



# Obesity

Developed August 2023



# Disclosures

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None

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None



# Agenda

- Defining & Measuring Obesity
- Epidemiology of Adult Obesity
- Neurobiology of obesity
- Weight Bias
- Treatment: Psychological, Pharmacological, Surgical
- Obesity Inducing Medications
- the Obesity Care Clinic
- Case Study



## Obesity Definition

*Obesity is a chronic disease in which excessive and/or dysfunction adipose tissue impairs health, increases comorbidities, and increases mortality*

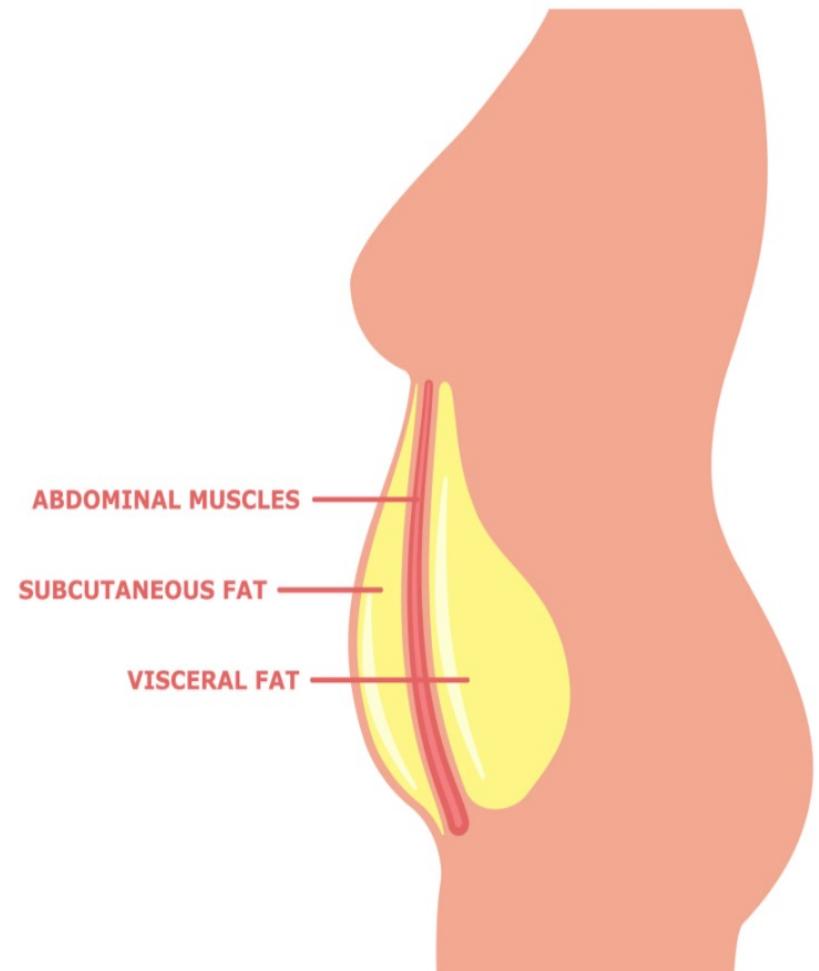
*Excessive or dysfunctional adipose tissue is caused by a complex interaction between biology, genetics and epigenetics, environment, our use of energy, and psychological factors*

*Recognized as a chronic disease by the World Health Organization in 1997, the Canadian Medical Association in 2015, and Doctors Nova Scotia in 2023*

Twells et al., 2020

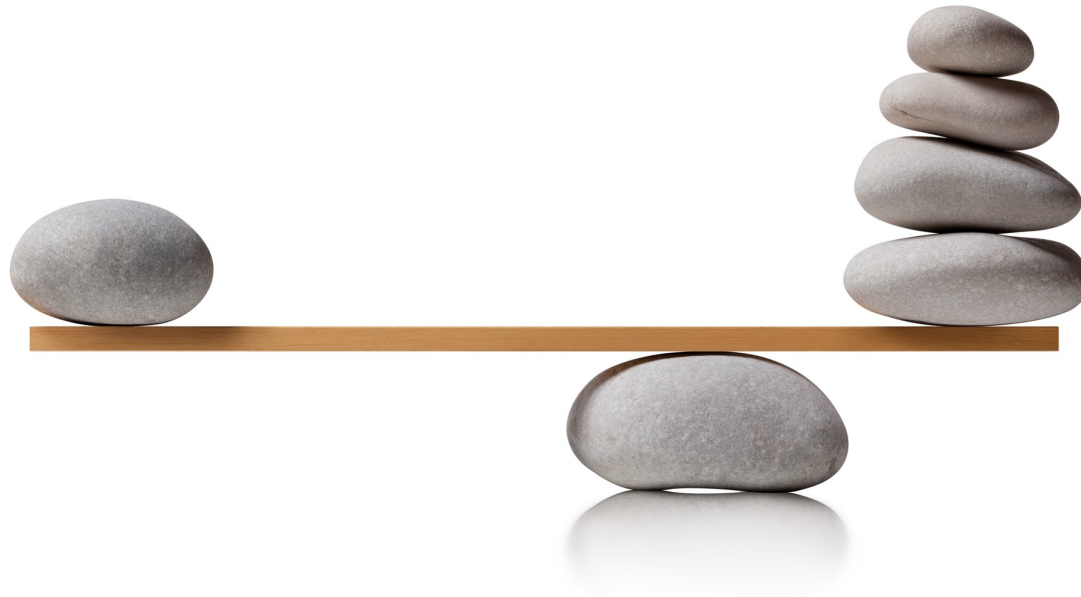
# Adipose Tissue

- Visceral adiposity and ectopic fat in the liver, muscle, and epicardium can cause:
  - Cell hypoxia
  - Increased adipokines
  - Decreased circulating adiponectin





# Measuring Obesity



# BMI

- Limited individual use
- Useful to screen for obesity, track changes over time, as measure on the population level
- WHO classification

BMI	Obesity Class
30.0-34.9	Class I
35.0-39.9	Class II
> 40	Class III

WHO, 2010

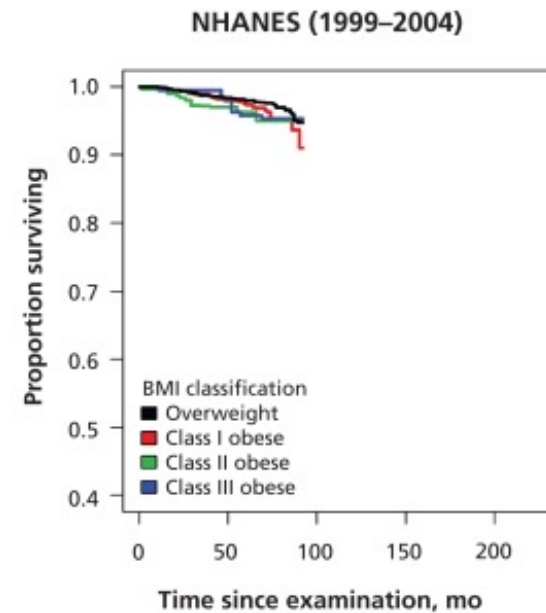
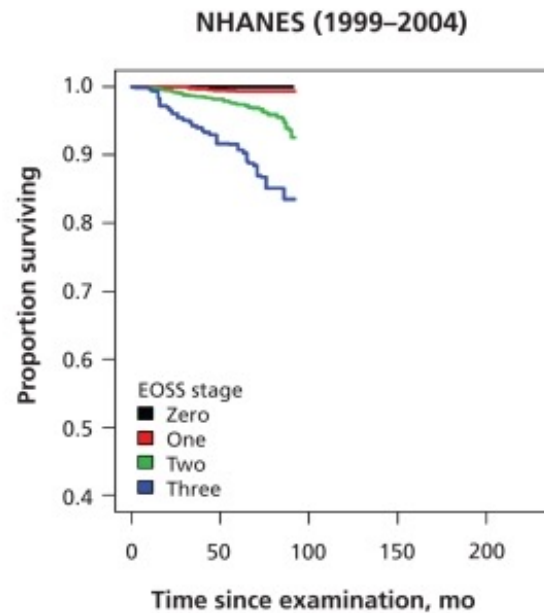
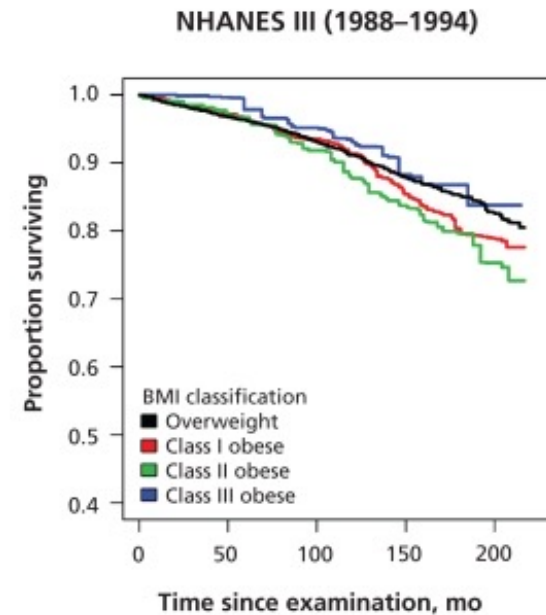
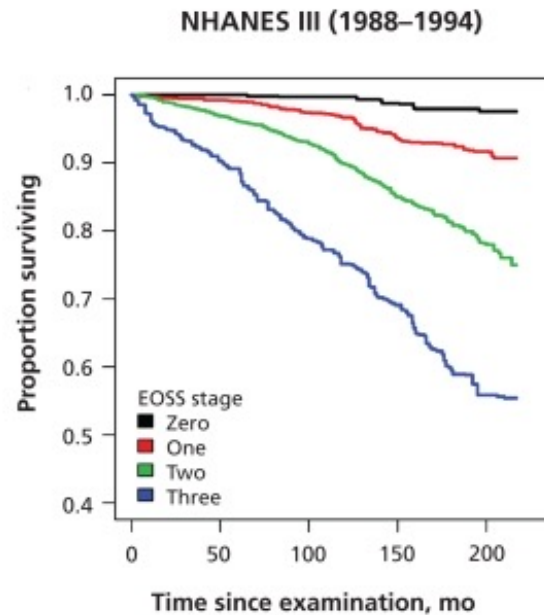


# Edmonton Obesity Staging System

Stage	Description
0	No sign of obesity related risk factors, physical, psychological limitations, or functional limitations
1	Subclinical obesity related risk factors or mild physical/psychological symptoms
2	Established obesity related comorbidities or moderate obesity related psychological symptoms or functional limitations
3	Significant obesity related end-organ damage, functional limitations, or impairment of wellbeing
4	Severe obesity related comorbidities, disabling psychological symptoms, or severe functional limitations



Data from the NHANES study comparing EOSS and BMI





# Health Risks of Obesity

- cardiovascular disease and cancer – resulting in shortened life expectancy by 6-14 years
  - Increased risk of colon, renal, esophageal and pancreatic cancer, endometrial and post-menopausal breast cancer in women
- pregnancy co-morbidities, obstructive sleep apnea, diabetes, gall bladder disease, and gout
- 3x increased risk of osteoarthritis
- chronic pain, depression, anxiety, and functional limitations, decreased quality of life



# Prevalance

- In Canada similar across all ages and genders
- People who are disadvantaged and women are at a slightly higher risk
- In Canada, obesity rates are 3X higher than they were in 1985
- As of 2020, % of population who self-declared they were living with obesity
  - In Canada, 28%
  - In Nova Scotia, 34.7%
  - In Eastern Zone, 42%



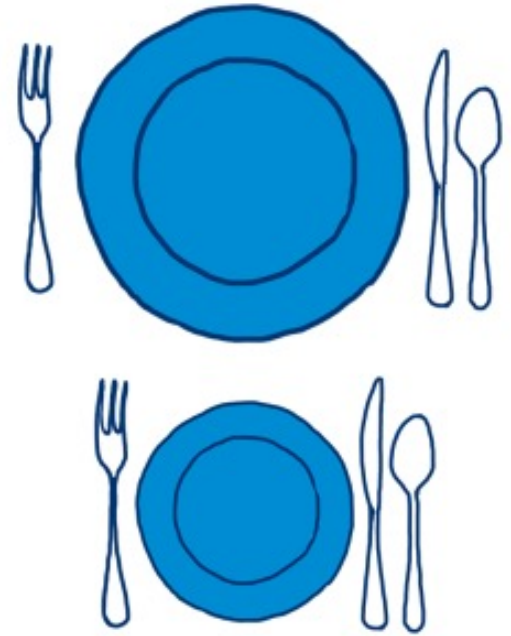
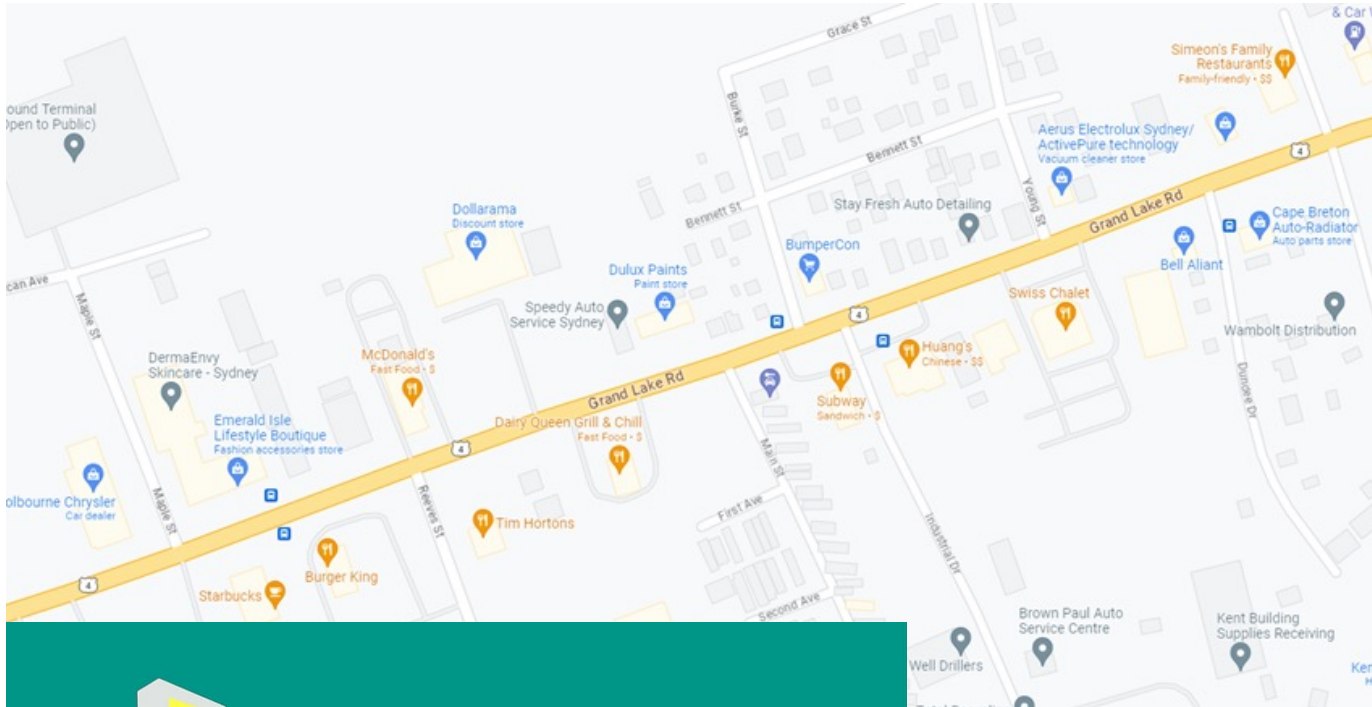
## Prevalance

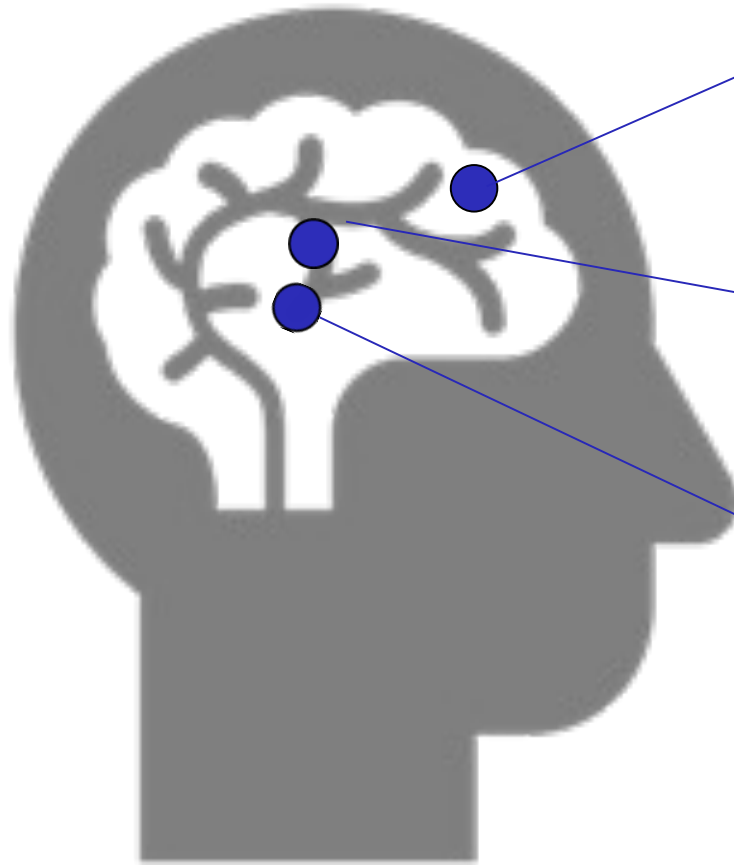
- Obesity rates vary amongst different ethnicities
- Adult obesity rates are similar for Inuit, Metis, and off-reserve First Nations people (between 23.9-26.4%)
- First Nations living on reserve have higher rates of obesity (36%)
- People of West, South, and East Asian ethnicities have lower rates of obesity; however cardiometabolic health risks are increased at lower BMIs in these populations

Twells et al., 2020

# Neurobiology of Obesity







Cognitive Lobe

Mesolimbic System

Hypothalamus



# The Hypothalamus



- Regulates energy intake and expenditure via two sets of neuronal populations in the arcuate nucleus
- Drives hunger and food seeking behaviour in response to activation of Agouti-related protein (AgRP) and neuropeptide Y (NPY) by hormone signals from the gut (ghrelin) and adipose tissue (leptin)
  - Weight loss causes less leptin to be produced therefore appetite is increased and energy expenditure is decreased after a period of weight loss
- Suppresses food intake via the pro-opiomelanocortin (POMC) and the cocaine-and-amphetamine regulated transcript (CART) system also in response to hormone signals from the gut (GLP-1, PYY, CCK) and peripheral organs (PP).



# The Mesolimbic System

- Hedonic center – provides emotional, pleasurable, reward-based aspect of eating
- Dopamine is released in the brain in response to emotional or environmental triggers
- Endocannabinoid and opioid signals released after food consumption are the cause of the pleasurable association with eating



# The Cognitive Lobe

- Executive functioning responsible to override signals from the hypothalamus and mesolimbic system
- Functions optimally in periods of low stress, adequate rest, and proper oxygenation
- Comprised of automatic responses and higher level executive function





## Messaging to Patients

- Hypothalamus
  - the thermostat of appetite control; it notices and responds to changes and turns off when everything is status quo
  - Outside our control without use of medication
- Mesolimbic System
  - Motivational center of appetite control; associates eating with pleasure
  - Allows us to eat past the point of satiety
  - Outside of our control without use of medication
- Cognitive Lobe
  - The only part of the appetite system that we can control
  - This is where we can use cognitive behavioural therapy to treat obesity

# Weight Bias



[This Photo](#)

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# Weight Bias

- 40% of adults report experiencing weight bias from family, teachers, employers, and health care professionals
- Weight discrimination is associated with physical and psychological consequences
- People experiencing weight bias in their interactions with health care professionals are less likely to engage in preventative health care

# Weight Bias

- Assess and reflect on our own attitudes and beliefs related to obesity
- Avoid using stigmatizing language and images
- Avoid making assumptions that healthy behaviors will or should result in weight change
- Ensure clinical environment is accessible, safe and respectful for all patients regardless of weight of size



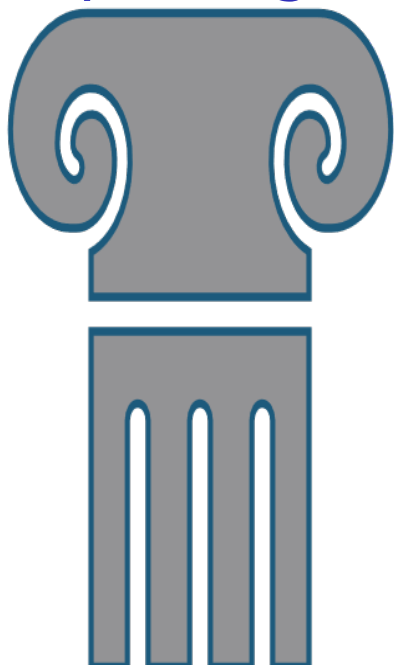


# Obesity Treatment

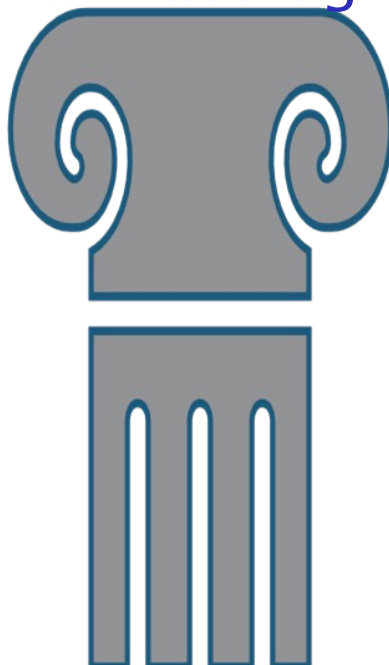


# Pillars of Obesity Treatment

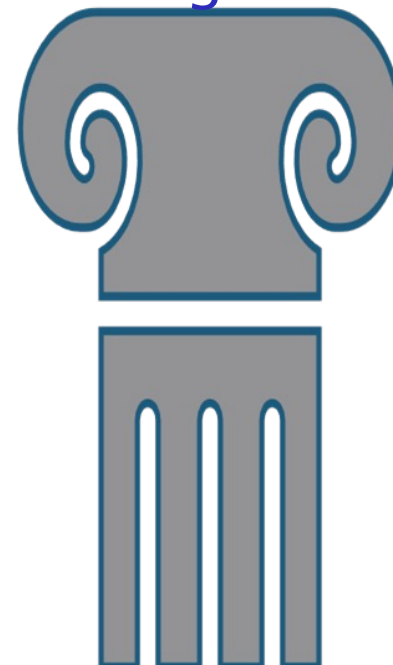
Psychological



Pharmacological



Surgical



Medical Nutrition Therapy

Physical Activity

Behaviour Change





# Psychological Treatment in Primary Care

- consider incorporating the 5As to support behaviour change
  - Ask permission to discuss weight; ask if the person sees their weight as an issue
  - Assess – determine the root cause of obesity
  - Advise – educate on concerns with obesity, how to achieve modest weight loss, and other treatment options
  - Agree – on a goal and treatment plan
  - Assist – educate, follow up, refer

# OBESITY IN ADULTS

A clinical practice guideline



BMIs are NOT AN ACCURATE TOOL FOR IDENTIFYING OBESITY-RELATED COMPLICATIONS

**Identify** individuals at greatest risk of developing or having complications from obesity

Factors:

- Health
- Quality of life
- Risks

People with obesity experience weight gain over years

Increased morbidity and mortality independent of weight or BMI

**Recognize** settings that present the highest risk for poor health outcomes of individuals

**Engage** primary care providers in obesity management

## THE PATIENT JOURNEY IN OBESITY MANAGEMENT

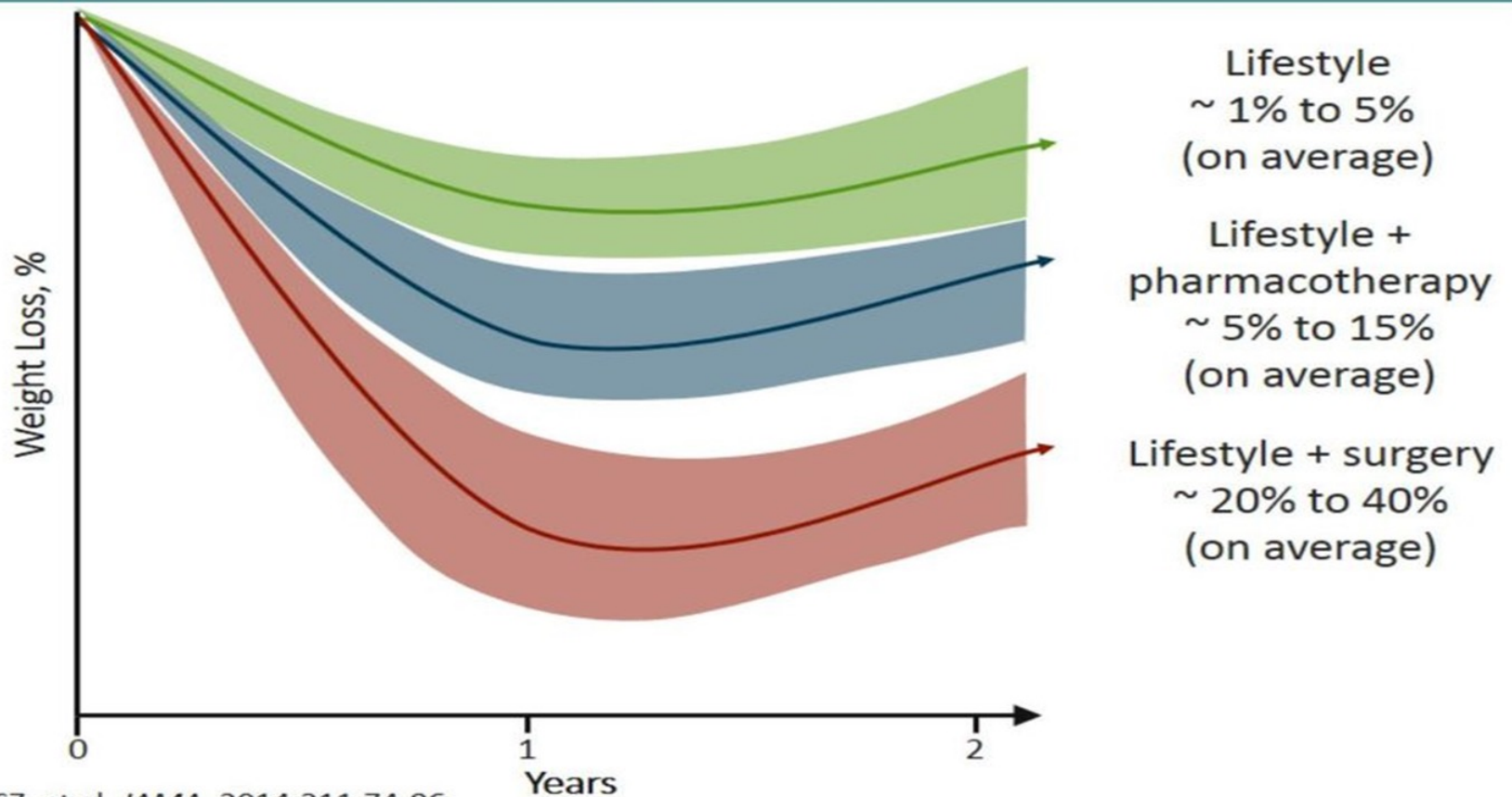


# Psychological Treatment in Primary Care

- cognitive behavioural therapy
- supporting the concept of best weight
- addressing self bias
- internalized weight bias
- manage expectations



# Obesity Treatment Success: Percentage Body Weight Lost



Yanovski SZ, et al. *JAMA*. 2014;311:74-86.  
Mechanick JL, et al. *Surg Obes Related Disord*. 2013;9:159-191.



# Medication Treatment of Obesity

- Indications:
  - BMI greater than 30
  - BMI 27-30 with an adipose related co-morbidity
- Things to Consider
  - Individual goals and expectations
  - Cost
  - Co-morbidities
  - Preferences
  - Behaviours

Medication	Action	Contraindications	Cost	Effect on Weight Loss at 1 year
orlistat 120mg TID	Inhibits breakdown of dietary triglycerides	Cholestasis, chronic malabsorption syndrome, pregnant or breastfeeding	~ \$100 per month	-2.9%
naltrexone/bupropion 16/180mg BID CONTRAVE  Start 1 tab daily. Increase by 1 tab weekly until 2tabs bid	Induces satiety by stimulating endorphins in the arcuate nucleus & blocking opioid receptor sites allowing more circulating endorphins	Uncontrolled hypertension, seizures or seizure risk, opioid or MAO-I use, liver failure, renal failure, pregnant or breastfeeding	~\$300 per month	-4.8%
liraglutide 3mg daily  SAXENDA Start 0.6mg Increase weekly	Acts on the POMC CART neurons to promote satiety and reduce hunger; transient delay in stomach emptying	Personal or family history of medullary thyroid cancer, personal history of MEN-2, pregnant or breastfeeding	~\$500 per month	-5.4%
Semaglutide/OZEMPIC 2.4mg  Start 0.25mg wkly Increase q4wks	Acts on the POMC CART neurons to promote satiety and reduce hunger; transient delay in stomach emptying	Personal or family history of medullary thyroid cancer, personal history of MEN-2, pregnant or breastfeeding	TBD	-12.5%

## New Medications

### Dual Acting "BI-agonist":

GLP-1 + GIP (Gastric Inhibitory Polypeptide). **TIRZEPATIDE/Mounjaro**

Possibly more effective by enhancing GLP-1 effects also additional actions on adipose and glucagon

Overall ↑ Insulin sensitivity, ↑ lipid breakdown

Was superior to Ozempic 1 mg in head to head.

**"TRIAGONIST": GLP+GIP+Glucagon receptor. RETATRUTIDE**

**In Phase 3 trials now.**

**MOA includes increased energy expenditure. Also some effect at liver.**

# Medication Follow Up



- Slowly titrate medication up to therapeutic dose
- Monitor for side effects
- Do not increase dose of GLP-1s if side effects are still bothersome
- Reassess weight in 3 months
  - Consider adding medication or changing if no change
- Medication treatment can be lifelong

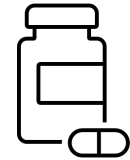


# Additional Benefits of Medication

- Medication treatment may also be associated with improvements in blood pressure, pre-diabetes, cholesterol, sleep apnea, NAFLD, physical function, and quality of life



# Obesity Inducing Medications



- Antidiabetics
  - Metformin, DPP4i, GLP-1s, and SGLTs are weight neutral compared to insulin, SUs
- Antidepressants
  - Most obesogenic SSRIs are fluoxetine and paroxetine
  - Mirtazepine
  - Consider using sertraline, duloxetine, venlafaxine, bupropion
- Antipsychotics
  - Aripiprazole, lurasidone, and ziprasidone are weight neutral
  - Risperidone is less obesogenic than quetiapine

# Bariatric Surgery

- Gastric sleeve surgery in Halifax
- Halifax Obesity Network
- Criteria:
  - BMI 40-60 regardless of comorbidities
  - BMI 35-39.9 with an adipose related comorbidity
  - BMI 30-34.9 who have exhausted all other options with no success
  - Never had gastric surgery previously
  - Non-smoker for 6 months
- Recommended to avoid pregnancy for 12-18 post operatively

## Pathway to Bariatric Surgery

Please fax completed document to 902-425-8292

Patient Name: \_\_\_\_\_  
 Health Card Number: \_\_\_\_\_  
 DOB: \_\_\_\_\_

Onset of Obesity: <age 10, 11-19, >age 19 (circle)

WLS Program Start Date: \_\_\_\_\_  
 (date patient began following these orders)

The following orders are to direct GPs and NPs who are working with patients to prepare for Weight Loss Surgery (WLS) in NSH Primary Care areas.

### Baseline Clinical data:

Weight (lbs.): \_\_\_\_\_  
 Height (feet): \_\_\_\_\_  
 BMI: \_\_\_\_\_  
 BP: \_\_\_\_\_  
 Waist circumference (inches): \_\_\_\_\_

Labs: (at least once and Q 3m as appropriate)  
 Include: CBC, ac glucose, A1c, BUN, Creatinine, CRP, HDL, LDL, Triglycerides, Ratio, Ca+, AST, ALT, Alk Phos, GGT, Vitamin B12, Vitamin D, TSH  
 \*Copy to Kara Evers NP, Fax 902-425-8292

### Co-morbidities:

- Diabetes/Prediabetes
- HTN
- Dyslipidemia
- Sleep Apnea (C-Pap Y or N)
- Reflux
- Chronic pain
- Awaiting Hip or Knee Replacement
- Asthma/COPD
- Chronic skin infections
- History of MI or Stroke
- Depression/ History of Depression
- Thyroid disease
- Fatty Liver Disease
- Cholecystectomy
- Other \_\_\_\_\_

Smoker: Yes or No

If Yes—Smoking cessation plan needed as patients must be smoke free for **6 months** prior to WLS

### Psychological Assessment:

- Motivated for behavior change
- Not motivated for behavior change
- Emotional eating
- Stress eating
- Mindless eating
- History of suicide attempts
- History of emotional abuse
- History of physical abuse
- History of sexual abuse
- History of binge eating
- History of skipping meals
- History of drug or alcohol abuse

### Obesity Medication Management

#### Considerations:

- Saxenda with WLS Program Diets
- Xenical with WLS Program Diets
- Contrave with WLS Program Diets
- Wegovy with WLS Program Diets

### Instructions for Patients ready to begin WLS Program:

- Go to the Halifax Obesity Network and assemble a binder with information posted on the website under the category Information/Handouts
- Watch posted videos on the website of the Bariatric Surgery Team
- Book monthly appointments with GP/NP for assessment
- Connect with community supports as appropriate. (psychologist, personal trainer, physiotherapist, dietitian, nurse)
- Complete labs Q 3m

### Communication with WLS Team:

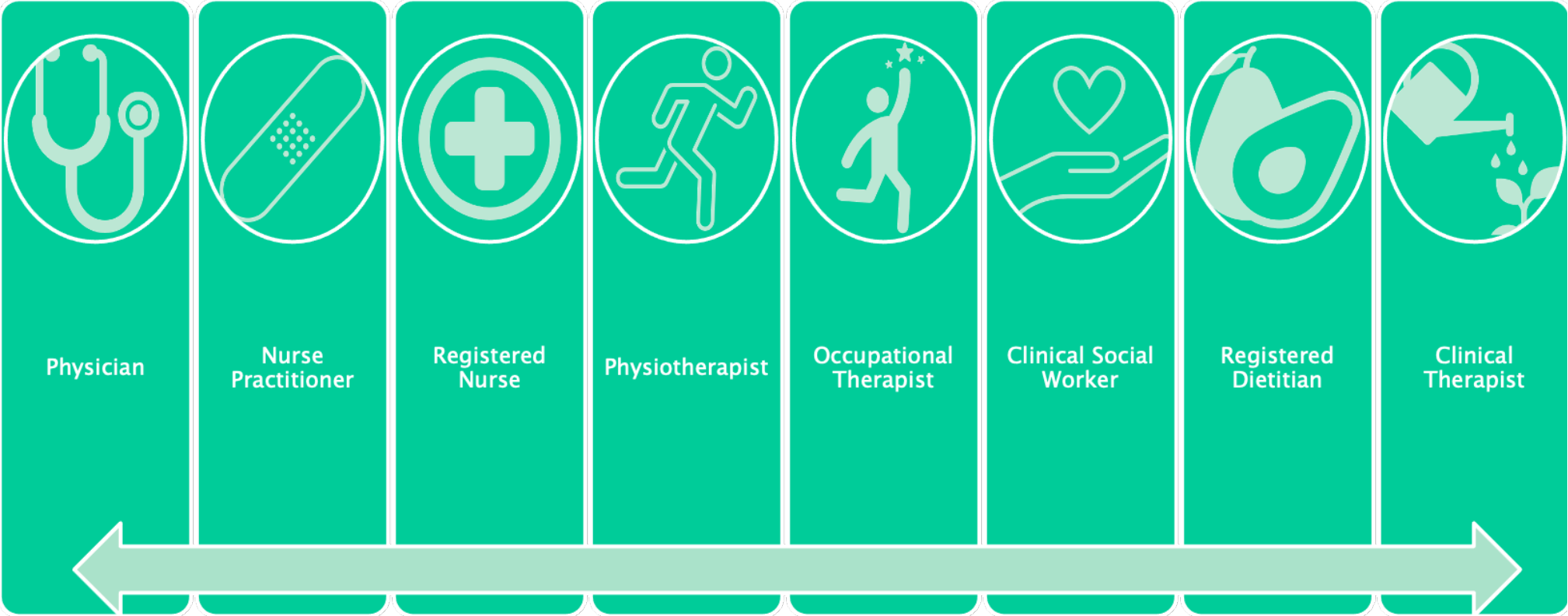
- Ready to be seen. **My patient has followed the Program for 3 consecutive months with success**

\_\_\_\_\_ Date

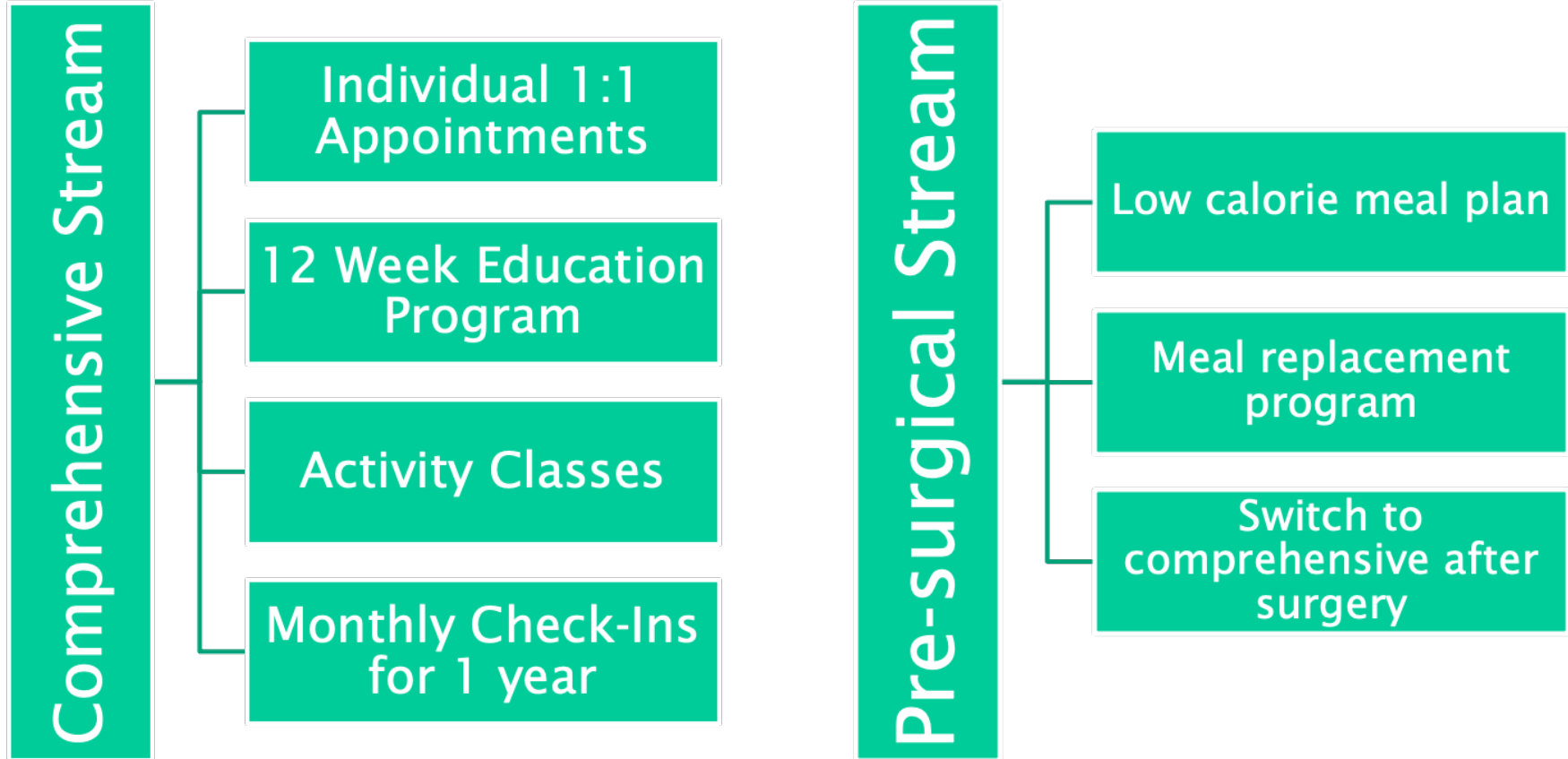
\_\_\_\_\_ Physician/NP Name (Print)

\_\_\_\_\_ Physician/NP Signature

# Obesity Care Clinic Team



# Obesity Care Clinic Program



# 12 Week Education Session Topics

- Internalized Weight Bias
- Best Weight
- Science, Medication and Bariatric Surgery
- Behavior Change
- Values and SMART Goals
- Body Image and Body Acceptance
- Physical Activity
- Eating for Health
- Sleep, Energy Management, Activities of Daily Living & Skin Health
- Food Skills
- How to Succeed When Eating at Home
- Stress, Cravings and Resilience

# Measuring Success

- Increased quality of life and self esteem
- Increased energy
- Increased mobility
- Improved overall health
- Decrease medications
- Weight or body composition change
- Improved mental health



# Referral Process

Referrals accepted from Physician and Nurse Practitioner

## Inclusion criteria:

*Adult with BMI  $\geq 30$  with at least 1 adipose related co-morbidity*

Comorbidities include:

- Type 2 diabetes
- Dyslipidemia
- Hypertension
- NAFLD
- Cerebrovascular disease
- Obstructive Sleep Apnea
- Hx of Coronary Vascular Disease
- PCOS
- Osteoarthritis
- Infertility
- Quality of life concerns

## Exclusion Criteria:

- In the past three months
  - ACS
  - CVA
  - VTE
- Pregnant or breast feeding
- Unstable mental health disorders
- Active Eating Disorder
- Active Substance Use Disorder
- BMI  $<30$

Questions?





## References

Canadian Community Health Survey, Statistics Canada via Canadian Institute for Health Information [Obesity \(Age 18 and Older\) · CIHI](#) Accessed February 13, 2023

[CMAJ. 2011 Oct 4; 183\(14\): e1059–e1066.](#)

Kirk SFL, Ramos Salas X, Alberga AS, Russell-Mayhew S. Canadian Adult Obesity Clinical Practice Guidelines: Reducing Weight Bias in Obesity Management, Practice and Policy. Available from: <https://obesitycanada.ca/guidelines/weightbias>. Accessed [September 14, 2023].

Lau DCW, Wharton S. Canadian Adult Obesity Clinical Practice Guidelines: The Science of Obesity. Available from: <https://obesitycanada.ca/guidelines/science>. Accessed [September 11, 2023]

Mechanick JI, et al. *Surg Obes Related Disorders* 2013; 9:159-191




N Engl J Med. Author manuscript; available in PMC 2011 June 02

Pedersen SD, Manjoo P, Wharton S. Canadian Adult Obesity Clinical Practice Guidelines: Pharmacotherapy for Obesity Management. Available from: <https://obesitycanada.ca/guidelines/pharmacotherapy>. Accessed [September 14, 2023].

Rueda-Clausen CF, Poddar M, Lear SA, Poirier P, Sharma AM. Canadian Adult Obesity Clinical Practice Guidelines: Assessment of People Living with Obesity. Available from: <https://obesitycanada.ca/guidelines/assessment>. Accessed [September 14, 2023].

Sharma AM, Kushner RF. A proposed clinical staging system for obesity. *Int J Obes*. 2009;33(3):289-295. doi:10.1038/ijo.2009.2

Twells LK, Janssen I, Kuk JL. Canadian Adult Obesity Clinical Practice Guidelines: Epidemiology of Adult Obesity. Available from: <https://obesitycanada.ca/guidelines/epidemiology>. Accessed [August 28, 2023].



Vallis TM, Macklin D, Russell-Mayhew S. Canadian Adult Obesity Clinical Practice Guidelines: Effective Psychological and Behavioural Interventions in Obesity Management. Available from: <https://obesitycanada.ca/guidelines/behavioural>. Accessed [September 14, 2023].

WHO 2010 [A healthy lifestyle - WHO recommendations](#), accessed August 28, 2023

Yanovski, SZ, et al. *JAMA* 2014; 311:74-86