This care process model (CPM) was created by a multidisciplinary team of surgeons, primary care physicians, and other healthcare providers at Intermountain Healthcare. Its purpose is to summarize and promote evidence-based approaches to metabolic and bariatric surgery (MBS) as a solution to obesity in specific populations. This CPM:

- Serves as an extension of Intermountain’s Adult Lifestyle and Weight Management CPM, providing guidance to primary care providers when options beyond lifestyle management are deemed necessary and appropriate, and it provides guidance for the care of bariatric patients post surgery.
- Defines protocols for patient selection, psychosocial evaluation, and pre-surgery examination and clearance as well as perioperative nutrition evaluation and counseling.
- Identifies Intermountain facilities accredited by the Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program (MBSAQIP) for bariatric procedures.

**Why Focus ON BARIATRIC SURGERY?**

Obesity is a direct contributor to multiple chronic conditions, including heart disease, stroke, type 2 diabetes, and some cancers.\(^1\)

- More than one-third of all US adults are obese, and more than one-half of Utah adults are considered overweight or obese (BMI > 25), with about 24% considered obese (> 30).\(^1\)
- Medical costs for obesity-related diseases account for nearly $147 billion in yearly medical costs. Obese people spend 42% more on healthcare than the average healthy-weight adult.\(^2\)
- For severely obese patients, traditional lifestyle modifications may not be enough to help them reach and maintain their weight-loss goals.\(^3\)
- MBS may aid in delaying the development of diabetes. A recent study shows that the longer a person delays onset of diabetes, their mortality rate decreases.\(^4\)
- MBS is a proven method for long-term weight loss and may resolve obesity-related comorbidities, lowering medical costs and improving quality of life.

**WHAT’S INSIDE?**

- EFFECTIVENESS OF MBS SURGERY ................................................. 2
- PATIENT SELECTION PROCESS ................................................. 3
  - Algorithm: MBS patient selection criteria ................................. 4
- PSYCHOSOCIAL EVALUATION ................................................. 6
- PREOPERATIVE SYSTEM CLEARANCE ........................................ 7
- NUTRITION EDUCATION AND THERAPY .................................. 8
- WEIGHT MANAGEMENT FOR LIFE ............................................ 9
- TYPES OF MBS ................................................................. 10
- POSSIBLE RISKS AND COMPLICATIONS .................................. 12
- ROUTINE CARE AND FOLLOW UP ........................................... 13
- ACCREDITED INTERMOUNTAIN MBS CENTERS ...................... 16
- KEY REFERENCES ............................................................... 16

**MEASUREMENT & GOALS**

Intermountain Healthcare tracks vital information about its metabolic and bariatric surgery (MBS) patient population. This includes:

- Preoperative histories
- Procedure details
- Intraoperative and postoperative occurrences
- Reoperations
- Readmissions
- Short- and long-term follow-up data including changes in weight and comorbidities (gastroesophageal reflux, sleep apnea, hyperlipidemia, hypertension, and diabetes) after surgery.

**CLINICAL GUIDELINES SUPPORTING THIS CPM**

The following clinical guidelines have been established to assist in the evaluation and treatment of bariatric and metabolic patients:

- Management of Bariatric and Metabolic Patients in the ED
- Anesthesia for Bariatric Surgery
EFFECTIVENESS OF BARIATRIC SURGERY

Diet and exercise are often not enough to help people who are severely overweight. MBS results in greater weight loss than medical treatment and lifestyle modification, and it is directly associated with improving or resolving certain health conditions including type 2 diabetes, sleep apnea, heart disease, and certain cancers.

Primary care providers are often the primary referral agents for MBS. Therefore, it is imperative that they be familiar with the patient selection criteria, the types of surgeries being performed in their geographic area, and the criteria for facility accreditation, ensuring their patients receive safe and effective care.

How MBS works

The term “bariatric surgery” is often used to encompass all weight-loss surgery. However, in recent years, care has been taken to distinguish metabolic surgery within this category. Generally speaking, bariatric surgery limits food intake. Metabolic surgery (sometimes referred to as “diabetes surgery”) also limits food intake but is designed to effect hormonal or metabolic changes, resulting in greater resolution of diabetes and other metabolic diseases. The number of MBS procedures has increased, and techniques are continuously evolving; both open and laparoscopic bariatric techniques are proven effective.

Clinical efficacy. Some patients lose as much as 50% of their body weight after surgery, and nearly half keep the pounds off for up to 10 years. A study by LDS Hospital researchers, published in the Journal of the American Medical Association showed the following benefits for patients who underwent gastric bypass (Roux-en-Y):

- **Effective maintenance of weight loss**: Surgical patients lost an average of 34.9% of their initial weight by 2 years after gastric bypass surgery, maintaining a loss of 27.7% of the weight at 6 years and 26.9% at 12 years. Of these patients, 96% maintained more than 10% weight loss from baseline, and 76% maintained more than 20%. In addition, the weight-loss maintenance of 28% from baseline measured at 6 years in the Utah study is quite significant in comparison to the 2% to 6% weight loss after 4 years of intensive lifestyle- and medication-based therapy.

- **Remission of type 2 diabetes**: In patients who had diabetes before surgery, 62% were in remission after 6 years and 52% at 12 years. Gastric bypass patients who did not have diabetes before the surgery were 5 to 9 times less likely to develop diabetes than nonsurgical participants.

- **Other health risks**: Surgical patients also showed improvements in hypertension, cholesterol, and triglyceride levels—3 factors that are associated with an increased risk of heart disease and stroke.

In addition, a review of studies by the National Heart, Lung, and Blood Institute (NHLBI) found:

- A reduction in the use of medication to treat hypertension in patients achieving 20% to 35% weight loss 2 to 3 years after bariatric surgery and a greater percentage of remission in those 10 years post surgery.

- Reduced serum triglycerides and improved HDL-C values at 2 to 3 years and 10 years post bariatric surgery in those with a mean weight loss of 20% to 35%.

(Insignificant changes were found in LDL-C and total cholesterol values.)
PATIENT SELECTION PROCESS

Successful patients are the beneficiaries of a team-based approach to care. For at-risk individuals, treatment for obesity should begin with the guidelines set by Intermountain experts in the Adult Lifestyle and Weight Management CPM. During the course of treatment, if it’s determined that either lifestyle interventions are ineffective for weight loss or the patient expresses a desire to explore options for weight-loss surgery, the following steps are recommended prior to referral to a surgeon.

- Initiate assessment and selection process.
  - The patient is identified by their primary care provider (PCP) or other healthcare provider as a candidate for surgical weight loss (see pages 4-5), or the patient requests consideration for surgical weight loss.
  - The PCP provides patient education and decision tool (see sidebar on right) and/or provides the EMMI® Solutions Bariatric Surgery informed decision video. To view the EMMI® Solutions Bariatric Surgery decision tool, go to www.tryemmi.com. The login information can be found on the Bariatric Surgery Appendix located on Intermountain.net.
  - If the patient is female, ascertain the patient’s plans for child bearing. It is recommended that patients DO NOT become pregnant in the first 18 months after surgical weight loss.

- Refer to additional care providers, as needed (cardiologist, pulmonologist, etc.) to assess medical comorbidities and additional health concerns.

- Refer to a pre-surgery class for education. (see page 9)

After the referral

Intermountain’s bariatric and metabolic programs take great care to ensure the best possible outcomes. After referral, the patient will undergo an in-depth screening process managed by the surgeon’s staff. This process includes:

- Patient education
- Psychosocial evaluation (Perioperative Care Protocol 2 — see page 12)
- Preoperative risk assessment (Perioperative Care Protocol 3 — see page 13)
- Nutrition education (Perioperative Care Protocol 4 — see page 14)

The process is guided in part by a patient care coordinator (see sidebar on page 6) at each facility. The coordinator is accountable for assessments, individual care plans, education, patient involvement and choice, resource coordination, and a number of other duties.

Tracking the data

The Surgical Services Clinical Program uses 2 applications to track and report important data on MBS at Intermountain Healthcare facilities: the Metabolic and Bariatric Accreditation and Quality Improvement Program (MBSAQIP) Data Registry (DR) and Intermountain’s Bariatric Patient Outcomes (BPO) tool. With the DR, the burden is on site coordinators to gather readmission and reoperation information across the system. In contrast, the BPO tool automatically captures and presents for review all of the patients’ clinical events occurring across Intermountain’s hospitals and clinics. The information tracked and reported through these applications helps Intermountain to carefully work in partnership with its metabolic and bariatric patient populations, surgeons, and other care providers to assess and minimize risks for postoperative complications and improve patient outcomes and survival long term.
ALGORITHM: MBS PATIENT SELECTION CRITERIA
(ADULTS ≥ 18 ONLY)
(PERIOPERATIVE CARE PROTOCOL 1)

Patient is referred for evaluation

Does patient meet primary criteria? (a)

yes

no

Evaluate patient for secondary selection criteria (b)

BMI ≥ 35, plus one or more of the following comorbidities:
- Diabetes
- Degenerative joint or disc disease
- Hypertension
- Hyperlipidemia
- Asthma
- Gastroesophageal reflux disease
- Coronary artery disease/chronic heart failure

• Chronic venous insufficiency
• Obstructive sleep apnea
• Non-alcoholic fatty liver disease
• Obesity hyperventilation syndrome
• Obesity hypoventilation syndrome
• Polycystic ovary syndrome
• Pseudotumor cerebri
• Severe urinary incontinence

Does patient meet secondary criteria?

yes

no

NOTE: Verify coverage for costs of testing if BMI ≥ 30.

Does patient have a BMI ≥ 30 with metabolic risk factors or type 2 diabetes? (c)

yes

no

Does patient have contraindications? (d)

yes

no

Patient MEETS MEDICAL CRITERIA

Does patient meet primary criteria? (a)

yes

no

REFER to the Lifestyle and Weight Management CPM and/or the Adult Diabetes Mellitus CPM for additional interventions.
Hyperlipidemia. Morbidly obese patients often have multiple chronic health conditions. Obesity raises heart disease risk by increasing hypertension. Degenerative joint or disc disease. Untreated or uncontrolled eating disorder. Inadequate support system. Central obesity. Pseudotumor cerebri (PTC). Pregnancy (pre-surgical pregnancy test). Obesity hyperventilation syndrome. Diabetes (type 2). Morbidly obese patients have Obesity hypoventilation syndrome (OHS). Untreated psychosis. Uncontrolled bipolar disorder. JEN. Patients with a BMI ≥ 40 or who are > 100 lbs overweight are considered morbidly obese. Patients who have a BMI > 50 are considered “super obese.” Morbid obesity can interfere with the most basic health functions such as walking, breathing, and sleeping. Morbidly obese patients often have multiple chronic health conditions.

BMI plus 1 or more of the following:

• **Diabetes (type 2).** Obesity diminishes glucose tolerance. Abnormalities in lipid and glucose metabolism appear to be related to fat distribution and to total body weight.

• **Degenerative joint or disc disease.** Excess weight limits mobility and creates excessive wear and tear on the joints, particularly in women. Adipose tissue produces and releases a variety of pro-inflammatory and anti-inflammatory factors related to osteoarthritis. Recent studies also cite the relationship between obesity and lumbar spine disc degeneration. Hypertension. Obesity is associated with impaired blood flow, cardiac output, and hypertension. Excess fatty tissue increases vascular resistance and, in turn, increases the load on the heart muscle.

• **Hyperlipidemia.** Obesity raises heart disease risk by increasing LDL cholesterol levels and reducing HDL cholesterol levels, resulting in atherosclerosis.

• **Asthma.** Obesity reduces pulmonary function, lung volume, and the diameter of peripheral respiratory airways as well as the volume of blood in the lungs and the ventilation-perfusion relationship. It also causes a systemic pro-inflammatory state.

• **Coronary artery disease/chronic heart failure.** In general, obesity and increased BMI are known risk factors for coronary artery disease and heart failure. In addition, obesity is a major contributor to other known risk factors including hypertension and hyperlipidemia.

• **Hypertension.** Obesity is associated with impaired blood flow, cardiac output, and hypertension. Excess fatty tissue increases vascular resistance and, in turn, increases the load on the heart muscle.

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• **Asthma.** Obesity reduces pulmonary function, lung volume, and the diameter of peripheral respiratory airways as well as the volume of blood in the lungs and the ventilation-perfusion relationship. It also causes a systemic pro-inflammatory state.

• **Chronic venous insufficiency.** Studies show that abdominal adipose tissue can lead to elevated risk of both venous thromboembolism and chronic venous insufficiency.

• **Obstructive sleep apnea (OSA).** Nearly 70% of morbidly obese patients have OSA. After bariatric surgery, many patients will see clinical improvement or resolution of OSA symptoms regardless of whether or not a normal BMI is ever achieved.

• **Gastroesophageal reflux disease (GERD).** More than 70% of morbidly obese patients suffer from GERD. GERD is associated with the increasing numbers of malignant esophageal cancers in the US.

• **Non-alcoholic fatty liver disease (NAFLD).** The prevalence rate of NAFLD increases with increasing BMI. Studies suggest that NAFLD improves significantly with surgical weight loss and benefits remain 2 years post surgery.

• **Polycystic ovary syndrome (PCOS).** Weight reduction is a proven treatment for PCOS. When lifestyle interventions are not effective, MBS is an alternative strategy, restoring menstrual cycles within 3 to 4 months post surgery.

**ALGORITHM NOTES**

(a) Primary criteria for bariatric surgery

- Patients with a BMI ≥ 40 or who are > 100 lbs overweight are considered morbidly obese.
- Patients who have a BMI > 50 are considered “super obese.”
- Morbid obesity can interfere with the most basic health functions such as walking, breathing, and sleeping.
- Morbidly obese patients often have multiple chronic health conditions.

(b) Secondary selection criteria

**NOTE: Verify CMS criteria and qualifications with individual’s insurance provider.**

- **Diabetes (type 2).** Obesity diminishes glucose tolerance. Abnormalities in lipid and glucose metabolism appear to be related to fat distribution and to total body weight.

- **Degenerative joint or disc disease.** Excess weight limits mobility and creates excessive wear and tear on the joints, particularly in women. Adipose tissue produces and releases a variety of pro-inflammatory and anti-inflammatory factors related to osteoarthritis. Recent studies also cite the relationship between obesity and lumbar spine disc degeneration.

- **Hypertension.** Obesity is associated with impaired blood flow, cardiac output, and hypertension. Excess fatty tissue increases vascular resistance and, in turn, increases the load on the heart muscle.

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- **Polycystic ovary syndrome (PCOS).** Weight reduction is a proven treatment for PCOS. When lifestyle interventions are not effective, MBS is an alternative strategy, restoring menstrual cycles within 3 to 4 months post surgery.

(c) Metabolic risk factors

Metabolic syndrome is a set of risk factors that are known to increase risk for type 2 diabetes, cardiovascular disease, and stroke. According to the National Institutes of Health, metabolic syndrome is present if the patient has three or more of the following:

- **Central obesity:** waist circumference > 40 inches in men and > 35 inches in women
- **Hypertension:** ≥ 140/90 or taking medication for hypertension
- **Elevated triglycerides:** ≥ 50 mg/dL
- **HDL cholesterol:** < 40 mg/dL in men and < 50 mg/dL in women
- **Glucose:** Fasting ≥ 100 mg/dL, 2-hour GTT ≥ 160 mg/dL or HbA1c ≥ 5.7

(d) Contraindications

- Untreated or uncontrolled eating disorder
- Inadequate support system
- Untreated schizophrenia
- Untreated psychosis
- Uncontrolled bipolar disorder
- Substance use disorder
- Unwillingness to comply with necessary guidelines following bariatric surgery
- Hormonal causes of obesity that can be medically treated
- Advanced age or other illnesses that greatly reduce life expectancy (<2 years) and are unlikely to be improved with weight reduction as well as other conditions in which patients are unable to understand the nature of bariatric surgery or the behavioral changes required afterward.

A decision to proceed with surgery will be made on an individual basis with regard to any other related health conditions that would adversely affect outcomes.
**BARIATRIC PATIENT CARE COORDINATORS**

Intermountain’s bariatric patient care coordinators are responsible for program development and implementation. They act as a bridge between affiliated physicians and internal resources. They also research evidence-based clinical practice processes and develop strategies and action plans to ensure program goals reflect best practices.

Bariatric coordinators:
- Coordinate patient care including assessment, individual plans of care, education, patient involvement and choice, and resource coordination.
- Provide ongoing monitoring and care conferencing according to hospital policy.
- Assist healthcare providers in collaborative interdisciplinary teaching for diagnostic-specific patients.
- Ensure effective planning and arranging for patient services at discharge.
- Evaluate the effectiveness of discharge processes by monitoring 30-day readmissions and completing necessary teaching for identified clinical programs.
- Evaluate patients for admission criteria and appropriate level of care.
- Identify and provide care management for patients with complex needs, prolonged inpatient stays, and/or frequent utilization of acute care services.
- Monitor and evaluate the effectiveness of care management activities in reaching desired patient outcomes on an ongoing basis.

**PSYCHOSOCIAL EVALUATION (PERIOPERATIVE CARE PROTOCOL 2)**

**Selection and referral**
- Patient meets medical criteria for MBS (see page 4).
- Surgeon refers patient to appropriate psychologist, psychiatrist, social worker, or other licensed behavioral healthcare provider.
- Patients may be seen by outside providers who have been educated as to bariatric and metabolic program needs.

**Pre-visit**
- Patient is given instructions and forms as indicated.
- History and evaluation forms/surveys are completed and scored.

**Further evaluation**

Evaluation may include the following:
- Previous attempts at weight loss. Did patient attempt any interventions advocated in the *Adult Lifestyle and Weight Management CPM* (e.g., *Weigh to Health*)? (Assess per *Adult Lifestyle and Weight Management CPM*.)
- Eating and dietary styles:
  - Binge eating disorders
  - Overeating
  - Grazing
  - Night eating
  - Bulimia
- Physical activity/inactivity
- Substance use disorder
- Compliance with medical treatment
- Health-related, risk-taking behaviors (impulsive/compulsive)
- Legal history
- Cognitive functioning
- Knowledge of anticipated surgical procedure
- Coping skills, emotional modulation, and boundaries
- Psychopathology
- Developmental history
- Current life situation
- Social support
- Motivation and expectations
- Specific recommendation for surgery

**Follow-up**
- A detailed report from a behavioral healthcare provider is provided to the surgeon’s office.
- If surgery is recommended, the patient proceeds along the pathway toward surgery (see page 7).
- If surgery is not recommended, the bariatric team confers as to patient disposition.
- The patient is informed of the results.
# PREOPERATIVE SYSTEM CLEARANCE

## PERIOPERATIVE CARE PROTOCOL 3

This table presents a weighted list of medical clearance elements as determined by the American Association of Clinical Endocrinologists, the Obesity Society, and the ASMBS. These evaluations include a comprehensive medical history, psychosocial evaluation, physical examination, and appropriate laboratory testing. In the selection of eligible patients, care must be taken during evaluation to ensure the best possible outcomes. This document defines protocols to ensure that factors beyond BMI are considered including the use of the Grading of the Strength of Recommendations from the NHLBI. The scale reflects levels of certainty of net benefit based on available evidence.

<table>
<thead>
<tr>
<th>Laboratory Testing</th>
<th>Diagnostic Testing</th>
<th>Behavioral Health Clearance</th>
<th>Long-term Follow up</th>
<th>Nutritional Health</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Grade A</strong></td>
<td><strong>Grade A</strong></td>
<td><strong>Grade A</strong></td>
<td><strong>Grade A, B, C</strong></td>
<td><strong>Grade A</strong></td>
</tr>
<tr>
<td>□ Glycemic control</td>
<td>□ Evaluate for b-adrenergic blockade if at risk for CAD.</td>
<td>□ Smoking</td>
<td>□ Willingness to sign agreement is determined</td>
<td></td>
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<tr>
<td>□ Cardiovascular: Fasting lipid profile</td>
<td>□ Cardiology clearance</td>
<td>□ Perioperative Care Protocol #2: Psychosocial Evaluation (see page 6)</td>
<td></td>
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</tr>
<tr>
<td>□ Vitamins</td>
<td>□ Based on individual risk factors, history and physical examination</td>
<td>□ Testing reviewed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ B1, B12</td>
<td>□ Cardiac echo if cardiac disease or pulmonary hypertension</td>
<td>□ Testing complete</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ D</td>
<td>□ Heart murmur</td>
<td></td>
<td>□ Follow up regimen established:</td>
<td></td>
</tr>
<tr>
<td>□ A</td>
<td>□ MVP</td>
<td></td>
<td>– Frequency is dependent on the bariatric procedure and severity of comorbidities.</td>
<td></td>
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<tr>
<td>□ Zinc</td>
<td>□ Phen-Fen use</td>
<td></td>
<td>– First 30 days (bariatric surgeon)</td>
<td></td>
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<tr>
<td><strong>Grade B</strong></td>
<td></td>
<td><strong>Grade C</strong></td>
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<tr>
<td>□ TSH</td>
<td></td>
<td>□ Pre-op testing</td>
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<td>□ Preoperative nutrition evaluation</td>
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<tr>
<td><strong>Grade C</strong></td>
<td></td>
<td>□ Sleep study and STOP-BANG evaluation</td>
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<tr>
<td>□ H-pylori (If blood is positive, check stool.)</td>
<td>□ Cardiac echo if cardiac disease or pulmonary hypertension</td>
<td>□ Perioperative Care Protocol #2: Psychosocial Evaluation (see page 6)</td>
<td></td>
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<tr>
<td><strong>As clinically indicated</strong></td>
<td>□ Heart murmur</td>
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<tr>
<td>□ Hematology</td>
<td>□ MVP</td>
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<td>□ Agreement signed and reviewed</td>
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<tr>
<td>□ CBC auto diff</td>
<td>□ Phen-Fen use</td>
<td></td>
<td>□ Follow up regimen established:</td>
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<td>□ CMP</td>
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<td>– Frequency is dependent on the bariatric procedure and severity of comorbidities.</td>
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<tr>
<td>□ PT, PTT, INR (as indicated)</td>
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<td>– First 30 days (bariatric surgeon)</td>
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<tr>
<td>□ Ferritin</td>
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<td>– 6 months (PCP or other)</td>
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<td>□ Urine analysis</td>
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<td>– Annually</td>
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<td>□ Magnesium and phosphorus</td>
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<td>– Lifetime</td>
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<tr>
<td>□ Pregnancy testing</td>
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<td>□ Type and screen per facility protocol</td>
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<tr>
<td>□ Drug screen per facility protocol</td>
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<td><strong>As clinically indicated</strong></td>
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<td>□ Stress test</td>
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<tr>
<td>□ Based on individual risk factors, history and physical examination</td>
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<td>□ ECG</td>
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## PATIENT EVALUATION AND GRADING

### Grade Strength of Recommendation

- **A = Strong recommendation.** There is a high certainty based on evidence that the net benefit is substantial.
- **B = Moderate recommendation.** There is moderate certainty based on evidence that the net benefit is moderate to substantial, or there is high certainty that the net benefit is moderate.
- **C = Weak recommendation.** There is at least moderate certainty based on evidence that there is a small net benefit.
DIETITIAN REFERRALS
Registered dietitian nutritionists (RDNs) certified in bariatric nutritional counseling are available at the following locations:
- Central Region bariatric services: 801-507-3253
- Utah Valley Regional Medical Center outpatient bariatric services: 801-357-7714
- Cedar City Hospital, Garfield County, and Dixie Regional Medical Center bariatric services: 435-251-3793.

DIET REGIMEN FOR READMISSIONS
Bariatric patients often have additional surgeries (knee replacement surgery, for example) after the initial period of recovery and weight loss. It is imperative that the primary care provider and/or RDN coordinate with the new admitting team to ensure the necessary dietary restrictions are noted in the patient’s records.

NUTRITION EDUCATION AND THERAPY (PERIOPERATIVE CARE PROTOCOL 4)

Why it’s important
Good nutrition remains key to improving health, reversing obesity and chronic diseases, and maintaining weight loss. The role of the registered dietitian nutritionist (RDN) is a critical piece of the MBS process as nutrition assessment and dietary management have been shown to correlate with success.

A nutrition assessment should be conducted preoperatively by an RDN. This assessment will help the team determine any pre-existing nutritional deficiencies, develop appropriate dietary interventions for correction, and create a plan for postoperative dietary intake that will improve long-term outcomes.

The comprehensive nutrition evaluation includes medical comorbidities, weight history, laboratory values, nutritional intake, readiness for change, realistic goal setting, and general nutrition knowledge as well as behavioral, cultural, psychosocial, and economic issues.

Preoperative Evaluation and Assessment
The management of postoperative nutrition begins preoperatively for each patient. It includes a strong emphasis on supplementation education, an assessment of nutrient status, and reinforcement of important principles associated with long-term weight-loss maintenance. Additionally, the following are taken into consideration:
- Anthropometrics
- Weight history
- Medical history
- Lab values
- Psychology history
- Dietary intake
- Physical activity
- Psychosocial factors
- Ability to incorporate nutritional and behavioral changes before and after surgery

Education
During this period of assessment and evaluation, the RDN provides the following education:
- Personal accountability, self care, and lifestyle choices for postoperative weight-loss success
- Self-monitoring techniques
- Postoperative diet education
- Nutrition supplementation

Pre-surgery weight loss
Depending on the patient’s BMI and condition, the surgeon may prescribe a preoperative weight loss intervention to reduce liver volumes and improve technical aspects of the surgical procedure. Very low calorie diet (VLCD) options include, but are not limited to, liquid diets and higher protein diets.
WEIGHT MANAGEMENT FOR LIFE

Key factors to maintaining weight loss after surgery

Key factors to maintaining weight loss include making permanent lifestyle changes that include a healthy balanced diet including regular breakfasts and avoiding added sugars, supplementation of vitamins, sleep hygiene, and regular exercise (see pages 14–15 for follow-up care.) Participation in follow-up visits with the surgeon and/or primary care physicians, dieticians, and counselors as well as continuing postoperative education, all contribute to long-term weight maintenance. Physicians and care managers should regularly address the following with their bariatric patients:

- Patient's understanding of dietary restrictions
- Patient's understanding of lifestyle change as key to maintenance
- Potential barriers to managing changes including:
  - Lack of dietary knowledge
  - Financial constraints
  - Mobility issues
  - Time

Weight regain

In some cases, a patient will regain some of their initial weight loss. It is imperative that the treating physician and staff engage the patient as soon as a trend is established in order to prevent further weight gain. Interventions to consider include:

- Nutritional consultation
- Referral to Intermountain’s Weigh to Health program
- Referral back to surgeon

Education and lifestyle support

Many Intermountain facilities offer no-cost classes in which prospective patients can learn about MBS, as well as support groups and educational resources. Some surgeons offer ongoing support as part of their surgery package. It is recommended that patients be referred to their surgeon’s office or contact one of the facilities listed below for more information.

LDS Hospital 801-408-1760
Utah Valley Hospital 801-357-2294
Dixie Regional Medical Center 435-251-1632

ADDRESSING BEHAVIOR CHANGE

Intermountain’s Behavior Change Framework combines several evidence-based models to address individual, social, and environmental factors that influence behavior.

One important feature to note is that there is no failure. All attempts at behavior change are experiments. If one plan of action doesn’t work, individuals are encouraged to keep tweaking their plan until they find a plan that fits.

The Making a Healthy Change worksheet appears on the back of Rx to LiVe. It addresses personal and environmental factors that can support a chosen behavior change.

HOW TO ACCESS PATIENT EDUCATION MATERIALS

To find Intermountain patient education materials in iCentra, look for the “_IH” tag in the document search results, or visit:

- intermountainphysician.org/clinicalprograms, and select from the “Clinical Topics” list
- iPrintstore.org

DIABETES MANAGEMENT

Intermountain’s Adult Diabetes Mellitus CPM promotes a comprehensive, team-based care approach for adults with diabetes in the outpatient setting and includes:

- Educational materials and programs for providers and patients
- Description of data systems that allow for population health management for patients with diabetes
- Enhancements to the electronic medical record and other tools to make it easier for clinicians to provide quality care
- Information on multidisciplinary coordination of diabetes care

Diabetes-specific patient education can be found in iCentra, on intermountain.net, on intermountainphysician.org, or in the iPrintstore.
**TYPES OF BARIATRIC SURGERY**

The patient and surgeon will decide together on the best approach by considering the benefits and risks of each type of surgery as well as the patient’s goals and values. The patient’s BMI, eating habits, health conditions related to obesity, and previous stomach surgeries will be of foremost importance in this decision process. Individual bariatric procedures have their own advantages and disadvantages.

**Gastric bypass (Roux-en-Y gastric bypass or RYGB)**
- The top of the stomach is divided from the rest of the stomach, creating a small pouch (about 30 mL in volume).
- The top portion of the small intestine is divided. The bottom end is connected to the pouch.
- The portion of the small intestine connected to the remaining stomach is attached further down the small intestine, allowing stomach acids and digestive enzymes to mix with food during digestion.
- Common problems include anemia and low calcium. Aspirin, NSAIDs, and smoking are known causes of ulcers in these patients. Bowel obstruction can occur.
- “Dumping syndrome,” (also called rapid gastric emptying) can develop after certain bariatric procedures and may be avoided with post-surgery diet changes.

**Sleeve gastrectomy (laparoscopic sleeve gastrectomy or LSG)**
- LSG is often used as a first-stage surgery in extremely obese patients prior to performing a duodenal switch procedure, but it can be used as a stand-alone procedure.
- A large portion (about 80%) of the stomach is removed, creating a “sleeve.” The smaller stomach restricts the amount of food the stomach can hold.
- The surgery changes the action of gut hormones to increase feelings of satiety, reduce hunger, and increase blood sugar control.
- Late reflux and GERD can occur.

**Duodenal switch (biliopancreatic diversion with duodenal switch or BPD/DS)**
- A large portion of the stomach is removed (similar to sleeve gastrectomy).
- The top portion of the duodenum is divided just past the stomach outlet (pylorus).
- A section of the lower part of the small intestine is brought up and attached to the duodenum. Most of the small intestine is bypassed, limiting food absorption.
- Common problems include loss of soluble iron (Fe) and vitamins (A, D, E, K), osteoporosis, and kidney stones.

**Adjustable gastric banding (laparoscopic adjustable gastric banding or LABG)**
- A small, inflatable band is placed around the top portion of the stomach just below where the esophagus is attached.
- The band is adjusted with sterile saline over a period of time.
- The band increases the feeling of fullness and reduces food intake.
- Food is digested normally.
- The procedure is adjustable and reversible and usually performed as an outpatient procedure with a low risk of complications following surgery.
Additional procedures

The first 2 procedures below (intra-gastric balloon and vagal nerve block) are approved by the FDA but are not yet performed at Intermountain facilities. Endoscopic sleeve gastrectomy is performed in specialized centers only. These procedures were included for informational purposes, as patients may be aware of such procedures and may query their healthcare provider regarding their effectiveness and availability.

Intra-gastric balloon
• This is an outpatient procedure.
• Using an endoscope, 1 or 2 soft, silicone balloons are placed in the stomach.
• The balloons are filled with air or saline, taking up space in the stomach.
• They are left in place for about 6 months. The patient experiences a feeling of fullness and is likely to eat less.
• The balloons are removed with an endoscope.

Vagal nerve blockage for obesity (VBLOC)
• The vagus nerve controls hunger and satiety, telling the brain when the stomach feels empty or full.
• A small device, similar to a pacemaker, with wire leads and electrodes, is surgically implanted into the abdomen. The device sends intermittent electrical signals to the abdominal vagus nerve, blocking the nerve activity between the stomach and the brain during waking hours.
• The procedure is reversible.

Endoscopic sleeve gastroplasty
• An endoscope is passed into the stomach.
• The surgeon places sutures in the stomach, creating a smaller space for food to be stored.
• As needed, the procedure can be performed again to recapture the feeling of fullness the patient experienced immediately after the first surgery.
• The procedure can also be reversed.
POSSIBLE RISKS AND COMPLICATIONS

Compared with other operations, bariatric surgery is considered to be remarkably safe, particularly in terms of mortality. According to the Agency for Healthcare Research and Quality (AHRQ), the risk of death from bariatric surgery is 0.1%, and the overall risk of major complications is about 0.4%. AHRQ. This is similar to other abdominal operations.

As in all cases, risk is determined by the type of surgery as well as the patient’s comorbidities and general health. Although risks are low, the complications can be deadly and need to be treated by a bariatric surgeon or a physician familiar with treating such complications. Complications can be acute or long-term.

Acute complications

Acute complications occur in 5% to 10% of patients regardless of the type of surgery. In morbidly obese patients, the first sign of a significant problem may only be tachycardia. Other complications include:

- Infection
- Hemorrhage, obstruction, or anastomotic leaks
- Arrhythmias
- Pulmonary embolism
- Pneumonia
- Injury to the spleen
- Blood clots
- Recurrent vomiting

Workups for these complications should follow standard practice and involve the bariatric surgeon as early as possible.

Long-term complications

- Acid reflux, ulcers, or esophagitis
- Dumping syndrome or other GI distress
- Neuropathies due to nutritional deficiencies
- Anemia without evidence of blood loss
- Osteopenia/Osteoporosis
  - In patients with a gastric bypass or duodenal switch, DEXA scanning may be performed at baseline and at 2 years for at-risk patients.
  - Evaluation should include serum PTH, total calcium, phosphorus, 23-hydroxy vitamin 25, and 24-hour urine calcium.
  - Treat with IV instead of oral bi-phosphonates.
• **Kidney stones** (calcium oxalate)
  
  – Avoid dehydration.
  
  – Recommend low-oxalate meal plan.
  
  – Prescribe oral calcium, potassium citrate, and probiotics containing oxalobacter formigenes.

• **Internal hernias.** Patients who have undergone gastric bypass or BPD-DS and present with a bowel obstruction are more likely to have an internal hernia than just intra-abdominal adhesions. A surgeon needs to be involved soon to prevent loss of small bowel due to ischemia.

• **Other complications:**
  
  – Bowel obstruction
  
  – Dehydration
  
  – Cholelithiasis
  
  – Kidney failure
  
  – Anastomotic stenosis
  
  – Emotional disorders, depression
  
  – Nutritional deficiencies
  
  – Hypoglycemia
  
  – Weight gain
  
  – Hair loss
  
  – Loose skin

Consider referral to a bariatric surgeon to address many of these problems.

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**POSTOPERATIVE CARE**

The post-surgery bariatric patient has unique needs. To address these needs, a panel of Intermountain experts examined the standards set by the MBSAQIP and developed a system for effective handoffs from the surgical care team to the primary care provider. The MBSAQIP requires that documented processes be developed for long-term follow up including:

• Identifying patients that are more than 1 year out from initial follow up

• Addressing why patients get lost to follow-up and how to avoid this

• Screening for mental health issues

  Current and past DSM5 psychiatric disorders are prevalent among bariatric surgery candidates and are associated with greater obesity and lower functional health status, highlighting the need to understand potential implications for surgery preparation and outcome.\(^{1,10}\)

  – Presurgery psychosocial functioning does not seem to affect the outcome of surgery, and psychosocial outcome is generally encouraging over the short term.

  – Moderate-quality evidence supports an association between bariatric surgery and lower rates of depression postoperatively.\(^{1,10,12}\)

  – Many patients experience depression and binge eating disorder, which is associated with weight regain.

  – Poor adjustment after weight loss has also been reported as a factor in alcohol abuse and suicide.\(^{1,10}\)

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**WHERE TO FIND INFORMATION ABOUT MBS**

Widespread use of online resources and anecdotal information often lead patients to inadequate and often inaccurate information. The ASMBS website provides a robust library of information for patients and providers alike.

The [ASMBS website](https://asmbs.org) provides information about obesity and surgery for diabetes as well as a list of the many misconceptions about bariatric surgery including weight gain, morbidity, suicide, and surgery as a “cop out.”
PREGNANCY AND MBS

MBS may increase fertility in some patients. Providers should counsel on the need for birth control, as pregnancy should be avoided for 12 to 18 months after surgery.

Non-oral birth control is recommended for women who have had RYGB or malabsorptive surgeries.

Women who become pregnant after bariatric surgery need to be monitored closely and counseled regarding nutrition, weight gain, and supplementation to ensure the health of the fetus.

- Monitor for nutritional deficiencies every trimester including screening for iron, folate, B₁₂, calcium, and fat-soluble vitamins.
- Make band adjustments in patients with LAGB to ensure appropriate weight gain and fetal health during pregnancy.¹

Many primary care providers are likely to have patients in their practice who have had weight loss surgery. To understand what follow-up they should have, refer to the table below.²

<table>
<thead>
<tr>
<th>Procedure</th>
<th>30-day bariatric surgeon</th>
<th>6-month surgeon, PCP, other</th>
<th>12-month surgeon, PCP, other</th>
<th>Lifelong surgeon, PCP, other</th>
</tr>
</thead>
<tbody>
<tr>
<td>LABG</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>LSG</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RYGB</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>BPD-DS</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td></td>
</tr>
</tbody>
</table>

- At each visit, assess for weight loss, adherence to diet, nutrition, physical activity, and evidence of complications; adjust medications.

**Labs and diagnostic testing**

<table>
<thead>
<tr>
<th>Test</th>
<th>Every 3 to 6 months</th>
<th>At 12 months (or more, as indicated)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBC</td>
<td>−</td>
<td>√</td>
</tr>
<tr>
<td>CMP</td>
<td>−</td>
<td>√</td>
</tr>
<tr>
<td>Lipids</td>
<td>Based on risk and therapy</td>
<td>√</td>
</tr>
<tr>
<td>Vitamin B12</td>
<td>If supplemented</td>
<td>√</td>
</tr>
<tr>
<td>Vitamin A, folic acid (Folate), Vit. D, PTH, iron</td>
<td>−</td>
<td>√</td>
</tr>
<tr>
<td>Dexa scan</td>
<td>√</td>
<td>√</td>
</tr>
</tbody>
</table>

**Comorbidity resolution**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes</td>
<td>MONITOR blood glucose; adjust meds as needed.</td>
</tr>
<tr>
<td>Hypertension</td>
<td>MONITOR blood pressure; adjust meds as needed.</td>
</tr>
<tr>
<td>Hyperlipidemia</td>
<td>MONITOR lipid levels; adjust meds as needed.</td>
</tr>
<tr>
<td>Sleep apnea</td>
<td>MONITOR C-Pap tolerance; refer to sleep lab as needed.</td>
</tr>
</tbody>
</table>

**Physical activity**

- Increase as tolerated
- Cardio: 150 minutes per week to start
- Strength training (30-minute session): 2 to 3 sessions per week
- Work up to a goal of 300 minutes per week

Abbreviations:

LAGB: Laparoscopic gastric band
LSG: Laparoscopic sleeve gastrectomy
RYGB: Roux-en-Y gastric bypass
BPD-DS: Biliopancreatic diversion with duodenal switch
PCP: Primary care provider

BEST PRACTICE FLASH CARDS ALIGNED WITH THIS CPM

Metabolic and Bariatric Procedures

Follow-Up Care for Bariatric Patients

Nutritional Care After Bariatric Surgery
### TABLE 1: ROUTINE CARE AND FOLLOW-UP VISITS (continued)

#### Nutritional Evaluation

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>LABG</th>
<th>LSG</th>
<th>RYGB</th>
<th>BPD-DS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin A</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Every 6 to 12 months</td>
</tr>
<tr>
<td>Iron</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Baseline and annually</td>
</tr>
<tr>
<td>Vitamin B12</td>
<td>–</td>
<td>Baseline and annually</td>
<td>Routine screening not recommended. Check in patients with unexplained anemia or fatigue, persistent diarrhea, cardiomyopathy, or metabolic bone disease.</td>
<td></td>
</tr>
<tr>
<td>Selenium</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Zinc</td>
<td>Consider in patients with hair loss, pica, significant dysgeusia, or (for male patients) with hypogonadism or erectile dysfunction.</td>
<td>Annually</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Copper</td>
<td>Routine screening not recommended. Evaluate in patients with anemia, neutropenia, myeloneuropathy, or impaired wound healing.</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thiamin (B1)</td>
<td>Routine screening not recommended. Consider in patients with rapid weight loss, protracted vomiting, parenteral nutrition, excessive alcohol use, neuropathy, encephalopathy, or heart failure.</td>
<td>–</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Lipids

| Blood levels | Every 6 to 12 months |

#### Nutritional Supplementation

<table>
<thead>
<tr>
<th>Blood levels</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALL PATIENTS</td>
<td></td>
</tr>
<tr>
<td>Multivitamin</td>
<td>• 1–2 per day, to 200% of RDA</td>
</tr>
<tr>
<td>Calcium citrate</td>
<td>• 1500 mg (500 mg x 3 daily)</td>
</tr>
<tr>
<td>Vitamin D</td>
<td>&lt; 30 ng/mL • 400 units D3, twice daily, OR Ergocalciferol 50,000 units weekly x 8 weeks (oral)</td>
</tr>
</tbody>
</table>

**ONLY AS INDICATED**

<table>
<thead>
<tr>
<th>Blood levels</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thiamine</td>
<td>• 100 mg daily to treat deficiency</td>
</tr>
<tr>
<td>Vitamin B12</td>
<td>• Sublingual or intramuscular injection as prescribed</td>
</tr>
<tr>
<td>Folate</td>
<td>&lt; 5 ng/mL • 1 mg folate daily (oral)</td>
</tr>
<tr>
<td>Total iron binding capacity</td>
<td>Iron saturation &lt; 20% • Ferrous gluconate 325 mg (oral)</td>
</tr>
<tr>
<td>Ferritin</td>
<td>&lt; 15 ng/ml women &lt; 30 ng/ml men • Ferrous gluconate 325 mg (oral)</td>
</tr>
<tr>
<td>Zinc</td>
<td>&lt; 60 mcg/dL • 220 mg daily x 4 weeks (oral) (1 mg copper should be taken for each 8 to 15 mg zinc.)</td>
</tr>
<tr>
<td>Magnesium</td>
<td>&lt; 1.6 mg/dL • As appropriate</td>
</tr>
<tr>
<td>Phosphate</td>
<td>&lt; 2.3 mg/dL • As appropriate</td>
</tr>
</tbody>
</table>

- Recommend liquid or chewable supplements to help with absorption.
- If patient has had surgery in the last year, nutrient levels should be checked every 3 to 6 months.
- If the surgery was more than 1 year ago, check these levels yearly and supplement as needed.

#### Diet

- Rigidly control portions.
- Restrict food selection.
- Recommend collaboration and consultation with an RDN experienced in treating bariatric patients.
In 2014, the ASMBS and the American College of Surgeons (ACS) joined together to become a single certifying body — the Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program (MBSAQIP) — for MBS programs in the United States and Canada. Accreditation by MBSAQIP indicates the facility and associated surgeons have achieved standard benchmarks and support continuous quality improvement.

Intermountain has developed perioperative protocols that align with MBSAQIP standards. The protocols address the entire perioperative process, including psychosocial evaluation, patient screening, pre- and post-operative care, and nutrition evaluations and counseling. In addition, Intermountain has developed 2 clinical guidelines detailing Anesthesia for Bariatric Surgery and providing guidance for treatment of Bariatric Patients in the Emergency Department.

Accredited Intermountain Centers
Currently, 3 Intermountain surgery centers are accredited for all types of MBS.

**LDS Hospital**
8th Avenue & C Street
Salt Lake City UT, 84143
801-408-1760

**Utah Valley Hospital**
1034 North 500 West
Provo UT, 84604
801-357-2294

**Dixie Regional Medical Center**
1380 East Medical Center Dr.
St. George UT, 84790
435-251-1632

This CPM is based on best evidence at the time of publication. It is not meant to be a prescription for every patient. Clinical judgment based on each patient’s unique situation remains vital.

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**KEY REFERENCES**

The following are the primary references used in the development of this CPM. A complete list of references can be found on the Surgical Services topic page on intermountain.net/clinicalprograms.