Bariatric and Metabolic Surgery
Choosing the right procedure for you
### Chart for Calculating BMI

This chart is based on information from the American Society for Metabolic and Bariatric Surgery. It helps in determining your body mass index (BMI) based on your height and weight.

BMI is calculated using the formula:

\[
BMI = \frac{weight\ (kg)}{height\ (m)^2}
\]

#### Height and Weight Categories

<table>
<thead>
<tr>
<th>Height (in)</th>
<th>Weight (lbs)</th>
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<tbody>
<tr>
<td>5'0&quot;</td>
<td>110, 120</td>
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<tr>
<td>5'1&quot;</td>
<td>120, 130</td>
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<tr>
<td>5'2&quot;</td>
<td>130, 140</td>
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<td>5'3&quot;</td>
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<td>5'4&quot;</td>
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<td>5'5&quot;</td>
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<td>170, 180</td>
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<td>5'7&quot;</td>
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<td>6'9&quot;</td>
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<td>7'0&quot;</td>
<td>330, 340</td>
</tr>
<tr>
<td>7'1&quot;</td>
<td>340, 350</td>
</tr>
</tbody>
</table>

#### BMI Categories

- **Underweight**: BMI < 18.5
- **Healthy weight**: BMI: 18.5 to 24.9
- **Overweight**: BMI: 25 to 29.9
- **Class I obesity**: BMI: 30 to 34.9
- **Class II obesity**: BMI: 35 to 39.9
- **Class III severe obesity**: BMI: ≥ 40

#### Health Risks of Obesity

- Underweight: Increased risk of osteoporosis, vitamin deficiencies, and infertility.
- Healthy weight: Optimal health with lowered risk of chronic diseases.
- Overweight: Increased risk of type 2 diabetes, high blood pressure, and certain cancers.
- Class I obesity: Substantial health risks, including increased risk of heart disease, stroke, and hypertension.
- Class II obesity: Serious health risks, potentially requiring medical intervention.
- Class III severe obesity: Life-threatening health risks, often requiring aggressive treatment and lifestyle changes.

[Chart based on information from the American Society for Metabolic and Bariatric Surgery.](http://asmbs.org/calculate-your-bmi/)
What Is Your BMI?

Chart based on information from the American Society for Metabolic and Bariatric Surgery.
http://asmbs.org/calculate-your-bmi/
How bariatric and metabolic surgery can improve your life

Bariatric and metabolic surgery help you to make the following changes:

• Decrease food intake
• Lose excess weight
• Take control of your overall health

Many obesity-related health conditions may be improved or resolved, including:

• Type 2 diabetes
• High blood pressure/heart disease
• Osteoarthritis of weight-bearing joints
• Heartburn
• Infertility/menstrual dysfunction
• Dyslipidemia (lipid metabolism abnormalities)
• Sleep apnea
• Gastroesophageal reflux/heartburn

Overall quality of life for bariatric surgery patients improves greatly.

Patients have experienced improvements in many areas of their lives:

• Physical functioning and appearance
• Social opportunities
• Economic opportunities
• Decrease food intake
• Lose excess weight
• Take control of your overall health

For an explanation of the risks of bariatric surgery, see the Risks of Abdominal Surgery tab.

There are multiple types of bariatric surgery:

• Gastric bypass
• Sleeve gastrectomy
• Gastric banding

Benefits of Surgery

Type 2 diabetes: A disorder of glucose and insulin metabolism.
How bariatric and metabolic surgery can improve your life

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• High blood pressure/heart disease
• Osteoarthritis of weight-bearing joints
• Obstructive sleep apnea
• Gastroesophageal reflux/heartburn
• Infertility/menstrual dysfunction
• Stress urinary incontinence
• Dyslipidemia (lipid metabolism abnormalities)

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Type 2 diabetes: A disorder of glucose and insulin metabolism.
Resolution of Obesity-Related Disease

After Bariatric and Metabolic Surgery

Migraines
46% improved

Depression
47% reduced

Pseudotumor cerebri
96% resolution of headaches

95% resolution of pulsatile tinnitus

Obstructive sleep apnea
45% to 76% resolved

Asthma
39% resolved

Nonalcoholic fatty liver disease
37% resolution of steatosis

GERD
72% to 95% resolved

Polycystic ovarian syndrome
52% resolution of hirsutism

100% resolution of menstrual dysfunction

Urinary stress incontinence
50% resolved

Osteoarthritis/degenerative joint disease
41% resolved

Venous stasis disease
95% resolution of venous stasis ulcers

High cholesterol
71% to 94% improved

High blood pressure
42% to 66% resolved

Metabolic syndrome
80% resolved

Type 2 diabetes

There are different types of bariatric surgery procedures, and your outcomes may vary depending on the type of procedure (as indicated in the ranges provided above). Please talk with your doctor about potential outcomes and your outcomes may vary depending on the type of procedure.

*Figure is for hyperlipidemia. Hyperlipidemia is a general term for high fats in blood, which may include cholesterol and/or triglycerides.
Resolution of Obesity-Related Disease After Bariatric and Metabolic Surgery

- **Migraines**: 46% improved
- **Depression**: 47% reduced
- **Pseudotumor cerebri**: 96% resolution of headaches
- **Obstructive sleep apnea**: 45% to 76% resolved
- **High cholesterol**: 71% to 94% improved
- **Asthma**: 39% resolved
- **Nonalcoholic fatty liver disease**: 37% resolution of steatosis
- **GERD**: 72% to 96% resolved
- **Metabolic syndrome**: 80% resolved
- **Type 2 diabetes**: 45% to 68% resolved
- **Polycystic ovarian syndrome**: 52% resolution of hirsutism
- **Urinary stress incontinence**: 50% resolved
- **Osteoarthritis/degenerative joint disease**: 41% resolved
- **Venous stasis disease**: 95% resolution of venous stasis ulcers

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There are different types of bariatric surgery procedures, and your outcomes may vary depending on the type of procedure (as indicated in the ranges provided above). Please talk with your doctor about potential surgical outcomes related to your procedure.
Understanding the Gastrointestinal Anatomy

- Stomach
- Esophagus
- Liver
- Pylorus
- Duodenum
- Large Intestine
- Small Intestine
- Stomach
- Liver
- Duodenum
- Pylorus
- Esophagus

Understanding the Gastrointestinal Anatomy
Understanding the Gastrointestinal Anatomy

- Esophagus
- Stomach
- Liver
- Pylorus
- Duodenum
- Small intestine
- Large intestine
Roux-en-Y Gastric Bypass

- Excluded portion of stomach
- Alimentary or roux limb
- Small intestine
- Esophagus
- Gastric pouch
- Duodenum
- Pylorus
- Stomach
Roux-en-Y Gastric Bypass
Roux-en-Y Gastric Bypass

How does it work?
During the procedure, the surgeon creates a small stomach pouch. The surgeon then attaches a section of the small intestine directly to the pouch. This allows food to bypass a portion of the small intestine, which absorbs calories and nutrients. Having the smaller stomach pouch causes patients to feel full sooner and eat less food; bypassing a portion of the small intestine means the patient’s body absorbs fewer calories. Like other metabolic surgeries, it also helps to establish a lower, healthier body fat set point by changing the signals between the stomach, brain, and liver.15

What are the benefits?
Patients report an early sense of fullness and satisfaction that reduces the desire to eat. Patients who have gastric bypass generally lose more weight sooner than patients who undergo purely restrictive procedures.

Gastric bypass patients can also experience dumping syndrome. This syndrome is a rapid movement of food through the small intestine that leaves the patient feeling flushed and uncomfortable, but it may also be seen as a benefit, as it provides important warning signs that too much sugar or food is being consumed.

What are the risks, complications, and side effects?
Additional risks and complications associated with Roux-en-Y gastric bypass include:
- Dehiscence (separation of tissue that was stitched or stapled together)
- Leaks from staple lines
- Ulcers
- Dumping syndrome, an unpleasant side effect that may include vomiting, nausea, weakness, sweating, faintness, and diarrhea
- Required supplementation of diet with a daily multivitamin, calcium, and sometimes vitamin B12 and/or iron
- Inability to detect the stomach, duodenum and parts of the small intestine using X-ray or endoscopy should problems arise after surgery, such as ulcers, bleeding, or malignancy
- Increased gas

Stapled: Surgical staples, similar in look and function to those used to fasten paper, are used for connecting tissue. Staples are usually permanent and made of titanium.
How does it work?

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- инъекции using X-ray or endoscopy should problems arise after surgery
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- Required supplementation of diet with a daily multivitamin, calcium, and sometimes vitamin B12 and/or iron
- Dehiscence (separation of tissue that was stitched or stapled together)
- Dumping syndrome, an unpleasant side effect that may occur
- Ulcers
- Leaks from staple lines
- Blood clots
- Additional risks associated with Roux-en-Y gastric bypass include:

Roux-en-Y Gastric Bypass

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Vertical sleeve gastrectomy

- Removed portion of stomach
- Gastric sleeve
- Small intestine
- Esophagus
- Pylorus
- Stomach or stomach removed portion
- Oesophagus
Vertical Sleeve Gastrectomy

- Esophagus
- Removed portion of stomach
- Gastric sleeve
- Pylorus
- Small intestine
How does it work?
During this procedure a thin vertical sleeve of stomach is created using a stapling device. The staple is about the size of a banana. The excised portion of the stomach is removed. Food passes through the digestive tract in the usual way, allowing vitamins and nutrients to be absorbed into the body. Like other metabolic surgeries, it also helps to establish a lower, healthier body fat set point by changing the signals between the stomach, brain, and liver.

What are the benefits?
A sleeve gastrectomy limits the amount of food you can eat by permanently reducing the size of your stomach. As a result, you feel full with less food and stay satisfied longer.

What are the risks, complications, and side effects?
Additional risks and complications associated with vertical sleeve gastrectomy include:

- Fistula
- Esophageal dysmotility
- Dyspepsia
- Ulcers
- Leaks from staple lines
- Dehiscence (separation of tissue that was stitched together)
- Fistula

Using a stapling device. The staple is about the size of a banana. This procedure creates a thin vertical sleeve of stomach.

How does it work?
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-Leaks from staple lines
-Ulcers
-Dyspepsia
-Esophageal dysmotility
-Fistula

Stapled: Surgical staples, similar in look and function to those used to fasten paper, are used for connecting tissue. Staples are usually permanent and made of titanium.
How does it work?

A silicone band is placed around the upper part of the stomach to create a small upper pouch and lower stomach. To control the tightness around your stomach, saline is delivered through an injection port and tubing connected to the band. The injection port is attached to the abdominal wall during surgery.

What are the benefits?

Gastric banding limits the amount of food you can eat at one time. This means you will feel fuller sooner and stay full longer. You will feel less food, your body will avoid discomfort and regulation. As you eat less food, your body will adjust to your band and fill with minimal discomfort. Your health care team will determine when adjustments to your band are needed. You will quickly learn how to control your appetite.

What are the risks, complications, and side effects?

Additional risks and complications associated with adjustable gastric banding include:

- Port-site infection
- Migration of implant (band erosion, band slippage, and port displacement)
- Gastroesophageal reflux disease (GERD)
- Esophageal spasm
- Band leak
- Tubing-related complications (port disconnection
- and tubing kinking)
- Stomachache to the lower stomach. This means you will feel fuller sooner and stomach to the upper stomach. This means you will feel fuller sooner and stomach to the upper stomach.

For this reason, you will feel fuller sooner than usual. The stomach will stop storing excess calories and begin to use its fat energy stores. You will eat less food, your body will avoid discomfort and regulation. As you eat less food, your body will adjust to your band and fill with minimal discomfort. Your health care team will determine when adjustments to your band are needed. You will quickly learn how to control your appetite.
Adjustable Gastric Banding

How does it work?

A silicone band is placed around the upper part of the stomach to create a small upper pouch and lower stomach. To control the tightness around your stomach, saline is delivered through an injection port and tubing connected to the band. The injection port is attached to the abdominal wall during surgery.\(^{15}\)

What are the benefits?

Gastric banding limits the amount of food you can eat at one time. For this reason, you will feel full sooner than usual. The stomach created by the band also slows the flow of food from the small upper stomach to the lower stomach. This means you will feel full sooner and stay full longer, and you will have better control of your appetite.

When the band fits properly and is filled adequately, it helps you feel satisfied and full with minimal discomfort. Your health care team will determine when adjustments to your band are needed. You will quickly learn how to eat to avoid discomfort and regurgitation. As you eat less food, your body will stop storing excess calories and begin to use its fat energy stores.

What are the risks, complications, and side effects?

Additional risks and complications associated with gastric banding include:

- Migration of implant (band erosion, band slippage, and port displacement)
- Tubing-related complications (port disconnection and tubing kinking)
- Band leak
- Esophageal spasm
- Gastroesophageal reflux disease (GERD)
- Inflammation of the esophagus or stomach
- Port-site infection

Other nonserious complications also were reported in a U.S. clinical study.\(^{16}\) None of these complications are usually life threatening. To learn more about the U.S. clinical study, visit REALIZE.com
Biliopancreatic Diversion with Duodenal Switch (BPD/DS)
Biliopancreatic Diversion with Duodenal Switch (BPD/DS)

- Removed portion of Stomach
- Biliopancreatic limb
- Small intestine
- Biliopancreatic limb
- Common channel
- Alimentary limb
- Gastric pouch
- Esophagus
How Does It Work?

Biliopancreatic diversion with duodenal switch (BPD/DS) is similar to gastric bypass. Instead of a small stomach pouch, the surgeon creates a sleeve-shaped stomach. The surgeon then attaches the final section of the small intestine to the stomach sleeve. The small intestine absorbs calories and nutrients. Bypassing all but the last section of the small intestine causes far fewer calories to be absorbed than with normal anatomy.

Like other metabolic surgeries, it also helps to establish a lower, healthier body fat set point by changing the signals between the stomach, brain, and liver.

What Are the Benefits?

Patients report less restriction on consumed food than with other bariatric procedures. BPD/DS studies also show that this procedure results in the greatest weight loss because it provides the highest levels of malabsorption and has the highest rate of resolution of type 2 diabetes and hyperlipidemia.

What are the risks, complications, and side effects?

- Abdominal bloating and foul-smelling stool or gas
- Ulcers
- Leaks from staple lines
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- Ulcers
- Required supplementation of diet with a daily multivitamin, calcium, and sometimes B12 and/or iron
- Inability to detect the duodenum and parts of the small intestine using X-ray or endoscopy should problems arise after surgery, such as ulcers, bleeding, or malignancy
- Abdominal bloating and foul-smelling stool or gas
**Comparison of Surgical Procedures**

**Important safety information**
Bariatric surgery is used in morbidly obese adult patients for significant long-term weight loss. It may not be right for individuals with certain digestive tract conditions. All surgery presents risks. Weight, age and medical history determine your specific risks. Ask your doctor if bariatric surgery is right for you. For potential risks associated with other bariatric procedures, please visit REALIZE.com/potentialrisks.

Resolution statistics above reflect observations in the confines of studies; EES has no independent data to suggest permanent resolution.

**Diabetes controlled in patients without medications. Control of diabetes is defined as HbA1c ≤7.0%**

### HEALTH BENEFITS SHOWN IN CLINICAL TRIALS

<table>
<thead>
<tr>
<th>Procedure Description</th>
<th>How it Works to Help You Lose Weight</th>
<th>How it Affects Digestion</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total percent excess body weight lost (at 3 years)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Type 2 diabetes</strong></td>
<td></td>
<td></td>
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<tr>
<td><strong>High blood pressure</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>High cholesterol</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Obstructive sleep apnea</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Procedure Description

#### GASTRIC BANDING

The adjustable gastric band wraps around the upper part of the stomach, dividing the stomach into a small upper pouch that holds about ½ cup of food and a larger lower stomach. The degree of band tightness affects how much food you can eat and the length of time it takes for food to leave the stomach pouch.

- By eating a smaller stomach pouch, the band limits the amount of food that can be eaten at one time, so you feel full sooner and stay full longer.
- As you eat less food, your body will stop storing excess calories and start using its fat supply for energy.
- Does not significantly alter normal digestion and absorption. Food passes through the digestive tract in the usual order, allowing it to be fully absorbed in the body.

- **Controlled in 41%**
- **Resolved in 31%**
- **Improved in 23%**
- **Average surgery time in 1 to 2.5 hours**
- **Length of hospital stay in 1 to 3 days**

#### SLEEVE GASTRECTOMY

During the sleeve gastrectomy procedure, a thin vertical sleeve of stomach is created using a stapling device. The sleeve is about the size of a banana. The rest of the stomach is removed.

- By creating a smaller stomach pouch, a sleeve gastrectomy limits the amount of food that can be eaten at one time, so you feel full sooner and stay full longer.
- As you eat less food, your body will stop storing excess calories and start using its fat supply for energy.
- Does not significantly alter normal digestion and absorption. Food passes through the digestive tract in the usual order, allowing it to be fully absorbed in the body.

- **Controlled in 66%**
- **Resolved in 45%**
- **Improved in 60%**
- **Average surgery time in 1.5 to 3.5 hours**
- **Length of hospital stay in 2 to 12 days**

#### GASTRIC BYPASS

In this procedure, the surgeon creates a small stomach pouch using a stapling device and attaches a section of the small intestine directly to the pouch. This allows food to bypass a portion of the small intestine.

- By creating a smaller stomach pouch, a gastric bypass limits the amount of food that can be eaten at one time, so you feel full sooner and stay full longer.
- By bypassing a portion of the small intestine, your body also absorbs fewer calories.
- As you eat less food and absorb fewer calories, your body will stop storing excess calories and start using its fat supply for energy.
- Reduces the amount of calories (in the form of nutrients) absorbed.

- **Controlled in 62%**
- **Resolved in 66%**
- **Resolved in 76%**
- **Average surgery time in 2 to 3.7 hours**
- **Length of hospital stay in 2 to 8 days**
Comparison of Surgical Procedures

<table>
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<tr>
<th>Procedure Description</th>
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<td><strong>GASTRIC BANDING</strong></td>
<td>By creating a smaller stomach pouch, the band limits the amount of food that can be eaten at one time, so you feel full sooner and stay full longer. As you eat less food, your body will stop storing excess calories and start using its fat supply for energy.</td>
<td>Does not significantly alter normal digestion and absorption. Food passes through the digestive tract in the usual order, allowing it to be fully absorbed in the body.</td>
<td>66%7,8</td>
<td>46% controlled7,8,9,20</td>
<td>71%3</td>
<td>45%1</td>
<td>71%1</td>
<td>1 to 2.5 hours5</td>
<td>1 to 3 days5</td>
</tr>
<tr>
<td><strong>SLEEVE GASTRECTOMY</strong></td>
<td>By creating a smaller stomach pouch, a sleeve gastrectomy limits the amount of food that can be eaten at one time, so you feel full sooner and stay full longer. As you eat less food, your body will stop storing excess calories and start using its fat supply for energy.</td>
<td>Does not significantly alter normal digestion and absorption. Food passes through the digestive tract in the usual order, allowing it to be fully absorbed in the body.</td>
<td>66%7,8</td>
<td>45-58% controlled7,8,9,20</td>
<td>77%3</td>
<td>60%1</td>
<td>94%1</td>
<td>1.5 to 3.5 hours5</td>
<td>2 to 12 days5</td>
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<td><strong>GASTRIC BYPASS</strong></td>
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<td>Reduces the amount of calories (in the form of nutrients) absorbed.</td>
<td>62%7,8</td>
<td>60-84% controlled7,8,9,20</td>
<td>94%3</td>
<td>76%1</td>
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<td>2 to 3.7 hours5</td>
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</table>

**Health Benefits Shown in Clinical Trials**

<table>
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<th>Benefits</th>
<th>Type 2 diabetes</th>
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<th>Length of hospital stay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes controlled in patients without medications. Control of diabetes is defined as HbA1c ≤7.0%</td>
<td>20-59% controlled7,8,9,20</td>
<td>42% resolved8</td>
<td>71% improved3</td>
<td>45% resolved3</td>
<td>1 to 2.5 hours5</td>
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**Important Safety Information**

Bariatric surgery is used in morbidly obese adult patients for significant long-term weight loss. It may not be right for individuals with certain digestive tract conditions. All surgery presents risks. Weight, age and medical history determine your specific risks. Ask your doctor if bariatric surgery is right for you. For potential risks associated with other bariatric procedures, please visit REALIZE.com/potentialrisks.

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*Diabetes controlled in patients without medications. Control of diabetes is defined as HbA1c ≤7.0%
The location, number, and size of incisions may vary from surgeon to surgeon.

Figure 1: Incisions for laparoscopic bariatric surgery

Figure 2: Incisions for open bariatric surgery
Incision Types for Bariatric Surgery

*The location, number, and size of incisions may vary from surgeon to surgeon.*
There are risks associated with abdominal surgery. You can think of risks in the following way: some are associated with surgery, some are specific to a particular bariatric procedure, and some may be unique to you. If you have health conditions such as heart disease or diabetes, or if you are on certain medications (such as blood-thinning medications), your surgeon will inform you about your specific risks for bariatric surgery.

Risks associated with any general abdominal surgery include:

- Bleeding
- Pain
- Shoulder pain
- Pneumonia
- Complications due to anesthesia and medications
- Deep vein thrombosis
- Injury to the stomach, esophagus, or surrounding organs
- Death
- Stroke
- Pulmonary embolism
- Infection
- Abdominal hernia
- Vomiting and nausea
- Surgical procedure repeated
- Stretching of the stomach
- Soreness of the abdomen
- Constipation or diarrhea
- Dehydration
- Enlarged heart
- Peritonitis
- Collapsed lung
- Chest pain
- Abdominal hernia
- Gastrointestinal inflammation or swelling
- Gallstones, pain from passing a gallstone, inflammation of the gallbladder, or surgery to remove the gallbladder
- Gallstones, pain from passing a gallstone, inflammation of the gallbladder
- Gallstones, pain from passing a gallstone, inflammation of the gallbladder

Risks associated with bariatric and metabolic surgery include:

- Abdominal hernia
- Deep vein thrombosis
- Injury to the stomach, esophagus, or surrounding organs
- Death
- Stroke
- Pulmonary embolism
- Infection
- Complications due to anesthesia and medications
- Chest pain
- Shoulder pain
- Pain
- Bleeding
- Abdominal hernia
- Vomiting and nausea
- Surgical procedure repeated
- Stretching of the stomach
- Soreness of the abdomen
- Constipation or diarrhea
- Dehydration
- Enlarged heart
- Peritonitis
- Collapsed lung
- Chest pain
- Abdominal hernia
- Gastrointestinal inflammation or swelling
- Gallstones, pain from passing a gallstone, inflammation of the gallbladder, or surgery to remove the gallbladder
- Gallstones, pain from passing a gallstone, inflammation of the gallbladder
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Risks of abdominal surgery:

Abdominal: Referring to the part of the body between the ribs and the pelvis.


Pulmonary embolism: A sudden blockage of a lung artery by material circulating in the blood; most often a blood clot from a deep vein in the lung or pelvis.
There are risks associated with abdominal surgery. You can think of risks in the following way: some are associated with surgery, some are specific to a particular bariatric procedure, and some may be unique to you. If you have health conditions such as heart disease or diabetes, or if you are on certain medications (such as blood-thinning medications) or have had other surgeries, your surgeon will inform you about your specific risks for bariatric surgery.

Risks associated with any general abdominal surgery include:

- Bleeding
- Pain
- Shoulder pain
- Pneumonia
- Complications due to anesthesia and medications
- Deep vein thrombosis
- Injury to the stomach, esophagus, or surrounding organs
- Infection
- Pulmonary embolism
- Stroke or heart attack
- Death

Risks associated with bariatric and metabolic surgery

Risks associated with all bariatric surgeries include:

- Abdominal hernia
- Chest pain
- Collapsed lung
- Constipation or diarrhea
- Dehydration
- Enlarged heart
- Gallstones, pain from passing a gallstone, inflammation of the gallbladder, or surgery to remove the gallbladder
- Gastrointestinal inflammation or swelling
- Stoma obstruction
- Stretching of the stomach
- Surgical procedure repeated
- Vomiting and nausea

**Abdominal:** Referring to the part of the body between the ribs and the pelvis that encloses the viscera.

**Deep vein thrombosis:** Blood clot.

**Pulmonary embolism:** A sudden blockage of a lung artery by material circulating in the blood; most often a blood clot from a deep vein in the lung or pelvis.
References