CROHN'S
&COLITIS
FOUNDATION

Diet, Nutrition, and **Inflammatory Bowel Disease**

What's Inside

Figuring out what to eat when you have an inflammatory bowel disease (IBD), like Crohn's disease or ulcerative colitis, can be complicated. These diseases affect your diet and nutrition in a variety of ways:

- **Certain foods or food groups may worsen symptoms.** These foods can be different for everyone and may change over time.
- **You may be able to eat most foods when feeling well, but need to avoid certain foods when you are flaring (active symptoms)**
- **A balanced, nutrient-rich diet is important to avoid nutrient deficiencies**
- **Hydration (water) is key to feeling well**
- **Many of our social activities involve food and drink.** With some additional planning, there's no reason why you can't enjoy those social gatherings.

This brochure explains the impact of IBD on diet and nutrition and provides practical information to help you eat well and stay healthy.

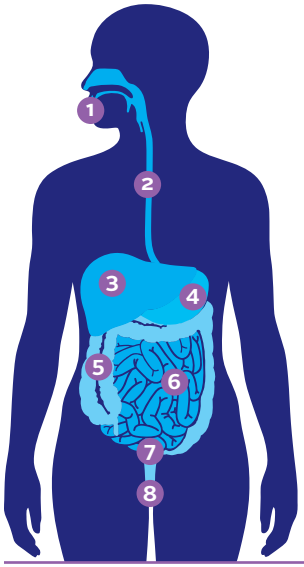
About Crohn's & colitis

Crohn's disease and ulcerative colitis belong to a group of conditions known as IBD. These diseases cause chronic inflammation in the gastrointestinal (GI) tract, the area of the body where digestion and absorption of nutrients take place. Normally, the immune system helps to protect the body from harmful infections and irritants. In IBD, the immune system reacts inappropriately, causing inflammation. This may lead to symptoms such as abdominal pain and cramping, diarrhea, bleeding, weight loss, and/or fatigue.

For more information about Crohn's disease or ulcerative colitis, view the Foundation's Living with Crohn's Disease and Living with Ulcerative Colitis brochures by visiting www.crohnscolitisfoundation.org/brochures

The digestive system

The GI tract consists of a series of mostly hollow organs beginning at the mouth and followed by the esophagus, stomach, small intestine, colon, rectum, and anus *(see Figure 1)*.



THE GASTROINTESTINAL (GI) TRACT

1. Oral cavity (mouth)
2. Esophagus (throat)
3. Liver
4. Stomach
5. Large intestine/colon
6. Small intestine
7. Rectum
8. Anus

Figure 1

The roles of the GI system are:

- **Digestion**—the breakdown and processing of food
- **Absorption of nutrients, water, and medication**
- **Elimination of waste**

The effect of IBD on digestion

Crohn's disease can affect any part of the GI tract, from the mouth to the anus. Ulcerative colitis affects the large intestine (colon and rectum). Because of the location of Crohn's and colitis, they can impact digestion in a number of ways:

- Inflammation in the small intestine can interfere with digestion and prevent absorption of vitamins, nutrients, water, carbohydrates, fats, proteins, and minerals.
- Water is reabsorbed in the colon. Inflammation in the colon prevents water from being reabsorbed from the stool. This may lead to diarrhea and urgent bowel movements.

IBD symptoms, complications, medications, and nutrition

Maintaining healthy nutrition with IBD can be a struggle due to active disease symptoms, disease complications, and medication side effects.

IBD symptoms

When your disease is active, symptoms like diarrhea, urgency to have a bowel movement (rushing to the bathroom), abdominal pain, nausea, vomiting, blood in the stool, constipation,

loss of appetite, fatigue, and weight loss can negatively impact nutrition.

Severe diarrhea can cause dehydration, which means that your body may not have enough fluids, nutrients, and/or electrolytes (especially sodium, potassium, magnesium, phosphorus, and zinc). If you are struggling with abdominal pain and nausea, you may not have an appetite, making it difficult to eat enough calories and take in adequate nutrients. When you are having numerous bowel movements daily, you may avoid eating to try to control diarrhea or avoid abdominal pain. This puts you at risk for malnutrition and weight loss.

Another possible symptom of IBD is rectal bleeding resulting from sores (ulceration) that form in the intestines, leading to blood loss. Chronic blood loss can eventually lead to anemia (low red blood cell count), which, if left unchecked, may cause fatigue.

IBD complications

Malabsorption of nutrients

Malabsorption (difficulty absorbing nutrients) may occur due to inflammation in the intestines. Proteins, fats, carbohydrates, vitamins, and minerals are absorbed primarily in the small intestine. If you have Crohn's disease that involves the small intestine (duodenum, jejunum, and ileum), inflammation can interfere with absorption of many nutrients, leading to malnutrition and weight loss.

The degree of malabsorption depends on how much of the small intestine is affected by Crohn's disease. Generally, the malabsorption and nutrient deficiencies tend to be more significant if larger sections of the small intestine are inflamed or removed. If a significant portion of the ileum (end of the small intestine) is inflamed or removed, the absorption of fat-soluble vitamins (A, D, E, and K) and vitamin B12 may be affected.

Bile acids or bile salts help your body to absorb fats. These bile salts are normally reabsorbed in your ileum. When your ileum is inflamed or removed by surgery, bile salts cannot be reabsorbed in the small intestine. Instead, they travel to the colon where they cause watery diarrhea. If a larger section of the ileum is affected, malabsorption of fatty acids can be a problem, causing abdominal cramping, diarrhea, loss of fat-soluble vitamins, and weight loss.

Patients with ulcerative colitis may have less significant nutrient deficiencies because the small intestine is not involved. However, weight loss and anemia may still be a problem due to poor appetite, food aversions, severe diarrhea, and blood loss.

Growth delays

Growth delays may occur in some children with IBD due to long-term use of corticosteroid medications (which inhibit bone growth), intestinal inflammation, and general poor nutrition.

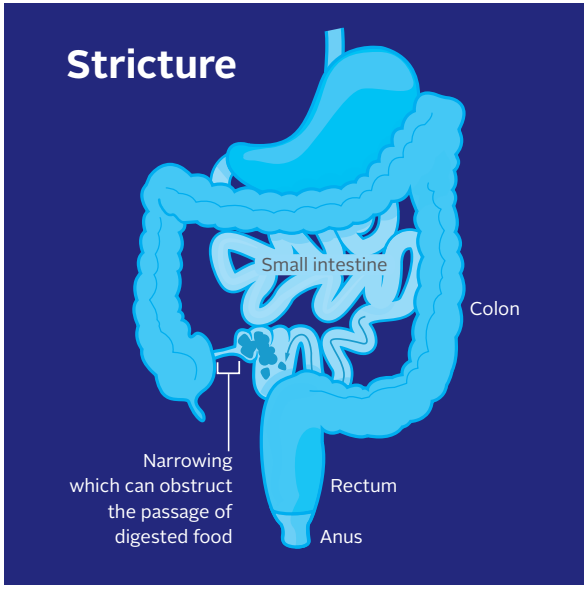
To minimize the negative effects of IBD on growth, good eating habits, adequate calorie intake, and control of intestinal inflammation are essential for children. If your child is not staying on their typical growth curve, it may be necessary to consult your physician or a registered dietitian for help with evaluating caloric and nutrient intake.

Low bone mass

Low bone mass (decreased bone mineral density) is common in children, adolescents, and adults with IBD. Severely low bone mineral density (osteoporosis) increases the risk for bone fracture. This may be due to inadequate calcium intake, poor absorption of calcium, vitamin D deficiency, decreased physical activity, inflammation, and/or long-term use of medications such as corticosteroids. Calcium helps to form and maintain healthy bones and teeth, and vitamin D is needed to help the body absorb calcium. Read more about vitamin and mineral supplementation on page 24.

Strictures

In some people with Crohn's disease, chronic inflammation in the intestine can cause the walls of the intestine to narrow and scar which is called a stricture. The scar tissue may narrow or block the passageway, making it difficult for digested food to pass easily through the intestine. High fiber foods, such as fresh fruits and vegetables, may become blocked in the strictured areas. This may cause pain, bloating, or nausea, especially when eating these foods.



Taking in a low fiber diet or a liquid diet may be needed to minimize the symptoms. For strictures related to inflammation, medications can be used. For strictures related to scar tissue, surgery may be needed to widen the narrowed section or remove it.

IBD medications

Medications tend to work better in people with good nutrition. Certain medications can directly interfere with good nutrition:

- **Corticosteroids** may interfere with calcium absorption and cause a decrease in bone mineral density, putting you at risk for osteopenia (weakened bones) or osteoporosis. They can also increase appetite. Blood sugars may increase on corticosteroid therapy, which can be a problem for people with diabetes or those at risk for diabetes.
- **Sulfasalazine** and **methotrexate** may interfere with the absorption of folic acid, a vitamin that helps the body make new healthy cells. A folic acid supplement is usually recommended when taking these medications.

Check with your doctor or pharmacist to find out if any of your medications could interfere with your nutrition.

Tips for maintaining a healthy diet with IBD

Diet and nutrition are important parts of IBD treatment. **Diet** refers to the foods we eat. **Nutrition** refers to the processes of taking in and using foods for health. A well-balanced diet includes an adequate intake of protein, carbohydrates, water, and fat, as well as vitamins and minerals. This can be achieved by eating a variety of foods:

Proteins: Meat, fish, poultry, legumes (beans, peanuts, soy), nuts, eggs, and dairy products.

Carbohydrates: Grains (rice, wheat, quinoa), fruits, legumes, dairy, and starchy vegetables.

Fats: Olive oil, avocado, butter, and oils.

However, eating with IBD is very individual. You may be able to tolerate certain foods that cause symptoms in others. It's important to figure out what works best for you to minimize your symptoms and maintain good nutrition. There are some basic guidelines to help you decide how and what to eat, especially when your disease is active.

People with IBD try and follow a nutrient-rich diet. If you are experiencing symptoms, it may help to:

- Eat smaller meals
- Have more frequent meals
- Eat in a relaxed atmosphere
- Avoid trigger foods
- Reduce the amount of greasy or fried foods

You may not be able to tolerate certain foods that other patients might have no problem eating. For example, you might be sensitive to spicy food while someone else can't eat popcorn. Figure out what works best for you and try to avoid those foods that don't agree with you.

See page 18 for a sample list of foods that may worsen symptoms when you are experiencing a flare.

The following recommendations are aimed at reducing uncomfortable symptoms, replacing lost fluids, preventing vitamin and mineral deficiencies, and providing adequate caloric intake.

Drink plenty of fluids

Everyone should drink plenty of fluids for good health. Our bodies, which are about 60% water, require a regular intake of water to stay hydrated. Your urine will look clear or light yellow if you are well hydrated. The amount of water to drink depends on several factors, such as physical activity, weather, and health conditions.

Beverages to try:

- Water
- Tomato juice
- Broth
- Oral rehydration solutions (4 cups of water, ½ tsp salt, 6 teaspoons of honey, sugar, or maple syrup. You can add a squeeze of lemon, lime, or orange.)

Beverages to avoid:

- Sugary beverages (juices, sodas, sports drinks). Excess sugar can cause more diarrhea because the sugar pulls water into the gut. Fruit juices and sports drinks used for rehydration and replenishing vitamins and electrolytes may need to be diluted.
- Ice-cold liquids (can cause cramps in some cases)
- Caffeine in coffee, tea, and other beverages can act as a stimulant to "rev" up the bowel. This can increase diarrhea but does not cause inflammation.
- Alcohol dehydrates the body. Drink in moderation and avoid during a flare.

General beverage guidelines:

- Try to drink enough fluid so that your urine looks clear or light yellow. This may include eating some foods with high water content such as watermelon.

- Drink your beverages slowly and avoid using a straw. Drinking fast and using a straw may introduce air into the digestive system, which can increase gas and cause discomfort.

Eat a variety of vegetables and fruits

Vegetables and fruits are important sources of many nutrients and are essential to a healthy diet. Tolerance for vegetables and fruits varies among people with IBD. To ease discomfort during a disease flare, select vegetables and fruits that are easier to digest. Removing the skin and seeds and cooking the vegetables until tender may help you tolerate them better.

If you have difficulty tolerating high fiber foods, try the following:

Low-fiber fruits:

- Bananas
- Cantaloupe
- Honeydew melon
- Cooked fruits

Fully cooked, seedless, skinless, non-cruciferous vegetables:

- Asparagus tips
- Potatoes
- Cucumbers
- Squash
- Vegetable stock

Select the right grains

Grains include wheat, rice, oats, cornmeal, barley, and others. These grains are used to make products such as bread, pasta, oatmeal, and breakfast cereal. In their natural form, grains have three components: bran, germ, and endosperm. Whole grain products contain all three.

Refined grains have been milled to remove the bran and germ, and they have a finer texture.

Grains are important sources of fiber, B vitamins, and minerals (such as iron, magnesium, and selenium). Registered dietitians often recommend eating whole grain products because the process of refining grains removes some of the iron, B vitamins, and fiber. But this is not always advisable for people with IBD because the insoluble fiber in the bran and germ may increase symptoms, especially during a flare.

During a disease flare, foods containing refined grains may cause fewer symptoms and may be easier for you to tolerate.

Recommended refined grains to choose during a flare include:

- Potato bread, sourdough, and white bread
- White pasta
- White rice
- Oatmeal

If you reduce your fiber intake during a flare, slowly increase the amount you consume when you are feeling better. Start by adding only a few grams of fiber per week or one new fiber rich food every three days.

Include protein-rich foods

Meat, seafood, beans, dairy, eggs, nuts, and seeds are excellent sources of protein. They also provide B vitamins (niacin, thiamin, riboflavin and B6), vitamin E, iron, zinc, magnesium, and other nutrients. Most of these foods should be easy to tolerate; however some patients may have issues with nuts and seeds, particularly when flaring or if you have a stricture.

Animal proteins (fish, beef, pork, poultry, eggs, and dairy) contain all the essential amino acids. Plant sources of protein may not contain all amino acids but can be eaten in combination to provide all complete proteins. Other sources of protein include soy-based products, legumes, and grains. Eat a variety of protein sources to ensure that you consume the recommended amount of amino acids.

People with IBD may also need to eat increased amounts of protein when experiencing inflammation or when recovering from inflammation or surgery. In general, it's best to choose lean or low-fat cuts of meat and poultry. This is especially important during disease flares. This is because excess fat can lead to poor absorption and may worsen symptoms. Before cooking meat, trim away any visible fat. Eat fish, especially oily fish that contains omega-3 fatty acids, like tuna and salmon, and try smooth nut butters.

Get enough calcium

Calcium consumption is especially important for people with IBD. To meet your calcium needs without a supplement, aim to eat at least three to four servings of calcium-rich foods daily. Sources of calcium include milk (regular, lactose-free, calcium-fortified almond, or soy), yogurt, cheese, calcium-fortified orange juice, canned fish, kale, collard greens, and firm tofu. If you aren't getting the recommended amount of calcium in your diet, you can ask your doctor or dietitian about adding a calcium supplement.

Group and Age	Recommended Calcium Intake
Children (4-8 years)	1,000 mg/day
Children (9-18 years)	1,300 mg/day
Men and Women (19-50 years)	1,000 mg/day
Women (51 years and older)	1,200 mg/day
Men (51-70 years)	1,000 mg/day
Men (71 years and older)	1,200 mg/day

Maintain adequate caloric intake

Meeting the body's calorie and protein demands is essential. However, consuming adequate calories can be challenging. Caloric needs may increase during times of stress, like when you have active inflammation. Follow your weight regularly. If your weight begins to fall, try adding 250 to 500 calories more per day, and talk to your healthcare provider for additional strategies to maintain a healthy weight.

Some recommendations to increase calories include:

- Eating small and frequent meals throughout the day
- Adding a smoothie or shake at night or between meals
- Adding avocado, cheese, or oil to meals
- Adding a snack of fruit and nut butter between meals

See page 35 for smoothie recipe.

Making a plan that works for you

Food journal

You may notice that you experience different

symptoms when you eat different foods. These symptoms may also change over time. You may find it helpful to keep a food journal to track what you eat and how you feel. The journal can help you identify foods that worsen your symptoms when you are having a flare. A food journal can also help you evaluate whether your diet is providing an adequate supply of nutrients. Tracking your foods along with symptoms that occur will be helpful when you speak with your physician or a registered dietitian.

Managing social eating

Knowing that you have to go out to dinner or to a social event involving food can be a source of worry for some people with IBD. Here are some tips to help you when dining out and eating socially:

- **Don't go out feeling too hungry.** You may not make the best food choices, as you will be driven by hunger and the desire to feel full. Instead, have a healthy snack before leaving.
- **Don't be afraid to make special requests.** Many restaurants will alter how a dish is prepared to accommodate your needs.
- **Call ahead if you have specific questions or review the menu ahead of time.** This way, you can identify potential food problems and avoid feeling hurried by the server when reviewing options.

- **Eat smaller portions**—perhaps an appetizer or a half-size portion. You can always order more if needed.
- **When in doubt, keep it simple.** Go for boiled, grilled, broiled, steamed, poached, or sautéed options, and limit sauces and spices.
- When going to a party, **bring an item you know you can eat** and bring enough for the group.
- **Locate the restroom before you check in** at a social event.
- **Ask your doctor about products that help to manage or reduce symptoms,** including anti-diarrheal medications, antispasmodics (prescriptions that you can use as needed to relieve cramping), or lactase supplements.
- **Carry a change of underwear and clothing** in your bag, backpack, or car.

If you find yourself avoiding social situations or struggling with eating or the thought of eating, tell your healthcare provider, registered dietitian, family or friend, or speak with a counselor or other mental health professional who can help you better manage eating and IBD.

Possible trigger foods and food intolerances

Food allergies and intolerances

Neither Crohn's disease nor ulcerative colitis is caused by a food allergy. Yet, some people with IBD may also have food allergies. The most common food allergies in the general population are milk, eggs, peanuts, tree nuts (e.g., walnuts, almonds, cashews, pistachios, and pecans), wheat, soy, fish, and shellfish.

It is important to distinguish between an actual food allergy and a food intolerance. A **food**

allergy causes an immune system response that can lead to a severe and life-threatening reaction. A **food intolerance** may cause an increase in GI symptoms, but does not trigger an immune response. Many people have food intolerances but true food allergies are much rarer.

Elimination diets (avoiding trigger foods, and avoiding food intolerances) are used to determine which foods can be avoided or minimized to decrease symptoms like pain, bloating, or diarrhea. This involves systematically removing foods or ingredients that may be causing your symptoms. It is important to do this under the supervision of your doctor and a registered dietitian, to be sure this does not cause poor nutrition. When eliminating foods, make sure you substitute other foods that provide the same nutrients. For example, when eliminating dairy products, be sure to obtain calcium and vitamin D from other sources, like kale and collard greens for calcium and fatty fish for vitamin D.

Fiber

Dietary fiber is essential for health and digestion and can be found in plant-based foods, such as fruits, vegetables, nuts, grains, legumes, and seeds. For some people with IBD, consuming fiber during times when your disease is active may cause abdominal cramping, bloating, and worsening diarrhea. If you have a stricture in your bowel, it may be difficult for high fiber foods to move through these narrowed areas, causing pain and bloating. However, it is important to know that not all sources of fiber may cause these problems. Some sources of fiber may actually help with IBD symptoms. Not all fiber is the same. Here is what you need to know:

There are two types of fiber:

1. **Soluble** (dissolves in water) **fiber** forms a gel in your intestines and can add consistency and formation to your stools. This can be helpful when you are having watery bowel movements. Examples include canned fruit, peeled fruit, bananas, cooked oats, lentils, beans, peas, potatoes, and squash.
2. **Insoluble fiber** does not dissolve in water and is more difficult to digest. This fiber can be thought of as a broom in your intestines. It pulls water into the gut and sweeps food through more quickly. It is a coarse fiber found in the skins of foods like apples and seeds. Consuming insoluble fiber may aggravate IBD symptoms by causing more bloating, diarrhea, gas, and pain. When there is severe inflammation or narrowing, insoluble fibers may get stuck at narrowed areas, leading to a blockage in the intestine. You may want to consider restricting your intake of insoluble fiber during a flare, or if you have significant strictures in your bowel. Examples of insoluble fiber include fruit with seeds, fruit and vegetable skins, whole nuts, whole seeds, wheat bran, whole grains, brown rice, quinoa, corn, and green leafy vegetables.

Most foods contain a combination of fibers. Cooking vegetables until tender, removing peels, and removing seeds are important when you want to reduce your intake of insoluble fibers.

Lactose

Lactose intolerance is a condition in which the body does not properly digest lactose, the sugar present in milk and milk products. Lactose intolerance may lead to cramping, abdominal pain, gas, diarrhea, and bloating. Some people may be able to consume small amounts of milk, while others may need to avoid it altogether.

Some people with IBD may be lactose intolerant. Others may only have problems with lactose digestion during a flare or after surgical removal of a segment of the small intestine. Diagnosing lactose intolerance can be difficult because the symptoms are similar to general symptoms

Suggestions for eating in a flare

Food Group	Suggested Foods	Foods That May Worsen Symptoms
Vegetables	• Vegetables that are easier to digest (asparagus tips, potatoes, squash, cooked beets with no skin, pumpkin, sweet potato) • Fully cooked, seedless, non-cruciferous vegetables • Vegetable stock added to rice or pasta for additional nutrients	• Vegetables that are gas-producing (broccoli, Brussels sprouts, cauliflower) • Raw green vegetables • Anything with a peel • Vegetables that have a tough skin
Fruits	• Fruits that are easier to digest and have less insoluble fiber (bananas, cantaloupe, honeydew, applesauce) • Cooked, pureed, or canned fruits	• Fruits with seeds or skins, unpeeled apples, peaches, or pears
Grains	• Grains that are more refined with less insoluble fiber • Sourdough, potato, or French bread or white bread • White pasta, white rice, and oatmeal	• Whole grains with added seeds, dried fruits, and/or nuts
Protein	• Lean sources of protein • Fish, white meat poultry, lean cuts of pork, soy, eggs, and firm tofu • Smooth nut butters (peanut, almond, cashew)	• Whole seeds and nuts • Fatty, fried, or highly processed meats

**This is a sample list based on general dietary recommendations. Your individual needs may be different from the foods listed above. We encourage you to work with your doctor and a registered dietitian to identify foods that may or may not work for you.*

of IBD. The best way to diagnose lactose intolerance is through a food trial/challenge.

If you are diagnosed with lactose intolerance, lactase supplements can be taken along with milk to help digest lactose. Specialty milk products that do not contain lactose are also available. Fermented dairy products, like plain yogurt and kefir, are lower in lactose and may be more easily tolerated. Hard cheeses are generally well tolerated because of their minimal lactose content.

Milk and dairy products are important sources of nutrients, particularly calcium. Therefore, if you limit or eliminate milk and dairy products from your diet, you should be mindful about obtaining calcium from other food sources or from supplements.

High-fat foods

Butter, coconut, margarine, and cream, as well as food that is fatty, fried, or greasy may cause diarrhea and gas due to malabsorption of fat. These symptoms tend to occur more often in people who have inflammation in the small intestine or who have had large sections of the small intestine removed.

If you need to add healthy fats to your diet, consider oils (such as olive oil), avocados, nuts, seeds, fish, and eggs.

Gluten and fructan intolerance

Gluten is a protein found in grains including wheat, rye, and barley products. Fructans are naturally occurring carbohydrates found in wheat products as well as other foods such as barley, broccoli, onions, Brussels sprouts, and garlic. Celiac disease is different from gluten or fructan intolerance. Celiac disease is an autoimmune reaction to gluten. If you don't have Celiac disease, you can still be sensitive to gluten or fructans.

Some people with IBD may have symptoms of bloating and diarrhea after eating foods with gluten or fructans. If you suspect you have sensitivity to these foods, speak with your doctor and registered dietitian. It is important to get tested for Celiac disease before going gluten-free.

Non-absorbable sugars/FODMAP (Fermentable Oligo Di-Monosaccharides and Polyols)

FODMAP is an acronym for Fermentable, Oligo-, Di-, Monosaccharides and Polyols. It describes a group of poorly-absorbed sugars that may aggravate IBD symptoms. Foods that are high in FODMAPs include:

- Fructose: fruits, honey, high fructose corn syrup
- Lactose: dairy products
- Oligosaccharides: certain vegetables, cereals, and legumes
- Polyols: sugar alcohols (sorbitol, mannitol, xylitol) that are found in sugarless gums, candies, ice creams, and certain types of fruits

A low-FODMAP diet may reduce IBD symptoms in some people, particularly those with bloating. But, a low-FODMAP diet does not reduce IBD inflammation or heal the bowel. See page 23 for more information on a low-FODMAP diet.

Is there a place for fast or junk food?

Living with IBD comes with special challenges, and eating nutritiously is an important consideration. Some fast foods provide a valuable supply of nutrients as well as calories. However, these foods often contain more salt and fat than should be consumed on a regular basis, and this can increase GI symptoms.

Take pizza—the cheese offers calcium, protein, and vitamin D; the tomato sauce provides vitamins A and C; and the crust supplies B vitamins. The same is true for hamburgers and cheeseburgers. Milkshakes and ice cream offer a good source of calcium, proteins, and calories. Smaller portions may be easier to tolerate.

Developing an individual diet

Many people with IBD can consume a normal diet when in remission but may need to change their diet during flares. Other people with IBD, such as those with intestinal strictures, may need to stay on a modified diet until the stricture is successfully treated with medical or surgical therapy.

An individualized diet plan should be based on:

- Symptoms (diarrhea, constipation, abdominal pain, etc.)
- Whether the person is in remission or experiencing a flare (these are often two different diet plans)
- Location of disease
- Presence of narrowing of the small intestine (strictures)

- Any prior surgeries
- Medications taken
- Whether there are any specific nutritional deficiencies (such as iron deficiency)

Is there an IBD diet?

Some evidence suggests that diets rich in animal proteins and low in fiber may lead to onset of IBD, and that diets high in fiber (found in fruits, vegetables, and whole grains) are protective. We know that while these diets work in some, they may not work in others. However, ***there is no single special IBD diet***. There are a few diets that are advertised specifically for managing IBD. Some diets may be recommended at different times by your healthcare team.

Diets commonly used by IBD patients:

Specific Carbohydrate Diet (SCD)™
SCD eliminates refined or processed foods, as well as soy, lactose, table sugar, grains, and certain vegetables such as potatoes, okra, and corn. This diet can be low in certain nutrients, such as B vitamins, calcium, vitamin D, and vitamin E. It is important to work with your medical team while following this diet to ensure that you maintain good nutrition and to avoid developing vitamin deficiencies. Some patients find that this diet feels very restricted in food options. A registered dietitian can help suggest ways to incorporate this diet into your lifestyle.

Low-FODMAP diet
FODMAP is an acronym for Fermentable, Oligo-, Di-, Mono-saccharides, and Polyols. It describes a group of sugars that may be poorly absorbed, including: fructose, lactose, sugar polyols (sorbitol and mannitol), fructans (found in garlic, leeks, artichokes, and wheat), and galacto-oligosaccharides (found in lentils, chickpeas, and black beans). A low-FODMAP diet may reduce

IBD symptoms, but research doesn't support its use for reducing IBD inflammation. This diet is not typically recommended or to be followed if you are in a flare, but it can be very helpful if you struggle with gas and bloating. A dietitian can help you to identify which of these sugars seem to cause worsening symptoms for you, and which food can be reintroduced without worsening of symptoms.

Mediterranean diet
This diet is rich in fiber and plant-based foods. It also includes olive oil, low-fat dairy, herbs, and spices. Poultry, eggs, cheese, and yogurt are eaten in moderation, and red meat is eaten rarely.

Other than enteral nutrition (see page 29), no diet has yet been scientifically proven to prevent or control IBD. Some of these diets can be very restrictive, leading to weight loss and/or malnutrition. Researchers are continuing to study the interaction between diet and IBD. More information on diet research can be found on page 32.

Vitamin and mineral supplementation

In general, most vitamins, minerals, and other nutrients can be obtained from food. In people with IBD, vitamin and mineral deficiencies may occur. Because of that, many people with IBD take supplements to make up for or prevent a deficiency from occurring.

It is important to keep the following in mind:

- Vitamin and mineral supplements can cause GI symptoms even for people who don't have a digestive disease—especially in pill form. Consider taking a liquid or powder formula.

- Check the supplement's label to see if it contains lactose, artificial colors, sugar alcohol, or preservatives.
- The United States Pharmacopeia is a scientific nonprofit organization that sets standards for the quality, purity, and potency of dietary supplements. Look for the USP symbol on bottles and packages. This symbolizes that the supplement meets the organization's standards.
- Never take vitamins or minerals on an empty stomach.
- Discuss all over-the-counter medications, dietary supplements, herbal formulas, and other treatments you take or are considering taking with your doctor and other members of your healthcare team.

Calcium supplements are recommended for patients taking corticosteroid medications, those who are not getting enough calcium in their diet, and those who have bone loss as shown on a bone density test. For most IBD patients, a daily calcium supplement of 1,200 to 1,500 mg is recommended. This should be taken in two to three doses of 500 to 600 mg of calcium. This is all your body can absorb at any one time.

Vitamin D is essential for good bone formation and for the processing of calcium. The recommended daily allowance for vitamin D depends on age and ranges from 400–800 international units (IU) per day. Vitamin D is contained in many foods, but it can also be obtained through sun exposure. Vitamin D deficiency is one of the most common nutritional deficiencies in people with Crohn's disease. Therefore, for people with IBD a supplement of 1000 IU daily is often recommended, but your healthcare provider can help determine your supplementation need based on your vitamin D levels.

Folic acid helps your body produce and maintain new cells, and helps you process fats and carbohydrates. Some medications used to treat IBD, such as sulfasalazine and methotrexate, interfere with the absorption of folic acid, one of the B vitamins. IBD patients who take sulfasalazine or methotrexate are advised to take a folic acid supplement of 800 mcg to one mg per day.

All pregnant women, including women with IBD, are advised to take folic acid supplements (at least 600 mcg daily) to prevent spina bifida and other neural tube defects in infants. Folic acid is particularly important for pregnant women with IBD who take sulfasalazine. Pregnant women taking sulfasalazine should take a folic acid supplement of two mg per day.

Vitamin B12 helps keep the nerve and blood cells healthy and is absorbed in the ileum (end of small intestine). People with Crohn's disease that affects the ileum and those who have had surgery to remove 20 centimeters or more of the ileum may have vitamin B12 deficiency because they are unable to absorb enough of this vitamin from their diet. A blood test can measure the amount of vitamin B12 in the blood. An oral tablet, monthly subcutaneous injection, or weekly nasal spray of vitamin B12 may be required for individuals who are deficient.

Iron is a component of hemoglobin, which is found in red blood cells and carries oxygen throughout your body. Blood loss from inflammation and ulceration of the intestines can occur in some people with IBD. Blood loss can cause anemia (low red blood cell count). Blood iron levels can be measured with a simple test. If they are found to be too low, iron supplements may be given. Because excess iron can be toxic to the liver, it is important to determine whether an iron deficiency is present before taking a supplement.

Iron supplements can be bought without a prescription. Before buying an iron supplement, discuss the appropriate dose with your doctor and ask him or her what form of iron supplement you should take. The different forms of iron supplements differ in the degree to which they are absorbed by the body.

Sometimes, oral iron can cause cramping or constipation. Liquid iron preparations are more easily absorbed and less likely to cause constipation than pills. Oral iron supplements may turn your stool a black color. Iron can also be given intravenously if oral iron is not well tolerated.

Zinc helps the body fight off invading bacteria and viruses. Patients with diarrhea, fistulas, or extensive disease in their small intestine are

at risk for zinc deficiency. People who develop short bowel syndrome (a condition that sometimes occurs after a significant portion of the small intestine has been removed or damaged) are also at risk. Symptoms of zinc deficiency include a rash, changes in taste, smell and sight, and difficulty with wound healing. If a deficiency is suspected, your physician can advise you on the proper amount needed for replacement.

Vitamins A, D, E, and K are essential for cell production and preventing cell damage, blood production, fighting infections, and bone health. Vitamins A, D, E, and K are also fat-soluble vitamins. Patients with malabsorption may be at risk for fat-soluble vitamin deficiency. Your healthcare provider can help determine if you need additional supplementation of these vitamins.

Probiotics

Probiotics are live microorganisms contained in foods or supplements that provide beneficial health effects. Yogurt, which contains live bacteria, is an example of a probiotic food. Under normal circumstances, so-called "good" bacteria are present in the intestines where they aid digestion and help protect the intestine from harmful bacteria. Some studies show that in people with IBD, there are fewer "good" bacteria.

The idea behind taking probiotic supplements and eating foods containing live bacteria is to restore the normal balance of microorganisms in the intestines. Lactobacillus preparations and live-culture yogurt are recommended for everyone. Some preparations of probiotics have been evaluated for specific types of IBD. Your healthcare provider may help you decide if a specific probiotic is needed.

Nutritional support therapy

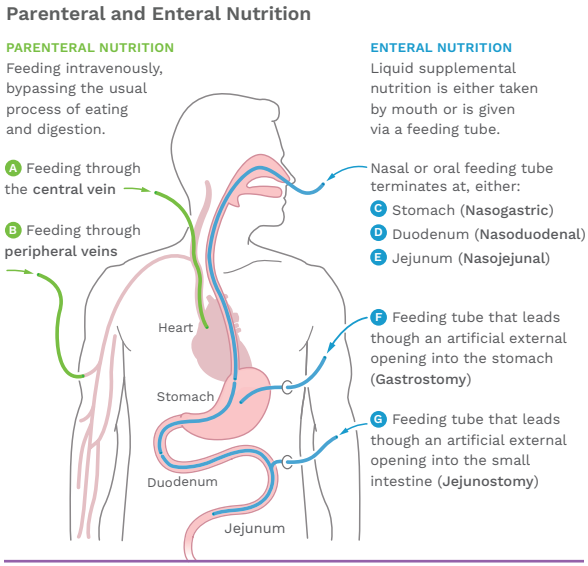
Some people with IBD can find it especially difficult to take in enough calories and nutrients. If you are unable to take in adequate nutrition by mouth, other methods may be used to boost your nutrition. These methods include enteral and parenteral nutrition. Enteral and parenteral nutrition may also be used in combination with medications to provide bowel rest and help control severe bowel inflammation in Crohn's disease.

Enteral nutrition

Enteral (meaning "passing through the intestines") nutrition is when a nutrient-rich formula (often a drink such as Boost®, Ensure®, or Orgain™) is provided as a supplement to or as the main source of a patient's calories. Enteral nutritional formulas can be taken orally or through a feeding tube. Some patients are unable to take in enough nutrition orally and a feeding tube may be necessary. Common types of feeding tubes include:

- A **nasogastric tube (NG tube)** is placed through one of your nostrils and travels down to the stomach
- A **nasoduodenal (ND)** or **nasojejunal (NJ)** is placed through one of your nostrils and passes into portions of the small intestine (duodenum or jejunum depending on the tube)
- A **gastrostomy tube (G-tube)** or **jejunostomy tube (J-tube)** is placed through a surgical incision in the skin into the stomach or small intestine (jejunum)

Most enteral liquid food mixtures contain all necessary proteins, carbohydrates, fats, minerals, and vitamins so you can be sustained, even if you are eating minimally or not eating at all.



Enteral nutrition can help protect or improve the absorption ability of the small intestine.

Partial enteral nutrition (PEN) is when you receive 30-50% of calories through formula and the remainder is from solid food or a regular diet.

Exclusive enteral nutrition (EEN) is when you receive all of your calories through formula—you do not eat any regular food. This is a proven therapy to induce remission in mild to moderate Crohn's disease. The North American Society for Pediatric Gastroenterology, Hepatology & Nutrition, or NASPGHAN, recommends EEN to be used as the first-line of therapy in pediatric Crohn's disease, and the European Society for Parenteral and Enteral Nutrition (ESPEN) recommends EEN as the first-line therapy for children and adolescents with acute active Crohn's disease. EEN may also be considered in adults intolerant to steroid therapy, or as a bridge to safer elective surgery.

Parenteral nutrition

Nutrition can also be delivered through a thin intravenous (IV) tube called a catheter, which is inserted directly into a large vein in the chest, arm, or neck. This is called parenteral (meaning outside of the digestive system) nutrition. Parenteral nutrition allows nutrients to go directly into the bloodstream, instead of through the stomach or small intestine.

Parenteral nutrition is used when the gut is not working and you are unable to absorb the nutrients you consume. This may also be used for a short course when a flare is very severe; if you have a bowel perforation; if you have a fistula; or if your nutrition needs to be improved before surgery. Parenteral nutrition may be needed long-term in Crohn's patients if you've had multiple surgeries to remove portions of your small intestine and you develop short bowel syndrome.

Questions to ask your healthcare provider

You may have questions about how IBD can affect your diet and nutrition—that's completely natural! Here are some questions you may want to ask your doctor, registered dietitian, or other healthcare provider:

- Do I have any nutritional deficiencies?
- What tests are needed to evaluate my nutritional status?
- How often should these tests be performed?
- Do I need to take vitamins and minerals? Which ones?
- Will any of my current medications affect my nutrition?
- How do I know if I have any food allergies or intolerances?
- Do I have stricture(s) that require a special diet?
- Now that I'm in remission, can I change my diet?
- Is it safe to drink alcoholic beverages?
- Should I get help from a registered dietitian? Can you recommend one?

If you find yourself struggling with eating or the thought of eating, tell your healthcare provider, registered dietitian, family or friend, or speak with a counselor or other mental health professional who can help you better manage eating and IBD. You can also reach out to your local Crohn's & Colitis Foundation chapter to get connected to a support group where you can talk to others about how they maintain a well-balanced, nutrient-rich diet.

Visit *www.crohnscolitiscommunity.org* to connect with peers and professionals.

Diet research

The Crohn's & Colitis Foundation has played a major role in the advancement of IBD research. Since inception in 1967, the Foundation has invested more than $350 million in IBD research. We are committed to supporting research to

help understand the role of diet and nutrition in the treatment of IBD.

We are advancing diet and nutrition research through IBD Partners, our patient-powered research network supported in partnership with the University of North Carolina School of Medicine. Through IBD Partners, we have looked at the role of fiber consumption with flares in adults with IBD[1]; evaluated whether a gluten-free diet can improve IBD clinical symptoms[2]; looked at self-reported associations of diets with IBD symptoms[3]; and more. Information about the outcomes of these studies as well as their publications can be found at *www.ibdpartners.org*

Consistent with advances in genetics and microbiome research, our aim is to focus on characterizing the response of individual patients to different foods based on their genetic makeup, gut microbiome composition, and lifestyle. The understanding of individual differences in these factors will help us determine why patients respond differently to food. It will also help enable the implementation of precision nutrition practices, in which effective diets are tailored to the biological characteristics of each patient, leading to better and more

personalized management of their disease. You can learn more about our research initiatives by visiting *www.crohnscolitisfoundation.org/research/challenges-ibd*

Final words about diet, nutrition, and IBD

Now that you know a little more about diet, nutrition, and IBD, you can begin or continue the process of managing your disease by following your healthcare team's recommendations. Following the tips below throughout your IBD journey may be helpful.

- In addition to medical treatment, making healthy food choices may help to reduce symptoms and improve your response to your medications.
- You may need to change your diet during a flare or if you develop strictures.
- Replace nutritional deficiencies and work with your provider to follow vitamin and mineral levels regularly.
- Maintain a well-balanced and nutrient-rich diet.
- Use helpful tools, such as a food journal, to help you keep track of your diet and how it affects your symptoms.
- Plan ahead! Have a snack before going out. Make special requests at restaurants and look at menus in advance.

If you find yourself avoiding social situations, struggling with eating, or spending a large amount of time thinking or worrying about eating, tell your healthcare provider, registered dietitian, family member or friend, or speak with a counselor or other mental health professional.

If you have additional questions, contact the Irwin M. and Suzanne R. Rosenthal IBD Resource Center (IBD Help Center) by email at *info@crohnscolitisfoundation.org* or by phone at 888-MY-GUT-PAIN (888-694-8872).

Make your own custom smoothie

As it is sometimes difficult to take in adequate vitamins and nutrients during a flare or in the setting of a stricture, a smoothie can be a great option that may be more easily tolerated and is high in protein, vitamins, and nutrients.

Choose a base

- Milk, milk alternatives (almond, coconut, rice, soy), plain yogurt, greek yogurt, silken tofu, kefir
- If you are sensitive to lactose or dairy, avoid milk, yogurt, or kefir
- Be aware that fruit juice, flavored yogurt, and some milk alternatives may contain a lot of added sugar

Add 1 cup of fresh fruit, or ½ cup of cooked/pureed fruit, or ¼ cup of dried fruit

- Banana, avocado, mango, papaya, peach, pear, pineapple, apricot, nectarine, plum, watermelon, berries
- Consider frozen fruit if the fruit is out of season
- Individually packaged fruit purees are available in the freezer section of many grocery stores and can easily be added to a smoothie
- Some fruits, such as avocado, apricots, mango, nectarines, peaches, and plums contain polyols, which can produce increased gas for some patients. If you are concerned about this, try adding one fruit at a time and see how you tolerate it.

- If you have strictures in your bowel and have been told to follow a low fiber diet, peel the fruit skins (of fruit like apples, peaches, or pears) before using them. Pineapple and berry skins can also cause increased symptoms if you have bowel strictures.

Consider adding one or two vegetables

- Dark leafy greens (spinach, swiss chard, kale). If you have been told to follow a low-residue diet, consider cooking these until tender before adding them.
- Cooked beets without skins
- Cooked or canned pumpkin
- Cooked sweet potato (no skin)

For additional fat or protein

- Consider adding creamy nut butters such as almond butter

Consider adding other spices or flavorings

- Cinnamon, nutmeg, vanilla, cocoa powder

References:

1. Brotherton CS, *et al.,* Avoidance of fiber is associated with greater risk of Crohn's disease flare in a 6-month period. *Clin. Gastro.* Hepat. 2016, 14: 1130–1136.

2. Herfarth HH, *et al.,* Prevalence of a gluten free diet and improvement of clinical symptoms in patients with inflammatory bowel diseases. *Inflamm. Bowel. Dis.* 2014, 20: 1194–1197.

3. Aaron BC, *et al.,* Dietary patterns and self-reported associations of diet with symptoms of inflammatory bowel disease. *Dig.Dis.Sci.* 2013, 58: 1322-1328.

About the Crohn's & Colitis Foundation

Established in 1967, the Crohn's & Colitis Foundation is a nonprofit, volunteer-fueled organization dedicated to finding cures for Crohn's disease and ulcerative colitis, and improving the quality of life of children and adults affected by these diseases.

Since our founding, the Foundation has remained at the forefront of research in Crohn's disease and ulcerative colitis. Today, we fund cutting-edge studies at major medical institutions, nurture investigators at the early stages of their careers, and finance underdeveloped areas of research.

In addition, the Crohn's & Colitis Foundation provides a comprehensive series of education programs, printed and online resources, support services, and advocacy programs to members of the IBD community, including patients and caregivers.

We can help! Contact us at:

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The Crohn's & Colitis Foundation is the leading non-profit organization focused on both research and patient support for inflammatory bowel disease (IBD). The Foundation's mission is to cure Crohn's disease and ulcerative colitis, and to improve the quality of life for the more than 3 million Americans living with IBD. Its work is dramatically accelerating the research process through its database and investment initiatives; it also provides extensive educational resources for patients and their families, medical professionals, and the public.

12/2019