



THE SCIENCE OF LIVING WELL, BEYOND CANCER

Relax

Exercise

Eat Real Food



Men will be diagnosed with prostate cancer.



Women will be diagnosed with breast cancer.



1 in 2 men and 1 in 3 women will be diagnosed with some form of cancer in their lifetimes.

Who Should Use This Guide?

Everyone.

This year, 1 in 9 men will be diagnosed with prostate cancer. 1 in 8 women will be diagnosed with breast cancer. 1 in 2 men and 1 in 3 women will be diagnosed with some form of cancer in their lifetimes. Everyone knows someone with cancer, but we all wish we didn't. An aging population, combined with poor lifestyle choices, has contributed to an overall rise in chronic disease, including cancer, diabetes, heart disease, autoimmune diseases, and depression.

Whether you are a cancer survivor or someone who just wants to prevent any number of chronic diseases, this guide is for you.

At the Prostate Cancer Foundation, we care about your life and your livelihood. We don't just want men to survive prostate cancer—we want you and your whole family to live well. We are also scientists, so this guide consolidates the latest research, reviewed by experts in the field, on lifestyle trends that could have a positive impact on your health. Because science changes constantly, this guide is updated frequently as new evidence becomes available. For the latest updates, please subscribe at pcf.org/livewell.

The most important thing to remember about your lifestyle choices is that they are choices. You can be a partner in your own health outcomes by making just a few of the simple changes found in this guide.



*For the latest updates,
please subscribe at
pcf.org/livewell.*

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Let food be thy
medicine and medicine
be thy food.

Attributed to **HIPPOCRATES**

Overview

The idea of food as medicine is not new; it crosses centuries and continents. The ancient Indians utilized turmeric for its antiseptic properties, lentils served as a constipation remedy in the Roman Empire, and the Aztecs used chocolate drinks to relieve congestion.

In the Middle Ages, drugs and pharmaceuticals were natural remedies extracted from plants. After the industrial revolution, pharmaceuticals transitioned from extracts to synthesized chemicals. At this point, opinions began to polarize: you either believed that food cured disease (quacks!) or medicine cured disease (scientists). Now, the two points of view are merging again. Why?

One thing that has helped science catch up to the intuition that food can heal is “big data”: computers can now crunch large volumes of data, allowing scientists to look for patterns and trends that they could never see before.

One thing that has helped science catch up to the intuition that food can heal is “big data”: computers can now crunch large volumes of data, allowing scientists to look for patterns and trends that they could never see before. Here’s just one example: for a number of years, drinking too much coffee was associated with poor health outcomes. But a 2018 study revealed that what was initially thought to be a link between coffee and cancer turned out to be a link between smoking and cancer. You see, many coffee drinkers smoke, and once there was enough data and computer power, researchers were able to see that the association

was not based on coffee at all. In fact, two studies have found that the antioxidants in coffee may reduce risk of prostate cancer, and there is now ample data to indicate that coffee may be associated with the prevention of certain types of cancer, including liver and endometrial.

Thanks to global access to people, information, high-speed computing, and time, we are beginning to understand the cause and effect (if any) of how certain nutrition behaviors factor into health outcomes. The result is a shift in the way food is being treated: the convergence of food as healing and nutrition as science.

Is It Possible To Eat To Prevent Cancer?

Is it possible to eat to slow down the growth of cancer, augment cancer therapy, or remain healthy after treatment? As more and more large-scale research studies are published, the answer seems to be, in most cases, yes. In one example, researchers in Spain found that study participants who were randomly assigned to a “Mediterranean diet”—including vegetables, beans, whole grains, fruits, fish, extra virgin olive oil (EVOO), and nuts—vs. a reduced-fat diet (control) had lower occurrence of cardiovascular disease and a lower risk of breast cancer.

However, it is also important to note that, as doctors, we see cases all the time where a patient takes great care of themselves and seems in otherwise excellent health...yet they still get cancer. Rest, exercise, and nutrition are three of the top social determinants of health; they are not the only determinants of health.



Precision Nutrition

Studies suggest that a diet supplemented with extra virgin olive oil may decrease risk of invasive breast cancer. However, we can't always make generalizations: for example, two breast cancer patients may respond slightly differently to the same diet. That's because every person is unique, so every person needs a unique diet, optimized to meet their nutrition needs. If you are recovering from cancer, your doctor will likely be able to recommend a nutritionist to help create a customized plan for you.

Precision Exercise

It's a little easier to see how exercise works best when tailored to different people. For one guy, a walk up a steep hill may be challenging as well as health-promoting; for another gal, running to the top of a mountain and back might feel easy. Research has found some pretty clear associations between exercise and cancer prevention and recovery. Furthermore, studies seem to indicate that exercise during treatment may be a boon for long-term effectiveness and reduce side effects.



If you are trying to eat to prevent cancer, some of the information in this document can be used as guiding principles—but it's important to remember that what works for someone else may not work for you. This is the concept of precision nutrition.



Precision Rest

What could be precise about rest? First, we have to answer the question of what “rest” even means. Resting your body can involve sleeping, recovering or sitting; it can also refer to more active rest like yoga or meditation. These activities, as well as others described in the following section, can help ease chronic pain, anxiety, and stress, resulting in all kinds of better outcomes for your immune system.

What is Cancer?

Cancer is a collection of 187 diseases which are all due to uncontrolled cell growth.

Cancer starts due to a genetic mutation, generally in the form of damage to the DNA. Our cells divide many times during our lives. At each division, our genes—made up of DNA—need to be replicated, and occasionally errors occur. If the error, or mutation, is in a gene that regulates cell division and it is not fixed in time, this may result in cancer. The majority of mutations that cause cancer are the result of chance: the more times cells divide, the more chance an error will occur. This is why cancer risk increases with age.

Cell division needs both energy and building blocks to make new cells, and thus a cancer cell or a growing tumor needs plenty of glucose and amino acids. Cancer cells ‘burn up’ glucose in a different way than normal cells, resulting in a high level of glucose in the cancer cells (this is one way in which tumors can be detected). This different type of metabolism, called the Warburg effect, is not fully understood, but it may help to fuel the growing tumor’s need for energy and building blocks for new cells.

Own Your Health: Get Involved

Whether you're reading this guide as a cancer prevention tool or a cancer recovery tool, the outcome could be in your hands. While 5%–10% of cancers, usually the most aggressive, are due to factors like inherited genetic mutations, 42% of cancer cases are thought to be preventable with the right lifestyle changes, including but not limited to HPV vaccination, quitting smoking, and reducing obesity. It is never too late to develop a personalized wellness plan.



42%

of cancer cases are thought to be preventable with the right lifestyle changes.

It can be tough to figure out *which* changes to make, though: the world is full of well-meaning self-help gurus, people who have been-there-done-that-spinach-smoothied their way to remission, and even some old-fashioned take-the-money-and-run shysters.

You've heard this before, but we'll say it again: DO NOT believe everything you read on the internet. Remember to look for science-based information, whether in this guide, at pcf.org, or from other sites with a .gov, .edu, or (in most cases) .org extension.

For those who are actively in treatment, especially treatments with side effects, there may be recommendations that are extremely specific to your particular cancer therapy protocol. Covering those is beyond the scope of this guide, but be proactive about asking your oncologist or nurse what you can do to minimize side effects or augment treatment efficacy with exercise and nutrition.

Lastly, although getting involved in your own health is critical, getting involved in helping other people can be even more uplifting. Without brave citizen scientists coming forward to participate in clinical trials, much of the research used in this guide would not exist. We hope you consider “paying it forward,” as others have done; there are many open clinical trials in exercise and nutrition that need your help.



Become a citizen scientist today—volunteer for a clinical study. Go to clinicaltrials.gov for more info.

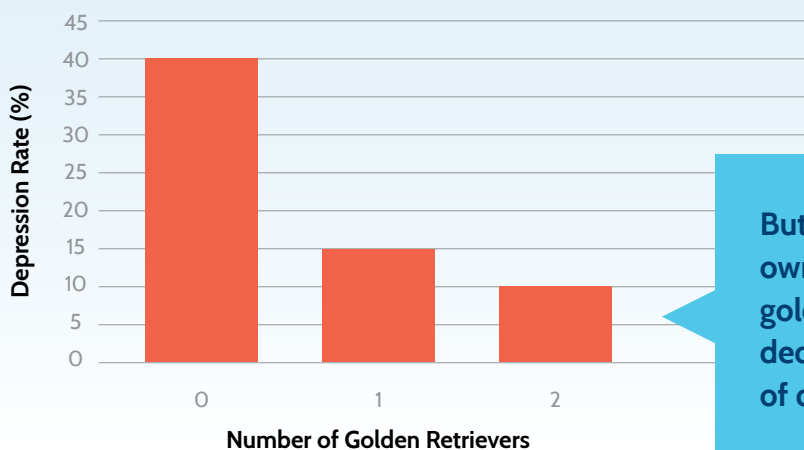
How To Read This Guide

In this booklet, we have translated a lot of established and cutting-edge scientific research into easy-to-read recommendations.

We put in a lot of science. If you want, you can download our references and read the original source material. Either way, it is important to keep in mind that most of the science today in the field of health and wellness is based on association, not causation.

Association refers to two variables that seem to be related in some way. For example, let's say a scientist looks at the relationship between golden retriever ownership and clinical depression diagnosis. Just based on survey data, it may seem like owning a golden retriever corresponds with lower rates of depression.

DEPRESSION RATES AMONG GOLDEN RETRIEVER OWNERS



But does this mean owning more golden retrievers decreases your risk of depression?

Not necessarily.



In order to determine causation—not just association between the two variables—you need to conduct a randomized controlled study.

But does this mean owning more golden retrievers decreases your risk of depression? Not necessarily.

In order to determine *causation*—not just *association*—between the two variables you need to conduct a randomized controlled trial. Randomly assigning subjects into each group helps control for other possibly related variables, like age, personality type, socioeconomic status, cancer stage, other disease interactions, etc. To make any causal relationship more evident, you might consider selecting subjects who are not currently depressed, and are generally healthy.

Maybe you give two golden retrievers to members of Group 1, one golden retriever to Group 2, and no animals to Group 3. It might be a good idea to give Groups 4 and 5 one and two Labrador retrievers, respectively, to make sure it's the *golden retrievers* themselves impacting depression, as opposed to the fact that the subjects have *dogs* in general. To make your study really rigorous, you could even give groups different kinds of pets—birds, hamsters, and fish, for example—to make sure whatever results you get are based on owning a *golden retriever*, and not just owning a pet.

Then, you might check in with every subject in two-year intervals for ten years to determine whether or not they've been diagnosed with clinical depression. Let's say the results show that people with golden retrievers have a significantly lower rate of depression diagnosis. Since the randomized assignment into groups helped you control for a lot of other variables, you can safely conclude a probable causal relationship between owning a golden retriever and having lower rates of depression.

To review: randomized controlled studies over time help scientists to determine causality. Does this mean that all other studies are inferior?

Not at all.

Epidemiological studies also use observational data; they may not control for as many variables, but they look at population trends and hence have the advantage of using much larger and more generalizable data sets than randomized controlled trials. This is also useful information.

Here's an example of one landmark observational study that examined associations between variables to make a life-saving health recommendation. In 1950, Dr. Ernst L. Wynder published a retrospective study that found that a significantly large percentage of lung cancer patients were also regular smokers. Even though his results didn't confirm a cause-and-effect relationship between smoking and lung cancer, they were strong enough to help catalyze larger, long-term studies, eventually leading to a US Surgeon General report that sparked a wave of anti-tobacco initiatives. The percentage of Americans aged 18+ who smoke has dropped by over 50% since the 1960s, and the percentage of deaths from lung cancer, particularly in men, has also dropped significantly.

Today, we have cause and effect firmly in hand for smoking and cardiovascular disease, lung cancer, bladder cancer, and more; back then we didn't. But the smoking gun (pun intended) of Wynder's study was enough to recommend a change in behavior even before the larger studies confirmed what we thought we knew. And that change in behavior saved thousands of lives along the way.

The Bottom Line

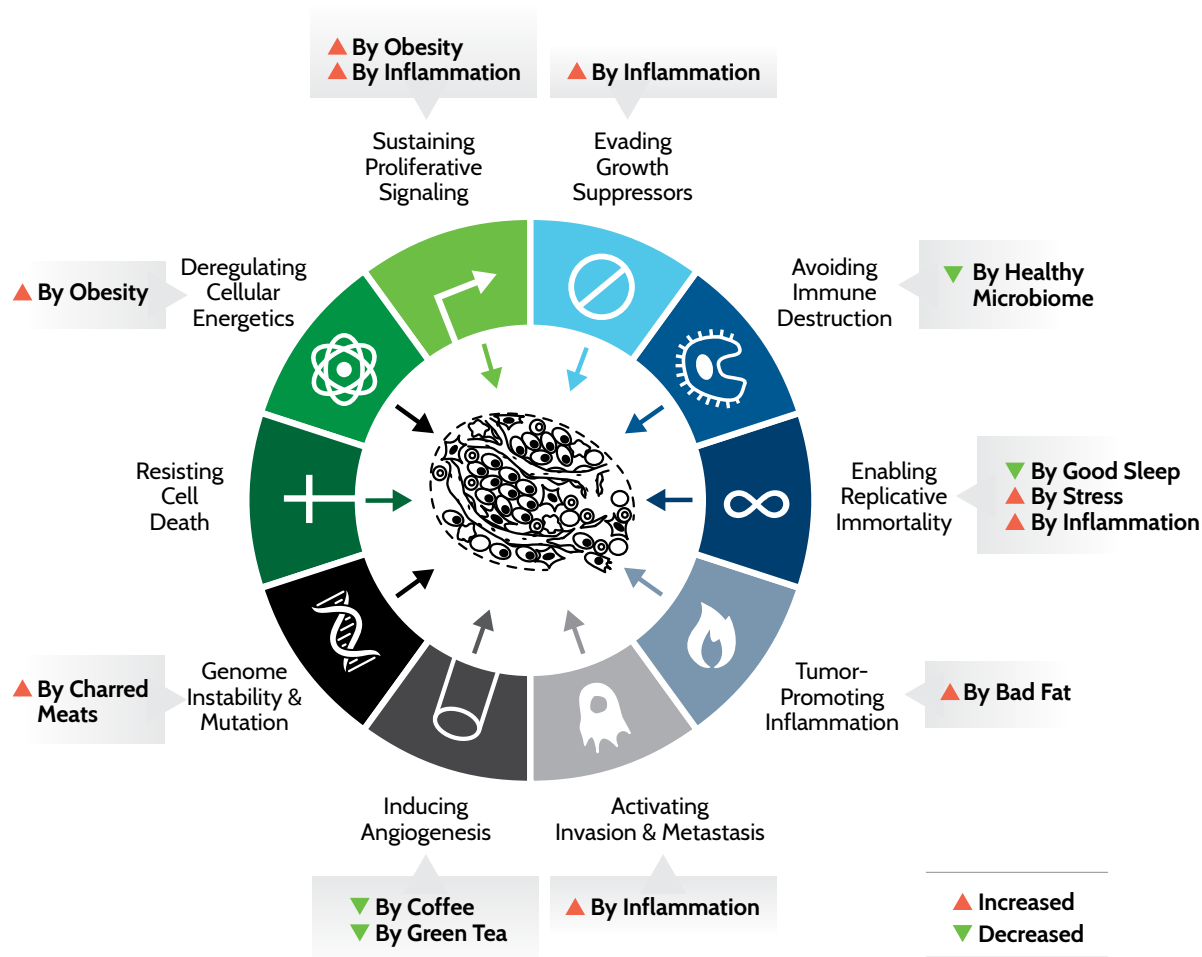
We recommend your cancer avoidance journey focuses on three primary areas: resting your body and mind, exercising vigorously to the best of your ability, and eating a whole-food diet. The remainder of the guide focuses on the latest available scientific research in these three areas.

Relax

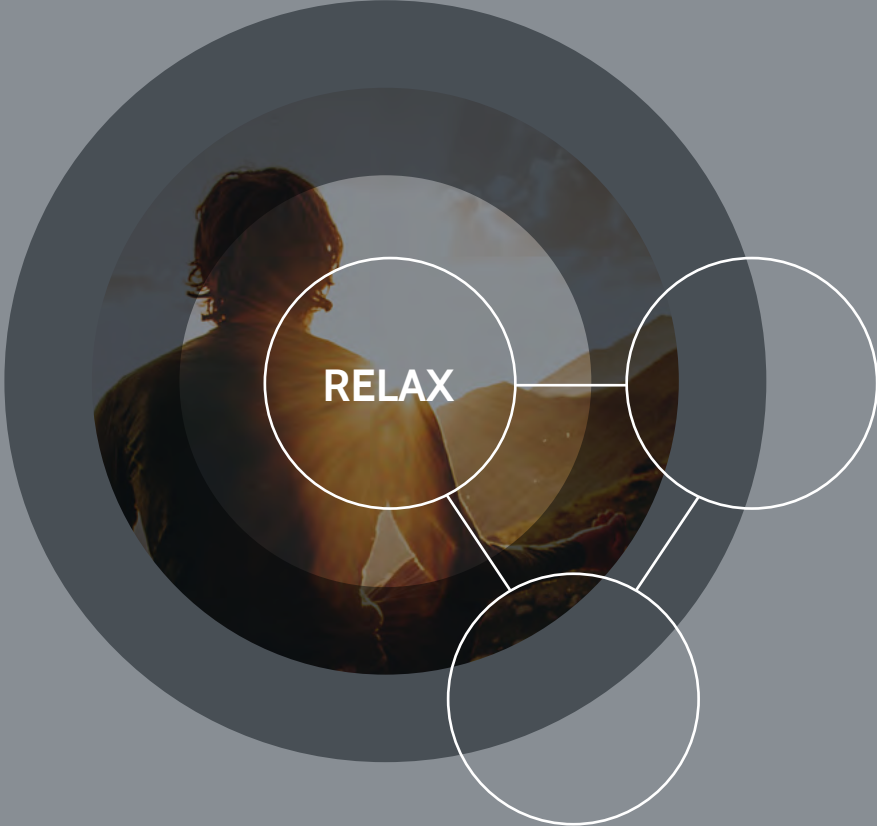
Exercise

Eat Real Food

Hallmarks of Human Cancer as Driven by Lifestyle Factors



A 2011 landmark paper by Hanahan and Weinberg published in *Cell* described six “hallmarks of cancer,” or biologic capabilities common across all cancer types. Above are an updated nine hallmarks, and some of the insights we now have about how the lifestyle factors described in the rest of this guide can affect cancer outcomes.





Except our own
thoughts, there is
nothing absolutely
in our power.

RENÉ DESCARTES

Mental Health

Right now, you might be thinking to yourself: “I came here for the latest info on cancer nutrition, and I’m getting 400-year-old advice. This is nonsense.” In fact, our ancestors were spot-on about a lot of things that we’ve now been able to verify with modern research.

René Descartes famously explored the mind-body connection. While Descartes mostly wrote about the mind’s ability to mechanically control the body, today’s science shows that our mental states can affect our health as well.

Here’s one example: Prostate Cancer Foundation (PCF)-funded researcher Suzanne Conzen studies the body’s stress hormone receptors. Her work, which overlaps both breast and prostate cancer, indicates a strong relationship between stress response and cancer. Our biggest hesitation in telling you that? That it will stress you out. But fear not, there are many techniques for managing your mind, and subsequently, the influence it has on your body.

In recent years, the value of something called emotional intelligence has been on the rise. EQ (emotional quotient) refers to your ability to recognize and regulate your emotions. In the “old days,” researchers used to think that IQ—intelligence quotient—was a predictor of performance. We now know that your EQ is a far more accurate predictor of success. On an intuitive level, that kind of makes sense, right? You might be the smartest person in the class, but if you can’t modulate your anxiety on test day, you’ll still get low grades.

Here’s some more good news: unlike IQ, EQ can be trained and improved. The ability to identify and regulate your emotions is critical if you’re going through cancer diagnosis, treatment, or recovery. Even if you’re reading this as a prevention guide, the EQ toolbox is a good jumping-off point for all your emotional management needs.

EQ

EQ refers to your ability to recognize and regulate your emotions. It can be trained and improved.

There are five main components of emotional intelligence:

1

Self-Awareness

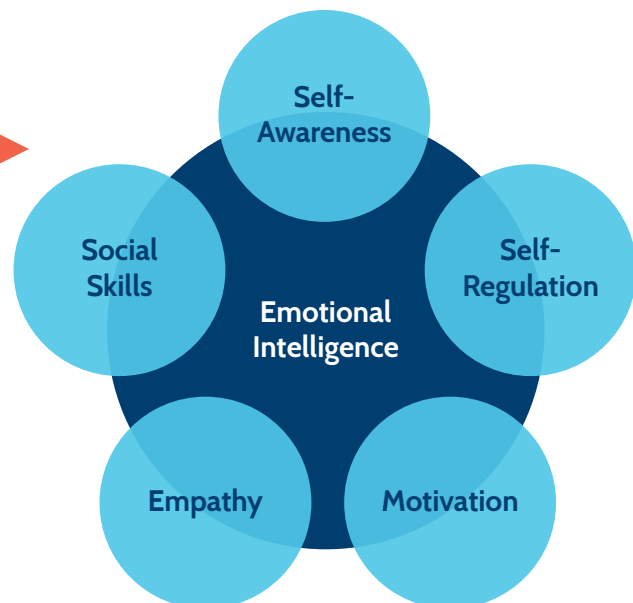
It is important to have a line on your own emotions and thoughts: Are you anxious in certain situations? Do specific events trigger anger, sadness, or joy? If you are going through cancer diagnosis or recovery, you may experience the widest range of emotions of your lifetime. Self-awareness means knowing your emotional strengths and weaknesses, *without* beating yourself up for it.

2

Self-Regulation

Once you're aware of your weak spots and tendencies, you can adapt to and redirect your moods, often taking the time to think before you act.

It's important to note that all five components of emotional intelligence are interconnected: as you work on one, you're simultaneously improving your skills in another area. For example, practicing positive self-talk to decrease anxiety also might give you confidence to try a more challenging workout routine at the gym.



3

Motivation

Find meaningful reasons to pursue your goals. Whether it's altruistic in nature, a desire to showcase your skills, a need for autonomy, or to feel a sense of relatedness to others, having passion helps to renew your energy and optimism through ups and downs, and helps you persist through to your goals.

4

Empathy

“You can't help others until you help yourself.” Having a firm handle on your own emotions allows you to react to other people in a more understanding way. For example, if you are helping your dad through his cancer treatment—and he can't seem to stop snapping at you—you might consider that he is probably scared. Instead of snapping back, take a deep breath and let him know you understand how hard it must be.

5

Social Skills

Your social skill set is the one that lets you connect easily with people and build lasting and supportive relationships. For anyone going through cancer diagnosis, treatment, recovery, survivorship, caregiving, and beyond, nurturing your social network and having the strength to call upon those you love will be a critical part of your journey.

In his book *Permission To Feel*, Marc Brackett, PhD, Director of the Yale Center for Emotional Intelligence, notes these tips for improving emotional intelligence:

1 Emotions are information! Historically, emotions were seen as disruptive - information to be ignored. But the truth is, emotions provide valuable information. Fear informs us: should I approach or avoid? Anger lets us know there has been an injustice. Joy signals that things are safe.

2 Think like an “emotion scientist.” Be the learner, not the knower. Listen to understand, not to build your own argument. Validate and show unconditional support to yourself and others.

3 Managing your emotion skills is a lifelong journey! Think about it: none of us are born with an advanced vocabulary to describe our inner lives. Work on building your emotional vocabulary. Replace unhelpful strategies for regulating emotions (negative self-talk) with positive strategies. Think about the advice you would give a best friend or loved one and apply it to yourself.



What Is Stress?

“People are disturbed not by a thing, but by their perception of a thing.” –Epictetus

More and more, stress is a pervasive aspect of everyday life. Disease, parenting, financial issues, relationships and work all seem more complex than they were 50 years ago. That means the things that relieve stress—mindfulness, community, and laughter, to name a few—are in short supply compared with the stressors. The perception that you are unable to “keep up with” or overcome multiple short-term stresses can result in persistent long-term anxiety. Both long- and short-term stress can impair cognitive processes, increase blood pressure, and cause headaches and other physical effects, as well as increasing negativity and decreasing productivity.

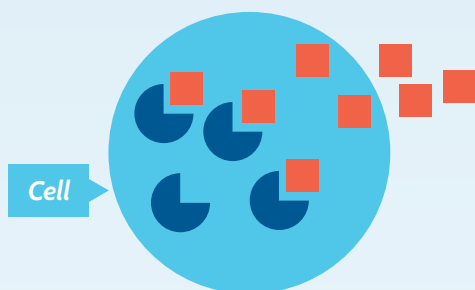
But what IS stress? Because stress is something very personal, it can be tough to imagine defining it. On a biological level, an individual person’s *response* to stress can be measured by looking at increased levels of the hormone cortisol. Most cells in the human body have receptors for cortisol called the glucocorticoid receptor, or GR for short. This means that when you get frazzled (ie, have a big response to stress), cortisol can affect almost every area in your body.

Have you ever felt “worried sick”? It’s not all in your head: stress responses have a plethora of physiological effects, including links between stress and disease. Studies have found that stress can trigger a physical reaction that appears to contribute to and/or exacerbate conditions including asthma, arthritis, depression, cardiovascular disease, chronic pain, HIV/AIDS, stroke, obesity, and certain types of cancers.

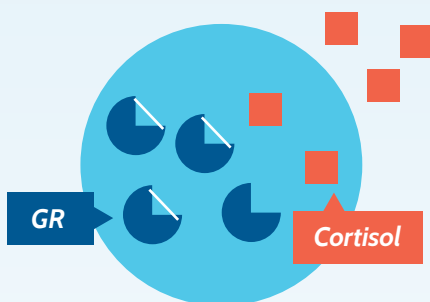
When it comes to cancer, it might be important to treat stress along with the actual disease. Studies by PCF-funded researcher Suzanne Conzen found that high expression of GR in tumor cells is related to decreased survival in ovarian cancer patients. Her research also suggests that decreasing GR’s downstream effects in tumor cells might delay cancer progression.

THE MECHANICS OF HOW STRESS AFFECTS CANCER GROWTH

Let's say you're frantically trying to meet a deadline. The mental angst is connected to a release of the stress hormone cortisol into the bloodstream. We'll represent cortisol with a red square and GRs with dark blue wedges.

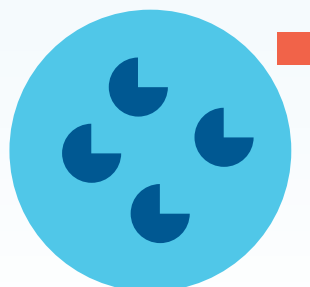


Cortisol can diffuse into your cells (the large blue circle), and bind to GRs—the dark blue wedge shapes. This can provide an environment for cancer to thrive.



Dr. Suzanne Conzen's research suggests that to enhance cancer therapy, we should introduce molecules that inhibit the activity of GR: that is, they allow fewer activated blue glucocorticoid receptors.

By blocking the places for cortisol to dock, the effect is that cancer progression is reduced.



Instead of blocking the docking site, there's another option: use the tools in this guide to decrease stress and you'll decrease cortisol secretion. With fewer cortisol molecules around, there's a lower chance of cortisol-GR binding, so again the effect on disease progression is reduced.

The takeaway from this research is that, believe it or not, we now have biological evidence that high stress levels can fan the fire of cancer growth. Therefore, it is important to keep your stress levels in check—that is easier said than done, especially if you are dealing with a cancer diagnosis.

The good news is that, as Epictetus said almost 2,000 years ago, you have the ability to change how your body perceives stressful situations, events, and people. Here are a few tips for keeping your stress response at bay. Even working on just 1-2 of these could have a substantial effect on your ability to manage stress.



1. Accept your stressors | Studies indicate that accepting stress decreases negative emotions and protects against depression. This doesn't mean you hide from your stressors: it just means that you acknowledge their presence, you do what you can to improve your situation, and then try hard to let it go.



2. Spend time in person with friends | Research suggests that in person socializing (vs. through social media) is important: limited face-to-face contact may double your risk of depression, but making the effort to have in-person conversations creates a more fulfilling experience. Take time to meet a friend in person for coffee, or start a monthly activity group with friends who share the same interests.



3. Give yoga a try | Despite what you might have seen on sitcom TV, yoga practice isn't about twisting yourself into a pretzel; the goal is to connect your body and mind in a way that gives you peace, power, and clarity. Research continues to find links between yoga and decreased anxiety and depression, and better regulation of your hypothalamic-pituitary-adrenal system, which controls cortisol secretion. Check to see if your gym offers classes, take a free trial class at your local studio, or look for online classes through your computer.



4. Jam out | Multiple studies provide evidence that listening to music every day helps lower your stress levels. Research suggests that listening to music for the express purpose of relaxation increases the stress-reducing benefits of music, as opposed to using it as a distraction from work or to stave off boredom.



5. Get physical | Not everyone's a hugger, but research suggests that both nonsexual physical affection and sexual activity itself may play a role in improving mood and increased oxytocin secretion, which is linked to antidepressive effects.



6. Laugh | Nothing feels better than a good belly laugh, and science backs it up! Both mirthful laughter and anticipation of mirthful laughter decreases cortisol secretion (the stress hormone). Plus, just hearing laughter helps your parasympathetic nervous system initiate a "rest and relaxation" response, so consider taking in some local standup comedy or start watching a TV show with a laugh track!



7. Get a pet | Research suggests that pet ownership alleviates stress-related blood pressure increases, and especially helps reverse depressive symptoms in the elderly. Dogs in particular are great stress-reducing companions, but consider volunteering at an animal shelter or visiting a dog park if you can't own one yourself.



8. Exercise | This is an oldie but a goodie: working up a sweat can release endorphins, help your self confidence, and improve mood-related disorders. See page 44 for more on exercise.



9. Cry | While a lot of stress-reducing techniques focus on rerouting your negative emotions, sometimes it's good to experience sadness and anxiety. Studies suggest that crying improves mood for both men and women, perhaps due to parasympathetic nervous system activation, which helps your body calm down from a stressful situation.



10. Get your sleep right | With jobs, commitments, and Candy Crush, it's easy to find yourself still awake at 4:00 a.m. with work the next day. But your body needs time to rest and recover: lack of sleep can increase your cortisol levels and may negatively impact your immune system.

Working on just a few of these could have a substantial effect on your ability to manage stress.



See also, sleep tips on pages 26-27.

In the following sections, we break down a few of the stress management factors that have been studied in relationship to cancer.



Manifestations of Emotional Stress

Sleep

Sleep is the body's chance to recover from everything that happened during the day. During sleep, your muscles relax and receive increased blood flow, your tissues grow and repair, and your brain cells get rid of waste so you're bright and fresh for a new day.

In terms of how many hours of dozing you need per night, the jury's still out. You've probably heard the 7-8 hours mantra, but there's also new research to suggest that 5-6 hours might be optimal for longevity. The National Sleep Foundation also recommends paying attention to your *quality* of sleep, which includes falling asleep in 30 minutes or less and waking up no more than once per night. Like any other piece of advice we give in this guide, you have to figure out what works for you: your coworker might be perky with 6 hours of sleep, and you might be a zombie with any less than 8.

Note, however: There is evidence against too much sleep. Studies suggest that oversleeping (usually 9+ hours) is linked to mood disorders, neurodegeneration, and inflammation.

Too little sleep also leads to similar issues. One example indicates that sleep deprivation may be correlated with increased cancer risk. A 2008 study compared women who worked the night shift (in other words, their circadian rhythms were off) with those who worked a regular daytime schedule. Researchers found that there was a 30% higher incidence of breast cancer in the night shift subjects. Shorter sleep duration has also more recently been linked to higher risk of death from prostate cancer and other cancers, particularly in patients who have other conditions such as cardiovascular disease.

Sleep, stress, and cancer can turn into a vicious cycle: a cancer diagnosis is understandably stressful; this can mess up your sleep cycle which makes you even more stressed out, which could put you at an even higher risk of cancer progression.



30%

Researchers found that there was a 30% higher incidence of breast cancer in the night shift

How do you break the cycle? Don't despair. In addition to the Tools for Managing Stress in the previous section, here are a few more tips specifically on how to improve your sleep quality.

1

Have a regular bedtime routine.

This is especially helpful if you suffer from insomnia: identify a few practices that you find relaxing, and implement them before your head hits the pillow. This can include having a hot bath, dimming the lights in your bedroom, listening to music, or reading a few chapters of a book.

2

Find the amount of sleep that is right for you.

Everyone is a little bit different, and that includes the amount of sleep you need to function optimally. While the “recommended range” is 7-9 hours for adults (7-8 hours for those age 65+), you may need more or less.

3

Ditch the device.

There's a bit of a catch-22 here: often people try to unwind on their phones before bedtime, but smart devices can make it more difficult to relax and are linked with worse quality of sleep. Consider powering down at least 30 minutes before bedtime, and keeping your phone further than an arm's length from your pillow.

4

Keep your bedroom dark, quiet and cool.

Darkness allows your body's melatonin levels to rise, which stabilizes your sleep/wake cycle. This goes along with turning off all the tech in the area: devices like smartphones, TVs, and computer monitors emit blue light, which is particularly damaging to melatonin production. Studies also find that low noise levels (you might consider a white noise machine or soft music if you live in a busy area) and a bedroom temperature of around 66 degrees Fahrenheit help create an ideal environment for you to doze off.

5

Sleep in bedding made of natural temperature-regulating fibers.

Studies suggest that bedding made of wool or cotton fibers may have a regulating effect on skin temperature and changes in humidity, allowing your body to maintain an optimal temperature for sleep.

6

Get active.

Physical activity has been linked to improved sleep, especially in insomnia patients. Regular exercise may even protect against the negative cognitive impacts of sleep deprivation. Exercise is also associated with better sleep quality.

7

Limit caffeine intake in the afternoon.

As tempting as it is to reach for a cup during that mid-afternoon slump, caffeine consumed up to 6 hours before bedtime can negatively impact your sleep quality.

8

Limit alcohol intake before bedtime.

Ditch the nightcap—just because being tipsy makes you feel like you're falling asleep faster doesn't mean you're actually sleeping better. A glass of wine with dinner is fine, but anything more than 2 servings can cause nighttime waking and prevent REM sleep, which is the most restorative stage of sleep.

9

Avoid over-the-counter sleep medications.

While prescriptions seem like a quick fix for sleeping problems, many medications pose risks of addiction and daytime side effects, particularly for the elderly. Consider drugs as a last resort for improving your sleep, and be sure to consult with your physician.

10

Eat a balanced dinner, including healthy fats.

Lean proteins, such as turkey and fish, and healthy fats, such as the kind found in nuts, can boost serotonin levels and help you sleep. However, research has also linked eating too close to bedtime with sleep disturbances, so try to finish dinner about 2-3 hours before you hit the hay.

Yoga & Meditation



Originating in ancient India, yoga is a practice that links coordinated movements with controlled breathing. It meshes both your physical and mental well-being by combining exercise with meditation. Millions of people practice each year, and the original 8 forms of yoga have exploded into many variations, including “doga”: yoga you can do with your dog!

Studies suggest that a regular yoga practice may have benefits for fighting cancer. For example, a comprehensive review of studies involving yoga and health outcomes indicates that yoga may play a role in improving health-related quality of life and reducing fatigue, sleep disturbances, depression, and anxiety in breast cancer patients.

Another example comes from a PCF-funded study of men with prostate cancer, jointly conducted in 2017 between researchers at the University of Pennsylvania and Johns Hopkins University. Men in the control group (no yoga) reported worsening cancer symptoms, while men in the yoga group self-reported stabilizing symptoms over time. Because the study was self-reported by the men, it's unclear what caused the improvement. It could be due to the men unconsciously linking yoga and health, so they perceived their symptoms to be lessening. Or it could be that the yoga physically strengthened their core muscles and pelvic floor, hence relieving symptoms of incontinence and erectile dysfunction. Either way, researchers continue to investigate the physiological mechanisms behind yoga's effects on cancer—for now, scientists believe that there is evidence for a positive connection.

If you're just starting out, you might consider trying classes at a yoga studio, your local gym, or the YMCA: group exercise has been shown to have physiological and emotional benefits for cancer patients. If you are unable to practice yoga outside the home, there are apps available for your phone, online courses, and free yoga videos on YouTube. Take a look online and figure out what style might be right for you. Because they all focus on breathing, you really can't go wrong with any style, but Hatha yoga offers a good starting point for beginners, because movements tend to be slower.

What about meditation? Yoga and meditation are related in that focusing your mind during yoga practice is as important, if not more so, than the movements themselves. Some would say that the physical yoga practice is merely a preparation for the real work, which is calmness and mental focus. That's why we have categorized yoga under relaxation, and not the exercise section of this document.

In 2014, a Canadian study found that meditating altered the length of cancer survivors' telomeres. Telomeres are the caps at the end of our chromosomes, and they shorten over time; this contributes to the process of cellular aging, and is connected to cancer progression. Participants in this study who didn't meditate saw their telomeres shorten over the period of the three-month study; those who meditated did not, which suggests that meditation can help prevent cancer progression.

Meditation can be done with or without a physical yoga practice. There are many apps that can help guide you through meditation at home. Research indicates that even 10 minutes a day can help with pain tolerance and anxiety, thereby decreasing stress and supporting cancer recovery.

Work



Modern-day work environments can be a quadruple threat of stress, thanks to longer hours, more responsibility, longer commutes, and lower pay.

Perceived work stress is linked to higher risk of prostate cancer in men under 65 as well as higher risk of lung, colon, bladder, rectal, and stomach cancer in all men. Chronic stress is connected to more aggressive breast cancer.

Dan Buettner is the founder and CEO of the public health organization Blue Zones. Buettner works with communities to emulate the conditions of unique places around the world where people live unusually long and healthy lives—including looking at diet, exercise, and workplace.

One important feature of Blue Zone regions is that their residents have a sense of purpose. This “reason to get up in the morning” is baked into ancient cultural norms: in Japan they call it *ikigai* and in Costa Rica, *plan de vida*. Buettner believes that this sense of purpose is linked to reduced risk of Alzheimer’s disease, arthritis, and stroke. A complementary study of 7,000 adults found that a stronger sense of purpose is correlated with lower mortality from all causes, including cancer. Likewise, as Buettner points out, sitting behind a desk simply isn’t what our bodies were made to do.

How can you manage this? For some people, work is their reason to wake up in the morning. For others, work is the polar opposite—instead, they prioritize family, community, or friendships. One of the most valuable things you can do is to identify your own personal *ikigai*, spend some time nurturing it, and learn not to sweat the other things too much (see page 19 for emotional intelligence tips).

Even if work doesn’t show up on your *ikigai* list, most of us still have to do it. Here are a few tips for weaving purpose into your current job:

- Add tasks you enjoy or that challenge you.**
If you’re bored with the same old routine, ask around to see if there are new and different job responsibilities you can take on.
- Set small goals.**
Not every day will be a groundbreaking victory, but you can focus on tackling small projects. Keep a to-do list and take pride in crossing things out all day.
- Work on relationships.**
Building personal connections and finding shared interests with colleagues helps make the workday more bearable. Ask someone different to lunch every day, or arrange a group outing after work.
- Remember the big picture.**
In order to escape cog-in-a-machine syndrome, take time to reflect on how the small contribution you make adds to a larger positive impact.

Physical Touch



In 2004, the National Bureau of Economic Research reported that having sex once a week instead of once a month is the happiness equivalent of getting a \$50,000 raise. Sex releases oxytocin and endorphins, which boost your mood and act as natural pain suppressors, as well as stimulate your immune system.

Unfortunately, cancer diagnosis and treatment can affect sexual drive and function. If you are in a committed relationship, it is critical that

you maintain an open dialogue with your partner about any changes or worries you are experiencing. It is not impossible to have a healthy, intimate relationship with your partner during cancer treatment. Plus, if you are a man worried about prostate cancer, we have some news you are going to like. There's a growing body of evidence that suggests that men who ejaculate more frequently have lower risk for prostate cancer.

If you are a man who has been diagnosed with prostate cancer, you may have many questions about erectile side effects from treatment. For a full review on side effects, treatment, and the latest research, download the Prostate Cancer Patient Guide at pcf.org/guides.

If cancer has affected your sex drive, there's still good news: the physical touch doesn't have to be sexual in nature to have beneficial effects. Therapeutic touch and massage have been shown to have a positive impact on cancer symptoms. As we mentioned before, nonsexual touch helps with stress reduction, which is associated with lower cancer risk. Research also suggests that a cancer diagnosis can actually increase needs for nonsexual touch and affection compared to before the diagnosis.

\$50K

Sex once a week
instead of once
a month is the
happiness equivalent
of getting a
\$50,000 raise.

Community



What would you cite as the best predictor of risk of death? Common answers might be cancer, heart disease, or behaviors like alcohol abuse or drug addiction.

But a study published by the American Cancer Society points in a different direction: social isolation. Researchers found that compared to the least socially isolated in their race-sex subgroup, the most socially isolated black men and women had more than 100% increased mortality risk, and white men and women had 60% and 84% greater risks of death, respectively. While more research has yet to be done on other demographics, this study provides some pretty compelling evidence for the damaging effects of social isolation.

Social isolation, loneliness and lack of adequate support are distinct but related, and are referred to as *social determinants of health*. Social isolation is physical separation from other people. Loneliness refers to your perception of being alone or separated from others. Social support refers to the overall overlap of your actual support and your perceptions of being cared for or belonging.

Regarding the value of community for health, some of you may be thinking, “I knew that!” while others of you may be thinking, “That’s just hippie stuff.” Regardless of where you land on this continuum, the data are unwavering on this topic: isolation, loneliness and lack of social support relate to adverse health outcomes, especially for the elderly. Fortunately, there are many new organizations cropping up to address this problem. One program, Silver Sneakers, brings older adults together to exercise, simultaneously helping to knock out both fitness and loneliness issues in one swing.

This brings us full circle to Epictetus and the start of this chapter. Many of the suggestions we’ve provided—strengthening your emotional intelligence, taking yoga classes, or building relationships at work—are inherently tied to creating strong networks to improve both your physical and emotional health. Research indicates not only that *positive thinking* can *improve* outcomes, but that if you *perceive* your situation to be lonely or stressful, regardless of whether it is, your health can actually *worsen*. This is all the more reason to be a proactive participant in your 360° wellness.





Lack of activity
destroys the good con-
dition of every human
being, while movement
and methodical physical
exercise save it and
preserve it.

PLATO

The Basics Of Movement

Movement is the act of changing the physical position of your body.

A lot of people think of walking as the most basic movement of the human body. But let's challenge that a little bit—think about the fact that babies cannot walk when they are born. What can they do? They can grab, smile, roll over, crawl. Over the course of an entire year, babies exercise a whole host of other natural movements that help to build the strength and coordination they will eventually need to walk.

So with that definition of movement, what is exercise? For this guide, we will define exercise as intensity of movement with the intention to effect change. In other words, exercise is anything you do where you 1) move your body rigorously such that 2) the outcome is that you get better, stronger, or faster in motion.

Wait wait wait wait. You might be thinking to yourself, “I thought all I had to do was walk briskly around the block for 30 minutes three times per week?” The answer is that the amount and type of exercise you have to do to stay healthy varies greatly with your body type and fitness level. Let's imagine someone who runs marathons for fun. Let's say he runs a marathon in January and he has another marathon planned for July. If he walks around the block for 30 minutes three times per week until July, will he be able to do well in the second marathon? Not likely. In comparison, for someone who spends most of their life at a desk working on the computer, and is just starting out with exercise, the round-the-block routine may drastically improve their fitness in that same 6-month period.

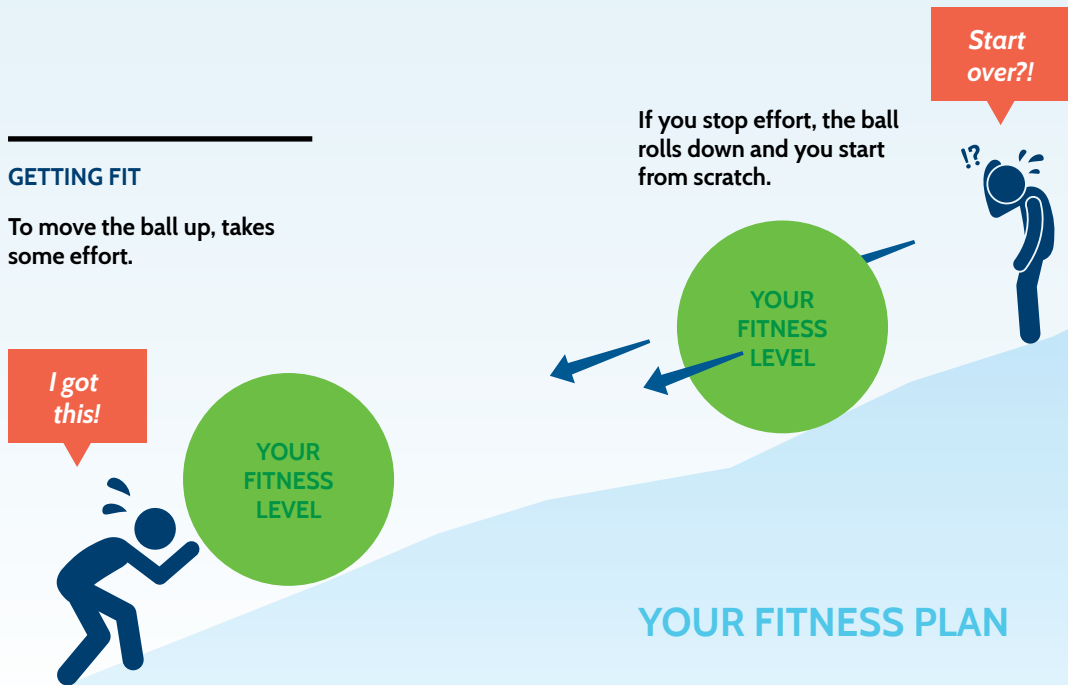
Your exercise routine needs to be tailored to maintain or improve your current fitness. And in order to improve, you have to challenge your current fitness status: you have to put in effort. For example, if you want to roll a ball up a hill, it takes a certain amount of effort, and how much effort you exert determines how fast you are able to push the ball up the hill. What happens if you get half-way up the hill and you let go of the ball? It rolls backwards and you have to start again. Even if you want to stay exactly as you are right now, you have to exert a little bit of effort, consistently. This is the same song Plato was singing over 2,000 years ago.

This is exercise.

Find something you like to do, because exercise is a lifetime healthy habit, not a single sprint up the hill.

GETTING FIT

To move the ball up, takes some effort.



Body Mass Index

Body Mass Index (BMI) is often used in health and fitness as a measure of—to not mince words—how overweight you are. BMI is an approximation, calculated by dividing your weight (in kilograms) by your height² (in meters). If you know your weight in pounds and height in feet, you can use any number of online calculators to get an approximation of how overweight you are (if at all).

BMI provides a crude but general way to measure obesity. Data indicates that as your BMI increases beyond healthy ranges, so does your risk for many diseases. One PCF-funded study found that obesity is associated with metabolic changes that may promote prostate cancer progression. A high BMI is also linked with

MAINTAINING FIT

To keep the ball from rolling down takes effort too!

It's worth it!



YOUR
FITNESS
LEVEL



Can I exercise when I'm in treatment?

Every person, cancer, and cancer treatment plan is different. When you are in treatment, it is recommended that you consult with your health care practitioners and not this guide. Your treatment center will likely provide access to or recommendations for alternative and complementary specialists (eg, a physical therapist) who can help you during treatment.

increased risk of cardiovascular disease, hypertension, diabetes, and multiple cancers including endometrial cancer and leukemia, as well as thyroid and colon cancer in men.


Remember, this is a correlation, not a causation. In other words, being overweight does not cause cancer, but it increases your risk both for getting cancer and having worse outcomes if you do get diagnosed. For example, obese men diagnosed with prostate cancer are nearly 30% more likely to die than those at a healthy BMI.

While data strongly suggests that obesity is correlated with cancer-related risk and death, it's important to point out that the full equation is more complicated. Consider the famed village of Acciaroli in Italy. About one third of the people who

live there are over 100 years old; many are also overweight, and smokers. While we absolutely do not advocate either of these lifestyle choices, it drives home the point that the relationship between lifestyle factors and outcomes is complex. For example, the folks in Acciaroli are also a part of a tight-knit community with a low-stress culture. Could it be that this helps balance the other aspects of their lifestyles? It's unclear, and more research is needed. In the meantime, as we advise in this guide, try to make small changes and improve upon all three aspects of your health - relaxation, exercise, and eating well - to create a long, well-rounded life.

What is a normal BMI? That's also a nuanced question. As already discussed, every person is a little different. If we were to dig in, what is considered a "risky" BMI may differ between diseases, e.g., heart disease vs. cancer. Likewise, BMI is a generalization that can mis-estimate body mass in Asians, overestimate body mass in athletes, and underestimate it in older people (because of differences in bone density and muscle mass). According to the Centers for Disease Control and Prevention, standard categories for BMI are as follows :

WHAT IS A NORMAL BMI?	
18 or lower	Underweight
18.5 to 24.9	Normal, healthy weight
25 to 29	Overweight
30 or higher	Obese



If you are overweight, all is not lost. BMI is just one indicator of cancer risk. Moreover, it is possible through a combination of healthy eating and exercise to lower your BMI. The rest of this section will discuss how exercising can both drop your BMI and have a marked effect on your cancer outcomes.

Metabolism

Metabolism is the process of converting food into energy, and occurs in every living, breathing creature. Converting food to usable energy occurs in alternating phases: 1) the food that you eat is converted to a form that your body can store, and 2) the body breaks down the food that you stored (as calories) for energy.

How is food stored and used as energy?

There are three basic macronutrients in food that provide energy:



Carbohydrates

The process of turning these foods into energy starts in the mouth. Enzymes in our saliva and then in our digestive tract (or gut) break up carbohydrates into individual glucose molecules, which are transported across the intestinal wall and into our bloodstream.

Glucose molecules are subsequently reassembled into a type of carbohydrate called glycogen. When your body stores glycogen, it starts with your muscles, then it fills up your liver; and when your liver has no more room left it is converted into fat. That fat is stored as adipose tissue, either under our skin (“subcutaneous fat”) or around our organs (“visceral fat”).

Proteins are broken up into their individual amino acids which can then be absorbed and reassembled into the various types of proteins our bodies need for various functions - including building muscle - but they can also be converted into glucose and fat.



Proteins



Fats

Fat needs to be digested into fatty acids before it can be absorbed into our bodies. Once absorbed, the fatty acids can also be used for energy or stored as fat.

It is important to appreciate that these three basic building blocks—glucose, amino acids, and fatty acids—can all be interconverted to each other inside the body.

The chemicals derived from our foods have three fates: they can be used to repair our organs and tissues, they can be stored as either glycogen or fat (as described above), or they can be ‘burnt up’ to produce energy in a process called respiration. It’s the equivalent of stoking a fire: glucose, fatty acids and amino acids can all enter a metabolic process in which they are broken up to release energy and the “waste” carbon is combined with oxygen (which we breathe in) to produce carbon dioxide (which we breathe out), just like burning fossil fuels.



BMR

Basal Metabolic Rate.
This refers to the amount of calories you burn when you are at rest.

So how are food, exercise, weight, and metabolism related? You may have heard people say things like “Oh, she has a fast metabolism” or “He has a slow metabolism.” This implies that your metabolism is something that is unique to you, that you were born with. That is only part of the story.

How “fast” your metabolism runs is determined by your BMR, or your Basal Metabolic Rate. This refers to the amount of calories you burn when you are at rest. In other words, it’s the base amount of energy your body needs to keep your heart pumping, your blood flowing, your cells regenerating, etc. It’s true that your genetics are involved in determining your BMR, but it’s not 100% predestined. Because maintaining muscle takes more energy than maintaining fat, it is possible to raise your BMR by increasing your muscle mass (such as through weight training). Likewise, the reason that BMR often drops with age is because of loss of lean muscle tissue.

Is it possible to calculate your BMR? Yes, but we think it is unnecessary. For the purposes of eating and exercising for good health, avoiding obesity, and preventing cancer, this guide advises you to stick with the lifestyle changes and leave the calculations behind.

Vigorous Exercise

You may have heard the suggestion that walking several times per week was all that was required for good health. We now know, as we age, and especially if we are aging with high cancer risk, more may be needed. Vigorous exercise—meaning close to maximum effort, where your heart beats rapidly, you are sweating, and you cannot carry on a conversation—is an important component of good health and disease prevention. What vigorous means for you will depend on your fitness level, but for most people, it equals more than just a walk around the block.

How Intense is Your Exercise? The Talk Test.

There are a number of personal fitness devices on the market today that can calculate your heart rate and other exercise statistics. If that's not your cup of tea or your budget, here's a classic test for determining intensity of exercise:

TALK

If you can talk, but not sing, during exercise, it's moderate.

SPEAK

If you can speak only a few words during exercise, it is considered vigorous.

SING

If you can sing while doing an activity, then it's movement but not exercise.





Long-term exercise affects your energy metabolism, lowers inflammation and oxidative stress, and improves immune response. In prostate cancer, several studies have shown that faster-paced walking or vigorous exercise significantly reduced the risk of prostate cancer recurrence or prostate cancer death (respectively), compared with less intense or slower-paced exercise. Two studies by

PCF researchers June Chan and Stacey Kenfield also suggest that regular exercise both reduces risk of breast cancer and helps alleviate symptoms for breast cancer patients. Vigorous exercise during young adulthood has also been linked to lower risk of endometrial cancer later in life, suggesting that the exercise you do now could reduce your risk of disease 20 years down the road. Because most cancers are similar in what makes them tick, a healthy cancer-fighting choice for everyone would be to exercise as vigorously and regularly as your personal fitness allows.

Exercise appears to be an effective adjunct therapy even in patients with advanced cancer. Across multiple studies, exercise interventions were associated with improved quality of life, fatigue, psychosocial function and sleep quality, and physical function. More targeted studies are required to determine the optimal exercise “dose” to enhance outcomes for specific types of cancer.

Here’s just one example of what scientists are discovering, and how precise it can get: PCF-funded researcher Lorelei Mucci and team studied a gene fusion called *TMPRSS2:ERG*, which is a molecular alteration found in 30%–40% of prostate cancer. This research suggested that long-term vigorous physical activity was associated with a lower risk of developing *TMPRSS2:ERG*-positive prostate cancers.

You don’t have to have a heart rate monitor or be a gym rat to exercise vigorously. Here are just a few suggestions for how to easily get your heart rate up to vigorous levels without having to get on a treadmill:

- 1 Walk or bike uphill
- 2 Run in place with your knees high
- 3 Put on some music and dance—make sure to move your feet, not just your hips!
- 4 Old fashioned “calisthenics”:—eg, jumping jacks!

Find your Baseline Fitness Level

Don't belong to a gym or own a heart rate monitor? Don't worry. Here's a great way to measure whether your exercise routine is helping you improve fitness. In order to record your baseline fitness and watch for improvements over time, follow these 4 simple steps:

- 1 Find a hill** in your neighborhood that is a minimum of 1 mile long (you can use your car or an online map program to confirm the distance), with a steadily rising upward slope. If you're already in a decent physical condition, then the steeper the better!
- 2 Get a good night's sleep**, eat a light breakfast (such as a piece of fruit with peanut butter or a bowl of cereal), and get yourself to the bottom of the hill.
- 3 Start the timer** on your phone or your watch and walk (not run!) as fast as you can for one mile uphill. Stop your timer. This is your baseline time. Walk easily back to the start.
- 4 Repeat this workout as often as one time per week** and record your time to see your fitness improve. Try to keep your routine the same (#2 above) and always start and stop your watch at the same locations.

Don't worry if you get slower one week or even two weeks in a row! It's all about changes over time, and these are not short-term fixes, but lifestyle changes. On the other hand, if your other weekly workouts are effective and you feel yourself getting in better shape, you can choose a longer and/or steeper walk and start a new baseline.



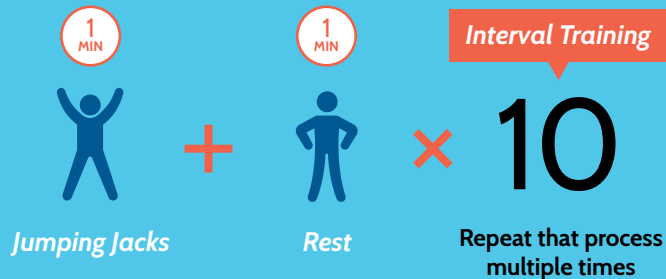
Also: don't forget to smile, you did it.

Always consult a doctor or trainer before beginning any new exercise routine, especially if you are new to exercise.

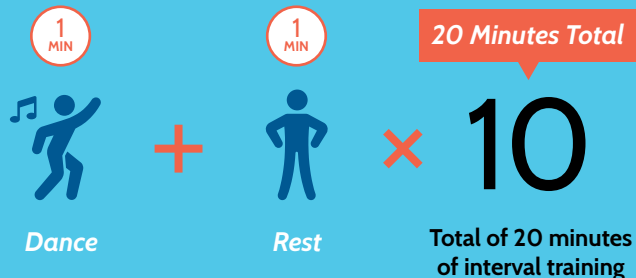
HIIT & Cancer

In recent years, High Intensity Interval Training (HIIT), has come into great popularity. But it is more than just a fitness fad. Interval training refers to alternated periods of intense exercise and easy recovery, repeated over time. This includes things like weightlifting sets and running sprints. Exercising in alternating phases causes your body to metabolize energy beyond the workout itself. Ultimately, HIIT is proven to lead to shorter and more satisfying workouts, more calories burned, and improved cardiovascular health and vitality. Additionally, benefits of HIIT during chemotherapy have been shown to continue a year into survivorship.

An example of a single interval

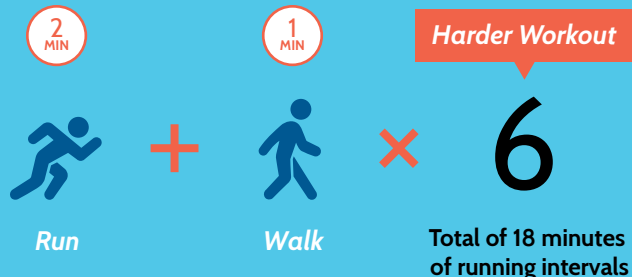


Anyone can participate in interval training just by substituting an activity that is appropriate for their level of physical fitness in the “on” slot.



You can also change the duration of the rest or active time.

Note that this is a significantly harder workout than the one above despite its total time being shorter.



The one thing you shouldn't change is the intensity. High intensity refers to how much effort you put into your activity. If you were to dance vigorously for one minute, such that you were out of breath at the end of that minute, and could not hold a conversation, that would be considered vigorous, or high intensity. On a scale of 1 to 10, with 1 being easy and 10 being as hard as you can possibly go, high-intensity intervals should be performed in the range of an 8-10. Change the activity, the activity length, or the rest time...but don't change the intensity.

Why do intervals? Because of the short duration of the activity, you are able to get your heart rate up quite a bit higher than you would for longer exercise. When your heart is beating fast and you are pushing your body to close to maximum effort, many positive metabolic changes take place in your body both during and after exercise. With HIIT, even more so than with low-intensity exercise, your body will continue to enjoy many health benefits—such as higher metabolism and improved cardiovascular health—well beyond the workout itself.

As a matter of fact, this is a good time to mention that most of the positive

effects of exercise do not happen during exercise, but rather during the rest in between workouts, when your body rebuilds stressed-out cells. During exercise, your body breaks down muscle; during rest—whether it's the time between intervals, the time between workouts, or the time you are sleeping—is when all of the good changes actually happen.

With regard to exercise and cancer, one study of breast cancer patients showed that employing HIIT during treatment resulted in less post-treatment fatigue. In addition, a meta-analysis suggested that HIIT could help improve health outcomes for patients across cancer types, both during and after treatment.

A word of caution about HIIT—it is important that you consult a doctor or fitness expert to ensure that exercising your body at near-maximum levels is safe for you. After cancer treatment, it may take your body a while to recover normal function. During early recovery, your doctor may recommend a lower exercise intensity and volume to prevent injury to bones and joints that may have been damaged during treatment. Slow and steady increase in activity over time is always the wisest path to improved health.

The Science of Weight Loss

Obesity is associated with higher cancer risk, so if your BMI is outside the healthy range, you might consider taking steps to lose weight. Weight loss is about long-term behavior changes, NOT short-term fad dieting or exercising. We'd like to suggest that if you do these things for as little as one month, you will start to feel the effects of a happier body.

1 Slowly build up to an exercise 5-6 days per week. Remember to adjust based on your base fitness level:

- a. Exercise vigorously 2 days per week for 30 minutes (can include one HIIT workout if your doctor allows), then stretch.
- b. Exercise moderately 2-3 days per week for 40 minutes or more (this includes resistance training), then stretch.
- c. Exercise lightly 1 day per week for 90 minutes or more (such as walking), then stretch.

Note: if you're a morning person, knocking this off before you even hit your desk is a great strategy for consistency.

2 Don't sit when you can move! Work on crafting an active lifestyle outside of official "workouts." Put on some music and move your hips while you cook, take a walk after a

meal instead sitting by the TV, take the stairs instead of the elevator, or do some gardening. Finding ways to incorporate movement into your daily life will help keep your muscles engaged even when you're not "officially" working out.

3 Eat only whole foods that you prepare. If it comes in a pre-wrapped plastic package, box, bag, or a can, double-check the ingredient list.

4 Be mindful about your portion sizes. Research shows that simply serving yourself a large portion causes you to eat more than you normally would, which leads to weight gain over a long period of time. "Standard" portion sizes have continued to rise in America, so it can be hard to determine how much is a healthy serving size: check out some guidelines on page 72.

5 Get 7-8 hours of sleep per night.

It may seem like the less you sleep, the more calories you will burn. Not true! Research in fact shows that sleep disruption or chronic sleep deprivation are linked to obesity and increased cancer risk. In one study, shorter sleep time was actually associated with higher risk of fatal prostate cancer in young men.

6 Don't worry too much. Stress causes your brain to trigger secretion of the hormone cortisol, which is linked to increased abdominal fat. Plus, research suggests that cortisol secretion contributes to stress eating cravings: so taking a few deep breaths may help you avoid reaching for the chocolate cake.

7 Max out at 0-3 glasses of alcohol per week, and never on the same day. You've probably heard of studies that associate moderate drinking with increased longevity and cardiovascular benefits. But it's still not clear exactly what causes these benefits: whether it's the drinking or some other factor that moderate drinkers have in common, like a strong social network. It's worth it to cut yourself off, though—higher levels of alcohol consumption are associated with risk factors for obesity and increased mortality.



If you are not familiar with what vigorous exercise means for your body, consider consulting a fitness trainer and getting a heart rate monitor.

Weight Bearing vs. Non-Weight Bearing Exercise

Exercises that force you to fight against gravity are considered weight-bearing. They include things like running, tennis, and dancing; these exercises are great for maintaining bone density because when your muscles contract and make slight tugs on your bone, bones react with new growth.

On the other hand, non-weight bearing exercises include things like swimming, biking and rowing. They are great for people with injuries, mobility issues, and brittle bones. Consult your doctor before beginning any new exercise routine.

Should You Eat Fat?

Cardio—good for your heart, fat—bad for your heart, right? Maybe. For years, many studies seemed to confirm that saturated fat and total fat intake were linked to cardiovascular disease. Dean Ornish famously published studies associating a low-fat diet with lower prostate specific antigen levels, among other things. Today, we have a little more detail about what's good and what's bad about fat. U.S. government guidelines now suggest optimizing the type of fat, vs. practicing a low- or no-fat diet. Furthermore, even saturated fat is not linked to heart disease in the absence of refined carbs and sugar. Saturated fats can have inflammatory properties, and inflammation is being linked to cancer risk. Unsaturated fats, however, are a different story. Studies have found that adding nuts like walnuts to your diet, or EVOO – which are good sources of unsaturated fats - helped significantly decrease risk of a cardiovascular event and risk of breast cancer.

What about stretching? Research indicates that the primary benefit of flexibility exercises is improvement in joint range of motion, and may improve postural stability and balance. For older adults, stretching and coordination exercises are recommended to maintain balance and avoid falls, which is also a major concern for those on cancer treatments. The American College of Sports Medicine and American Academy of Family Physicians both include regular flexibility exercise in their recommendations for healthy adults and older adults.

Exercise During Treatment

Recommendations for how to exercise during treatment are beyond the scope of this guide, because each cancer and cancer treatment affect individuals differently, with different short- and long-term side effects. Consult with your doctor to determine which exercise regimen might be right for you during treatment.

Please note that many cancer treatments cause fatigue to your body, and include side effects from anemia to kidney problems. Although decreasing body fat is beneficial for most long-term cancer outcomes, it is almost never ok to diet or exercise for weight loss during cancer treatment, and certainly without physician approval. Your focus should be on eating enough calories, and the proper type of calories in order to minimize the side effects of treatment.



Exercise After Treatment

As we mentioned before, cancer treatment can include a plethora of side effects: fatigue, pain, muscle loss are three of the most common. Other side effects include appetite loss, anemia, swelling, internal bleeding and bruising, and changes to your bowel habits. It may seem counterintuitive to want to exercise with these symptoms—after all, how can you exercise if you are tired, weak, and in pain? However, if you can push through the initial discomfort, exercise can actually help relieve many post-treatment symptoms.

Numerous studies have supported the idea that exercise can help accelerate relief from many of the side effects of cancer treatment. Consult with your doctor to determine if you have any specific restrictions on what you can do with your post-treatment exercise plan.

Exercise Suggestions For Seniors

It's common to hear that, because of the symptoms listed above, people feel as if their bodies have aged beyond their actual age after cancer treatment. For similar reasons, sometimes seniors are afraid to exercise because they might get hurt. Research indicates the opposite. A study published by the NIH suggests that regular physical activity is safe for older people with all ranges of physical fitness, even those considered “frail.” In fact, the risk of heart disease, obesity, falling, cognitive loss, osteoporosis and muscle weakness are all decreased by regular exercise.



So for seniors, we stick by our suggestion that exercise is exercise, but everyone is different. What does this mean? It means that the same good habits of fitness apply to all ages, but that each person has a different history, lifestyle, and genetic footprint when it comes to exercise. For example, a 70-year-old man who runs marathons could possibly employ a more intense fitness plan than a 40-year-old man who is overweight and exercising for the first time as a result of doctor recommendations after prostate cancer treatment.

Here are some tips to get the most out of your workout: some of these may apply to you, and some may not, depending on your level of fitness.

1 Don't omit the strength training.

Muscle mass is lost at the rate of 3%–8% per decade after age 30. Bone formation also decreases with age. Weight training, specifically high-intensity resistance training, can prevent bone damage as well as improve balance, strength and muscle mass. This can have the wonderful benefit of making everything you do, from walking to dancing to bending over, feel easier and more steady. It will also lower your risk of injury. That said, if you have functional or cognitive impairments that prevent you from being able to perform some tasks or activities safely, discuss with your doctor before beginning any weight training activity.

2 Watch for interference from injuries, other non-cancer health concerns or medications. Even though you may be feeling good on the other side, don't forget to watch out for other disease states that can affect your ability to exercise. Heart conditions, diabetes, old fractures and sprains, back or hip injury, medication interactions, and asthma top the list of conditions that may interfere with exercise, regardless of your age. Consult with your doctor before beginning any exercise routine.



Principles of good fitness planning

Whether you are 17 or 70, consider this:

Since everyone starts at a different level, each exercise plan should be personalized.

Compare yourself to no one but yourself, last week.

Each week, make one small positive change towards better fitness.

Unless your doctor tells you specifically NOT to exercise, there's always something you can do to move your body towards better health.

3 Get enough sleep. If our pro-sleep spiel sounds like a broken record, that's just because sleep is important to nearly every aspect of your health! Research indicates that higher sleep quality is associated with higher levels of physical activity. This makes sense: you're not going to feel energized to work out and benefit from all the gains that come with it if you're exhausted. Because most changes to the body happen during rest, it is critical that you give your body a chance to recover day over day, and that means getting the proper amount of sleep (including napping when you feel tired!). This coupled with eating a nutrient-dense diet sets you up for exercise success.

4 Find an exercise partner. Everything is more fun when you have someone to do it with! A training partner can help you pass the time, keep to your exercise schedule, and provide support in the event of an injury. If you are single or if your spouse is unable to join you, check with your local senior center to see if you can be matched with a like-minded and like-abled exercise buddy.

The Rise Of Complementary Integrated Therapies

If it hasn't become apparent so far, in addition to the theme of personalization and precision, many of the recommendations herein are complementary. Taken individually, they have some qualities that can improve your health outcomes. Taken together, they can revolutionize your long-term health, the way you feel on a day-to-day basis, and the way you live well beyond cancer.

The terms complementary, integrated, and alternative are sometimes used interchangeably to refer to a class of strategies which can be used together with traditional medicine to improve your quality of care. That includes exercise, nutrition, yoga, meditation and other strategies in this guide. It also includes things like massage, acupuncture, music therapy, hypnosis, cognitive behavioral therapy, qigong and other strategies which may influence your ability to manage pain, among other beneficial outcomes.

Please note that we are not including nutritional supplements in this category, which are discussed in detail on page 88.



CAM

Complementary or
alternative medicine
has been on the rise
for a few decades

The adoption of complementary or alternative medicine (CAM) or integrated treatments alongside western medicine has been on the rise for a few decades. In 2007, according to the CDC, 38% of adults used some kind of CAM. Today, the percentages of adults involved in yoga, meditation, and chiropractic as specific CAM treatments have increased even more. For example, CAM treatments are widespread in Americans aged 52 and older, particularly chiropractic treatments.

Are CAM treatments scientifically backed? The answer is: maybe. Many studies have cited the health benefits of yoga, for example. On the other hand, many CAM treatments still need much more testing to confirm benefits. The effects of CAM therapies on cancer-related pain, for instance, look to be positive, but there aren't enough studies published to make a watertight case. However, no adverse outcomes were related with these therapies, and this tends to be a trend with evidence-based CAM investigations: we don't know that they're 100% effective, but they're usually non-harmful and could have positive mental and physical effects.

As always, stick to the ideas that are contained in this guide or ask your doctor for recommendations and never hesitate to do your own research. When researching, make sure you stick to respectable studies from medical journals. There is a lot of misleading information out there—for example, a PCF study found that there was an inverse relationship between the number of views on YouTube videos about prostate cancer and how legitimate the medical information was; this means that just watching the most-viewed videos for your wellness information isn't going to cut it. There are, in fact, some snake oil salesmen out there who are looking to capitalize on folks who are sick, desperate and at their weakest. Be a savvy consumer.





The word “diet” has become laden with meaning in modern society. But it originates from the Greek word *diaeta*—which means “way of life.”

What Is Real Food?

Real food has a single ingredient. It comes from a farm. It is free of added chemicals or preservatives. It has been minimally processed.

Why is it so important to eat real food? The answer is simple: real unprocessed food, preferably freshly harvested from the ground, is higher in nutrient density. Processing and transport (time from harvest to plate) can strip some of the nutritional value from food. Also, because real food is minimally processed, it is usually high in fiber. In an ideal world, which doesn't always happen, we even know the source of the food (the farmers' market, our backyard garden, your local produce aisle). More and more evidence seems to be indicating that the fiber in food, not just the vitamins & minerals, are responsible for good health (more on that later).

Take The Real Food Test

YES NO

- | | | |
|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Bacon |
| <input type="checkbox"/> | <input type="checkbox"/> | Whole Grain Bread |
| <input type="checkbox"/> | <input type="checkbox"/> | Watermelon |
| <input type="checkbox"/> | <input type="checkbox"/> | Protein Bar |



Go to pcf.org/realfood to take the Real Food Challenge and see how you score.

If you are trying to eat to prevent cancer, why is nutritional value important? Specific nutrient compounds in food can prevent the kind of cell damage that can lead to cancer. Phytochemical compounds, found in plant-based foods such as fruits, vegetables, grains, nuts, seeds, and beans, work at the cellular level, keeping your risk of cancer at bay.

You may have heard that vitamins like A and C are considered antioxidants, that is, compounds that prevent damage to your body and your cells. But beyond vitamins, the term antioxidant describes a larger class of food-based compounds that can help ward off disease by suppressing the division of cancer cells or by upregulating our immune response to cancer.

Cancer's Worst Enemies: Food-Based Antioxidant Anti-Inflammatory Compounds

Even elemental foods, like the ones found in the PCF periodic table on page 64, contain a complex mixture of many thousands of naturally occurring chemicals. Contrast this with a drug that your physician may prescribe, which may contain only a single chemical, and you'll see why nutrition can be such a complex and often controversial subject.



Eating foods that contain the compounds listed below increases your body's ability to defend against oxidizing cell damage. That means less damage to your DNA from lifestyle choices and environment.

Flavonoids | There are about 10,000 types of flavonoids, which are one of the most-studied plant-based food compounds. Isoflavones are a class of flavonoid found in soy, and early research suggests they help increase efficiency of cancer treatments like chemotherapy and radiation. Other flavonoids, such as quercetin, have been shown to promote apoptosis (ie, cancer cell death) while leaving alone normal cells, and can be found in broccoli, apples, and strawberries.

Carotenoids | This class of phytochemicals gives foods yellow, orange, or red color; dark-green leafy vegetables are also rich in carotenoids, but their color is masked by chlorophyll. Lycopene is a red-hued carotenoid found in tomatoes, watermelon, and grapefruit that has been linked with decreased risk of several cancers. This is due to carotenoids' antioxidant activity: they neutralize free radicals, which are unstable molecules that contribute to cancer development.

Ellagic Acid | Ellagic acid is another naturally-occurring antioxidant found in berries, grapes, and nuts. It has been shown to halt the cell cycle of bladder cancer cells, preventing their replication, and trigger apoptosis of colon cancer cells.

Glucosinolates | Glucosinolates are found in many of the foods you were forced to eat as a kid (but hopefully have grown to appreciate!): cabbage, broccoli, cauliflower, and Brussels sprouts. They have a variety of anti-cancer properties: they promote cellular excretion of mutation-causing carcinogens, aid with antioxidant activities, and arrest cancer cell growth.

Fresh Food is the Best Food

Per our suggestion to eat “real” food, here are 4 examples, with numbers, backed by research, to show how each of these methods—freezing, canning, transport, and pesticide-based farming—have the potential to affect nutritional value. Note that effects of food preservation depend on the food and the specific vitamin—in many cases, there is minimal loss of nutrition if storage temperatures are well-maintained.



Vitamin C in fresh peas vs. Vitamin C in frozen peas | A study in the UK found that several varieties of peas lost an average of 30% of vitamin C content when frozen.



Vitamin A in fresh peaches vs. Vitamin A in canned peaches | Researchers at The Ohio State University found a 50% decrease in carotene once peaches were canned. Beta-carotene is converted in the body to vitamin A.



Folate in spinach at harvest vs. Folate in spinach at 1 week | Folate is a water-soluble B vitamin. A research team at Penn State found that packaged spinach lost 47% of its folate after just 8 days at 39.2°F, which is the temperature of the average refrigerator.



Organic tomatoes vs. Conventional tomatoes | One ten-year study in California found that tomatoes grown with organic practices had 97% higher kaempferol content (a flavonoid known for its antioxidant properties) than conventionally grown tomatoes. Does that mean that all organic food has higher nutrient content? We just don't know yet. The organic vs. non-organic debate is a heated one. Each food needs to be studied individually and that is a work in progress.

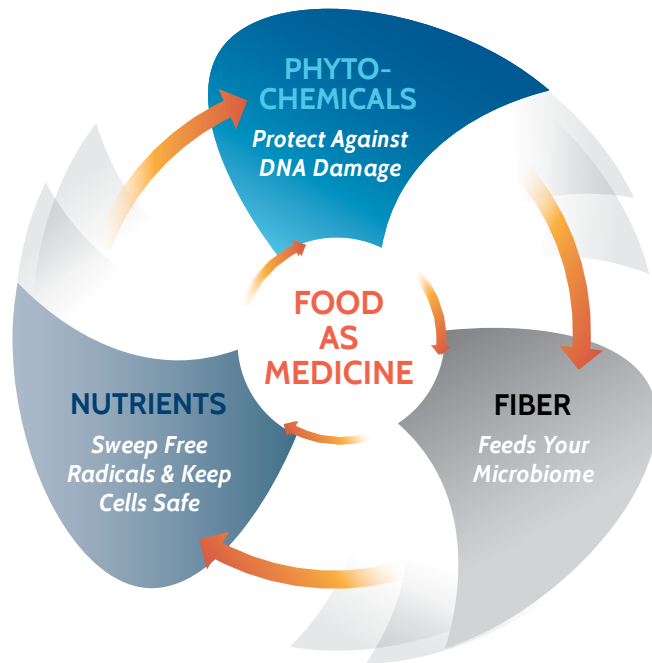
Life happens and a lot of meals end up on-the-run. If you don't have time to go to the local market to shoot the breeze with the farmer who grew the organic carrots, don't despair. If it's a choice between frozen veggies or nothing—frozen it is! Even though freezing can alter a vegetable's appealing consistency, most of the healthy soluble and insoluble fiber remains intact. Gently reheat and add a dash of olive oil and a squeeze of lemon for a healthy side dish.



Remember! Any nutrient-rich vegetable from any source is better than no vegetable at all.

Cancer-Fighting Trio

How is it possible for food to act like medicine? The foods we eat make biochemical changes to our bodies at the cellular level, either encouraging or discouraging the chemical reactions that drive cancer to grow and spread.



Should You Eat Organic?

You might think that because many pesticides are known carcinogens, eating food without pesticides will help prevent cancer. And you may or may not be right—the research on the differences between conventionally-grown foods compared with organic practices is still ongoing. On one hand, conventional produce has been found to have trace amounts of pesticides; on the other hand, those amounts are small enough to *currently* be considered nontoxic. The FDA produces an annual pesticide residue report as part of a monitoring program. Still, maybe you decide you don't want any pesticides in your food at all, and decide to opt for organic.

Even though researchers are still looking at the outcomes of organic vs. conventional farming, research definitely favors eating plenty of brightly-colored fruits and vegetables, regardless of whether you choose conventional, certified organic, or pesticide-free foods.

The Microbiome



Did you know that at any given time there are 30 trillion microorganisms living in and on you? Every day, more research indicates that an improperly balanced microbiome—the collection of bacteria in your body—may be the culprit in a lot of modern health issues.

Many of the bacteria on your body were acquired at birth (through the birth canal) and many of the bacteria in your gut are acquired through the food you eat. Research seems to indicate that the more *fiber-rich foods* you eat, the more “good” bacteria grow in your gut. Moreover, eating a healthy mix of *different* plant-based foods can help foster the correct diversity of disease-fighting gut bacteria.

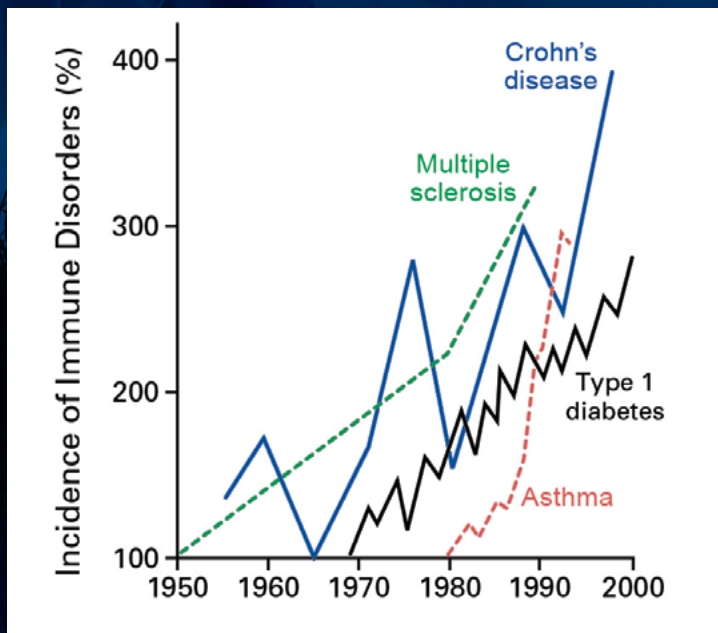
How does this work? Most nutrients are absorbed in the “upper gut.” However, fiber passes into the lower gut or colon where millions of bacteria and some fungi make up what is collectively referred to as the “gut microbiome.” Your microbiome feeds and thrives on the undigested parts of food—a process known as fermentation. Some of the byproducts of this process, such as short-chain fatty acids, are thought to be particularly good for health.

There are estimated to be nearly 5,000 species of microbes (bacteria!) making up the human microbiome across different age groups, geographical locations, and disease states; we might have several hundred of these species on our bodies at any given time. The relationship of these microbes to you and to each other is complicated.

For example, one crucial role of gut bacteria is to break down complex carbohydrates. The products of this process, in turn, feed other bacteria. This is good for the bacterial host (you!). But, as anyone who’s ever taken antibiotics knows, this relationship can be disrupted when too many “good” bacteria are killed off. When it comes to gut bacteria, it’s all about having the right mix of players on your team: if you have all quarterbacks or all wide receivers, you’ll never move the ball down the field.

The Microbiome and Chronic Disease

The last 100 years has seen both the rise of many chronic diseases as well as a decline in the amount of whole foods eaten in the standard American diet. What we eat, our bacteria eat...and one thing we know for sure is that our bacteria need the fiber from food to be healthy. The theory goes that a decline in “good” bacteria may be responsible for many modern diseases. On the opposite page, we list a few conditions where researchers are making interesting observations about the microbiome and disease. Most of these studies have focused on fecal transplant (yup, that’s exactly what it sounds like), but the hope is that some day, specific dietary changes may be able to prevent or reverse these conditions as well. Until then, a safe strategy is to eat fiber-rich, nutrient-rich real food.



Bach, *NEJM*, 2002.

Diabetes

The drug metformin is widely used in the treatment of Type 2 diabetes. A 2017 study found that part of its therapeutic effect was due to how it altered gut microbiota.

Obesity

Gut microbiota may play a significant role in contributing to obesity: research indicates that obese people have a different composition of gut bacteria than leaner people. The theory goes that this “obese microbiome” extracts more energy from food, thereby contributing to weight gain. One current clinical trial is attempting to transplant a “lean microbiome” from leaner subjects to heavier ones, in an attempt to reverse or curtail obesity.

Alzheimer's

A 2016 study found that elderly Alzheimer's patients given probiotic milk to supplement their gut microbiome showed improvements in their MMSE scores—a measure of cognitive ability—compared with subjects who were given a placebo (who showed cognitive decline consistent with disease progression). This suggests that altering gut bacteria composition could potentially reverse the effects of neurodegenerative diseases.

Autism

A study published by researchers at Arizona State University found that two years after a microbiota transplant, children with autism demonstrated a 45% reduction in core autism symptoms.

Peanut Allergies

A 2018 study in mice linked lack of specific gut bacteria with an allergic reaction to peanuts, and a clinical trial is currently underway to test the efficacy of microbiota transplants in protecting against peanut allergies.

Inflammatory Bowel Disease

An ongoing phase 3 clinical trial shows significant promise in treating IBD with fecal microbiota transplants.

Asthma

Research has associated pediatric asthma cases with a lack of four types of gut bacteria, and a 2015 study found that inoculating newborn mice with these bacteria decreased severity of asthma symptoms in later life.

Cardiovascular disease

A current clinical trial seeks to improve outcomes for heart failure patients using drugs targeting microbiota.

Why is this important? It allows us to confidently double down on our suggestion that you eat real food. It doesn't mean you can't ever eat a piece of birthday cake or a fried chicken sandwich. As a matter of fact, quite the opposite: microbiome research indicates that the common denominator of gut health is the amount and variety of vegetables, fruits, nuts whole grains, and beans that you eat (see pages 64-65 for a chart of fiber-rich and gut-friendly foods). That means if some of your diet consists of meat or Pop-Tarts, as long as most of what you eat is fiber-rich whole food—you're in pretty good shape for good health. (But that's overall good health. For cancer, because it is often a disease that's driven by inflammation, we're still telling you to eat less meat and Pop-Tarts!)

Manipulating the microbiome has specific implications for cancer. In 2018, several studies found that patients with specific gut bacteria compositions showed greater antitumor immunity. In addition, tests with mice suggested the possibility of transplanting "good" microbiomes to patients who need them, which could improve cancer outcomes. Similar results were found for prostate cancer patients.






















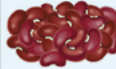



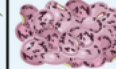
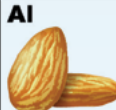













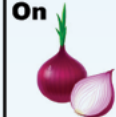









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The Top 10 Foods To Eat To Prevent Cancer

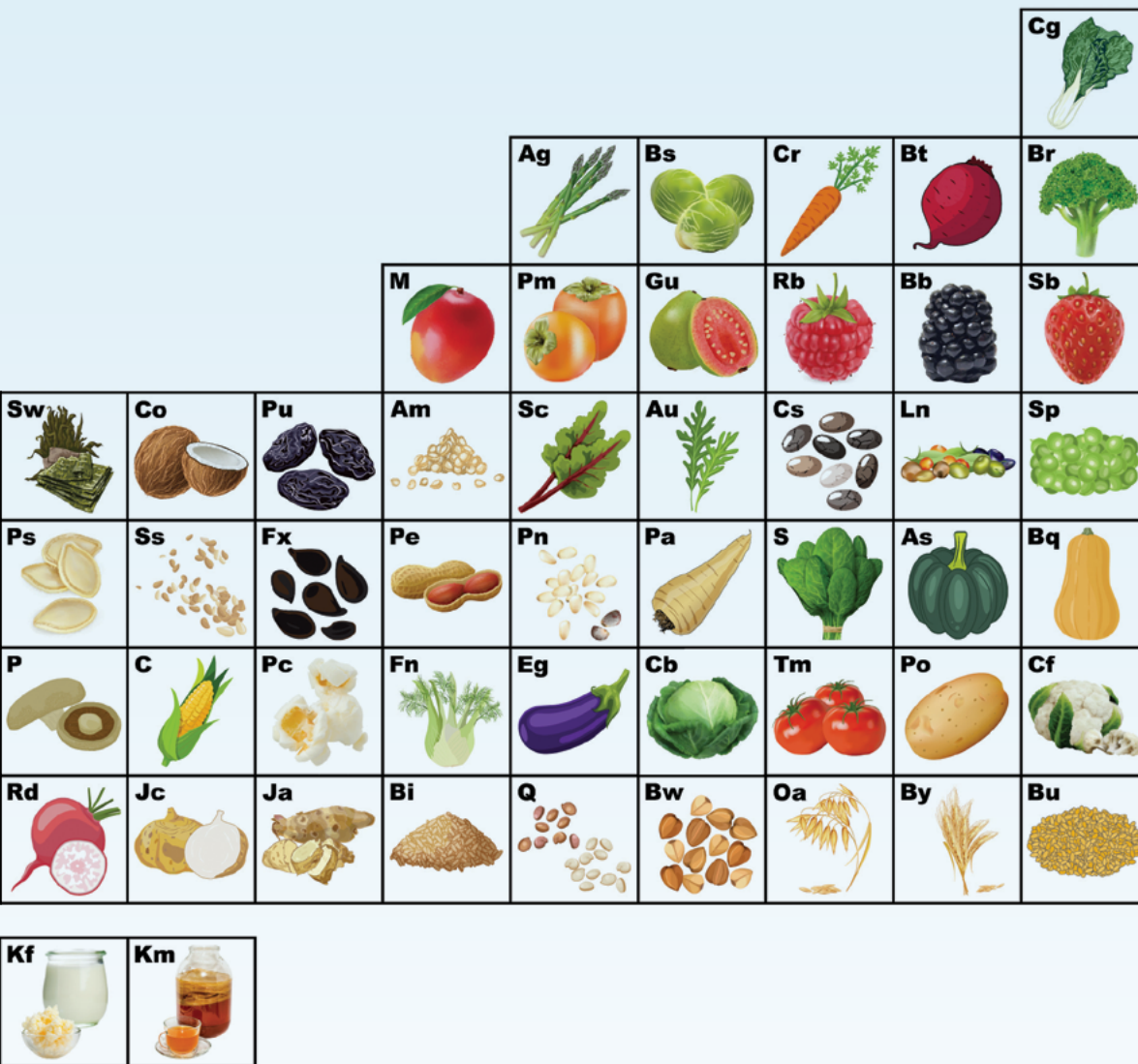
When we started writing this guide, this section was one of the first in our outline. Because these kinds of lists are what everyone expects out of a cancer nutrition guide, and because we want to make a point, we left it in. The issue of which specific foods get a gold star is murky. So, instead of telling you *what* to eat, this guide makes a point of telling you *how* to eat.

Hold on. We already told you that scholarly research on the relationship between foods and disease has skyrocketed in the last 10 years. So why can't we tell you *exactly* what to eat? The answer is, we are just not there yet. New research is constantly evolving. To give you a sense of how fast that evolution can be, and how complicated the equation is around any particular food, on pages 66-67, we've teased out the history of just one food (tomatoes) around one disease (prostate cancer). For more on known dietary recommendations for prostate cancer, download our dietary guide, created in collaboration with the University of California, San Francisco, at pcf.org/guides. To join our monthly recipe club, go to pcf.org/recipe.

Periodic Table of Microbiome-Friendly Foods

Ar 									Br 
K 	Dg 								
Av 	Sp 								
Bl 	Ap 	Ba 	Pr 	Fg 	Da 	Gb 	Gp 	Em 	
Bp 	Gb 	Kb 	Bn 	Lb 	Wb 	Pb 	Al 	Sf 	
Pm 	Y 								
Z 	Cl 	Bg 	Nb 	Ok 	Tn 	Sm 	Bm 		
		Ov 	Lk 	On 	G 	Sl 	Br 		
		Tp 	Ms 	Kc 	Sk 	Pk 	Yg 		

- | | | | | |
|----------------------------|------------------------|------------------------|---------------------------|---------------------------|
| Ar Artichoke | Sp Sweet Potato | Pr Pear | Sc Swiss Chard | Wb White Beans |
| Cg Collard Greens | M Mango | Fg Fig | Au Arugula | Pb Pinto Beans |
| K Kale | Pm Persimmon | Da Dates | Cs Chia Seeds | Al Almonds |
| Dg Dandelion Greens | Gu Guava | Gb Green Banana | Ln Lentils | Sf Sunflower Seeds |
| Ag Asparagus | Rb Raspberries | Gp Green Peas | Sp Split Peas | Ps Pumpkin Seeds |
| Bs Brussels Sprouts | Bb Blackberries | Em Edamame | Bp Black Eyed Peas | Ss Sesame Seeds |
| Cr Carrot | Sb Strawberries | Sw Seaweed | Gb Garbanzo Beans | Fx Flax Seeds |
| Bt Beet | Bl Blueberries | Co Coconut | Kb Kidney Beans | Pe Peanuts |
| Br Broccoli | Ap Apple | Pu Prunes | Bn Black Beans | Pn Pine Nuts |
| Av Avocado | Ba Banana | Am Amaranth | Lb Lima Beans | Pa Parsnip |



- S** Spinach
- As** Acorn Squash
- Bq** Butternut Squash
- Pm** Pumpkin
- Y** Yam
- Bg** Beet Greens
- Nb** Green Beans
- Ok** Okra
- Tn** Turnip
- S** Shiitake Mushroom

- Bm** Button Mushroom
- P** Portobello Mushroom
- C** Corn
- Pc** Popcorn
- Fn** Fennel
- Eg** Eggplant
- Cb** Cabbage
- Tm** Tomato
- Po** Potato
- Cf** Cauliflower

- Z** Zucchini
- Cl** Celery
- Ov** Olive
- Lk** Leek
- On** Onion
- G** Garlic
- Sl** Shallot
- Br** Bean Sprouts
- Rd** Radish
- Jc** Jicama

- Ja** Jerusalem Artichoke
- Bi** Brown Rice
- Q** Quinoa
- Bw** Buckwheat
- Oa** Oats
- By** Barley
- Bu** Bulgur

FERMENTED FOODS

- Tp** Tempeh
- Ms** Miso
- Kc** Kimchi
- Sk** Sauerkraut
- Pk** Pickles
- Yg** Yogurt
- Kf** Kefir
- Km** Kombucha

Is Pizza the Perfect Food?

In this guide, we have made many evidence-based recommendations for good health. But research is constantly evolving and the relationship between food and health is not simple. To illustrate this complexity, we'll use pizza to discuss the history of thinking around one food (tomatoes) and one disease (prostate cancer).

Who among us, at some point in time, has not enjoyed a drippy hot slice of pizza? But is pizza healthy? You might remember the controversy in 2011 when Congress *supposedly* declared pizza to be a vegetable. Let's dig in...

Pizza is a part of the Mediterranean diet, an eating style that dates back to ancient Roman times. However, pizza is a bit newer: it can be traced to the 18th century when Neapolitans started adding tomatoes to focaccia. The scientific community started paying keen attention to the Mediterranean diet in 1980 with the publication of Ancel Keys' Seven Countries Study, which associated lower risk of cardiovascular disease in Southern European countries to lifestyle factors, including diet.



Tomatoes, such as those used in pizza and pasta sauce, have been proposed as a beneficial food, possibly playing a role in, among other things, prostate cancer prevention. Scientists have been studying vitamins A and C in tomatoes since at least the 1940s. At that time, scientists didn't know how important these nutrients are for immunity and cell repair. But there's more. Tomatoes also contain lycopene, part of the class of carotenoid antioxidants that can protect cells from the damage caused by chemicals called free radicals. This makes tomatoes potentially a great food to fight cancer.

Subsequently, researchers uncovered another interesting fact about tomatoes: cooking them increases the amount of available lycopene. This is because molecules like lycopene are trapped in the cellular matrix, so crushing and cooking releases them and enhances absorption. Scientists theorized that cooked tomatoes and tomato paste would have a greater effect on reducing prostate cancer risk than raw tomatoes, though so far results have been mixed. However, lycopene supplements (vs. lycopene in tomatoes) have not been shown to

decrease prostate cancer risk or slow progression, implying that there's more to learn about what aspects of tomatoes influence health (hint: it could be fiber).

What about food interactions? It turns out that lycopene is fat-soluble. So for your body to use all the good stuff in tomatoes, you need to eat it with fat. Mozzarella has fat, making tomatoes and cheese a (possibly) better combination than tomatoes alone. Another check mark for pizza as the perfect food!

Not so fast...Mozzarella and other animal products increase inflammation, which is in turn linked to cancer, as discussed in the following section. Good news, though: for a healthier pizza, you can skip or reduce the cheese and make your tomato sauce with olive oil—which has monounsaturated fatty acids and antioxidant, anti-inflammatory phenolic compounds—and sprinkle on the fresh garlic. Garlic contains micronutrients similar to the sulforaphanes in broccoli, though in much smaller quantities. Allicin, which is released when a clove of garlic is crushed, is known for having a positive impact on your immune-boosting gut bacteria.

So is pizza the perfect food? Well, not exactly....if we knew of a perfect food, we would have told you on page 1. Pizza provides a great example of how food as medicine is an evolving art. Nevertheless, it's hard to deny that the Neapolitans were onto *something*.

We mentioned earlier that good health is about choices, and in the 21st century, we certainly have our options when it comes to pizza. Do it like New Yorkers and stick with a single slice for a (decently) healthy fast meal. Pass on the thick-crust extra-cheese meat-lover's pie and choose a thin whole-wheat crust with vegetable toppings—light on the cheese, please. You might even try a cauliflower crust!

While active research continues on the role of tomatoes, tomato products, and lycopene in prostate cancer, data does suggest a relationship between brightly colored vegetables and cancer prevention. So, if you like to eat your veggies on pizza, to that, we say, "Mangia!"

The Relationship Between Inflammation And Cancer

The idea that inflammation causes cancer is not new. In fact, it dates back to the 1800s, when scientist Rudolf Virchow first observed that cancer originated at sites of chronic inflammation. His theory was that the enhanced proliferation of cells at sites of inflammation caused cancer to grow. While the mechanics of Virchow's theory were a bit oversimplified, we now know that what goes on in the tumor microenvironment—that is, the collection of cells, molecules and blood vessels that surround a tumor—is essential to a tumor's overall survival, growth, and migration to other sites in the body.

It is now widely accepted that *chronic inflammation* is a trigger for many diseases, including some forms of cancer. Chronic inflammation can be caused by things like poor dietary choices, stress, and smoking, which create a burden on your immune system.

Bacteria, Inflammation, and Prostate Cancer

Bacterial infections supported by poor dietary choices cause small, slow-burning, asymptomatic damage at the cellular level that end up driving prostate cancer later in life. Right now, we don't know what dietary elements are the culprits, but dairy is implicated.

It is important to note that not all inflammation is bad; for example, when you are injured, inflammation at the injury site is your body's way of signaling your immune system to kick in gear, and send cellular soldiers out to help the healing process. That is acute inflammation; it is your body's temporary and normal response to sudden distress.

The good news is that healthy lifestyle choices can reduce your risk of chronic inflammation-related diseases. Reversing the triggers mentioned above—smoking, lack of exercise, and a poor diet—will help your body flush inflammation.

Remember, diet has the ability to affect health outcomes both *negatively* and *positively*. What you put in your body affects your levels of C-Reactive Protein (CRP), which is a protein that mediates your response to inflammation. More CRP = more inflammation = bad, less CRP = less inflammation = good.



Eating Choices that Cause Inflammation

Artificial ingredients found in processed, packaged, instant, and fast foods.

Processed meats: eg, bacon, hot dogs, sliced deli meat, pepperoni, sausage.

Animal products: sadly, all animal products cause some inflammation, including red meat, eggs, cheese, and milk; If you do chose these products, choose those that are pasture-raised and hormone-free, since everything the animal eats is passed on to you.

Refined vegetable oils containing omega-6 fatty acids: eg, corn, sunflower, peanut, sesame, and soybean oils found in processed and fried foods, packaged cookies, and sweets.

Refined grains: eg, white bread, white flour, white pasta, pastries.



Eating Choices that Reduce Inflammation

Fiber-rich foods: eg, vegetables, fruits, beans, and whole grains.

Healthy fats such as those found in avocado, extra-virgin olive oil, canola oil, fatty fish like salmon, tuna, and herring, seeds like flax, hemp, and chia, and nuts such as walnuts and pecans.

Probiotics: eg, fermented foods such as sauerkraut, kimchi, other pickled vegetables; kombucha, yogurt, miso soup.



Artificial vs. “Natural” vs. Real Ingredients

For the purposes of this guide, a *Real Ingredient* is something that was cultivated via farming and has not been significantly modified. As much as possible, choose foods that are made from real ingredients.

Artificial Ingredients are man-made and chemically derived. Examples include artificial flavors and colors such as aspartame (a sweetener), hydrogenated vegetable oil (increases shelf life), Blue #2 (color), butylated hydroxyanisole (preservative), sodium nitrate (preservative), potassium bromate (increases bread volume). Many of these substances have been shown to have negative effects in animal studies and some are banned in Europe.

The term “natural” is the most ambiguous and ill-defined of these three. Foods that are labeled “all natural” are often assumed by the consumer to be safe and free of artificial additives. However, the U.S. FDA has no clear definition of what constitutes “natural,” so it’s important to read labels carefully. Food companies often use “natural” as a marketing technique to get you to buy their food, so it’s up to you to be a smart consumer. One easy way to know exactly what’s in the food you’re eating is to buy real ingredients at the market and prepare them yourself at home.

Like almost everything in this guide, everything you do is connected. Another fantastic side effect of reduced inflammation, in addition to reducing risk of chronic disease, is that you will feel better. Chronic inflammation can cause joint aches and pains, feelings of overall lethargy, poor sleep, and digestive distress. Reducing inflammation can help you recover faster in between exercising, and sleep better.



A healthy lifestyle includes rest, exercise and nutrition. Together, these factors stimulate your immune system’s ability to police your body for cancer cells and prevent them from growing out of control.

EVERYTHING IS CONNECTED: THE HAPPY BODY FEEDBACK LOOP



How To Eat To Prevent Cancer

A lot of the lifestyle changes presented in this guide can have a positive impact on your overall health. However, as anyone who has opened up a newspaper, turned on the evening news, or fired up an internet browser can tell you, there's a LOT of competing diet and nutrition advice out there.

The Prostate Cancer Foundation was one of the early advocates for precision medicine: the idea that because every cancer and every cancer patient is unique, treatment must be equally unique. The same is true of diet. For example, some people see a spike in their blood sugar when they eat ice cream; others see a greater spike when they eat brown rice. We can't tell you exactly what to eat to prevent yourself from getting cancer. But we can provide guidelines to help steer your diet in a disease-fighting direction. Remember, 42% of cancer cases are thought to be preventable with lifestyle choices.

Portion Sizes

Government and doctor recommendations for portion sizes have not increased over time, but anyone who has eaten out at a restaurant knows that the amount of food you are served is often more than you can eat. Opportunities to pay a fraction more money to “supersize” your soda or get a bowl of pasta the size of your head are everywhere.

In this guide we’ve talked a lot about the quality of the food you eat; this section is about quantity.

Page 39 talks about what happens when you eat excess food – it triggers your body to convert calories to fat. Portion sizes are where the rubber meets the road: it is important to eat appropriate amounts of various healthy foods at each sitting.

Examples that might influence food volume:

Training for a 10K	▲
Trying to lower your BMI	▼
Just finished treatment	▲
Just turned 60	▼
Lift weights 3x/week	▲

HOW MUCH SHOULD YOU EAT?

That’s where a little precision comes in. As we’ve emphasized before, each individual is different. We can’t tell you how much to eat—we can just give you a few guidelines and some insight into the mechanisms of how your body processes food. From there, it’s up to you to make good choices.

Category	Size	Frequency
Brightly-Colored Vegetables	6-8 cups	Daily
Healthy Added Fats (eg. EVOO)	1-3 tbsp	Daily
Fruit	3 cups/pieces	Daily
Whole Grains (eg. Rice, Quinoa)	½ cup cooked	Per meal
Nuts & Seeds	1 oz	Daily
Breads, Pastas, Desserts	1 serving	3x per week
Protein	25 g*	Per meal

*See box on p. 76


1 cup = 8 oz
Get educated on
serving sizes.

Why are Pasta and Bread with Dessert?

Most pastas and breads are made of refined grains. Highly refined grains (such as white flour) behave similarly to sugar in your body. Read your labels, choose carefully, and balance your daily choices (eg, if you have a sandwich at lunch, skip the whole grains at that meal).

How do our recommendations differ from what you may already be eating?

- Brightly-colored vegetables should be the hub of your eating wheel. We suggest 6-8 cups a day. That might be more than you're used to!
- In addition to that, eat one serving of protein with each meal, alternating your choices between beans, fish, tofu, and meat. Serving size? Rather than ounces or cups, because volume varies widely between meat and vegetarian options, we are suggesting 20-25 grams of high-quality protein per meal. See page 76 for examples.
- If you're adding fat to your diet, focus on "good fats," including avocado and olive oil. Use 1-3 tablespoons per day, depending on your size. Note! Be smart. If you're already treating yourself to a marbled steak for dinner, skip the extra fat.
- Feel free to eat whole grains at every meal, but keep serving sizes small (about ½ cup cooked). Reduce grains on the meals where you eat bread or pasta.
- Whole-grain breads and pastas are okay a few times per week. Think of them as a treat, like dessert. Keep portion sizes small. Check the label: in bread, use higher fiber content and lower sugar to gauge quality.
- Speaking of dessert, focus on finishing your meal with fruits, nuts, and seeds rather than treats with added sugar.



In addition to what you should eat, observe these "don'ts:"

- Whenever possible, don't eat packaged food. Pack your lunch, make multiple meals ahead of time, and focus on nuts, fruits, and vegetables for snacking.
- Don't eat too much in a single sitting. Studies have linked body fat distribution—such as having a lot of weight around your mid-section, with poor outcomes. Controlling portion size is one of the few ways to help fend off the belly fat.
- Don't eat too much added sugar: limit or eliminate.
- Don't eat too much meat or dairy: moderation is key.

The Evolution of the Food Pyramid

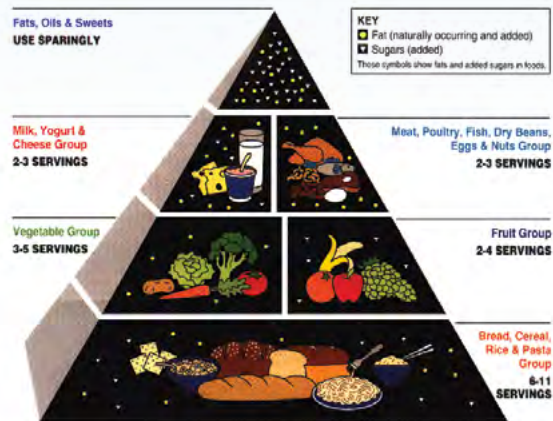
1940s

In the 1940s, meats and cheeses featured prominently, with butter and margarine having a category of their own.



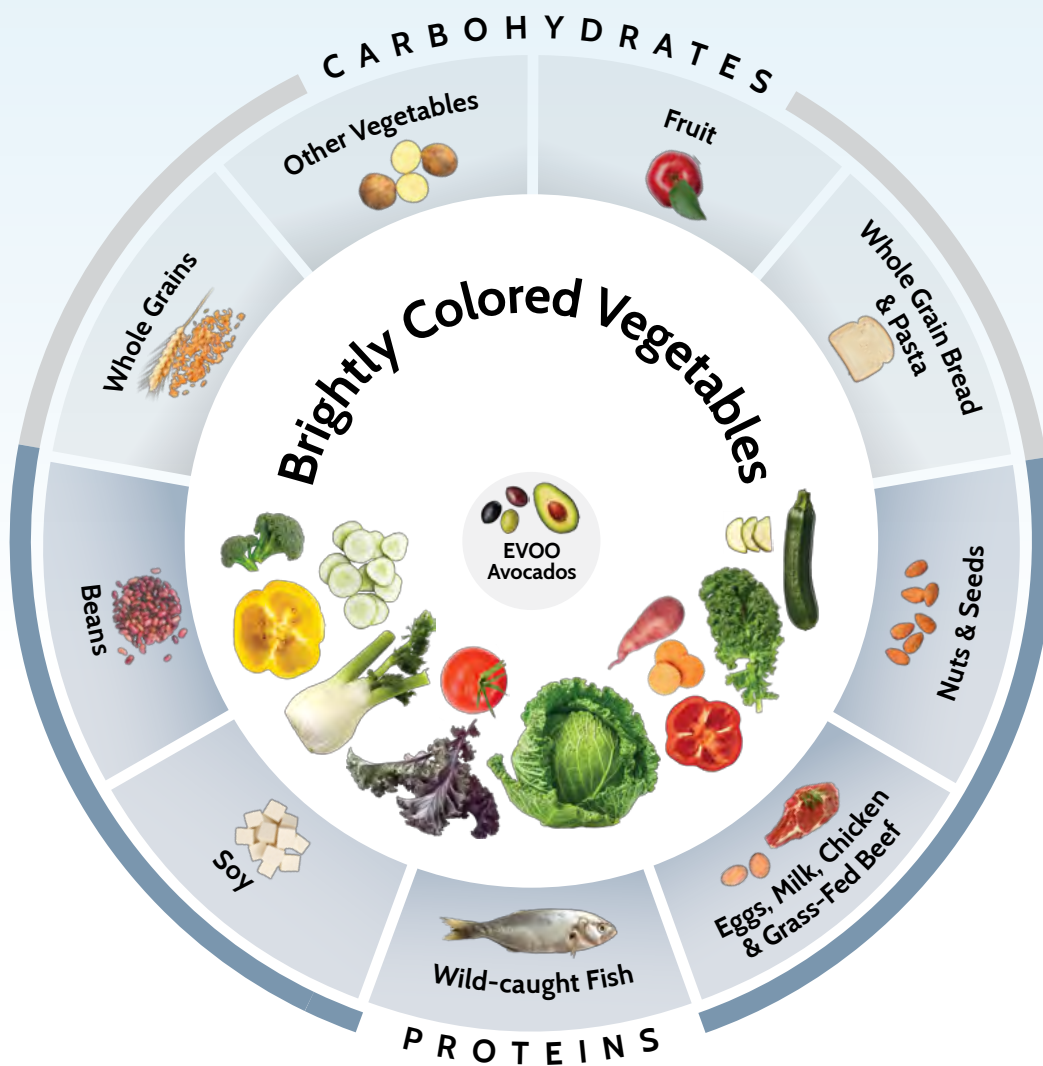
1990s

In 1992, bread, starches, and grains were the foundation of the pyramid.



Today

Today, at the Prostate Cancer Foundation, we recommend a diet whose core is in brightly-colored, cancer-fighting vegetables.



How To Moderate Meat

You might be disappointed to see on the previous chart that meat is listed in foods to limit. Meat and meat products cause the body to respond with inflammation, particularly red meat.

But meat is everywhere. It's at that summer BBQ. It's at that restaurant you love and the wedding reception this fall. Burgers are cheap, easy, and tasty. So how in the world is it possible to eat less of it? The first trick to cutting down on meat is to stock low-cost, high-quality, easy and tasty sources of alternative proteins. Once you do that, we are going to help you drop your consumption of meat products to a maximum of one time per day.

How do you get the protein that your body needs?

Here is approximately
**25 grams of complete
protein, 6 ways:**

9 oz of Tofu

5 oz of Salmon

4 Eggs

2.5 cups of Lentils & Quinoa

2 cups of Low-Fat Yogurt

3.5 oz of 90% Lean Grass-Fed
Ground Beef

The average-sized man or woman needs about 50-60 grams of protein per day. Those who exercise regularly, especially if you are doing weight training, require more protein. If you exercise rigorously and often, you may need as much as 2x the recommended protein intake for a sedentary person. At each single meal, you should try to eat no more than 20-25 grams of protein, so your protein intake must be divided among your meals throughout the day. If you're eating whole foods like we suggest, you might find it easier to take in protein than you think, because most whole foods, like beans and grains, work together

to provide your body with complete protein. Complete proteins contain all nine essential amino acids (the building blocks of protein) in the correct proportion. Complete proteins that meet the standards in this guide include beans and grains (which together make a complete protein), fish, and soy. Meat, eggs, and dairy are also complete proteins, but we suggest eating them in moderation, if at all.

As a strategy for replacing some of the meat in your diet, try varying your weekly protein intake by choosing a few servings from each of the food families below.



Fish | Fish is a high-quality source of protein. Some white meat fish are relatively low in fat compared with red meat protein sources (although note that nowhere in this guide have we advocated for a low-fat diet—just a low-bad-fat diet). Other oily fish are high in omega-3 fatty acids, which are the *crème de la crème* of cancer-fighting fats. This includes fish like wild salmon, arctic char, Atlantic mackerel, sardines, anchovies, and albacore tuna. Unfortunately, because of contamination from mercury, PCBs and other toxins that fish absorb, fish consumption should be limited and fish sources should be known and carefully monitored. For more information on which fish are safe to eat and in what proportion, the Washington State Department of Health website maintains an excellent resource.



Legumes | Beans, lentils, peas, and peanuts are all part of a class of non-meat foods that are high in protein. Unfortunately, they do not contain all of the essential amino acids needed to make a complete protein. The good news is that most grains (corn being the notable exception), when combined with beans, form a complete protein. Beans and rice are eaten in many countries around the world. You can combine different legumes with different grains to make complete protein. Experts used to say that you had to eat beans and rice in the same meal, but research now shows that your body harbors all the amino acids from what you eat in a day to combine when needed; as long as you are eating a variety of grains, beans and nuts throughout the day, your body can make what it needs.



Soy | Soy products—such as edamame, tofu, and tempeh—have long been a staple of vegetarian and Asian diets. Research has indicated that the isoflavones in soy may help inhibit tumor growth in animal models. You may have heard that soy was given a bad rap as potentially increasing the risk of breast cancer, because isoflavones have a similar chemical composition to estrogen. However, more recent studies have said quite the opposite—moderate soy consumption can decrease the risk of breast cancer recurrence and we recommend it as a regular part of any cancer-fighting lifestyle plan. A word of

caution: Soy is one of the most commonly genetically modified foods in the U.S., and GM soy has been found to have higher levels of the pesticide glyphosate. Buy organic (hence non-GMO) if soy is a regular part of your diet. Like everything else in this guide, stick to soy that is minimally processed, such as the products listed above, and minimize fake “meats” made with soy derivatives.



Nuts | Nuts are a lovely way to supplement your protein intake, but because they have a very high fat content, they are not a good exclusive source of protein for a meal. Instead, consider nuts an excellent high-protein snack that can keep your blood sugar level and help you feel satisfied.

A piece of fruit plus a handful of nuts makes a great filler between meals, or even to satisfy your “dessert” craving afterwards.



Meat Substitutes | If you like the taste, feel, and vibe of meat, but want to avoid the health risks, try the occasional plant-based protein substitutes. The market is now full of a variety of engineered “burgers” made exclusively of plant protein, designed to have the look, taste, and texture of

meat. Another caution: these products are new; although they have passed FDA standards, they have not yet stood the test of time under any long-term study. They are also highly processed in order to mimic meat’s qualities, which, as you know, is against the recommendations in this guide. Consider meat substitutes to be the occasional treat, eaten no more than two times per week, if that.

Still Love Your Red Meat? READ THIS

One (and only one of) the problems with red meat is that it contains large amounts of omega-6 fatty acids, which cause inflammation. But there is good news for meat lovers: while grain-fed beef contains high amounts of bad fats, grass-fed beef contains high amounts of good fats. Grass-fed beef has less fat overall and contains as much as five times the amount of omega-3s as traditional grain-fed. PRO TIP: although you may love a good char on your steak, skip it. Grilling at high temperatures results in the formation of two compounds—HCAs and PAHs—that have been shown to cause cancer in animals. Keep temperatures low to avoid the formation of HCAs and PAHs, and remove charred pieces before eating.

How To Moderate Sugar

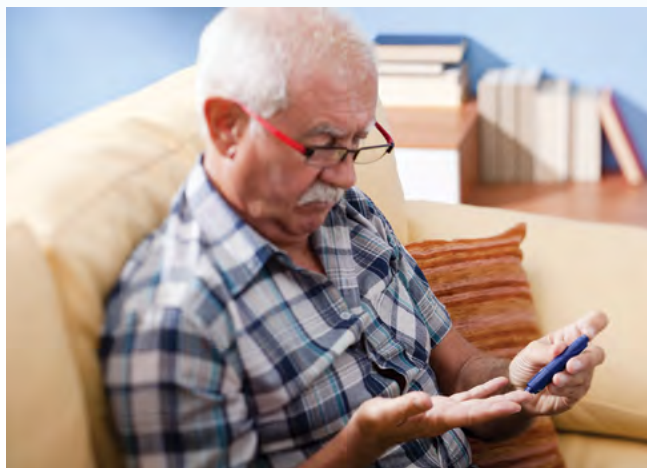
Again, we are not going to mince words. There's little left to debate about whether too much sugar is bad for your overall health. It is.

Blood Glucose and Diabetes

The typical person has about 4 grams of glucose in their blood at any given time. This level is carefully regulated by your body. When we eat food, our blood glucose levels immediately increase, causing insulin to be released from the pancreas. This helps our cells to absorb glucose and to store it as either fat or glycogen, allowing our blood glucose to return to a healthy level. If we start exercising, our muscles need more glucose to burn up to generate energy and glucose is released back into the blood.

Having too much glucose in the blood can be devastating for our health—a condition known as diabetes—and is a risk factor for many cancers (prostate cancer being one notable exception). Type 1 diabetes is usually due to a genetic defect where the pancreas cannot make insulin. In Type 2 diabetes, the cells of the body cannot respond to insulin and so glucose remains in the bloodstream, resulting in hyperglycemia (high blood glucose levels).

How does the way something tastes (sweetness) relate to the way your body reacts to it? Molecules like fructose and sucrose are simple carbohydrates—monosaccharides and disaccharides—and so can be digested fairly quickly, leading to spikes in blood sugar and insulin secretion.



Does sugar cause cancer? Right now, there is no direct evidence that eating sugar causes cancer. But we do know that eating a lot of sugar leads to weight gain, body mass increase, increased fat in the mid-section, and diabetes. And we know that all of those things are correlated (remember the difference between causation and correlation?) with cancer.

Cancer aside, more and more research indicates that one of the characteristics of the traditional Western diet that is at odds with good health may have to do with high sugar intake.

We needn't talk about whether to moderate sugar—it's time to cut to the chase and talk about how.

In 2014, the World Health Organization reduced its “free sugar” intake recommendations (ie, added sugars, and sugars occurring naturally in fruit juices, and honey) from 10% of your daily calorie intake to 5%. For a 150 lb middle-aged adult, that's about 25 grams of sugar, or 6-7 teaspoons per day. For reference, a single soda, a single-serving low-fat flavored yogurt, and a single protein bar each contain more than the WHO-recommended allowance.

To Eat Fruit or To Not Eat Fruit, That is the Question

Some of us have a sweet tooth. A 2017 study from the University of Copenhagen found that, for some people who have a certain form of the gene FGF21, it might be genetic. For others, it could be just a bad habit or way to cope with stress.

Fruit contains fructose, a sugar—that's what makes it sweet. So should you skip the fruit? The answer is, maybe. If you don't have a sweet tooth, you don't *have* to add fruit to your diet, although whole fruit with skin on can be a nice way to add fiber. On the other hand, if you are someone who just has to have that taste of sweetness after dinner, swap your normal cookie, brownie, or ice cream for a piece of fruit with nuts. Most fruit contains less total sugar than most desserts, and the fiber and fat help keep your metabolism regulated. Skip juiced fruit, which has a sweetness profile similar to sugared beverages and sodas.



So the bottom line, in no uncertain terms, is that this guide recommends you stick with the WHO guideline for added sugar intake. How do you calculate your personal allowance of sugar? Take your current weight, and divide it by 6. That is a reasonable approximation of the number of grams of sugar that you are allowed to eat in a day. If you want to lose weight, we are sad to report that you would be well-advised to eat even less.

Ugh. Depending on where you live and your lifestyle, this may be the hardest thing we tell you in this guide. But it's an important one. Tough love. Fortunately, if you cut out the sweetened drinks (soda, pre-sweetened coffee and tea, and juice), and fill up on a diet of home-cooked vegetables, whole grains, nuts and beans, you're off to a great start.



Read the label!

Beware of the Hidden Sugar

Here's just a few of the foods that have a higher sugar content than you might imagine. **Read the label**, compare brands, and look for dressings that are naturally sweet vs. artificially sweetened (from things like sugar or, worse, high-fructose corn syrup). Even better: make these items from scratch at home so you know exactly what is in them.

Salad dressings

Marinades

Tomato sauce

Flavored yogurt

Granola bars

Fruit smoothies/juices

Breakfast cereal

How to Get Out of 7-11 Alive

We have all been in a situation, no matter how healthy we are trying to be, where healthy choices are incredibly hard to come by. One of those situations is travel.

These days, there are very few geographic locations where there are not a few healthy choices to consider. Even McDonald's has salad. Just as important as *having* the right choices is *making* the right choices. Here are some tips for getting through difficult health choices with grace:

In a restaurant or at a truck stop.	Order a salad, ask if you can add plain grilled fish or meat, get a side of vegetables or soup, and skip the fruity cocktails and dessert; or, split one dessert with everyone at the table. If you simply must have something sweet after your meal, see if you can grab a piece of fresh fruit at a local grocery or restaurant.
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Bring food from home.	Obviously you can't do this at a wedding or a work event, but if it's travel that has you worried, the options are limitless: pack leftovers from home, sliced fruit and veggies, and nuts and seeds to snack on. If you run out of food from home while on your travels—tempting as it is to pull over to that rest stop and grab a sugary drink and a bag of chips—think about choosing water, unsweetened tea or coffee, a bag of nuts, dried fruit, or even whole-grain crackers to keep you going.
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Relax, and eat what you want.	For real—if it's just one meal or a day or even a week of meals (vacation!)—you could be doing yourself more harm by worrying than by just letting it go and enjoying yourself. Feel like having that ice cream sundae for dessert? Do it. Good nutrition is a marathon, not a sprint, and a few unhealthy meals are unlikely to harm you, as long as it's a blip in an otherwise healthy lifestyle. For those days when you reach for the cake, ice cream, and French fries, try to add lots of healthy vegetables to other parts of your day. And if you can't? Eh, fuggedaboutit.
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Ask your doctor for a nutritionist who can help develop a plan during cancer therapy.

What To Eat If You Have Cancer

There are about over 100 different cancer types based on organ sites (eg, lung, breast, prostate), multiple subtypes of every one of these cancers, and endless amount of nuance in how those subtypes are treated (type, dosage, frequency, duration). Many of those drugs have side effects that can compromise taste buds and appetite significantly; nausea and vomiting are both common side effects of many cancer treatments.

During chemotherapy, many people find it hard to eat and keep down a sufficient amount of calories. Eating a low-calorie diet with processed foods like low-sugar or low-fat products is never advised, but that goes double for during treatment, when you may be advised to pour on the olive oil and eat as much as you can stomach to get the proper calories and nutrients needed to stay healthy.

As Hippocrates implied, food is medicine; therefore, food has the possibility to interact with the drugs you are taking. For this reason, recommending what to eat if you are in active treatment for cancer is beyond the scope of this guide. Please consult your medical team to find out which foods are most appropriate and/or banned during your specific treatment. Most facilities have associated nutritionists who can help develop a plan that is right for you during cancer therapy.

How otherwise healthy foods can interact with prescription drugs

Here are just two examples showing why it's important to discuss diet with your doctor, in conjunction with medication planning.

Example 1 KALE



You may have marveled at the quick transition that kale has made in the past 5 years—from inedible garnish to cornerstone health food. There is no doubt that kale is an antioxidant-packed superfood. Just one cup of chopped kale contains 100% more vitamin A and 40% more vitamin C than you need in an entire day. It also contains trace minerals, compounds that protect against inflammation, heart disease, and cancer, as well as 7 times the RDA of vitamin K. And here's an example of where it gets complicated. Vitamin K is critical for blood clotting and medications called anticoagulants inhibit the formation of vitamin K-dependent clotting factors. As such, if you were, for example, recovering from a stroke and taking an anticoagulant, you should keep the amount of vitamin K-containing foods (such as kale) that you eat consistent to avoid affecting the dosing you are provided.

Example 2 GRAPEFRUIT

Oral chemotherapies have been shown to interact with foods and other drugs. For example, a study found that grapefruit consumption reduced efficacy of oral chemotherapy for 19 different cancer drugs. Grapefruit is also contraindicated when taking a statin because it interferes with your body's ability to metabolize the drug, and can cause increased side effects.



Cancer Recovery Foods

Eating to prevent cancer is very similar to eating to prevent cancer from reoccurring, but it is not exactly the same. Both immediately after treatment and over time, many cancer therapies include a harrowing list of short and long-term effects including: heart issues, hormonal irregularities, high blood pressure, loss of muscle and bone density, lung problems, dental health issues, cognitive impairment and many others. Because many cancer treatments harm normal as well as cancer cells, they can systematically damage the body from top to bottom.

While developing more targeted drugs with lesser side effects is an active high-priority area of research for the Prostate Cancer Foundation, in the immediate future we suggest the following:

- 1 Track your symptoms.** If you are having treatment-related side effects, write down when they occur and note intensity.

- 2 Follow up with your oncology team.** If your symptoms are new or intense, don't hesitate to get in with your doctor right away. Even if it's years later, and you're not sure if it's related, make the call.

- 3 Divide and conquer.** Ask your doctor what your options are for managing side effects with medication vs. complementary alternative approaches vs. nutrition and exercise.

- 4 Share this guide.** Let your medical team know that you'd like to eat healthy and exercise and ask them to review whether there's anything in here that would be contraindicated during or after your particular form of treatment.



To learn more about the future of precision medicine, including the promise of reduced side effects, visit pcf.org.



Research shows that what you do to your body in your 20s and 30s has a profound effect on how you age.

Health And Wellness Suggestions For Parents

You might wonder what this section is doing in a guide about cancer. Good question! There are a few simple answers:

- 1 You love your kids, and you want them to be healthy at every age.
- 2 Your kids love you, and they want you to be around for a long time.
- 3 Here's the kicker: research shows that what you do to your body in your 20s and 30s has a profound effect on how you age, well or not so well. For example, a 2016 study found that leanness (eg, those in the lowest BMI category) enhanced the effects of healthy lifestyle choices on decreasing premature mortality across 30 years.

Share this guide with your whole family, to help everyone live a long and productive life.

What about if you are a new parent? You have to listen even more carefully. Having a new baby can be the time in your life when you take the least care of yourself...but not so fast! Now more than ever, because someone depends on you 100%, you have a reason to stay healthy.

A few pragmatic tips for new parents:

- **Start your kids eating well as soon as they move from milk to solid food.** Some tastes have a genetic component, such as an aversion to bitterness. Other tastes are acquired. Have you ever heard a parent say, “Oh, my kid would never eat that!” To them, we say: sorry, but that’s your fault. In Chennai, India, children eat fermented lentil dumplings with spicy tomato sauce for breakfast, something most Western parents, much less children, would balk at. Teach your children’s taste buds, right now, that vegetables are the core of their long life.
- **Share this guide with grandparents.** They, too, have a new stake in the game, and you want them around for everything from the first day of kindergarten to graduations to weddings.
- **Take time to take care of yourself.** It’s easy to fall into only taking care of someone else, because they need your help. But it’s important to take time to rest, exercise and eat well, in order to ultimately make yourself the best parent you can be. Tough (self) love!

Smoking

Smoking causes cancer.

So far, research has shown a link between smoking and at least 15 forms of cancer (including lung and prostate) and heart disease. For every 15 cigarettes smoked, there is a DNA change that could cause a cell in the body to become cancerous.

The good news is that it’s never too late to quit smoking, and the benefits start immediately. Quitting smoking may reduce the risk of dying from prostate cancer, and reduces the risk of dying from any cause. The health benefits from quitting begin on the first day after smoking ceases. Recent evidence from a PCF study further suggests that smoking is associated with more aggressive prostate cancer at the time of diagnosis. Furthermore, smokers have a higher risk of prostate cancer progression, including recurrence and metastasis, as well as an increased likelihood of death. Importantly, PCF-funded researchers Stacy Kenfield and June Chan found that when compared with current smokers, men who quit smoking more than 10 years ago had prostate cancer mortality risk similar to those who had never smoked.

According to the American Lung Association, most people who smoke know that smoking is harmful to their health and to those around them. Most people have already made at least one attempt to quit. As a matter of fact, one study reported that on average it took a person about 2.7 attempts to quit. The advent of nicotine replacement therapies and apps to help provide support for quitting have increased success rates. On the negative side, in 2018 the U.S. Surgeon General issued a warning about rising rates of e-cigarette use among youth. In 2018, an alarming 1 in 5 high school students and 1 in 20 middle school students were e-cigarette users. Since 99% of smokers start before age 26, it is imperative to talk to your family members about the risks of smoking and disease.

Supplements

Since we told you about all these good foods that contain lots of vitamins, nutrients, and cancer-fighting compounds, you might be inclined to think that you'd be in really good shape if you just went out to the local health food store and bought some supplements where these elements have been extracted from real food into pill form. Not so.



It is generally accepted that the use of a regular multivitamin is safe and may be beneficial. One large randomized controlled trial demonstrated a modest (8%) reduction in overall cancer risk among men who regularly took a multivitamin supplement. However, the general consensus is that there isn't enough evidence to support the use of any single supplement for protection against cancer.

Another risk of supplements is a false sense of security. It is not ok to simply eat poorly, then take a vitamin. It is important to eat and live well. Stick to a whole foods diet.

Simply because a product is derived from "natural" ingredients does not mean it is safe. Remember, the supplement industry is regulated under a different set of FDA standards than either food or medication: they are not required to be proven



safe to FDA satisfaction before they are marketed for sale. It's also important to note that some single-nutrient supplements may be harmful, depending on your particular situation. As just two examples, vitamin E supplementation after surgery can increase unwanted bleeding, and based on a PCF-funded study, selenium supplementation after prostate cancer diagnosis may actually increase the risk of dying from prostate cancer.

One potential exception is vitamin D. Vitamin D is not found in food, but rather is produced in the body when the skin is exposed to sunlight. Because of the recent proliferation of sun blockers, many people are now vitamin D deficient, especially older people, those with less sun exposure or who live in northern latitudes, and people with heavily pigmented (dark) skin.

It is recommended that you consult with your physician before beginning any supplements, including vitamin D. Remember, more and more, research is indicating that supplements cannot replace the complicated nutrient mix found in real food.

What To Drink (Or Not Drink) To Prevent Cancer

So far in this section we've covered everything you put in your body—from food to tobacco—that affects your cancer outcomes. Liquids have the power to tip the needle in either a health-positive or health-negative direction. While we can't extensively cover every beverage on the planet, this guide would be incomplete without a few do's and don'ts from the common beverage cart.



Green Tea | Green tea has anti-angiogenic properties.

Angiogenesis is the process by which tumor cells recruit blood vessels to grow. Green tea inhibits cellular ability to recruit new blood vessels. Similar properties have been discovered in spices like licorice, ginseng, cumin, and garlic. Green tea contains a particular polyphenol called EGCG (epigallocatechin-3-gallate), which has been shown in mouse studies to interfere with cell replication. What about black tea? It also contains polyphenols, but at levels about 50% lower than green tea.



Coffee | Coffee also contains various polyphenols, which were shown in a University of South Carolina study to turn on a tumor suppressor gene called RARB2. One study from researchers in Spain found that two compounds in coffee, kahweol acetate and cefestol, both inhibited the growth of prostate cancer cells in mice. Note that caffeine in coffee can interfere with sleep, which is a critical part of good health. Lastly, try to limit or avoid cream and sugar.



Water | Drinking a lot of water to stay healthy is important for good health, because it helps your body flush waste and keeps your body temperature regulated. Maintaining adequate blood volume is necessary to carry oxygen, water-soluble vitamins, and other protective compounds around your body. How much water you need can depend on your habits, but a good estimate is 12-16 cups per day. If you're eating a lot of fiber, as we suggest, you might want to add in a few more cups. Alcohol, coffee, and tea are all diuretics that inhibit your body's ability to absorb water, so excessive consumption can lead to dehydration if water is not replenished. A study from the Environmental Working Group found that a majority of water systems in the U.S. contained known or likely carcinogens at levels above government health guidelines. We recommend that you add a water filter at home to filter out contaminants. Other than during treatment, when you might be dehydrated or short on calories and appetite, we recommend drinking water when thirsty, as opposed to reaching for a juice or sweetened beverage.



Soda | Do not drink soda, sweetened with sugar or sugar substitutes. One sugar-sweetened soda contains more sugar than the WHO suggests for your daily sugar intake. "Diet" soda containing artificial sweeteners has been shown to send signals to your brain similar to sugar, which has the accumulated effect of disrupting your metabolism, as if you had consumed sugar. Repeat: do not drink soda. So how do you quit the habit? Try transitioning to fruit-sweetened seltzer.





Juices and Other Sweetened or Artificially Sweetened Beverages | Ditto the previous. In short, and to repeat, do not drink things that are sweet to the taste on a regular basis. However, if you have to choose between sweetened beverages, a vitamin-filled juice beats a soda anyday. That said, read the labels. Many commercial juices have little nutritional value remaining. As with food, stick with juice where you can I.D. the source of the fruit. Just remember: sugar is sugar, whether it's from fructose (fruit) or sucrose (table sugar).



Alcohol | Studies indicate an association between increased alcohol consumption and increased risk for some types of cancer. This includes all kinds of alcohol. The byproducts of alcohol consumption can make it harder for your body to control the normal growth of cells. You may have heard about a compound called resveratrol, found in red wine, that is a strong anti-inflammatory. Unfortunately, the amount of wine you would need to drink to get enough resveratrol would be impractical. You may also have heard several association studies that linked drinking with longevity. As we learned earlier, there may be other factors at play here, like community-building and reduced stress that often go hand in hand with alcohol consumption. This is also one of those times when precision might come into your nutrition decision: alcohol intake has been consistently linked to reduced risk of heart disease and diabetes...but elevated risks of many types of cancer. A safe suggestion for those who enjoy a cocktail every now and then is to limit to one drink per day maximum, drink it with friends, and make sure to drink lots of water alongside your wine.

How To Stay Current On What To Eat

Nutrition research is a very swiftly evolving field. There are thousands of articles published in each year on nutrition and cancer and hundreds of active clinical trials. Whether you're a science geek who wants to stay current on the latest research or a healthy-ish eater who wants to make sure not to miss practice-changing updates to this guide, go to pcf.org/livewell to subscribe for updates.



Stay current on the latest research: visit pcf.org/livewell.

Conclusion: There are no short cuts.

What if there was a pill you could take for cancer-fighting good health? What if it didn't matter if you exercise, sleep or eat right... because this pill took care of everything? Whether you are a cancer survivor, an elite athlete, or just someone interested in good health, we're here to tell you: that pill does not exist. Good health requires long term, sustained lifestyle changes. It does take some effort. But the good news is, none of this has to be painful. Fruits and vegetables are delicious, exercising outside is invigorating, sleeping well boosts mood and makes us feel more resilient, and reducing stress will open the door to a cascade of positive people, places and things in your life.



Be Well.



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