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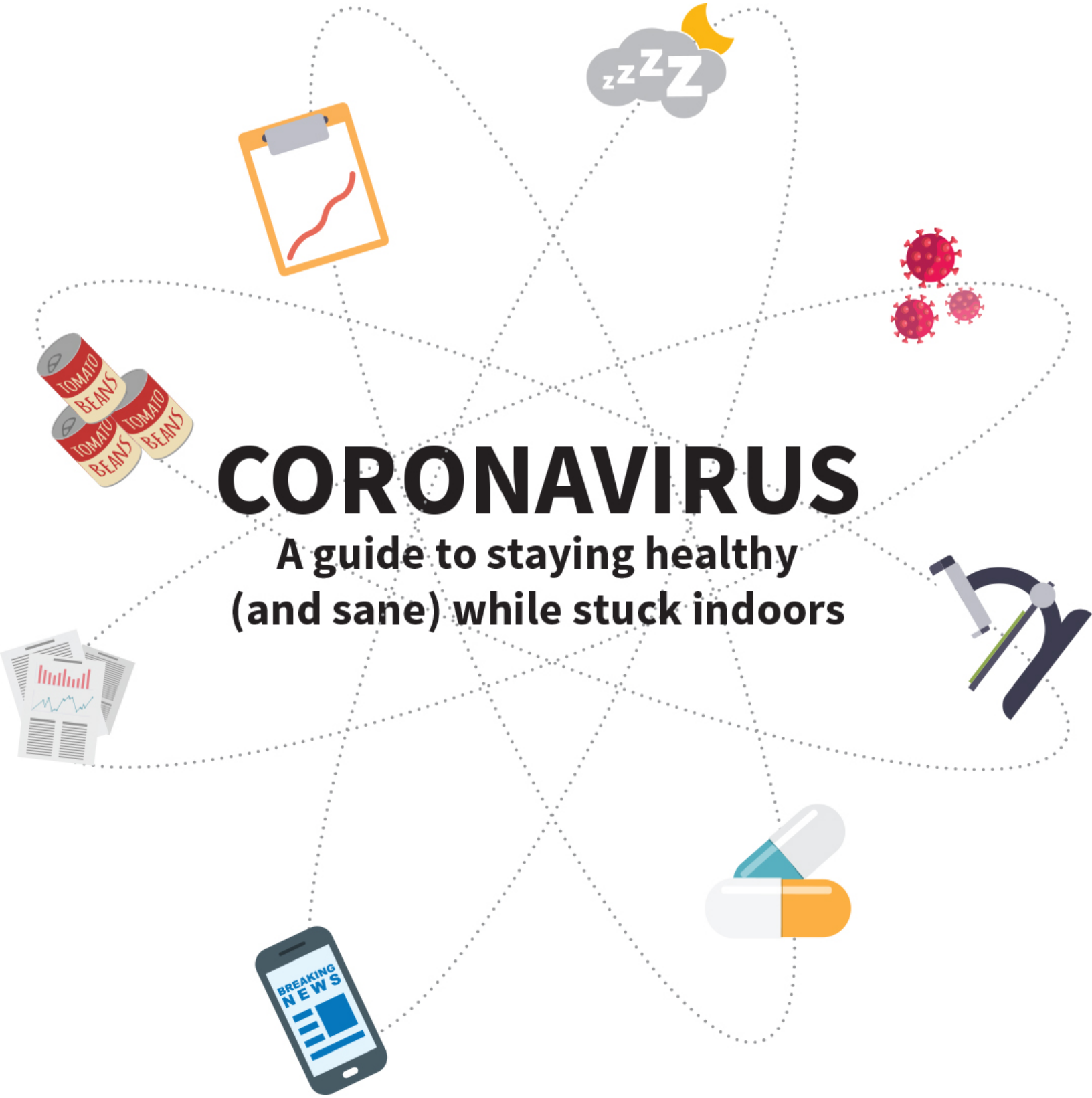

CORONAVIRUS

A guide to staying healthy (and sane) while stuck indoors

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Medical Disclaimer

Some lifestyle choices can affect your immune system, and we'll mention some, but **there is currently no cure or prophylactic for COVID-19**. To protect you (and others), there are only two proven methods: good hygiene and physical distancing. The extreme version of physical distancing is isolation, and that's what this guide is truly about: **we want to help you make the best of life under lockdown**.

This guide is a general-health document for adults 18 or over. Its aim is strictly educational. It does not constitute medical advice. Please consult a medical or health professional before you take any step that may affect your health (such as taking a new supplement or starting a new diet or exercise program) or if you have questions about your health.

This guide is based on scientific studies, but individual results will vary — in studies as in real life. In other words, any intervention (exercise program, diet, supplement …) may affect different people differently.

If you engage in any activity or take any product mentioned herein, you do so of your own free will, and you knowingly and voluntarily accept the risks. We mention major known interactions, but the number of potential interactions (between foods, supplements, pharmaceuticals, exercise programs, and health conditions) is virtually infinite. You may want to avoid combining too many supplements, especially if you also take pharmaceuticals.

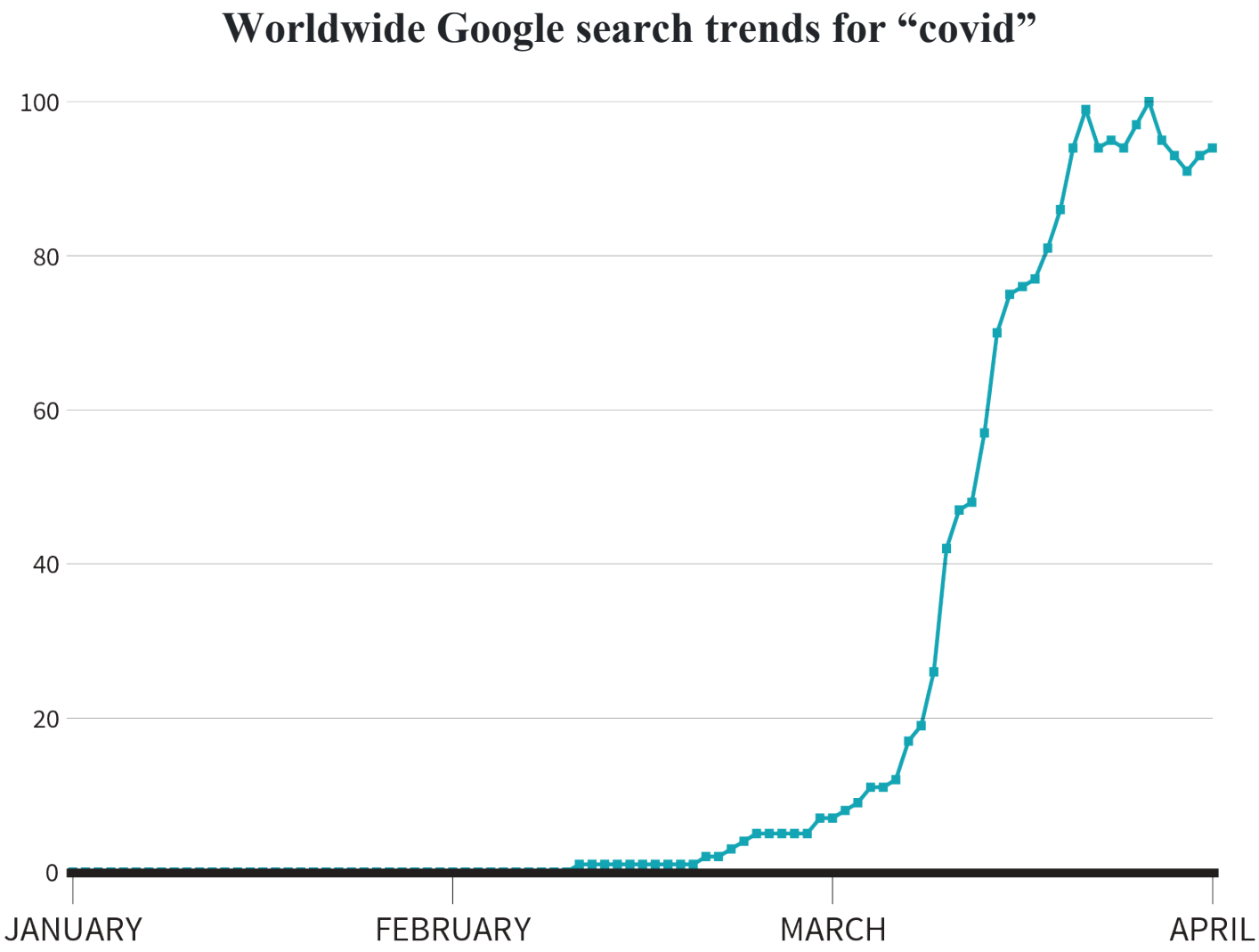
As researchers and scientists, we've found the sites we link to in this guide useful, but we're not endorsing them. Always check multiple credible sources.

Keep in mind that **COVID-19 evidence is changing by the day**. We'll update this guide, but we're a small team — very small, in the face of a pandemic. Some information herein is bound to get

> outdated. So, again: **always check multiple credible sources**. Don’t rely on just one, not even Examine.com.

Introduction

Like most of you, the Examine.com team is closely following the evolution of the COVID-19 situation. And like most of you, as our normal routines were being upended and the necessity of coping with a new paradigm was setting in, we've been looking for ways to stay healthy, informed … and sane.



Reference: Google Trends

Now, we're neither virologists nor infectious-disease or pandemic-modelling specialists. But we are a team of health experts, with degrees in nutrition, exercise science, public health, pharmacology, toxicology, microbiology, biophysics, biomedical science, neuroscience, chemistry, and more. Further, as a fully remote company, we're accustomed to the challenges of trying to stay healthy (and sane) while spending a lot of time at home. Finally, for our recent coronavirus-related articles

and for this guide, we've brought in additional experts in order to provide you with the most up-to-date, accurate information.

In this guide, we aim to answer this question: ***How can you focus on what matters most to your health?*** (And, relatedly: *How can you avoid spending all your time stressing about the pandemic, and all your money on the latest "miracle cure"?*)

The circumstances you find yourselves in are varied. Some of you are newly working from home. Some of you are currently pulling very long work shifts. Too many of you have lost their jobs. And to compound the professional with the personal, some of you may be spending too much time with loved ones, maybe getting on one another's nerves, while others may not be able to see theirs right now.

Whatever your circumstances, there is something in this guide for anyone trying to maintain their health. It contains condensed versions of some of our best research, as well as practical advice and answers to common questions. We also discuss how the following elements interact with your immune function:

- 👟 **Lifestyle** (diet, supplements, exercise, and sleep)
- 😰 **Mental health** (depression, stress, anxiety, and information overload)
- 💬 **Socialization** (and what it means in the times of physical distancing)
- 🧼 **Sanitation practices** (air quality and food preparation and packaging)
- ⏰ **Routines** (and how to set up one to bring some "normal" back in your life)

Let's begin!

Lifestyle and Immune Function

You don't achieve good immune health by taking buckets of supplements clumsily targeting inflammation or other signaling processes, but through a balanced diet, proper hydration, restful sleep, regular exercise, and stress-control. Your immune system must be strong enough to fight off invading microbes but should not react so strongly that it ends up damaging healthy cells. The perils of an overactive immune system are made obvious by autoimmune conditions such as lupus,[1] rheumatoid arthritis,[2] or Sjögren's syndrome.[3]

⚠ Caution: Lifestyle factors and COVID-19

We know that sleep, exercise, diet, and certain nutrients affect the immune system, but **there is no direct scientific evidence that any of these factors can prevent, treat, or cure COVID-19**.

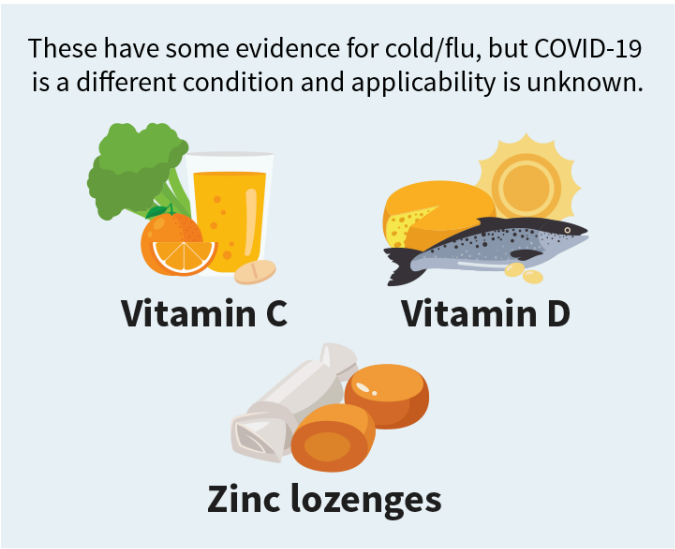
What you need to know

Pressed for time? Aren't we all! If you just want the essential information, check out the graphics below.

How can I reduce my chances of getting sick?

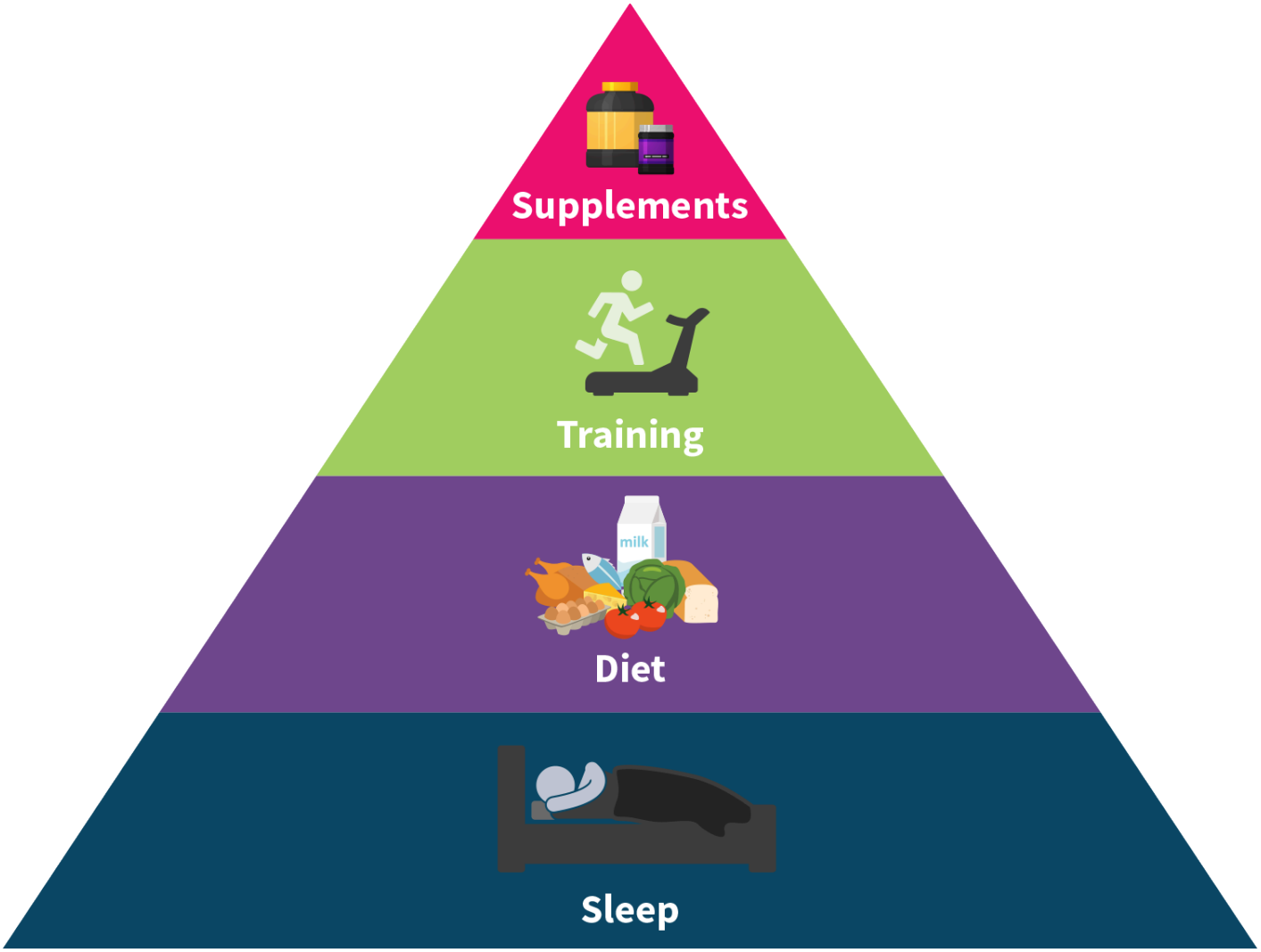
First, focus on what DEFINITELY helps

Supplement efficacy is unknown for COVID-19

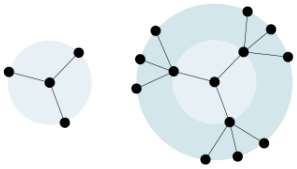


How can you reduce your chances of falling sick?

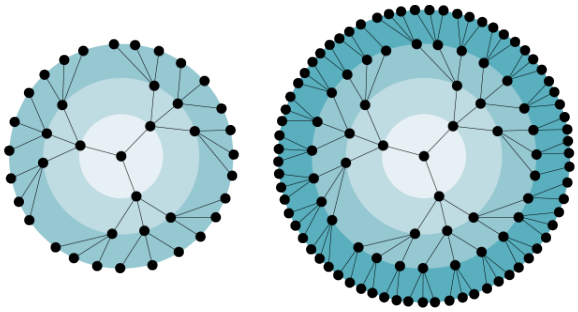
Which lifestyle changes will most benefit my health?



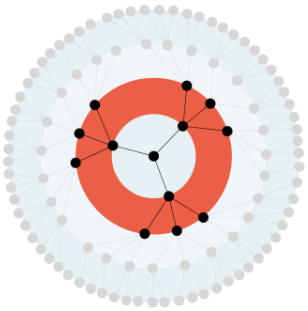
How does physical distancing help?



This is how the novel coronavirus spreads — one person infects a few people, and so forth.



Without sufficient control measures, exponential growth results



But what if more people early on in the spread self-isolated? This is how you flatten the curve.

What is the evidence for face masks?

		CLOTH MASK	SURGICAL MASK	N95 RESPIRATOR
Who is it for?		 General public	 Medical staff	 Medical staff (especially workers exposed to aerosol-generating procedures)
Does it require training for proper fit?		 No	 No	 Yes
What is the level of virus protection?	**From wearer** 	 Moderate	 High	 Highest
		 Typically low (depending on design)	 Moderate	 High
	For wearer 			
Have the masks been validated?		No	Cleared by the FDA*	Evaluated, tested, and approved by NIOSH**
What is the potential for air leakage?		 Moderate to very high, depending on material (front leakage) and fit (side leakage)	 Moderate (mostly side leakage)	 Minimal (with proper fit)
What are the cons?		 The efficacy can vary greatly depending on material and crafter's skill.	 The public may not know that these masks aren't tested for protection against small particles.	 These masks require training to fit properly. They're uncomfortable and may cause headaches and skin reactions.
What are the pros?		 They're washable and usually easy to breathe through. They can be purchased or crafted.	 They're more comfortable, available, and affordable than N95 respirators.	 They're standardized for efficacy against very small particles.

* Enforcement Policy for Face Masks and Respirators During the Coronavirus Disease Public Health Emergency, Revised

** NIOSH-Approved Particulate Filtering Facepiece Respirators

Want to dive in a bit more? Keep reading!

Diet

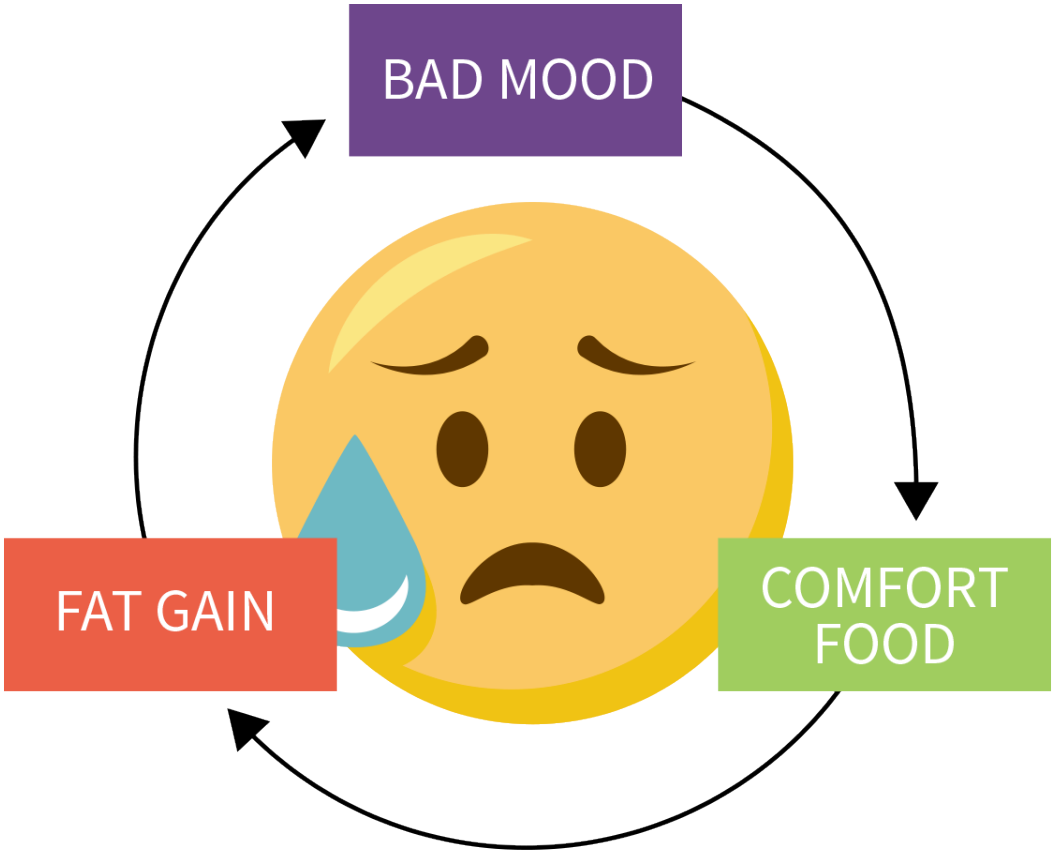
Is there an ideal diet to fight COVID-19?

No, there is no diet out there that can prevent or cure COVID-19. The virus that causes this illness (SARS-CoV-2) isn't some bacterium in your stomach that could thrive on some types of food and not others. By the same token, starving yourself in the hope of starving the virus simply isn't going to work, and the effects of extended fasting (such as elevated cortisol)[4] may put you at risk in this uncertain situation. So all you can do (and indeed should do) is eat a balanced diet rich in micronutrients and poor in processed carbs/fats (which are known to impair the immune system[5] [6]).

My healthy eating habits have gone out the window!

Whether it is because of stress, too much time spent sitting at home, or the availability of food just a few steps away, you might find yourself eating more (in general, and more "comfort foods" in particular).

The vicious circle of comfort foods



Cut yourself some slack! Don't be too hard on yourself if you've fallen off the healthy-eating bandwagon recently. It is okay to take occasional breaks — be they planned or unplanned.

The goal is to be *consistent* in your healthy eating habits, not *perfect*.

What can I do to (re)start a healthy eating pattern?

Set a goal. Setting goals can help you refocus your efforts. At the risk of sounding hokey, chances of success are much lower if you haven't articulated to yourself what exactly it is that you're trying to achieve. You may be familiar with the concept of SMART goals.

- **S**pecific
- **M**easurable
- **A**chievable
- **R**elevant
- **T**ime-bound

Not every goal needs to exactly fit those criteria, but be aware of the two torpedoes that most often

sink dieting ships:

- Unrealistic goals — i.e., eating 5 kg (11 lb) of vegetables per day
- Substitute goals — i.e., trying yet another fad diet instead of addressing your core issues, for instance stress or lack of sleep

What can help me stick to a healthy diet?

Diet adherence hinges on many factors. In addition to high internal motivation, let's mention the POSE factors:

PREFERENCES

- If you like the foods your diet includes more than the foods it excludes, you'll find adherence easier.
- To speak in broader terms: the better a diet fits your lifestyle and food preferences, the more likely you are to stick to it.

ORGANIZATION

- If you prepare diet-appropriate meals and snacks in advance, you'll find adherence easier. Studies in which meals are provided by the researchers see greater diet adherence.
- Advance preparation can also spare you the cumulative stress of deciding what to eat under time pressure (i.e., when meal time comes, each day, several times a day).
- Relatedly, following any eating pattern usually means spending a little more time planning your grocery shopping.
- Advance preparation also allows you to better control your portions.

SUPPORT

- If your family is supportive, you'll find adherence easier.
- Your friends and colleagues might need to be supportive too.
- Having access to a support system (dietician, dedicated online group …) will also help *a lot*.

ENVIRONMENT

- If you live alone, consider removing from your residence the foods you tend to overconsume.
- If you don't live alone and the people you live with don't share your diet, you should at least make sure that the foods you tend to overconsume don't lie in plain sight, so they won't constantly tempt you.
- Another risk factor is your TV: anytime you watch ad-supported content, you're likely to be

assaulted with commercials for incredibly delicious-looking foods.

You'll notice we didn't mention hunger. That's because not all diets are hypocaloric, or need to be. Hypocaloric diets (diets that have you eat less than you burn) are useful only if you wish to lose weight. Many eating patterns (Mediterranean, vegan, keto …) are not intrinsically hypocaloric.

However, you may need to be mindful of the types of hunger you can experience. Sometimes, you eat because you're hungry; at other times, you may eat because you're bored or anxious. You may even overeat when you're already full from a meal!

What if I want to focus on keeping a healthy weight?

In addition to the above POSE factors, the most effective diets tend to share these common traits:

ENOUGH PROTEIN

- Whereas the ratio of carbohydrate or fat seems to matter little,[7] diets rich in protein consistently lead to greater fat loss (and less muscle loss).[8][9][10][11]
- Not only is protein more satiating than carb or fat, it is also more thermogenic (your body needs more energy to convert protein into energy).[12][13]
- You can calculate your optimal daily protein intake with our Protein Intake Calculator.

LOTS OF FRUITS AND VEGGIES

- Foods with lower caloric density are sometimes called higher-volume foods. By making you feel fuller, they can help you keep your weight in check.[14][15]
- Lettuce, for instance, is 0% fat, 1% protein, 1% sugar, 2% fiber, and 95% water — it has very low caloric density. It can easily fill your stomach, which is why simply eating a salad at the start of a meal can reduce your caloric intake for the whole meal.[16]
- Fruits and vegetables are rich in vitamins, minerals, antioxidants, and other healthful compounds — they can help satisfy your body's needs in micronutrients without overloading it with calories.

The concept of energy density

400 Calories of oil | 400 Calories of meat | 400 Calories of vegetables

WHOLE FOODS

- You'll find it easier to maintain your weight and overall health if you prioritize foods that have been minimally processed.[17][18][19] High amounts of processed carbs/fats can impair your immune function.[5][6]
- Apples, for instance, which you need to chew even though they're mostly water, increase satiety and reduce food intake more than applesauce or apple juice do.[20]
- Our body can extract more calories from peanut butter than from whole peanuts, even though both foods have similar caloric values (kcal/g).[21]

No type of diet will work for everyone, but there's one factor that will decide if you succeed or fail: consistency.[7] You need to choose an eating pattern that fits you — one you can stick to.

💡 Tip: Calculating your caloric needs

Your height, weight, age, and level of physical activity all contribute to your caloric needs. There are many calorie calculators out there, but one does stand above the rest:

This calculator has been tested and validated against real-world data.[22] It can estimate the number of calories *you* need to reach then maintain a specific weight. Click on the image above to get going!

Remember, you do not *have* to count calories — it's simply one method that may or may not work for you. If you try this method and feel yourself becoming overly obsessive or depressed when you don't hit your target, it may not be the healthy option for you. The last thing you need right now is something that causes you **more** stress!

Is fresh produce better than frozen or canned?

With so many grocery stores experiencing shortages, is it okay to rely more on frozen and/or canned produce?

CANNED PRODUCE

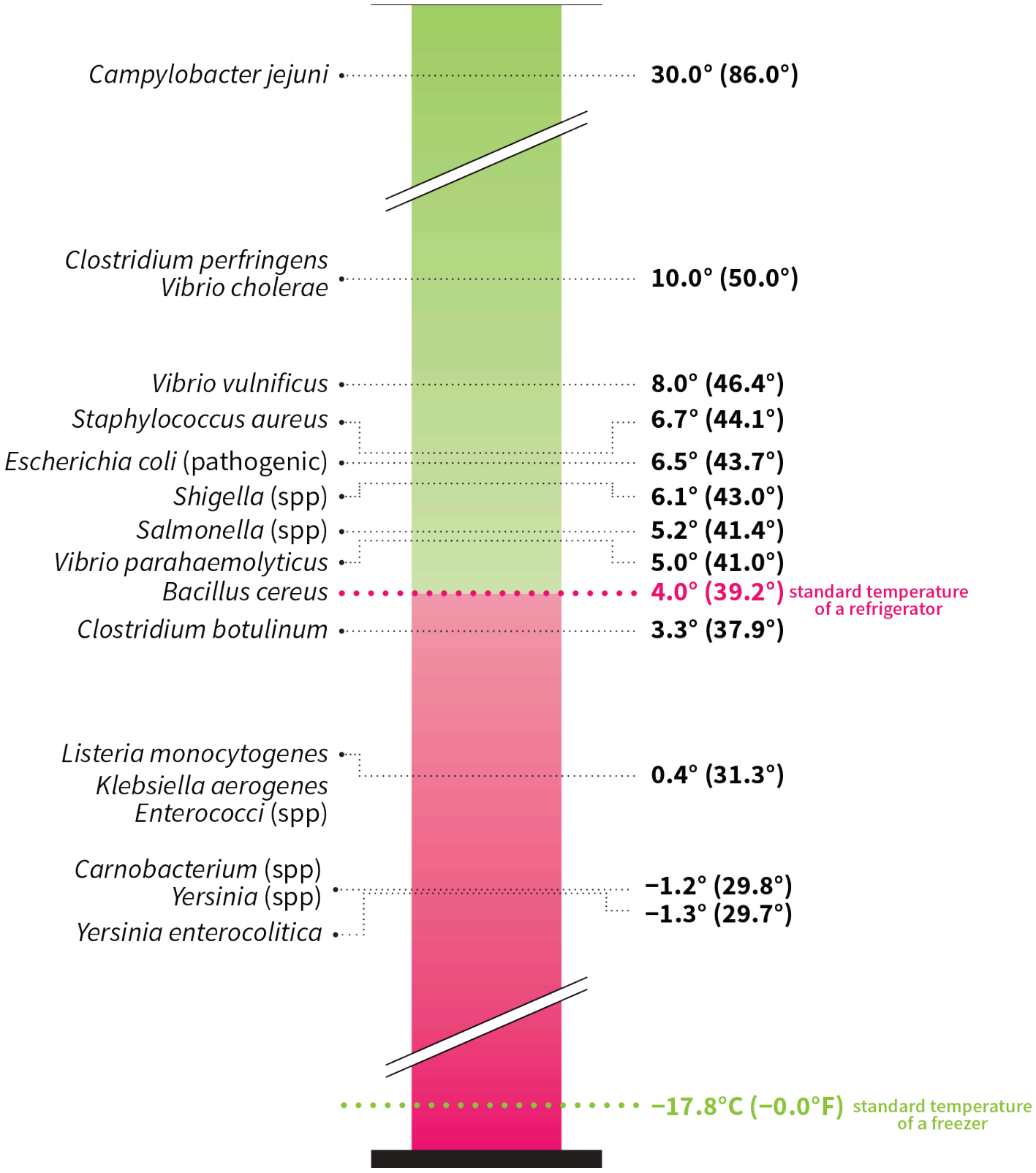
Overall, fresh and frozen produce are nutritionally similar,[23] and while they *might* be more a bit nutritious than canned produce,[24] eating enough whole-food fruits and vegetables is what really matters.

However, since salt (sodium) and sugar are often added to canned foods to make them last longer, make sure you don't get too much of one or the other.

FROZEN FOOD

Set your freezer low enough to prevent pathogen growth: −18°C (−0°F) or colder. This will also reduce the incidence of freezer burns, as will protecting your food from air (through close wrapping and by allowing less air circulation in your freezer).

The lowest temperatures at which microbes can grow in °C (°F)



References: Junttila et al. *J Appl Bacteriol*. 1988.[25] ● Michener and Elliott. *Adv Food Res*. 1964.[26] ● Hazeleger et al. *Appl Environ Microbiol*. 1998.[27] ● Kaur et al. *Food Microbiol*. 2017.[28] ● FDA Office of Food Safety. *Hazard Analysis and Risk-*

Based Preventive Controls for Human Food. 2016.[29]

We don't yet have direct evidence on how freezers might affect the survival of SARS-CoV-2, the virus that causes COVID-19, but other coronavirus strains appear to be stable at low and freezing temperatures for an indefinite period.[30] One study found coronavirus 229E to be stable after 25 cycles of freezing at −70°C (−94°F) for 2 hours followed by thawing at 37°C (98.6°F) in a water bath.[31] This suggests a lack of vulnerability to freezing itself. However, −70°C avoids the formation of ice crystals, which damage viruses, so freezing at temperatures that lead to the formation of ice crystals *might* work — but there is no direct evidence that it *does*.

FOR MORE INFORMATION …

If you'd like to take a deeper dive into the *fresh vs. frozen vs. canned* debate, you can read our recently updated article on this topic.

I drank too much alcohol. Is there a cure for hangovers?

Between locktails and quarantinis, alcohol — the world's favorite intoxicant — has seen a 55% jump in sales as of late (with online sales up by 243%!). As always, our advice is to drink in moderation, if at all. But if you find yourself drinking more than usual, you might be wondering if there are proven ways to prevent or treat a hangover.

> If you find yourself struggling with alcohol intake, you can find support at the US SAMHSA's National Helpline — a free, confidential, 24/7, year-round treatment referral and information service (in English and Spanish) for individuals and families facing mental and/or substance-use disorders. They can be reached at 1-800-662-HELP (4357) or TTY 1-800-487-4889.

The research around hangover prevention and mitigation, via some food or dietary supplement, has investigated a diverse array of potentially useful products. Mechanistically, they work by facilitating alcohol metabolism, preventing oxidative stress, and/or controlling inflammation. Unfortunately, study replication is practically nonexistent, and the evidence tends to be of poor quality, so we're left without clear options.[32][33][34][35]

Only six hangover preventative supplements are backed by well-designed human studies.

- *Panax ginseng* (aka Asian/Chinese/Korean ginseng)[36]
- *Eleutherococcus senticosus* (aka Siberian ginseng)[37]
- Japanese raisin tree[38]
- Prickly pear fruit (a cactus)[39]
- Korean pear[40]
- A mix of pear, green grape, and ashibata[41]

Yet none are backed by more than one trial. Other supplements claiming preventative hangover powers only have, at best, some biological plausibility.

The only proven way to prevent hangovers is to drink only in moderation. Failing this, you can reduce the severity of upcoming hangovers by making sure you drink on a full stomach, stay hydrated, and get enough quality sleep.

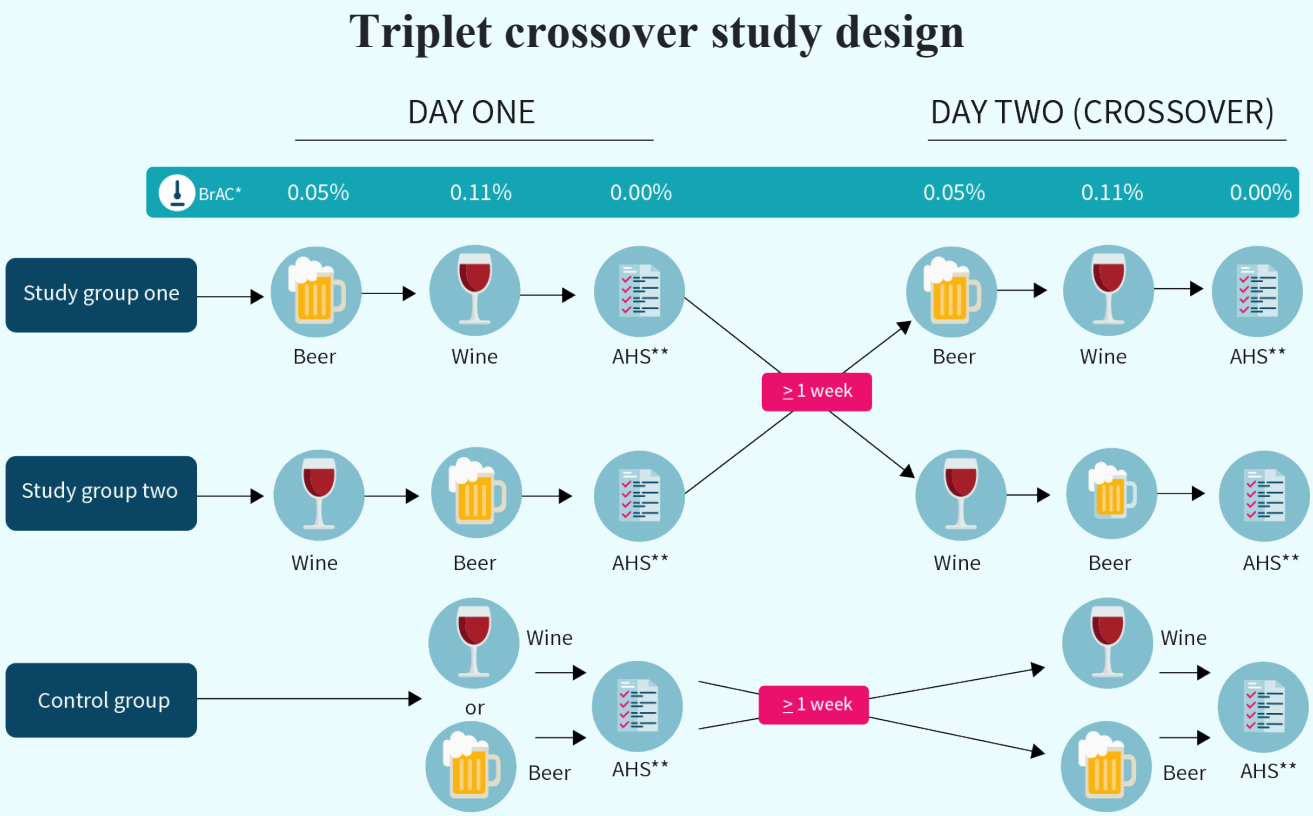
If you want to dive in more, we have a detailed article on hangovers.

🔍 Digging Deeper: Beer before wine or wine before beer?

Many of you may recognize the old aphorism: “beer before wine and you’ll feel fine”. But did you know that science has actually studied this question?

In an open-label, randomized, triple-crossover trial, 90 healthy males and females of non-Eastern Asian origin drank beer followed by wine (on one day) and wine followed by beer (on another day). On the day following each drinking bout, after *breath alcohol concentration* (BrAC) had returned to zero, hangover severity was assessed using the Acute Hangover Scale (AHS).[42]

The primary outcome assessed was hangover severity (how it differed between interventions). The secondary outcomes assessed were factors associated with hangover severity (e.g., demographics, laboratory parameters, etc.).



* Breath alcohol concentration | ** Acute hangover scale

Reference: Köchling et al. *Am J Clin Nutr*. 2019.[43]

For the primary outcome, no significant differences were found between interventions. In other words, the order of wine and beer consumption had no effect on next-day hangover severity.

For the secondary outcomes, it was found that age, sex, drinking habits, and peak BrAC did not help predict hangover severity, but that vomiting and perceived drunkenness did.

However, considering that this was the first study of its kind, the case may not yet be closed.

I'm exercising less; should I get less protein?

Possibly. If you find yourself stuck at home and sitting around more than normal, an adjustment to both your caloric and protein intakes may be warranted. (But we encourage you to find a way to incorporate exercise into your day!)

Here's a quick rundown of how much daily protein you may need in different situations (g/kg = grams of protein per kilogram of body weight). If you want to know more, check out our in-depth article on protein needs.

- If you're **sedentary**, aim for at least 1.2 g/kg (0.54 g/lb). Keep in mind that your body composition will improve more if you add consistent activity, especially resistance training, than if you merely hit a protein target.
- If you're of **healthy weight, active, and wish to keep your weight**, aim for 1.4–1.6 g/kg (0.64–0.73 g/lb). People who are trying to keep the same weight but improve their body composition (more muscle, less fat) may benefit from the higher end of the range.
- If you're of **healthy weight, active, and wish to build muscle**, aim for 1.4–2.7 g/kg (0.64–1.09 g/lb).
- If you're of **healthy weight, active, and wish to lose fat**, aim for 1.8–2.7 g/kg (0.82–1.23 g/lb), skewing toward the higher end of the range as you become leaner or if you increase your caloric deficit (by eating less or exercising more).
- If you're **overweight or obese**, aim for 1.2–1.5 g/kg (0.54–0.68 g/lb). This range, like all the others in this list, is based on your total body weight (most studies on people who are overweight or obese report their findings based on total body weight, but you'll find some calculators that determine your optimal protein intake based on your lean mass or your ideal body weight).
- If you're **pregnant**, aim for 1.66–1.77 g/kg (0.75–0.80 g/lb).
- If you're **lactating**, aim for at least 1.5 g/kg (0.68 g/lb).
- If you're **vegan or obtain most of your protein from plants**, then your protein requirements may be higher because plant-based proteins are usually inferior to animal-based proteins with regard to both bioavailability and amino acid profile.

💡 Tip: Use our Protein Intake Calculator

Your protein needs hinge on many factors — notably your weight, health goals, and level of physical activity. Based on our research and the data you input, we can calculate your optimal daily protein intake. Click on the image below to get started!

Should I use a protein powder?

Protein powders are used by more than 40% of males who regularly go to the gym and by more and more people who don't,[44] but they're not strictly necessary.

Still, they do have some advantages: they're very low in carbs and fat (i.e., their protein:calorie ratio is high), cheap (per gram of protein), easy to carry, fast to prepare, easy to drink even when you're too full to eat, and easy to digest and absorb.

Yet, you still need protein-rich whole foods for their vitamins, minerals, and essential fatty acids. As an added bonus, by affecting gut hormones and through other mechanisms, protein foods are more filling.[45]

Our advice: prioritize *eating* enough protein (from whole foods). Not that powders are bad, mind you — except when used to make up for (or even *replace*) a good diet. So think of protein powder as just a convenient way to help you meet your protein requirements.

If you want to know more about protein powders, you can check out our *Definitive Guide to Whey Protein*.

I didn't stick to my diet. Now what?

When trying to eat healthier, maintaining a flexible mindset is key. Some days will be better than others, and the *occasional* binge may happen. Make a serious effort every day, but don't crank up the pressure — an additional reason to stress out is *not* what you need right now. Moreover, an "all or nothing" mindset is all too likely to backfire, since a single failure could then suffice to make you give up ("I've already eaten this forbidden cookie, what's the difference if I finish the whole box now!").

Also, sometimes, it isn't you not sticking to the diet but the diet not sticking to you. If you try this wonderful diet that works for thousands of people, including your enthusiastic best friend, and it just isn't working for you, **don't feel bad about it!** Your efforts weren't wasted. Take stock of what worked well and what didn't:

- **Note what you most disliked** about this specific diet, then try to find an eating pattern that doesn't include those hated elements!
- **Note what you enjoyed** about this specific diet, then try to incorporate these elements into whatever diet pattern you choose to explore next.

Your end goal is to find a healthy eating pattern that you can consistently sustain for life. Jumping from one popular fad diet to the next is likely to end in frustration and feed into feelings of defeat.

Supplements

Are there any supplements known to prevent, treat, or cure COVID-19?

No, not at this time.

Are there supplements that can improve immune function?

The immune system is complex and finely balanced. No single supplement (or food) will affect every aspect of it. It does need some micronutrients to function optimally, however, and we'll discuss some of those (and link to lists of common food sources).

No specific micronutrient is going to work wonders by itself, even if you megadose; but taken together in reasonable amounts in the context of an overall healthful lifestyle, they can help (more so if you usually don't get enough).

⚠ Caution: Don't let supplements lure you into a false sense of security

If you opt to supplement with any of the micronutrients mentioned below, remember that none of them have proven efficacy against COVID-19.

Supplements are not strictly necessary, and they pale in comparison to established preventative measures.[46] **Maintaining proper hygiene should be your primary focus**, as it is the best option for reducing the risk of spreading or contracting SARS-CoV-2.

If you suspect you have COVID-19, do not rely on supplements to cure you — contact a healthcare professional.

VITAMIN C

Vitamin C is unique in that it can be either an antioxidant or a pro-oxidant, depending on physiological context. Vitamin C aids immune cells form and function, and it supports the physical barriers (such as the epithelial cells of your skin) that protect you from pathogens.[47]

Many fruits and vegetables contain good amounts of vitamin C. Hitting at least your Recommended Dietary Allowance (RDA) of 75–120 mg/day is easy, even if you don't like oranges.

Recommended Dietary Allowance (RDA) of vitamin C* (mg)

AGE	MALE	FEMALE	PREGNANT	LACTATING
0–6 months	40**	40**	—	—
7–12 months	50**	50**	—	—
1–3 years	15	15	—	—
4–8 years	25	25	—	—
9–13 years	45	45	—	—
14–18 years	75	75	80	115
>18 years	90	75	85	120

* Smokers may require 35 mg/day more than nonsmokers. | ** Adequate intake (AI)

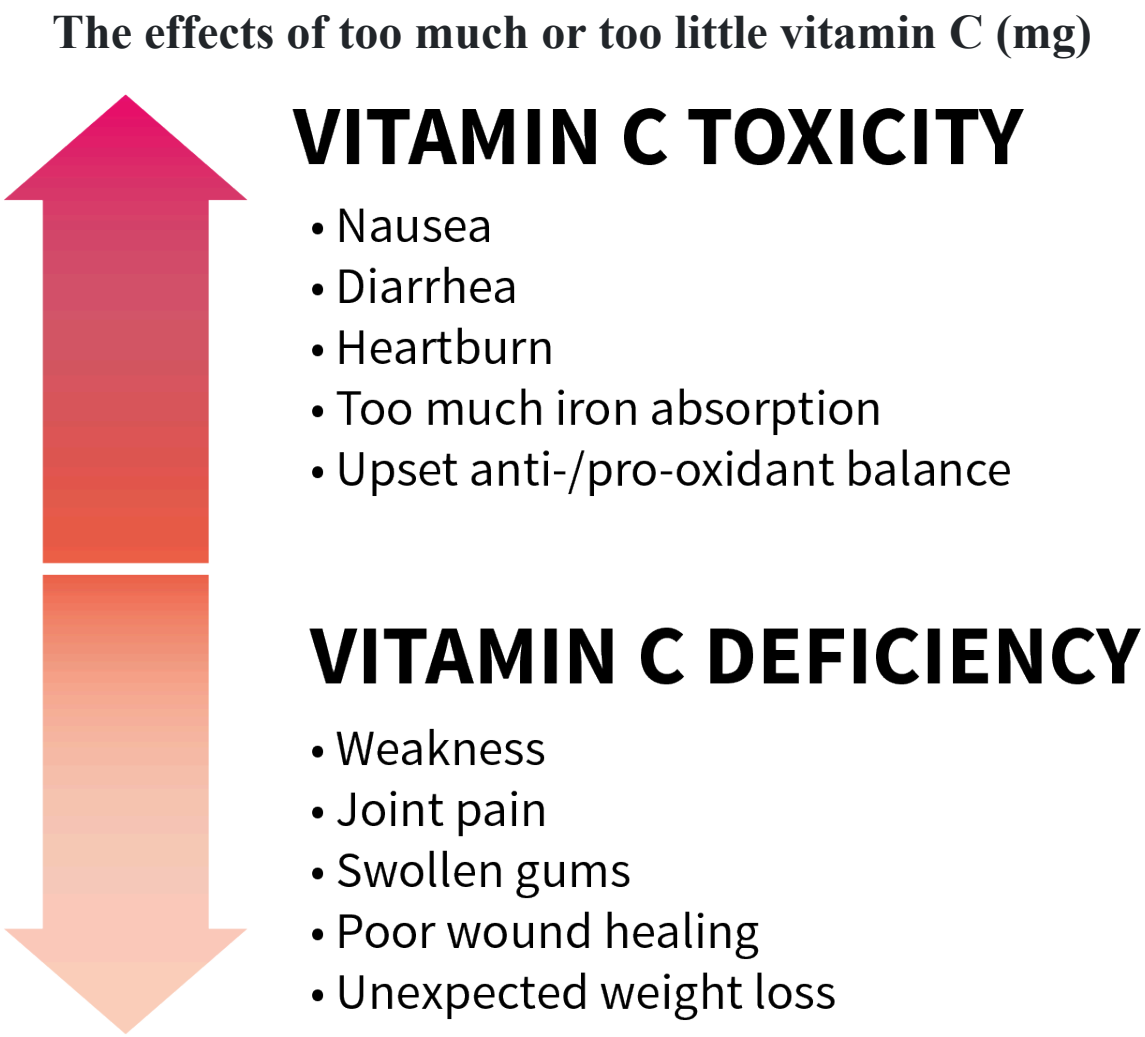
Reference: Institute of Medicine. Vitamin C (chapter 5 in *Dietary Reference Intakes for Vitamin C, Vitamin E, Selenium, and Carotenoids*. The National Academies Press. 2000.)[48]

A clinical trial of intravenous (IV) vitamin C for severe COVID-19-induced pneumonia is underway, and we will report on it when it is published. Remember, though, that a single study is preliminary evidence, so *even if* it finds some benefit, more studies will be required for confirmation before the treatment can be recommended.

Also, note that **(1)** this study was not designed to tell us if vitamin C could be used as a *preventive* measure, and **(2)** a high-dose supplement that addresses severe symptoms in hospitalized patients could very well have unintended consequences when used in healthy people.

While vitamin C deficiency is of course a problem, be wary of vitamin C megadoses as well. Doses that exceed the Tolerable Upper Intake Level (UL) of 2,000 mg/day can have adverse effects,

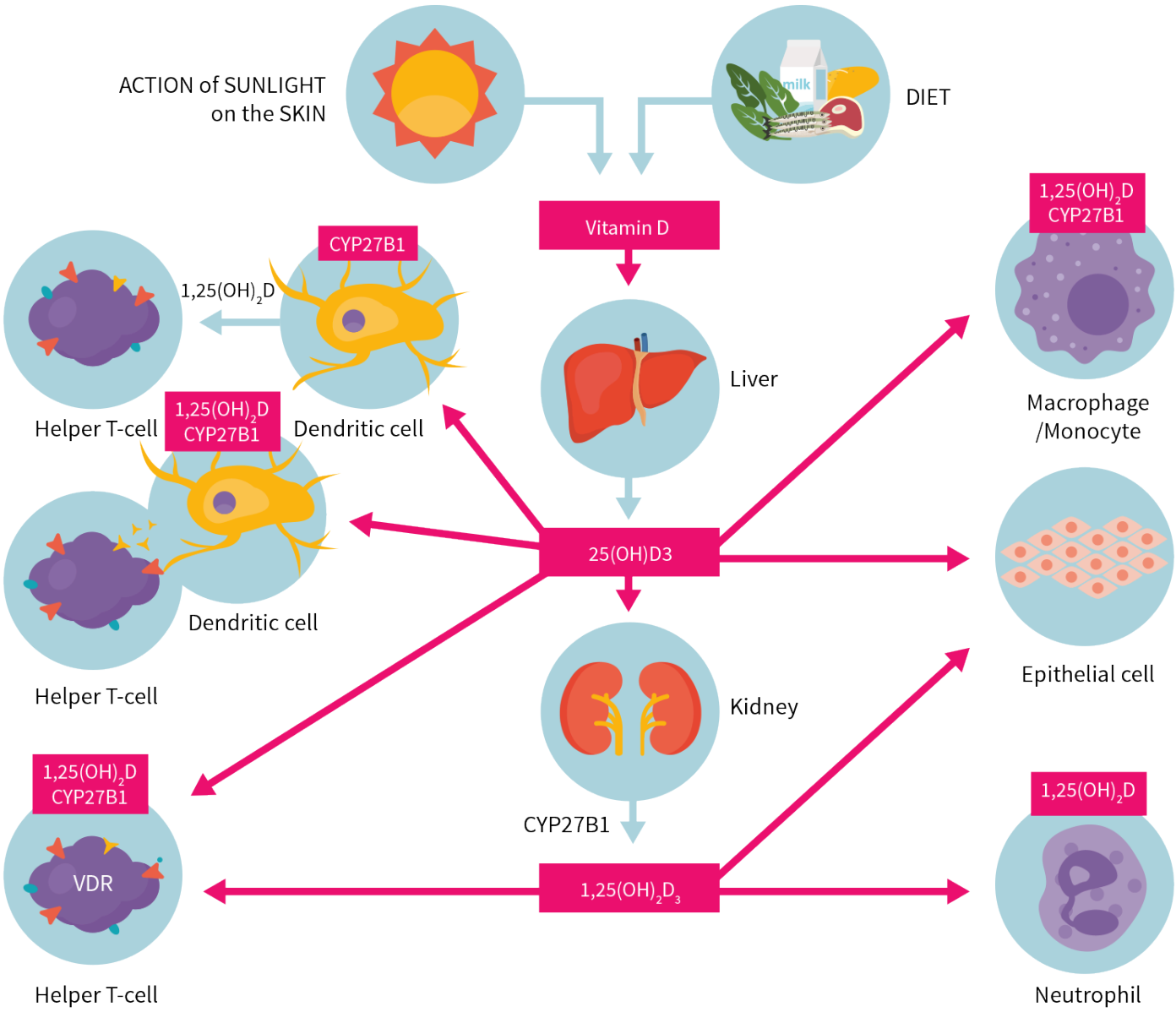
especially if taken consistently for days or weeks. The idea that “because vitamin C is a water-soluble vitamin, your body will take what it needs and pee the rest” should be put to rest.



VITAMIN D

Vitamin D receptors are found throughout the body, and vitamin D is involved in many cellular processes, including the regulation of immune cells during infections.[49][50] Unsurprisingly, low levels of vitamin D have been associated with worse immune function[51] and increased rates of acute respiratory infection.[52]

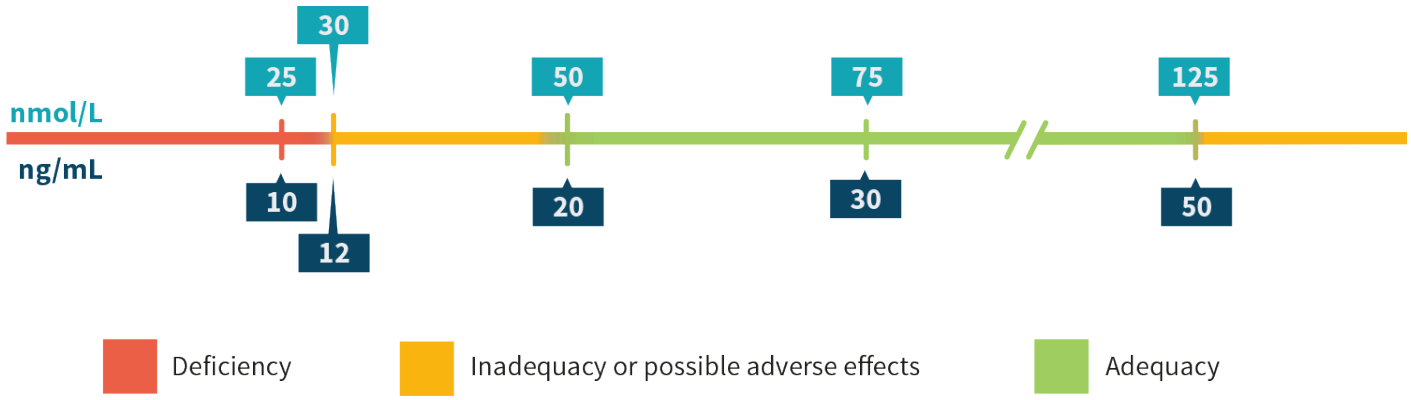
The immunomodulatory effects of vitamin D



Reference: Lemire JM. *J Steroid Biochem Mol Biol*. 1995.[53]

Oily fish is about the only food naturally rich in vitamin D, which is why vitamin D is often added to milk during manufacturing (the milk has been *fortified* with vitamin D).

Why milk? Because milk is rich in calcium, which vitamin D helps your intestines absorb. For the same reason, yogurt, cheese, and calcium-enriched breakfast cereals are also commonly fortified. Other frequently fortified foods include bread, margarine, and fruit juice (orange juice, in particular). Which foods get fortified, if any, vary by country, based on local laws and policies.



Reference: Institute of Medicine. Overview of Vitamin D (chapter 3 in *Dietary Reference Intakes for Calcium and Vitamin D*. The National Academies Press. 2011.)[54]

Ideally, before you supplement, you should first determine if you really need to by checking your current vitamin D levels — i.e., your blood levels of 25(OH)D. Alas, venturing into a doctor's office or medical facility for non-critical testing is ill-advised at the moment.

Alternatively, you could track your food intake for a week to determine your average daily vitamin D intake, then select a complementary dose to reach your Recommended Dietary Allowance (RDA).

Recommended Dietary Allowance (RDAs) for vitamin D (IU*)

AGE	MALE	FEMALE	PREGNANT	LACTATING
0–12 months	400**	400**	—	—
1–13 years	600	600	—	—
14–18 years	600	600	600	600
19–50 years	600	600	600	600
51–70 years	600	600	—	—

AGE	MALE	FEMALE	PREGNANT	LACTATING
>70 years	800	800	—	—

* 40 IU = 1 mcg | ** Adequate intake (AI)

Reference: Institute of Medicine. Overview of Vitamin D (chapter 3 in *Dietary Reference Intakes for Calcium and Vitamin D*. The National Academies Press. 2011.)[54]

If you don't know your vitamin D levels, cannot get them tested, and have not tracked your vitamin D intake but are still intent on supplementation, it would be prudent to limit yourself to a safe maintenance dose of 400 IU (10 mcg) of D_3 per day.

⚠ Caution: Supplementing with calcium and vitamin D

If you supplement with calcium daily at a dose that puts you over the (RDA) (1,000–1,300 mg/day), consider lowering your dose before adding vitamin D. Taken with a high dose of calcium, even a modest dose of vitamin D (400 IU, so 10 mcg) may increase your risk of kidney stones.

If you take a multivitamin, check to see if it contains vitamin D. It may already contain sufficient amounts for your needs. Check the calcium dose as well, to ensure it is not too high.

If you are taking a medically prescribed calcium supplement, do not make any changes without speaking to your physician.

ZINC

Zinc is a dietary mineral that can bolster the immune system and thus offer some protection against the common cold and some other viral diseases. Around one fifth of the world's population is thought to be at risk for zinc deficiency, but low zinc intake is rarer in developed countries, in part due to higher meat intake.[55][56]

Zinc lozenges may reduce symptom severity for the common cold by inhibiting viral replication at the back of your throat.[57][58][59] Their effects on COVID-19, if any, are unknown.

Effects of low, adequate, and high zinc levels

LOW INTAKE	ADEQUATE INTAKE	HIGH INTAKE
Low testosterone, impaired immune function, diarrhea	Normal testosterone, robust immune function, normal growth	Upset gastrointestinal tract, liver damage, kidney damage, copper deficiency

As a first line of defense, you should make sure your diet provides you with enough (but not too much) zinc.

As with vitamin D, ideally you should first determine if you really need to supplement by checking your current blood levels. Alas, venturing into a doctor's office or medical facility for non-critical testing is ill advised at the moment. Additionally, a blood test isn't always accurate for zinc,[60] so you may be better served by tracking your food intake for a week to determine your average daily zinc intake. You can then select a complementary dose to reach your Recommended Dietary Allowance (RDA).

Blood levels of zinc

HEALTH STATUS	µmol/L	mcg/dL
Severe deficiency	<4.6	<30
Deficiency	4.6–9.0	30–59

HEALTH STATUS	µmol/L	mcg/dL
Mild deficiency	9.2–12.7	60–83
Normal	12.9–24.3	84–159
Intoxication	>24.3	>159

Reference: Yanagisawa. *JMAJ*. 2004.[61]

If you don't know your zinc levels, cannot get them tested, and have not tracked your zinc intake but are still intent on supplementation, it would be prudent to limit yourself to a maintenance dose of 5–15 mg/day. If you have high blood sugar or insulin resistance, take 15–20 mg/day.

Zinc sulfate and **gluconate** are the most researched forms for oral supplementation and are therefore preferred.

Compared to gluconate, **oxide** is less well absorbed;[62] **citrate** seems to be absorbed equally well; and **picolinate** and **bisglycinate** may be absorbed better, but more research is needed.[63][64]

Recommended Dietary Allowance (RDA) for zinc (mg)

AGE	MALE	FEMALE	PREGNANT	LACTATING
0–6 months	2*	2*	—	—
7–12 months	3	3	—	—
1–3 years	3	3	—	—
4–8 years	5	5	—	—
9–13 years	8	8	—	—
14–18 years	11	9	12	13

AGE	MALE	FEMALE	PREGNANT	LACTATING
>18 years	11	8	11	12

* Adequate intake (AI)

Reference: Institute of Medicine. Zinc (chapter 12 in *Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc*. The National Academies Press. 2001.)[65]

What about for seniors, who are more at risk for COVID-19?

The International Society for Immunonutrition (ISIN) has published a position statement on nutrition, immunity, and COVID-19. For the elderly specifically, it recommends increasing the daily intake of the following nutrients:

- Vitamin C: 200–2,000 mg
- Vitamin D: 400–4,000 IU (10–100 mcg) if low blood levels
- Vitamin E: 134–800 mg
- Zinc: 30–220 mg

Importantly, they make the following disclaimer:

“There is no specific evidence these nutritional measures can help protect against, or even lessen the effects of, COVID-19 infection.”

Let’s add that the higher end of their zinc intake range (220 mg) far exceeds the established Tolerable Upper Intake Level (UL) of 40 mg/day.[65] Taking too much zinc for too long can be toxic and cause copper deficiency.[66][67] **Do not exceed the UL for zinc for more than 2 weeks unless under the direction and supervision of a physician.**

Are there any other supplements worth mentioning?

Not at this time. While a few other supplements — such as echinacea, garlic, and quercetin — have gained popularity on social platforms, their evidence is weak or preliminary for general immune-system support.

We examined the evidence for these and other supplements with regard to COVID-19 here.

What about taking a multivitamin?

You may be inclined to take a multivitamin as a sort of insurance against nutritional deficiencies. A multivitamin isn't strictly necessary, but it can help **if it is well formulated** and your diet is poor in some micronutrients.

When buying a multivitamin, check on the label the content of each serving, the number of pills per serving, and the number of servings per day; don't pay more for dubious bells and whistles; and stick to a company with a reputation for good manufacturing.

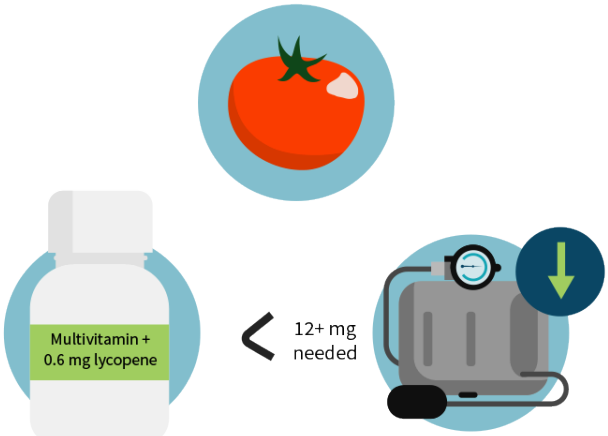
The form of the supplement can matter, too. Magnesium oxide, for instance, has very low bioavailability — not only will you absorb less elemental magnesium from it but it may also cause intestinal discomfort.

All that being said, take stock of your personal dietary situation before turning to multivitamins. You may be better off adjusting your eating habits or supplementing with specific vitamins and minerals instead.

Factors to consider when buying a multivitamin

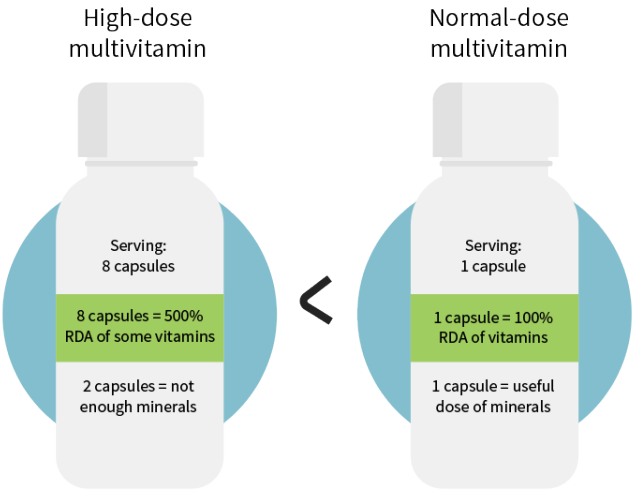
Multivitamins don't meet the RDAs for some micronutrients

Multivitamins may contain extra ingredients but in too-small doses (e.g., lycopene)

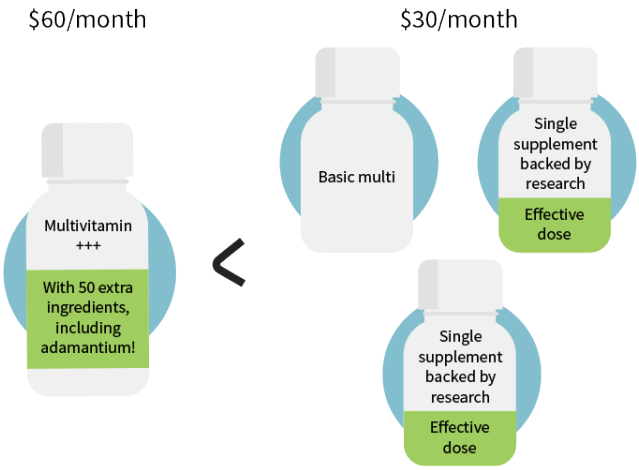


To lower systolic blood pressure

High-dose multivitamins make you choose between too much of some vitamins and not enough minerals



Don't pay extra for multivitamins that contain many superfluous, often unproven ingredients



Always buy from a reputable company with good manufacturing practices.

Exercise

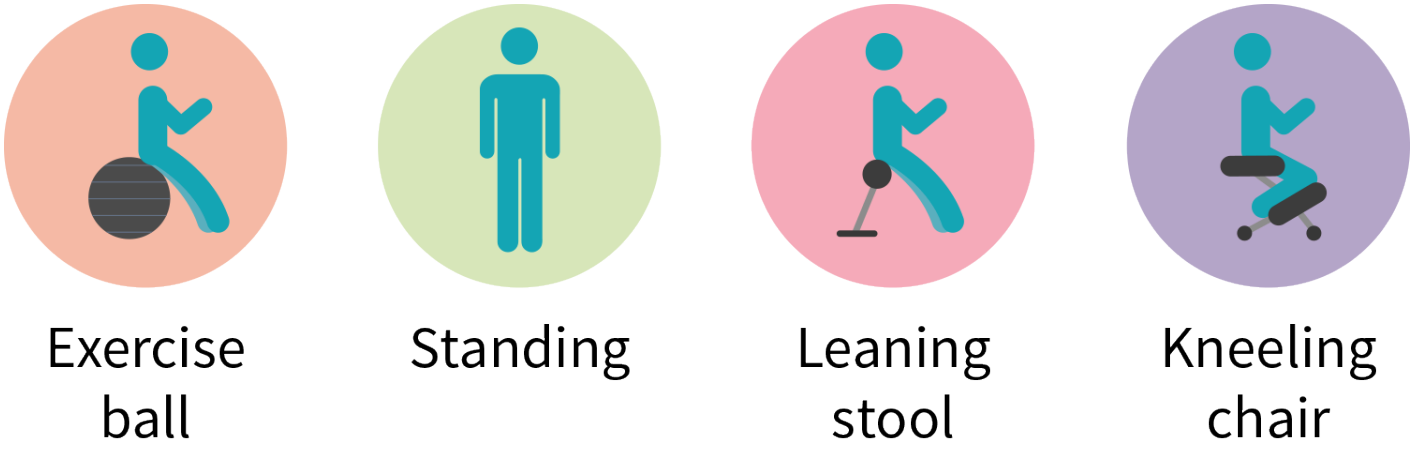
What's your #1 piece of advice?

Don't sit all the time.

Sitting all day long is one of the worst health-related habits you can have. Sitting for ≥10 hours a day has been associated with an estimated 34% higher mortality risk.[68] Long, uninterrupted stretches of sitting are especially unhealthy.[69]

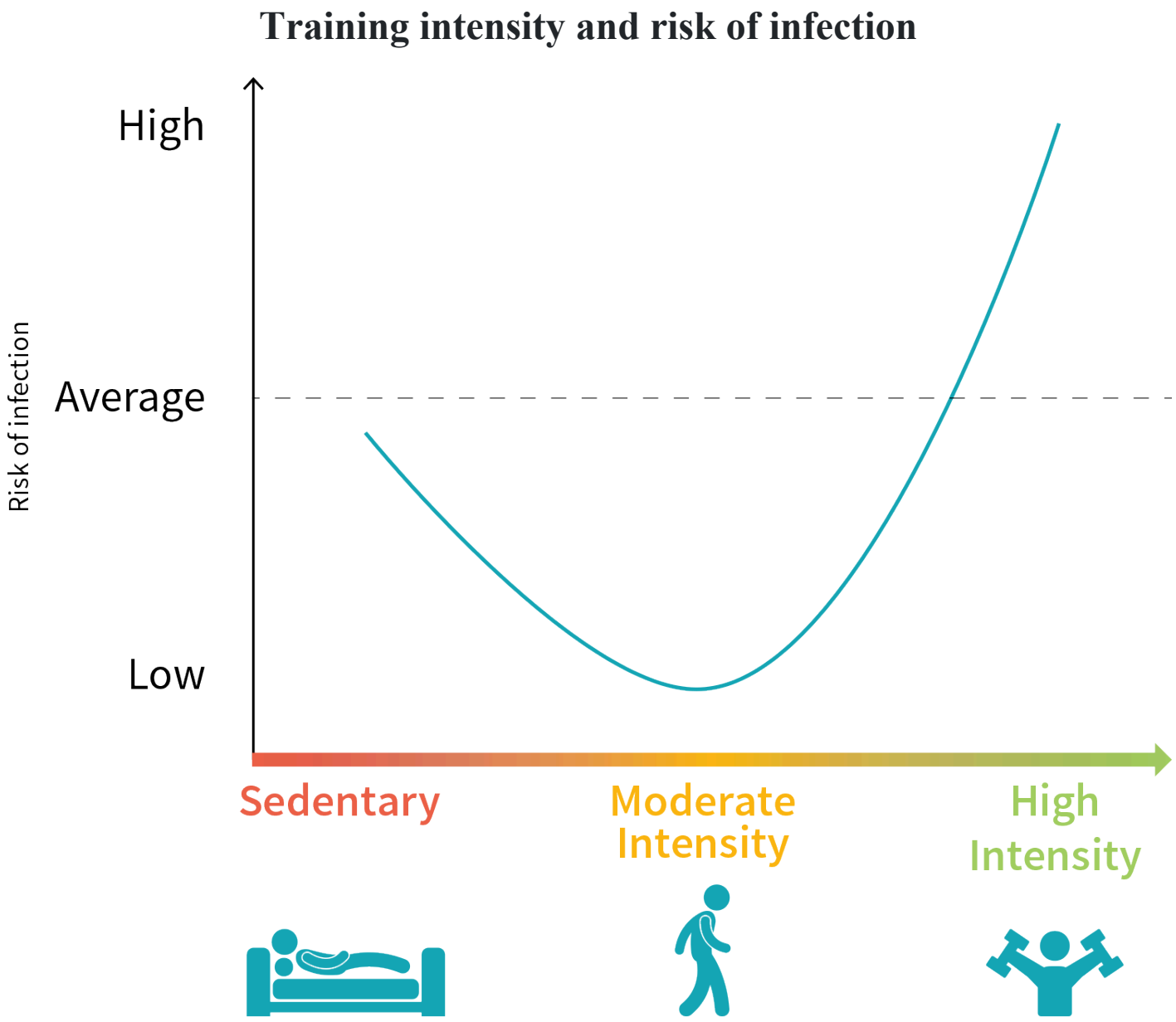
Try to get up and move for five minutes every half hour.[69][70][71][72][73] You could also try alternating between different positions, some of which are illustrated below.

Alternatives to chair-sitting



Can exercise affect my immune function?

Yes,[74] though not always positively. It is possible to exercise yourself into illness: too much physical activity can suppress your immune system, making you more susceptible to infection.[75] A happy medium will deliver better health benefits, including to your immune system.[76]



My exercise plan has gone out the window!

Life *always* intrudes. But some times more than others. You may have a deadline coming at work, or a vacation, or … ya know … a global pandemic.

The good news is: a short break from exercising isn't a big deal.[77][78]

The bad news is: once your exercise routine gets interrupted, it can be hard to resume — especially if enough time has passed that you fear your performance has decreased (nobody wants to face *that*). In such a case, willpower is key, and having a plan to get back into action will help a lot.

Of course, it would be best if you just kept exercising, in one way or another. Some activity is better than no activity — long-term consistency is the name of the game here. Many of us now have to work out at home, with limited or inexistent equipment, but there are a ton of great online resources for home workouts.

- A few quick searches around YouTube will yield a near endless supply of home-workout videos for every level of skill and fitness. Some of those workouts require minimal equipment — equipment you may already have or might be able to make — and others none, save for a little space.
- For a workout throwback, YouTube is also filled with retro exercise videos.
- The UK National Health Service's 10-minute workouts and the *New York Times*'s 6-minute and high-intensity 7-minute workouts require either no or minimal equipment.
- The Wirecutter sorts 22 websites and apps with free workout content by type: general fitness, specialty workouts, yoga, and a kids section.
- Similarly, Nutrition.gov lists exercise examples and videos.

How can I prevent muscle loss?

Forced into a more sedentary lifestyle, do you fear for your hard-earned gains? Fortunately, to preserve your muscles, you don't need to stimulate and feed them *to the same extent* as when you try to make them bigger. The following guidelines focus on muscle preservation.

EAT ENOUGH CALORIES

If preserving muscle mass is your priority, you want to eat *at least* as many calories as your burn.

Eating as many calories as your burn means following a **eu**caloric diet, which is also called "maintenance diet" because your weight won't change much; but you can still gain or lose fat or muscle, depending on how much exercise and protein you get.

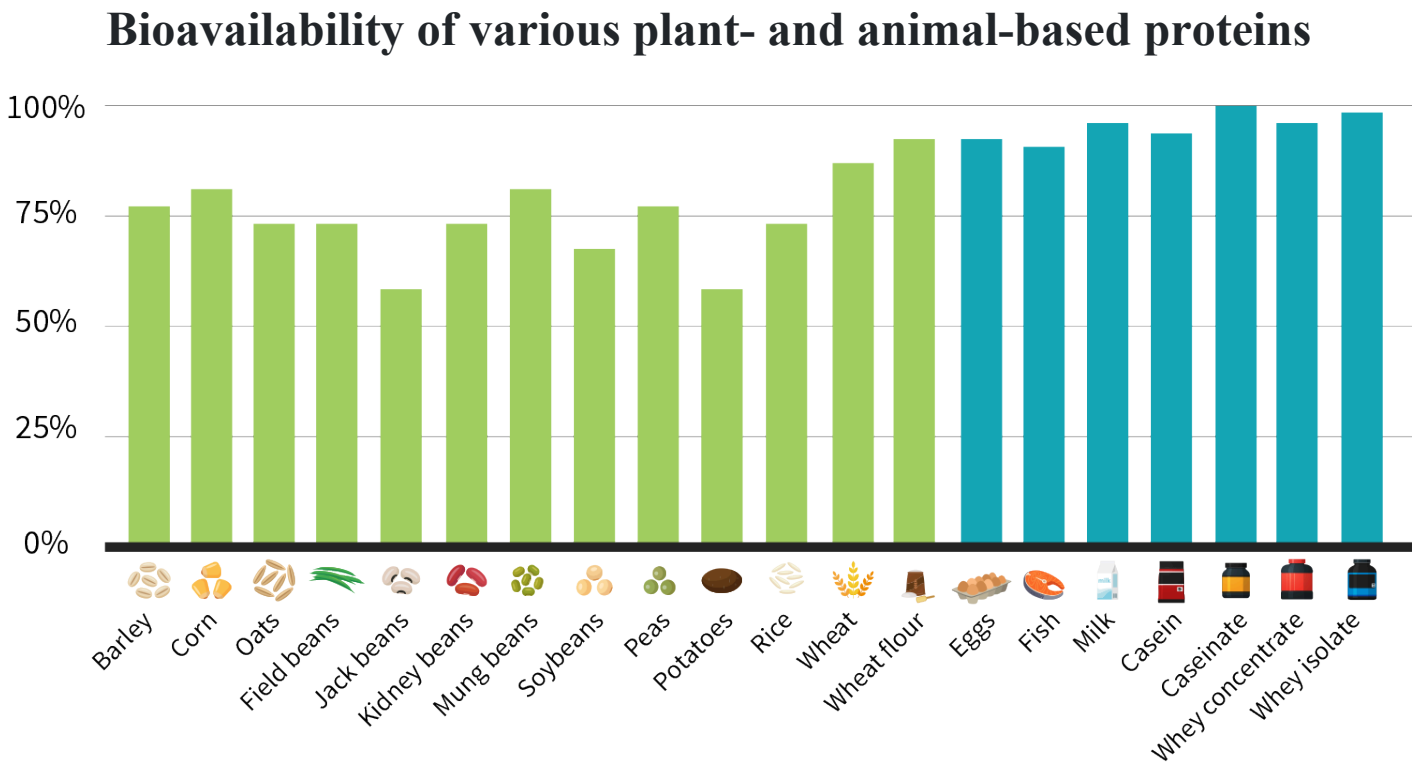
If building muscle is your priority, you'll want to eat *more* calories than your burn (you'll want your diet to be **hyper**caloric). Note, however, that most people need only some 200 kcal/day above maintenance to maximize muscle growth.[79] If you eat too much above maintenance, you risk accumulating too much fat, which you'll later have to shed. If you want most of your weight gain to be in the form of muscle, not fat, you'll need to get enough protein and engage in resistance training — even if, during a lockdown, the resistance may be limited to that provided by your own weight.

To calculate your caloric needs, see here.

EAT ENOUGH (HIGH-QUALITY) PROTEIN DAILY

Several rating systems have been developed over the years to rank proteins based on two criteria: bioavailability and *essential amino acid* (EAA) composition.

Animal-based proteins and plant-based protein powders are highly bioavailable: they're digested and absorbed with more than 90% efficiency, compared to 60–80% for the protein in plant-based whole foods.



Reference: FAO. *Dietary protein quality evaluation in human nutrition*. 2013.

Whey protein is high in the nine EAAs, notably leucine (the most anabolic amino acid). Whey protein is 52% EAAs and 13.6% leucine. By contrast, protein from other animal sources (including milk and casein) is roughly 40–49% EAAs and 8.1–10.9% leucine, while protein from plant sources is typically lower.[80]

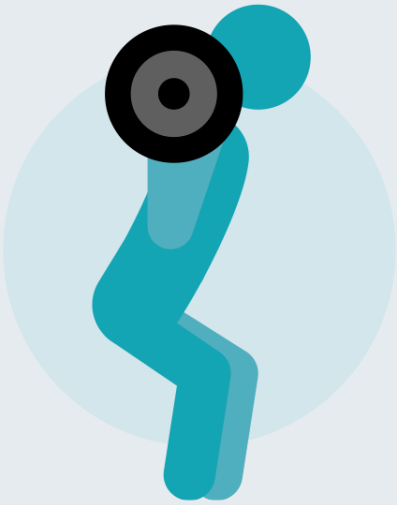
A protein is called complete when, proportionally to its overall amino-acid content, it has enough of each EAA. The main advantage of animal proteins is that most are complete.

You don't need each protein you ingest to be complete, however; in a balanced diet, incomplete proteins, rich and poor in different amino acids, can complement one another (especially when eaten at about the same time). But a protein's rating can be one of the criteria you consider when selecting a protein source.

ENGAGE IN RESISTANCE TRAINING REGULARLY

Include resistance training in your exercise regimen. To preserve your muscle mass, and even more to increase it, you need *at least* two resistance workouts a week.[81] Remember, the exercise volume you need to **preserve** muscle is less than the exercise volume you need to **grow** muscle.[82]

A basic resistance training program

CONVENTIONAL RESISTANCE TRAINING	BODYWEIGHT RESISTANCE TRAINING
	
Exercise **at least** twice a week.	Exercise **at least** twice a week.
Train your **whole body**.	Train your **whole body**.
Progressively increase the weight, reps, and/or sets.	Progressively increase the reps and/or sets.
For each exercise, use 30–70% of the maximum weight with which you're able to perform at least one rep.	Perform 1–3 sets of as many reps as possible.
Perform 2–3 sets of 6–15 reps or 1–2 sets of as many reps as possible (at least 14).	

Adapted from Mcleod et al. *Front Physiol*. 2019.[83]

TAKE IT EASY ON CARDIO

Endurance training can increase blood flow to the muscles, thus speeding the delivery of the nutrients they need for recovery, and it can limit fat gain on a hypercaloric diet by keeping fat-burning pathways active. But too much cardio can also hinder muscle growth by burning up too many calories, cutting into recovery, and interfering with muscle-building signaling pathways.

If your primary goal is muscle building, take it easy on the cardio.[84] Otherwise, cardio can help

you create a caloric deficit (for weight loss) or balance (for weight maintenance).

SUPPLEMENT SMARTLY

Most important is to make sure you get enough high-quality protein, primarily from whole foods, but a few supplements can also help, notably creatine and caffeine.

Creatine can help regenerate *adenosine triphosphate* (ATP), the main energy carrier in your cells, whereas caffeine can increase power output. So they both have an indirect anabolic effect: they won't directly build muscle, but they'll allow you to exercise harder, thus building more muscle.

If you find yourself a bit jittery after taking caffeine, the amino acid theanine can tame the overexcitability associated with caffeine without reducing caffeine's stimulatory effect.

If you want to know more about performance supplements — including doses, combinations, and timing — check out our *Muscle Gain & Exercise Performance* Supplement Guide.

GET ENOUGH SLEEP

Lack of sleep impairs exercise performance in the short and long term.[85][86] Part of the reason it impairs exercise performance in the long term is that it promotes inflammation, thus delaying muscle repair and increasing the risk of injury.[87]

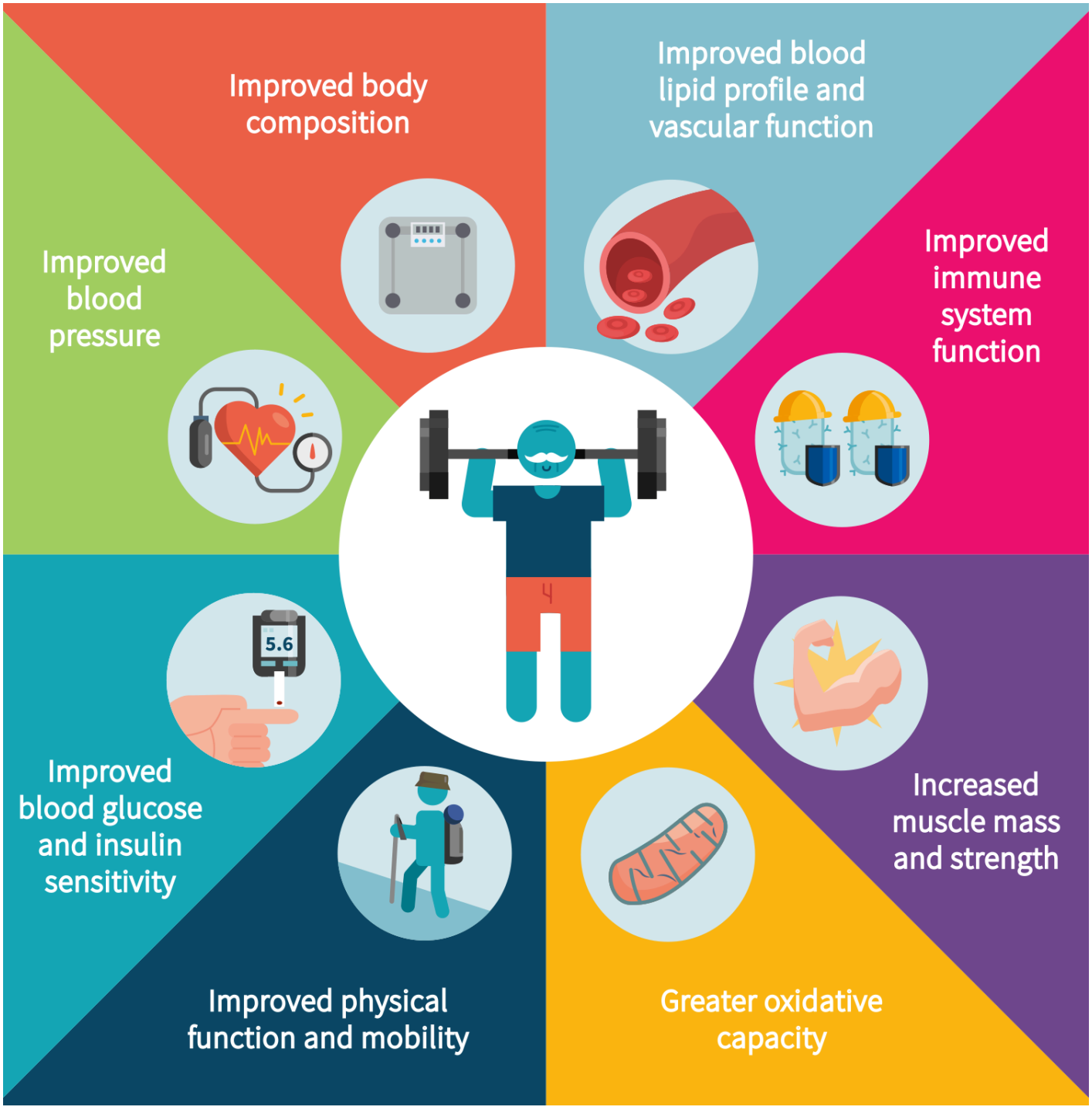
Since lack of sleep delays muscle repair, it also hinders muscle gain. While we can't say that more muscle mass is built during sleep than during waking hours, we do know that lack of sleep can inhibit the creation of new muscle fibers,[86] possibly because of the aforementioned increase in inflammation, possibly because of a drop in testosterone levels, and possibly because of an increase in fatigue decreasing the quality of the workouts.[88][89][90][91][92]

And to add insult to injury, lack of sleep can also leads to fat gain.[93]

Exercise benefits: beyond the immune system

Exercise is good for more than your immune function. While many of you are (understandably) focusing on improving your immune health, know that maintaining a regular exercise routine can benefit your overall health in myriad other ways — such as improving your mood!

The influence of resistance training on the risk of chronic disease



Adapted from Mcleod et al. *Front Physiol*. 2019.[83]

Sleep

Does sleep affect my immune function?

Sleep, or the lack thereof, affects just about every aspect of your health, and sleep quality is as important as sleep duration. Getting enough quality sleep,[94] with or without the help of supplements, is necessary for optimal immune function.

Deep sleep provides a time for your body to replenish its immune system. Regular sleep disturbances end up impairing your body's ability to mount a full response against invaders.[95][96][97]

How much sleep should I get?

How much sleep *you* need may take some trial-and-error testing to see what works best. But if you're looking for some general guidelines, check out the recommendations from the National Sleep Foundation below.[94]

Recommended hours of sleep

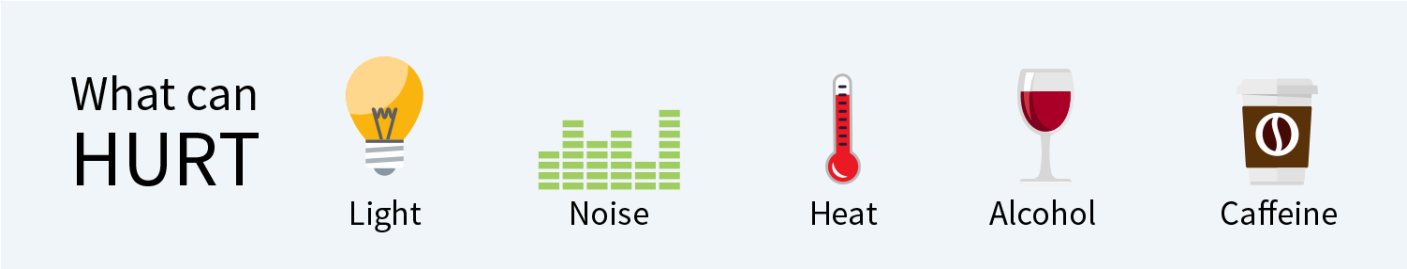
AGE	RECOMMENDED	MAY BE APPROPRIATE	NOT RECOMMENDED
0–3 months	14–17	11–19	<11 or >19
4–11 months	12–15	10–18	<10 or >18
1–2 years	11–14	9–16	<9 or >16
3–5 years	10–13	8–14	<8 or >14
6–13 years	9–11	7–12	<7 or >12
14–17 years	8–10	7–11	<7 or >11
18–25 years	7–9	6–11	<6 or >11

AGE	RECOMMENDED	MAY BE APPROPRIATE	NOT RECOMMENDED
26–64 years	7–9	6–10	<6 or >10
≥65 years	7–8	5–9	<5 or >9

Adapted from Hirshkowitz. *Sleep Health*. 2015.[94]

What's bad for my sleep?

Sleep has five main enemies: **light**, **noise**, **heat**, **alcohol**, and **caffeine**.



LIGHT

To fall asleep faster, avoid bright lights and blue lights within the two hours before bedtime; if necessary, use blue-light-blocking glasses or a program that reduces the blue light from the screen of your computer, tablet, or phone. To sleep better, make your bedroom dark; if you can't, consider using a sleep mask.

NOISE

Noise can drastically reduce the quality of your sleep. If you can't make your bedroom silent, use earplugs (unless you need to hear your baby calling). Some people appreciate white noise or soothing music, especially when it masks more irritating sounds, such as traffic noise; but keep the volume low.

HEAT

Ambient heat can delay sleep onset and reduce sleep quality. Conversely, a comfortably cool room can reduce the time it takes you to fall asleep and enter the deeper stages of sleep.

ALCOHOL

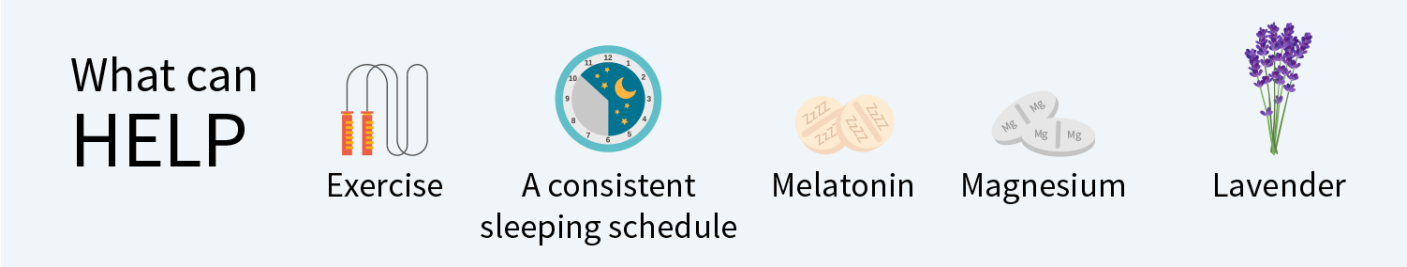
Don't use alcohol as a sleep aid — it might help you relax, but it will impair the quality of your sleep. You may find it beneficial to avoid alcohol after dinner.

CAFFEINE

Even if it doesn't prevent you from falling asleep, caffeine can still impair the quality of your sleep. Avoid it within the six hours before bedtime.

What's good for my sleep?

Exercise and **a consistent sleeping schedule** are your main allies, but some supplements may also be of use — notably **melatonin**, **magnesium**, and **lavender**.



EXERCISE

Physical exercise during the day leads to better sleep at night.[98] Nightly exercise is better than no exercise, with regard to sleep quality and other health factors, but it can disrupt the circadian rhythm of some people.

Since physical exercise leads to better sleep and better sleep leads to better exercise performance, exercise and sleep make for quite a nice synergistic relationship, don't ya think?

A CONSISTENT SCHEDULE

Going to bed at around the same time every night can help you to both fall asleep faster and sleep better. A bedtime routine can prime your body for sleep — of course, it should be more soothing (e.g., meditation) than stimulating (e.g., computer games).

MELATONIN

If you have trouble falling asleep, you could try taking melatonin near bedtime. Oral melatonin can also improve the quality of your sleep and help you fight jet lag, but it won't allow you to change your sleeping schedule at will.

MAGNESIUM

Lack of magnesium can impair sleep. Multiple types of magnesium supplements exist, but magnesium-rich foods are numerous and can fit all kinds of diets; they should be your first option. If your body has enough magnesium already, supplementing with more won't benefit your sleep.

Recommended Dietary Allowance (RDA) for magnesium (mg)

AGE	MALE	FEMALE	PREGNANT	LACTATING
0–6 months	30*	30*	—	—
7–12 months	75*	75*	—	—
1–3 years	80	80	—	—
4–8 years	130	130	—	—
9–13 years	240	240	—	—
14–18 years	410	360	400	360
19–30 years	400	310	350	310
31–50 years	420	320	360	320
>51 years	420	320	—	—

* Adequate intake (AI)

Reference: Institute of Medicine. Magnesium (chapter 6 of *Dietary Reference Intakes for Calcium, Phosphorus, Magnesium, Vitamin D, and Fluoride*. The National Academies Press. 1997.)[99]

LAVENDER

If stress or anxiety hurts your sleep, then lavender may help.

However, **if you're male and your breasts become tender, stop using lavender oil immediately**. The Endocrine Society and the National Institutes of Health (NIH) warn that lavender

oil has estrogenic properties that may cause gynecomastia (enlarged breasts in males).

If you are interested in the science behind sleep supplements, our *Sleep* Supplement Guide dives into the research.

How do I set up a sleep schedule?

If you're looking to improve your sleep, try following these three steps:

1. Schedule enough time for sleep each day. Yes, we do mean *schedule*. Think of this as a very important meeting with your body that you *cannot* afford to miss.

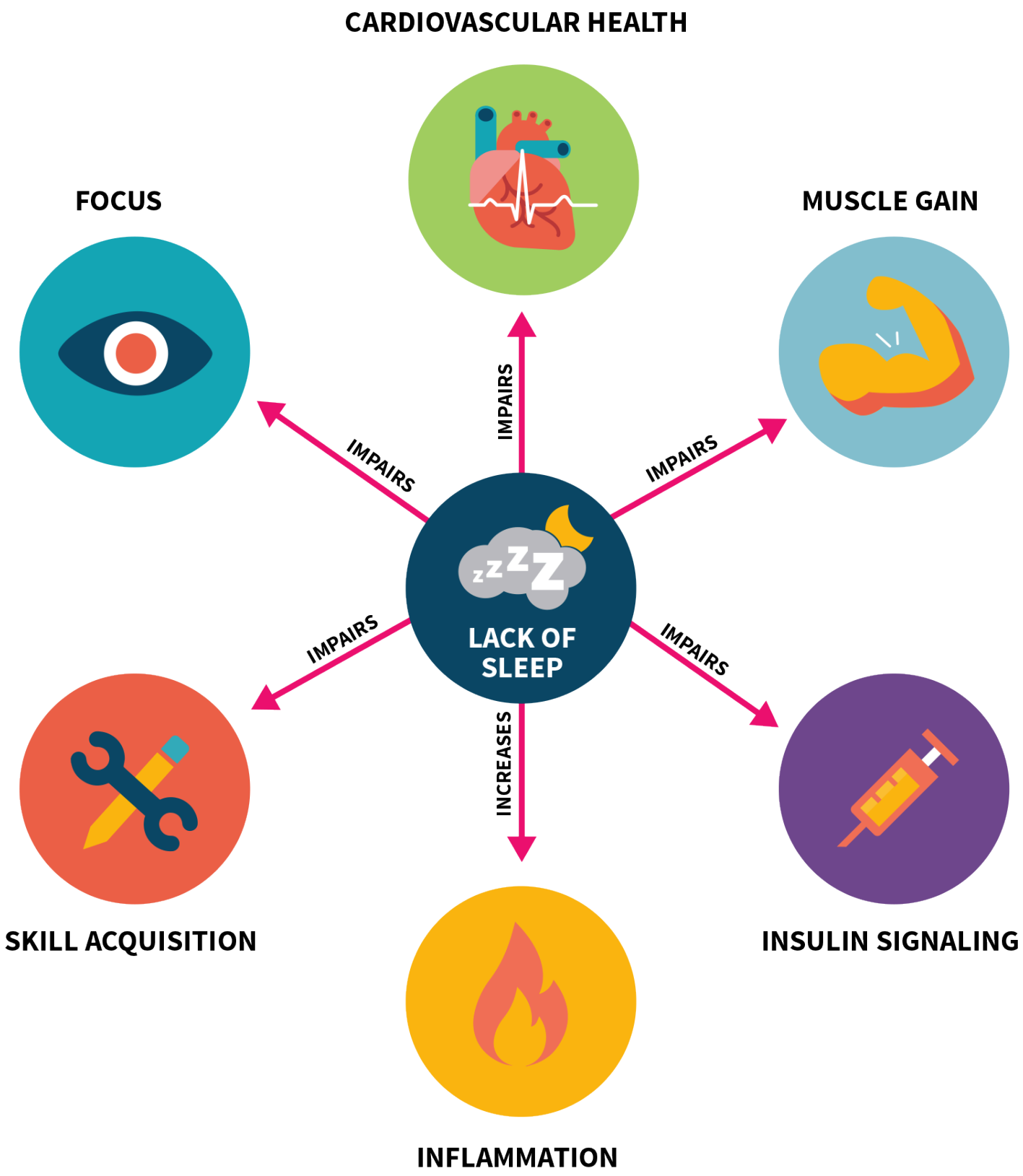
2. Try going to bed at the same time every day, even during the weekend, as this habit both reduces the time it takes to fall asleep and improves sleep quality.

3. For at least one hour before bed, relax and avoid sources of blue light. No emails, text messaging, and no overly stimulating television shows or games. Look for something that allows you to tune out and turn your brain off.

Good sleep can bestow a host of benefits

Like exercise, adequate sleep helps ensure that all your body systems are operating optimally.

How lack of sleep affects you



Dealing With Information Overload

I just want clear evidence summaries

If you just want the actionable, accessible, cut-to-the-chase information, check out some of these continually updated COVID-19 resources:

WEBSITES AND ARTICLES

- A good Q&A article.
- An introductory article and a more in-depth article exploring the epidemiology, virology, clinical features, diagnosis, and prevention of COVID-19..
- A brief Q&A article, an introductory article, and a more in-depth article on COVID-19 during pregnancy, delivery, and after childbirth.
- An introductory article and a more in-depth article on COVID-19 and children.
- An in-depth article on COVID-19 and people with kidney disease or high blood pressure.
- An in-depth article on COVID-19 and cancer care.
- An in-depth article on the management of patients who are critically ill due to COVID-19.
- Johns Hopkins University and the World Health Organization (WHO) provide daily reports on coronavirus research, disease spread, and government responses. Johns Hopkins also collates links to articles from various news media.

VIDEOS

- Public Health On Call is a video playlist from the Johns Hopkins Bloomberg School of Public Health that provides a daily series on issues related to COVID-19.
- STAT provides very brief explainer videos (under 2 minutes each) on a semi-regular basis.
- Vox has a series of longer explainer videos released semi-regularly.
- Healthcare Triage, hosted by Dr. Aaron E. Carroll, MD, MS, posts semi-regular explainer and Q&A videos.
- MedCram offers near-daily video updates from Dr. Roger Seheult, MD, with highly detailed science and reports on recent studies.
- Osmosis hosts daily reports by Dr. Rishi Desai, MD, MPH. It also has a playlist with detailed medical information related to COVID-19.

PODCASTS

- Public Health On Call is the audio-only version of the aforementioned video playlist from the Johns Hopkins Bloomberg School of Public Health.

- Raise the Line is hosted by Dr. Rishi Desai, MD, MPH, and Shiv Gaglani, MBA, of Osmosis. It explores ways to increase healthcare capacity during COVID-19.
- Sawbones is hosted by Dr. Sydnee McElroy, MD, FMC, and her comedian husband Justin. Recently, it has been diving into current COVID-19 developments. It provides some historical medical context.
- Science Vs is hosted by journalist Wendy Zukerman, who holds degrees in both law and biomedical science. Recently, it has been interviewing multiple experts on COVID-19 topics.
- Social Distance is hosted by Dr. James Hamblin, MD, MPH. He talks to friends and colleagues and answers their concerns and questions about the pandemic.

ADDITIONAL RESOURCES

- If you're looking for more resources, we compiled some on this page.

I want to fact-check something I read

A lot of people out there are sharing their "logical" or "common-sense" or even "science-based" take on COVID-19. On social media, coronavirus myths seem to spread even faster than the virus itself. We've tackled some of those myths in this post and list some credible resources here to help you separate the signal from the noise.

9 common coronavirus myths

MYTH 1: If you have COVID-19, you can tell.

A dry cough is more common with COVID-19, but a wet cough and a runny nose are possible.[100][101][102][103] There is no easy way to distinguish between COVID-19, the flu, and the common cold.

You may have heard that if you can hold your breath for more than 10 seconds without coughing or discomfort, you don't have COVID-19 — this is untrue.

MYTH 2: You're contagious only if you have symptoms.

When infected, most people don't show any symptoms for 2–14 days. Some never do. Your asymptomatic friends could infect you; you could infect your friends without knowing you harbor

MYTH 2: You're contagious only if you have symptoms.

the virus.

Respect physical distancing. Procuring food and medical services is vital, but most direct interactions are not.

MYTH 3: Staying at home is necessary only if you're sick.

Avoiding other people will protect both you and them, whether or not you feel sick. Remember: when infected, people don't show any symptoms for 2–14 days.

Minimize interactions and maintain physical distance. Visits to the elderly and immunocompromised are especially inadvisable.

MYTH 4: COVID-19 is less dangerous than the seasonal flu.

Current evidence points to the reverse.

COVID-19 has higher transmissibility and a much higher case fatality rate.

And unlike with the seasonal flu, there isn't any immunity established in humans, nor are there standardized treatments.

MYTH 5: COVID-19 is dangerous only for older people.

Less risk ≠ no risk. In children, symptoms tend to be mild, but as in adults, underlying health issues can make them more severe.

In China, the youngest person to die was 10 months old.[104] The second youngest, 14 years old.[105] In the US, three children died between February 12 and April 2, 2020.[106] Also, we don't know what the long-term effects will be. And of course, young people can transmit the disease to older people, without necessarily displaying any symptoms themselves.

MYTH 6: The virus will disappear when it gets warmer.

We don't know for sure, but don't hold your breath: as of mid-March, some countries with confirmed cases have already had days above 27°C (80°F).

Warm and humid weather may slow the virus[107] — but isn't likely to stop it.

MYTH 7: A vaccine will be available soon.

Scientists in several countries are working on a vaccine, but it'll take many months before one is considered both effective and safe enough to be made widely available.

MYTH 8: Supplements have proven efficacy against COVID-19.

While some supplements show a small benefit for some respiratory infections, extrapolating that evidence to COVID-19 is highly risky, as can be taking supplements in very high doses.

In vitro evidence for the novel coronavirus doesn't mean a supplement is effective in actual living humans. Supplements may also give some people a false sense of security.

MYTH 9: It's time to buy months of supplies.

Having supplies for two or three weeks makes sense. Buying enough of everything to last for months, however, is inducing panic by creating shortages and making it tougher for the most at-risk people to get what they need.

Additionally, here's a simple checklist you should use before you take anyone's advice or claim at face value:

Are they selling you a cure or a prophylactic?

If they're selling you a cure or a prophylactic (i.e., a preventive treatment), they have a monetary incentive in cherry-picking and bending the research to promote their cure. For instance, they may promote a supplement "shown to destroy the coronavirus" and link you to a study showing that zinc

ionophores block the replication of SARS-CoV (the virus that causes SARS) in cell culture.

That's so far from using zinc supplements against SARS-CoV-2 (the virus that causes COVID-19), that doesn't even qualify as preliminary evidence. (On the other hand, we know that taking too much zinc can **hurt** you.)

Also, please don't trust the usual "This is the cure for X that doctors don't want you to know!" We all want to believe a miracle cure already exists, but if it did, the vast majority of doctors would gladly share it.

Can you track and trust their sources?

Coronavirus posts on social media easily get, well, viral. And since 1,000,000 people shared this advice, it must be good, right? Well, no. "I read it on the Internet, so it must be true!" is an old joke that shouldn't work anymore, but alas it still represents our reality.

Don't trust something just because you read it somewhere or because a good, well-intentioned friend sent it to you. Check the source of your source; find the original source, and make sure you can trust *them*.

Check the original source **directly**. Recently, claims that drinking hot water and exposure to the sun could cure COVID-19 were attributed to the United Nations International Children's Emergency Fund (UNICEF). That was fake. It is problematic that so many people reposted the "information" without even a quick check on the UNICEF page on COVID-19.

Do they have education and experience in the field?

Education and experience are necessary for expertise. Nobody knows all there is to know about COVID-19, but experts such as infectious-disease specialists have a better grasp of advanced concepts in virology, epidemiology, and other pertinent fields compared to politicians and social-media influencers.

Do they show an understanding of consequences?

Good sources are precise and cautious with their language. Imprecise language, implying fact when only hypotheses have been put forth, and not anticipating consequences are hallmarks of bad thinking. For instance, the advice to go to the hospital as soon as you have symptoms is well meaning, but it has for consequence to overload hospitals and make the situation worse. Instead, follow the instructions provided by your state or country.

I want to find the latest COVID-19 research

If you want to keep track of all the **published** COVID-19 research, you can visit LitCovid, created by the US National Institutes of Health (NIH).

If you want to keep track of all the **preprint** COVID-19 research, you have a few resources at your disposal, but keep in mind that unrefereed preprints are papers that have not yet undergone peer review.

- medRxiv.org
- Preprints.org
- ResearchSquare.com

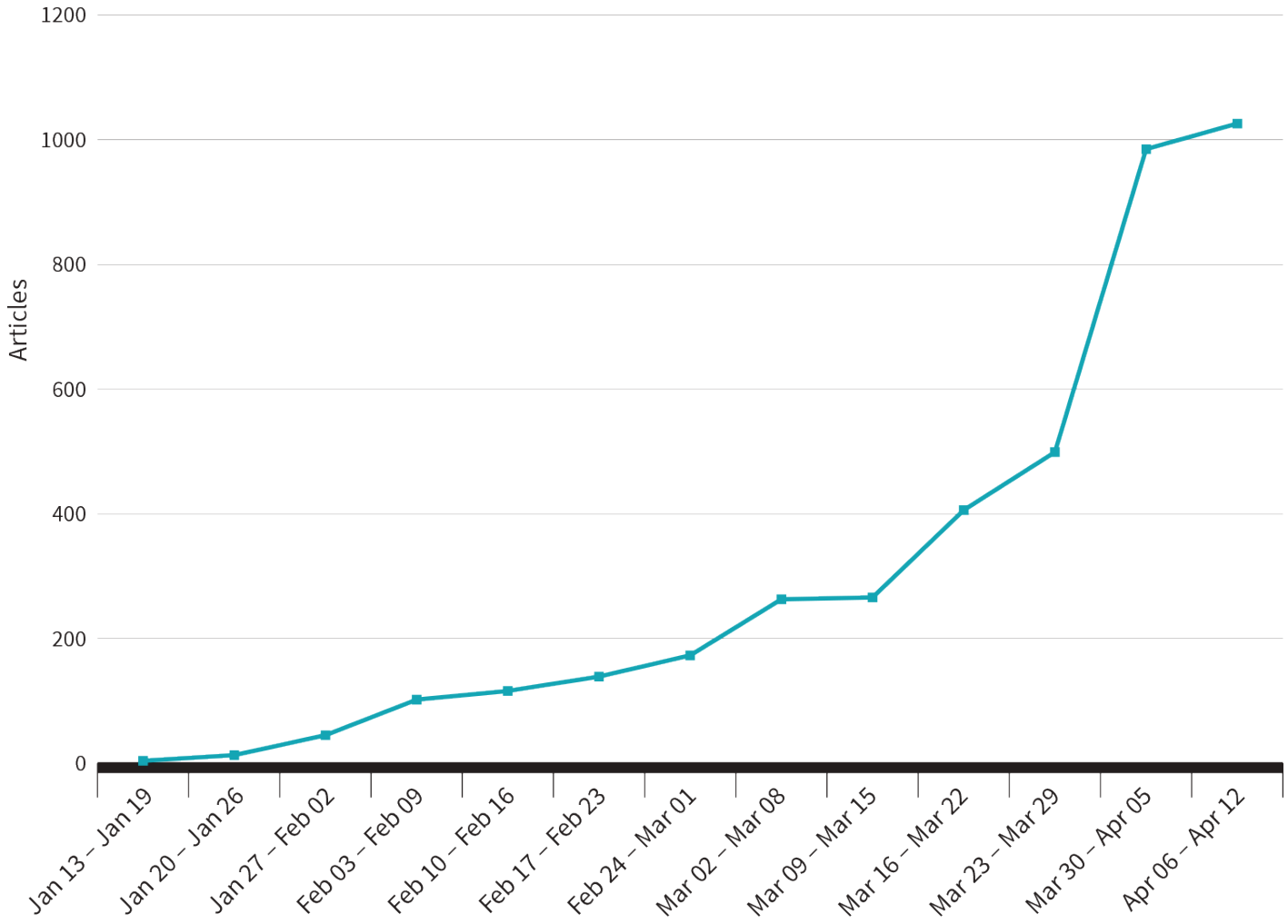
If you want to keep track of all the **ongoing** COVID-19 research, you can access two continuously updated, searchable databases of planned, in process, and completed studies:

- COVID-evidence is maintained by the Department of Clinical Research at the University of Basel and the Meta-Research Innovation Center at Stanford.
- COVID-19 TrialsTracker is maintained by the Centre for Evidence-Based Medicine at the University of Oxford.

I want help interpreting all these studies

The number of studies investigating COVID-19 has (predictably) exploded. As more and better data come in, authorities may shift the recommendations given to the public in ways that may seem to contradict earlier advice.

Scientific articles on COVID-19 published per week in 2020*



* Does not include preprints (aka non-peer-reviewed articles)

Reference: NIH LitCovid

The ever-changing landscape of COVID-19 research may leave you feeling a bit overwhelmed or even frustrated. Understanding the evidence can provide a certain sense of control and may ease some of your worries. To aid in this endeavour, Examine has another free guide available:

This guide was designed to help you better understand the ins-and-outs of studies, with an emphasis on experimental research. If you invest some effort in learning the nuts and bolts of research, you can reap the dividends for years.

We also have a continually updated page of research information on COVID-19.

Mental Health

Talk it out

If you find yourself needing to talk to someone, other than your family, friends, pets, or plants (we won't judge), check out some of the resources below. These organizations can also assist you if you wish to help someone else, and many can now be reached through online chat or text messaging, in addition to phone calls. Don't hesitate to reach out to them.

You can also use the resources provided by the National Institute of Mental Health and the BeThe1To campaign.

FOR PEOPLE WHO JUST NEED TO TALK

- 7 Cups
- Crisis Text Line
- IMALIVE
- NYC Well
- QuarantineChat
- SAMHSA's Disaster Distress Helpline

FOR PEOPLE WHO HAVE SUICIDAL THOUGHTS

- Crisis Text Line
- National Suicide Prevention Lifeline
- Wikipedia's list of suicide hotlines

FOR PEOPLE DEALING WITH SUBSTANCE ABUSE

- SAMHSA's National Helpline

FOR PEOPLE DEALING WITH SEXUAL ABUSE OR ASSAULT

- RAINN National Sexual Assault Hotline

FOR PEOPLE DEALING WITH DOMESTIC VIOLENCE

- National Domestic Violence Hotline

FOR MEMBERS OF THE LGBT+ OR QUEER COMMUNITY

- LGBT National Help Center
- The Trevor Project
- Trans Lifeline

FOR MEMBERS OF THE MILITARY

- Veterans Crisis Line

FOR TEENAGERS

- Teen Line

I can't stop checking the news. Help!

You might wake up each morning with a mild sense of panic. What happened to the world in the past few hours? What new COVID-19 evidence has come out?! Have we found a cure yet?!? Has a date been announced for the end of the lockdown?!?!

Do not read about the coronavirus 24/7! That's not a good strategy for physical or mental health.

Put yourself on a Coronavirus Information Diet (CID™). Select the resources and websites you want to check regularly and decide in advance how many times you can read them in a day and how long you can spend reading them each time. Then stop. Even if you're in the middle of an article, *stop*.

The next step would be to take a 24-hour "vacation" away from coronavirus news. In fact, avoid the news entirely. Find something else to occupy yourself, so you won't fret: read an engrossing novel, watch a funny movie, or lose yourself in a video game (a scientist is saying it's good for you, for a change!). And if you find that you do feel better, more relaxed, after this virus-free day, then plan for one such day (or more) on a weekly basis.

(If you're worried about missing something *very* important during your "vacation", ask a friend to notify you should any drastic developments occur.)

If you need help finding sources of accurate information, we've compiled some for you in this guide

and on this page.

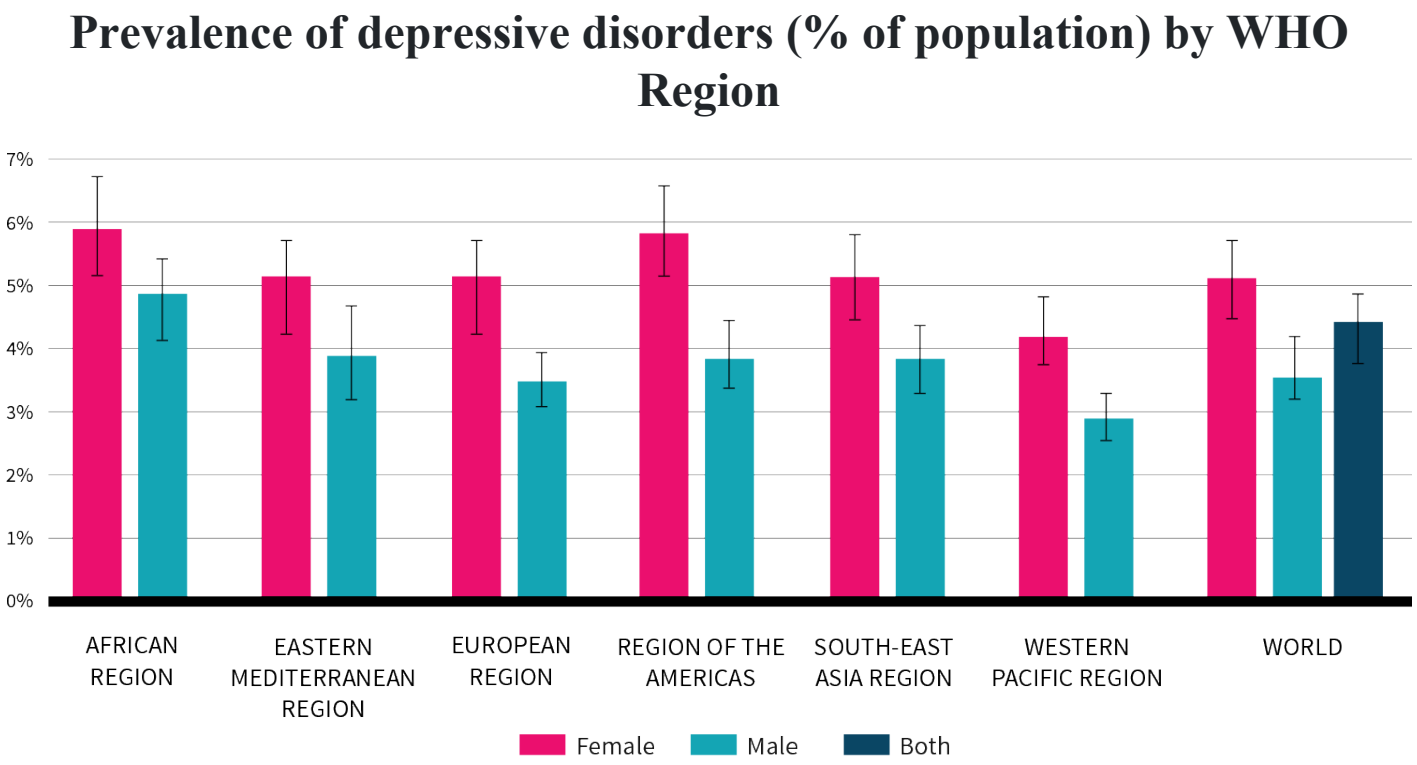
Mood and depression

It's normal to feel down *sometimes*

From time to time, everyone feels down for some reason, such as losing a job or a loved one. Just

being cooped up can take its toll on your mood; it can even become disabling, preventing you from performing normal, everyday tasks. And when this soured mood turns very severe or persists for two weeks or longer, it can be classified as a mood disorder.

The World Health Organization (WHO) estimates that the number of people living with depression increased by nearly 20% from 2005 to 2015.[108] Although estimated to be more common in females[109] and adults of working age, depressive symptoms are frequently found in both sexes and all age groups.[110]



Reference: World Health Organization. *Depression and Other Common Mental Disorders: Global Health Estimates*. 2017. [108]

Despite depression being a common ailment, it can be incredibly difficult to talk about, both because of the stigma around mental health[111] and because it may not be taken as seriously as ailments that can be objectively assessed, such as viral infections or diabetes.

⚠ Caution: Don't self-diagnose

Diagnosing mental disorders is very, very complicated. So please, don't try to self-diagnose. If you suspect that you're under too much stress or that you suffer from anxiety or

depression, get the opinion of a mental-health professional or your primary-care provider.

Are there useful therapies?

Yes. There's evidence notably for a family of therapies called *cognitive-behavioral therapy* (CBT). While "simple" behavioral therapies require that you change your behavior, CBT requires that you *also* change your thoughts — if you have irrational, harmful thoughts, CBT trains you to replace them with more rational thoughts based on the evidence.

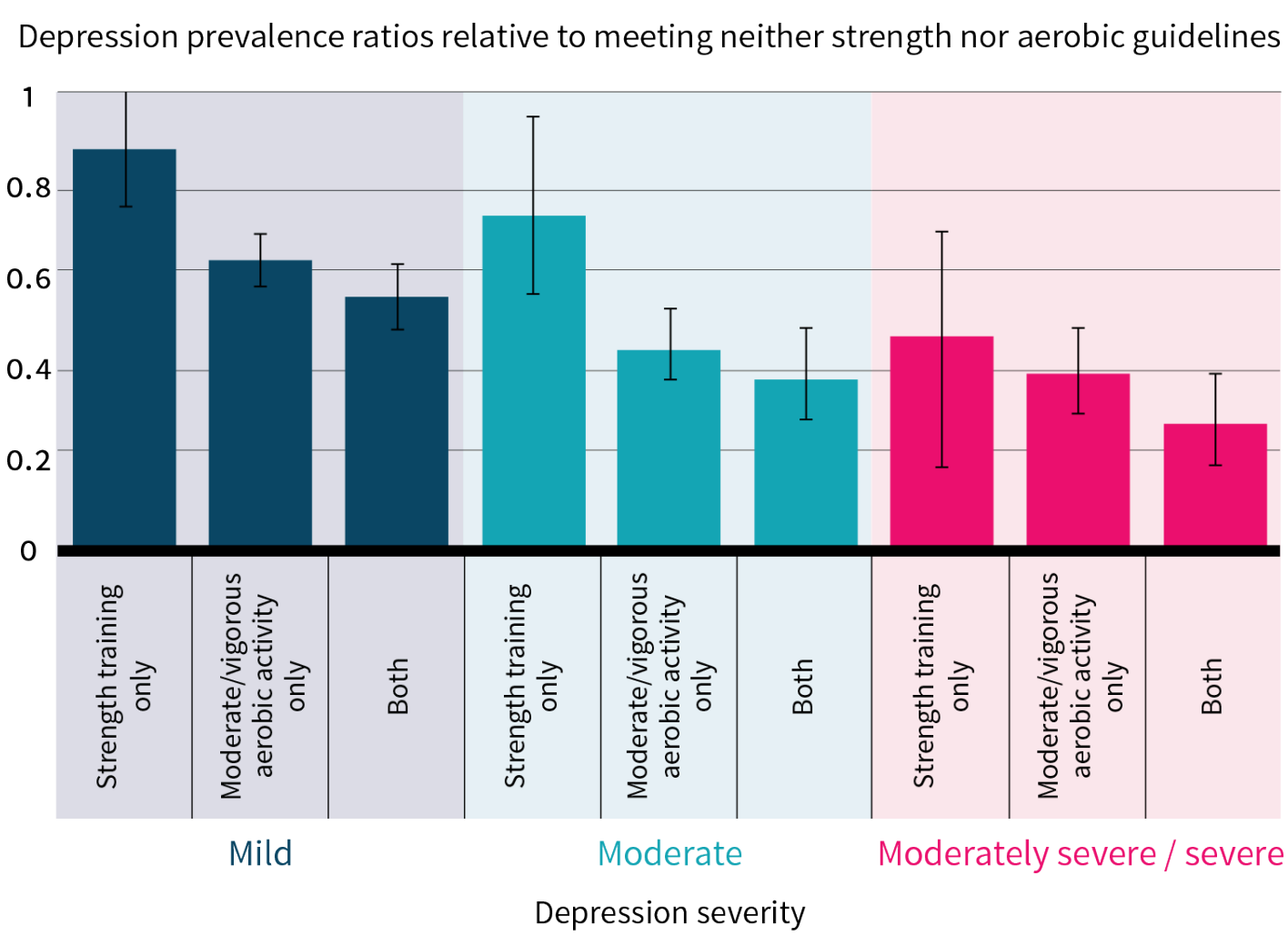
Unfortunately, CBT can be inaccessible to many people due to cost and lack of information.[112] Moreover, while it works well on average,[113][114] its efficacy varies greatly between individuals (for depression as well as for other mood disorders).[114][115]

Importantly, some evidence points to the combination of CBT with antidepressant medicines being more efficacious than either treatment alone.[113][116][117]

Can exercise help?

Meeting the CDC guidelines for resistance training and/or aerobic exercise[118] appears to help ward off depression, according to a study of nearly 18,000 self-reports,[119] whose findings are illustrated by the graph below.

CDC activity guidelines: effect on depression



Reference: Bennie et al. *Prev Med*. 2019.[119]

Despite the considerable number of individual studies on this topic, further work is needed to refine future recommendations. As we saw earlier, too much exercise can impair the immune system,[75] and the possibility exists that too much exercise could also hurt your mood. Balance, as always, is key.

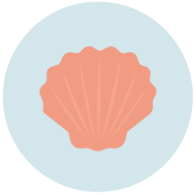
Is there a diet that can lessen depression?

The best way to answer this question would be through head-to-head trials or a network meta-analysis. Unfortunately, this information isn't available yet. However, trends appear to emerge across dietary intervention trials investigating changes in depressive symptoms, and several of those trends align with a Mediterranean-type diet pattern: mood seems to benefit from a diet rich in fruits, vegetables, nuts, seeds, and fish[120] and suffer from a diet rich in processed meats, refined carbohydrates, and other highly processed foods.[121]

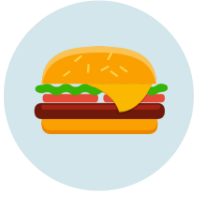
In other words, there is some (mostly observational) evidence that certain food groups, illustrated below, may affect the risk of depression.

Foods associated with depressive risk

FOODS THAT MAY DECREASE THE RISK OF DEPRESSION

Plant-based foods	Fruits  Veggies  Green tea  Soy products 
Food that are nutrient dense, high in fiber, and low in saturated and trans fats	Legumes  Whole grains  Nuts 
Fish and omega-3 fatty acids	Fish (especially oily fish)  Shellfish 

FOODS THAT MAY INCREASE THE RISK OF DEPRESSION

Pro-inflammatory foods, rich in calories and poor in micronutrients	Fast food   Sweets  

References: Opie et al. *Nutr Neurosci*. 2017.[122] ● Phillips et al. *Clin Nutr*. 2018.[121]

Is mood affected by specific foods or nutrients?

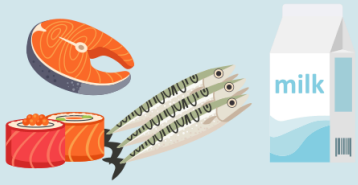
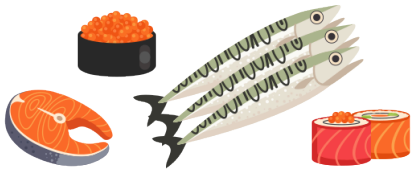
There are three main ways by which food can affect your mood:

- Delicious food can make you instantly happier. But seldom for long.
- A healthy diet can support your fitness and health goals. Being active and healthy is better for your mood than being sedentary and unhealthy.
- Certain nutrients in healthy foods can benefit your mood, and not just in the short term.

There is decent evidence that at least five nutrients help modulating mood: magnesium, zinc, vitamin D, omega-3 fatty acids, and tryptophan. The table below shows foods rich in those nutrients.

Note that you are more likely to see your mood improve from eating these foods if you have been consistently underconsuming these nutrients. However, if these whole foods displace processed foods in your diet, the end result may also be a happier you.

Some foods rich in 5 nutrients that could lift your mood

Nutrient	Foods	Effects
MAGNESIUM	 Nuts (almond, cashew ...), spinach, soy, avocado, oats, etc.	Might mitigate anxiety in deficient individuals (the supporting evidence is weak).
ZINC	 Meat (beef, chicken, pork ...), seafood (lobster, oyster ...), nuts (almond, cashew ...), milk, etc.	May mitigate depression in deficient individuals and reinforce the antidepressant effect of other foods and supplements.
VITAMIN D_3	 Mostly oily fish (salmon, sardine, tuna ...) and fortified milk.	May mitigate depression, especially in people who don't get enough sun.
EPA, DHA	 Mostly oily fish (salmon, sardine, tuna ...).	EPA and, to a lesser extent, DHA may alleviate clinical depression, especially when used to complement standard antidepressant therapies.
TRYPTOPHAN	 Seeds (chia, sesame, sunflower ...), nuts (almond, cashew, pistachio ...), meat (beef, chicken, lamb, pork ...), fish (salmon, tuna ...), milk, eggs, oats, etc.	Gets converted into serotonin, a neurotransmitter known to affect mood.

Are there useful supplements?

A large 2019 umbrella review of 33 meta-analyses of randomized controlled trials (10,951 people total) looked at the effects of non-herbal supplements (vitamins, minerals, fatty acids, amino acids …) on mental health in general and depression in particular.[123]

We're just going to summarize the results of the paper's stronger findings — the evidence for supplements that have "sufficient data" (which the authors defined as results from meta-analyses involving more than 400 people). The larger a meta-analysis, the less susceptible its estimates are to random error. However, as you can see in the "authors' notes" column of the table below, even relatively large meta-analyses may not always be reliable.

Effects of supplements on depression

NUTRIENT	EFFECT SIZE	MAY BE EFFECTIVE FOR …	DOSING	AUTHORS' NOTES
Magnesium	None	n/a	n/a	While a large meta-analysis exists, it has critical flaws.
Vitamin B_9	Small	Adjunctive therapy for major depressive disorder	Methylfolate: 15 mg/day	The highest effects are seen in high-dose trials for treatment-resistant depression, but those trials are too few to constitute strong evidence.
Vitamin D	Moderate	Adjunctive therapy for major depressive disorder	D_3: 50,000 IU (1,250 mcg) per week	Confidence in this finding is low.
N-acetylcysteine	Small to moderate	Various depressive diagnoses	2 g/day	Confidence in this finding is low.

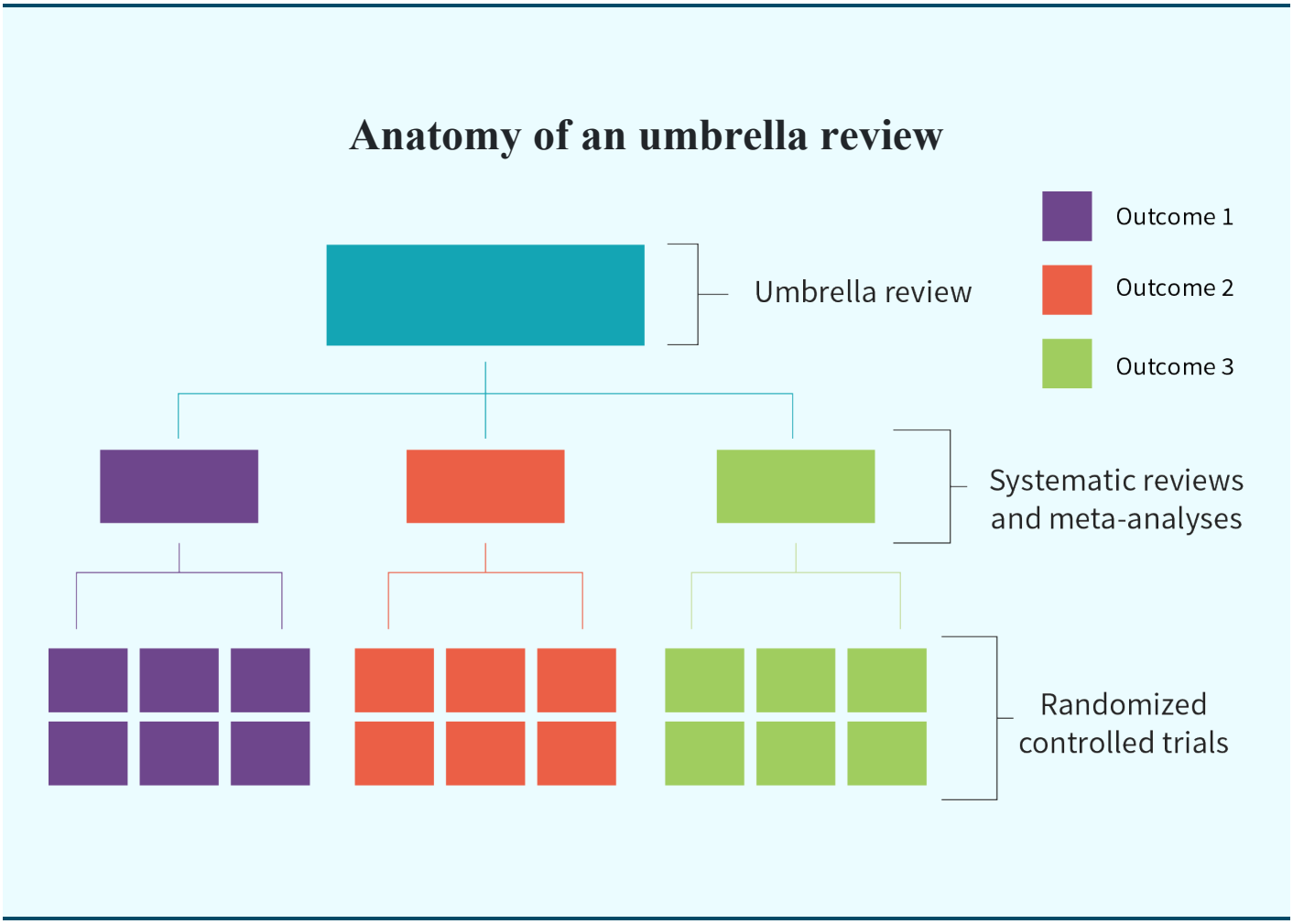
NUTRIENT	EFFECT SIZE	MAY BE EFFECTIVE FOR …	DOSING	AUTHORS' NOTES
Omega-3s	Small to moderate	Clinical depression + Adjunctive to SSRI medicines for the treatment ofmajor depressive disorder	EPA: 2.2 g/ day (from formulations with >50% EPA)	There is no clear benefit from DHA-predominant formulas.

Reference: Firth et al. *World Psychiatry*. 2019.[123]

If you want to know more about supplements — including doses, combinations, and timing — check out our *Mood & Depression* Supplement Guide.

🔍 Digging Deeper: What is an umbrella review?

Umbrella reviews compile meta-analyses, systematic reviews, and narrative reviews, all three of which compile primary research studies. Umbrella reviews are particularly useful for assessing the overall evidence for the various effects of a given intervention.



Stress and anxiety

Some anxiety is normal

Anxiety and fear are normal parts of the human experience and not necessarily a problem. The fifth edition of the American Psychological Association's *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-5*) lays out some specific criteria for when fear and anxiety can be labelled as mental disorders.[124]

WHEN THEY'RE PERSISTENT

As a rule of thumb, fear and anxiety qualify as disorders if they last six months or more without a clear stressor. For instance, being anxious about an upcoming speech is probably normal; but being constantly anxious about appearing in public, even when there is no event planned, suggests a disorder.

WHEN THEY'RE OUT OF PROPORTION TO THE ACTUAL THREAT

For example, being afraid when stuck in an elevator can be considered normal; but refusing to ever get into an elevator is out of proportion to the actual risk.

DSM-5 is careful to note that since people with anxiety disorders are prone to overestimate the threat level of situations they dread, whether a threat is "out of proportion" should be determined by an experienced mental-health clinician. It also notes that the clinician should take culture and context into account when determining whether the fear or anxiety is actually out of proportion; there's no one-size-fits-all rule.

⚠ Caution: Don't self-diagnose

Diagnosing mental disorders is very, very complicated. So please, don't try to self-diagnose. If you suspect that you're under too much stress or that you suffer from anxiety or depression, get the opinion of a mental-health professional or your primary-care provider.

Anxiety isn't one disorder — it's many

The types of anxiety disorders *DSM-5* recognizes are summarized in the table below.[124] You'll notice one recurrent criterion: to rank as a disorder, the fear, anxiety, or avoidance behavior should interfere with living a normal life. After all, if something's not getting in the way of living the life you want, then it's not really a problem, is it?

Anxiety disorders as classified by *DSM-5*

DISORDER	DEFINITION
Separation anxiety	High levels of fear and anxiety caused by separation from home or a particular person. Usually develops in childhood.
Selective mutism	Failure to speak in specific social situations where speaking is expected. Usually develops in childhood. Often accompanied by social anxiety disorder.
Specific phobia	Life-disrupting fear, anxiety, or avoidance behavior caused by a specific situation or object.

DISORDER	DEFINITION
Social anxiety disorder	Life-disrupting fear, anxiety, or avoidance behavior caused by social situations.
Panic disorder	Frequent, regular panic attacks, and a fear of future attacks alongside avoidance behavior.
Agoraphobia	Strong fear in situations where escape feels difficult, such as crowded enclosed places or wide open spaces. Often accompanied by dysfunctional avoidance of those situations.
Generalized anxiety disorder	Excessive, disruptive fear or worry about a wide range of subjects.
Substance-, medication-, and disease-related disorders	Anxiety that can be specifically traced to another disease, a medicine, or substance withdrawal.
Other or unspecified disorders	Life-disrupting, troubling anxiety that doesn't fall into any of the categories above.

Reference: *Diagnostic and Statistical Manual of Mental Disorders*, fifth edition. American Psychiatric Association. 2013.[124]

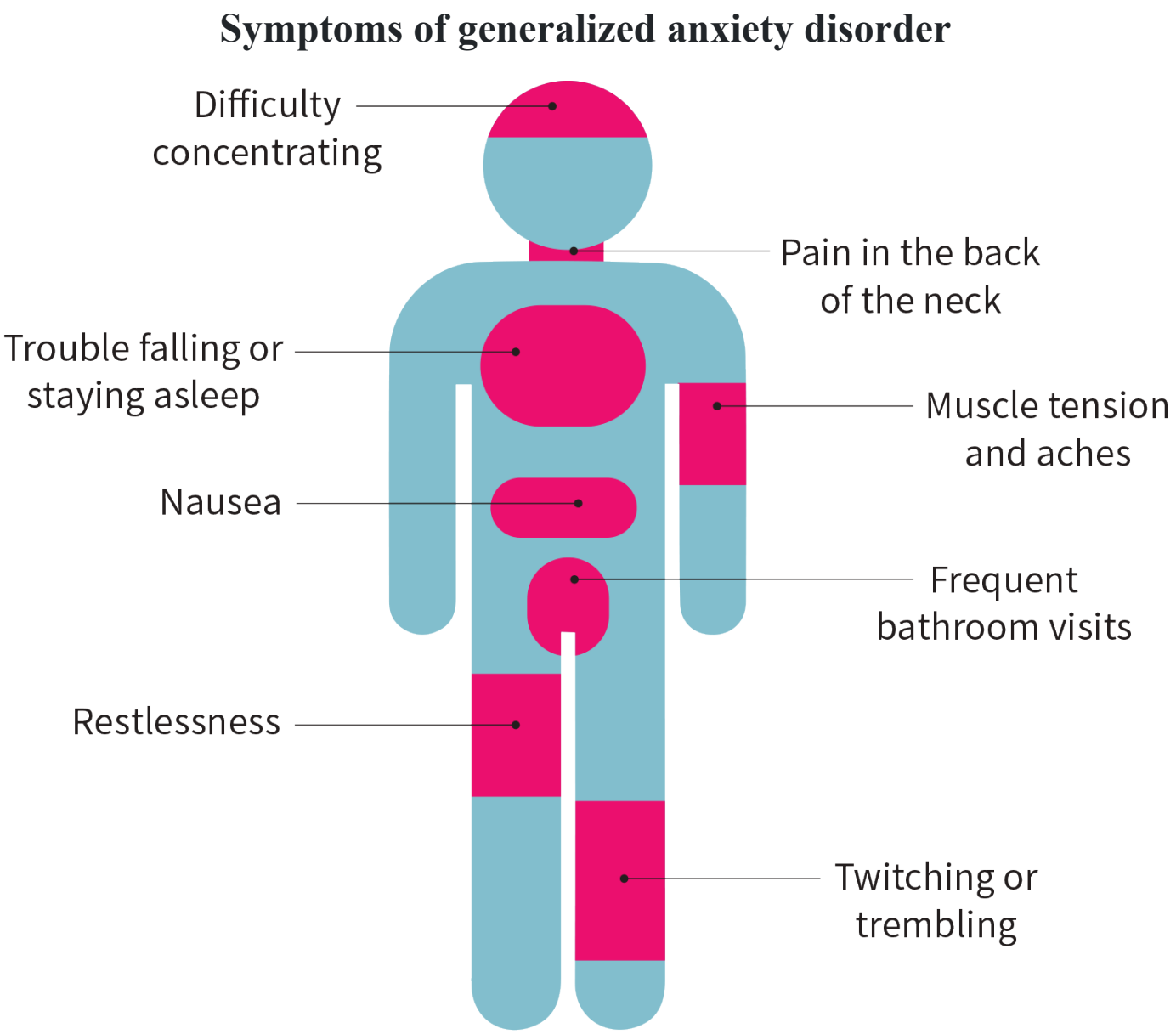
What are some general coping strategies?

Deep breathing, muscle relaxation, and stretching are typical methods to cope with anxiety. The most effective stress-reducing activities, however, are highly dependent on the individual. Some people will soothe their anxiety through quiet rituals (knitting, tea ceremony …), while others will quell it through high-intensity exercising (boxing, weight lifting …).

Regular contact with nature has also shown some mild general benefits. If you have a house with a yard, you can devote some time to gardening or sunbathing, but those of us cooped up in an apartment will need to be more creative. Hiking may be an option in some areas, if the trails are not too crowded (and local laws have not prohibited such activities).

Are there useful therapies?

Cognitive-behavioral therapy (CBT) is a family of therapies that works well for many anxiety disorders[113][125][126] — such as *generalized anxiety disorder* (GAD), depicted below — especially in combination with medicines.[127]



GAD can be defined as a constant state of restlessness and worry. People suffering from GAD are anxious about getting through the day, believing as they do that things will go poorly for them.

While “simple” behavioral therapies require that you change your behavior, CBT requires that you

also change your thoughts — if you have irrational, harmful thoughts, CBT trains you to replace them with more rational thoughts based on the evidence.

Unfortunately, CBT can be inaccessible to many people due to cost and lack of information.[112] Moreover, while it works well on average,[113][114] its efficacy varies greatly between individuals (for anxiety as well as for other mood disorders).[114][115]

Other types of therapy may help, too. Relaxation therapy, notably, seems to give results on par with CBT's.[128]

You can find more information on psychotherapies here, including what to look for in a therapist.

Can meditation help?

Meditation may alleviate symptoms of anxiety,[129] especially among people for whom anxiety is a secondary concern.[130] It may also reduce the physical[131] and mental[132] symptoms of stress.

Keep in mind, however, that the quality of the evidence has been questioned and that many studies only measure improvements in anxiety symptoms, but not anxiety disorders as clinically diagnosed.[133][134][135]

Can exercise help?

Exercise is roughly as efficacious as CBT, but generally less than medicines.[127]

- Aerobic exercise reduces anxiety in people who have clinical anxiety, with higher-intensity exercise tending to be more effective.[136]
- Resistance training has less evidence, but it seems to benefit people with anxiety disorders[137] and with overweight or obesity.[138]
- Yoga tends to incorporate the basic anti-anxiety coping strategies: deep breathing, muscle relaxation, and stretching. Yoga is also a form of meditation, which may help.

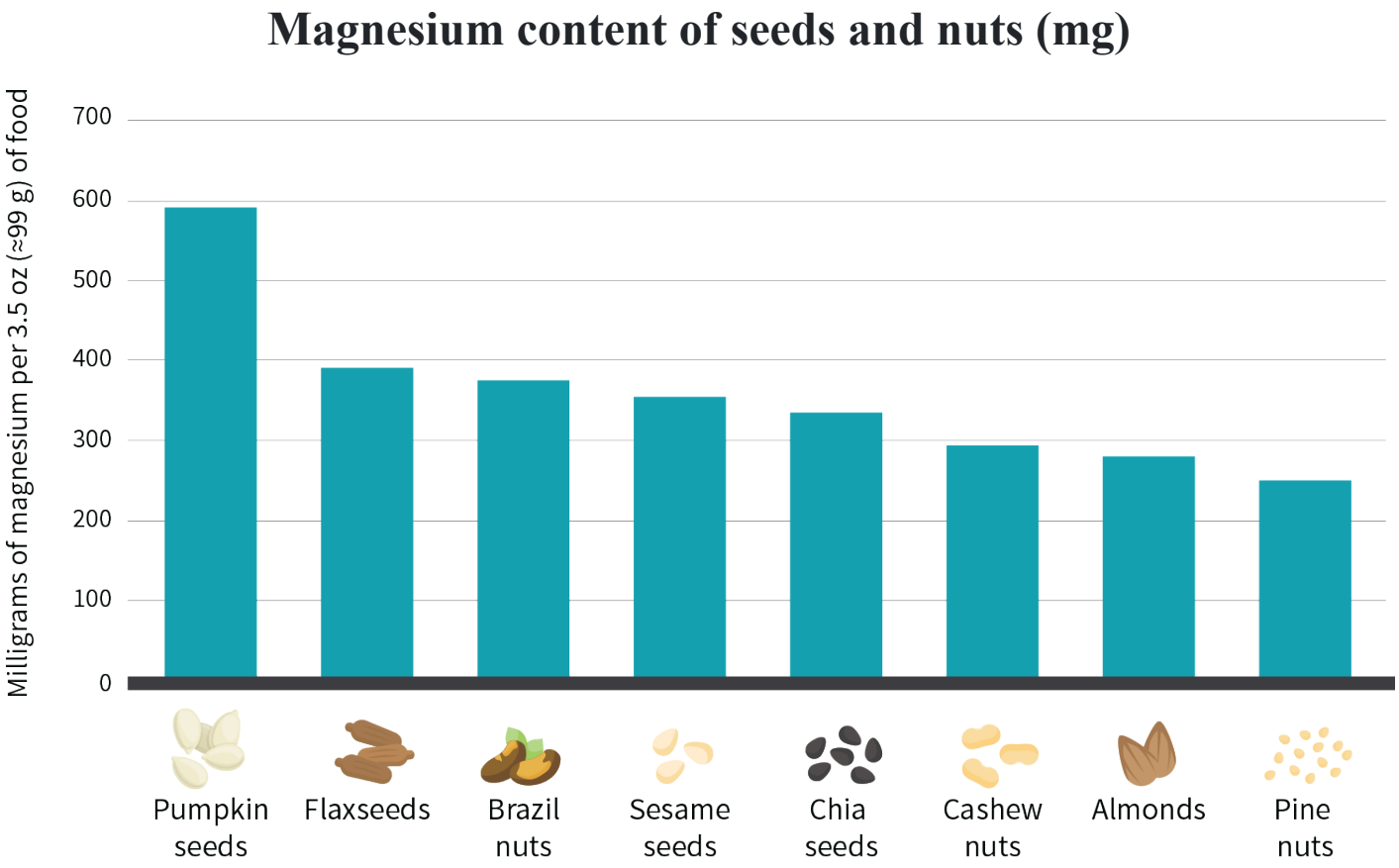
Are there useful supplements?

MAGNESIUM

Magnesium is a dietary mineral that plays an important role in the brain. Hypomagnesemia (subnormal magnesium levels in the blood) can result in abnormal neuronal excitations and thereby cause or increase anxiety. Studies have shown that inducing magnesium deficiencies also induces stress and anxiety, which can then be alleviated through magnesium supplementation.

Multiple types of magnesium supplements exist, but magnesium-rich foods are numerous and can fit all kinds of diets — they should be your first option.

There is no reliable evidence to suggest that taking a magnesium supplement can help people who are not magnesium deficient.



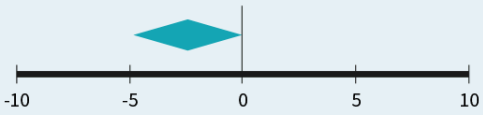
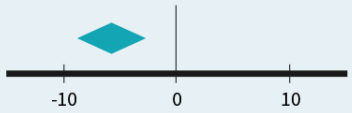
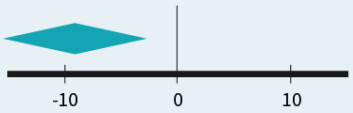
Reference: USDA FoodData Central Database

LAVENDER

Lavender's purported calming and sedative effects have been linked to two of its constituents: linalool and linalyl acetate.[139] Lavender is usually administered in the form of an essential oil distilled from the flower. This oil can be used orally, topically, or through inhalation.

A 2019 study looked at 37 *randomized controlled trials* (RCTs). Some settings were highly anxiogenic (e.g., patients in an intensive care unit) and others milder (e.g., students taking a test).[140] To account for differences in anxiety assessment and lavender administration (oral, topical, or inhaled), the study's authors conducted seven meta-analyses, whose findings are summarized in the graphic below.

Results of a lavender meta-analysis

	Favors lavender / Favors control	STUDIES AT HIGH RISK OF BIAS?	HETEROGENEITY?
CAPSULES 	 Change on the Hamilton anxiety rating scale (Range: 0–56)	Around half	High
	 Change on the Zung self-reported anxiety scale (Range: 20–80)	Over half	Very low
INHALED OIL 	 Change in STAI-S score (Range: 20–80)	Around half	Very high
	 Change in STAI-T score (Range: 20–80)	Over half	Very high
	 Change in systolic blood pressure (mmHg)	Over half	Very low
	 Change in any validated anxiety scale (standardized mean difference)	Over half	Very high
MASSAGE OIL 	 Change in any validated anxiety scale (standardized mean difference)	Around half	High

Reference: Donelli et al. *Phytomedicine*. 2019.[140]

Lavender was associated with an overall improvement in anxiety, but the RCTs were highly heterogeneous, and most exhibited a high risk of bias.

To determine the efficacy of inhalation and topical administration, researchers will need not only to conduct higher quality studies but also to standardize their methods (notably the dose and the duration of exposure). Even then, the risk of bias will stay high because of the difficulty inherent to blinding trials when lavender oil can easily be recognized by its smell.

Oral administration showed the most robust results, due to a standardized extract and dose: Silexan™ seems as efficacious as SSRIs and benzodiazepines, without the adverse effects of those anti-anxiety pharmaceuticals (who are still backed, however, by sturdier evidence).

This isn't to say that lavender oil cannot have adverse effects. **If you're male and your breasts become tender, stop using lavender oil immediately.** The Endocrine Society and the National Institutes of Health (NIH) warn that lavender oil has estrogenic properties that may cause gynecomastia (enlarged breasts in males).

If you want to know more about supplements — including doses, combinations, and timing — check out our *Stress & Anxiety* Supplement Guide.

🔍 Digging Deeper: Why you should care about heterogeneity

Heterogeneity within a meta-analysis (usually represented as I2) represents the degree of variation among the included studies. An I2 value can range from 0% to 100%, with high percentages representing considerable variation — in the intervention (e.g., delivery method, dosage), population studied (e.g., age, sex, health issues), or study methodology. If you meta-analyze studies that are too different (i.e., highly heterogeneous), you wind up comparing apples and oranges.

When heterogeneity is identified, it is common to explore the cause by conducting subgroup analyses. For example, you could analyze the results from males and females separately. It must be noted that explorations of heterogeneity done after the fact (that is, after heterogeneity has been identified) should be interpreted with caution, especially if there are very few studies or people in each subgroup.

Should I stop using stimulants if I have anxiety?

Stimulants seldom *cause* anxiety, but many create a stress response that can worsen existing symptoms. People with anxiety might not need to stop using stimulants entirely, but they may want to avoid frequent use, especially if their symptoms worsen.

If caffeine worsens your anxiety, either stop taking it altogether or try pairing it with 100–200 mg of theanine, an amino acid that can tame the anxiety caused by caffeine (in some people) without impairing caffeine's stimulatory effect. Caffeine and theanine can both improve concentration (focus and attention span), separately and synergistically.

Avoid yohimbine and supplements with a similar mechanism, such as rauwolscine.

Additional resources

Looking for more ways to unwind? Take a look at some of the stress-relief resources used by members of the Examine.com team — or just keep reading.

Comfort items and activities

Go out — virtually

GO TO A MUSEUM

- Google's Arts and Culture website offers a variety of virtual museum tours.
- The National Palace Museum of Taipei offers an extensive virtual tour.
- The Louvre has a small collection of virtual tours of its exhibits.

EXPLORE A PARK

- NYC has a parks@home initiative that includes park tours, meditation, art classes, fitness activities, and activities for kids.
- You can also "visit" some US national parks via the National Park Foundation and via Google Earth.

Want to level up your virtual national-park experience? Google has an *excellent* semi-interactive guided series available. Start the full tour here, or jump right into the following exotic locations:

- The Bryce Canyon in Utah
- The Carlsbad Caverns in New Mexico
- The Dry Tortugas in Florida
- The Kenai Fjords in Alaska
- The Volcanoes in Hawai'i

TOUR THE WORLD

- Go for an underwater, interactive tour of the Great Barrier Reef in Australia, or have a swim with sea turtles.
- Experience the culture and scenery of Greece.
- Head over to Perú for a narrated tour of the famous Incan citadel, Machu Picchu.
- Explore cities from all around the world with these 4K videos.
- Enjoy an Alaskan view of the aurora borealis.
- Take a tour of some of the most beautiful places on Earth from the ground for 3 hours or from the air for 7 hours.

HEAD OUT INTO SPACE

- Slowly orbit the globe with time-lapse photography from the International Space Station (ISS). (You can also watch live video from the ISS.)
- Earth from orbit is beautiful, but does the silence of the void creep you out? You can enjoy a space concert with Vivaldi's *The Four Seasons* as you drift around our home world.
- Ah, but you may be a little sick of Earth right now. If so, why not go spend ten minutes on Mars?
- Looking for something more interactive? Then take a walk around Mars while learning what the NASA rover Curiosity discovered on our red neighbor.
- Mars too suburban to your liking? Want a vacation away from our solar system? NASA has got you covered with an interactive tour of exoplanets.
- You could even let the Hubble Space Telescope launch your into deep space or discover what it has photographed on your birthday.

Expand your mind

Online classes are in no short supply. Some can be completed in a day, whereas others can take you a few weeks. Whatever your interests, you'll be sure to find something to keep your mind busy at the sites below.

- Class Central
- Coursera
- Crash Course
- EdX
- Harvard Online Courses
- Hogwarts School of Witchcraft and Wizardry
- Khan Academy
- Open Yale Courses
- OpenWHO
- Osmosis
- Skillshare
- Udemy

Need something to keep the kids engaged? The James Dyson Foundation has a few dozen hands-on science and engineering experiments you can try at home.

Looking for some relevant and timely courses? Check out these options:

MENTAL HEALTH

- Learn about emotions, stress, and health on Crash Course.
- Learn about physical distancing and its implications for mental health on SciShow Psych
- Learn about the science of well-being with Dr. Laurie Santos, PhD, from Yale University.
- Learn about managing your mental health during COVID-19 with Dr. Steve Joordens, PhD, from the University of Toronto.

IMMUNOLOGY

- Crash Course has a three-part series (30 minutes total) on the immune system.
- For a deeper dive into immune function, try these lessons from the Khan Academy.
- Class Central has a list of courses dealing with infections and vaccination.

EPIDEMICS AND INFECTIOUS DISEASES

- SciShow has a playlist of videos to help you understand epidemics and other diseases.
- The Khan Academy has lessons on infectious diseases such as influenza.
- Class Central has a list of courses that cover the science of epidemics.
- On Coursera, the Johns Hopkins University offers a teach-out on fighting COVID-19 with epidemiology. (All videos but one are about using data science to fight epidemics in

general, and seem to predate COVID-19. The knowledge is applicable to the current pandemic, though.)

COVID-19

- Class Central maintains a list of (currently 20) coronavirus-related courses. This list indicates how many hours each course takes to complete.
- COVID-19: What You Need to Know is a 3-hour CME-eligible course provided by Osmosis and Coursera.
- The CDC has a series of webinars for healthcare professionals.
- The National Academy of Medicine and the American Public Health Association offer a lecture on the science of physical distancing (part 1, part 2).

Read (or listen to) free books

Looking for a good read (or a good listen)? These sites offer access to thousands of free books and audiobooks:

- Digital Books
- Google Books
- LibriVox

Commercial platforms also have free stuff:

- Apple has released a special collection of free books and audiobooks. It can be accessed through their Apple Books app.
- For Android, free content can be found through the Google Play bookstore.
- Audible has temporarily provided free access to hundreds of audiobooks for kids and adults alike.

Looking for free textbooks? (And, I mean, who isn't?) Get your fill on these platforms:

- LibreTexts
- NCBI Bookshelf
- Open Textbook Library

Springer Nature also makes hundreds of textbooks free during the coronavirus lockdown.

💡 Tip: Your local library … in your home

Do you have a library card or membership? You can borrow many books and audiobooks from your library's digital collections. OverDrive is a popular way to access these resources.

Watch together

If you're missing the experience of watching movies or listening to music or podcasts together, there are a few options out there for you:

- Metastream synchronizes online videos so you can watch them with friends. It supports a variety of platforms, among which Amazon Prime Video, CrunchyRoll, Hulu, Netflix, Reddit, SoundCloud, Twitch, and YouTube.

- Netflix Party synchronizes Netflix videos so you can watch them with friends, and lets you add a group chat.
- Scener allows you to video chat while watching Netflix.
- Vemos allows you to video chat while watching Amazon Prime Video, Disney, Hulu, Netflix, and YouTube.
- Watch2Gether allows you to synchronize media with other people in your own virtual room. It supports a variety of platforms, among which Dailymotion, Facebook, Instagram, Soundcloud, Twitch, Twitter, Vimeo, and YouTube.

Challenge yourself

If you're spending too much time dwelling on negatives, try to refocus your mind by doing something uncomfortable or challenging — such as learning a language or learning to code. Spending some time distracted by a new, different challenge may help you put things in perspective (putting things in perspective is one of the aims of cognitive behavioral therapy, which is used to tame anxiety and depression.)

Volunteer

If you're in a position to volunteer, consider giving it a try. Because of COVID-19, many organizations — some born out of the pandemic — are in need of additional hands (or voices).

Invisible Hands, for instance, was created by three New Yorkers in their 20s to organize volunteers

to deliver supplies to the most at-risk members of the greater New York City area. There may be similar groups in *your* area!

Volunteering can also be done from home, such as by serving as a crisis counselor for the Crisis Text Line.

These sites may speed your search for volunteering opportunities:

- All for Good
- Create the Good
- Corporation for National and Community Service
- Idealist
- VolunteerMatch

Toward a new normal(ish)

Set up a new routine

Many of you have been unceremoniously thrust into a new living situation — one that has seen your normal daily routines go out the window. So, what should you do?

Start with a simple schedule. It doesn't need to be crazy complicated. Begin by establishing the general structure of your days and build up from there. Follow these three steps:

1. Outline when you want to wake up, eat, and go to sleep.
2. Block off periods for work, play, exercise, and rest.
3. Revise and tweak as needed.

You can also start each day by following these three steps:

1. Create a list of what you want to get done today.
2. Prioritize these tasks.
3. Focus on the top 2–3 items on your list.

Looking back at your lists may also reveal that you're getting more done than you think!

If you need more tips, the CDC has a resource page for families looking to create structure and regular schedules at home. You can watch the videos and download helpful printouts for younger children.

Pro tip: Don't go it alone! Many of your friends and family are facing the same issues. Reach out to them for support and ideas.

Don't forget to socialize!

While *physical* distancing is important, don't *socially* isolate yourself! You don't need to be close to feel close. There are many options for staying in touch with your support network:

- 📞 Call
- 📧 Email
- 💻 Chat online
- 📱 Video chat
- 💬 Text
- 🤳 Use social media
- 📪 Write a letter
- 🎁 Send a small gift

Looking to meet new people? Meetup.com — which used to tell its users to "use the Internet to get off the Internet" — is now having organizers host meetings online. Browse their site and you'll find a bunch of ways to meet people to do stuff together while at home.

And if you're feeling adventurous, Quarantine Chat is a service that randomly pairs you up with another person for a one-on-one call.

Sanitation and Safety Practices

The essentials

You've probably heard these *ad nauseum* by now, but they're worth repeating.

- Wash your hands for at least 20 seconds, frequently throughout the day.
- Don't touch your mouth, eyes, or nose (and wear a face covering in public).
- Get serious about physical distancing.
- Call your healthcare professional if you think you may be infected.

For more details, see our main coronavirus page.

Face coverings and masks

We briefly answer some basic questions below, but if you want to dig into the research, check out our in-depth article: Coronavirus masks: What's the latest evidence?

Can masks help against the coronavirus?

The virus is likely spread mostly by sneeze/cough droplets, but it can also be transmitted through conversation in close quarters.

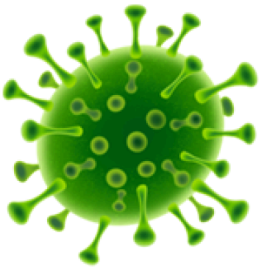
Droplets can spread much farther than six feet and linger for minutes to hours (depending on wind, atmospheric humidity, etc.).

Masks protect **others** from you better than they protect **you** from others.

Mask efficacy is highly dependent on fit, materials, and number of layers.

Healthcare workers face much greater risk than the general public. **Don't hoard N95 or surgical masks!**

If you're sick, definitely wear a mask. If you're not sick, wearing a mask when going to public places may decrease your chances of getting sick.



Why have mask recommendations been so conflicting?

Mask recommendations have been handed out to the public without much explanation, let alone references to the state of the evidence. Granted, many people wouldn't understand the details of the studies forming the evidence, but basic explanations could have been provided. Such communication failures erode the public's trust.[141]

If you wish to better understand what happened, you can read our article, but to cut to the chase: yes, **the current evidence indicates that we can all benefit if everyone wears a mask**. The message that widespread masking is more or less useless was either misguided or misinterpreted. Masks are at worst slightly useful on a population-wide level, during pandemics like this one.[142]

What are the different types of masks?

There are three major categories of masks: non-medical, medical/surgical, and N95.

NON-MEDICAL MASKS

These include masks that are made at home (typically cloth masks, made out of T-shirts and the like) as well as other non-medical and non-N95 masks. Their potential benefit varies widely depending on the material used, the number of layers, the fit, and how they're cleaned.[143]

MEDICAL MASKS (AKA SURGICAL MASKS)

Surgical masks vary widely in efficacy, being able to filter between <10% and 90% of droplets. Their fit is usually much looser than the fit of N95 respirators, so side leakage is a risk. They appear to offer only minimal to moderate protection *for the wearer* **but** good protection *for others* if the wearer is sick[144] (and remember that it is common to have COVID-19 and not know it).

N95 RESPIRATORS

> In times of shortages, available N95 "masks" (properly called "respirators") should go to healthcare workers. Don't hoard these!

N95 is the most common type of respirator. It provides a one-two punch of filtering out small particles and sealing the face with a tight fit. It is tested to make sure it blocks at least 95% of particles as small as 0.3 microns.[145] Sadly, since SARS-CoV-2 particle size ranges from 0.07 to 0.09 microns,[146] even N95 respirators cannot afford absolute protection.

What can masks do?

There is preliminary evidence that N95 respirators and surgical masks help protect the wearer from COVID-19, but no evidence (yet) for non-medical masks. Note that surgical masks and especially N95 respirators offer good protection against colds and the flu, but that cloth masks don't seem to perform well for that purpose.

There's a ton of evidence that **sick people can protect healthy people** by wearing an N95 respirator, a surgical mask, or even a homemade mask. With regard to COVID-19 specifically, however, one small study suggests that masks may not be as effective as previously thought, at least not if you're coughing.[147]

Can masks be reused?

You can wash cloth masks with soap and water and dry them on high, but N95 respirators and surgical masks are disposable masks: they cannot be washed, and ideally shouldn't be reused.

The CDC suggests that if healthcare workers, lacking supplies, must reuse N95 respirators, then those should be stored for 72 hours between uses, in order to exceed the expected survival time of SARS-CoV-2.

So if you *must* reuse disposable masks, you should at least store them — for three days between uses — where they can dry out and dissipate the moisture they have accumulated. You can hang them or you can store each in a container.

- A container must have sufficient airflow (think paper bag, not airtight plastic box).
- A container must not deform the mask.
- A container must be cleaned or replaced regularly.

Air quality

⚠ Caution: Primary modes of transmission

SARS-CoV-2 can remain in the air for a time, but that shouldn't be your central concern. There are two primary methods of transmission:

- **Direct** (person-to-person: touching, coughing, sneezing, and talking can all spread

virus-containing droplets)

- **Indirect** (surface-to-person: touching surfaces contaminated with respiratory droplets containing the virus then touching your mouth, nose, or eyes)

Can plants clean SARS-CoV-2 from the air?

If plants can remove the SARS-CoV-2 virus from the air, it's unlikely to be to any meaningful degree. The air-filtering capacity of plants is much lower than most people assume.

Take, for example, *volatile organic compounds* (VOCs). VOCs are gasses or vapors released from things like plastics, wood preservatives, coal burning, and cigarettes (to name a few). While plants can remove these pollutants from the air, to make even a small dent you would need one highly effective VOC-filtering plant per square foot (i.e., per 0.09 m^2) in your home.[148] That doesn't leave room for much else!

💡 Tip: Hard to kill houseplants

Looking for some low-maintenance plants that don't easily die? The United States Botanic Garden (USBG) recommends the following species, which they describe as being able to survive relative neglect, having low requirements for light and water and high resistance to insects and diseases.

If you have any plant-related questions, you can email USBG or call them and leave a message (202-226-4785).

Foolproof plants

SORTED BY WATER NEEDS		
COMMON NAME *(SPECIES)*	**Water needs**	**Light needs**
Aloe *(Aloe vera)*	Low	Bright-to-moderate
Snake plant *(Sansevieria trifasciata)*	Low	Bright-to-moderate
Asparagus fern *(Asparagus densiflorus)*	Moderate	Bright-to-moderate
Cast-iron plant *(Aspidistra elatior)*	Moderate	Moderate-to-low
Chinese evergreen *(Aglaonema spp.)*	Moderate	Moderate-to-low
Corn plant *(Dracaena spp. marginata, fragrans)*	Moderate	Moderate-to-low
Golden pothos *(Epipremnum aureum)*	Moderate	Low
Peace lily *(Spathiphyllum wallisii)*	Moderate	Moderate
Spider plant *(Chlorophytum comosum)*	Moderate	Moderate
Wax plant *(Hoya carnosa)*	Moderate	Bright-to-moderate

SORTED BY LIGHT NEEDS		
COMMON NAME *(SPECIES)*	**Water needs**	**Light needs**
Golden pothos *(Epipremnum aureum)*	Moderate	Low
Cast-iron plant *(Aspidistra elatior)*	Moderate	Moderate-to-low
Chinese evergreen *(Aglaonema spp.)*	Moderate	Moderate-to-low
Corn plant *(Dracaena spp. marginata, fragrans)*	Moderate	Moderate-to-low
Peace lily *(Spathiphyllum wallisii)*	Moderate	Moderate
Spider plant *(Chlorophytum comosum)*	Moderate	Moderate
Aloe *(Aloe vera)*	Low	Bright-to-moderate
Snake plant *(Sansevieria trifasciata)*	Low	Bright-to-moderate
Asparagus fern *(Asparagus densiflorus)*	Moderate	Bright-to-moderate
Wax plant *(Hoya carnosa)*	Moderate	Bright-to-moderate

Reference: United States Botanical Garden

Note that the following plants from our table above may be harmful to the pets who eat them:

- Aloe (*Aloe vera*)
- Corn plant (*Dracaena* spp. *marginata*, *fragrans*)

- Golden pothos (*Epipremnum aureum*)
- Peace lily (*Spathiphyllum wallisii*)

If you have any questions about the pet safety of these or other plants, contact the Pet Poison Helpline (855-764-7661) or the ASPCA Animal Poison Control Center (888-426-4435).

Can air filters remove SARS-CoV-2 from the air?

Yes, with caveats.

Air purifiers with *high-efficiency particulate air* (HEPA) filters can capture particles down to a size of 0.01 micron.[149] The SARS-CoV-2 particle size ranges from from 0.07 to 0.09 microns.[146]

Is it safe to keep my windows open?

For the vast majority of people, yes. SARS-CoV-2 does not linger in the air the way an aerosol does.

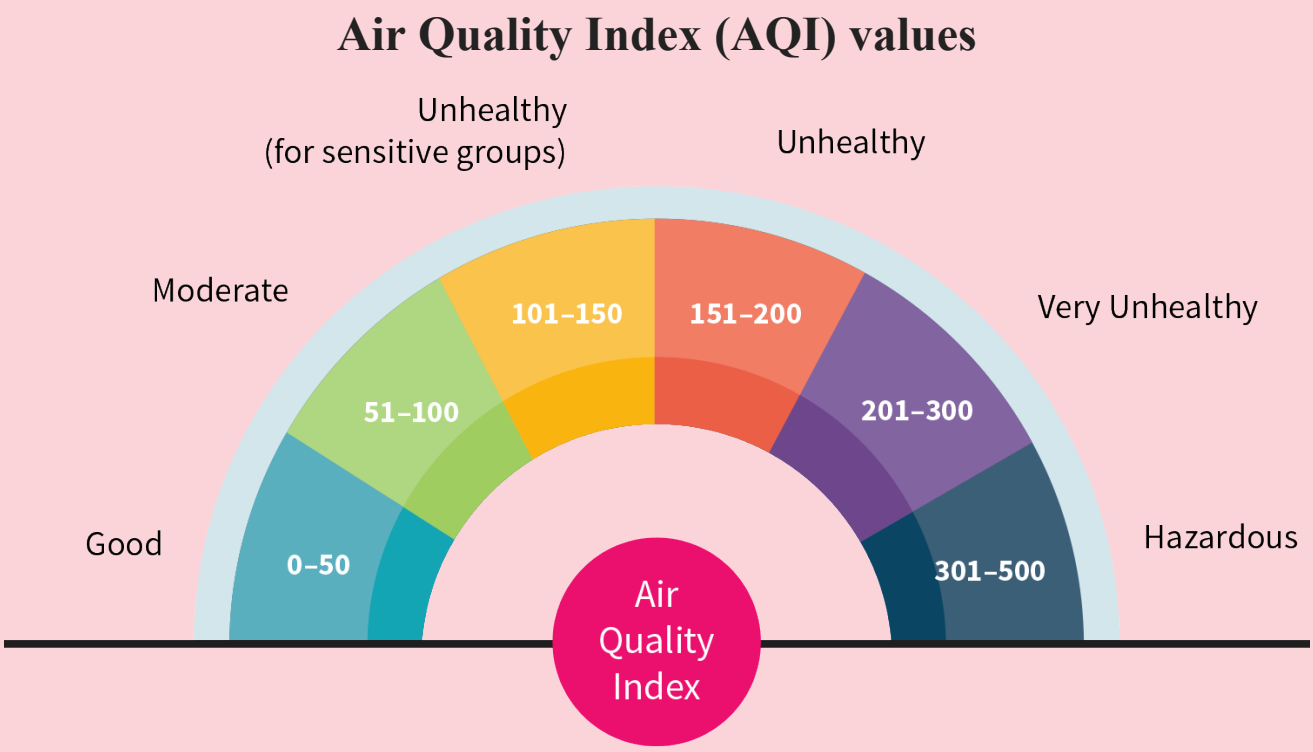
One exception might be if your window is level with a busy sidewalk, in which case you should keep your window shut — or, if you have a double-hung window, open only the top panel, so that the air comes in from higher up.

⚠ Caution: COVID-19 and pollution synergy

Air quality is commonly measured using the Air Quality Index (AQI) on the scale depicted below. Preliminary evidence has associated higher AQIs with higher death rates from SARS-CoV-2.[150][151] This comes as no surprise, since a 2003 study had already associated air pollution with higher death rates from another coronavirus: SARS-CoV.[152]

In other words, it is possible that air pollution and COVID-19 may be synergistically deadly. Remember, however, that pollution is plenty deadly on its own. By the WHO's estimates, pollution contributes to the deaths of seven million people worldwide every year. If there is a silver lining to the current pandemic, it is that pollution has been decreasing worldwide due

to the drop in human travel.[153]



Reference: AirNow

Many weather apps list the air quality in your area, but you can also check your AQI at these sites:

- AirNow.gov (US only)
- The World Air Quality Index project (international)

Food safety

Can SARS-CoV-2 be transmitted via food packaging?

Yes, but the risk seems low at this point. For you to become infected from food packaging, a lot of things have to line up:

- The packaging needs to be touched by a sick person who is actively shedding the virus or by a non-sick person who has previously touched a virus-contaminated surface.

- During that contact, viral particles need to be transferred to the packaging.
- The number of viral particles transferred needs to be enough to cause an infection.
- The viral particles need to survive on the packaging until you touch it.
- You need to touch the packaging.
- During that contact, viral particles need to be transferred to your hands.
- The number of viral particles transferred needs to be enough to cause an infection.
- You have to touch your mouth, nose, or eyes.
- During that contact, viral particles need to be transferred to your mouth, nose, or eyes.
- The number of viral particles transferred needs to be enough to cause an infection.

All that being said, if you are disinfecting the food packaging you bring into your house, you are being *very* cautious — but you're not being completely unreasonable.

Remember, before and after handling food or food packaging, wash or sanitize your hands.

Stability of SARS-CoV-2 on various surfaces

SURFACE	UNDETECTABLE AFTER ABOUT …
Paper, tissue paper	3 hours
Copper	4 hours
Cardboard	1 day
Cloth, wood	2 days
Glass, paper money	4 days
Plastic, stainless steel	3–7 days

References: van Doremalen et al. *N Engl J Med*. 2020.[154] ● Chin et al. *The Lancet Microbe*. 2020.[155]

Can SARS-CoV-2 be transmitted via food?

Given the information we have now, this seems unlikely. However, following good food safety practices will minimize any potential risk.

The 4 steps of food safety

CLEAN	SEPARATE	COOK	CHILL
Wash hands, utensils and surfaces often. Germs can spread and survive in many places.	Raw meat, poultry, seafood, and eggs can spread illness-causing bacteria to ready-to-eat foods, so keep them separate.	Cook to the right temperature. Ensure that foods are cooked safely by always using a food thermometer.	Refrigerate promptly. Bacteria that cause food poisoning multiply quickest between 4.5–60°C (40–140°F).

Adapted from FoodSafety.gov

Should I wash my food with alcohol, bleach, or soap?

None of those three! If enough residue is left over and consumed, you'll get sick.

Instead, follow these FDA recommendations for cleaning produce:

🧼 Wash your hands for 20 seconds before and after preparing food.

🍌 Rinse the produce before peeling it, so dirt and bacteria aren't transferred from the knife to the produce.

🔪 Cut away bruised areas, where bacteria may be living.

💧 Gently rub the produce while holding it under running water.

🧽 Use a clean vegetable brush to scrub firm produce, such as melons and cucumbers.

🦠 Dry the produce with a clean cloth or paper towel to further remove bacteria.

🥬 Remove the outermost leaves of a head of lettuce or cabbage.

Will cooking kill SARS-CoV-2?

Yes, with the right temperature and sufficient time:

Stability of SARS-CoV-2 at various temperatures in °C (°F)

TEMPERATURE	UNDETECTABLE AT …
4 (39.2)	Still detectable at 14 days
22 (71.6)	14 days
37 (98.6)	2 days
56 (132.8)	30 minutes
70 (158)	5 minutes

Reference: Chin et al. *The Lancet Microbe*. 2020.[155]

The high temperatures recommended to kill pathogens when cooking food (62.8–73.9°C, 145–165°F) are likely to quickly inactivate SARS-CoV-2.

Will microwaving kill SARS-CoV-2?

It should, with the right temperature and sufficient time — two factors influenced by the wattage of your microwave, the ability of your microwave to evenly heat food, and the amount of food.

To be on the safer side, microwave your food at the highest setting for at least 3 minutes.

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