Your guide to intermittent fasting

A comprehensive resource for patients

Fullscript

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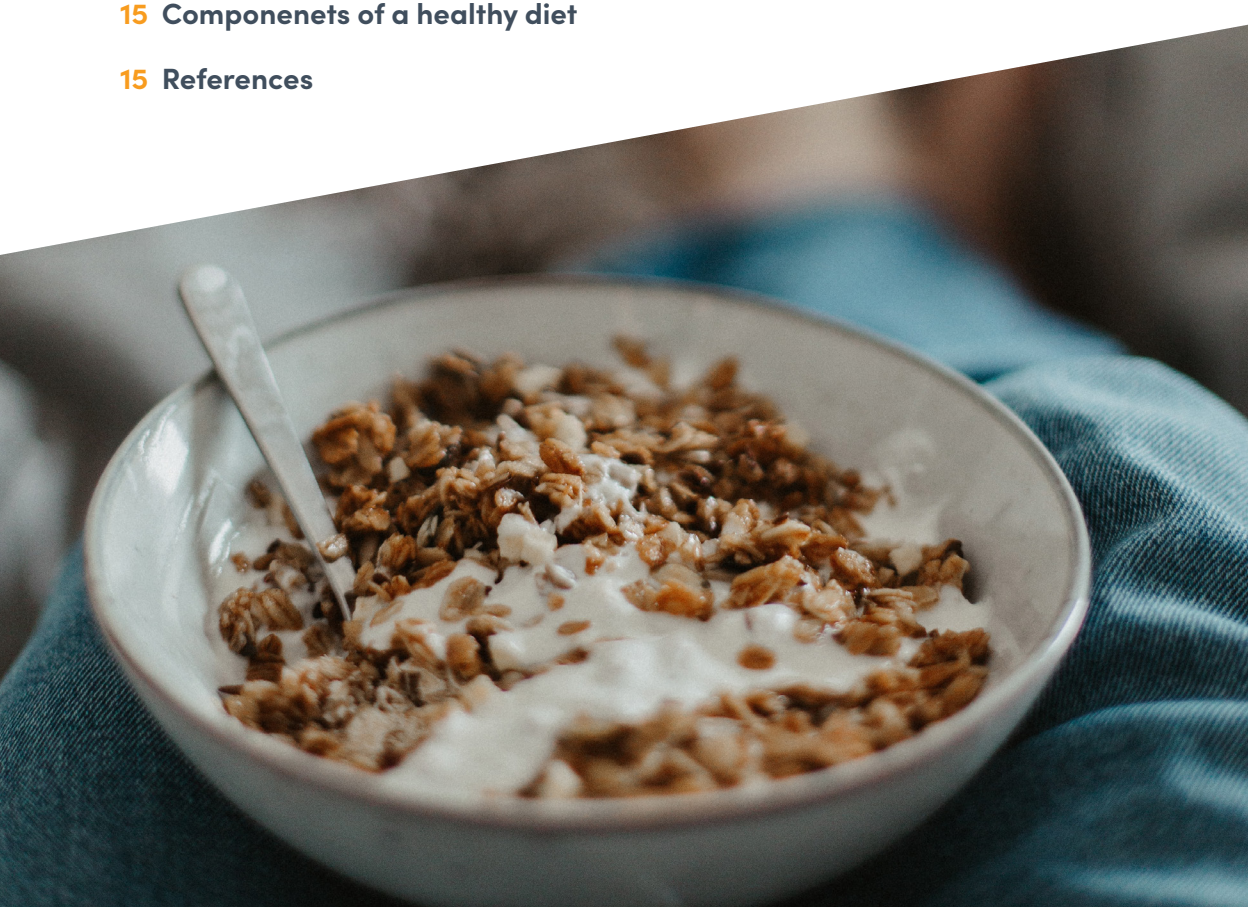


An introduction to intermittent fasting

Intermittent fasting (IF) is a common dietary approach made popular in recent years due to its many health benefits. Historically, fasting regimens have been used for medicinal purposes by ancient Roman, Greek, and Chinese civilizations and is a common practice for many religions. Fasting involves abstaining from calorie-containing foods and beverages for at least 12 consecutive hours, inducing a number of hormonal and metabolic changes in the body. Research demonstrates that IF can promote certain health benefits including weight loss, reduced inflammation, and improved blood glucose and insulin levels.

In this guide, we'll discuss the different types of IF, how it works, and its benefits. Additionally, safety considerations and resources for planning are provided.

How it works:

examining the science behind fasting

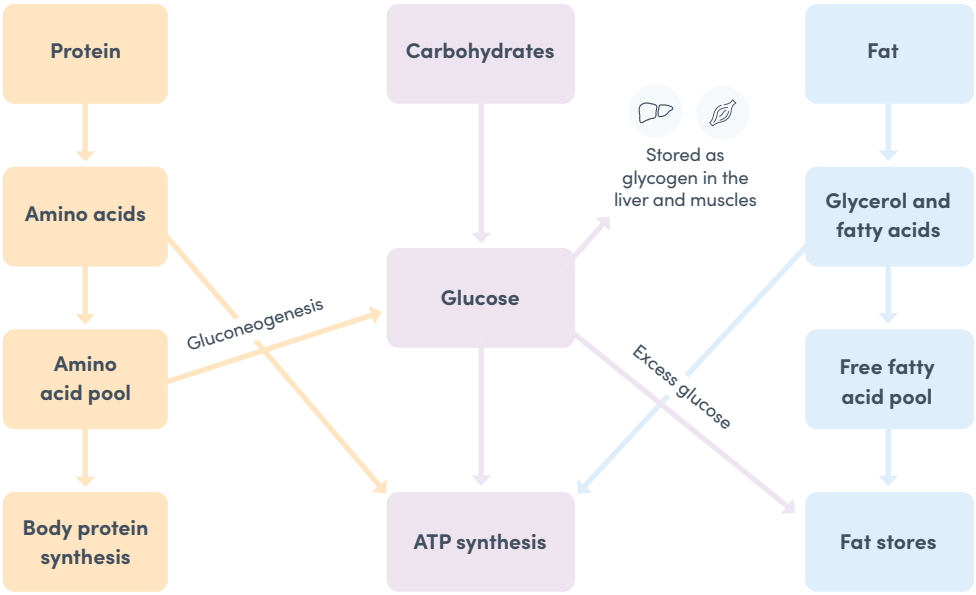
When we eat, food is broken down in the digestive tract into nutrients and absorbed into the body. Carbohydrates in food are broken down to glucose (simple sugar), which can then be absorbed into the bloodstream and distributed into body tissues, where it is used as the body's primary source of energy. When carbohydrates, fats, and proteins are broken down during digestion, adenosine triphosphate (ATP) is generated. ATP is the primary carrier of energy in cells. When a cell needs energy, ATP is broken down and the energy released is utilized for a variety of cellular processes, such as cell division, protein synthesis, muscle contraction, and transmission of nerve impulses.

The hormone insulin regulates glucose levels in the blood by signaling for your cells to uptake glucose from the blood into cells, where it provides fuel for body functions. Excess glucose is stored in the liver and skeletal muscles as glycogen and as fat for long-term energy storage. To meet energy needs, the body taps into these storage reserves when blood glucose levels are low. When glucose levels are low, the body can undergo gluconeogenesis, a process by which the liver produces glucose from non-carbohydrate sources.

After approximately 18 hours of fasting, insulin levels are low and a process called lipolysis ("lipo" for lipid or fat, "lysis" for breaking down) begins. During lipolysis, the body breaks down adipose tissue (fat) into free fatty acids. Glycogen stores are typically depleted within 24 hours of fasting. When there is insufficient glucose or glycogen available to meet the body's energy demands, the body will transition to using fatty acids and fatty acid-derived ketone bodies (ketones) for energy, a metabolic state known as *ketosis*. Liver cells are responsible for ketogenesis, the production of ketone bodies. During ketogenesis, fatty acids are broken down in the mitochondria of cells by a process called beta-oxidation and converted to the ketones acetoacetate and beta-hydroxybutyrate. These ketones are used by muscle cells and neurons (brain cells) to generate ATP used to fuel cellular processes.

Metabolism overview

Metabolism is the process by which your body converts food into energy.



Why fast?

Health benefits of fasting

Research has demonstrated that intermittent fasting provides a variety of health benefits.

Weight loss

During periods of fasting, the body shifts to using stored body fat as an energy source. This can result in fat loss and a lower body mass index (BMI). Fasting may also increase levels of human growth hormone (HGH), a hormone produced by the pituitary gland that improves fat metabolism and helps maintain a healthy body composition. Furthermore, IF reduces total caloric intake on fasted and non-fasted days, resulting in weight loss.

Improved metabolic health

Insulin resistance, a hallmark trait of type 2 diabetes, has been shown to improve in individuals adhering to IF regimens. Following a fasting period, insulin sensitivity rises, resulting in lower insulin levels – this has long-term positive effects on insulin resistance, which occurs when the body's cells don't respond normally to insulin. Metabolic syndrome, characterized by high blood pressure, elevated blood sugar, large waist circumference, and abnormal blood cholesterol levels, may be prevented or reversed by regular periods of fasting.

Reduced cardiovascular disease risk

Research suggests that IF improves blood pressure, triglyceride, LDL, and total cholesterol levels. Improved cardiovascular risk factors associated with IF appear to be related to weight loss and lowered insulin levels.

Decreased inflammation

The physiological changes associated with IF, such as reduced inflammation, may result in a reduced risk of various inflammatory conditions, including diabetes, cancer, and heart disease. IF may also reduce proinflammatory factors, including homocysteine and C-reactive protein (CRP), that can lead to the build-up of plaque in the arteries, a condition known as atherosclerosis.

Neuroprotection

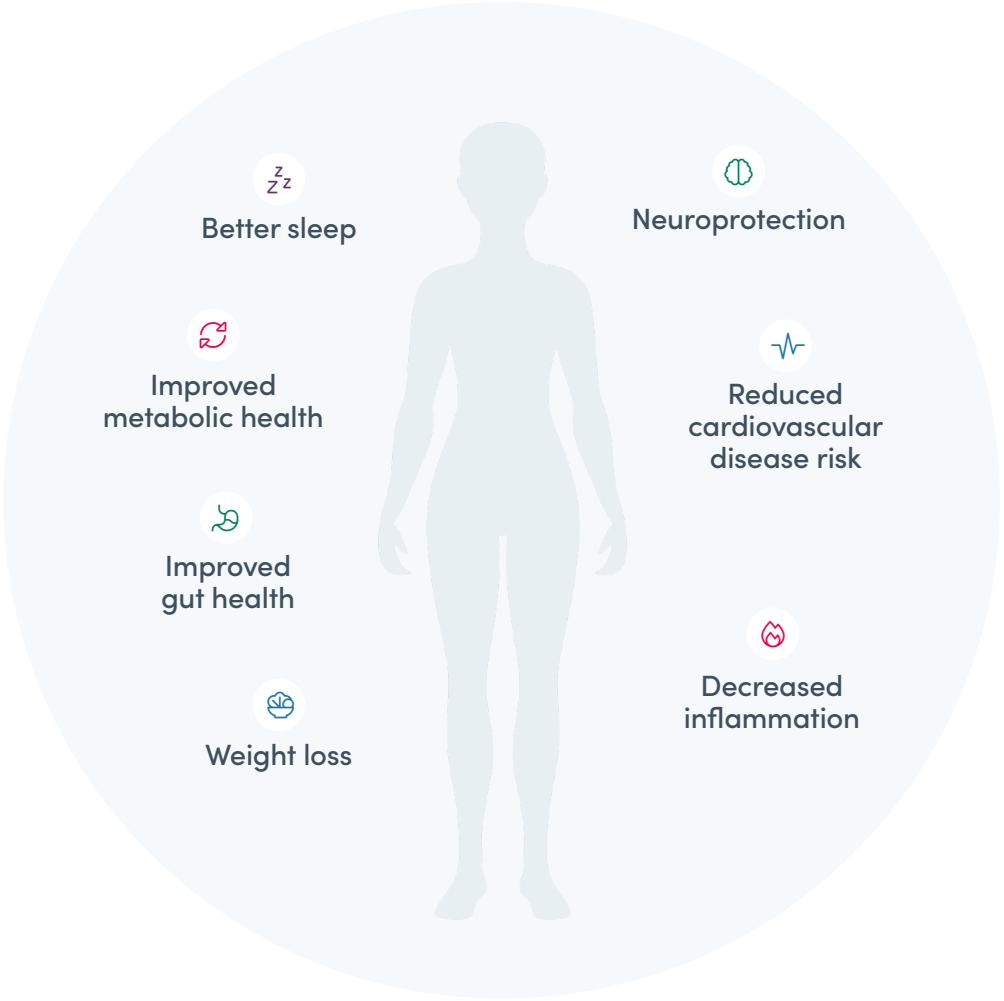
Research suggests that IF supports healthy aging of the nervous system by protecting neurons and nerve cells against genetic and environmental factors. IF protects neurons by reducing inflammation in the brain and aiding in a process called autophagy, which is the body's way of eliminating damaged cells and generating healthier cells. Additionally, IF reduces markers of oxidative stress and improves the body's stress response, thus helping cells better manage stress and resist disease.

Better sleep

Studies show a relationship between late night eating and poor quality sleep. Chronic insufficient sleep is associated with an increased risk of chronic health issues, such as obesity, cancer, and cardiovascular disease. Following a consistent intermittent fasting routine and avoiding late night eating may positively influence circadian rhythm, which is the body's internal clock that regulates the sleep-wake cycle.

Improved gut health

IF increases the population of healthy gut microbiota, which play an important role in promoting healthy digestion and immune function. IF also reduces intestinal permeability (compromised gut lining) and improves gut motility by enhancing the parasympathetic nervous system, the system responsible for the body's rest and digest response.



Side effects and safety considerations

While some side effects have been reported, IF is generally recognized as safe, and side effects are mild for most individuals.

Potential side effects include:

- Fatigue
- Feeling cold
- Hunger
- Irritability
- Low energy
- Mood and behavior changes

Some side effects may be temporary as your body adjusts to periods of fasting and using fat stores as a primary energy source. You can mitigate some of these side effects by easing into an IF routine and slowly increase the duration and frequency of your fasts.

Patients with diabetes should take special precautions while fasting as they are more susceptible to hypoglycemia (low blood sugar). Other populations at increased risk for complications include pregnant and lactating women, young children, certain older adults, and individuals with immunodeficiencies. Speak to your integrative healthcare practitioner further regarding safety considerations and possible supportive supplements.

How does IF differ from other types of fasting regimens?

There are several dietary patterns that may result in similar effects to intermittent fasting. Comparable diets are outlined below. Note that there are various forms of intermittent fasting, which will be covered further in the guide.

Regimen	Description	Benefits
Calorie restriction	Reduces total daily calorie intake by 20-40% while eating at regular intervals throughout the day. Unlike IF, calorie restriction does not induce a fasted state.	Research has demonstrated the effectiveness of calorie restriction for weight loss and improved cardiometabolic health. However, this type of diet is difficult to sustain, resulting in poor long-term adherence.
Ketogenic diet	High-fat, moderate-protein, and very low-carbohydrate diet. The body undergoes ketogenesis as a result of severe carbohydrate restriction in the diet, mimicking the effects of fasting.	This diet may be beneficial for a number of different conditions including brain trauma, cancer, Parkinson's disease, Alzheimer's disease, amyotrophic lateral sclerosis (ALS), autism, depression, migraines, and narcolepsy.
Master Cleanse diet (lemonade diet)	Liquid diet consisting of water, lemon juice, maple syrup, and cayenne pepper, consumed exclusively for a duration of at least ten days	Proponents of this diet claim that you can expect weight loss of up to 20 lbs in ten days and that it promotes detoxification. However, no scientific evidence exists to support these claims.
Fasting-mimicking diet (FMD)	High-fat, low-calorie diet designed to mimic the effects of fasting while allowing the intake of small amounts of food. The diet involves a five-day reduced-calorie fast followed by a 25-day refeeding phase during which participants resume their normal diet.	A clinical trial led by the developer of the ProLon Fasting Mimicking Diet found that participants who followed the diet for five consecutive days per month lost an average of 2.6 kg (5.7 lbs) after three months. Ongoing research is investigating the effects of the FMD on longevity, as well its potential role in cancer prevention and treatment.

Planning a fast

Choosing your preferred fasting method

There are several types of IF, determined by the duration of the "feeding window", the timeframe in which food is consumed, and the "fasting window", the timeframe in which food is avoided. The common types of IF are summarized in the table below.

Fasting method	Description	Feeding window	Fasting window
Alternate day fasting (ADF)	Abstain from all calorie-containing food and beverages during the fasting window; consume food *ad libitum** during the feeding window	Every other day	Every other day
Modified alternate day fasting (mADF)	Restrict energy intake to 20-25% of daily caloric requirement during the fasting window; consume food *ad libitum* during the feeding window	Every other day	Every other day
Time-restricted feeding (TRF)	Abstain from all calorie-containing food and beverages during the fasting window; consume food *ad libitum* during the feeding window	4-12 hours per day	12-20 hours per day
Early time-restricted feeding (eTRF)	Abstain from all calorie-containing food and beverages during the fasting window; consume food *ad libitum* during the feeding window	6 hours per day, early (e.g., 8 am-2 pm)	The remainder of the day
5:2 diet - Periodic or cyclic fasting	Restrict energy intake to 20-25% of daily caloric requirement during the fasting window; consume food *ad libitum* during the feeding window	5 days per week	2 non-consecutive days per week
6:1 diet - Periodic or cyclic fasting	Abstain from all calorie-containing food and beverages during the fasting window; consume food *ad libitum* during the feeding window	6 days per week	1 day per week

* ad libitum = without restrictions

Planning your fasting and feeding periods

Mobile apps are a useful tool for tracking fasting and feeding windows. For a table of recommended IF mobile apps, refer to the resources section of this guide. If you prefer using a paper tracker, use the calendar found in the resource section to plan out your fasting and feeding windows.

Breaking your fast

Following a period of fasting, it's best to slowly reintroduce foods as opposed to consuming a large meal. Stick with whole, unprocessed foods that contain all three macronutrients, including carbohydrates, protein, and fat. Avoid refined carbohydrates and sugary beverages when breaking a fast as they can raise insulin levels.

Below are some examples of healthy foods to include in your first post-fast meal:

- Fruits and vegetables
- Healthy fats (e.g., avocado, olive oil, nuts, seeds)
- Lean proteins (e.g., chicken, eggs, fish, turkey)
- Whole grains (e.g., barley, oats, whole wheat)
- Beans and legumes

Consider pairing macronutrients together, such as oatmeal with nuts or seeds, chicken with broccoli and brown rice, or a garden salad with garbanzo beans and an olive oil-based vinaigrette. Eating meals with a combination of all three macronutrients can improve satiety, helping you stay fuller for a longer period of time.

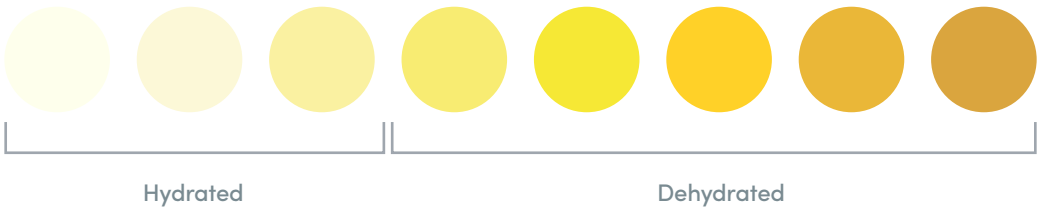
Meeting your nutritional needs

The restricted feeding windows of IF may lead to fewer calories consumed and challenges with meeting nutritional needs. Focus on eating an abundance of nutrient-dense, whole foods during feeding periods for optimal results. Refer to the nutritional needs table in the resources section for specific recommendations.

Hydrating while fasting

It is estimated that about 20 to 30% of our total water intake comes directly from the foods we consume. During periods of fasting, proper hydration is especially important. Fluid needs differ based on body size and activity level, but aim to consume approximately two to three liters (60 to 100 fl oz) of filtered water per day.

Pay close attention to any signs of dehydration you may experience including dark urine, dry mouth, headache, lethargy, and thirst. If you experience any of these signs, drink some water right away.



Quick tip:

Create your own electrolyte drink by adding a pinch of sea salt to your water bottle for added minerals. For extra flavor, squeeze in some lemon juice, lime juice, or add fresh fruit.

Frequently asked questions

How much should I eat while intermittent fasting?

Avoid all calorie-containing foods or beverages during fasting periods. Only water, unsweetened tea, and black coffee should be consumed.

Can I exercise while fasting?

Brief, low-impact exercise while in a fasted state is safe for most individuals. Exercising while fasting can improve your body's ability to use fat as energy, which may result in weight loss. Fat oxidation (breakdown of fat cells) decreases during feeding windows due to increased insulin levels post-meal.

Pay close attention to signs of dehydration or low blood sugar if you exercise while fasting. If you find that you feel lightheaded or dizzy, take a break and consider eating something before exercising. Endurance athletes should use extra caution and refrain from participating in high-intensity training while fasting since performance may be negatively impacted.

Does intermittent fasting have different effects on men and women?

There is some evidence to suggest that intermittent fasting affects men and women differently. After three weeks of alternate day fasting, women in one study had decreased glucose tolerance, while men's glucose tolerance remained the same.

Furthermore, early research suggests that intermittent fasting may negatively affect reproductive hormones, disrupting a woman's menstrual cycle. With guidance from an integrative healthcare practitioner, some women may need to consider taking a less rigid approach to intermittent fasting and focus on participating in shorter fasting periods and fewer fasting days overall.

What if I get hungry while fasting?

Hunger sensations are normal while fasting and are typically short-lasting. Water consumption can ease hunger pangs and increase feelings of satiety. Participate in activities to distract yourself from sensations of hunger, including low-intensity exercise, reading, or meditating.

During feeding windows, focus on eating foods rich in fiber and lean protein. Fiber and protein increase satiety, leaving you feeling fuller for longer.

Can I take supplements while fasting?

Any calorie-containing dietary supplement will break a fast, and the body will revert back to using glucose for energy when it becomes readily available. Additionally, supplements that alter insulin levels, such as protein powders, fatty acid supplements, chewable or gummy vitamins, and meal replacement supplements, may impact the desired effects of fasting.

Five tips for taking supplements while fasting:

1. Always check the "Supplement Facts" label on the product bottle for the number of calories.
2. Look for supplements that are unsweetened or contain calorie-free sweeteners, such as monk fruit (Luo han guo) extract and stevia (*Stevia rebaudiana*) or stevia leaf extract.
3. If appropriate, consume your supplements within your feeding window. Note that certain dietary supplements may be recommended on an empty stomach or at a certain time of day.
4. Be cautious with supplement ingredients that may further lower your blood glucose levels. Ingredients that have been shown to reduce blood sugar include chromium picolinate, berberine, and psyllium husk.
5. Prior to making any changes, consult your integrative healthcare provider regarding intermittent fasting and your supplement regime.

Resources

Mobile apps

The apps outlined in the table below can assist you in planning fasting periods and tracking results.

App	How it works
FastHabit	Allows you to customize fasting windows and sends reminders Tracks weight and can be synced with the Apple Health app
Life Fasting Tracker	Includes several types of fasting intervals Features evidence-based articles and tips for intermittent fasting Syncs with several health apps including Garmin and Fitbit
Vora	Tracks your weekly fasting progress and weight changes Can share your progress with other users on the app
Zero	Follow preset fasting schedules or create your own fasting interval Sets reminders and tracks your progress

Intermittent fasting planning calendar

16/8 Time-restricted feeding

Example:

Time	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
12 am	Fast						
4 am							
8 am							
Noon	Consume first meal of the day at noon						
4 pm	Consume last meal of the day no later than 8 pm						
8 pm	Fast						
12 am							

Light blue: Fasting window
White: Feeding window

✂ Cut me out and stick me on the fridge!

Use the blank template below to plan fasting and feeding windows based on desired intervals.

Time	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
12 am							
4 am							
8 am							
Noon							
4 pm							
8 pm							
12 am							

Meeting your nutritional needs

The following table includes daily nutritional goals based on the 2015 to 2020 Dietary Guidelines published by the U.S. Department of Agriculture (USDA), the U.S. Department of Health and Human Services (HHS), and Canada's Dietary Guidelines. Use the values included in this table as a guide for supporting healthy eating patterns.

Dietary component	Recommended ranges (% daily calories)	Women	Men
Recommended calorie intake		1,600–2,200 kcal*	2,000–3,000 kcal*
Carbohydrate	45–65%	275 g	275 g
Dietary fiber		25 g	30 g
Added sugar	<10%	<25 g	<36 g
Protein	10–35%	46 g	56 g
Fat	20–35%	78 g	78 g
Saturated fat	<10%	<22 g	<22 g

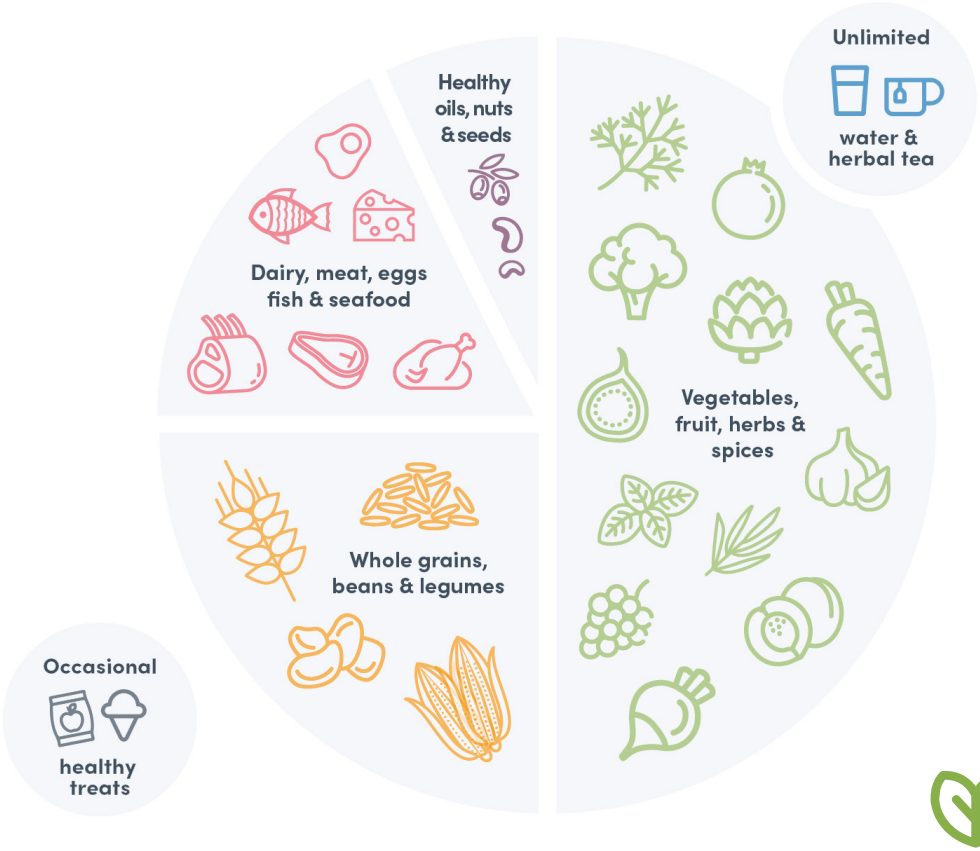
Estimated energy requirements specific to gender, age, and activity level

Gender	Age	Sedentary (kcal/day)	Moderately active (kcal/day)	Active (kcal/day)
Female	2-3	1,000	1,000-1,400	1,000-1,400
	4-8	1,200	1,400-1,600	1,400-1,800
	9-13	1,600	1,600-2,000	1,800-2,000
	14-18	1,800	2,000	2,400
	19-30	2,000	2,000-2,200	2,400
	31-50	1,800	2,000	2,200
	51+	1,600	1,800	2,000-2,200
Male	2-3	1,000	1,000-1,400	1,000-1,400
	4-8	1,400	1,400-1,600	1,600-2,000
	9-13	1,800	1,800-2,200	2,000-2,600
	14-18	2,200	2,600-2,800	2,800-3,200
	19-30	2,400	2,600-2,800	3,000
	31-50	2,200	2,400-2,600	2,800-3,000
	51+	2,000	2,200-2,400	2,400-2,800

Sedentary: light physical activity (related to basic activities of daily living) and sitting for most of the day
Moderately active: daily activities and walking up to three miles per day
Active: walking more than three miles per day in addition to basic activities of daily living

Components of a healthy diet

This graphic provides a visual representation of the proportions of dietary components that should be consumed on a healthy diet. Keep this handout in a visible place, such as on your fridge, to help guide healthy dietary choices.



✂ Print me out and stick me on the fridge!

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