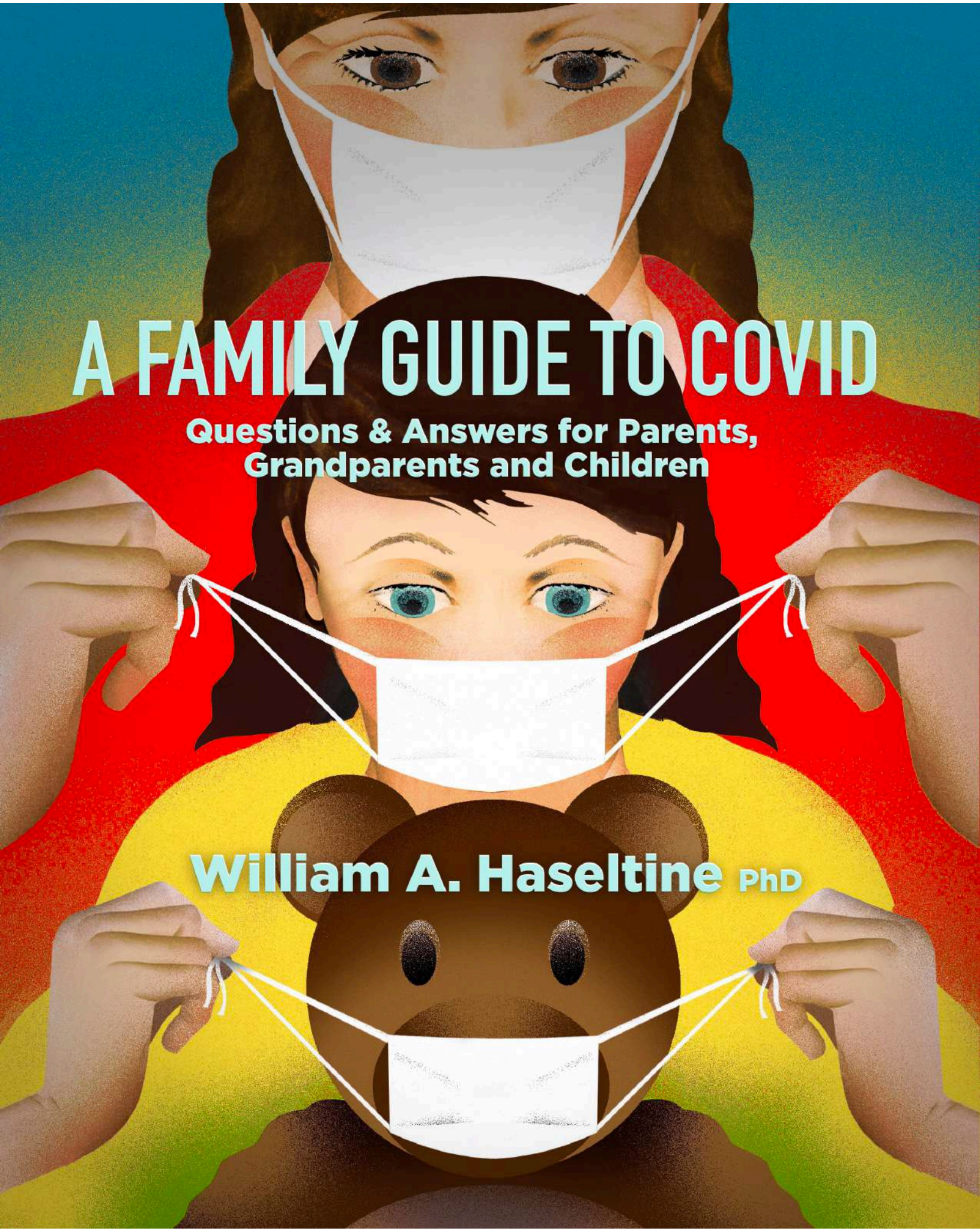
A FAMILY GUIDE TO COVID
Questions & Answers for Parents, Grandparents and Children
William A. Haseltine PhD

In *A Family Guide to Covid*, William A. Haseltine answers tough questions about Covid-19 honestly, with equal measures of clarity and compassion.

I wrote this book to help parents, grandparents, and children — including my own grandchildren—protect themselves and the people they love from this new disease. As a child, I lived through the polio epidemic which changed everyone's life. I knew then that I wanted to grow up and stamp out disease so everyone could live happy, healthy lives. I became a scientist and over the years I managed to fulfill my dream. I developed new drugs to fight HIV/AIDS, cancer, diabetes and lupus, and I even developed a vaccine to prevent cats from getting leukemia. Now I help governments around the world improve the health of all people. I know someday normal life will return, even better than it was before.

A Family Guide to Covid

Questions & Answers for Parents, Grandparents and Children

William A. Haseltine PhD

Disclaimer: While this is a book about health, it does not provide medical advice, nor does it substitute for medical advice or services provided by a trained medical professional.

Thank you for buying the *Family Guide to Covid*! This is what we call a *living book*. As our understanding of the disease changes, so will the contents of this book—and as its owner, you now have a permanent pass to every edition to come.

Visit www.accessh.org/covidfamilyguide
Click on Read The Book
And enter the password: AskDrBill

You'll be taken to a special section of our website where you can download the most up to date version.

You can also contribute to future editions of the book by clicking on *Ask Dr. Bill A Question* and asking me anything I didn't cover. Your question might just appear in the next edition, or in the question and answer section of our website.

I look forward to hearing from you!

Sincerely,
Dr. Bill

P.S. I earned the Dr. in my title when I earned my Ph.D. If you have questions about the virus that causes Covid or about the disease itself, I am probably the right person to ask. But if you have specific questions about an illness or treatment, you should seek advice from a medical doctor instead.

To my children, Mara and Alexander, who triumph now as always over illness.

To my loving wife, Maria Eugenia, and her tireless efforts to care for us all.

To my step-daughters, Karina, Manuela, and Camila, each a model of loving care and responsibility.

To our three grandchildren, Pedro Agustin, Enrique Matias, and Carlos Eduardo, may they live in a peaceful and healthy world.

And to parents and grandparents everywhere, who are helping their children learn and grow through this difficult time.

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INTRODUCTION

A new disease has spread across our world. Schools have shut down, people around the world have been asked to stay home, businesses have shuttered, and economies are crashing.

The sad state of affairs is not entirely new to me. I remember how polio overshadowed my younger years. Swimming, my favorite relief from the oppressive heat of the Mojave Desert where I was raised, was forbidden. So too were the cool dark theaters where I longed to see the latest Flash Gordon and Hopalong Cassidy films.

With time, I realized that diseases don't just harm individuals, but rather cripple communities and devastate entire countries. I eventually became a scientist, dedicating

my life to understanding the diseases that threaten us most and figuring out ways to stop and prevent them.

Today, I find that my children, my grandchildren, many of my friends, and extended family members are coming to me with question after question. Why have our lives changed? Are my children in danger? When will this be over? Will there be a vaccine or a cure and, if so, when? When will our lives return to normal?

I've earned the nickname 'Willapedia' because of the odd bits of knowledge I've collected from reading, traveling, and talking to people who know a lot more than I do. I have studied diseases and modern medicine with a laser-like focus and written many books. I have made profound discoveries about how living systems work and deciphered the secrets of another great plague known as HIV/AIDS. I created companies that have brought drugs to market to treat and prevent cancer, AIDS, diabetes, and lupus. I have

developed vaccines and ways to thwart potential bioweapons like anthrax. I have worked to help strengthen health systems around the world. And I have had a great time doing it, working with some of the greatest minds of our time, and with friends from all walks of life and on every continent.

I have dedicated my life to making sure everyone, no matter where they live, no matter what their age, has access to high-quality affordable health care. My friends and colleagues know I am plainspoken, and I don't pull my punches when I see truth.

This book attempts to answer questions about Covid honestly, with equal measures of clarity and compassion. It is written especially for those of you who are faced with the difficult task of not only protecting yourselves, but of protecting your families, your children, your spouses, and your parents.

The first section answers questions your children and grandchildren may ask. Each of the questions in this section are ones that I have been asked by the younger people in my life, some as young as four and five.

The second section provides short answers to many of the difficult questions that adults from ages eighteen to one hundred ask themselves to understand this new reality. Again, these are real questions people have asked. The answers are as concise and straightforward as I could make them. For those who want to know more, I will add a link to what I view as being reliable sources that will allow questioning readers to judge the answers for themselves.

Our understanding of the pandemic, what it is, and where it is going is changing almost daily. The burning questions of today may not be those of tomorrow. Even the answers to the same question may change. That is why this will be an ever-changing manuscript, a book that will be updated as

new questions and new answers appear. You can access the most up to date version of the book by visiting www.accessh.org/covidfamilyguide and entering the password “AskDrBill”. The printed version of the book will also be updated regularly on Amazon.

In my heart and soul, I am a scientist, one who has devoted his life to discovering new ways to treat and cure disease and to make sure all who walk this earth share the benefits of science and medicine. I am certain that science will show us the way, that in the end science will save us as it has done so many times before, from the likes of smallpox to the bubonic plague, polio and so many other great scourges of the past.

In the meantime, we must fight this disease in our homes, in our communities, and in our hospitals with the tools we have: vigilance, self-isolation, public health measures, and the best care for those who are ill.

Our children and grandchildren will one day look back, as I do, and remember a time when disease stalked the streets and changed their life. I hope some of those children will be inspired to dedicate their lives to science and medicine so that their own children and grandchildren will never have to endure what they did.

PART ONE

Questions Kids Ask Us

Why has my life changed?

There is a new disease going around that is dangerous. Some people who catch it get very sick. Some even die.

Right now, no vaccine can prevent someone from catching it. And no medicine can cure it.

Our job is to keep you safe. The best way to do that is to keep you at home so you can't catch the disease. Once we think it is safe, you can meet up with your friends again and go back to school.

How long will this last? When will it be over?

We don't know for sure. We all hope soon, but it won't be safe to go out until the chances of catching the disease are very low. If we can be sure that not many people who live close by have the disease, then it may

be safer for us to go out. When scientists find a vaccine to protect us, it will be a lot safer for all of us.

Can I play with my friends when it is over?

We will have to keep being extra careful. We will have to wear masks in public places, and we won't be able to get together in big groups.


FAMILY
CAFE
RESTAURANT

Will I be able to go back to school in September?

We don't know yet. A lot depends on how safe the adults in charge of your city and your school think it is for you to go back. Maybe your school will reopen but all the students and teachers will have their temperature taken before going inside to make sure everyone at school is healthy. Or maybe you will go back a few days a week and see some of your classmates, but not all of them at once. No matter what, your teachers will work hard to keep up your learning, whether it's online or in the classroom.

Can we be sure the disease will go away?

We are pretty sure it will. Scientists all over the world are working to create new ways to protect all of us.

If the disease goes away, can it come back?

It might. But by then we may have good ways to protect ourselves if it does.

Are we sure there will be a vaccine?

The very best scientists think so. Science has been successful in the past, and we think it can be successful again.

When will there be a vaccine?

We hope by sometime early next year. Others think it may take longer.

But that is a long time. Do I have to stay inside the whole time?

Remember that once not many people near us have it, we can begin to go outside and to go to school and

to do many of the things we did before. But as long as the disease is around, we have to be careful.

We want to go back to normal life as much as you do, and we will let you know as soon as we can.

What happens to families that have to stay inside all the time?

It can be fun for families to spend so much time together since normally things like work and school keep us apart. But there will be times when we get bored or annoyed with each other. Your parents might seem worried a lot, which might make you worry too. You might miss your friends or feel sad that so much has changed.

It is important to remember that this is all OK. We may be hurting, but we aren't alone. If you feel worried or

scared, know that you can always tell a grownup about your feelings. We want you to feel safe, loved, and protected.

What happens if one or both of my parents lose their job?

A lot of adults lost their jobs when businesses shut down because of this disease. When a parent loses a job, it can be hard on the whole family. You might notice that things around your home change a little bit or that your parents are a little more worried than usual. You may feel worried and sad too. That's normal. Don't be afraid to talk to your parents about how you are feeling. Remember, they love you and they will always do their best to take care of you.

How do you catch the disease?

You catch it just like you catch a cold: by being around people who have it.

If someone in your school has a cold, chances are you will get it. It is the same for this disease. When people sneeze, cough, and even talk, they spread germs. If you are near them, those germs can land on you.

Some of the objects around you may have germs on them too, like a doorknob that a sick person touched or a pencil they put in their mouth.

You may also catch it from drinking really dirty water. That's why you must be careful with the wastewater you drink.

Is that why we wear masks and why you tell me to wash my hands all the time?

Yes. Masks keep the germs from spraying out when someone breathes, sneezes, coughs, or talks.

Carefully washing your hands with soap and water gets rid of the germs, too.

How do I wash my hands properly?

Get your hands super wet and super soapy. Then rub your hands together for a whole 20 seconds. You can sing “Happy Birthday” out loud or in your head twice as a way to keep the time. Make sure you rub soap onto the backs of your hands, the palms of your hands, between your fingers, your thumbs, and even underneath your fingernails.

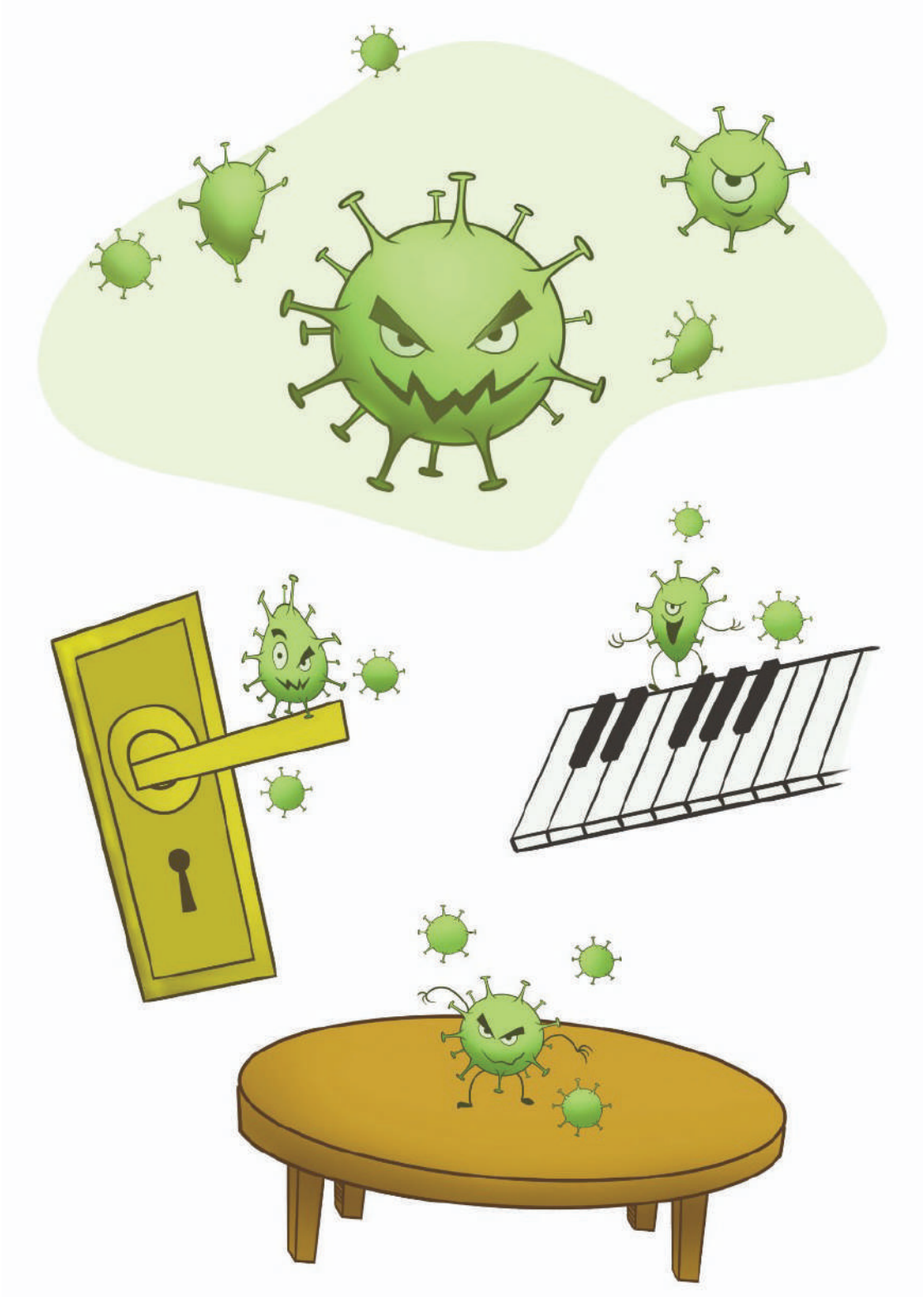
When you’re done singing “Happy Birthday”, rinse all the soap off. Shake, shake, shake, then dry with a towel.


HAPPY BIRTHDAY~♪

Is it easy to catch the disease from objects?

Yes. If someone who has the disease sneezes, coughs or wipes their spit or snot on the surfaces of things like doorknobs, furniture, toys, phones, and countertops, their germs will stay there for a while.

How long they survive depends on what the object is made of. The germs will survive longer on a metal doorknob, for example, than on one of your plastic toys. That's why we must keep our house clean.



Can I catch it from food?

No. Still, you should always wash your fruits and vegetables before you eat them!

Can I catch it from plants?

No. Plants do get sick, but their sicknesses are very different from ours. Lucky for them, they're safe from this disease.

Can I catch it from my pets?

You may have heard that the virus doesn't just infect humans. It infects animals, too. You can infect some pets like dogs, cats, and hamsters.

We don't know if your pets can infect you. I'll let you know when I find out.

How do I avoid catching it?

Stay inside as much as possible. It's easier for us to protect ourselves at home than outside, where germs are floating all around us.

If you do go outside, *stay a safe distance* away from other people. If you see somebody you know on the

street, you can smile and wave, but don't get close to them.

Wash your hands—a lot. If germs get on your hands, drowning them in soap and water may be able to kill them.

This is why you should also *avoid touching your face*. Especially your eyes, your nose, and your mouth. Don't pick your nose or suck your thumb! It is easier to wash the virus off your hands than off your face.

What if one or both of my parents have to go to work and can't stay at home? How do they stay safe?

Some jobs can't be done at home, like working at a hospital or grocery store. You might be worried about your parents if they have jobs like these, but

remember they're following extra special rules to keep themselves, and everyone around them, safe.

What if someone outside my family has to take care of me while my parents are working? Am I still safe?

As long as you and the person who is taking care of you still follow the rules that protect us from the disease, like handwashing and social distancing outside, then you'll be as safe as anyone else. That's why they were asked to watch over you—to keep you extra safe.

If I catch the disease, will I die?

You will probably be okay if you catch it. Most kids are. You might have a little cold.

A few kids, a very few, can get very sick and even die. That is why we all must be careful not to catch it.

What if I already have a special disease that other kids don't have?

If you already have a special disease and you get this new disease, there is a greater chance you'll get sick. You and your parents will have to do all the things everyone else is doing to keep themselves safe, like washing your hands often and cleaning the house, but extra carefully.

Remember that all the big changes the world is going through are to protect people just like you. There are many millions of people out there who are staying inside, wearing masks, and inventing new medicines to try and keep you safe.

If I catch it, can I give it to you and Grandma and Grandpa?

Yes, just like a cold. If you bring it home from school, your brothers and sisters can get it, and so can your grandma and grandpa.

Will you die if you catch it?

It's possible, but not likely. If we get it, we will probably get sicker than you would, but we won't die. The older you are, the more dangerous the disease can be. If your grandparents get it, it could be much worse.

Can doctors save people who are sick?

Doctors can save most people if they can get to a hospital in time, just like with other diseases. It is sad they can't save everyone.

Is there a medicine that can save them?

Scientists and doctors are working night and day to find new medicines that can cure this disease. One day there will be a cure.

Until then, there are many things our doctors and nurses can do to save people who are very sick from this disease. Nothing can get rid of it completely, but there are lots of medicines that can help.

Do we know when we'll have medicine to save them?

Not yet, but we hope it will be by this time next year. That might seem like a long time, but in the meantime, not all hope is lost. Day by day, doctors and nurses are getting better at saving people's lives. When they learn something new about the disease, they quickly

tell everybody around the world. It's the same for scientists. They know we're all in this together.

I'm scared for Grandma and Grandpa. Can I visit them?

It is too dangerous to visit them right now, but you can make them happy by writing them a letter, sending them a card, or calling them on the phone to tell them how much you miss them.

Why are people other than doctors still working? Shouldn't they stay home like me?

Doctors, nurses, and the other people who work in hospitals aren't the only heroes keeping us safe while the disease is still out there.

People working in grocery stores and pharmacies make it possible for us to still have food and medicine. People driving our buses and cleaning our streets make it possible for us to get around safely.

One or both of my parents has to go to work each day. Is it safe for me to hug them when they come home?

Because they've been around other people all day, they have to shower and change into clean clothes first. Then you can give them all the hugs you want!

What are some fun things I can do if I'm stuck inside all the time?

There is so much you can do to have fun without going outside! You can read a book, paint, do some fun exercises, have a dance party, or watch a movie. You

can also write letters to your friends or your grandparents.

What can I do to help?

You're already helping us stop the disease from spreading by staying home and washing your hands a lot. You're even helping when you cough or sneeze into your elbow instead of all over your hands!

What if I want to be a doctor or scientist when I grow up?

If you become a scientist like me, next time there is a dangerous disease you could be one of the people who comes up with a way to stop it! Tell your parents and they can help you get started.

Why is the disease called Covid?

Covid is short for *coronavirus.* The disease is a super tiny germ called a *virus*. This virus has a lot of spikes on its surface that makes it look like a crown. *Corona* means crown in Latin, the old language that scientists use to name lots of things. Corona + virus = coronavirus. And coronavirus disease = Covid.

How small is the virus?

The virus is so tiny that hundreds and hundreds of them could fit on the head of a needle.

What does this disease do to the body to make us so sick?

When little viruses invade the body, they begin to make lots of copies of themselves so they can take over. This coronavirus is good at getting inside our

lungs, especially in older people. When the virus grows deep inside the lungs, it gets harder to breathe. The body can even start to shut down, which is why some people need to be hooked up to special machines that breathe for them.

Can the virus attack parts of the body other than the lungs?

Yes, it can get in your nose and throat. It can also get in your blood vessels, your heart and your intestines.

How does the body fight the disease?

Your body has a defense system that protects you at all times. Your body has seen most germs before, so when they attack, your defense system can kick them out easily. Others take a little longer to battle, and a little more power, too. That's why you sometimes get

fevers—your defense system is working hard to clear bad germs out of your body.

PART TWO

Questions We Ask Ourselves

COVID AND CHILDREN

How do I know if my child is infected with the Covid virus?

SARS-CoV-2 is the virus that causes Covid. Most children who are infected with the Covid virus have either no symptoms or mild cold symptoms that resolve within a week or two. Very few become seriously ill.

In some young people, however, Covid can cause a very serious disease called Multisystem Inflammatory

Syndrome in Children (MIS-C). MIS-C is a very serious disease. This is what you must watch for.

What symptoms should I watch for?

For mild cases of Covid, symptoms include fever, cough, sore throat, quick and shallow breathing, chills, muscle pain, headache, vomiting, diarrhea, and a loss of taste or smell.[1]

When children develop Multisystem Inflammatory Syndrome in Children (MIS-C), their blood vessels become inflamed. Symptoms include persistent fever, serious rashes, “strawberry” tongue, bright red toes and fingers, and other inflammatory symptoms.[2]

What do I do if I suspect my child is infected?

If your child has any of the MIS-C symptoms, take them to an emergency room immediately or call 911.

If your child has a mild fever or cold and you think it might be Covid, call a doctor, preferably one who already knows your child's medical history. Schedule a telehealth visit if possible so your child can be examined without leaving your home. Make sure the child is resting and getting enough fluids.

When do I need to seek urgent care?

If your child has trouble breathing, chest pains, acute sleepiness and confusion, cold or blotchy skin, or dizziness, take them to the emergency room immediately.

If your child develops symptoms for Multisystem Inflammatory Syndrome in Children (MIS-C), take them to the emergency room immediately.

If your child can't breathe, turns blue, or faints, call 911.

Where is the best place to go for help for my children?

Go to the emergency room of a nearby hospital. If there is a children's hospital close by, that is where you should go.

ENDING IT WITH A VACCINE

When will this be over?

The Covid pandemic will be over when the last virus is eliminated from the human population.

One way the pandemic could end is through the discovery of a safe and effective vaccine that is given to everybody around the world, just like smallpox and polio vaccines were.

A second way the epidemic could end is the discovery of a drug that can prevent people who are exposed from being infected. I think it is possible to develop such drugs, but it will take several years.

The third way the pandemic could end is to stop the spread from person to person by identifying all those infected, tracking down all who were exposed, and isolating those exposed until the chance that they can infect others is negligible. This has worked in some countries.

Continued vigilance is still needed. If there is no vaccine, all it takes is one infected person to start the pandemic all over again.

When will there be a vaccine?

The short answer is we don't know.

The hopeful answer is that a vaccine may be ready sometime next year.

More than 100 Covid vaccines are currently in development worldwide.[3] But even if one of these proves effective, it will be at least another year before it is ready and available to all.

Is it possible that we won't have a vaccine for many years?

Yes. In fact, we are not even sure that a vaccine for Covid will work. We still don't have effective vaccines for tuberculosis, HIV, herpes simplex viruses, or hepatitis C, even though people have been working on them for decades.

I am hopeful that we will have a vaccine, but not certain.

Is it possible to speed up vaccine development?

It is possible to speed up the testing of vaccines. Vaccines are given to healthy people to prevent them from becoming sick.

But if the plan is to vaccinate two or three billion people or more, any vaccine must be safe beyond

doubt. Up until now, the fastest we have ever produced a vaccine, proven it safe, and made it available for so many people is four years. We might be able to make that timeline a little shorter.

Why is developing a vaccine so difficult?

The interactions between one virus and the human immune system are very complex. Many viruses have learned to evade our immune defenses.

The coronaviruses that cause colds come back each year. The virus that causes colds one year is the same as the one that causes colds the next year. This means we don’t build up long-lasting immunity against these viruses.

To be successful, a vaccine must build up long-lasting immunity. That is a problem. Even if we make one, it might not be what you would call a “slam dunk”.

We have yet to develop a successful vaccine for a human coronavirus. Attempts to develop vaccines for SARS and MERS, the last two deadly coronavirus epidemics, ran into serious trouble even before human trials began.[4] Because they couldn’t protect non-human primates (monkeys), they were never tested in people.

Could a vaccine turn out to be harmful?

Yes. That is why each vaccine candidate must be tested for safety in many people before it can be used to protect what might be billions of people.

If there is a vaccine, will everybody get it?

The idea is that everybody should get the vaccine. But this is a big challenge.

It is very likely that rich countries will get the vaccine before poorer countries. That is unfortunate. I hope this time, things will change. Remember that as long as one person in the world has it, we are all at risk.

Will the vaccine work in older adults?

The simple answer is that we don't know yet.

As we age, our immune system weakens and does not respond as effectively to vaccines as it does when we're young. But some people older than 65 can still be protected by some vaccines, such as the seasonal influenza vaccines.[5]

How long will it take to make enough for the entire world?

Manufacturing can be a bottleneck. It depends on the type of vaccine. Some are easy to make, some very hard. The good news is that a number of vaccines are given to all children before the age of five and often earlier.

Manufacturing vaccines for the whole world is a challenge we can meet.

How long will it take to vaccinate everyone?

Initial batches will likely go to healthcare workers, critically ill patients, and those at highest risk.[6] Only then will the vaccine become available for mass use. Billions of doses will need to be manufactured and distributed fairly around the world.

How long it takes to vaccinate everyone depends on many factors, cooperation across borders not least among them. Knowing so little, for now, we can't say.

When we have a vaccine and treatment, will the disease go away for good?

There is a chance that the Covid virus could become endemic like HIV and malaria, which means it would never really leave us. Four other coronaviruses, albeit less harmful ones, are already endemic in our communities, and the World Health Organization has warned this one could be next.[7]

Some illnesses persist even when we can effectively treat and vaccinate against them, like measles. But when those treatments and vaccines are available to

all, the real threat of the disease becomes negligible, and the disease itself is good as gone.

TREATMENTS IF YOU FALL ILL

Are there drugs to treat Covid?

As of this writing, no drugs specifically designed to treat Covid symptoms or treat SARS-2 infection have been approved by the U.S. Food and Drug Administration.

Doctors around the world are learning how to use drugs and treatments approved for other diseases. These treatments are getting better and better.

I divide the drugs into three groups: drugs for people with mild symptoms (low fever, cold, home care only); drugs for people hospitalized but not in intensive care;

and drugs for seriously ill patients who require intensive care, with or without ventilator support.

Mild

Mild cold-like symptoms are treated with over-the-counter remedies at home. Unless you have difficulty breathing or a pulse oximeter reading is 95 percent or lower, no need to even call a doctor.

Moderate

Many drugs approved for treatment of other diseases are being tested in patients hospitalized with moderate Covid symptoms.

Two treatments are reported to shorten the time it takes to discharge these patients. One uses a four-drug cocktail (lopinavir, ritonavir, ribavirin and interferon-beta) delivered orally and by intramuscular

or subcutaneous injection.[8] The other uses a single drug, remdesivir, delivered intravenously.

Neither treatment has been shown to reduce death rates of those hospitalized for Covid. They are described as modestly effective.

Treatment with anticoagulants such as heparin does improve survival for people with moderate disease.[9]

Serious

Patients with serious disease are those who need intensive care and possibly mechanical or other ventilation support.

Convalescent plasma treatment is approved for treatment of serious illness.[10] Convalescent plasma has been effective in the treatment of other serious viral diseases.[11]

Anticoagulants have been shown, in one study, to reduce the death of intubated patients from 70 percent to about 30 percent.[12]

Much of the damage to the lungs is thought to result from an overactive immune response to viral infection. Many drugs have been developed for treatment of autoimmune diseases such as arthritis, lupus, psoriasis, and multiple sclerosis. Many are being tested.

The takeaway is that doctors are getting better every day at recognizing the many symptoms of Covid, tracing them, and saving lives. This section will be updated frequently to keep track of the rapid pace of improvements.

Can drug treatments substitute for a vaccine and end the pandemic?

No. Drug treatments can be used to minimize the toll a disease like Covid takes on the body, whether it is by adjusting our immune response or by countering the virus itself. Some drugs may protect people from becoming infected. Such drugs, if and when developed, might significantly slow the spread of the disease. Even so, they're no substitute for a vaccine.

I hear about so many other treatments. How do I know what to trust?

If you have a question, refer to the websites of the U.S. Centers for Disease Control[13], the U.S. Food and Drug Administration[14], and the World Health Organization.[15] They are trusted sources of information.

Do people with Covid who need ventilators usually die?

No. Today, in the best hospitals, only about one in three Covid patients who need ventilators die. The number used to be much higher.

Why are old drugs being tested as potential Covid treatments?

Repurposing either one drug or a combination of drugs can sometimes prove effective in treating a new disease. This was the case for hepatitis C and HIV.[16]

How long will it take to make an anti-Covid drug?

We don't know yet. Drug development generally proceeds at a faster pace than vaccines, and the results of safety trials for repurposed malaria and HIV drugs have already started to trickle in.

With more than 150 anti-Covid drugs in the running, and one cocktail of drugs yielding particularly promising results, there is reason to hope that a treatment will emerge within the year.[17]

Can the antibodies of recovered patients be used to treat Covid?

The antibody-rich blood plasma of recovered patients, also known as convalescent sera, has been used to treat emerging infectious disease since the nineteenth century. Some studies of this experimental therapy, which was also used during the SARS epidemic, have shown reductions in mortality and viral load.[18]

In March, the U.S. Food and Drug Administration authorized this approach for emergency use in critically ill Covid patients.[19] Use is limited due to the

worry that rogue substances in plasma donations could lead to other kinds of infections, especially in patients whose lungs or immune systems are already weak or compromised.

Can monoclonal antibodies be used as treatment?

Monoclonal antibody drugs are made using a single cell that produces a single, highly neutralizing antibody, which is replicated over and over again at a large scale. They have the purity and consistency of a synthetic product, but remain wholly human and, in some cases, very effective. To date, more than 80 pharmaceutical products that use this technology to treat cancer, infectious diseases like Ebola, and other health conditions have received approval from the U.S. Food and Drug Administration.[20]

Unfortunately, monoclonal antibody drugs are very expensive and difficult to make. Coronaviruses, specifically those closely related to the SARS virus, also have a talent for escaping monoclonal antibody neutralization—which means just one probably won't do the trick.

WHO'S AT RISK OF FALLING ILL

What is it like to have Covid?

Covid begins as all colds do: with an infection in the upper respiratory tract, nose sinuses, and throat. It can also enter the body through the mouth or intestines by drinking water contaminated with raw sewage.

About two people in every ten who are infected never know it. They have no symptoms—not even a mild

cold. They can, however, transmit the virus to others for one to two weeks.

About six people out of every ten have cold symptoms. It may seem like a mild cold, or even a serious one. Some people may have a fever and a cough. Some may lose their sense of smell and taste. Losing your taste and smell is a sure sign of Covid.

The remaining two of every ten who are infected become very ill. People whose infections advance to this stage have described feeling as if a huge weight is on their chest, or like burning tar has been poured into their lungs. They run a high fever above 101.2 degrees Fahrenheit. They are short of breath and feel weak and achy all over. Many can’t get enough oxygen and must go to the hospital. Everyone who gets this sick describes it as one of the worst things

that has happened to them. Many return to their home, still ill but recovered enough to breathe on their own. It may take a month or two to recover full strength.

Of the 20 percent who need hospitalization, about one in three become so ill that they need to be cared for in an intensive care unit. To stay alive, many need mechanical ventilation to force oxygen into their lungs. They are given powerful drugs that partially paralyze them so they can endure the process. People may remain in intensive care for one or two weeks. Recovery is very slow, as people are weak from the disease and from not moving for a long period.

Covid is sometimes fatal. In the best hospitals, about 1 to 2 percent of people die.

Doctors around the world are learning every day how to care for Covid patients given the tools they have. The good news is that many more people are surviving the most serious effects of the disease now, in mid-2020, than they were at the beginning of the outbreak. But even if symptoms aren't severe, evidence from multiple sources shows that they can last a long time. One survey found that 91 percent of participants had symptoms for 40 days on average.[21]

The takeaway message is that Covid is a very serious disease that can be fatal.

Can Covid cause complications like heart attacks and kidney damage?

Yes, there are other complications. The virus can cause the formation of blood clots. These blood clots

can travel to the heart, where they can block the arteries and cause a heart attack. They may travel to the brain to cause a stroke and may also cause lung damage. Blood clots can damage the kidneys as well.[22]

Many hospitalized patients now receive blood thinners to prevent such clots from forming.[23]

The virus can grow in the heart and kidney and damage those organs too. There are hints that the virus can travel from the nasal passages to the brain where it can also cause damage. The virus can also infect and kill cells that line blood vessels.

What are the long-term effects of Covid?

Because the disease is so new, a lot of the long-term effects are still unknown. What we do know is that

those who were sick enough to require ventilation, or were in intensive care units, may suffer from lifelong injury to their lungs, heart, kidney, and brain. Covid may also induce serious strokes, leading to other forms of long-term disability.

Even those with mild cases of Covid may be diagnosed with chronic disease syndrome (myalgic encephalomyelitis/chronic fatigue syndrome (ME/CFS)), a set of persistent symptoms that can include crushing fatigue, muscle pain, and cognitive problems.[24]

Can dangerous blood clots form in people with no or mild symptoms?

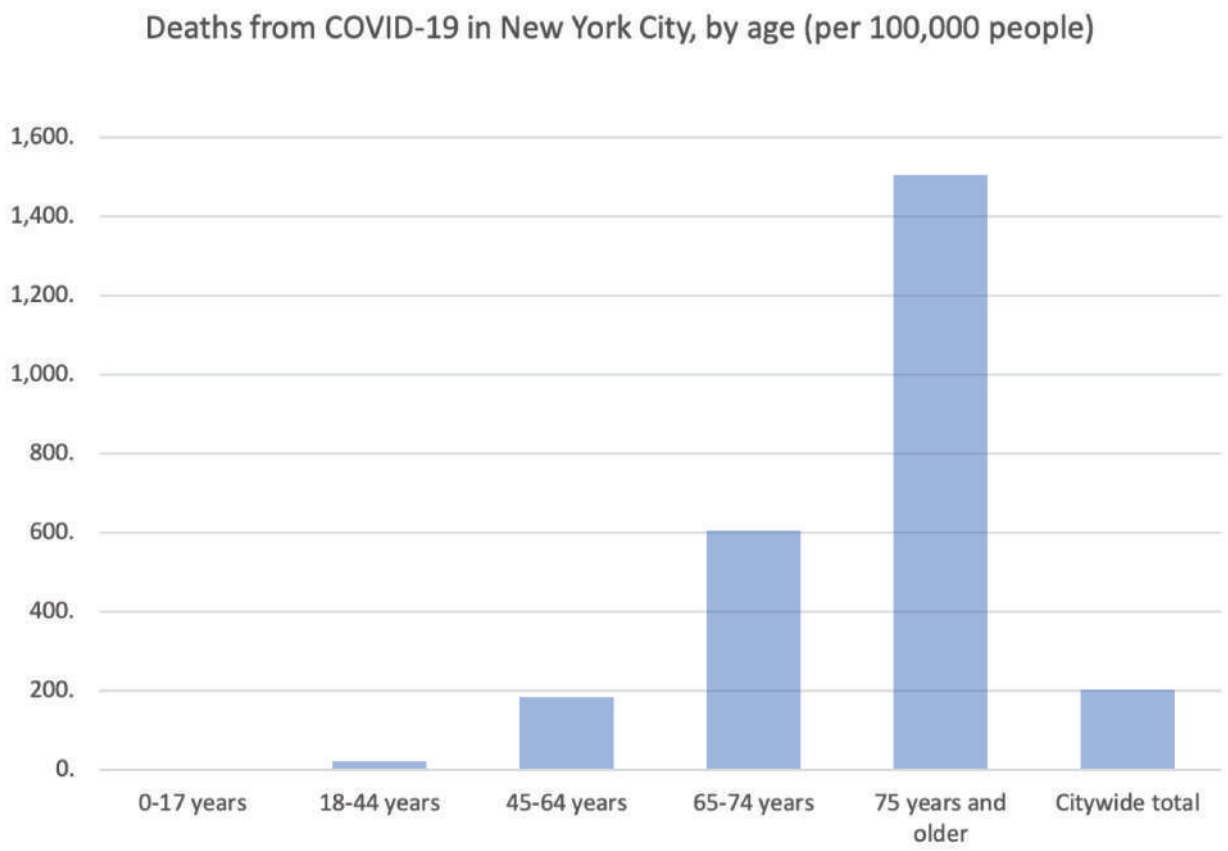
Yes. Young adults as well as older people have been admitted to the hospital for heart attacks and stroke

as a result of infection. They may not know they are infected until they are tested in the hospital.[25]

Can Covid be dangerous for young adults, like it is for older adults?

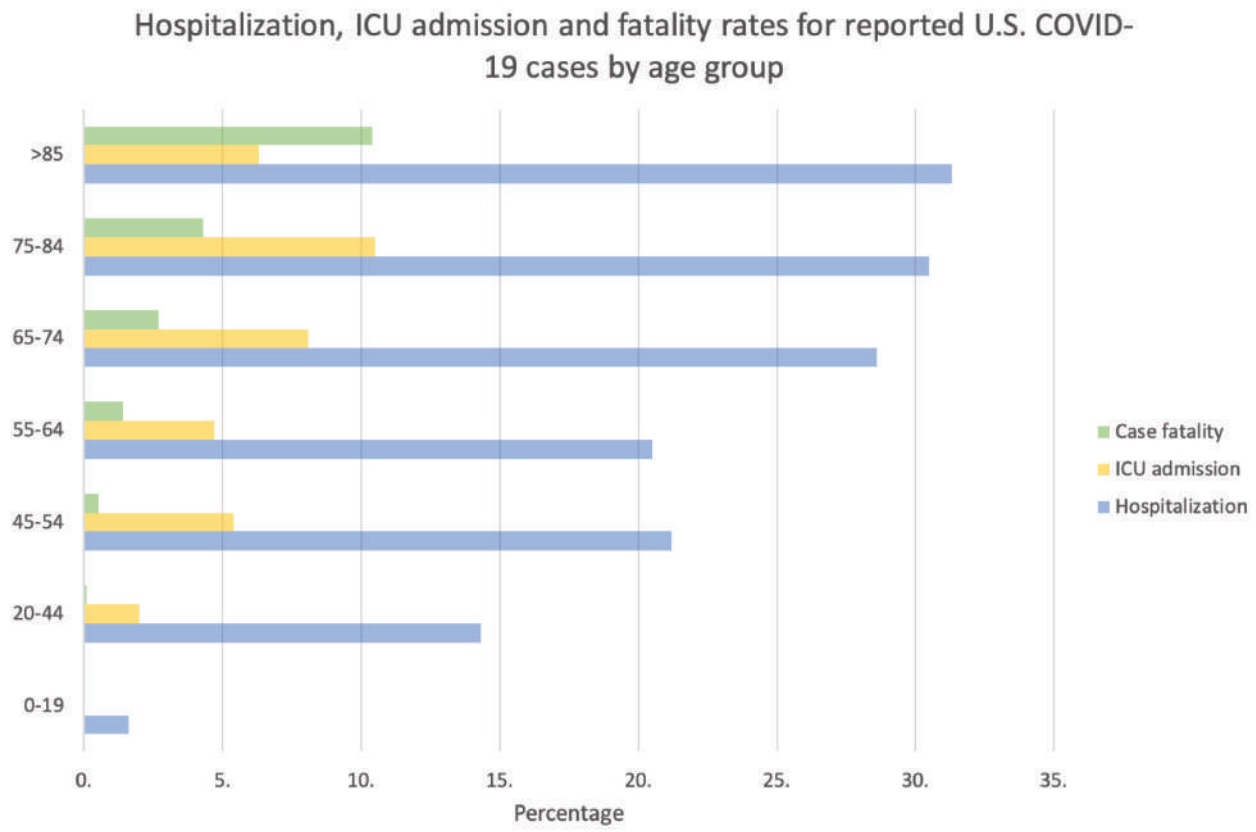
Covid is dangerous for everyone, from newborns to the very old. People of all ages have died from the infection.

The chance of death from Covid is higher for older people than younger people. Below is a bar graph of death from Covid sorted by age. Notice that Covid kills young, middle-aged, and older adults.



Source: NYC Health, June 2020, https://www1.nyc.gov/

Below is a graph of hospitalizations, intensive care unit admissions, and fatality rates sorted by age. Notice that Covid causes serious disease in people of all ages.



Source: Statista/Centers for Disease Control and Prevention, March 2020, https://www.statista.com/chart/21173/hospitalization-icu-admission-and-fatality-rates-for-reported-coronavirus-cases/

Is Covid more dangerous for people who have certain health conditions than others?

Yes. Covid kills more people with other conditions, including people with diabetes, people who are active

smokers, people who are overweight (body mass index over 30), people with chronic heart conditions, and people being treated for cancer.[26] [27]

What medical equipment should we have at home to cope with Covid?

The medical devices listed below can be used to accurately monitor your symptoms at home. They are available for purchase at relatively low prices through Amazon and other online retailers.

A thermometer. The best allow you to take someone's temperature without actually touching their skin. A forehead or ear thermometer is best.

A *pulse oximeter*. This measures the amount of oxygen in the blood. This is a simple device that clips onto an index finger.

If the oxygen saturation level reading is below 95 percent, it is time to go to a hospital.

A *defibrillator*. This is used to treat a person who has collapsed because of a heart attack. It is good to have it in the house for family and friends who visit.

A *blood pressure cuff*. Hypertension is one of the major causes of preventable death worldwide.

The defibrillator and blood pressure cuff are not specific for Covid, but I think every household should have them.

How do I catch the disease?

You catch it from people who have it, by being in close contact with them or coming into contact with the tiny, virus-laden droplets they discharge with each cough and sneeze. The even tinier particles that come out of

the nose and mouth when we breathe and talk may also contain the SARS-2 virus.

You can also catch it from water contaminated with untreated sewage.

Can I catch it from objects and surfaces?

Technically, yes. If droplets containing the SARS-2 virus end up on a doorknob, railing, countertop, phone, toilet, or any number of other surfaces, they could stay there for hours or even days.[28] How long they survive depends on the type of material and other extraneous circumstances, like the weather.

Transmission through objects, however, is not the main way the virus spreads.[29] The main way is through close contact with people who have it.

Can I get sick from someone who doesn't look sick?

Yes. You can get the disease from people who look and feel perfectly healthy.

Some people who get infected never develop symptoms, but they're still able to infect others. They are *asymptomatic*.

Some people may infect others when they are in an early stage of their sickness. They haven't developed symptoms yet, but they will. They are *presymptomatic*. According to the World Health Organization, people who have Covid are likely able to infect others one to three days before their symptoms first appear.[30] Asymptomatic and presymptomatic cases make up about four out 0f every ten infections.[31]

Even people who have mild cases of Covid are able to spread it more easily than other respiratory illnesses. They might not feel or seem very sick, but an unusually large concentration of the virus still builds up in their lungs and nasal passages.

Can Covid be transmitted through sex?

Since sex involves close contact between two people, if one person is infected the other will be, too. Additionally, the SARS-2 virus has been detected in the semen of male Covid patients.[32] It is not yet known whether the disease can be transmitted through oral sex, but it might.

Can I get sick from airborne transmission?

Yes. The SARS-2 virus, once breathed or sneezed out, can linger in the air as tiny aerosol particles for a

few hours.[33] This is especially true in closed rooms or airplanes.

Can the virus be transmitted through speaking?

Yes. If you're inside, droplets that come out of your mouth when you speak can stay in the air for several minutes at a time.[34]

Is it easier to transmit the virus in a closed room?

Yes, the risk of transmission is greater in a closed room than in open air, especially if ventilation is poor and air is stagnant.[35]

Does the amount of time I spend in a room with an infected person impact my chances of getting infected as well?

Yes, even if you're both wearing masks. If you're in an enclosed room with someone who is infected, there is bound to be leakage. If one of you isn't wearing a mask, the risk is all the greater.

In this situation, your chances of getting infected yourself depend on how physically close you are to the person and how much time you spend together. Consider the formula below.

Probability of infection indoors = (Time/Distance) * Number of people * Number of people without masks * % Newly infected in your community

If you're physically close to the person infected, it will take less time for the virus to transmit. If you're farther apart, it will take longer, but the risk is still there.

If the people with you don't wear masks, the chance of transmission is much higher. The same is true for large groups of people even if they do wear masks, since there is bound to be some leakage.

Is there a mask that can protect me?

The only attire that can safeguard against infection almost completely is the full array of personal protective equipment that healthcare workers wear in the intensive care unit.[36] Their masks, paired sometimes with special face shields, are designed to seal their faces off and filter out any incoming viral

particles. Tight-fitting goggles prevent viruses from entering via your eyes.

So heavy-duty a getup is, for many reasons, not a practical option for most. Though wearing some kind of mask or cloth face-covering is important, we cannot rely on masks alone to protect us.

How much virus does a cough or sneeze release into the environment?

When someone sick with Covid coughs, about 3,000 virus-laden droplets fly out of their mouth at a speed of 50 miles per hour. When they sneeze, ten times as many droplets are released at four times the speed.[37] The droplets themselves can contain hundreds of millions of virus particles that, once unleashed, flood their surrounding environment.

This is why wearing a mask and covering your mouth and nose when you cough and sneeze is no small matter.

Does population density affect how the virus is transmitted?

Remember how in the early days of the outbreak, much of our focus was on clusters of cases that broke out in nursing homes, cruise ships, family gatherings, and other conditions of crowdedness and enclosure?

So far, the data amassed on mortality and transmission rates indicate that it is these kinds of cramped environments—within individual homes and buildings—rather than urban environments at large that do more to spread the disease.[38]

Can children transmit the virus to adults?

Yes. The coronavirus is a member of a family of viruses that cause more than 20 percent of all common colds.[39] Since we all know that children can transmit colds to adults, there is no reason to think that they would not transmit Covid, too.

Children who are infected with Covid often have very high levels of the virus in their nose and throat, even if they don't have symptoms.[40]

How often do animals infect humans with Covid?

Very rarely. We do know some house pets, like cats, dogs, and hamsters, can be infected, although they do not become ill. There is a possibility that animals could spread the virus to each other and, from there, back to humans but we don’t know enough yet to say

whether this could occur and, if it did, how common it might be. Scientists are still working hard to understand if and how this might happen.[41]

We think the entire pandemic started when one person was infected by close contact with an infected animal or by drinking water which contained the feces of an infected animal.

There is a very deadly disease called MERS that is mostly transmitted from camels infected with a coronavirus. The virus only causes mild cold in camels but kills about one third of all people who catch it. Luckily that virus doesn't spread well among humans, although some rare cases of human to human transmission occur.

Are some animals more at risk of infection from humans than others?

While hard data is lacking, we can be reasonably confident that many species, including household pets like dogs and cats,[42] zoo animals,[43] and farmed mink,[44] have caught Covid from their human keepers. We also know that some species are vulnerable because they were infected on purpose for lab experiments, like hamsters and monkeys.[45]

Which animals aren't at risk?

Lab studies of pigs, the species that helped the H1N1 influenza virus make the leap from animals to humans, show that they aren't susceptible to Covid. This is also true for ducks and chickens.[46] For other

common livestock, like cows and horses, not enough is known yet to say.

Can I catch it from packages that come in the mail?

It is unlikely that you would catch the virus from the surface of a package or its contents, according to the U.S. Centers for Disease Control.[47] But packages don't deliver themselves, and it's in the hand-off from the delivery person to the recipient that the greatest risk of transmission lies.

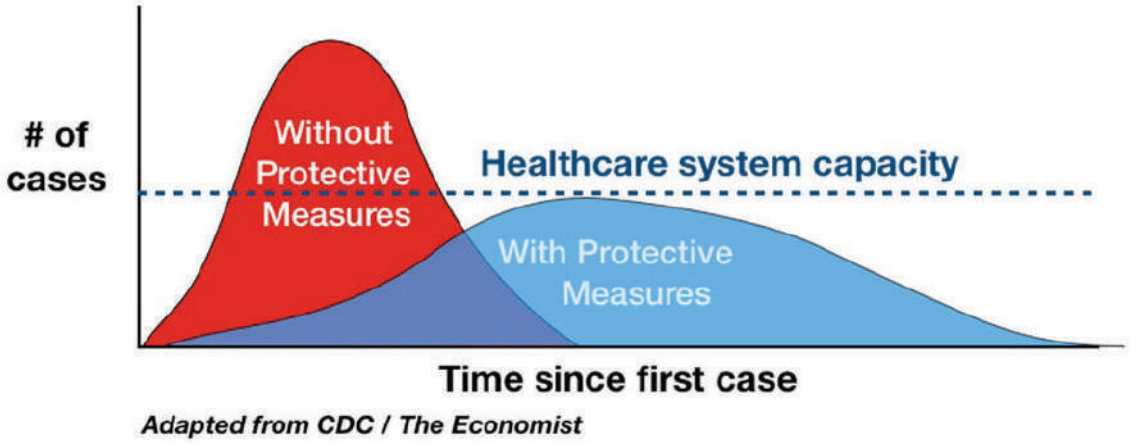
To keep yourself and the person delivering your package safe, make payments online or over the phone when possible and request that packages be left outside your house or in the lobby. If you do need

to accept a delivery in person, maintain the standard six feet of distance, then wash your hands afterward.

Can I catch Covid from food delivery?

Because there is currently no evidence that shows the virus can be transmitted through food, ordering takeout is safe so long as the hand-off from the delivery person to the recipient is conducted safely. The official guidelines for accepting takeout orders are the same as those for accepting package deliveries—pay online or over the phone, leave the order outside if possible, maintain six feet of distance, and wash your hands either way.[48]

Does “flattening the curve” reduce transmission?

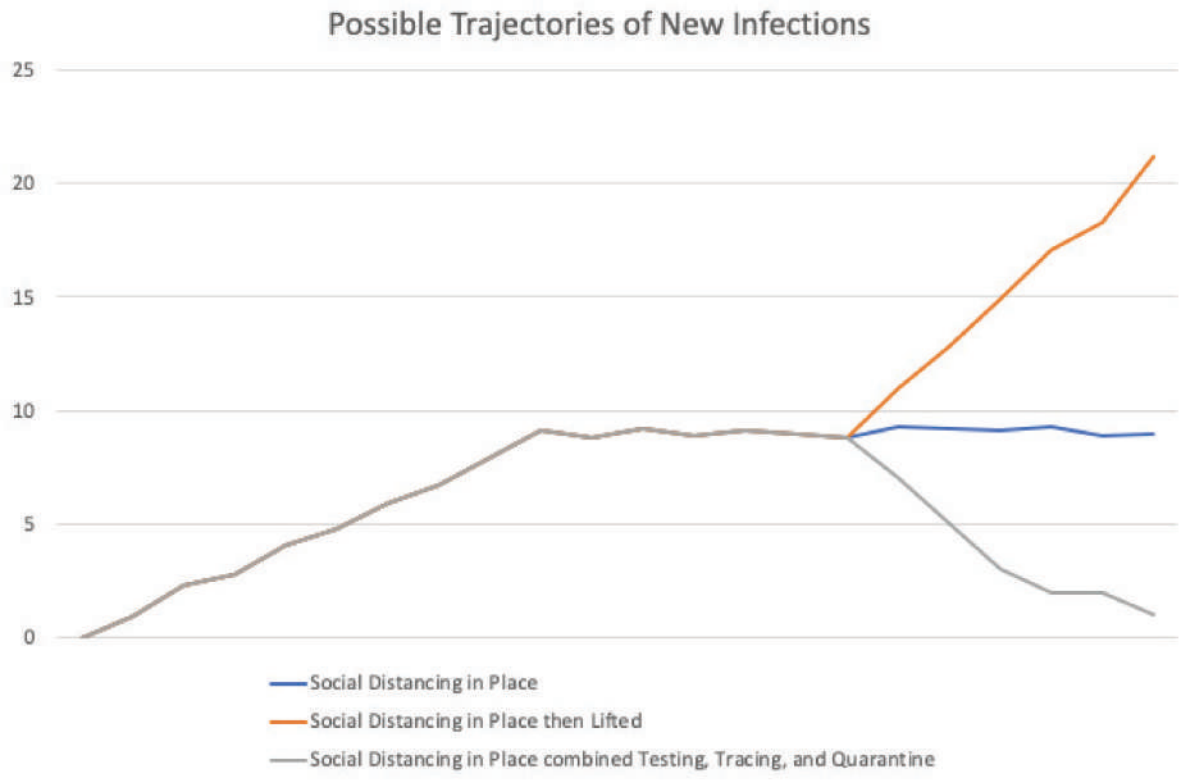


Source: Drew Harris/New York Times, March 2020, https://www.nytimes.com/article/flatten-curve-coronavirus.html

Flattening the curve is shorthand for slowing down the rate of transmission. As a strategy, it involves measures like social distancing, self-isolation, and frequent handwashing.

The principal aim of flattening the curve is to keep hospitals from being overloaded. It doesn't necessarily mean reducing the total number of infections, which requires a more aggressive approach: crushing the curve.

To only partially restrict transmission, as some countries including the United States have done, is a strategy I call "climbing the mesa." Per this logic, the steep slope of initial rates of infection flattens into a long, bumpy plateau, with the drop-off in new cases somewhere in the distant future. Rates of infection may be reduced from what they first were but remain high for a long period of time.



What is Covid toe? Is it a symptom?

Covid toe refers to the painful, chilblain-like lesions, either deep red or purple, that have appeared on the toes of some people with mild or otherwise asymptomatic cases of Covid.[49]

In children, these toe lesions could also be a symptom of Multisystem Inflammatory Syndrome in Children (MIS-C).

Can age groups other than children be affected by Multisystem Inflammatory Syndrome in Children (MIS-C)?

As of this writing, there have been scattered reports of severe inflammatory symptoms appearing in young adults in their early 20s.[50] Unlike the children who have developed MIS-C, whose symptoms closely resemble Kawasaki disease, these young adults are so far exhibiting more vicious patterns of inflammation around the heart and other organs. I know a young woman who developed the symptoms of MIS-C at age 30.

Besides MIS-C, are there Covid symptoms children have that adults don't?

What usually distinguishes the Covid cases in children from those of adults aren't specific symptoms, but a relative lack of symptoms altogether. Although multiple studies have confirmed that children are capable of transmitting the virus, they usually don't get very sick from it.

There are exceptions. A recent study of five children who were hospitalized and later diagnosed with Covid revealed that all five had problems with their digestive tract (usually diarrhea) that preceded all other related symptoms.[51] This suggests that symptoms like diarrhea and stomach pain might indicate otherwise undetectable cases of Covid.

Who is most vulnerable to getting the disease?

Anybody, young or old, could be at risk for developing a severe case of Covid. But in some groups, a greater proportion of people will become critically ill, indicating that the group at large is at higher risk.

Age is the biggest factor by far. The older you are, the more vulnerable you are to Covid. Some young people have died from the disease, but most people who do are over the age of 70.[52]

People with the following pre-existing medical conditions, according to the U.S. Centers for Disease Control and Prevention, are also at risk for developing a severe case of Covid:

Chronic lung disease or moderate to severe asthma: such as chronic obstructive pulmonary disease

(COPD) (including emphysema and chronic bronchitis), idiopathic pulmonary fibrosis, and cystic fibrosis

Serious heart conditions: including heart failure, coronary artery disease, congenital heart disease, cardiomyopathies, and pulmonary hypertension

Immunocompromised: weakened immune system

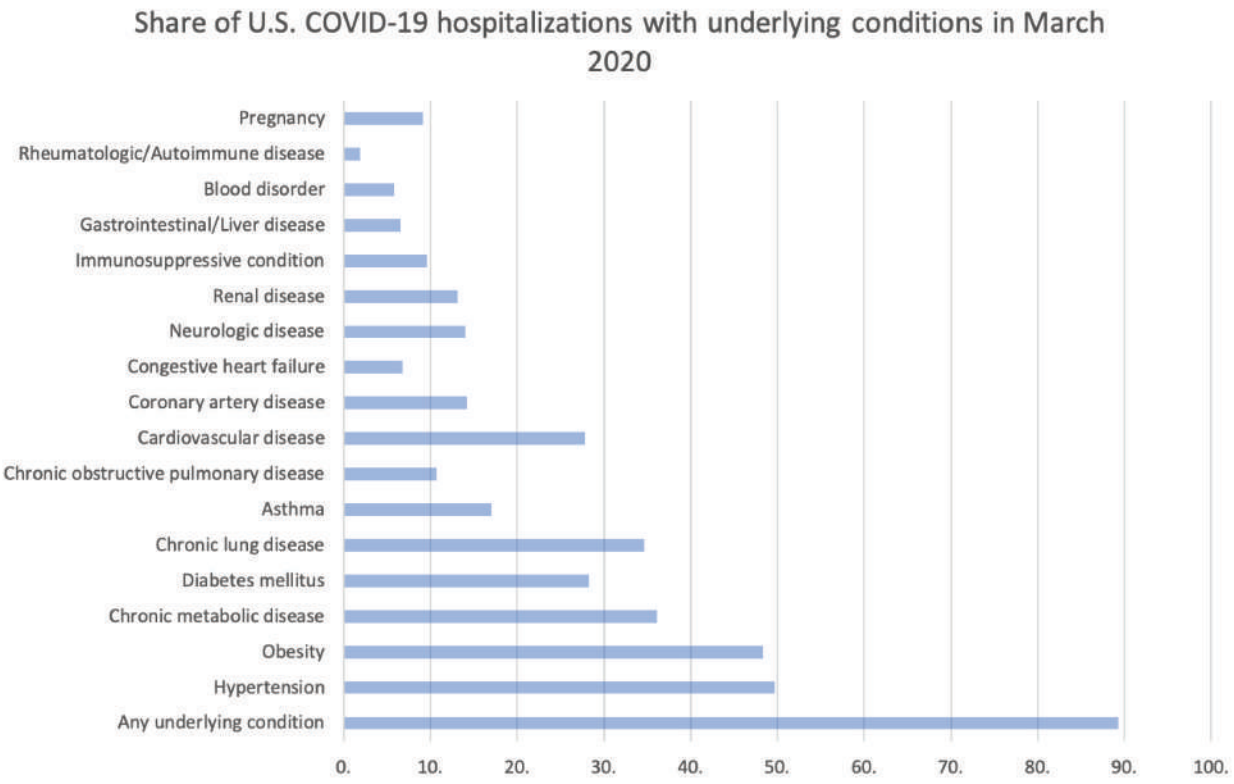
Severe obesity: body mass index (BMI) of 40 or above

Diabetes: type 1, type 2, or gestational

Chronic kidney disease: being treated with dialysis

Liver disease: including cirrhosis

Actively being treated for cancer[53]



Source: MMWR/CDC, April 2020,

https://www.cdc.gov/mmwr/volumes/69/wr/mm6915e3.htm

Beyond high-risk groups like older adults and those with certain underlying health conditions, does Covid impact some populations more than others?

Yes. Studies clearly show that in the United States, Covid has disproportionately affected minority groups,

especially African American, Latino, American Indian, Alaska Native, and Pacific Islander populations.[54]

African Americans are especially overrepresented, accounting for a third of hospitalized patients despite making up only 18% of the community at large.[55] A more recent Gallup report included a finding even more startling: that African Americans and Latinos are twice as likely to die from Covid than Caucasians.[56]

Why are some populations impacted more than others?

The answer to this question goes well beyond Covid. The disproportionate amount of suffering experienced by minority groups during this pandemic speaks to broader and deeper racial disparities that have

affected who receives quality healthcare—and who gets to be healthy—for centuries.

Take high blood pressure, or hypertension, as an example. In many studies, hypertension has been identified as one of the most common comorbidities to occur in Covid patients. In the United States, it also happens to be disproportionately prevalent among African Americans. This is not because of biology, but rather the result of other factors like income, living conditions, level of education, and access to transportation and nutritious food.

While these structural inequities shape our lives and actions each and every day, they become acutely felt in times of crisis. This was true of natural disasters like Hurricane Katrina, and it is true of Covid.

PREVENTING INFECTION

How do I avoid getting the disease?

By avoiding exposure as much as possible. Stay home when you can, and when going out stay six feet away from the people around you. Wear a mask when appropriate.

As the country begins to open back up again and people return to work, protecting ourselves will become more difficult.

What if I can't work from home?

Your job may demand that you not only have to spend your day out of the house, but also interact with many people and/or take public transport. If possible, avoid ride sharing and taking public transport at rush hours. Leave accessories like jewelry or watches at home.

Keep some hand sanitizer on your person instead, especially if a sink isn't easily within reach at all times.

When coming home, leave your shoes at the front door and toss your dirty clothes into a designated hamper or bag straightaway. (If you have a washing machine at home, throw them in there instead.) If possible, take a shower; if not, wash your hands and change into a clean set of clothes.

For more information on how people with specific occupations can keep themselves safe, consult the guide to worker safety and support compiled by the U.S. Centers for Disease Control and Prevention.[57]

I am the sole caretaker of my children. What do I do if I need to take them to the grocery store with me?

First, come up with a list of everything you need to buy before you leave. This will save you time you'd otherwise spend aimlessly browsing the aisles. Before you leave, make sure all children over the age of two are wearing masks or cloth face-coverings.

Once you get to the store, wipe down your cart before you place your baby or child in it. Discourage your kids from touching things and approaching people too closely. They should stay close to you at all times, for their sake and the people around you.

As soon as you're home, both you and your kids should change into clean clothes and throw the dirty ones into the laundry machine or hamper. Shower

and bathe if you can. If neither of these options aren't immediately possible, everyone should at least wash their hands.

When do I wear a mask?

You should wear a mask in public settings, particularly in places like grocery stores and pharmacies where it is difficult to maintain six feet of distance from the people around you.[58] Only children under the age of two and people who already have difficulty breathing shouldn't wear some kind of cloth face cover in these situations.

Will wearing a mask protect me from Covid?

Wearing a mask doesn't prevent you from catching the disease, but it does help stop its spread. The more people wear cloth face covers in public, the greater

the chance that those who have already been infected won't be able to infect others.[59]

Is there a specific type of mask I should use?

There are several. Surgical masks will do the job, but so will a bandana, cloth, or scarf—anything that keeps the tiny droplets that come out of your nose and mouth from reaching other people and surfaces. The U.S. Centers for Disease Control and Prevention released a guide on how to make a mask yourself which is available on their website.[60]

You might have heard about N95 masks, the medical grade masks that healthcare workers wear to protect themselves on the job. The general public doesn't need to wear such heavy-duty masks; in fact, buying them might prevent healthcare workers from acquiring

an adequate supply.[61] For everyone who isn't a healthcare worker, making and wearing a cloth face-covering works just as well.

Can I get carbon dioxide poisoning (hypercapnia) from wearing a mask?

No. Wearing a mask doesn't reduce the amount of oxygen you're getting. Nor does it increase your level of carbon dioxide. Both oxygen and carbon dioxide are gases that diffuse through masks easily, which is why you can still breathe while wearing one, unless you have an underlying lung condition.[62]

Can I wear gloves?

Yes, but wearing gloves can't substitute for handwashing. Remember that if you're out and about, the outside of your gloves can be contaminated. To

remove them, you must peel them off from the inside out—and even then, wash your hands afterwards.[63]

If you're not using disposable gloves, treat them as you would any open surface and clean and disinfect them when you come home.

Can I continue to take my child to their pediatrician for normal care?

Yes. Children need to have regular checkups, and insofar as it is possible, this care must continue. The specifics of where, when, and how will depend on your pediatrician.

Some providers are using telehealth to keep scheduled pediatric appointments. Others might redirect you to a different clinic where your child can be checked without risking exposure to Covid. If your

child is due for a checkup later this year, call their pediatrician to arrange a plan of action that works for you.

Can I continue to take my child for vaccinations?

Yes. Not only can you, but you should. Just because one virus is currently demanding our attention doesn't mean your child is safe from all others.[64]

If your child is due for vaccinations, get in touch with their pediatrician to verify when and where they can be given.

Is it safe for me to leave my child at a daycare center or drop them off for an organized group activity?

In the end, decisions about your child returning to daycare or regular group activities should be based

on your family's comfort level around the possible risk of infection. The U.S. Centers for Disease Control and Prevention has created guidelines for childcare programs and daycare centers to ensure the safety of children and workers.[65] These include social distancing measures, modified pick-up and drop-off procedures, and staff training and protection. Child Care Aware created a similar resource that you can use to make sure your childcare center is doing all it can for the children in their care.[66]

If you are worried that your daycare center or childcare program isn't following safety guidelines and that workers or children are at risk of infection, don't hesitate to bring it up with staff. Together, you may be able to develop a plan of action and source protective equipment to improve how kids are cared for. If you

can't come to a solution you are comfortable with and you are unable to find any other childcare options, use the tips in this book to teach your child how to protect themselves and their friends if they are at an age where they can understand.

In the event of a medical emergency unrelated to Covid, can I still go to the emergency room?

If you're facing a life-threatening emergency, such as a stroke or heart attack, yes. Do not hesitate to call 911 or go to the nearest ER.

Getting immediate medical attention for minor emergencies will be more difficult than usual at this time, as hospitals are currently overwhelmed with Covid patients.

Can I still go to the dentist?

Yes, though the U.S. Centers for Disease Control and Prevention has urged providers of dental care to postpone non-urgent visits, surgeries, and procedures.[67] Most dental clinics are not open now. They are working to understand how they can work in a way that is safe for you and for them.

If you have a dental emergency, or if your dental office has indicated that they will be resuming non-urgent care and you'd like to make an appointment, ask your provider about the specific safety protocol you'll need to follow when dropping by. If possible, make any necessary changes to your information remotely, so as to minimize your time spent in any common areas. Don't forget to bring your mask, too.

Should I still allow workers into my home, like nannies, plumbers, electricians, or cleaners?

If infection rates are high in your community, try to reduce visits from outsiders as much as possible, or avoid them entirely. If you cannot avoid having visitors to your home, make sure you provide them with protective gear upon entry—like masks and hand sanitizer—so they can protect themselves, their families at home, and you. If it's possible, ask other members of your family to stay in a separate room while they are in your home. If it's not, keep a safe physical distance from the workers while they are in your home and make sure to keep rooms as well ventilated as possible. For some workers, like nannies, this won't be possible. But for cleaners, handymen, and others, this should be possible to do.

After the visit is over, give your visitor the opportunity to disinfect their hands and any materials they brought into your home. And after they leave, disinfect the areas in your home they visited as well.

How can I care for people who used to work for us regularly but who we can no longer employ because of social distancing restrictions?

These are challenging times for everyone. If you are among those who are able to remain financially stable during these times, consider paying your staff throughout the crisis. A significant loss of income can drive people to make riskier choices, not out of ignorance but out of necessity. If you cannot continue to pay a full salary to any staff, consider offering a smaller amount or offering them an advance on future work.

For those struggling with their own financial worries, providing any form of support may be challenging. In this case, you might want to try connecting former workers with other potential sources of support, like local food banks, loans, or government stimulus support.

I think a friend, family member, or loved one is at risk. What can I do to keep them safe?

If the loved one *isn't* a member of your household, make sure they're in contact with a primary care provider who is familiar with their medical history and can advise them on appropriate precautions to take. Should they start experiencing symptoms—for Covid, or for another serious illness—they must notify their provider as soon as possible and keep them updated on any developments.

You can explore which nearby hospitals offer the highest quality of care and talk to them about where they can go if their condition worsens. Check in with them regularly to see how they're feeling and provide comfort to the best of your abilities. In lieu of routine clinical care, emotional support can be valuable.

These basic guidelines still apply if the loved one *is* a member of your household, but with the added emphasis on creating a safe, clean environment that minimizes any further risk. Use household cleaners and wipes to disinfect the house daily. Wash your hands often, especially after going outside. Know what to do in the event your loved one gets sick and needs some level of home isolation.

When I'm cleaning and disinfecting my home, how do I know if I'm actually killing the virus?

Experts agree that to eliminate the virus completely, you probably need to spend more time scrubbing down surfaces than you think.[68] To know just how long you should leave a product on a given surface before toweling it dry, double check the label. It could be as little as 30 seconds, or as much as several minutes.

If you want to verify that a cleaning product is effective against the SARS-2 virus, consult the list compiled by the U.S. Environmental Protection Agency on their website.[69]

How often do I need to wash my bedsheets?

More often than usual. Every time you climb into bed after the end of a long day, you shed sweat, dirt, dead

skin—and, if you're infected, bits of SARS-2 virus. While no magic number of washes exists, experts suggest halving the time between wash periods.[70] Don't forget to wash or disinfect your laundry hamper as well.

What do I do if I've been exposed to Covid?

Because Covid is highly infectious, anyone who has been exposed to someone with the disease should consider themselves infected and should isolate themselves from all others.

Ideally, this would happen at a facility that was monitored and supervised by public health officials.

Realistically, this probably means isolating yourself in a hotel room or in a bedroom in your own home. No one should enter the room that you are in for any

reason. Food should be left outside your door; garbage should be collected the same way and immediately disposed of; and—if it is necessary for you to leave the room to go to the bathroom, for example—you should wear a mask and gloves at all times and ensure the shared room is disinfected immediately after use.

If I've been exposed, how long will it be before I'm contagious?

It could take anywhere from three days to three weeks. According to the World Health Organization, you'll be able to spread the virus to others three to five days before symptoms start to show up.[71]

How do I care for someone who is sick with Covid?

If possible, they should be isolated in a hotel room or another location where they can recover. If it does fall to you to take care of someone sick with Covid, the chances you will be infected are extremely high.

If they've consulted a healthcare provider themselves, or if you've consulted a healthcare provider for them (e.g. for your child), you'll need to help them follow any instructions given and pick up any medications prescribed, in addition to suggested over-the-counter medicines. Remember, you may be infected and infectious too, so try to have medications delivered and dropped off at your door.

Make sure they're consuming a lot of fluids, getting a lot of rest, and staying away from pets, if you have

any. Monitor and log their symptoms to track any changes for better or for worse. Get in touch with a healthcare provider if you're nervous or unsure about which symptoms are common and which are warning signs.

If I or someone else in my household is infected, will everyone get sick?

The hard truth is that if someone in your household is sick, it will be very hard for you and others in your household to not become infected as well. The ideal situation to protect yourself and the rest of your family is to relocate the sick person to a hotel room or a supervised health facility.

If relocation isn't an option, how do I protect myself and other people in my home if someone gets sick?

Do your best to isolate the person within your home, in a separate bedroom with access to a separate bathroom. Food should be left outside the door of the room and any garbage should be collected in the same way. Silverware and dishes should not be shared under any circumstances and any clothes should be thoroughly washed in hot water immediately.

If the sick person must leave the isolation area to use the bathroom or for another reason, they must wear a mask and gloves at all times and the shared area should be thoroughly disinfected once the sick person has left.

What if I have small children?

Take the time to plan for back up care should the caregivers in your household fall severely ill.

If your kids are older, involve them in the caregiving process. Give them access to your medical history and the names of your healthcare providers so they can step in and care for you if you yourselves cannot.

How can I manage my Covid-related anxiety?

You can start by moderating your intake of Covid-related news. As important as it is to stay informed, it's also important to recognize when too much is too much. Learn to take a break or walk away when you start to feel overwhelmed by what you're reading or watching. Impose time limits if necessary.

Engage in some form of physical activity daily and unburden your mind by talking out your worries with family and friends. Schedule a weekly video call with someone to replace your weekly coffee or lunch. Don't forget to be kind to yourself and make time to unwind.

I have so much Covid-related anxiety that I can't sleep. What can I do?

During the day, try to expose your body to as much natural light as lockdown allows—whether that means setting up your workstation near a window, or going for a stroll around the neighborhood at a safe distance from others.

Try to develop habits that, starting a few hours before bedtime, begin to cue your mind and body for sleep.

If possible, create a sleep schedule that you can follow consistently. Avoid using your phone both before and in bed. To naturally boost the body's relaxing hormone, melatonin, take a warm shower shortly before hopping into bed.[72]

How do I tell the difference between shortness of breath caused by Covid and shortness of breath caused by anxiety?

If your inability to breathe sets in suddenly and without warning, it is likely caused by anxiety, rather than Covid itself. The shortness of breath typical of severe Covid cases is known to set in gradually, over the course of several days.[73]

How can I help older relatives and neighbors who are living in isolation?

As you would with anyone else who is at risk, check in often and ask what you can do for your relative or neighbor that might be helpful. Video calls can also take the edge off prolonged isolation.

The Washington Post created a resource with more tips and expert advice on how to help your older relatives and neighbors.[74]

What do I do if my parent or spouse or grandparent is in a nursing home?

Check in with them frequently. Ask them about their health, how they feel, and the quality of care they're receiving. Speak with their staff and caregivers, too. Ask them about what they're doing to keep the

disease out and what they'll do if it gets in. Request that your loved one's temperature be taken twice daily. If their temperature ever exceeds 100.4 degrees Fahrenheit, insist that they be taken to a hospital immediately.

If, based on conversations with staff and your loved one, you come to the conclusion that they're not safe, it may be time to have a conversation about bringing them home.

How do I know if I should remove my parent or spouse or grandparent from their nursing home?

The only answer I can offer to this difficult question is: it depends. Both the U.S. Centers for Disease Control and AARP have cautioned against moving older adults out of nursing homes and long term care

facilities since the process could unnecessarily expose them to infection.[75] Even so, the decision should ultimately be made on a case by case basis by the resident and their loved ones.

If my child or relative is living with a disability, are they at increased risk of getting Covid?

Yes. Those who live with mobility impairment, cognitive disability, or any other condition that impedes their ability to follow basic prevention guidelines around social distancing and handwashing are, according to the U.S. Centers for Disease Control and Prevention, at increased risk of getting sick with Covid.[76]

How can I protect my children or relatives who are living with a disability from getting sick?

Devise a backup plan for care provision in case their current caregiver gets sick—whether that's you, a home care worker, or someone else. Pull together a network of contacts you or your loved one might reach out to for support that includes neighbors, local service agencies, and friends and family.

Help your loved one stock up on food and medications as much as restrictions allow. Think of other routines that will require rethinking due to lockdown or other Covid-related disruptions and work with your loved one's support network to figure out necessary adjustments.

What if my child or relative is living with a serious mental illness?

This will largely depend on the specific ways in which they feel impacted or vulnerable. For more information, consult the free Covid Resource and Information Guide created by the National Alliance on Mental Illness.[77]

If I'm pregnant, what can I do to protect myself and my baby throughout my pregnancy?

Being pregnant doesn't increase your chances of catching Covid.[78] The protective measures recommended by the American College of Obstetricians and Gynecologists for pregnant women are no different from those that the U.S. Centers Disease Control and Prevention and the World Health Organization have issued to the general public:

staying home, social distancing, and frequent handwashing.[79]

If I'm pregnant and catch Covid, can I infect my baby during pregnancy, labor, or delivery?

There is some evidence that mothers can transmit the SARS-2 virus to their fetus during pregnancy. The study behind this was small, though, and many more births must be examined before we can say for sure.[80]

It is also unknown whether you can infect the baby during childbirth. However, there is some evidence that you can transmit the virus to your newborn infant, just as you would a cold.[81]

If I'm pregnant, is it safe to go to a hospital for delivery?

Experts agree that it would be more dangerous for you to give birth at home than at a hospital or certified birth center.[82] While there is a risk that you could become infected with Covid, most hospitals are taking extreme care to separate Covid patients from the rest of their patient population.

I have hypertension, or high blood pressure. Should I continue taking medication that interacts with ACE2, the receptor for SARS-2?

As long as your healthcare provider does not tell you to stop, you should continue to take your medication. Even though some doctors warned early on in the outbreak that continuing to take such medications would increase your risk of contracting Covid, several

large studies conducted since have disproved this theory. No evidence currently exists that would suggest hypertension medication is an exception.[83]

If I have diabetes, how dangerous is Covid for me?

While you're no more likely to catch the disease than the general population, research shows that people with diabetes who do get infected are at a higher risk of becoming very sick and developing serious complications.[84] More than 25 percent of people who were hospitalized due to Covid in England had diabetes, making it the most common underlying condition among Covid patients.[85]

According to the American Diabetes Association, this risk goes down if your diabetes is well-managed.

Currently it is unknown whether people living with type 1 or type 2 diabetes experience Covid differently. The more important distinction is age.[86]

If I have diabetes, are there specific precautions I can take to keep myself safe?

Your main goal should be to avoid exposure. Stay at home as much as possible and follow the protective guidelines given by state and local health authorities and the U.S. Centers for Disease Control and Prevention. Make sure you're stocked up on simple carbs and have at least a week's supply of insulin on hand at all times. If this isn't feasible, consult InsulinHelp.org for help.

Speak to your healthcare provider about creating a plan of action if you do get sick. They'll be able to

advise you on how often to check your blood sugar and ketones, appropriate medications to take, potential changes to your current medications, and when to seek medical attention.[87]

If I have chronic obstructive pulmonary disease, how dangerous is Covid for me?

You're no more likely to catch the disease than the general population, but once infected, you are at higher risk of developing serious complications.[88] People with chronic obstructive pulmonary disease who become sick with Covid might experience breathlessness sooner than others, a symptom that demands immediate medical attention.[89]

If I have chronic obstructive pulmonary disease, are there specific precautions I can take to keep myself safe?

Unless instructed otherwise by your healthcare provider, keep up with your usual medications and treatments.[90] Have a month's worth of medication on hand—even 90 days if possible—and contact your oxygen provider to make sure there will be no interruption to your supply.

Avoiding exposure should be your highest priority. Stay at home as much as possible and follow the protective guidelines given by state and local health authorities and the U.S. Centers for Disease Control and Prevention.

If I have HIV, how dangerous is Covid for me?

If you're on antiretroviral treatment, you're no more likely to get the disease than anyone else and you're not at greater risk of becoming very sick if you do become infected. But if you're immunocompromised or not receiving treatment, then you're at greater risk of developing severe symptoms because your immune system is more susceptible to viral infection.[91]

For more information and resources on Covid and living with HIV, consult the official web pages created by the U.S. Centers for Disease Control and Prevention and HIV.gov.[92] [93]

If I have HIV, are there specific precautions I can take to keep myself safe?

Unless instructed otherwise by your healthcare provider, keep up with your usual medications. Have at least a month's supply of your antiretroviral treatment on hand, or 90 days if possible. The U.S. Centers for Disease Control and Prevention has advised clinics to expand pre-exposure prophylaxis (PrEP) prescriptions from 30 days to 90 days.[94]

Avoiding exposure should be your highest priority, especially if you're untreated or immunocompromised. Stay at home as much as possible and follow the protective guidelines given by state and local health authorities and the U.S. Centers for Disease Control and Prevention.

If I'm immunocompromised, how dangerous is Covid for me?

You're no more likely to catch the disease than the general population, but once infected, you are at greater risk of developing serious complications. Having either a weakened or overactive immune system makes you more vulnerable to Covid. Even after recovery, you may be infectious longer than most, but we don't know this yet for sure.[95]

For additional information about specific conditions and risk factors, consult the U.S. Centers for Disease Control and Prevention webpage.[96]

If I'm immunocompromised, are there specific precautions I can take to keep myself safe?

Avoiding exposure should be your highest priority. Stay at home as much as possible and follow the protective guidelines given by state and local health authorities and the U.S. Centers for Disease Control and Prevention.

Unless your healthcare provider advises otherwise, keep up your current medications and treatments, including immunoglobulin replacement therapy infusions.[97] Have at least a month's supply of medication on hand in case you get sick.

If I have chronic myeloid leukemia and am being treated with tyrosine kinase inhibitors (TKIs), how dangerous is Covid for me?

Although the data presently available is limited, none of it suggests that having chronic myeloid leukemia or using TKIs as treatment makes you more vulnerable to getting Covid. Neither the cancer nor the therapy alone is believed to suppress the immune system to the point of greater risk.[98]

A small study conducted in the Hubei Province of China suggests that Covid infections among people being treated with TKIs were few, and the severity of their cases on par with rates observed in the general population.[99]

If I have chronic myeloid leukemia, are there specific precautions I can take to keep myself safe?

Avoiding exposure should be your highest priority. Stay at home as much as possible and follow the protective guidelines given by state and local health authorities and the Centers for Disease Control and Prevention.

Unless your healthcare team says otherwise, do not stop or reduce your medications or treatments.[100] [101]

UH OH! I'M INFECTED

What do I do if I have mild symptoms?

When a case of Covid is mild, the best thing to do is isolate yourself and rest. Medicines specific to Covid

haven’t been created yet, and until they are this is the surest path to recovery.

Call your primary care provider for guidance but avoid going to the hospital based on suspicion alone. Schedule a telehealth appointment if possible so you can discuss your situation with a healthcare provider face to face. Keep a running log of your symptoms in case they get better or worse.

If you do not have a regular family provider, call the hotline for Covid at a nearby hospital. They will all want to speak to you before asking you to come in for a visit.

If you share a home with others, chances are they’re already infected. If possible, relocate to a hotel room

or another location where you can live alone for the duration of your sickness.

Is there medicine I can take if I have mild symptoms, even if no Covid treatment is available?

Yes, you can take over-the-counter medicines like Tylenol, acetaminophen, and decongestants to mitigate your symptoms.[102]

When and where should I get tested?

So long as there is a general shortage of testing kits, not everybody will be able to get tested. That's why the U.S. Centers for Disease Control recommends deferring this question to a healthcare provider who will be able to give you an expert opinion.

If you simply know you've been exposed, assume you've been infected. At this stage, you don't need to get tested. Only people who have developed more serious symptoms (difficulty breathing, persistent chest pain or pressure, unable to be woken, bluish lips or face) should get tested.

When should I go to the hospital?

You should go to the hospital if you begin experiencing severe symptoms (difficulty breathing, persistent chest pain or pressure, unable to be woken, bluish lips or face). You should also go if your oxygen saturation level is below 95 percent, even if your symptoms are mild.

If possible, schedule a telehealth appointment with a healthcare provider or speak to one over the phone before making the trip.

If I'm sick, how long will it take me to recover?

It depends on the severity of your illness. According to the World Health Organization, it usually takes about two weeks from when symptoms first appear for someone with a mild case of Covid to recover. For people with severe cases, it takes longer—anywhere from three to six weeks.[103]

I'm a single parent. How can I prepare myself in case I get sick?

Beyond the standard safety and protection guidelines, there are some things you can do to prepare yourself and your child in the event that you fall ill.

Stock up on over-the-counter medicines, tissues, and other necessities like nonperishable soups and foods. If you do get sick and develop mild symptoms, such a supply will allow you to recover comfortably at home without needing to go outside. Have someone in mind who might be able to bring you groceries. Pack a compact overnight bag in case you have a more severe case of Covid and need to go to the hospital.

I'm a single parent. How can I prepare my child in case I get sick?

Now is the time to reach out to healthy friends, family members, or neighbors who don't belong to a high-risk group and see who would be willing to care for them even if they're potentially infected or contagious.

Pack a bag for them that includes clothes and a comfort item like a stuffed animal or special blanket, medications, copies of their insurance cards, and a list of names and phone numbers for their pediatricians, teachers and principal, and emergency contacts.

If I recover from Covid, is there still a chance I can infect other people?

Possibly. After you recover, there will be a period of time when you're still contagious. For most, this period lasts around 10 days, though there have been some exceptions. This is why, after symptoms have resolved, some experts recommend staying in isolation for at least 14 days.[104]

How do I know when I can go out after being sick?

If you've been sick and in isolation, you should feel comfortable going out again if one or more of the following conditions are met: no fever for a full three days; improvement of all symptoms (like cough); or tested negative for the SARS-2 virus on two consecutive days.

There have been a few exceptions to this rule. Some people test negative repeatedly for the virus, only to be identified later as still having it. Some cases of reinfection may come from viruses left over from the first round of infection.

When I start going out again after recovering, do I still need to protect myself?

Even if you feel fully recovered and your symptoms have disappeared, you should continue to observe protection guidelines as if you'd never gotten sick in the first place.

If I recover from sickness, can I get infected again?

We are not sure. Very possibly. There are several reports of reinfection, though none have been confirmed. Reinfection does occur with cold-causing coronaviruses.[105] [106]

If I recover from Covid, am I immune?

We just don't know yet. Our best guess is that some, but not all, people who have recovered from Covid are immune.[107]

Until we have more information, however, it is safest to assume that you are not immune. Even after you recover, you should take the same precautions as someone who hasn't yet fallen ill. There is a small chance that you can still infect others even after your symptoms have disappeared.

If I do have immunity, how long will it last?

This is another thing we don't know yet. With milder coronaviruses, it has been found that immunity sometimes doesn't last more than a year.[108] Whether this is true of Covid remains to be seen.

Should I catch Covid on purpose so I develop immunity to it?

No. We know too little about how immunity against Covid works to assume that contracting the virus leads to prolonged protection from it. Such behavior is dangerous not just for you, but for the people around you.[109]

GETTING TESTED

What kinds of tests are available for Covid?

Three types of tests have been approved by the U.S. Food and Drug Administration: RNA tests, which measure the presence of the actual virus; antigen tests, which measure the presence of viral proteins; and antibody tests, which measure the body's reaction to the virus.[110]

What are RNA tests and how do they work?

Of the three different types, RNA tests, also known as genome or nucleic acid tests, are useful for detecting active infections. They're the most sensitive and reliable of available Covid tests, but their results also take the most time to deliver—from one day to a week and a half, depending on the context.

RNA tests measure the presence of viral genes in the body using a swabbed sample, usually taken from the nose and throat. The sample must then be sent to a lab where it can be replicated and analyzed in a special machine. The test itself may not take long to complete, but most labs have accumulated a backlog of samples in need of processing that prolongs turnaround time.[111]

What about point-of-care RNA tests?

Point-of-care RNA tests have also been developed that shorten this waiting period to mere minutes, though the World Health Organization recommends limiting use of these tests to research settings only due to a lack of supportive evidence.[112]

What are antigen tests and how do they work?

While RNA tests detect the presence of viral genes, antigen tests do the same for viral proteins, meaning they can also detect active infections. They are the latest of the Covid tests to be approved by the U.S. Food and Drug Administration, they are also the fastest, though not the most sensitive.

The U.S. Food and Drug Administration cautions that those who test negative for Covid using an antigen

test may need to confirm their results with a genome test, or risk acting on a false negative.[113] But in addition to yielding fast results, antigen tests are cheaper to produce and easier to scale up to the levels needed to test entire states and nations.[114]

What are antibody tests and how do they work?

An antibody test, or serology test, measures the presence of antibodies in the blood, meaning they're good at detecting past infections rather than active infections. Antibody tests are designed to reveal whether or not someone has developed an immune response to the SARS-2 virus, though testing positive doesn't necessarily ensure immunity.[115]

Like antigen tests or point of care RNA tests, antibody tests are a rapid diagnostic test that will give users a

verdict within minutes. However, their speed and convenience can come at a cost; some users have reported incidents of inaccuracy or trouble interpreting the results in the first place.[116]

While reports of their inaccuracy have been a cause for doubt, newly licensed versions show promise to be more specific than many already brought to market.

Are home tests available?

Yes. As of June 5, at least one at-home saliva test has been approved by the U.S. Food and Drug Administration.[117] So far, the test has been found to produce less false negatives than standard RNA tests, and no false positives.

What about temperature checks?

So-called “fever detectors” and thermal scanners alone cannot reliably identify people who are sick with Covid. These technologies, which claim to pick up on elevated temperatures by measuring the heat coming off a person’s skin, have a hard time distinguishing between fevers and other forms of excess body heat.[118]

According to one study, screening strategies like airport temperature checks are estimated to miss more than half of infections.[119] This isn’t exactly surprising, given that many people who have Covid don’t even run a temperature.

How many tests do we really need?

Ideally, all 155 million workers in the United States should be tested before returning or continuing to work. All 80 million students (kindergarten through grade 12 and college) should be tested before returning to classrooms, which are ideal settings for disease transmission. All those over the age of 65 (about 50 million) should be tested, as they are at high risk.

According to the Harvard Roadmap to Pandemic Resilience, we may need as many as five million tests a day by June, and 20 million tests a day by July. That translates to 10 billion tests per year, which exceeds even the estimates above.[120]

WORKING AND LEARNING FROM HOME

How can I create an ideal environment for working from home?

To start, focus on your immediate environment. Make a habit of decluttering your desk space or desktop before you get down to business or do some simple list-making to get your priorities straight. Remember—your mind needs just as much upkeep as your surroundings.

Experts recommend devoting a few minutes each day to a gratitude, mindfulness, or meditation practice, or a combination of those, to mentally reset before or after a long workday. For more tips on working from home, check out the guide created by Healthline.[121]

What are some easy ways I can give my brain a break?

Try breaking your schedule up into uninterrupted chunks of work time punctuated by short breaks. One variation of this is the famous Pomodoro Technique, in which every 25 to 30 minutes of work time is met with a five-minute pause.[122] Some people prefer longer chunks of an hour or two. The key is to stop and rest at consistent intervals, whether that means drinking water, grabbing a snack, or having a quick stretch.

How can I avoid burnout while working from home?

When it comes to introducing some breathing room into an overwhelming work schedule, it can be the little things that count. If a commute to and from your

place of work once served that purpose, try slotting in some open-ended “commute time” that will help you ease in and out of work mode. Allow yourself time to recharge on the weekends. If the weather is nice and you have a spare minute, go for a walk with a mask and at a safe distance from others to unwind.

Ultimately, the trick is to find an approach that works for you and stick with it. To get a sense of how widely such strategies can vary, check out the website listed at the bottom of the page that was compiled using the advice of business leaders and wellbeing experts across the country.[123]

How do I balance working from home with helping my kids with their remote learning?

At the beginning of each day and week, compare your work schedule with your kid's learning schedule and, as best you can, set your priorities and plan time accordingly. Kids benefit from routine—as will you—so being able to create and fall into a consistent rhythm is your best bet at introducing some structure into your new situation, inevitable interruptions aside.

When it works, square your kids away with learning and extracurricular activities to keep them busy so you can have long periods of uninterrupted focus. Some days will demand more intervention on your part than others, making it extremely difficult to be productive—and that's okay.

For more tips on how to juggle work and your kid's education from experts and parents alike, check out the guide compiled by *Vox*.[124]

What if my kid doesn't enjoy virtual learning and virtual playdates?

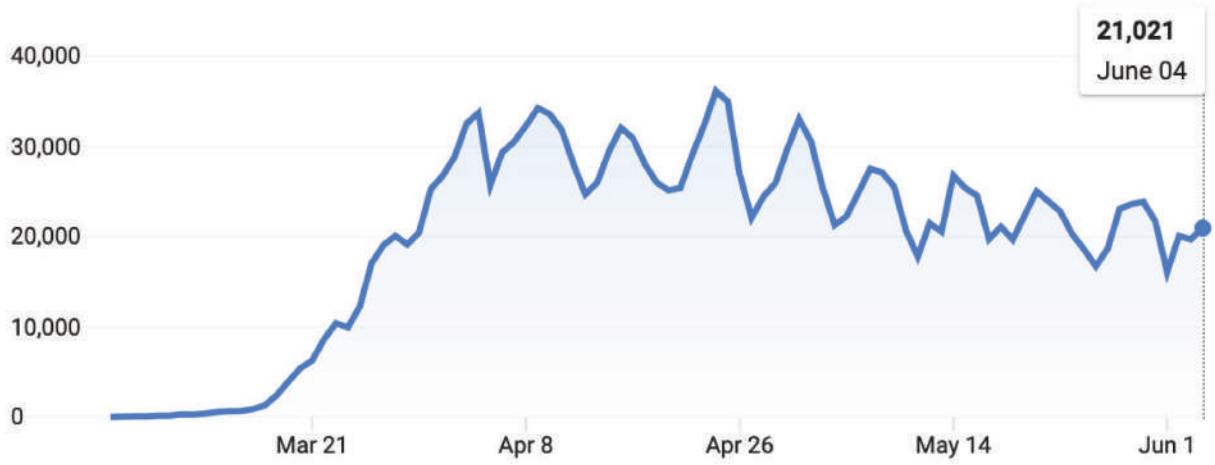
Chances are your kid isn't allergic to the technology itself, but instead tired of not being able to go to school and play with friends like they did before. If their sadness or frustration is beginning to affect their ability to participate in school and have fun, there are a few things you can try out that might help.

Remember that even if you've had conversations with your child about the pandemic and its impact on our social and emotional lives, they still might lack the language they need to process these changes and

express their feelings about them. Helping them find that language might not cure their aversion to Zoom, but it would at least help you both understand it.

For more advice from experts on how to respond to your kid's aversion to virtual hangouts, check out *HuffPost's* guide.[125]

WHAT DOES THE FUTURE LOOK LIKE?



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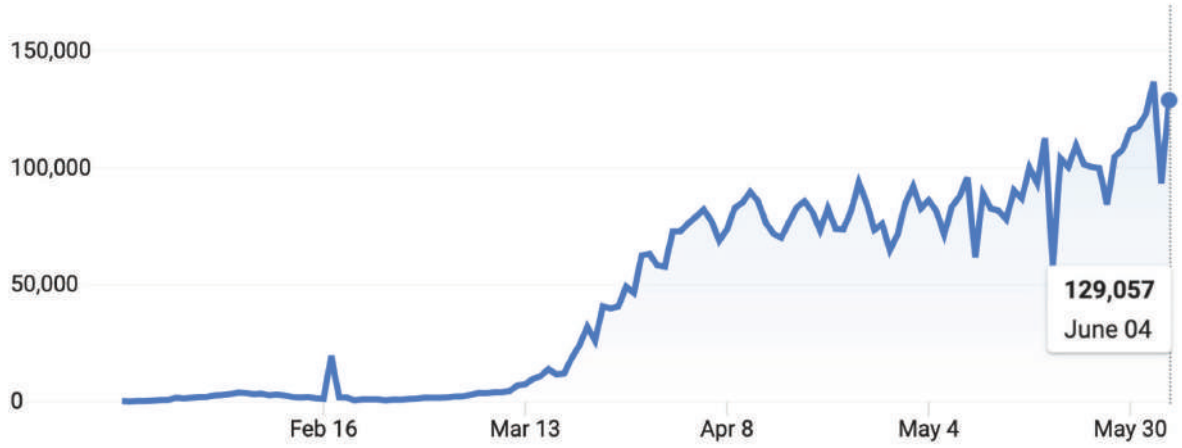


Source: Wikipedia

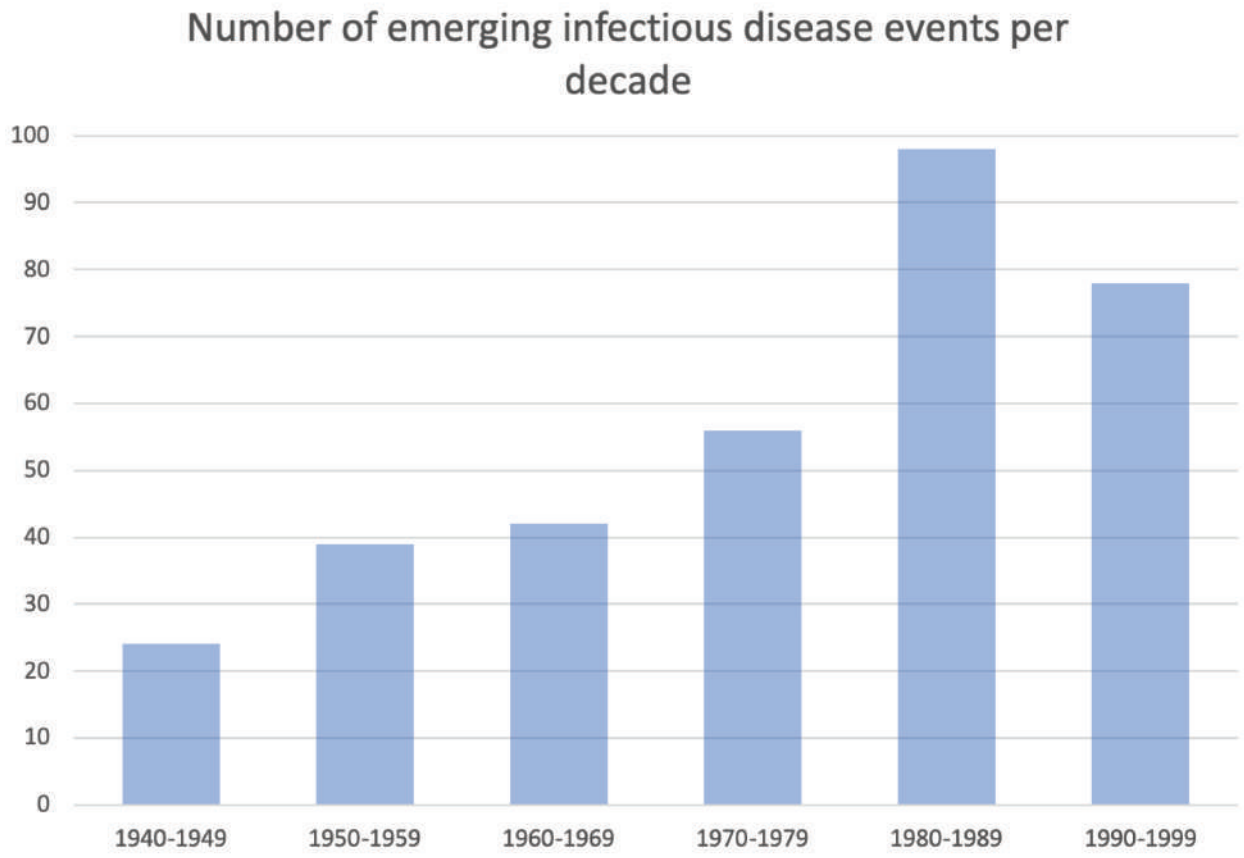
Can the virus become more lethal and more transmissible?

Because viruses continually adapt as they spread, it is possible that the SARS-2 virus can become more transmissible. It can also become more lethal.

Today, we can track daily changes in the virus by complete genome sequence analysis. More than 20,000 SARS-2 isolates have been sequenced already. Many more are being added daily.[126]

As of now, there is no proof that the virus has changed substantially, but there are hints that it may become more transmissible.

It seems like many new infectious diseases have emerged in the last decade. Is that true?



Source: Jones, K., Patel, N., Levy, M. *et al.* Global trends in emerging infectious diseases. *Nature* 451, 990–993 (2008). https://doi.org/10.1038/nature06536

Yes. Over the last 20 years we have seen many new diseases, especially many new infectious disease outbreaks. This is in large part because of the way humans behave, rather than any change in the number of diseases that exist in nature. A rapid growth in global population, increased urbanization—with more of us crowded together in a smaller geographic space—and increases in travel, trade, and connectivity are the main causes.

What's more, a warming climate means that diseases carried by mosquitoes are moving from the tropics to what used to be colder climates. The good news is we

are also getting much better at detecting new outbreaks and containing them.

Do most of these new diseases come from animals?

Yes. There were the two previous coronavirus epidemics, SARS and MERS, which both originated in bats and then passed to humans through civets. Ebola came from gorillas and chimpanzees; Zika comes from mosquitoes; hantavirus pulmonary syndrome from rodents; and HIV/AIDS originated in chimpanzees.[127]

Will warm weather weaken the disease?

Coronavirus infections that cause colds peak in the winter months. That is why there is hope that infections will slow in the summer. However, we know

that some coronaviruses that peak in wintertime persist all year long, albeit at lower levels in the summer months and in the tropics.

MERS, the lethal coronavirus that camels give to humans, occurs in the dry heat of the Middle East. Covid itself is as serious a threat in the hot, humid cities of Singapore and Southern China as anywhere else.

The general consensus is that Covid cases may slow in the summer, but pick again in the winter months.[128]

When will the country reopen?

Since plans and timelines for reopening vary from state to state, when the country as a whole will be back up and running is unknown.

Across the country, many shelter-in-place and stay-at-home orders expired in early May or late April. Most states are currently permitting a slow reopening of some businesses, with restrictions on how many customers can enter, some measures for enforcing social distancing guidelines, and requirements that customers wear masks.

To learn which states are either in the process of reopening or planning to reopen soon, check out the map created by *The New York Times* on their website.[129]

When will schools for young children open?

The guidelines for reopening schools should mirror those for reopening a country or region at large. Only when the level of new cases in a community is either

very low, less than one case a day for a large city, or absent altogether, should schools reopen.

Many people think that children aren't easily infected, which isn't actually the case. Young children may not fall ill as often as adults, but that doesn't mean they can't get infected and transmit the SARS-2 virus to others. As long as infection persists at a high level in the community, opening schools to young children may accelerate the spread of the infection.

Will school shutdowns have long-term effects on our children?

Yes, though the effects will be variable and uneven, determined in large part by existing gaps in the quality and capabilities of our school systems.

How our children learn will change. Current experiments with remote learning, some of which are based largely on trial-and-error, will evolve into mainstay digital learning tools and modes of instruction.

Will these long-term effects be beneficial?

The children more likely to benefit from this transition, and even prefer it, are those who already have their own electronic devices and a high-speed internet connection.[130]

Children living in low-income and otherwise underserved communities are currently having a more difficult experience with remote learning. Already they have less access to their virtual classrooms and teachers and spend less time studying overall.[131] A

similar split can be seen between the students of public and private schools.

Is there a way to make the long-term effects beneficial to all?

As more data on long-term effects emerges, so will opportunities for interventions that level a very unequal playing field for our young learners whose education was interrupted by the pandemic. If not, the gaps will only continue to grow.

Will school shutdowns affect the mental health of our children?

The world, as our children knew it, has grown very small over the course of the pandemic—and as it opens back up to them, it won't be the same as before. Some will be grieving great losses, others will

be struggling with anxiety, disappointment, and disillusionment, and others still will be emerging from a volatile or violent home environment.[132]

So long as these struggles play out within the confines of individual homes, it will be difficult to gauge just how detrimental this has been to the mental health of children across the country.

Can another coronavirus pandemic occur?

Yes, another coronavirus pandemic is possible and indeed very likely. Covid is the third coronavirus epidemic to occur in the last two decades, the first and second being SARS and MERS, respectively. In the case of all three, the virus originated from bats, but came to infect humans by infecting another mammal first.

For the SARS virus, that mammal was the civet cat. For the MERS virus, it was the camel. For the SARS-2 virus, it remains unknown, though like SARS, it originated from bats found in the caves of southern China.[133]

No matter the path from animals to humans, the fact remains that this particular strain—more deadly, and more easily spread, than those that came before—ultimately began with *one person*. Before Covid was a global pandemic, it was one person with a cold. If this happened three times, it could happen again.

What is contact tracing?

Contact tracing is a strategy for slowing the spread of Covid infections that involves tracing and monitoring the contacts of people who have been infected—

which is to say, those that might have been exposed. Trained volunteers and public health workers work with Covid patients to help them identify these contacts, then work with the contacts themselves to arrange a safe two-week quarantine.

Contact tracing efforts can be assisted by mobile technologies, digital surveillance systems, and private-public partnerships, all of which have been used to varying degrees in countries like South Korea, Taiwan, and China.[134] [135]

How can countries reopen safely?

All public health authorities agree that to reopen a country, region, or state, at least three conditions must be met.

First, the transmission rate has to be very low throughout the entire region—at the highest, five per day. Second, there must be a rigorous testing regime in place to identify who is actually infected. Third, there must be contact tracing and a strategy for isolating those exposed for up to fourteen days or longer, preferably in a supervised facility like a hotel.

Have any countries had success in reopening safely?

The countries leading the way in reopening their cities are, for the most part, those that were able to quickly contain the disease when it first began to spread.

In Taiwan, China, and South Korea, a combination of government-supported public health measures, smart technologies, and consistent engagement with the

general public has paved the way for current attempts to resume social and economic activity. While only time will tell whether their respective reopening can be judged a true "success," the number of new cases reported daily continues to drop in all three countries.[136]

What can the United States learn from other countries that have reopened successfully?

One component that is largely present in the successful disease control efforts of countries like South Korea, China, and Taiwan, but lacking entirely from those of the United States, are designated isolation centers where people who have been infected or exposed can quarantine.[137] Two other vital components, testing and contact tracing, are present

in the U.S. response but not nearly as widespread or robust.

What happens if a country reopens before the epidemic has subsided?

If rates of infection are still high, it is very likely that they will increase. Within two weeks, the number of confirmed cases and hospitalizations will surge. Within three weeks, so will death rates.

How can colleges and universities reopen safely?

Like schools for young children, only the availability of a Covid vaccine would guarantee the safety of students attending institutions of higher learning. In the meantime, students should expect reopening strategies to vary. What a large public university does

to prevent infection among students, for instance, will likely differ from a citywide community college or small liberal arts college. This applies to questions of on-campus housing, study abroad opportunities, research facilities, and other features of higher education.

The Chronicle of Higher Education has compiled an at-a-glance guide to the reopening strategies of different universities. To compare them, follow the link at the bottom of the page.[138]

What is an example of some measures colleges and universities are taking to reopen safely?

For guidance we can look to NYU Shanghai, which began the process of reopening in late April.[139] With a student body of around 1,300 students, the campus is

on the smaller side. All incoming and outgoing traffic is limited to one entrance and exit to allow temperature checks upon arrival. Masks are supplied to all students, faculty, and staff, who are required to wear them in all public areas. Hand sanitizer pumps can be found all over school buildings, shuttles, and in elevators, where no more than five people can ride at a time.

If my boss wants me to go back to work and I'm healthy, what can I do to keep myself and others safe?

If you are healthy and commute to work via public transit, wear gloves to help you avoid getting the virus on your hands. Do not touch your eyes, nose, or mouth, and leave your phone in your pocket throughout your commute to avoid transferring germs

onto its surface. If you can, consider taking a bike or car to work instead, being careful to wipe down all surfaces with disinfectant sheets prior to touching any surface.

If my boss wants me to go back to work but I'm in a high-risk group, what can I do to keep myself and others safe?

If you have another medical condition that puts you at high risk for a severe case of Covid, ask your employer to provide you with reasonable low-cost solutions to make the office space safer for you.

This could include moving your work area away from others, limiting foot traffic around your workspace, or using plexiglass, tables or other barriers to ensure a minimum distance between you and your coworkers. You may also want to ask your employer for a change

in hours to help you avoid rush hour commutes and to limit the number of employees around you at the office.

If my boss wants me to go back to work but I'm sick, what can I do to keep myself and others safe?

If you are sick with a fever or cough—no matter whether you were officially tested and diagnosed with Covid—do not return to the workplace until at least 14 days, ideally up to 16 days, since the onset of your symptoms.

When you do return to work, wear a mask, keep a safe distance from your colleagues, and be conscious of what you touch in common areas, wiping down surfaces after you touch them.

If my boss wants me to go back to work but someone in my household is showing signs of Covid, what can I do to keep myself and others safe?

If you are not sick but someone in your household is showing signs of Covid, do not go into work until your entire household has recovered.

When cities begin to reopen, and I begin to go outside again, how can I keep myself safe?

Assume that everyone is infected and act accordingly.

Continue wearing a mask, maintaining six feet of distance from the people around you, and washing your hands after going outside. Because subsequent waves of infection, if they occur, will likely spread undetected before the number of confirmed cases begins to surge, it is best to proceed with the utmost

caution in the uncertain weeks and months that lie ahead.

Are there specific events or activities I should avoid?

As life on the outside begins to pick up, it might be difficult at first to make judgments about the safety of certain activities. Not everyone will choose to follow the recommendations of local health authorities, so confusion is sure to abound.

To stay safe, we should remember the places and events that proved to be significant sources of transmission in the early days of the outbreak. Large gatherings like birthday parties, weddings, and funerals were what the U.S. Centers for Disease Control and Prevention calls *super-spreading events*.

This means that some clusters of Covid cases were traced back to a single social gathering.[140] Conferences and networking events held in February were another culprit.

Are there specific places I should avoid?

Steer clear of buildings and spaces that are confined, poorly ventilated, and densely populated.[141] This has less to do with the type of establishment—office, restaurant, what have you—and more to do with the type of environment. If a place you usually frequent has problems with volume and airflow, consider delaying your return or discussing your safety concerns with someone who can address them.

This also applies to places indoors and outdoors where people tend to loosely gather and hang around

for extended periods of time—"talking, singing, and panting," as one *Forbes* columnist put it.[142] Such activities tend to promote a general lingering and commingling of particles in the air.

Will it be safe for me to host or take part in small gatherings?

Look to community infection rates, not those of your peer group, when making this decision. If community infection rates haven't yet dropped to single digits or zero, it is safest to gather outdoors at six feet apart and with masks on.

Recall the following equation:

Probability of infection indoors = (Time/Distance) * Number of people * Number of people without masks * % Newly infected in your community

Which outdoor activities are safe for me and my family?

Most outdoor activities are safe if you keep your distance from other people, don't travel too far, and limit outings to you and your household only.[143] That rules out team and contact sports but leaves plenty of room for other kinds of recreation. The U.S. Centers for Disease Control and Prevention also advises us to stay away from crowded parks and playgrounds.[144]

The California state government has compiled a list of safe activities that includes picnicking, watching the sunset, and hiking, so long as the trails are spacious enough to permit six feet of distance.[145] Social distancing guidelines apply to runners and bikers, too.

When will it be safe for me to travel to my non-primary residence?

There is no easy answer to this question because the restrictions and risks involved vary from place to place. Many city and local officials have urged non-primary homeowners to remain in place for the sake of slowing the spread, but as regions reopen and restrictions begin to ease up, the decision will ultimately be left to the individual.

If you're considering relocating to a non-primary residence, consult the websites of the local police department, sheriff's office, and health authorities both of your current location and of your destination to make sure you're not violating any protective guidelines. Make phone calls if necessary.

I need to travel for emergency reasons. If I'm driving, is it safe to stay at hotels or rental properties along the way?

Driving in your own car is safe. Staying overnight in a hotel or rented apartment is much riskier. You can never be sure who was there before you and how well was cleaned.

Until the number of new infections at all points of your destination is very low—between zero to five per day—I do not advise traveling unless it is absolutely necessary.

Is it safe to travel by plane?

Until the number of infections in the country of travel and between countries is very low, I do not advise plane travel unless absolutely necessary. At least for

now, there is no guarantee as to how you will be seated and how clean the plane will be. It is very difficult to guarantee your safety on a plane.

When can I start to spend time with my grandchildren again?

It will be safe to be with your grandchildren again when the chance of contracting Covid in your community is very low. You will know that when, for the previous two weeks, between zero to five people are diagnosed.

A community may be your city, or for those living in smaller towns and communities, your county.

What is telehealth or telemedicine?

Telehealth or telemedicine takes processes that constitute healthcare as we know it—visits to the

clinic, exchanges of health information, health education—and conducts them remotely, using telecommunications technology. It includes a consultation completed over phone or video chat as much as a mobile health application that allows you to access your health data online.

Telemedicine can be used to reach patients in remote locations and reduce congestion at clinics and other healthcare facilities.

How many healthcare providers offer telemedicine?

Thanks to Covid, about half of physicians across the country are now using telemedicine to continue caring for their patients.[146] Not all providers have the technological or administrative capabilities to make a

transition so abrupt, but many are having to find a solution fast—or risk losing contact or continuity of care. Visits to clinics and other outpatient care centers have plummeted since the beginning of March, putting some practices in dire straits.[147]

How many U.S. insurance providers cover telemedicine?

Many U.S. insurers have expanded their policies to cover more telehealth services in the wake of the pandemic. For example, Blue Cross Blue Shield of Massachusetts, a private health insurance company, expanded its policy to include more coverage for telemedicine in March. As of May 21, Blue Cross has processed upwards of a million telehealth claims, which amount to tens of thousands per day.[148]

America's Health Insurance Plans has created a guide to how different insurance providers are taking action around Covid available online.[149]

What services can be provided using telemedicine?

Usually, telemedicine is a format most suited to follow-up visits, medication, chronic disease management, and other kinds of consultations that can be conducted virtually. In most cases, a respiratory syndrome like Covid can be evaluated and detected using telemedicine.

How can telemedicine help during Covid?

One benefit is that people who suspect they might have Covid but aren't sure can consult with their

doctor without risking unnecessary exposure in a waiting or examination room.

One challenge is that testing is still difficult to coordinate remotely. As more testing sites become available, providers will be better positioned to design pathways from a remote consultation to a testing site.

Will telemedicine become more prevalent after Covid?

Most likely. The pandemic is forcing both federal and state governments to reevaluate restrictions on telehealth services and coverage, and hopefully insurers will follow suit.[150] More health systems are expected to adopt some form of telemedicine both during and after the pandemic, with the number of

telehealth visits predicted to increase more than five times over for 2020.[151]

What are the limitations of telemedicine?

Not everyone has equal access to traditional health services, and the same is true of telemedicine, even if it tends to be marketed as a tool for closing the gaps that fragment our systems of care.

The digital divide that exists between those who have a stable internet connection and those who don't is one barrier. Others include a lack of functioning electronics and basic technological literacy. These are especially rife in rural and low-income communities, whose residents generally suffer from some of the greatest health disparities in the country.

PART THREE

RESOURCES

KIDS

Covid-19 Education

Dr. Panda TotoTime

https://www.youtube.com/channel/UCpzdzxPD8acq8ssStKvDNtw

BrainPOP – Coronavirus

https://www.brainpop.com/health/diseasesinjuriesanddconditions/coronavirus/

PBS for Parents – Science

https://www.pbs.org/parents/learn-grow/all-ages/science

ADULTS

Covid-19 Information Hubs

Centers for Disease Control: https://www.cdc.gov/coronavirus/2019-ncov/index.html

Food and Drug Administration: https://www.fda.gov/emergency-preparedness-and-response/counterterrorism-and-emerging-threats/coronavirus-disease-2019-covid-19

World Health Organization: https://www.who.int/emergencies/diseases/novel-coronavirus-2019

National Coalition of STD Directors: Maps, graphs, and figures about coronavirus.

https://www.ncsddc.org/covid-command-center-maps-graphs-figures/

Interactive Maps and Lists

See How All 50 States Are Reopening https://www.nytimes.com/interactive/2020/us/states-reopen-map-coronavirus.html

Here's a List of Colleges' Plans for Reopening in the Fall https://www.chronicle.com/article/Here-s-a-List-of-Colleges-/248626

Health Insurance Providers Respond to Coronavirus (COVID-19) https://www.ahip.org/health-insurance-providers-respond-to-coronavirus-covid-19/

Coronavirus Shutdown https://www.coronashutdown.com/

Covid ActNow https://covidactnow.org/?s=37528

Staying Safe

Worker Safety and Support https://www.cdc.gov/coronavirus/2019-ncov/community/worker-safety-support/index.html

Disinfectants for Use Against SARS-CoV-2 (COVID-19) https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2-covid-19

How to Make Cloth Face Coverings https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/how-to-make-cloth-face-covering.html

How Often You Should Wash Your Sheets During The Coronavirus Pandemic https://www.huffpost.com/entry/how-often-wash-sheets-coronavirus-

pandemic_l_5eac4f6bc5b624b396929d10?utm_campaign=share_email&ncid=other_email_o63gt2jcad4

Specific Health Conditions

Coronavirus (COVID-19) and People with HIV https://www.hiv.gov/hiv-basics/staying-in-hiv-care/other-related-health-issues/coronavirus-covid-19

COVID-19 and HIV https://www.cdc.gov/hiv/covid-19/index.html

If You Are Immunocompromised, Protect Yourself From COVID-19 https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/immunocompromised.html

Parenting

Kids Are Grieving, Too
https://www.nytimes.com/2020/05/13/parenting/kids-death-coronavirus-grieving.html?smid=em-share

When coronavirus strikes, kids make the news
https://www.washingtonpost.com/graphics/2020/lifestyle/kidspost/kids-newspapers-coronavirus/

A Kids' Guide to Coronavirus (podcast episode)
https://www.nytimes.com/2020/03/27/podcasts/the-daily/kids-coronavirus.html?searchResultPosition=1

Kids Are So Over Zoom. Here's What To Do About It. https://www.huffpost.com/entry/zoom-and-google-hangouts-are-making-kids-miserable_l_5ebd5cbbc5b655620b13a149?utm_campaign=share_email&ncid=other_email_o63gt2jcad4

6 Tips You Can Trust: How to help kids cope with extended school closures https://www.savethechildren.org/content/dam/usa/reports/emergency-response/help-kids-cope-with-school-closures.pdf

Mental Health

COVID-19 Resource and Information Guide https://www.nami.org/Support-Education/NAMI-HelpLine/COVID-19-Information-and-Resources/COVID-19-Resource-and-Information-Guide

Distant Together: Mental Health Resources for COVID-19 https://www.distanttogether.org/

Why Uncertainty Feels So Terrifying, And How To Cope With It

https://www.huffpost.com/entry/uncertainty-stress-how-to-cope_l_5ed0047cc5b6521c93a80e43?utm_campaign=share_email&ncid=other_email_o63gt2jcad4

How To Sleep Better If Coronavirus Anxiety Is Keeping You Awake
https://www.huffpost.com/entry/sleep-better-coronavirus-anxiety_l_5e8b5b2cc5b6cc1e47799a4d

Dealing With Coronavirus Anxiety? Here Are Some Ways To Cope With The Stress
https://www.huffpost.com/entry/coronavirus-anxiety-stress-tips_l_5e84a845c5b6a1bb76512b7d

What Not To Say To Someone Grieving During The Coronavirus Crisis
https://www.huffpost.com/entry/what-not-to-say-

grieving-coronavirus_l_5ea9a134c5b6fb98a2b65056?utm_campaign=share_email&ncid=other_email_o63gt2jcad4

Working from Home

26 WFH Tips While Self-Isolating During the COVID-19 Outbreak
https://www.healthline.com/health/working-from-home-tips#tips-for-newbies

Working from home with kids feels unsustainable. Here's how to ease the burden.
https://www.vox.com/identities/2020/3/25/21193142/coronavirus-covid-19-kids-work-from-home-child-care-school-cancellations

How to Set Boundaries and Avoid Burnout While Working From Home
https://thriveglobal.com/stories/how-to-avoid-burnout-stress-work-from-home-tips/

Helping Others

Ways to help older neighbors and relatives in isolation (and how they can help you)
https://www.washingtonpost.com/lifestyle/2020/05/06/seniors-isolation-quarantine-help-how-to/

BIBLIOGRAPHY

Al Jazeera. "Coronavirus: Lessons From Asia." May 3, 2020. Accessed June 4, 2020. https://www.aljazeera.com/programmes/specialseries/2020/05/coronavirus-lessons-asia-200501110507558.html.

Altmann, Daniel M., Daniel C. Douek, and Rosemary J. Boyton. "What policy makers need to know about COVID-19 protective immunity." *The Lancet* 395, no. 10236 (May 16, 2020): 1527-29. Accessed June 4, 2020. https://doi.org/10.1016/S0140-6736(20)30985-5.

American College of Obstetricians and Gynecologists. "Novel Coronavirus 2019 (COVID-19): Practical Advisory." ACOG Clinical. Last modified May 19, 2020. Accessed June 4, 2020. https://www.acog.org/clinical/clinical-guidance/practice-advisory/articles/2020/03/novel-coronavirus-2019.

American Diabetes Association. "How COVID-19 Impacts People with Diabetes." American Diabetes Association - COVID-19. Last modified 2020. Accessed June 4, 2020.

https://www.diabetes.org/coronavirus-covid-19/how-coronavirus-impacts-people-with-diabetes.

———. "Planning for Coronavirus." American Diabetes Association - COVID-19. Last modified 2020. Accessed June 4, 2020. https://www.diabetes.org/coronavirus-covid-19/planning-for-coronavirus.

American Lung Association. "How Fast Is a Sneeze Versus a Cough? Cover Your Mouth Either Way!" Each Breath: A Blog by the American Lung Association. Last modified May 12, 2016. Accessed June 4, 2020. https://www.lung.org/blog/sneeze-versus-cough.

Appleby, Julie. "What Takes So Long? A Behind-The-Scenes Look At The Steps Involved In COVID-19 Testing." *Kaiser Health News*, May 30, 2020. Accessed June 4, 2020. https://khn.org/news/what-takes-so-long-a-behind-the-scenes-look-at-the-steps-involved-in-covid-19-testing/.

Avert. "COVID-19 and HIV." Avert: Global information and education on HIV and AIDS. Last modified June 3, 2020. Accessed June 4, 2020. https://www.avert.org/coronavirus/covid19-HIV.

Begley, Sharon. "What explains Covid-19's lethality for the elderly? Scientists look to 'twilight' of the immune system." *STAT News*, March 30, 2020. Accessed June 4, 2020. https://www.statnews.com/2020/03/30/what-explains-coronavirus-lethality-for-elderly/.

"Blood thinners being used to mitigate risk of clots in COVID-19 patients." CBS News. Last modified May 26, 2020. Accessed June 4, 2020. https://www.cbsnews.com/news/coronavirus-blood-clots-covid-19-symptom-strokes-young-people/.

Blue Cross Blue Shield of Massachusetts. "Blue Cross Blue Shield of Massachusetts Processes 1 Million Telehealth Claims in 9 Weeks." Blue Cross Blue Shield of Massachusetts. Last modified May 21, 2020. Accessed June 4, 2020. http://newsroom.bluecrossma.com/2020-05-21-Blue-Cross-Blue-Shield-of-Massachusetts-Processes-1-Million-Telehealth-Claims-in-9-Weeks?utm_source=STAT+Newsletters&utm_campaign=ff37996f74-MR_COPY_01&utm_medium=email&utm_term=0_8cab1d7961-ff37996f74-151227717.

Breslin, Noelle et.al. "Coronavirus disease 2019 infection among asymptomatic and symptomatic pregnant women: two weeks of confirmed presentations to an affiliated pair of New York City hospitals." *American Journal of Obstetrics & Gynecology MFM* 2, no. 2 (April 9, 2020). https://doi.org/10.1016/j.ajogmf.2020.100118.

Cai, Xiaofang, Yaoling Ma, Songbo Li, Yan Chen, Zhihui Rong, and Wenbin Li. "Clinical Characteristics of 5 COVID-19 Cases With Non-respiratory Symptoms as the First Manifestation in Children." *Frontiers in Pediatrics*, May 12, 2020. Accessed June 4, 2020. https://doi.org/10.3389/fped.2020.00258.

California State Government. "Stay home Q&A." Covid19.CA.gov. Last modified June 4, 2020. Accessed June 4, 2020. https://covid19.ca.gov/stay-home-except-for-essential-needs/?campaign_id=49&emc=edit_ca_20200501&instance_id=18134&nl=california-today&regi_id=78159988&segment_id=26374&te=1&user_id=930b2d6d815949d1bd3f3835944a4f18#outdoor.

Campbell, Denis. "Quarter of Covid-19 deaths in English hospitals were of diabetics." *The Guardian*, May 14, 2020.

Accessed June 4, 2020. https://www.theguardian.com/world/2020/may/14/one-in-four-people-who-died-in-uk-hospitals-with-covid-19-had-diabetes.

Cariou, B., Hadjadj, S., Wargny, M. et.al. "Phenotypic characteristics and prognosis of inpatients with COVID-19 and diabetes: the CORONADO study." *Diabetologia*, May 29, 2020. https://doi.org/10.1007/s00125-020-05180-x.

Centers for Disease Control and Prevention. "CDC Releases Interim Reopening Guidance for Dental Settings." Centers for Disease Control and Prevention - Oral Health. Last modified June 3, 2020. Accessed June 4, 2020. https://www.cdc.gov/oralhealth/infectioncontrol/statement-COVID.html.

———. "Community Transmission of SARS-CoV-2 at Two Family Gatherings — Chicago, Illinois, February–March 2020." Morbidity and Mortality Weekly Report (MMWR). Last modified April 17, 2020. Accessed June 4, 2020. https://www.cdc.gov/mmwr/volumes/69/wr/mm6915e1.htm?s_cid=mm6915e1_w.

———. "Effects of the COVID-19 Pandemic on Routine Pediatric Vaccine Ordering and Administration — United States, 2020." Morbidity and Mortality Weekly Report (MMWR). Last modified May 15, 2020. Accessed June 4, 2020. https://www.cdc.gov/mmwr/volumes/69/wr/mm6919e2.htm.

———. "For Parents: Multisystem Inflammatory Syndrome in Children (MIS-C) associated with COVID-19." Centers for Disease Control and Prevention - Coronavirus Disease 2019 (COVID-19). https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/children/mis-c.html.

———. "Frequently Asked Questions." Centers for Disease Control and Prevention - Coronavirus Disease 2019 (COVID-19). Last modified June 2, 2020. Accessed June 4, 2020. https://www.cdc.gov/coronavirus/2019-ncov/faq.html.

———. "Groups at Higher Risk for Severe Illness." Centers for Disease Control and Prevention - Coronavirus Disease 2019 (COVID-19). Last modified May 14, 2020. Accessed June 4, 2020. https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/groups-at-higher-risk.html.

———. "Guidance for Child Care Programs that Remain Open." Centers for Disease Control and Prevention - Coronavirus Disease 2019 (COVID-19). Last modified April 21, 2020. Accessed June 4, 2020. https://www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/guidance-for-childcare.html.

———. "Hospitalization Rates and Characteristics of Patients Hospitalized with Laboratory-Confirmed Coronavirus Disease 2019 — COVID-NET, 14 States, March 1–30, 2020." Morbidity and Mortality Weekly Report (MMWR). Last modified April 17, 2020. Accessed June 4, 2020. https://www.cdc.gov/mmwr/volumes/69/wr/mm6915e3.htm?s_cid=mm6915e3_w.

———. "How COVID-19 Spreads." Centers for Disease Control and Prevention - Coronavirus Disease 2019 (COVID-19). Last modified June 1, 2020. Accessed June 4, 2020. https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/how-covid-spreads.html.

———. "How to Protect Yourself & Others." Centers for Disease Control and Prevention - Coronavirus Disease 2019 (COVID-19). Last modified April 24, 2020. Accessed

June 4, 2020. https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/prevention.html.

———. "If You Are Immunocompromised, Protect Yourself From COVID-19." Centers for Disease Control and Prevention - Coronavirus Disease 2019 (COVID-19). Last modified May 14, 2020. Accessed June 4, 2020. https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/immunocompromised.html.

———. "People with Disabilities." Centers for Disease Control and Prevention - Coronavirus Disease 2019 (COVID-19). Last modified April 7, 2020. Accessed June 4, 2020. https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/people-with-disabilities.html.

———. "Personal Protective Equipment: Questions and Answers." Centers for Disease Control and Prevention - Coronavirus Disease 2019 (COVID-19). Last modified March 14, 2020. Accessed June 4, 2020. https://www.cdc.gov/coronavirus/2019-ncov/hcp/respirator-use-faq.html.

———. "Running Essential Errands." Centers for Disease Control and Prevention - Coronavirus Disease 2019

(COVID-19). Last modified May 11, 2020. Accessed June 4, 2020. https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/essential-goods-services.html.

———. "Strategies to Optimize the Supply of PPE and Equipment." Centers for Disease Control and Prevention - Coronavirus Disease 2019 (COVID-19). Last modified May 18, 2020. Accessed June 4, 2020. https://www.cdc.gov/coronavirus/2019-ncov/hcp/ppe-strategy/index.html.

———. "Vaccination of Tier 1 at All Pandemic Severities." Centers for Disease Control and Prevention - Influenza (Flu). Last modified October 24, 2018. Accessed May 29, 2020. https://www.cdc.gov/flu/pandemic-resources/national-strategy/planning-guidance/pandemic-severities-tier-1.html.

———. "Visiting Parks and Recreational Facilities." Centers for Disease Control and Prevention - Coronavirus Disease 2019 (COVID-19). Last modified May 19, 2020. Accessed June 4, 2020. https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/visitors.html.

———. "What You Can Do." Centers for Disease Control and Prevention - Coronavirus Disease 2019 (COVID-19). Last modified May 8, 2020. Accessed June 4, 2020. https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/what-you-can-do.html.

Cha, Ariana Eunjung. "Young and middle-aged people, barely sick with covid-19, are dying of strokes." *Washington Post*, April 25, 2020. Accessed June 4, 2020. https://www.washingtonpost.com/health/2020/04/24/strokes-coronavirus-young-patients/.

Cha, Ariana Eunjung, and Chelsea Janes. "Young adults are also affected by Kawasaki-like disease linked to coronavirus, doctors say." *Washington Post*, May 21, 2020. Accessed June 4, 2020. https://www.washingtonpost.com/health/2020/05/21/misc-c-kawasaki-coronavirus-young-adults/.

Cirillo, Francesco. "The Pomodoro Technique®." The Pomodoro Technique®. Last modified 2020. Accessed June 4, 2020. https://francescocirillo.com/pages/pomodoro-technique.

Coombs, Bertha. "Telehealth visits are booming as doctors and patients embrace distancing amid the coronavirus crisis." CNBC. Last modified April 4, 2020. Accessed June 4, 2020. https://www.cnbc.com/2020/04/03/telehealth-visits-could-top-1-billion-in-2020-amid-the-coronavirus-crisis.html.

Cullinane, Carl, and Rebecca Montacute. "COVID-19 and Social Mobility Impact Brief #1: School Shutdown." The Sutton Trust. Last modified April 2020. Accessed June 4, 2020. https://www.suttontrust.com/wp-content/uploads/2020/04/COVID-19-Impact-Brief-School-Shutdown.pdf.

Dean, Natalie E. "COVID-19 Data Dives: Why Don't We Have a Vaccine for SARS or MERS?" *Medscape*, May 28, 2020. Accessed May 29, 2020. https://www.medscape.com/viewarticle/931226.

"Does the flu vaccine work as well in elderly people?" *Harvard Health Publishing*, December 2019. Accessed May 29, 2020. https://www.health.harvard.edu/diseases-and-conditions/does-the-flu-vaccine-work-as-well-in-elderly-people.

Duan, Kai et.al. "The feasibility of convalescent plasma therapy in severe COVID-19 patients: a pilot study." *medRxiv*, March 23, 2020. Accessed May 29, 2020. https://doi.org/10.1101/2020.03.16.20036145.

Edmond J. Safra Center for Ethics at Harvard University. "Road to Pandemic Resilience." Edmond J. Safra Center for Ethics at Harvard University. Last modified April 20, 2020. Accessed June 4, 2020. https://ethics.harvard.edu/files/center-for-ethics/files/roadmaptopandemicresilience_updated_4.20.20_0.pdf.

European Lung Foundation. "Covid-19 and lung disease Q&A." European Lung Foundation - COVID-19. Last modified May 27, 2020. Accessed June 4, 2020. https://www.europeanlung.org/covid-19/covid-19-information-and-resources/covid-19-info.

Farge, Emma, and Michael Shields. "'This virus may never go away,' WHO says." *Reuters*, May 13, 2020. Accessed May 29, 2020. https://www.reuters.com/article/us-health-coronavirus-who-briefing/this-virus-may-never-go-away-who-says-idUSKBN22P2IJ.

Forster, Victoria. "Wearing A Mask To Reduce The Spread Of Coronavirus Will Not Give You Carbon Dioxide Poisoning." *Forbes*, May 12, 2020. Accessed June 4, 2020. https://www.forbes.com/sites/victoriaforster/2020/05/12/wearing-a-mask-to-reduce-the-spread-of-coronavirus-will-not-give-you-carbon-dioxide-poisoning/#660a241017f5.

Fottrell, Quentin. "Black Americans are twice as likely to be hospitalized from COVID-19." MarketWatch. Last modified June 4, 2020. Accessed June 4, 2020. https://www.marketwatch.com/story/75-of-frontline-workers-in-new-york-the-epicenter-of-coronavirus-are-people-of-color-and-black-americans-are-twice-as-likely-to-die-from-covid-19-2020-06-01.

Franklin-Wallis, Oliver. "How School Shutdowns Have Long-Term Effects on Children." *WIRED UK*, May 18, 2020. Accessed June 4, 2020. https://www.wired.com/story/how-school-shutdowns-have-longterm-effects-on-children/?utm_source=onsite-share&utm_medium=email&utm_campaign=onsite-share&utm_brand=wired.

Gallagher, James. "Coronavirus cure: When will we have a drug to treat it?" *BBC News*, May 27, 2020. Accessed

June 4, 2020. https://www.bbc.com/news/health-52354520.

Gostic, Katelyn, Ana CR Gomez, Riley O. Mummah, Adam J. Kucharski, and James O. Lloyd-Smith. "Estimated effectiveness of symptom and risk screening to prevent the spread of COVID-19." *eLife Sciences*, February 24, 2020. Accessed June 4, 2020. https://doi.org/10.7554/eLife.55570.

Hahn, Stephen M., and Jeffrey E. Shuren. "Coronavirus (COVID-19) Update: FDA Authorizes First Antigen Test to Help in the Rapid Detection of the Virus that Causes COVID-19 in Patients." U.S. Food & Drug Administration. Last modified May 9, 2020. Accessed June 4, 2020. https://www.fda.gov/news-events/press-announcements/coronavirus-covid-19-update-fda-authorizes-first-antigen-test-help-rapid-detection-virus-causes.

Harvard Health Publishing. "If you've been exposed to the coronavirus." Harvard Health Publishing. Last modified May 28, 2020. Accessed June 4, 2020. https://www.health.harvard.edu/diseases-and-conditions/if-youve-been-exposed-to-the-coronavirus.

Harwell, Drew. "Thermal scanners are the latest technology being deployed to detect the coronavirus. But they don't really work." *Washington Post*, May 11, 2020. Accessed June 4, 2020. https://www.washingtonpost.com/technology/2020/05/11/thermal-scanners-are-latest-technology-being-deployed-detect-coronavirus-they-dont-really-work/.

Haseltine, William A. "How Antibody Tests Can Be Used To Fight COVID-19." *Forbes*, April 6, 2020. Accessed June 4, 2020. https://www.forbes.com/sites/williamhaseltine/2020/04/06/how-antibody-tests-can-be-used-to-fight-covid-19/#70c7b57a3904.

———. "Why America Is Losing to COVID-19." *Project Syndicate*, March 31, 2020. Accessed June 4, 2020. https://www.project-syndicate.org/commentary/united-states-covid-testing-contact-tracing-by-william-a-haseltine-2020-03.

He, X., Lau, E.H.Y., Wu, P. et.al. "Temporal dynamics in viral shedding and transmissibility of COVID-19." *Nature Medicine* 26 (April 15, 2020): 672-75. Accessed June 4, 2020. https://doi.org/10.1038/s41591-020-0869-5.

Hinde, Natasha. "Why Wearing Gloves To The Grocery Store Won't Protect You From COVID-19." HuffPost. Last modified June 2, 2020. Accessed June 4, 2020. https://www.huffpost.com/entry/wearing-gloves-to-grocery-store-coronavirus_l_5ed656abc5b63e9c88e4d4bc?utm_campaign=share_email&ncid=other_email_o63gt2jcad4.

Hogdson, Camilla. "Mystery of prolonged Covid-19 symptoms adds to unknowns." *Financial Times*, May 16, 2020. Accessed June 4, 2020. https://www.ft.com/content/91e4482e-d120-49ab-93e3-d314d99b5336.

Holdeman, Eric. "COVID-19: Transmission Scenarios Explained." *Government Technology*, May 11, 2020. Accessed June 4, 2020. https://www.govtech.com/em/emergency-blogs/disaster-zone/covid-19-transmission-scenarios-explained.html.

Hooper, Monica Webb, Anna María Nápoles, and Eliseo J. Pérez-Stable. "COVID-19 and Racial/Ethnic Disparities." *JAMA*, May 11, 2020. Accessed June 4, 2020. https://doi.org/10.1001/jama.2020.8598.

Huang, Yasheng, Meicen Sun, and Yuze Sui. "How Digital Contact Tracing Slowed Covid-19 in East Asia." *Harvard Business Review*, April 15, 2020. Accessed June 4, 2020. https://hbr.org/2020/04/how-digital-contact-tracing-slowed-covid-19-in-east-asia.

Hung, Ivan Fan-Ngai et.al. "Triple combination of interferon beta-1b, lopinavir–ritonavir, and ribavirin in the treatment of patients admitted to hospital with COVID-19: an open-label, randomised, phase 2 trial." *The Lancet* 395, no. 10238 (May 30, 2020): 1695-704. Accessed May 29, 2020. https://doi.org/10.1016/S0140-6736(20)31042-4.

International Chronic Myeloid Leukemia Foundation. "Advice for people with Chronic Myeloid Leukemia on COVID-19 (coronavirus)." International Chronic Myeloid Leukemia Foundation. Last modified March 2020. Accessed June 4, 2020. https://www.cml-foundation.org/news-icmlf-mobile/1437-advice-for-people-with-chronic-myeloid-leukemia-on-covid-19-coronavirus.html.

International Society for Infectious Diseases. "An update letter from the Minister of Agriculture to the Dutch House of Representatives." Program for Monitoring Emerging Diseases. Last modified May 25, 2020. Accessed June 4,

2020. https://promedmail.org/promed-post/?id=20200525.7375359.

Janes, Chelsea. "In some nations, government isolation centers helped reduce coronavirus infections. The U.S. has resisted the strategy." *Washington Post*, May 20, 2020. Accessed June 4, 2020. https://www.washingtonpost.com/health/in-some-nations-government-isolation-centers-helped-reduce-covid-19-infections-the-us-has-resisted-the-strategy/2020/05/19/533850d6-9616-11ea-9f5e-56d8239bf9ad_story.html.

Khan, Amir. "Doctor's Note: What are serology tests and do they work?" *Al Jazeera*, May 9, 2020. Accessed June 4, 2020. https://www.aljazeera.com/indepth/features/doctor-note-serology-tests-work-200505151942226.html.

King, Anthony. "What four coronaviruses from history can tell us about covid-19." *New Scientist*, April 29, 2020. Accessed June 4, 2020. https://www.newscientist.com/article/mg24632800-700-what-four-coronaviruses-from-history-can-tell-us-about-covid-19/.

Kirkcaldy, Robert D., Brian A. King, and John T. Brooks. "COVID-19 and Postinfection Immunity: Limited Evidence, Many Remaining Questions." *JAMA*, May 11, 2020. Accessed June 4, 2020. https://doi.org/10.1001/jama.2020.7869.

Koran, Mario. "'It's irresponsible': Washington state warns against 'coronavirus parties.'" *The Guardian*, May 6, 2020. Accessed June 4, 2020. https://www.theguardian.com/world/2020/may/06/its-irresponsible-washington-state-sees-sudden-rise-in-covid-parties.

Landi, Heather. "Half of physicians now using telehealth as COVID-19 changes practice operations." *Fierce Healthcare*, April 23, 2020. Accessed June 4, 2020. https://www.fiercehealthcare.com/practices/half-physicians-now-using-telehealth-as-covid-changes-practice-operations.

Lanese, Nicoletta. "First at-home saliva test for COVID-19 earns FDA approval." Live Science. Last modified May 2020. Accessed June 4, 2020. https://www.livescience.com/at-home-saliva-test-for-covid19.html.

Lazar, Kay, and Andrew Ryan. "No, warm weather will not kill the coronavirus." *Boston Globe*, April 24, 2020. Accessed June 4, 2020. https://www.bostonglobe.com/2020/04/24/nation/no-warm-weather-will-not-kill-coronavirus/.

Lee, Bruce Y. "Where Coronavirus Is More Likely To Be Airborne, 5 Places To Avoid." *Forbes*, May 30, 2020. Accessed June 4, 2020. https://www.forbes.com/sites/brucelee/2020/05/30/where-coronavirus-is-more-likely-to-be-airborne-5-places-to-avoid/#44f194bb39ab.

Li, Diangeng, Meiling Jin, and Pengtao Bao. "Clinical Characteristics and Results of Semen Tests Among Men With Coronavirus Disease 2019." *JAMA Network Open* 3, no. 5 (May 7, 2020). Accessed June 4, 2020. https://doi.org/10.1001/jamanetworkopen.2020.8292.

Lippi, Giuseppe. "Chronic obstructive pulmonary disease is associated with severe coronavirus disease 2019 (COVID-19)." *Respiratory Medicine*, June 2020. https://doi.org/10.1016/j.rmed.2020.105941.

Li, W., Wang, D., Guo, J. et.al. "COVID-19 in persons with chronic myeloid leukaemia." *Leukemia*, May 18, 2020. Accessed June 4, 2020. https://doi.org/10.1038/s41375-020-0853-6.

Mallapaty, Smriti. "What's the risk that animals will spread the coronavirus?" *Nature*, June 1, 2020. Accessed June 4, 2020. https://www.nature.com/articles/d41586-020-01574-4?utm_source=Nature+Briefing&utm_campaign=32981e1f33-briefing-dy-20200601&utm_medium=email&utm_term=0_c9dfd39373-32981e1f33-45423538.

Mandavilli, Apoorva. "New Studies Add to Evidence that Children May Transmit the Coronavirus." *New York Times*, May 8, 2020. Accessed June 4, 2020. https://www.nytimes.com/2020/05/05/health/coronavirus-children-transmission-school.html?smid=em-share.

March of Dimes. "Coronavirus Disease (COVID-19): What You Need to Know About Its Impact on Moms and Babies." March of Dimes. Last modified May 29, 2020. Accessed June 4, 2020. https://www.marchofdimes.org/complications/coronavirus-disease-covid-19-what-you-need-to-know.aspx.

McCray, Eugene, and Jonathan H. Mermin. "PrEP During COVID-19." Centers for Disease Control and Prevention - National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention. Last modified May 15, 2020. Accessed June 4, 2020. https://www.cdc.gov/nchhstp/dear_colleague/2020/dcl-051520-PrEP-during-COVID-19.html.

Mehrotra, Ateev, Michael Chernew, David Linetsky, David Cutler, and Hilary Hatch. "The Impact of the COVID-19 Pandemic on Outpatient Visits: A Rebound Emerges." The Commonwealth Fund. Last modified May 19, 2020. Accessed June 4, 2020. https://www.commonwealthfund.org/publications/2020/apr/impact-covid-19-outpatient-visits.

Metzger, Kylene. "Slow the Spread with Cloth Masks." University of Utah Health Feed Blog. Last modified May 6, 2020. Accessed June 4, 2020. https://healthcare.utah.edu/healthfeed/postings/2020/03/coronavirus-face-masks.php.

Muenter, Olivia. "How Often You Should Wash Your Sheets During The Coronavirus Pandemic." HuffPost. Last modified May 5, 2020.

https://www.huffpost.com/entry/how-often-wash-sheets-coronavirus-pandemic_l_5eac4f6bc5b624b396929d10?utm_campaign=share_email&ncid=other_email_o63gt2jcad4.

Nadia Oreshkova et.al. "SARS-CoV2 infection in farmed mink, Netherlands, April 2020." *bioRxiv*, May 18, 2020. Accessed June 4, 2020. https://doi.org/10.1101/2020.05.18.101493.

National Cancer Research Institute. "COVID-19 (coronavirus) advice for patients with Chronic Myeloid Leukaemia receiving TKI therapy." British Society for Haematology. Last modified March 21, 2020. Accessed June 4, 2020. https://b-s-h.org.uk/media/18154/covid-19-and-cml-recommendations-ncri-sub-group-21_3_20.pdf.

National Institutes of Health. "NIAID Emerging Infectious Diseases/ Pathogens." National Institute of Allergy and Infectious Disease - Biodefense. Last modified July 26, 2018. Accessed June 4, 2020. https://www.niaid.nih.gov/research/emerging-infectious-diseases-pathogens.

Neeltje van Doremalen et.al. "Aerosol and Surface Stability of SARS-CoV-2 as Compared With SARS-CoV-1." *New England Journal of Medicine* 382, no. 16 (April 16, 2020). https://doi.org/10.1056/NEJMc2004973.

NYU Shanghai. "NYU Shanghai to Begin Reopening to Students April 27." NYU Shanghai. Last modified April 24, 2020. Accessed June 4, 2020. https://shanghai.nyu.edu/news/nyu-shanghai-begin-reopening-students-april-27.

Paranjpe, Ishan et.al. "Association of Treatment Dose Anticoagulation with In-Hospital Survival Among Hospitalized Patients with COVID-19." *Journal of the American College of Cardiology*, May 6, 2020. Accessed May 29, 2020. https://doi.org/10.1016/j.jacc.2020.05.001.

Parker-Pope, Tara. "Have I Been Cleaning All Wrong?" *New York Times*, May 13, 2020. Accessed June 4, 2020. https://www.nytimes.com/2020/05/06/well/live/coronavirus-cleaning-cleaners-disinfectants-home.html?smid=em-share.

Patel, Ami, Mamadou A. Bah, and David B. Weiner. "In Vivo Delivery of Nucleic Acid-Encoded Monoclonal Antibodies."

BioDrugs 34 (March 10, 2020): 273-93. https://doi.org/10.1007/s40259-020-00412-3.

Patel, Neel V. "Antigen testing could be a faster, cheaper way to diagnose covid-19." *MIT Technology Review*, April 24, 2020. Accessed June 4, 2020. https://www.technologyreview.com/2020/04/24/1000486/antigen-testing-could-faster-cheaper-diagnose-covid-19-coronavirus/.

Paton, James, Jason Gale, and John Lauerman. "The Race to Develop a Coronavirus Vaccine: What you need to know." *Bloomberg*, May 8, 2020. Accessed May 29, 2020. https://www.bloomberg.com/news/storythreads/2020-05-08/the-race-to-develop-a-coronavirus-vaccine.

Pesheva, Ekaterina. "Outpatient COVID-19 Clues." Harvard Medical School - News & Research. Last modified May 6, 2020. Accessed June 4, 2020. https://hms.harvard.edu/news/outpatient-covid-19-clues#.Xrp8gJ_9h4c.mailto.

Pizzorno, Andrés, Blandine Padey, Olivier Terrier, and Manuel Rosa-Calatrava. "Drug Repurposing Approaches for the Treatment of Influenza Viral Infection: Reviving Old

Drugs to Fight Against a Long-Lived Enemy." *Frontiers in Immunology* 10, no. 531 (March 19, 2020). Accessed May 29, 2020. https://doi.org/10.3389/fimmu.2019.00531.

Rabin, Roni Caryn. "What Is 'Covid Toe'? Maybe a Strange Sign of Coronavirus Infection." *New York Times*, May 5, 2020. Accessed June 4, 2020. https://www.nytimes.com/2020/05/01/health/coronavirus-covid-toe.html?smid=em-share.

Reynolds, Harmony et.al. "Renin–Angiotensin–Aldosterone System Inhibitors and Risk of Covid-19." *New England Journal of Medicine*, May 1, 2020. Accessed June 4, 2020. https://doi.org/10.1056/NEJMoa2008975.

Rogers, Adam. "How Does a Virus Spread in Cities? It's a Problem of Scale." *WIRED*, May 20, 2020. Accessed June 4, 2020. https://www.wired.com/story/how-does-a-virus-spread-in-cities-its-a-problem-of-scale/.

Schoch, Deborah. "amilies Anxious Over Loved Ones in Nursing Homes, Assisted Living." AARP Resources for Caregivers. Last modified April 2, 2020. Accessed June 4, 2020. https://www.aarp.org/caregiving/health/info-2020/preventing-coronavirus-in-nursing-homes.html.

Sia, S.F., Yan, L., Chin, A.W.H. et.al. "Pathogenesis and transmission of SARS-CoV-2 in golden hamsters." *Nature*, May 14, 2020. Accessed June 4, 2020. https://doi.org/10.1038/s41586-020-2342-5.

Spinelli, Alexander. "Recovery from Covid-19 is filled with uncertainty. An antibody test offered me a little comfort." *STAT News*, May 21, 2020. Accessed June 4, 2020. https://www.statnews.com/2020/05/21/recovery-from-covid-19-antibodies-uncertainty/.

Stadnytskyi, Valentyn, Christina E. Bax, Adriaan Bax, and Philip Anfinrud. "The airborne lifetime of small speech droplets and their potential importance in SARS-CoV-2 transmission." *Proceedings of the National Academy of Sciences of the United States of America* 117, no. 22 (May 13, 2020): 11875-77. Accessed June 4, 2020. https://doi.org/10.1073/pnas.2006874117.

The Nemours Foundation. "Coronavirus (COVID-19) Pandemic: What to Do if Your Child Is Sick." KidsHealth. Last modified May 2020. Accessed June 4, 2020. https://kidshealth.org/en/parents/coronavirus-child-is-sick.html.

University of Oxford. "Co-SPACE study - COVID-19: Supporting Parents, Adolescents, and Children during Epidemics." Department of Experimental Psychology at University of Oxford. Accessed June 4, 2020. https://oxfordxpsy.az1.qualtrics.com/jfe/form/SV_3VO130LTKOcloMd.

U.S. Food & Drug Administration. "FDA COMBATING COVID-19 WITH THERAPEUTICS." U.S. Food & Drug Administration. Last modified May 11, 2020. Accessed June 4, 2020. https://www.fda.gov/media/136832/download.

———. "Recommendations for Investigational COVID-19 Convalescent Plasma." U.S. Food & Drug Administration. Last modified May 1, 2020. Accessed May 29, 2020. https://www.fda.gov/vaccines-blood-biologics/investigational-new-drug-ind-or-device-exemption-ide-process-cber/recommendations-investigational-covid-19-convalescent-plasma.

Vastag, Brian, and Beth Mazur. "Researchers warn covid-19 could cause debilitating long-term illness in some patients." *Washington Post*, May 30, 2020. Accessed June 4, 2020. https://www.washingtonpost.com/health/could-

covid-19-cause-long-term-chronic-fatigue-and-illness-in-some-patients/2020/05/29/bcd5edb2-a02c-11ea-b5c9-570a91917d8d_story.html.

Watson, Clare. "How countries are using genomics to help avoid a second coronavirus wave." *Nature*, May 27, 2020. Accessed June 4, 2020. https://www.nature.com/articles/d41586-020-01573-5.

Watterberg, Kristi, and COMMITTEE ON FETUS AND NEWBORN. "Providing Care for Infants Born at Home." *Pediatrics* 145, no. 5 (May 2020). Accessed June 4, 2020. https://doi.org/10.1542/peds.2020-0626.

Weigel, Gabriela, Amrutha Ramaswarmy, Laurie Sobel, Alina Salganicoff, Juliette Cubanski, and Meredith Freed. "Opportunities and Barriers for Telemedicine in the U.S. During the COVID-19 Emergency and Beyond." Kaiser Family Foundation - Women's Health Policy. Last modified May 11, 2020. Accessed June 4, 2020. https://www.kff.org/womens-health-policy/issue-brief/opportunities-and-barriers-for-telemedicine-in-the-u-s-during-the-covid-19-emergency-and-beyond/.

Willyard, Cassandra. "Coronavirus blood-clot mystery intensifies." *Nature*, May 8, 2020. Accessed June 4, 2020. https://www.nature.com/articles/d41586-020-01403-8.

Wilson, Jillian. "How To Sleep Better If Coronavirus Anxiety Is Keeping You Awake." HuffPost. Last modified April 9, 2020. Accessed June 4, 2020. https://www.huffpost.com/entry/sleep-better-coronavirus-anxiety_l_5e8b5b2cc5b6cc1e47799a4d.

World Health Organization. "Advice on the use of point-of-care immunodiagnostic tests for COVID-19." World Health Organization. Last modified April 8, 2020. Accessed June 4, 2020. https://www.who.int/news-room/commentaries/detail/advice-on-the-use-of-point-of-care-immunodiagnostic-tests-for-covid-19.

———. "Coronavirus disease 2019 (COVID-19) Situation Report – 73." World Health Organization. Last modified April 2, 2020. Accessed June 4, 2020. https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200402-sitrep-73-covid-19.pdf.

———. "Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19)." World Health Organization. Last modified February 24, 2020. Accessed June 4, 2020. https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf.

———. "WHO statement: Tobacco use and COVID-19." World Health Organization. Last modified May 11, 2020. Accessed June 4, 2020. https://www.who.int/news-room/detail/11-05-2020-who-statement-tobacco-use-and-covid-19.

World Organisation for Animal Health. "Questions and Answers on the COVID-19." OIE - World Organisation for Animal Health. Last modified May 26, 2020. Accessed June 4, 2020. https://www.oie.int/en/scientific-expertise/specific-information-and-recommendations/questions-and-answers-on-2019novel-coronavirus/.

Zeng, Hui et.al. "Antibodies in Infants Born to Mothers With COVID-19 Pneumonia." *JAMA* 323, no. 18 (March 26, 2020): 1848-49. Accessed June 4, 2020. https://doi.org/10.1001/jama.2020.4861.

Zhou, Hong et.al. "A Novel Bat Coronavirus Closely Related to SARS-CoV-2 Contains Natural Insertions at the S1/S2 Cleavage Site of the Spike Protein." *Current Biology*, May 10, 2020. Accessed June 4, 2020. https://doi.org/10.1016/j.cub.2020.05.023.

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[1] The Nemours Foundation, "Coronavirus (COVID-19) Pandemic: What to Do if Your Child Is Sick," KidsHealth, last modified May 2020, accessed June 4, 2020, https://kidshealth.org/en/parents/coronavirus-child-is-sick.html.

[2] Centers for Disease Control and Prevention, "For Parents: Multisystem Inflammatory Syndrome in Children (MIS-C) associated with COVID-19," Centers for Disease Control and Prevention - Coronavirus Disease 2019 (COVID-19), https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/children/mis-c.html.

[3] James Paton, Jason Gale, and John Lauerman, "The Race to Develop a Coronavirus Vaccine: What you need to know," *Bloomberg*, May 8, 2020, accessed May 29, 2020, https://www.bloomberg.com/news/storythreads/2020-05-08/the-race-to-develop-a-coronavirus-vaccine.

[4] Natalie E. Dean, "COVID-19 Data Dives: Why Don't We Have a Vaccine for SARS or MERS?," *Medscape*, May 28, 2020, accessed May 29, 2020, https://www.medscape.com/viewarticle/931226.

[5] "Does the flu vaccine work as well in elderly people?," *Harvard Health Publishing*, December 2019, accessed May 29, 2020, https://www.health.harvard.edu/diseases-and-conditions/does-the-flu-vaccine-work-as-well-in-elderly-people.

[6] Centers for Disease Control and Prevention, "Vaccination of Tier 1 at All Pandemic Severities," Centers for Disease Control and Prevention - Influenza (Flu), last modified October 24, 2018, accessed May 29, 2020, https://www.cdc.gov/flu/pandemic-resources/national-strategy/planning-guidance/pandemic-severities-tier-1.html.

[7] Emma Farge and Michael Shields, "'This virus may never go away,' WHO says," *Reuters*, May 13, 2020, accessed May 29, 2020, https://www.reuters.com/article/us-health-coronavirus-who-briefing/this-virus-may-never-go-away-who-says-idUSKBN22P2IJ.

[8] Hung, Ivan Fan-Ngai et.al., "Triple combination of interferon beta-1b, lopinavir–ritonavir, and ribavirin in the treatment of patients admitted to hospital with COVID-19: an open-label, randomised, phase 2 trial," *The Lancet* 395, no. 10238 (May 30, 2020), accessed May 29, 2020, https://doi.org/10.1016/S0140-6736(20)31042-4.

[9] Paranjpe, Ishan et.al, "Association of Treatment Dose Anticoagulation with In-Hospital Survival Among Hospitalized Patients with COVID-19," *Journal of the American College of Cardiology*, May 6, 2020, accessed May 29, 2020, https://doi.org/10.1016/j.jacc.2020.05.001.

[10] U.S. Food & Drug Administration, "Recommendations for Investigational COVID-19 Convalescent Plasma," U.S. Food & Drug Administration, last modified May 1, 2020, accessed May 29, 2020,

https://www.fda.gov/vaccines-blood-biologics/investigational-new-drug-ind-or-device-exemption-ide-process-cber/recommendations-investigational-covid-19-convalescent-plasma.

[11] Duan, Kai et.al, "The feasibility of convalescent plasma therapy in severe COVID-19 patients: a pilot study," *medRxiv*, March 23, 2020, accessed May 29, 2020, https://doi.org/10.1101/2020.03.16.20036145.

[12] Paranjpe, Ishan et.al, "Association of Treatment".

[13] https://www.cdc.gov/coronavirus/2019-ncov/index.html

[14] https://www.fda.gov/emergency-preparedness-and-response/counterterrorism-and-emerging-threats/coronavirus-disease-2019-covid-19

[15] https://www.who.int/emergencies/diseases/novel-coronavirus-2019

[16] Andrés Pizzorno et al., "Drug Repurposing Approaches for the Treatment of Influenza Viral Infection: Reviving Old Drugs to Fight Against a Long-Lived Enemy," *Frontiers in Immunology* 10, no. 531 (March 19, 2020), accessed May 29, 2020, https://doi.org/10.3389/fimmu.2019.00531.

[17] James Gallagher, "Coronavirus cure: When will we have a drug to treat it?," *BBC News*, May 27, 2020, accessed June 4, 2020, https://www.bbc.com/news/health-52354520.

[18] Duan, Kai et.al, "The feasibility".

[19] U.S. Food & Drug Administration, "FDA COMBATING COVID-19 WITH THERAPEUTICS," U.S. Food & Drug Administration, last modified May 11, 2020, accessed June 4, 2020, https://www.fda.gov/media/136832/download.

[20] Ami Patel, Mamadou A. Bah, and David B. Weiner, "In Vivo Delivery of Nucleic Acid-Encoded Monoclonal Antibodies," *BioDrugs* 34 (March 10, 2020), https://doi.org/10.1007/s40259-020-00412-3.

[21] Camilla Hogdson, "Mystery of prolonged Covid-19 symptoms adds to unknowns," *Financial Times*, May 16, 2020, accessed June 4, 2020, https://www.ft.com/content/91e4482e-d120-49ab-93e3-d314d99b5336.

[22] Cassandra Willyard, "Coronavirus blood-clot mystery intensifies," *Nature*, May 8, 2020, accessed June 4, 2020, https://www.nature.com/articles/d41586-020-01403-8.

[23] "Blood thinners being used to mitigate risk of clots in COVID-19 patients," CBS News, last modified May 26, 2020, accessed June 4, 2020, https://www.cbsnews.com/news/coronavirus-blood-clots-covid-19-symptom-strokes-young-people/.

[24] Brian Vastag and Beth Mazur, "Researchers warn covid-19 could cause debilitating long-term illness in some patients," *Washington Post*, May 30, 2020, accessed June 4, 2020, https://www.washingtonpost.com/health/could-covid-19-cause-long-term-chronic-fatigue-and-illness-in-some-patients/2020/05/29/bcd5edb2-a02c-11ea-b5c9-570a91917d8d_story.html.

[25] Ariana Eunjung Cha, "Young and middle-aged people, barely sick with covid-19, are dying of strokes," *Washington Post*, April 25, 2020, accessed June 4, 2020, https://www.washingtonpost.com/health/2020/04/24/strokes-coronavirus-young-patients/.

[26] Centers for Disease Control and Prevention, "Groups at Higher Risk for Severe Illness," Centers for Disease Control and Prevention - Coronavirus Disease 2019 (COVID-19), last modified May 14, 2020, accessed June 4, 2020, https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/groups-at-higher-risk.html.

[27] World Health Organization, "WHO statement: Tobacco use and COVID-19," World Health Organization, last modified May 11, 2020, accessed June 4, 2020, https://www.who.int/news-room/detail/11-05-2020-who-statement-tobacco-use-and-covid-19.

[28] Neeltje van Doremalen et.al, "Aerosol and Surface Stability of SARS-CoV-2 as Compared With SARS-CoV-1," *New England Journal of Medicine* 382, no. 16 (April 16, 2020), https://doi.org/10.1056/NEJMc2004973.

[29] Centers for Disease Control and Prevention, "How COVID-19 Spreads," Centers for Disease Control and Prevention - Coronavirus Disease 2019 (COVID-19), last modified June 1, 2020, accessed June 4, 2020, https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/how-covid-spreads.html.

[30] World Health Organization, "Coronavirus disease 2019 (COVID-19) Situation Report – 73," World Health Organization, last modified April 2,

2020, accessed June 4, 2020, https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200402-sitrep-73-covid-19.pdf.

[31] He, X., Lau, E.H.Y., Wu, P. et.al, "Temporal dynamics in viral shedding and transmissibility of COVID-19," *Nature Medicine* 26 (April 15, 2020, accessed June 4, 2020, https://doi.org/10.1038/s41591-020-0869-5.

[32] Diangeng Li, Meiling Jin, and Pengtao Bao, "Clinical Characteristics and Results of Semen Tests Among Men With Coronavirus Disease 2019," *JAMA Network Open* 3, no. 5 (May 7, 2020), accessed June 4, 2020, https://doi.org/10.1001/jamanetworkopen.2020.8292.

[33] World Health Organization, "Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19)," World Health Organization, last modified February 24, 2020, accessed June 4, 2020, https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf.

[34] Valentyn Stadnytskyi et al., "The airborne lifetime of small speech droplets and their potential importance in SARS-CoV-2 transmission," *Proceedings of the National Academy of Sciences of the United States of America* 117, no. 22 (May 13, 2020): [Page #], accessed June 4, 2020, https://doi.org/10.1073/pnas.2006874117.

[35] Stadnytskyi et al., "The airborne".

[36] Centers for Disease Control and Prevention, "Strategies to Optimize the Supply of PPE and Equipment," Centers for Disease Control and Prevention - Coronavirus Disease 2019 (COVID-19), last modified May 18,

2020, accessed June 4, 2020, https://www.cdc.gov/coronavirus/2019-ncov/hcp/ppe-strategy/index.html.

[37] American Lung Association, "How Fast Is a Sneeze Versus a Cough? Cover Your Mouth Either Way!," Each Breath: A Blog by the American Lung Association, last modified May 12, 2016, accessed June 4, 2020, https://www.lung.org/blog/sneeze-versus-cough.

[38] Adam Rogers, "How Does a Virus Spread in Cities? It's a Problem of Scale," *WIRED*, May 20, 2020, accessed June 4, 2020, https://www.wired.com/story/how-does-a-virus-spread-in-cities-its-a-problem-of-scale/.

[39] Anthony King, "What four coronaviruses from history can tell us about covid-19," *New Scientist*, April 29, 2020, accessed June 4, 2020, https://www.newscientist.com/article/mg24632800-700-what-four-coronaviruses-from-history-can-tell-us-about-covid-19/.

[40] Apoorva Mandavilli, "New Studies Add to Evidence that Children May Transmit the Coronavirus," *New York Times*, May 8, 2020, accessed June 4, 2020, https://www.nytimes.com/2020/05/05/health/coronavirus-children-transmission-school.html?smid=em-share.

[41] Smriti Mallapaty, "What's the risk that animals will spread the coronavirus?," *Nature*, June 1, 2020, accessed June 4, 2020, https://www.nature.com/articles/d41586-020-01574-4?utm_source=Nature+Briefing&utm_campaign=32981e1f33-briefing-dy-20200601&utm_medium=email&utm_term=0_c9dfd39373-32981e1f33-45423538.

[42] World Organisation for Animal Health, "Questions and Answers on the COVID-19," OIE - World Organisation for Animal Health, last modified May 26, 2020, accessed June 4, 2020, https://www.oie.int/en/scientific-expertise/specific-information-and-recommendations/questions-and-answers-on-2019novel-coronavirus/.

[43] Nadia Oreshkova et.al, "SARS-CoV2 infection in farmed mink, Netherlands, April 2020," *bioRxiv*, May 18, 2020, accessed June 4, 2020, https://doi.org/10.1101/2020.05.18.101493.

[44] International Society for Infectious Diseases, "An update letter from the Minister of Agriculture to the Dutch House of Representatives," Program for Monitoring Emerging Diseases, last modified May 25, 2020, accessed June 4, 2020, https://promedmail.org/promed-post/?id=20200525.7375359.

[45] Sia, S.F., Yan, L., Chin, A.W.H. et.al, "Pathogenesis and transmission of SARS-CoV-2 in golden hamsters," *Nature*, May 14, 2020, accessed June 4, 2020, https://doi.org/10.1038/s41586-020-2342-5.

[46] Nadia Oreshkova et.al, "SARS-CoV2 infection".

[47] Centers for Disease Control and Prevention, "Frequently Asked Questions," Centers for Disease Control and Prevention - Coronavirus Disease 2019 (COVID-19), last modified June 2, 2020, accessed June 4, 2020, https://www.cdc.gov/coronavirus/2019-ncov/faq.html.

[48] Centers for Disease Control and Prevention, "Running Essential Errands," Centers for Disease Control and Prevention - Coronavirus Disease 2019 (COVID-19), last modified May 11, 2020, accessed June 4,

2020, https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/essential-goods-services.html.

[49] Roni Caryn Rabin, "What Is 'Covid Toe'? Maybe a Strange Sign of Coronavirus Infection," *New York Times*, May 5, 2020, accessed June 4, 2020, https://www.nytimes.com/2020/05/01/health/coronavirus-covid-toe.html?smid=em-share.

[50] Ariana Eunjung Cha and Chelsea Janes, "Young adults are also affected by Kawasaki-like disease linked to coronavirus, doctors say," *Washington Post*, May 21, 2020, accessed June 4, 2020, https://www.washingtonpost.com/health/2020/05/21/misc-c-kawasaki-coronavirus-young-adults/.

[51] Xiaofang Cai et al., "Clinical Characteristics of 5 COVID-19 Cases With Non-respiratory Symptoms as the First Manifestation in Children," *Frontiers in Pediatrics*, May 12, 2020, accessed June 4, 2020, https://doi.org/10.3389/fped.2020.00258.

[52] Sharon Begley, "What explains Covid-19's lethality for the elderly? Scientists look to 'twilight' of the immune system," *STAT News*, March 30, 2020, accessed June 4, 2020, https://www.statnews.com/2020/03/30/what-explains-coronavirus-lethality-for-elderly/.

[53] Centers for Disease Control and Prevention, "Groups at Higher," Centers for Disease Control and Prevention - Coronavirus Disease 2019 (COVID-19).

[54] Monica Webb Hooper, Anna María Nápoles, and Eliseo J. Pérez-Stable, "COVID-19 and Racial/Ethnic Disparities," *JAMA*, May 11, 2020, accessed June 4, 2020, https://doi.org/10.1001/jama.2020.8598.

[55] Centers for Disease Control and Prevention, "Hospitalization Rates and Characteristics of Patients Hospitalized with Laboratory-Confirmed Coronavirus Disease 2019 — COVID-NET, 14 States, March 1–30, 2020," Morbidity and Mortality Weekly Report (MMWR), last modified April 17, 2020, accessed June 4, 2020, https://www.cdc.gov/mmwr/volumes/69/wr/mm6915e3.htm?s_cid=mm6915e3_w.

[56] Quentin Fottrell, "Black Americans are twice as likely to be hospitalized from COVID-19," MarketWatch, last modified June 4, 2020, accessed June 4, 2020, https://www.marketwatch.com/story/75-of-frontline-workers-in-new-york-the-epicenter-of-coronavirus-are-people-of-color-and-black-americans-are-twice-as-likely-to-die-from-covid-19-2020-06-01.

[57] https://www.cdc.gov/coronavirus/2019-ncov/community/worker-safety-support/index.html

[58] Centers for Disease Control and Prevention, "How to Protect Yourself & Others," Centers for Disease Control and Prevention - Coronavirus Disease 2019 (COVID-19), last modified April 24, 2020, accessed June 4, 2020, https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/prevention.html.

[59] Kylene Metzger, "Slow the Spread with Cloth Masks," University of Utah Health Feed Blog, last modified May 6, 2020, accessed June 4, 2020,

https://healthcare.utah.edu/healthfeed/postings/2020/03/coronavirus-face-masks.php.

[60] https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/how-to-make-cloth-face-covering.html

[61] Centers for Disease Control and Prevention, "Personal Protective Equipment: Questions and Answers," Centers for Disease Control and Prevention - Coronavirus Disease 2019 (COVID-19), last modified March 14, 2020, accessed June 4, 2020, https://www.cdc.gov/coronavirus/2019-ncov/hcp/respirator-use-faq.html.

[62] Victoria Forster, "Wearing A Mask To Reduce The Spread Of Coronavirus Will Not Give You Carbon Dioxide Poisoning," *Forbes*, May 12, 2020, accessed June 4, 2020, https://www.forbes.com/sites/victoriaforster/2020/05/12/wearing-a-mask-to-reduce-the-spread-of-coronavirus-will-not-give-you-carbon-dioxide-poisoning/#660a241017f5.

[63] Natasha Hinde, "Why Wearing Gloves To The Grocery Store Won't Protect You From COVID-19," HuffPost, last modified June 2, 2020, accessed June 4, 2020, https://www.huffpost.com/entry/wearing-gloves-to-grocery-store-coronavirus_l_5ed656abc5b63e9c88e4d4bc?utm_campaign=share_email&ncid=other_email_o63gt2jcad4.

[64] Centers for Disease Control and Prevention, "Effects of the COVID-19 Pandemic on Routine Pediatric Vaccine Ordering and Administration — United States, 2020," Morbidity and Mortality Weekly Report (MMWR), last

modified May 15, 2020, accessed June 4, 2020, https://www.cdc.gov/mmwr/volumes/69/wr/mm6919e2.htm.

[65] Centers for Disease Control and Prevention, "Guidance for Child Care Programs that Remain Open," Centers for Disease Control and Prevention - Coronavirus Disease 2019 (COVID-19), last modified April 21, 2020, accessed June 4, 2020, https://www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/guidance-for-childcare.html.

[66] Child Care Aware, "Information for Families on Health and Safety Measures," last modified May 13, 2020, accessed June 5, 2020, https://info.childcareaware.org/hubfs/Health And Safety Measures For Families.pdf

[67] Centers for Disease Control and Prevention, "CDC Releases Interim Reopening Guidance for Dental Settings," Centers for Disease Control and Prevention - Oral Health, last modified June 3, 2020, accessed June 4, 2020, https://www.cdc.gov/oralhealth/infectioncontrol/statement-COVID.html.

[68] Tara Parker-Pope, "Have I Been Cleaning All Wrong?," *New York Times*, May 13, 2020, accessed June 4, 2020, https://www.nytimes.com/2020/05/06/well/live/coronavirus-cleaning-cleaners-disinfectants-home.html?smid=em-share.

[69] https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2

[70] Olivia Muenter, "How Often You Should Wash Your Sheets During The Coronavirus Pandemic," HuffPost, last modified May 5, 2020,

https://www.huffpost.com/entry/how-often-wash-sheets-coronavirus-pandemic_l_5eac4f6bc5b624b396929d10?utm_campaign=share_email&ncid=other_email_o63gt2jcad4.

[71] World Health Organization, "Coronavirus disease," World Health Organization.

[72] Jillian Wilson, "How To Sleep Better If Coronavirus Anxiety Is Keeping You Awake," HuffPost, last modified April 9, 2020, accessed June 4, 2020, https://www.huffpost.com/entry/sleep-better-coronavirus-anxiety_l_5e8b5b2cc5b6cc1e47799a4d.

[73] Ekaterina Pesheva, "Outpatient COVID-19 Clues," Harvard Medical School - News & Research, last modified May 6, 2020, accessed June 4, 2020, https://hms.harvard.edu/news/outpatient-covid-19-clues#.Xrp8gJ_9h4c.mailto.

[74] https://www.washingtonpost.com/lifestyle/2020/05/06/seniors-isolation-quarantine-help-how-to/

[75] Deborah Schoch, "amilies Anxious Over Loved Ones in Nursing Homes, Assisted Living," AARP Resources for Caregivers, last modified April 2, 2020, accessed June 4, 2020, https://www.aarp.org/caregiving/health/info-2020/preventing-coronavirus-in-nursing-homes.html.

[76] Centers for Disease Control and Prevention, "People with Disabilities," Centers for Disease Control and Prevention - Coronavirus Disease 2019 (COVID-19), last modified April 7, 2020, accessed June 4, 2020, https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/people-with-disabilities.html.

[77] https://www.nami.org/covid-19-guide

[78] Breslin, Noelle et.al, "Coronavirus disease 2019 infection among asymptomatic and symptomatic pregnant women: two weeks of confirmed presentations to an affiliated pair of New York City hospitals," *American Journal of Obstetrics & Gynecology MFM* 2, no. 2 (April 9, 2020), https://doi.org/10.1016/j.ajogmf.2020.100118.

[79] American College of Obstetricians and Gynecologists, "Novel Coronavirus 2019 (COVID-19): Practical Advisory," ACOG Clinical, last modified May 19, 2020, accessed June 4, 2020, https://www.acog.org/clinical/clinical-guidance/practice-advisory/articles/2020/03/novel-coronavirus-2019.

[80] Zeng, Hui et.al, "Antibodies in Infants Born to Mothers With COVID-19 Pneumonia," *JAMA* 323, no. 18 (March 26, 2020), accessed June 4, 2020, https://doi.org/10.1001/jama.2020.4861.

[81] March of Dimes, "Coronavirus Disease (COVID-19): What You Need to Know About Its Impact on Moms and Babies," March of Dimes, last modified May 29, 2020, accessed June 4, 2020, https://www.marchofdimes.org/complications/coronavirus-disease-covid-19-what-you-need-to-know.aspx.

[82] Kristi Watterberg and COMMITTEE ON FETUS AND NEWBORN, "Providing Care for Infants Born at Home," *Pediatrics* 145, no. 5 (May 2020), accessed June 4, 2020, https://doi.org/10.1542/peds.2020-0626.

[83] Reynolds, Harmony et.al, "Renin–Angiotensin–Aldosterone System Inhibitors and Risk of Covid-19," *New England Journal of Medicine*, May 1, 2020, accessed June 4, 2020, https://doi.org/10.1056/NEJMoa2008975.

[84] Cariou, B., Hadjadj, S., Wargny, M. et.al, "Phenotypic characteristics and prognosis of inpatients with COVID-19 and diabetes: the CORONADO study," *Diabetologia*, May 29, 2020, https://doi.org/10.1007/s00125-020-05180-x.

[85] Denis Campbell, "Quarter of Covid-19 deaths in English hospitals were of diabetics," *The Guardian*, May 14, 2020, accessed June 4, 2020, https://www.theguardian.com/world/2020/may/14/one-in-four-people-who-died-in-uk-hospitals-with-covid-19-had-diabetes.

[86] American Diabetes Association, "How COVID-19 Impacts People with Diabetes," American Diabetes Association - COVID-19, last modified 2020, accessed June 4, 2020, https://www.diabetes.org/coronavirus-covid-19/how-coronavirus-impacts-people-with-diabetes.

[87] American Diabetes Association, "Planning for Coronavirus," American Diabetes Association - COVID-19, last modified 2020, accessed June 4, 2020, https://www.diabetes.org/coronavirus-covid-19/planning-for-coronavirus.

[88] Giuseppe Lippi, "Chronic obstructive pulmonary disease is associated with severe coronavirus disease 2019 (COVID-19)," *Respiratory Medicine*, June 2020, https://doi.org/10.1016/j.rmed.2020.105941.

[89] European Lung Foundation, "Covid-19 and lung disease Q&A," European Lung Foundation - COVID-19, last modified May 27, 2020, accessed June

4, 2020, https://www.europeanlung.org/covid-19/covid-19-information-and-resources/covid-19-info.

[90] European Lung Foundation, "Covid-19 and lung," European Lung Foundation - COVID-19.

[91] Avert, "COVID-19 and HIV," Avert: Global information and education on HIV and AIDS, last modified June 3, 2020, accessed June 4, 2020, https://www.avert.org/coronavirus/covid19-HIV.

[92] https://www.hiv.gov/hiv-basics/staying-in-hiv-care/other-related-health-issues/coronavirus-covid-19

[93] https://www.cdc.gov/hiv/covid-19/index.html

[94] Eugene McCray and Jonathan H. Mermin, "PrEP During COVID-19," Centers for Disease Control and Prevention - National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, last modified May 15, 2020, accessed June 4, 2020, https://www.cdc.gov/nchhstp/dear_colleague/2020/dcl-051520-PrEP-during-COVID-19.html.

[95] https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/immunocompromised.html.

[96] Centers for Disease Control and Prevention, "If You Are Immunocompromised, Protect Yourself From COVID-19," Centers for Disease Control and Prevention - Coronavirus Disease 2019 (COVID-19), last modified May 14, 2020, accessed June 4, 2020,

https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/immunocompromised.html.

[97] Centers for Disease Control and Prevention, "If You Are Immunocompromised," Centers for Disease Control and Prevention - Coronavirus Disease 2019 (COVID-19).

[98] National Cancer Research Institute, "COVID-19 (coronavirus) advice for patients with Chronic Myeloid Leukaemia receiving TKI therapy," British Society for Haematology, last modified March 21, 2020, accessed June 4, 2020, https://b-s-h.org.uk/media/18154/covid-19-and-cml-recommendations-ncri-sub-group-21_3_20.pdf.

[99] Li, W., Wang, D., Guo, J. et.al, "COVID-19 in persons with chronic myeloid leukaemia," *Leukemia*, May 18, 2020, accessed June 4, 2020, https://doi.org/10.1038/s41375-020-0853-6.

[100] National Cancer Research Institute, "COVID-19 (coronavirus)," British Society for Haematology.

[101] International Chronic Myeloid Leukemia Foundation, "Advice for people with Chronic Myeloid Leukemia on COVID-19 (coronavirus)," International Chronic Myeloid Leukemia Foundation, last modified March 2020, accessed June 4, 2020, https://www.cml-foundation.org/news-icmlf-mobile/1437-advice-for-people-with-chronic-myeloid-leukemia-on-covid-19-coronavirus.html.

[102] Centers for Disease Control and Prevention, "What You Can Do," Centers for Disease Control and Prevention - Coronavirus Disease 2019 (COVID-19), last modified May 8, 2020, accessed June 4, 2020,

https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/what-you-can-do.html.

[103] World Health Organization, "Report of the WHO-China," World Health Organization.

[104] Harvard Health Publishing, "If you've been exposed to the coronavirus," Harvard Health Publishing, last modified May 28, 2020, accessed June 4, 2020, https://www.health.harvard.edu/diseases-and-conditions/if-youve-been-exposed-to-the-coronavirus.

[105] Daniel M. Altmann, Daniel C. Douek, and Rosemary J. Boyton, "What policy makers need to know about COVID-19 protective immunity," *The Lancet* 395, no. 10236 (May 16, 2020), accessed June 4, 2020, https://doi.org/10.1016/S0140-6736(20)30985-5.

[106] Robert D. Kirkcaldy, Brian A. King, and John T. Brooks, "COVID-19 and Postinfection Immunity: Limited Evidence, Many Remaining Questions," *JAMA*, May 11, 2020, accessed June 4, 2020, https://doi.org/10.1001/jama.2020.7869.

[107] Kirkcaldy, King, and Brooks, "COVID-19 and Postinfection".

[108] Altmann, Douek, and Boyton, "What policy".

[109] Mario Koran, "'It's irresponsible': Washington state warns against 'coronavirus parties,'" *The Guardian*, May 6, 2020, accessed June 4, 2020, https://www.theguardian.com/world/2020/may/06/its-irresponsible-washington-state-sees-sudden-rise-in-covid-parties.

[110] William A. Haseltine, "How Antibody Tests Can Be Used To Fight COVID-19," *Forbes*, April 6, 2020, accessed June 4, 2020, https://www.forbes.com/sites/williamhaseltine/2020/04/06/how-antibody-tests-can-be-used-to-fight-covid-19/#70c7b57a3904.

[111] Julie Appleby, "What Takes So Long? A Behind-The-Scenes Look At The Steps Involved In COVID-19 Testing," *Kaiser Health News*, May 30, 2020, accessed June 4, 2020, https://khn.org/news/what-takes-so-long-a-behind-the-scenes-look-at-the-steps-involved-in-covid-19-testing/.

[112] World Health Organization, "Advice on the use of point-of-care immunodiagnostic tests for COVID-19," World Health Organization, last modified April 8, 2020, accessed June 4, 2020, https://www.who.int/news-room/commentaries/detail/advice-on-the-use-of-point-of-care-immunodiagnostic-tests-for-covid-19.

[113] Stephen M. Hahn and Jeffrey E. Shuren, "Coronavirus (COVID-19) Update: FDA Authorizes First Antigen Test to Help in the Rapid Detection of the Virus that Causes COVID-19 in Patients," U.S. Food & Drug Administration, last modified May 9, 2020, accessed June 4, 2020, https://www.fda.gov/news-events/press-announcements/coronavirus-covid-19-update-fda-authorizes-first-antigen-test-help-rapid-detection-virus-causes.

[114] Neel V. Patel, "Antigen testing could be a faster, cheaper way to diagnose covid-19," *MIT Technology Review*, April 24, 2020, accessed June 4, 2020, https://www.technologyreview.com/2020/04/24/1000486/antigen-testing-could-faster-cheaper-diagnose-covid-19-coronavirus/.

[115] Amir Khan, "Doctor's Note: What are serology tests and do they work?," *Al Jazeera*, May 9, 2020, accessed June 4, 2020, https://www.aljazeera.com/indepth/features/doctor-note-serology-tests-work-200505151942226.html.

[116] Alexander Spinelli, "Recovery from Covid-19 is filled with uncertainty. An antibody test offered me a little comfort," *STAT News*, May 21, 2020, accessed June 4, 2020, https://www.statnews.com/2020/05/21/recovery-from-covid-19-antibodies-uncertainty/.

[117] Nicoletta Lanese, "First at-home saliva test for COVID-19 earns FDA approval," Live Science, last modified May 2020, accessed June 4, 2020, https://www.livescience.com/at-home-saliva-test-for-covid19.html.

[118] Drew Harwell, "Thermal scanners are the latest technology being deployed to detect the coronavirus. But they don't really work.," *Washington Post*, May 11, 2020, accessed June 4, 2020, https://www.washingtonpost.com/technology/2020/05/11/thermal-scanners-are-latest-technology-being-deployed-detect-coronavirus-they-dont-really-work/.

[119] Katelyn Gostic et al., "Estimated effectiveness of symptom and risk screening to prevent the spread of COVID-19," *eLife Sciences*, February 24, 2020, accessed June 4, 2020, https://doi.org/10.7554/eLife.55570.

[120] Edmond J. Safra Center for Ethics at Harvard University, "Road to Pandemic Resilience," Edmond J. Safra Center for Ethics at Harvard University, last modified April 20, 2020, accessed June 4, 2020,

https://ethics.harvard.edu/files/center-for-ethics/files/roadmaptopandemicresilience_updated_4.20.20_0.pdf.

[121] https://www.healthline.com/health/working-from-home-tips#tips-for-newbies

[122] Francesco Cirillo, "The Pomodoro Technique®," The Pomodoro Technique®, last modified 2020, accessed June 4, 2020, https://francescocirillo.com/pages/pomodoro-technique.

[123] https://thriveglobal.com/stories/how-to-avoid-burnout-stress-work-from-home-tips/

[124] https://www.vox.com/identities/2020/3/25/21193142/coronavirus-covid-19-kids-work-from-home-child-care-school-cancellations

[125] https://www.huffpost.com/entry/zoom-and-google-hangouts-are-making-kids-miserable_l_5ebd5cbbc5b655620b13a149?utm_campaign=share_email&ncid=other_email_o63gt2jcad4

[126] Clare Watson, "How countries are using genomics to help avoid a second coronavirus wave," *Nature*, May 27, 2020, accessed June 4, 2020, https://www.nature.com/articles/d41586-020-01573-5.

[127] National Institutes of Health, "NIAID Emerging Infectious Diseases/ Pathogens," National Institute of Allergy and Infectious Disease - Biodefense, last modified July 26, 2018, accessed June 4, 2020, https://www.niaid.nih.gov/research/emerging-infectious-diseases-pathogens.

[128] Kay Lazar and Andrew Ryan, "No, warm weather will not kill the coronavirus," *Boston Globe*, April 24, 2020, accessed June 4, 2020, https://www.bostonglobe.com/2020/04/24/nation/no-warm-weather-will-not-kill-coronavirus/.

[129] https://www.nytimes.com/interactive/2020/us/states-reopen-map-coronavirus.html

[130] Oliver Franklin-Wallis, "How School Shutdowns Have Long-Term Effects on Children," *WIRED UK*, May 18, 2020, accessed June 4, 2020, https://www.wired.com/story/how-school-shutdowns-have-longterm-effects-on-children/?utm_source=onsite-share&utm_medium=email&utm_campaign=onsite-share&utm_brand=wired.

[131] Carl Cullinane and Rebecca Montacute, "COVID-19 and Social Mobility Impact Brief #1: School Shutdown," The Sutton Trust, last modified April 2020, accessed June 4, 2020, https://www.suttontrust.com/wp-content/uploads/2020/04/COVID-19-Impact-Brief-School-Shutdown.pdf.

[132] University of Oxford, "Co-SPACE study - COVID-19: Supporting Parents, Adolescents, and Children during Epidemics," Department of Experimental Psychology at University of Oxford, accessed June 4, 2020, https://oxfordxpsy.az1.qualtrics.com/jfe/form/SV_3VO130LTKOcloMd.

[133] Zhou, Hong et.al, "A Novel Bat Coronavirus Closely Related to SARS-CoV-2 Contains Natural Insertions at the S1/S2 Cleavage Site of the Spike Protein," *Current Biology*, May 10, 2020, accessed June 4, 2020, https://doi.org/10.1016/j.cub.2020.05.023.

[134] William A. Haseltine, "Why America Is Losing to COVID-19," *Project Syndicate*, March 31, 2020, accessed June 4, 2020, https://www.project-syndicate.org/commentary/united-states-covid-testing-contact-tracing-by-william-a-haseltine-2020-03.

[135] Yasheng Huang, Meicen Sun, and Yuze Sui, "How Digital Contact Tracing Slowed Covid-19 in East Asia," *Harvard Business Review*, April 15, 2020, accessed June 4, 2020, https://hbr.org/2020/04/how-digital-contact-tracing-slowed-covid-19-in-east-asia.

[136] "Coronavirus: Lessons From Asia," *Al Jazeera*, May 3, 2020, accessed June 4, 2020, https://www.aljazeera.com/programmes/specialseries/2020/05/coronavirus-lessons-asia-200501110507558.html.

[137] Chelsea Janes, "In some nations, government isolation centers helped reduce coronavirus infections. The U.S. has resisted the strategy.," *Washington Post*, May 20, 2020, accessed June 4, 2020, https://www.washingtonpost.com/health/in-some-nations-government-isolation-centers-helped-reduce-covid-19-infections-the-us-has-resisted-the-strategy/2020/05/19/533850d6-9616-11ea-9f5e-56d8239bf9ad_story.html.

[138] https://www.chronicle.com/article/Here-s-a-List-of-Colleges-/248626

[139] NYU Shanghai, "NYU Shanghai to Begin Reopening to Students April 27," NYU Shanghai, last modified April 24, 2020, accessed June 4, 2020, https://shanghai.nyu.edu/news/nyu-shanghai-begin-reopening-students-april-27.

[140] Centers for Disease Control and Prevention, "Community Transmission of SARS-CoV-2 at Two Family Gatherings — Chicago, Illinois, February–March 2020," Morbidity and Mortality Weekly Report (MMWR), last modified April 17, 2020, accessed June 4, 2020, https://www.cdc.gov/mmwr/volumes/69/wr/mm6915e1.htm?s_cid=mm6915e1_w.

[141] Eric Holdeman, "COVID-19: Transmission Scenarios Explained," *Government Technology*, May 11, 2020, accessed June 4, 2020, https://www.govtech.com/em/emergency-blogs/disaster-zone/covid-19-transmission-scenarios-explained.html.

[142] Bruce Y. Lee, "Where Coronavirus Is More Likely To Be Airborne, 5 Places To Avoid," *Forbes*, May 30, 2020, accessed June 4, 2020, https://www.forbes.com/sites/brucelee/2020/05/30/where-coronavirus-is-more-likely-to-be-airborne-5-places-to-avoid/#44f194bb39ab.

[143] California State Government, "Stay home Q&A," Covid19.CA.gov, last modified June 4, 2020, accessed June 4, 2020, https://covid19.ca.gov/stay-home-except-for-essential-needs/?campaign_id=49&emc=edit_ca_20200501&instance_id=18134&nl=california-today®i_id=78159988&segment_id=26374&te=1&user_id=930b2d6d815949d1bd3f3835944a4f18#outdoor.

[144] Centers for Disease Control and Prevention, "Visiting Parks and Recreational Facilities," Centers for Disease Control and Prevention - Coronavirus Disease 2019 (COVID-19), last modified May 19, 2020, accessed June 4, 2020, https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/visitors.html.

[145] California State Government, "Stay home," Covid19.CA.gov.

[146] Heather Landi, "Half of physicians now using telehealth as COVID-19 changes practice operations," *Fierce Healthcare*, April 23, 2020, accessed June 4, 2020, https://www.fiercehealthcare.com/practices/half-physicians-now-using-telehealth-as-covid-changes-practice-operations.

[147] Ateev Mehrotra et al., "The Impact of the COVID-19 Pandemic on Outpatient Visits: A Rebound Emerges," The Commonwealth Fund, last modified May 19, 2020, accessed June 4, 2020, https://www.commonwealthfund.org/publications/2020/apr/impact-covid-19-outpatient-visits.

[148] Blue Cross Blue Shield of Massachusetts, "Blue Cross Blue Shield of Massachusetts Processes 1 Million Telehealth Claims in 9 Weeks," Blue Cross Blue Shield of Massachusetts, last modified May 21, 2020, accessed June 4, 2020, http://newsroom.bluecrossma.com/2020-05-21-Blue-Cross-Blue-Shield-of-Massachusetts-Processes-1-Million-Telehealth-Claims-in-9-Weeks?utm_source=STAT+Newsletters&utm_campaign=ff37996f74-MR_COPY_01&utm_medium=email&utm_term=0_8cab1d7961-ff37996f74-151227717.

[149] https://www.ahip.org/health-insurance-providers-respond-to-coronavirus-covid-19/

[150] Gabriela Weigel et al., "Opportunities and Barriers for Telemedicine in the U.S. During the COVID-19 Emergency and Beyond," Kaiser Family Foundation - Women's Health Policy, last modified May 11, 2020, accessed June 4, 2020, https://www.kff.org/womens-health-policy/issue-

brief/opportunities-and-barriers-for-telemedicine-in-the-u-s-during-the-covid-19-emergency-and-beyond/.

[151] Bertha Coombs, "Telehealth visits are booming as doctors and patients embrace distancing amid the coronavirus crisis," CNBC, last modified April 4, 2020, accessed June 4, 2020, https://www.cnbc.com/2020/04/03/telehealth-visits-could-top-1-billion-in-2020-amid-the-coronavirus-crisis.html.