

2020 Clinical Practice Guidelines: 5As Framework for Obesity Management in Adults

i Obesity is a complex, progressive, and relapsing chronic disease characterized by abnormal and/ or excessive body fat (adiposity) that impairs health.

Please scan code for detailed information.
obesitycanada.ca/guidelines



1 Ask | Weight is a sensitive issue. Do not assume every patient with a larger body has obesity. Ask for permission to discuss body weight. Does the person feel their weight is impairing their medical, functional, or psychosocial health?
 “Would it be alright if we discussed your weight?”

i If the person is not ready to discuss their weight offer resources about obesity as a chronic disease and an open opportunity to reassess.

2 Assess | Understanding an individual’s story and life context is crucial in the management of obesity.

1. The value-based goal that matters to the patient
e.g. Being able to play at the park with my grandchildren
2. Obesity classification (height, weight, BMI & waist circumference)
3. Adiposity related complications and ‘root causes’ of weight gain
(4M framework - Mechanical, Metabolic, Mental and Social Milieu)
4. Disease severity e.g. Edmonton Obesity Staging System (EOSS)

**Primary care assessment
5as Toolkit**
obesitycanada.ca/5as-team/



3 Advise | On obesity risks. Discuss the health benefits of obesity management.

Medical Nutrition Therapy (MNT)

MNT is used in managing chronic diseases and focuses on nutrition assessment, diagnostics, therapy and counselling. MNT should:

- a. be personalized and meet individual values, preferences and treatment goals to promote long term adherence
- b. be administered by a registered dietitian to improve weight-related and health outcomes

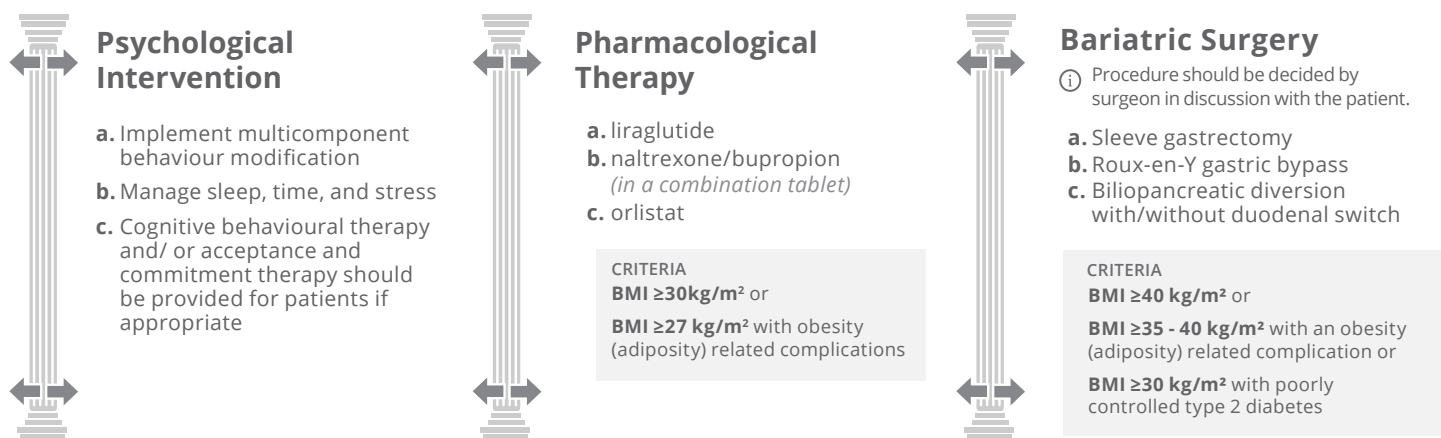
Physical Activity

30-60 mins of aerobic activity on most days of the week, at moderate to vigorous intensity, can result in:

- a. small amount of weight and fat loss
- b. improvements in cardiometabolic parameters
- c. weight maintenance after weight loss

i Remember nutrition and physical activity recommendations are important for all Canadians regardless of body size or composition.

The Three Pillars of Obesity Management that Support Nutrition and Activity



Treating the root causes of obesity is the foundation of obesity management - refer to the 4M framework - mechanical, metabolic, mental and social milieu

4 Agree

Agree on realistic expectations, sustainable behavioural goals, and health outcomes. Agree on a personalized action plan that is practical and sustainable, and addresses the drivers of weight gain.



5 Assist

Assist in identifying and addressing drivers and barriers. Provide education and resources. Refer to appropriate providers or interdisciplinary teams (if available). Arrange for regular, timely follow-up.

Figure 1. Algorithm: Choice of Obesity Pharmacotherapy

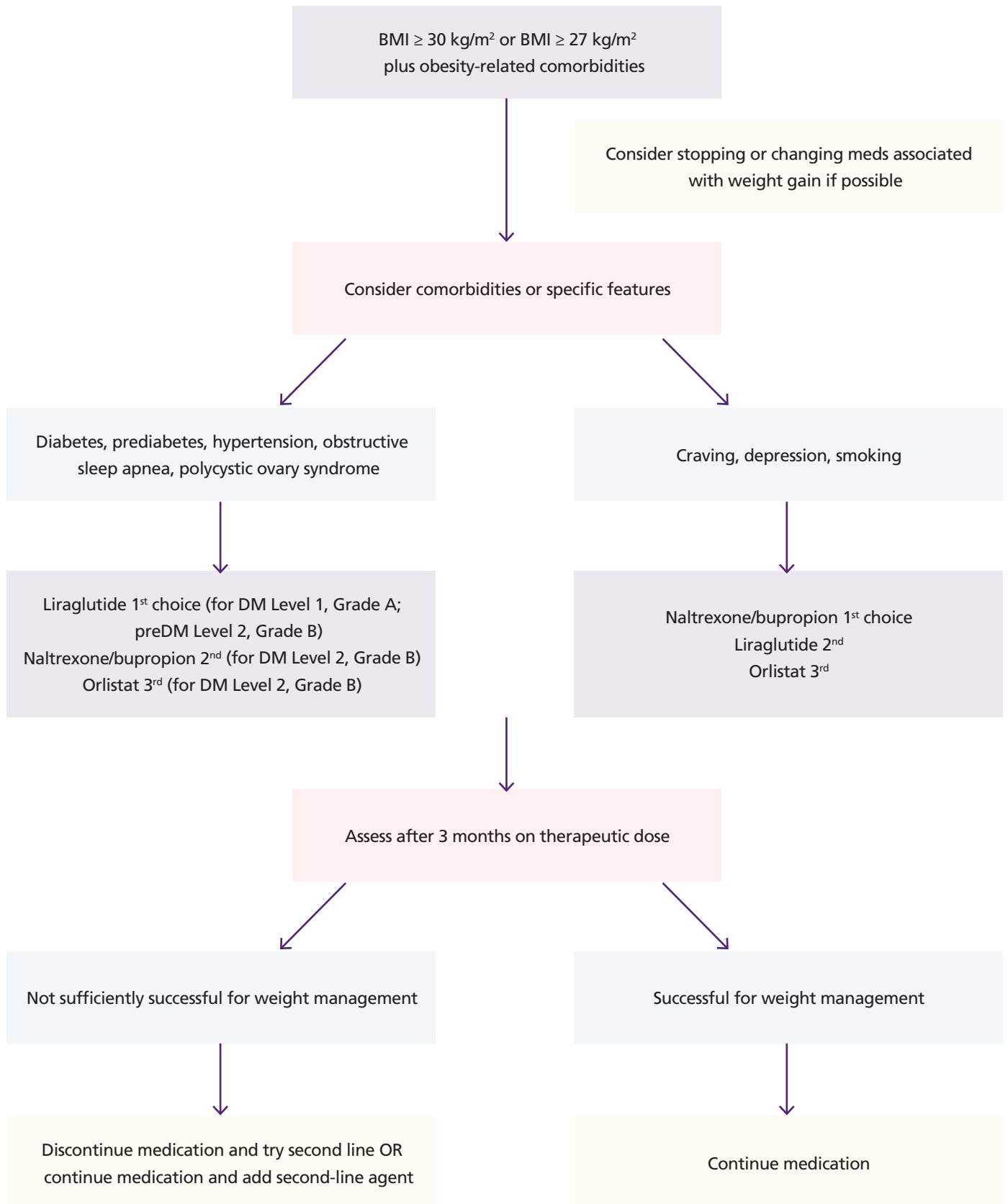


Table 1. Pharmacotherapy for Obesity

	Orlistat	Liraglutide	Naltrexone/Bupropion
Mode of administration	Oral	Subcutaneous	Oral
Dose/frequency	120 mg TID	3.0 mg daily	16/180 mg BID
Effect on % weight loss at 1 year, placebo subtracted	-2.9% ⁵	-5.4% ¹	-4.8% ⁴
Effect on weight over longer term, placebo subtracted	-2.8kg at 4 years ¹⁰	-4.2% at 3 years ²	Not studied
% of patients achieving ≥ 5% weight loss at 1 year	54% (vs. 33% in placebo) ⁵	63.2% (vs. 27.1% in placebo) ¹	48% (vs. 16% in placebo) ⁴
% of patients achieving ≥ 10% weight loss at 1 year	26% (vs. 14% in placebo) ⁵	33.1% (vs. 10.6% in placebo) ¹	25% (vs. 7% in placebo) ⁴
Effect on maintenance of previous weight loss	2.4kg less weight regain vs. placebo over 3 years ⁵	-6.0% additional placebo-subtracted weight loss at 1 year ³	Not studied
Effect on prediabetes	37.3% reduction in risk of developing T2DM over 4 years ¹⁰	79% reduction in risk of developing T2DM over 3 years ²	Not studied
Effect on BP at 1 year, placebo subtracted	-1.9 mmHg SBP -1.5 mmHg DBP ²²	-2.8mmHg SBP -0.9mmHg DBP ¹	+1.8mmHg SBP 0.9mmHg DBP ⁴
Effect on lipids at 1 year, placebo subtracted	- 0.27 mmol/L total chol - 0.21 mmol/L LDL - 0.02 mmol/L HDL - 0.00 mmol/L TG ²²	-2.3% total chol -2.4% LDL +1.9% HDL -3.9% nonHDL -9.3% TG ¹	-1.5 % LDL +7.2% HDL - 9.6 % TG ⁴
Effect on HR at 1 year, placebo subtracted	No change	+2.4 BPM ¹	+1.1 BPM ⁴
Effect on A1C in patients with diabetes at 1 year, placebo subtracted	-0.4% ⁹	-1.0% ⁷	-0.5% ⁸
Effect on NASH	No improvement	Improvement ²³	Not studied
Effect on PCOS	Not studied	-5.2 kg placebo subtracted weight loss at 6mo; no data on menstrual cyclicity ²⁴	Not studied
Effect on OA	Not studied	Not studied	Not studied
Effect on OSA	Not studied	Reduces AHI by 6/hr ²⁵	Not studied
Cost	\$\$	\$\$\$\$	\$\$\$
Contraindications	<ul style="list-style-type: none"> • Cholestasis • Chronic malabsorption syndrome¹⁶ • Pregnancy 	<ul style="list-style-type: none"> • Past history of pancreatitis • Personal or family history of medullary thyroid cancer • Personal history of MEN2 syndrome • Pregnancy 	<ul style="list-style-type: none"> • Uncontrolled hypertension • Any opioid use • History of, or risk factors for, seizure • Abrupt discontinuation of alcohol • Concomitant administration of monoamine oxidase inhibitors (MAOI) • Severe hepatic impairment • End-stage renal failure • Pregnancy
Common side effects	Loose, oily stools, flatus	Nausea, constipation, diarrhea, vomiting	Nausea, constipation, headache, dry mouth, dizziness, diarrhea
Rare side effects	<ul style="list-style-type: none"> • Liver failure • Nephrolithiasis • Acute kidney injury 	Pancreatitis Cholelithiasis	<ul style="list-style-type: none"> • Seizure • Worsening of depression
Drug interactions	<ul style="list-style-type: none"> • Fat-soluble vitamins • Levothyroxine • Cyclosporine • Oral anticoagulants • anticonvulsants¹⁶ 	May affect absorption of medications due to slowing of gastric emptying	Yes: See chapter text

Table 8: Summary of Weight-Promoting Medications and Alternate Therapies

Category	Class	Name	Weight gain	Alternative therapy
Antihyperglycemics	Insulins	Insulin	↑↑	Biguanide (metformin) DPP4i (alogliptin, linagliptin, sitagliptin, saxagliptin) GLP1 analogs (exenatide, liraglutide, dulaglutide, semaglutide) AGI (acarbose, miglitol) SGLT2 inhibitors (canagliflozin, dapagliflozin, empagliflozin) Pioglitazone/metformin* Glipizide/metformin* Glyburide/metformin*
	Thiazolidinedione	Pioglitazone	↑↑	
	Sulfonylureas	Glipizide	↑	
		Glyburide	↑↑	
		Glimepiride	↑↑	
		Chlorpropamide Tolbutamide Gliclazide	↑↑ ↑↑ ↑↑	
	Meglitinides	Repaglinide	↑	
Antidepressants	Tricyclics	Amitriptyline	↑↑↑	Bupropion Nefazodone Duloxetine Venlafaxine Desvenlafaxine Trazodone Levomilnacipran Vilazodone Vortioxetine Selegiline (topical MAOIs)
		Doxepin	↑↑↑	
		Imipramine	↑↑	
	Atypical	Nortriptyline	↑↑	
		Mirtazapine	↑↑	
	MAOIs	Phenelzine Tranylcypromine	↑↑↑ ↑↑↑	
	Selective Serotonin Reuptake Inhibitors (SSRIs)	Sertraline	↑	
Paroxetine		↑↑		
Citalopram		↑↑↑		
Lithium	Escitalopram	↑↑		
	Fluoxetine	↑↑↑		
	Lithium	↑↑		
Antipsychotics		Haloperidol	↑↑	Ziprasidone Lurasidone Aripiprazole
		Loxapine	↑↑	
		Clozapine	↑↑	
		Chlorpromazine	↑↑	
		Fluphenazine	↑↑	
		Risperidone	↑	
		Olanzapine	↑↑	
		Quetiapine	↑↑	
		Iloperidone	↑↑	
		Sertindole	↑	
		Anticonvulsants		
Carbamazepine	↑↑↑			
Gabapentin	↑↑↑			
Corticosteroids	Oral steroids	Prednisone Prednisolone Cortisone	↑↑↑ ↑↑↑ ↑↑↑	Budesonide NSAIDs
	Inhaled steroids	Ciclesonide Fluticasone	↑ ↑	
Hormone replacement therapy	Estrogens Progestogens		↑↑ ↑	
Antihistamines		Diphenhydramine	↑	Oxymetazoline
Beta blockers		Propranolol	↑	ACEi ARBs CCBs (may cause fluid retention) Timolol
		Metoprolol	↑	
		Atenolol	↑↑	
Antihypertensive		Clonidine	↑	Prazosin ACEi ARBs Diuretics

DPP4i: Inhibitors of dipeptidyl peptidase 4; GLP-1: Glucagon-like peptide-1 receptor agonists; NSAIDs: Nonsteroidal anti-inflammatory drugs; SGLT2: Sodium glucose co-transporter 2; AGI: Alpha-glucosidase inhibitor; ACEi: Angiotensin converting inhibitors; ARBs: Angiotensin II receptors blockers; CCBs: Calcium channel blockers; MAOIs: Monoamine oxidase inhibitors; SSRIs: Selective serotonin reuptake inhibitors; *Combination therapy is less likely to cause weight gain; †/† variable reported effect; ↑ up to 5 kg weight gain; ↑↑ 5 to 10 kg weight gain; ↑↑↑ more than 10 kg weight gain.

Table 1: Weight Loss Surgeries³

	Adjustable gastric banding	Sleeve gastrectomy	Roux-en-Y gastric bypass	Duodenal switch
Total weight loss (%)	20	25	30	40
Resolution rate of T2DM (%)	20	30	40	80
Resolution rate of hypertension (%)	20	30	40	60
Resolution rate of sleep apnoea/hypopnoea syndrome (%)	30	40	50	70
Mortality rate (%)	0.01	0.01	0.01	0.02
Serious adverse events (%)	2	3	3	5
Common side effects	Dysphagia, vomiting	Vomiting, constipation	Dumping syndrome	Increased bowel movements, bloating
Long-term risks	Band erosion, band intolerance, weight regain	Gastro-esophageal reflux, Barrett's esophagus, weight regain	Anastomotic ulcer, internal hernia, small bowel obstruction, nesidioblastosis (uncommon)	Protein malnutrition, vitamin deficiency, small bowel obstruction, internal hernia

Biertho L, Hong D, Gagner M. Canadian Adult Obesity Clinical Practice Guidelines: Bariatric Surgery: Surgical Options and Outcomes. Available from: <https://obesitycanada.ca/guidelines/surgeryoptions>. Accessed [April 7, 2022].

Table 1: Post-Bariatric Surgery Nutrition and Exercise, Vitamin Supplementation and Monitoring for Prevention of Complications

Post-bariatric surgery nutrition and exercise: eat 3–5 small meals; chew food slowly; aim for minimum 60 g protein/day (LS/RYGB) or 80–120 g protein/day (duodenal switch/DS); separate liquids and solids by 30 minutes; no carbonated or caffeinated beverages; minimal to no alcohol intake; no smoking, no NSAIDs or DOACS post RYGB and DS; activity: 150 to 300 minutes/week.

Vitamins and minerals	Daily prevention recommendation post-bariatric surgery (solid line means difference in dosing; — means no evidence of difference in dosing between the types of bariatric surgery)			Description of supplement with suggested timing (most patients will require complete multivitamins [MVs] with additional supplementation of B12, D, calcium and iron)
	Laparoscopic Adjustable Gastric Banding or Sleeve	Roux-en-Y Gastric Bypass	Duodenal Switch	
Vitamin B2 (Riboflavin)		3.4 mg		<p>Take complete MVs at breakfast.</p> <p>The vitamins and minerals listed on the left can be found in OTC complete MVs. Patients and clinicians need to carefully check labels as formulations differ between brands and sometimes can change.</p> <p>Generally, patients will need two complete OTC MV day to reach the daily recommendations post-bariatric surgery.</p> <p>The ratio of zinc:copper should remain 8–15 mg:1 mg.</p> <p>Some marketed vitamins are labelled as post-bariatric surgery vitamins but may still need additional calcium, iron, B12 or vitamin D supplementation. Read labels carefully and adjust according to lab results.</p> <p>If pregnant, switch OTC MV to prenatal vitamin, not to exceed 5000 IU of vitamin A per day. Avoid retinol-based vitamin A during pregnancy and lactation; it is safe to continue beta-carotene. Additional screening and increased requirements of vitamin A in duodenal switch or if steatorrhea presents.</p>
Vitamin B3 (Niacin)		40 mg		
Pantothenic acid (B5)		20 mg		
Vitamin B6		4 mg		
Biotin		60 mcg		
Vitamin C		120 mg		
Selenium		140 mcg		
Magnesium		400 mg		
Manganese		4 mg		
Chromium		120 mcg		
Molybdenum		50 mcg		
Zinc	8–11 mg	8–22 mg	16–22 mg	
Copper	1 mg	1–2 mg	2 mg	
Vitamin A	5000–10000 IU	5000–10000 IU	10000 IU	
Vitamin K	90–120 mcg	90–120 mcg	300 mcg	
Vitamin E		15mg		
Folic acid		400–800 mcg		
Folic acid (pre-conception to 12 weeks GA)		1000 mcg		
Folic acid from > 12 wks to breastfeeding/ or 4–6 wks postpartum		800–1000 mcg Duodenal Switch		

ADDITIONAL SUPPLEMENTS				
Vitamins and minerals	LAGB or LS	RYGB	DS	Description of supplement with suggested timing
Vitamin B1 (thiamine)		12 mg		If insufficient amount in complete MV, add a 50 mg B-complex supplement. Take at breakfast.
Vitamin B1 for at-risk patients*		50–100 mg		Take two 50 mg B-complex supplements.
Vitamin B12		350–500 ug		Take at breakfast. Oral: 350–500 ug/day. Nasal spray: as directed by manufacturer. Parenteral (IM or SC): 1000 ug monthly.
Vitamin D		3000 IU		Take at breakfast. Titrate vitamin D supplementation: To maintain 25(OH)D levels at > 75nmol/L To parathyroid hormone levels. It is not uncommon that for duodenal switch, higher supplementation of vitamin D (as high as 50,000 IU 2-3 times/week) may be required. D3 (cholecalciferol) is preferred over D2 (ergocalciferol) for its more potent effect.
Calcium (from food and supplements)	1200–1500 mg	1200–1500 mg	1800–2400 mg	Take in divided doses. Calcium citrate (preferred) with or without meals. Calcium carbonate with meals. Titrate to calcium and parathyroid hormone levels.
Iron	18 mg			Take before bed. Do not take with calcium as absorption blocked.
Low risk (men and patients without history of anemia)				
Menstruating women	45–60 mg			Ferrous sulphate is the preferred iron supplement, but others may be considered if this supplement is not tolerated. Take with vitamin C 250–500 mg for better absorption with non-heme iron supplements. Formulations of different non-heme iron supplements (elemental iron mg): <ul style="list-style-type: none"> • Ferrous sulphate 300 mg (60 mg), • Ferrous gluconate 300 mg (35 mg), and • Ferrous fumarate 300 mg (99 mg). There is no evidence for the role of heme iron supplements (11 mg elemental heme iron/tablet) for prevention of anemia in post-bariatric surgical patients. However, if this is what is tolerated clinically, careful monitoring of CBC and ferritin levels are warranted.

*At-risk factors include GI symptoms such as intractable nausea and vomiting, malnutrition, excessive and/or rapid weight loss, excessive alcohol use.

Shiau J, Biertho L. Canadian Adult Obesity Clinical Practice Guidelines: Bariatric Surgery: Postoperative Management. Downloaded from: <https://obesitycanada.ca/guidelines/postop>. Accessed [April 7, 2022].

LAB MONITORING				
	LAGB or LS	RYGB	DS	Comments
Lab values to monitor	CBC, electrolytes, albumin, ferritin, B12, folate, calcium, 25(OH) vitamin D, PTH	Same as LAGB/LS + vitamin A, zinc, copper	Same as RYGB + INR	Screen for thiamine for at-risk patients* or who have clinical features related to thiamine deficiency (see Table 2).
Lab frequency	Every 3–6 months	Every 3-6 months	Every 3 months	In pregnancy, labs should be monitored each trimester: CBC, ferritin, albumin, B12, 25(OH) D, calcium, PTH, folate.
First year post-op	Yearly	Yearly	Every 6-12 months	For hypoabsorptive surgeries add zinc, copper, vitamin A (for duodenal switch possibly add vitamin E and vitamin K)
Thereafter				Vitamin A levels with RYGB and DS need to be adjusted.

*At-risk factors include GI symptoms such as intractable nausea and vomiting, malnutrition, excessive and/or rapid weight loss, excessive alcohol use. LAGB: laparoscopic adjustable gastric banding; LS: laparoscopic sleeve; RYGB: Roux-en-Y gastric bypass; DS: duodenal switch; NSAIDs: non-steroidal anti-inflammatory drugs; DOACs: direct oral anticoagulants; OTC: over-the-counter; MV: multivitamin; CBC: complete blood count.

Source: Shiau, J.

Table 2: Treatment for Post-Operative Deficiencies and Suggested Supplementation^{58–62}

Micronutrient	Post-op deficiency prevalence	Food sources	Signs/symptoms of deficiency	Treatment for deficiency
Vitamin B3 (niacin)		Yeast, liver, cereals, legumes, seeds	4D's of Pellegra: Dermatitis: photosensitive, pigmented Diarrhea Dementia Death	
Magnesium	32%		Muscle contractions, pain, spasms, osteoporosis	Oral magnesium
Zinc	LS: 12% RYGB: 21–33% DS: 74–91%	Meat, chicken, nuts, lentils, fortified breakfast cereals	Skin lesions, poor wound healing, dermatitis, blunting of taste sense, hair loss, altered immune function, alopecia, glossitis, infertility	Remember: Zinc:copper: 8–15 mg:1 mg as zinc supplementation can cause a deficiency in copper (e.g.: if taking zinc 50 mg/d, then add copper 4 mg/d)
Copper	RYGB: 2% DS: 10–24%	Everything (vegetables, grains, meat, fish, poultry)	Anemia, leukopenia, hypopigmentation of hair, skin, nails, unsteady gait, numbness and tingling in hands and feet, painful paresthesia, poor wound healing, peripheral neuropathy, myelopathy, paralysis	If copper deficient: Mild-moderate deficiency (including low hematologic indices): 3–8 mg/d copper gluconate or sulfate Severe deficiency: 2–4 mg/d iv copper for 6 days or until serum levels return to normal and neurologic symptoms resolve. Toxicity level: Zinc 24-h urine >1200 ug/d Copper women >155 ug/dL Copper men >140 ug/dL

Micronutrient	Post-op deficiency prevalence	Food Sources	Signs/symptoms of deficiency	Treatment for deficiency
Vitamin A	RYGB: 8–11% DS: 61–69%	Preformed vitamin A (retinol): liver, kidney, egg yolk, butter Provitamin A (beta-carotene): leafy greens, carrots, sweet potatoes	Loss of nocturnal vision, Bitot's spots (foamy white spots on sclera), itching, dry hair, xerophthalmia, decreased immunity, poor wound healing, hyperkeratinization of the skin, loss of taste (Vit A and zinc metabolism interrelated)	No corneal changes: 10000–25000 IU/day orally for 1–2 weeks Corneal lesions present: 50000–100000 IU/day <i>im</i> for 3 days followed by 50000IU/day <i>im</i> for 2 weeks Toxicity level: >80 ug/dL
Vitamin E		Olive oil, meat, eggs, leafy vegetables	Gait ataxia, hyporeflexia/weakness, nystagmus, ophthalmoplegia, ceroid deposition in muscle	
Vitamin K			Skin hemorrhages (petechia, purpura, ecchymosis)	For post-bariatric surgery patients with hypoabsorption, the recommended dosage of vitamin K is either 1–2 mg/d orally or 1–2 mg/wk parenterally
Folic acid	9–38%	Animal products, leafy vegetables; easily destroyed by heat of cooking	Macrocytic anemia, palpitations, fatigue, neural tube defects, changes in pigmentation or ulceration of skin, nails, or oral mucosa	1 mg/day orally for 1–3 months
Vitamin B1 (thiamine)	Up to 49%	Yeast, legumes, pork, rice, cereals; denatured at high temperature	Dry beriberi: symmetrical peripheral neuropathy; convulsions, muscle weakness +/- pain of lower and upper extremities, brisk tendon reflexes Wet beriberi: heart failure, tachycardia or bradycardia, lactic acidosis, dyspnea, leg edema, RV dilatation Wernicke's encephalopathy: polyneuropathy and ataxia, ocular changes (ophthalmoplegia and nystagmus), confabulation, short-term memory loss Korsakoff psychosis: psychosis and /or hallucinations	Treat for suspected thiamine deficiency before or in the absence of lab confirmation. Oral: 100 mg bid-tid until symptoms resolve IV: 200 mg tid or 500 mg od-bid for 3–5 days, followed by 250 mg/d for 3–5 d or until symptoms resolve. <i>im</i> : 250 mg od for 3–5 days or 100–250 mg monthly Simultaneous administration of magnesium, potassium and phosphorus should be given to patients at risk for refeeding syndrome.
Vitamin B12	2 years post RYGB/DS: 4–62%; 5 years post RYGB/DS 19–35%	Meat and dairy products	Pernicious anemia, tingling in fingers and toes, depression, dementia, ataxia, sore tongue, smooth and "beefy red" tongue, pale skin, slightly icteric skin and eyes	1000 or 2000 ug/day (1–2 ampoules) orally or 1000 ug/week <i>im</i>

Micronutrient	Post-op deficiency prevalence	Food Sources	Signs/symptoms of deficiency	Treatment for deficiency
Vitamin D	25–80%		Osteomalacia, arthralgia, depression, fasciculation, myalgia	Vit D3 is more potent than Vit D2 when comparing frequency and amount needed for repletion. Vitamin D3 3000 to 6000 IU/d or Vitamin D2 50000 IU 1–3 times weekly. Toxicity level: >150 ng/mL
Calcium (from food and supplements)	Approx. 10%	E.g.: food=mg calcium 1 cup milk=300 mg 1 oz cheese=250 mg ¾ cup yogurt=200 mg ½ cup cooked leafy greens=50 mg	Low bone density, osteoporosis, muscle contractions, bone pain, spasms, paresthesia, muscle weakness, tetany	Adjust calcium and vitamin D intake based on normalizing lab values of calcium, 25(OH) vitamin D and PTH levels.
Iron	LS: 17% RYGB/DS: 30% (45% after 2 years)		Fatigue, impaired work performance and productivity, microcytic anemia, decreased immune function, enteropathy, glossitis, dysphagia, spoon-shaped nails (koilonychias), vertical ridge on nails	Can increase oral non-heme iron intake in divided doses to provide 150–200 mg elemental iron daily (e.g.: ferrous sulfate 300 mg tid). ⁶³ Take separately from calcium supplements, acid-reducing medications – if no response, then consider parenteral iron administration. Heme iron for treatment of post-Roux-en-Y gastric bypass iron deficiency is not recommended as first line but may be considered if patient does not tolerate non-heme iron. The dosing would be 4 tablets of heme iron daily.

Source: Shiau, J.

Shiau J, Biertho L. Canadian Adult Obesity Clinical Practice Guidelines: Bariatric Surgery: Postoperative Management. Downloaded from: <https://obesitycanada.ca/guidelines/postop>. Accessed [April 7, 2022].

Table 3: Clinical Features that Patients Might Present Post-Bariatric Surgery with Possible Related Nutrient Deficiency^{58,62}

Clinical features	Possible micronutrient deficiency
Hair	
Alopecia	Iron, zinc, biotin, protein deficiency
Corkscrew hair	Vit C
Eyes	
Night blindness, ocular xerosis, keratomalacia, Bitot's spots	Vit A
Ophthalmoplegia	Thiamine, vitamin E
Optic neuropathy	B12, thiamine (Wernicke), copper (rarely folate)
Face/skin	
Dermatitis: hyperpigmentation around sun-exposed skin: face, neck and hands	Niacin
impaired wound healing	Zinc, Vit C, protein deficiency,
Petechia, purpura	Vit C, Vit K
Mouth	
Soreness, burning	Riboflavin (B2)
Angular stomatitis or cheilitis	B2, niacin, iron, B6, B12; or vitamin A toxicity
Pica	Iron, zinc
Hypogeusia or dysgeusia	Zinc
Glossitis (sore, swollen, red and smooth tongue)	Folate, riboflavin, niacin, B6, B2, folate, severe iron deficiency
Gingival bleeding	Vit C, niacin, folate, zinc, severe vit D deficiency; or vit A toxicity
Beefy red tongue	Folate, niacin, B12
Nails	
Beau's lines (transverse ridges, horizontal grooves)	Zinc, protein, calcium
Koilonychia	Iron, protein, anemia
Splinter hemorrhage	Vit C
Brittle, soft, dry, weak, thin, split easy	Magnesium; or vit A toxicity and selenium toxicity
Musculoskeletal	
Bone pain	Vit D
Calf tenderness, absent deep tendon reflexes, foot and wrist drop	Thiamine
Peripheral neuropathy, tingling, "pins and needles"	Folate, B6, pantothenic acid, phosphate, thiamine, B12
Muscle twitching, convulsions, tetany	Calcium, vit D, Mg deficiency, B6 (or excess Mg and B6)
Muscle cramps	Chloride, sodium, potassium, magnesium, calcium, vitamin, dehydration
Muscle pain	Vit D, biotin
Sexual	
Hypogonadism, erectile dysfunction	Zinc
Hematology	
Anemia and fatigue	Protein, zinc, copper, selenium
Microcytic anemia	Iron, copper, pyridoxine, vit E
Macrocytic anemia	B12, folate
Neutropenia	Copper
Nervous System	
Ataxia	B12, copper
Myelopathy	B2, copper (rarely folate, vitamin E)
Polyradiculopathy	Thiamine
Neuropathy	B12, thiamine (Wernicke), copper (rarely pyridoxine, folate, niacin, vit E)
Myopathy	Vit D, vit E
Dementia	Niacin, B12
Amnesia, hallucinations, confabulation	Thiamine (Korsakoff)
Confusion, encephalopathy	Thiamine (Wernicke), B12
Heart	
Cardiomyopathy	Selenium
Heart failure	Thiamine

Source: Shiao, J.

Table 4: Pharmacotherapy After Bariatric Surgery

Increased concentration	Decreased concentration
Atorvastatin short-term 8 weeks ⁶⁴ Metformin ⁴² Morphine ⁶⁵ Acetaminophen Moxifloxacin ⁶⁶	Atorvastatin long-term 2 years ⁶⁴ Levothyroxine ³⁸ Cyclosporin ³⁸ Phenytoin ³⁸ Rifampin ³⁸ Sertraline SRI (SSRI more likely to decrease than SNRI) reduced at 1 month and then normal at 1 year ⁶⁷ Tamoxifen ⁶⁸
List of medications not to be crushed	
Alendronate, bisacodyl, bupropion, ciprofloxacin, diltiazem, dipyridamole/ASA, divalproex, felodipine, ferrous sulfate, fexofenadine, finasteride, glipizide, lansoprazole, lithium, loratadine, metformin, metoprolol, morphine, nifedipine, omeprazole, pantoprazole, phenytoin, piroxicam, prednisolone, pseudoephedrine, rabeprazole, tamsulosin, verapamil ³⁹	

Source: Shiau, J.

Shiau J, Biertho L. Canadian Adult Obesity Clinical Practice Guidelines: Bariatric Surgery: Postoperative Management. Downloaded from: <https://obesitycanada.ca/guidelines/postop>. Accessed [April 7, 2022].

Links to Tools & Resources

The 5AsT Program – Access to free, downloadable tools, and our 5AsT Toolkit; educational videos on weight bias, emotional eating, clinical assessment of obesity related risk, pregnancy, culture and the body, 5As of Obesity Management, prevention of weight gain, sustaining change, depression, and anxiety; links to published research



- <https://obesitycanada.ca/5as-team/>

Obesity Canada – Includes links to the guideline chapters, publications, events, and initiatives and information for the public, patients, and people living with obesity as well as tools and resources.

- <https://obesitycanada.ca/>
- <https://obesitycanada.ca/guidelines/chapters/>

OC Connect is a Mighty Networks community for anyone affected by obesity to meet and discuss their experience, ask questions and more.

OC Connect Pro is a TimedRight discussion forum for healthcare professionals to discuss the new *Canadian Adult Obesity Clinical Practice Guidelines*, obesity management strategies and more. (Note: This community is for healthcare professionals only).

- <https://obesitycanada.ca/oc-news/join-oc-connect/>

Training Workshops

The 5As Team have developed a comprehensive educational program that was developed, piloted, and refined for use with medical residents, physicians, and interdisciplinary team members. We have now adapted this training program for the virtual environment. Our virtual course uses a flipped classroom design. Participants will be provided with pre-recorded content videos to watch before attending live, interactive sessions, where they will have the opportunity to ask questions, interact in case-based discussions, and practice skills that they can use in their practice.

For more information or to be added to the waitlist for our **upcoming workshop in October 2022** contact:

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