. *Quality in Obesity Treatment.* 1st ed. Springer International Publishing; 2019.

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Case 1: Kalisha

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Meet Kalisha
• 32-year-old black female
• Human resources director
• Married with no children
• Here for her annual physical exam with her new primary care nurse practitioner who treats obesity one day per week in her primary care clinic
UConn Rudd Center for Food Policy & Obesity
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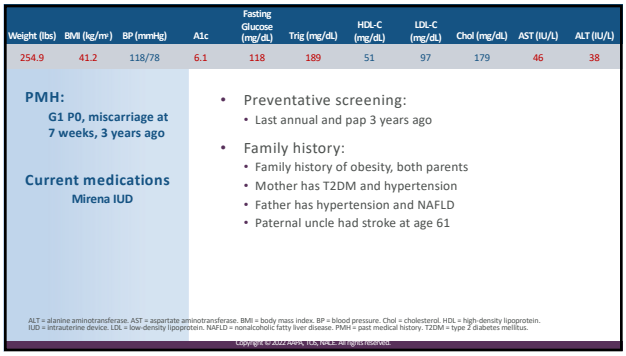
Weight (lbs) BMI (kg/m²) BP (mmHg) A1c Fasting Glucose (mg/dL) Trig (mg/dL) HDL-C (mg/dL) LDL-C (mg/dL) Chol (mg/dL) AST (IU/L) ALT (IU/L)
254.9 41.2 118/78 6.1 118 189 51 97 179 46 38
PMH:
G1 P0, miscarriage at 7 weeks, 3 years ago
Current medications
Mirena IUD
• Preventative screening:
• Last annual and pap 3 years ago
• Family history:
• Family history of obesity, both parents
• Mother has T2DM and hypertension
• Father has hypertension and NAFLD
• Paternal uncle had stroke at age 61
ALT = alanine aminotransferase. AST = aspartate aminotransferase. BMI = body mass index. BP = blood pressure. Chol = cholesterol. HDL = high-density lipoprotein. IUD = intrauterine device. LDL = low-density lipoprotein. NAFLD = nonalcoholic fatty liver disease. PMH = past medical history. T2DM = type 2 diabetes mellitus.
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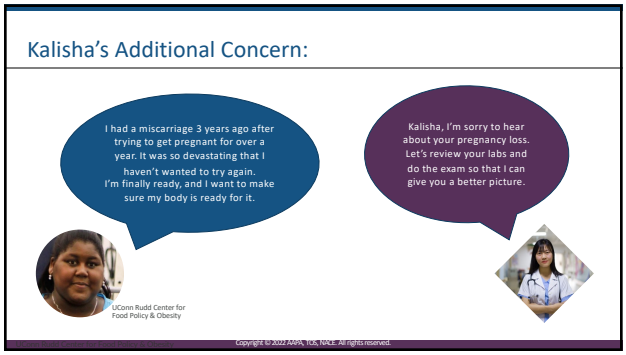
Kalisha's Additional Concern:
I had a miscarriage 3 years ago after trying to get pregnant for over a year. It was so devastating that I haven't wanted to try again. I'm finally ready, and I want to make sure my body is ready for it.
Kalisha, I'm sorry to hear about your pregnancy loss. Let's review your labs and do the exam so that I can give you a better picture.
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Polling Question

How would you classify and stage obesity for Kalisha according to the WHO and AACE?

A. Class 2, Stage 0
B. Class 3, Stage 0
C. Class 3, Stage 1
D. Class 3, Stage 2

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Assessment

- Class 3, Stage 1 obesity
- Prediabetes
- Hypertriglyceridemia
- Elevated liver enzymes
- Infertility, seeking pregnancy

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Polling Question

Which one of Kalisha's diagnoses should be addressed first?

A. Prediabetes
B. Infertility
C. Hypertriglyceridemia
D. Obesity
E. Elevated liver enzymes

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Assessment and Plan

- Well woman visit
  - Return to clinic (RTC) in 1 year
  - Seeking pregnancy; will defer to address obesity first
- Prediabetes
  - Start metformin 500 mg ER once daily x 2 weeks
  - Increase to 500 mg ER BID
  - Begin obesity treatment
- Hypertriglyceridemia
  - Begin obesity treatment
- Elevated liver enzymes
  - Begin obesity treatment
- Infertility with history of pregnancy loss
  - Begin obesity treatment
- Obesity
  - Return for obesity treatment

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Kalisha's First Obesity-Focused Appointment

	Weight (lbs)	BMI (kg/m²)	BP (mmHg)	P (bpm)
Initial	254.9	41.2	118/78	87

Medications

- Metformin 500 mg ER once daily X 2 weeks, well tolerated
- Mirena IUD

bpm = beats per minute. P = pulse.

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Evaluation

History

Physical

Labs

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Pertinent Information from Annual

Medical History	Family History	Physical Exam	Labs
• Prediabetes • Hypertriglyceridemia • Elevated liver enzymes • Infertility, seeking pregnancy	• Mother and father have obesity and hypertension • Mother has T2DM • Father has NAFLD	• BMI: 41.2 kg/m² • WC: 49 inches • Acanthosis nigricans	• A1c: 6.1% • Fasting glucose: 118 mg/dL • Triglycerides: 189 mg/dL • AST: 46 IU/L; ALT: 38 IU/L

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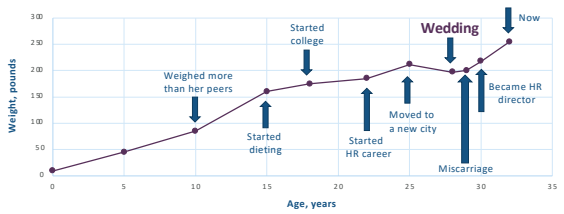
Kalisha's Weight Graph



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Weight History

Nutrition	Physical Activity
• First meal at 11 am—breakfast sandwich or pastry • Late afternoon—hungry, so grabs 1-2 pastries or donuts from the staff room • Dinner at 7 pm—take-out meal or protein, starch, and veggie • 10 pm—popcorn, candy, or ice cream	• Enjoys exercise, but limited by time • Walks for an hour with a friend on Saturday mornings • Previously went to a cardio class at the gym, but got out of the habit when work got stressful

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Weight History (cont'd)

Sleep / Stress

- Works as an HR director at a large firm
- Long hours—7:30 am-6:00 pm
- Sleeps midnight to 6 am, sleeps in on weekends

Support System

- Married for 4 years
- Husband has obesity—he will be supportive but will likely tempt patient to indulge with him
- Parents and friends will be moderately supportive

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Weight History (cont'd)

Previous Weight Loss Attempts

- Has tried all kinds of diets but can never stick to them
- Most have been low-calorie diets

How Weight Affects Function

- Walking has become more difficult with weight gain
- Feels self-conscious at the gym

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Assessment

1. Class 3, Stage 1 obesity
2. Prediabetes
3. Hypertriglyceridemia
4. Elevated liver enzymes
5. Infertility
6. Seeking pregnancy, but deferring for obesity treatment
7. Varied success with past weight loss attempts
8. Disordered eating in afternoon and evenings
9. Weight causing discomfort with physical activity
10. Inadequate sleep

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Kalisha's Stepwise Obesity Treatment Plan

- Low-carbohydrate eating plan
- Physical activity routine
- Adequate sleep
- Anti-obesity medications

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Plan

- Initiate low-carb eating plan
- Increase metformin to 500 mg ER BID
- RTC in 1 week

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One Week Later

	Weight (lbs)	Weight Change (lbs)	Total Weight Change (lbs)	BMI (kg/m²)	BP (mmHg)	P (bpm)
Initial	254.9	-	-	41.3	118/78	87
1 week	253.7	-1.2	-1.2	41.0	117/74	85

Medications

- Metformin 500 mg ER BID
- Mirena IUD

- Tolerated increased metformin dose well
- Implementing low-carb eating
- Reports less hunger before and after dinner
- Feels more energy and focus at work

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Plan

1. Continue current eating schedule
2. Add a 5-10 minute walk on 3 days per week
3. Continue 1000 mg metformin daily
4. RTC in 2 weeks

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Two Weeks Later

	Weight (lbs)	Weight Change (lbs)	Total Weight Change (lbs)	BMI (kg/m²)	BP (mmHg)	P (bpm)
Initial	254.9	-	-	41.3	118/78	87
1 week	253.7	-1.2	-1.2	41.0	117/74	85
3 weeks	250.1	-3.6	-4.8	40.2	116/77	85

Medications
- Metformin 500 mg ER BID
- Mirena IUD

- Mostly following low-carb eating plan
- Hunger well-controlled
- Initiated walking routine
- Tolerating metformin

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Plan

- Continue low-carb eating
- Increase weekday walks to 15 minutes on 3-4 days and continue weekend walks
- Shift bedtime to 15 minutes earlier (11:45 pm) for one week, then to 11:30 pm the next week
- Increase metformin to 1500 mg daily

- RTC in 2 weeks

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Two Weeks Later

	Weight (lbs)	Weight Change (lbs)	Total Weight Change (lbs)	BMI (kg/m²)	BP (mmHg)	P (bpm)
Initial	254.9	-	-	41.3	118/78	87
1 week	253.7	-1.2	-1.2	41.0	117/74	85
3 weeks	250.1	-3.6	-4.8	40.2	116/77	85
5 weeks	247.6	-2.5	-7.3	40.0	119/73	82

Medications
- Metformin 1500 mg ER daily
- Mirena IUD

- Following eating plan
- Hunger well-controlled
- Walked for 15 minutes, 3 days per week after lunch and weekend walk; well-tolerated
- Tolerating 1500 mg metformin

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Plan

Continue current eating plan

Increase weekday walks to 15 minutes daily

Shift bedtime to 15 minutes earlier once a week until falling asleep at 10:30 (wakes at 6:00 = 7.5 hours sleep)

Increase metformin to 2000 mg daily

Continue appointments once every 2 weeks

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At 3 Months of Treatment

	Weight (lbs)	Total Weight Change (lbs)	% Weight Loss	BMI (kg/m²)	BP (mmHg)	P (bpm)
Initial	254.9			41.3	118/78	87
3 Months	229.6	-25.3	10.1%	37.1	112/73	81

	A1c	Fast Glu (mg/dL)	Trig (mg/dL)	HDL-C (mg/dL)	LDL-C (mg/dL)	Chol (mg/dL)	AST (IU/L)	ALT (IU/L)
Initial	6.1	118	189	51	97	179	46	38
3 Months	5.7	99	147	55	93	174	32	21

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At 3 Months of Treatment

- Mostly following eating plan, but nibbling on carbs in the afternoon some days
- New onset carb cravings that start after lunch and continue until bedtime (open to trying AOM to manage)
- Walks 20-30 minutes daily, with a 1-hour walk on weekend
- Resumed weekly circuit class at gym
- Sleeps 10:30-6:00 on weeknights; 11:00-7:00 on weekends
- Tolerating 2000 mg metformin ER daily

AOM = anti-obesity medication.

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Polling Question

Which anti-obesity medications would you consider to address Kalisha's carbohydrate cravings that begin after lunch?

A. Phentermine-topiramate
B. Naltrexone-bupropion
C. Liraglutide 3.0 mg
D. Semaglutide 2.4 mg
E. Phentermine 15-37.5 mg
F. Phentermine 8 mg (Lomaira)

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Plan

- Continue current eating plan
- Increase walks to 45 minutes on weekdays; 1 hour on weekend
- Continue weekly circuit class
- Continue current sleep schedule
- Continue 2000 mg daily metformin
- Start phentermine 8 mg (Lomaira) 1 hour prior to lunch
  - If tolerated after 5-7 days, add a second Lomaira mid-afternoon
- RTC in 2 weeks

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Two Weeks Later

	Weight (lbs)	Weight Change (lbs)	Total Weight Change (lbs)	BMI (kg/m²)	BP (mmHg)	P (bpm)
Initial	254.9			41.3	118/78	87
3 Months	229.6	-25.3	10.1%	37.1	112/73	81
3 Mo + 2 Wks	226.3	-28.6	11.2%	36.6	110/71	85

Medications
- Metformin 500 mg ER BID
- Lomaira, 1 tab BID
- Mirena IUD

- Following eating plan
- No carb cravings or consumption since starting Lomaira
- Not sleeping soundly and staying up later since starting Lomaira
- Skipped some walks due to being too tired

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Plan

Discontinue Lomaira

Start 1 tablet naltrexone-bupropion once daily in the morning; if tolerated, increase to 1 tablet BID in 1-2 weeks

Continue current eating plan

Resume full physical activity routine

Resume previous sleep schedule

RTC in 2 weeks

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Two Weeks Later

	Weight (lbs)	Weight Change (lbs)	Total Weight Change (lbs)	BMI (kg/m²)	BP (mmHg)	P (bpm)
Initial	254.9			41.3	118/78	87
3 Months	229.6	-25.3	10.1 %	37.1	112/73	81
3 Mo + 2 Wks	226.3	-28.6	11.2%	36.6	110/71	85
3 Yr + 4 Wks	225.1	-29.8	11.7%	36.4	109/73	79

Medications
- Metformin 500 mg ER BID
- Naltrexone-bupropion: 1 tablet BID
- Mirena IUD

- Following eating plan
- No carb cravings or consumption
- Resumed previous physical activity routine
- Resumed previous sleep schedule

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Plan

- Continue current eating plan
- Continue current physical activity routine
- Continue current sleep schedule
- Continue metformin
- Titrate naltrexone-bupropion to 2 tablets BID
- Shift appointments to once every 4 weeks
  - RTC sooner if has more than a 3- to 4-pound weight gain or any challenges

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At 6 Months of Treatment

	Weight (lbs)	Total Weight Change (lbs)	% Weight Loss	BMI (kg/m²)	BP (mmHg)	P (bpm)
Initial	254.9			41.3	118/78	87
3 Months	229.6	-25.3	10.1 %	37.1	112/73	81
6 Months	216.3	-38.6	15.1%	35.0	108/72	79

	A1c	Fast Glu (mg/dL)	Trig (mg/dL)	HDL-C (mg/dL)	LDL-C (mg/dL)	Chol (mg/dL)	AST (IU/L)	ALT (IU/L)
Initial	6.1	118	189	51	97	179	46	38
3 Months	5.7	99	147	55	93	174	18	19
6 Months	5.4	92	132	56	96	171	15	18

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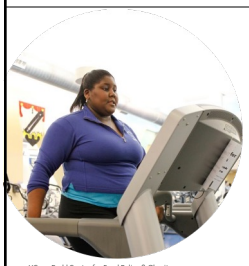
At 6 Months of Treatment



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- Mostly following eating plan
- Carb cravings resolved
- Continues walking / circuit class routine
- On track with sleep schedule
- Continues metformin 2000 mg daily
- Taking naltrexone-bupropion 2 tablets BID
- Feels better physically & emotionally
- Wants to continue active weight loss for another 6 months before having IUD removed
- Husband has lost 15 pounds

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At 1 Year

	Weight (lbs)	Total Weight Change (lbs)	% Weight Loss	BMI (kg/m²)	BP (mmHg)	P (bpm)
Initial	254.9			41.3	118/78	87
3 Months	231.6	-23.3	9.1 %	37.1	112/73	81
6 Months	219.3	-35.6	14.0%	35.0	108/72	79
1 Year	208.4	-46.5	18.2%	33.7	111/75	81

	A1c	Fast Glu (mg/dL)	Trig (mg/dL)	HDL-C (mg/dL)	LDL-C (mg/dL)	Chol (mg/dL)	AST (IU/L)	ALT (IU/L)
Initial	6.1	118	189	51	97	179	46	38
3 Months	5.7	99	147	55	93	174	18	19
6 Months	5.4	92	132	56	96	171	15	18
1 Year	5.3	96	122	57	93	170	16	20

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At 1 Year

- Mostly on track with low-carb eating
- Had a few lapses with processed / refined carbs, so increased appointment frequency to every 2 weeks until resolved
- Continues physical activity routine
- Continues sleep routine
- Ready to have IUD removed after discontinues AOM
- Will continue with monthly appointments

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At 3 Years

- Became pregnant 3 months after IUD removed
- Healthy pregnancy with 18-pound weight gain
- Vaginally delivered full-term baby girl
- Successful breastfeeding
- Resumed naltrexone-bupropion after completed breastfeeding
- Continued monthly appointments throughout pregnancy and beyond

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At 3 Years

	Weight (lbs)	Total Weight Change (lbs)	% Weight Loss	BMI (kg/m^2)	BP (mmHg)	P (bpm)
Initial	254.9	-		41.3	118/78	87
3 Months	231.6	-23.3	9.1 %	37.1	112/73	81
6 Months	219.3	-35.6	14.0%	35.0	108/72	79
1 Year	208.4	-46.5	18.2%	33.7	111/75	81
3 Years	205.3	-49.6	19.5%	33.2	118/76	84

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At 3 Years

	A1c	Fast Glu (mg/dL)	Trig (mg/dL)	HDL-C (mg/dL)	LDL-C (mg/dL)	Chol (mg/dL)	AST (IU/L)	ALT (IU/L)
Initial	6.1	118	189	51	97	179	46	38
3 Months	5.7	99	147	55	93	174	18	19
6 Months	5.4	92	132	56	96	171	15	18
1 Year	5.3	96	122	57	93	170	16	20
3 Years	5.4	93	119	56	101	174	17	18

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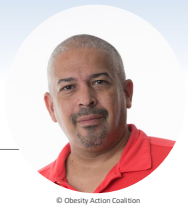
Case 2: Renaldo



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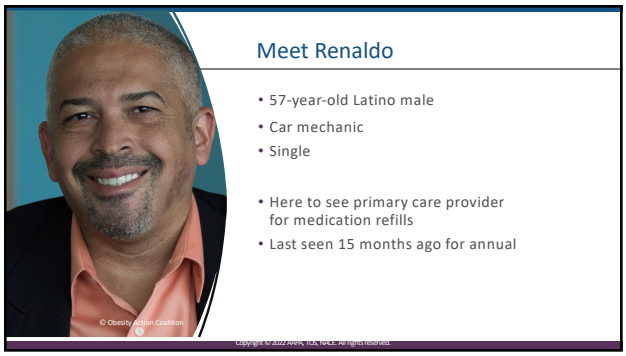
Meet Renaldo
• 57-year-old Latino male
• Car mechanic
• Single
• Here to see primary care provider for medication refills
• Last seen 15 months ago for annual
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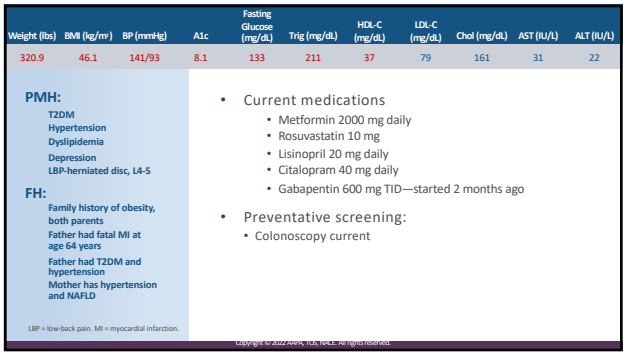
Weight (lbs) BMI (kg/m²) BP (mmHg) A1c Fasting Glucose (mg/dL) Trig (mg/dL) HDL-C (mg/dL) LDL-C (mg/dL) Chol (mg/dL) AST (IU/L) ALT (IU/L)
320.9 46.1 141/93 8.1 133 211 37 79 161 31 22
PMH:
T2DM
Hypertension
Dyslipidemia
Depression
LBP-herniated disc, L4-5
FH:
Family history of obesity, both parents
Father had fatal MI at age 64 years
Father had T2DM and hypertension
Mother has hypertension and NAFLD
LBP = low-back pain. MI = myocardial infarction.
• Current medications
• Metformin 2000 mg daily
• Rosuvastatin 10 mg
• Lisinopril 20 mg daily
• Citalopram 40 mg daily
• Gabapentin 600 mg TID—started 2 months ago
• Preventative screening:
• Colonoscopy current
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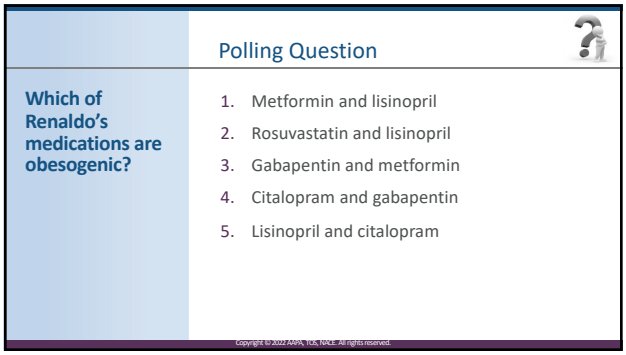
Polling Question
Which of Renaldo's medications are obesogenic?
1. Metformin and lisinopril
2. Rosuvastatin and lisinopril
3. Gabapentin and metformin
4. Citalopram and gabapentin
5. Lisinopril and citalopram
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Past Medical History

- No diabetes follow-up or labs for 15 months
- Started to get low on medications a few months ago, so decreased doses or only took every 2-3 days
- Developed severe LBP with sciatica 3 months ago
  - Evaluated by ortho—herniated disc, L4-5
  - Referred to PT, but patient hasn't made an appointment
  - Prescribed gabapentin for pain
- Decreased mobility due to LBP
- Depression worsened with LBP and decreased mobility
- Weight gain since onset of LBP

PT = physical therapy.

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Polling Question

How would you classify and stage obesity for Renaldo according to the WHO and AACE?

A. Class 2, stage 0
B. Class 3, stage 0
C. Class 3, stage 1
D. Class 3, stage 2

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Assessment

- Class 3, Stage 2 obesity with weight gain of 32.3 pounds in the last 15 months
- Type 2 diabetes, not controlled, with inconsistent follow-up
- Hypertension, not fully controlled with inconsistent medication dosing
- Dyslipidemia, with elevated triglycerides and suppressed HDL
- Depression worsened
- LBP with herniated disc, L4-5
- Not fully adherent to medications

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Assessment and Plan

1. Obesity
   - Begin non-surgical obesity treatment
   - Consider bariatric surgery in the future
2. Diabetes
   - Restart and titrate metformin ER to 2000 mg daily
   - Once tolerating metformin, start semaglutide and titrate to 1.0 mg weekly
   - Begin obesity treatment
3. Hypertension
   - Resume daily lisinopril
   - Begin obesity treatment
4. Dyslipidemia
   - Resume daily rosuvastatin
   - Begin obesity treatment
5. Depression
   - Resume daily citalopram
   - Begin obesity treatment
6. LBP
   - Start PT
   - Begin obesity treatment

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Renaldo's First Obesity-Focused Appointment

	Weight (lbs)	BMI (kg/m²)	BP (mmHg)	P (bpm)
Initial	319.3	45.9	132/88	99

Medications

- Taking full doses of all medications

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Initial Treatment Strategy

Treat obesity first

Treat diabetes in a manner that optimizes obesity treatment

Use anti-diabetes medications that:

- Don't cause weight gain
- Promote weight loss

Reduce LBP

- Reduce weight
- Add PT

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Plan

- Initiate low-carb eating plan
- Continue metformin 2000 mg ER daily
- Start semaglutide 0.25 mg once weekly
- Schedule PT for LBP

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Two Weeks Later

	Weight (lbs)	Weight Change (lbs)	Total Weight Change (lbs)	BMI (kg/m²)	BP (mmHg)	P (bpm)
Initial	319.3			45.9	132/88	99
2 weeks	318.0	-1.3	-1.3	45.7	124/82	85

Medications

- Metformin 2000 mg ER daily
- Semaglutide 0.25 mg weekly
- Lisinopril 20 mg daily
- Rosuvastatin 20 mg daily
- Citalopram 40 mg daily
- Gabapentin 600 mg TID

- Implemented low-carb eating
- Tolerated 0.25 semaglutide
- No reduction in LBP
- Had first PT appointment, will continue twice weekly

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Plan

1. Continue low-carb eating
2. Continue current medications
3. Continue PT twice weekly
4. RTC in 2 weeks

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Two Weeks Later

	Weight (lbs)	Weight Change (lbs)	Total Weight Change (lbs)	BMI (kg/m^2)	BP (mmHg)	P (bpm)
Initial	319.3			45.9	132/88	99
2 weeks	318.0	-1.3	-1.3	45.7	128/82	85
4 weeks	313.4	-4.6	-5.9	45.0	120/81	88

Medications

- Metformin 2000 mg ER daily
- Semaglutide 0.25 mg weekly
- Lisinopril 20 mg daily
- Rosuvastatin 20 mg daily
- Citalopram 40 mg daily
- Gabapentin 600 mg TID

- Mostly following low-carb eating plan
- Mild appetite reduction
- Continues PT twice weekly
- LBP reduced
- Tolerating semaglutide

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Plan

Continue low-carb eating

Continue PT twice weekly

Add a 5-minute daily walk

Increase semaglutide to 0.5 mg weekly

- RTC in 2 weeks

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Continue Stepwise Comprehensive Treatment Plan

Nutrition

Continue low-carb eating

Physical activity

Gradually increase as tolerated

Behavior

Encourage adherence to medications and appointments

Pharmacotherapy

- Increase semaglutide to 1.0 mg
- Transition from obesogenic medications to those that are weight neutral or weight negative or discontinue if able
  - Citalopram
  - Gabapentin
- Add AOM

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Polling Question

Which anti-obesity medications would you consider for Renaldo?

1. Phentermine-topiramate
2. Naltrexone-bupropion
3. Liraglutide 3.0 mg
4. Semaglutide 2.4 mg
5. Phentermine 15-37.5 mg
6. Phentermine 8 mg (Lomaira)

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At 3 Months of Treatment

	Weight (lbs)	Total Weight Change (lbs)	% Weight Loss	BMI (kg/m²)	BP (mmHg)	P (bpm)
Initial	319.3			45.9	132/88	99
3 Months	294.0	-25.3	7.9%	42.2	116/77	81

Medications

- Metformin 2000 mg ER daily
- Semaglutide 1.0 mg weekly
- Lisinopril 20 mg daily
- Rosuvastatin 20 mg daily
- Bupropion 300 mg XL daily
- Gabapentin 300 mg TID

	A1c	Fast Glu (mg/dL)	Trig (mg/dL)	HDL-C (mg/dL)	LDL-C (mg/dL)	Chol (mg/dL)	AST (IU/L)	ALT (IU/L)
Initial	8.1	133	211	37	79	161	31	22
3 Months	6.9	112	183	34	71	159	32	21

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At 3 Months of Treatment

- Fairly adherent to low-carb eating
- Walking 10 minutes daily, exercise bike 3x/wk x 10 minutes
- Taking all medications and attending appointments
- Transitioned from citalopram to bupropion, depression improved
- LBP significantly improved, slowly tapering off gabapentin (50% of previous dose)
- Released from PT; following up with ortho
- Mobility improved

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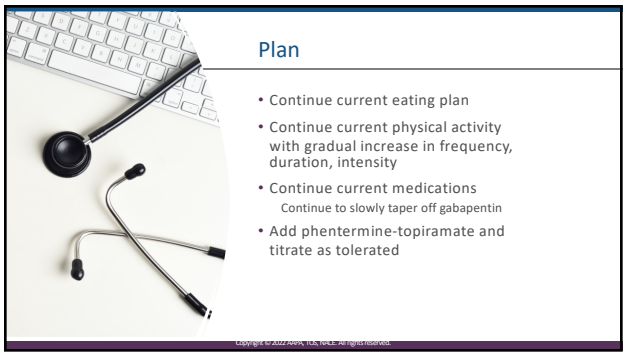
Plan
• Continue current eating plan
• Continue current physical activity with gradual increase in frequency, duration, intensity
• Continue current medications
Continue to slowly taper off gabapentin
• Add phentermine-topiramate and titrate as tolerated
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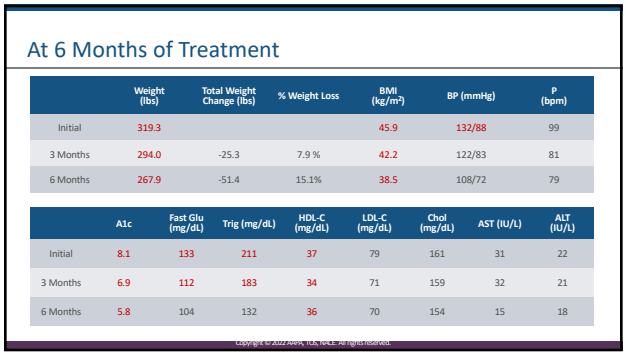
At 6 Months of Treatment
Weight (lbs) | Total Weight Change (lbs) | % Weight Loss | BMI (kg/m²) | BP (mmHg) | P (bpm)
Initial | 319.3 | | | 45.9 | 132/88 | 99
3 Months | 294.0 | -25.3 | 7.9 % | 42.2 | 122/83 | 81
6 Months | 267.9 | -51.4 | 15.1% | 38.5 | 108/72 | 79
A1c | Fast Glu (mg/dL) | Trig (mg/dL) | HDL-C (mg/dL) | LDL-C (mg/dL) | Chol (mg/dL) | AST (IU/L) | ALT (IU/L)
Initial | 8.1 | 133 | 211 | 37 | 79 | 161 | 31 | 22
3 Months | 6.9 | 112 | 183 | 34 | 71 | 159 | 32 | 21
6 Months | 5.8 | 104 | 132 | 36 | 70 | 154 | 15 | 18
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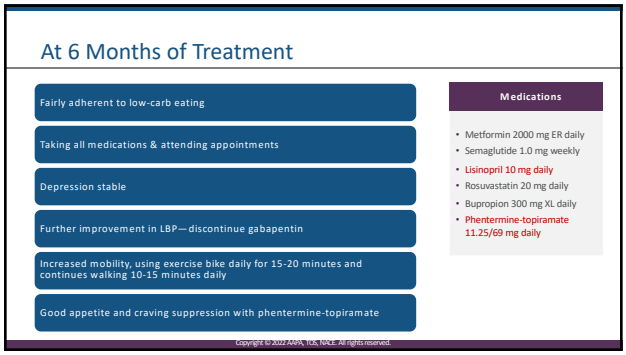
At 6 Months of Treatment
Fairly adherent to low-carb eating
Taking all medications & attending appointments
Depression stable
Further improvement in LBP—discontinue gabapentin
Increased mobility, using exercise bike daily for 15-20 minutes and continues walking 10-15 minutes daily
Good appetite and craving suppression with phentermine-topiramate
Medications
• Metformin 2000 mg ER daily
• Semaglutide 1.0 mg weekly
• Lisinopril 10 mg daily
• Rosuvastatin 20 mg daily
• Bupropion 300 mg XL daily
• Phentermine-topiramate 11.25/69 mg daily
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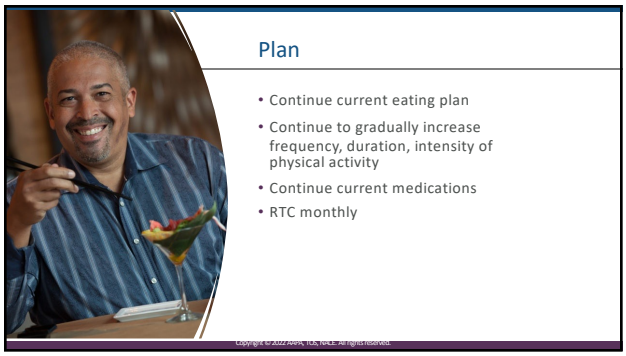

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At 1 Year of Treatment

	Weight (lbs)	Total Weight Change (lbs)	% Weight Loss	BMI (kg/m²)	BP (mmHg)	P (bpm)
Initial	319.3			45.9	132/88	99
3 Months	294.0	-25.3	7.9 %	42.2	122/83	81
6 Months	267.9	-51.4	15.1%	38.5	108/72	79
1 Year	263.1	-56.2	17.6%	37.8	115/76	81

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At 1 Year of Treatment

	A1c	Fast Glu (mg/dL)	Trig (mg/dL)	HDL-C (mg/dL)	LDL-C (mg/dL)	Chol (mg/dL)	AST (IU/L)	ALT (IU/L)
Initial	8.1	133	211	37	79	161	31	22
3 Months	6.9	112	183	34	71	159	32	21
6 Months	5.8	104	132	36	70	154	15	18
1 Year	6.0	113	154	35	77	161	22	19

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At 1 Year of Treatment

Continued to lose weight until 2 months ago when he stopped taking phentermine-topiramate and regained 8 pounds

Started eating more ultra-processed carbs

LBP worsened with regain

No walking and decreased exercise bike to 15 minutes "a few days a week"

Missed last month's follow-up appointment due to shame about regaining weight

Ready to refocus, so returned for follow-up

Open to bariatric surgery referral

Medications

- Metformin 2000 mg ER daily
- Semaglutide 1.0 mg weekly
- Lisinopril 10 mg daily
- Rosuvastatin 20 mg daily
- Bupropion 300 mg XL daily
- Phentermine-topiramate 11.25/69 mg daily (but not taking)

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Plan

Restart phentermine-topiramate and titrate to previous dose

Resume all previous lifestyle habits

Refer to bariatric surgery

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At 3 Years of Treatment

	Weight (lbs)	Total Weight Change (lbs)	% Weight Loss	BMI (kg/m^2)	BP (mmHg)	P (bpm)
Initial	319.3			45.9	132/88	99
3 Months	294.0	-25.3	7.9 %	42.2	122/83	81
6 Months	267.9	-51.4	15.1%	38.5	108/72	79
1 Year	263.1	-56.2	17.6%	37.8	115/76	81
3 Years	218.7	-100.6	31.5%	31.4	111/72	76

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At 3 Years of Treatment

	A1c	Fast Glu (mg/dL)	Trig (mg/dL)	HDL-C (mg/dL)	LDL-C (mg/dL)	Chol (mg/dL)	AST (IU/L)	ALT (IU/L)
Initial	8.1	133	211	37	79	161	31	22
3 Months	6.9	112	183	34	71	159	32	21
6 Months	5.8	104	132	36	70	154	15	18
1 Year	6.0	113	154	35	77	161	22	19
3 Years	5.4	104	115	38	71	155	14	16

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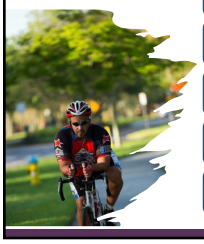
3 Years Later



- Gastric sleeve 18 months ago
- Continues low-carb eating
- Exercise and road bike 30-60 minutes daily with strength training 2x/wk
- Continues phentermine-topiramate daily
- Returns for follow-up every 3 months, with instructions to return sooner if has regain of >5 pounds

Medications

- Metformin 1000 mg ER daily
- Semaglutide 1.0 mg weekly
- Lisinopril 5 mg daily
- Rosuvastatin 5 mg daily
- Bupropion 150 mg XL daily
- Phentermine-topiramate 11.25/69 mg daily
- Multivitamin

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Key Take-away Points

01 Excess adiposity causes obesity-related complications

02 When you treat obesity first, complications improve or resolve

03 Obesity treatment should be implemented in a comprehensive, stepwise manner

04 Utilize treatments that improve both obesity & obesity-related complications

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