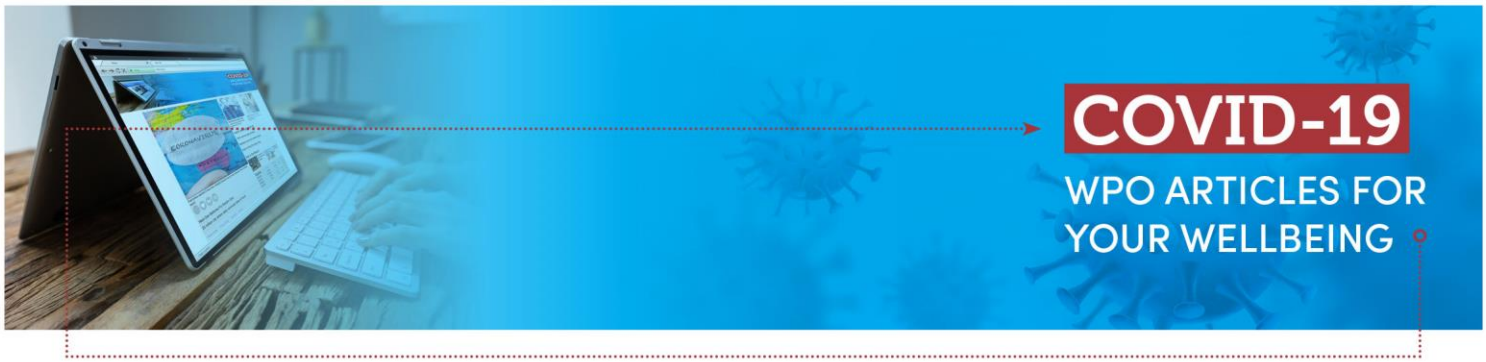

Understanding and Reducing Risk During the COVID-19 Pandemic

Since COVID-19 first appeared, and as it has grown as a global health threat, scientists have learned more about how the virus spreads. These discoveries have brought new recommendations about ways to reduce the risk of infection. The following information can help you understand the risks of different activities—and steps you can take to reduce the risk of illness for you and the people you love.

What is known about how COVID-19 spreads?

When COVID-19 first appeared, before data was available on this new disease, scientists relied on what they knew about similar diseases to recommend protective steps and model how it might spread. Public health experts and government leaders were forced to act and offer guidance to the public based on the limited information available at the time.

Not a Seasonal Pattern

Some of those assumptions turned out to be wrong. For example, many experts thought the disease would follow the pattern of influenza outbreaks, with three to four months of rapid spread followed by a drop in new cases, then, later on, a second wave. But it's now clear that COVID-19 is more contagious than influenza and doesn't follow that seasonal pattern. There is no drop in cases unless active measures are taken to reduce the kinds of human-to-human contact that fuels the disease's spread—spring, summer, fall, or winter. It's yet to be seen whether there will be a new wave of cases in the fall and winter.

Asymptomatic Spread

The other significant surprise was that COVID-19 can be spread by people who don't have symptoms—either in the few days before symptoms become noticeable or by people who are infected but never experience symptoms. Scientists now estimate that more than 4 in every 10 cases are spread by people without symptoms. That finding has changed public health and personal-protection recommendations dramatically. It is now understood, for example, that screening for entry into shared spaces with temperature checks or symptom questions offers less protection if close to half of the people spreading the disease don't have a fever or other symptoms.

Spread Through Respiratory Droplets

Researchers have also learned that the great majority of COVID-19 cases are caused by inhaling respiratory droplets—the tiny particles of moisture in the air that people exhale in normal breathing or expel in larger quantities when they talk, yell, sing, cough, or sneeze. Studies of these droplets have shown that they can hover in still air for hours and accumulate in indoor air. This has led to the recommendations to maintain physical distance from others when away from home; avoid large gatherings, especially in indoor spaces; and wear face masks. It has also raised awareness of the importance of good ventilation in indoor spaces.

Surface Transmission

Transmission on surfaces, such as door handles, grocery bags, countertops, and mobile phones, is still seen as a potential source of sickness but is not now considered the main pathway for disease spread. This is still a gray area in the research, as it's difficult to know with any certainty that a person did not become sick by touching an infected surface and then touching their face. So, experts still recommend frequent handwashing, surface disinfecting, and avoiding touching your face.

Importance of Community Data

Finally, widespread testing has enabled better estimates of the prevalence of the disease in different locations and communities. This can help inform public health guidance and individual behavior. If your community has a high number of infected people, you need to take even greater care, when outside your home, to avoid close encounters or contaminated spaces.

How have scientists learned how COVID-19 spreads?

The main way scientists have learned about the pathways for the spread of COVID-19 is with contact tracing. When a person becomes ill with or tests positive for COVID-19, contact tracers can learn who the person has been in contact with and follow the trail of transmission. They can trace both backward, to learn how the person caught the virus, and forward, to learn if the person spread the virus to others.

Contact Tracing

Contact tracing has helped to control the spread of COVID-19 where it has been used effectively. The results have also identified patterns of disease spread. In some very thorough examples, contact tracers have looked at where people were sitting in a restaurant or an office when multiple people were infected and found that the flow of air in the space affected who got sick. They've looked at the time spent near an infected person and found that longer exposure increases the risk of infection.

A two-minute conversation with an infected person, for example, is less likely to result in disease spread than a two-hour indoor meal with that person. Coworkers of an infected store employee are much more likely to get sick than customers, who spend less time in the store. A bus ride with an infected person on board is riskier than time spent with the person in a large, indoor space. All of these examples are from actual contact-tracing reports.

The type of activity in an enclosed space is also important. In Washington state, a choir practice became a "super spreader" event, where one person infected 32 others . Bars have been identified as hubs of disease transmission. The reason? When singing or speaking loudly, a person expels many more aerosol droplets than they do when breathing or speaking softly.

Contact tracing has also provided clues as to what may slow the spread of COVID-19. At a hair salon in Missouri, two infected stylists worked with 140 clients. Perhaps because masks were worn by all employees and customers, none of the clients became sick.

There's still a lot that experts don't know about COVID-19, and new findings are sure to add to their knowledge as research continues. Big gaps remain in understanding the extent to which children can get and transmit the disease, for example, and whether a person can get the disease again after getting sick and recovering.

Which activities are thought to be low or high risk for the spread of COVID-19?

Because inhaled exposure to coronavirus is considered the greatest risk for catching the disease, the key risk factors are

1. The amount of virus in the air you're breathing
2. The amount of time you're breathing that contaminated air
3. The kind of protection you are wearing

The amount of virus in the air you're breathing goes up with the number of infected people near you and down with greater air circulation and the wearing of masks. So, if you live in an area with a low incidence of disease and pass someone on the sidewalk while you are both wearing masks, your risk of exposure is very low. If you live in an area with a high incidence of disease and you spend time in an indoor restaurant, bar, or other space with poor ventilation, your risk of exposure is quite high.

Coronavirus particles are an invisible threat, but they are real. One way to visualize this varying risk for yourself is to imagine that the people around you have terrible, garlic breath. Outdoors and when you are far apart, the smell won't bother you. That's because the aerosols are being dispersed and reaching you only in tiny quantities. But when you stand close to people or spend time in an indoor space—think of a bus or subway car—you'll definitely notice the smell. The aerosols are reaching you in much larger numbers.

Because there is some risk of getting the disease from touching a contaminated surface, it's important to wash your hands after touching an object, such as a door handle that others may have touched, and to disinfect surfaces in your home or other places where you spend time.

Here are some examples of common activities, ranked from lowest to highest risk.

Lowest-Risk Activities

- Time at home—allowing only people you live with into your home and ensuring that those people engage in low-risk activities when outside the home
- Virtual-only gatherings
- Low-Risk Activities
- Opening the mail
- Eating takeout food from a restaurant
- Going for a walk, run, or bike ride by yourself
- Low- to Moderate-Risk Activities
- Grocery shopping (wearing a face mask and maintaining physical distance)
- Eating at a restaurant outdoors (where spacing and sanitary precautions are observed)
- Spending an hour at a playground
- Sitting in a doctor's waiting room (with spaced seating and good ventilation)
- Going for a walk, run, or bike ride with one or two other people

Moderate-Risk Activities

- Having an outdoor dinner with friends
- Attending a backyard barbecue
- Going to the beach
- Swimming in a public pool
- Working in an office building
- Moderate- to High-Risk Activities
- Flying on an airplane
- Eating indoors at a restaurant
- Going to the barber or hairdresser

High-Risk Activities

- Attending an indoor event with more than 20 people
- Going to the gym
- Going to a bar

The risk of any of these activities can be lowered with precautions, such as physical distancing, good ventilation or open windows, mask-wearing, not touching surfaces, handwashing, and not sharing food or serving utensils. The risk is higher when precautions aren't carefully observed by all attendees.

How does the risk of getting COVID-19 vary in different places?

The risk of COVID-19 spread is higher or lower depending on the incidence of disease in the community. Pay close attention to public health guidelines for your community, which should be adjusted periodically based on the changing number of detected cases. As case numbers go down, more activities are considered safe. As case numbers go up, more caution is needed, and you should restrict your activities.

Who is at greatest risk of serious illness and death from COVID-19?

The other element in assessing your risk from COVID-19 is understanding how the virus tends to affect people differently, depending on age and underlying medical conditions.

Age as a Risk Factor

While healthy, younger adults, in their 20s and 30s, are vulnerable to COVID-19, they have, so far, been found to be at lower risk of dying from the disease or suffering permanent injury. Their risk is not zero, however. Adults of all ages have died from the disease or suffered permanent organ damage, including damage to the lungs, kidneys, liver, heart, and brain. And younger people have been found to be a significant source of transmission to older and more vulnerable friends and family members.

As age increases, the risk of death or serious harm from COVID-19 rises steeply. Eight out of 10 deaths from COVID-19 in the United States have been in adults 65 and older, with the greatest risk among those age 85 and older.

Children appear to be at low risk for serious illness from COVID-19, and young children are not thought to be a significant path for bringing infection into the home.

Underlying Conditions as a Risk Factor

People of any age with certain medical conditions are at an increased risk of severe illness from COVID-19. The list of conditions known to increase risk includes

- Serious heart or lung conditions
- Cancer
- Chronic kidney disease
- Obesity (body mass index of 30 or higher)
- Weakened immune system from an organ transplant
- Sickle cell disease
- Type 2 diabetes

Other conditions may be found to increase risk from COVID-19 as more information is collected. These include

- Asthma
- Cystic fibrosis
- Hypertension or high blood pressure
- Liver disease
- Pregnancy
- A history of smoking
- Type 1 diabetes

The Centers for Disease Control and Prevention (CDC) provides a current list of conditions associated with higher risk of serious COVID-19 illness.

Race and Ethnicity as a Risk Factor

While people of all races and ethnicities are at risk from COVID-19, certain racial and ethnic minority groups are at greater risk of serious illness or death from the disease. According to the CDC, these include non-Hispanic, Black persons; Hispanics and Latinos; and American Indians/Alaska Natives.

What can you do to reduce your risk of getting COVID-19?

- Limit your physical interactions with other people. The fewer people you come into contact with, the lower your risk of getting COVID-19. Stay in touch with friends and family by phone or video.
- Avoid large, group gatherings. The more people at a gathering, the greater the likelihood that someone will be infected with COVID-19.
- Practice physical distancing. Stay at least six feet apart when in a place with people who are not members of your household. This keeps you beyond the range of the largest aerosol droplets from other people's breathing and talking.
- Wear a face mask when you are in public. Even a non-medical cloth face mask interrupts the flow of aerosols from your breathing and talking, so fewer of them linger in the air near you. The mask helps protect others, and also provides some protection for you from inhaling infected aerosols. Note that face masks with exhalation valves do not protect other people.
- Interact with others outdoors. Infected aerosols from breathing, talking, coughing, or sneezing disperse much more quickly outdoors than they do indoors. If you want to meet or have a meal with a small group of friends, do it outdoors and practice physical distancing.
- Limit time indoors in public spaces. Do your shopping quickly, wearing a mask and practicing physical distancing. Shop at off-peak times. If you have the option, limit work time in the office, and work from home as much as possible.
- Pay attention to ventilation. When you must be indoors with people who are not members of

your household, choose stores with more space and better ventilation. Open windows in your office.

- Wash your hands frequently and thoroughly. Use soap and water for at least 20 seconds, especially after using the bathroom, before preparing food, or after touching a surface outside of your home.
- Use hand sanitizer. Do this after visiting public places and touching door handles, grocery cart handles, or elevator buttons.
- Avoid touching your mouth, nose, or eyes with unwashed hands.
- Talk with your health care provider. Consider this if you have a condition that puts you at higher risk of serious illness from COVID-19.

Disclaimer: This document is intended for general information only. It does not provide the reader with specific direction, advice, or recommendations. You may wish to contact an appropriate professional for questions concerning your particular situation.

*Article also available online.