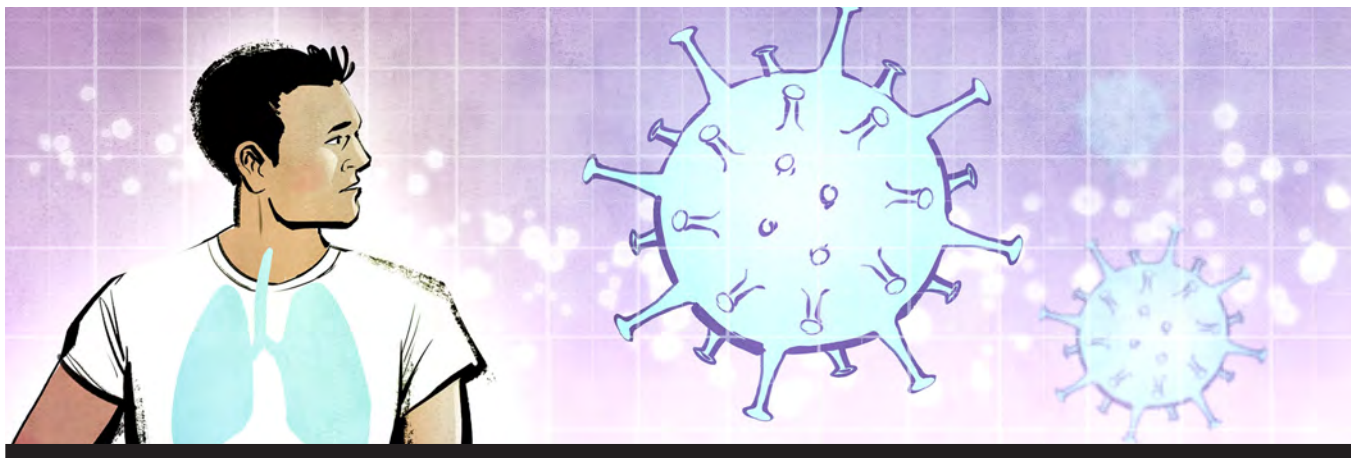




# COVID-19 BACKGROUNDER

– WHAT DOES THE SCIENCE SAY?



This hugely challenging pandemic has turned our lives upside down. It's easy to get caught up in the fear and anxiety, the rumours and 'noise.'

Instead, let's focus on the science. There are things **epidemiologists** and infectious disease experts still do not know about the **coronavirus** that causes COVID-19. We have only been aware of the virus for just over three months. But we're on a fast learning curve.

## A TINY VIRUS GOES PANDEMIC

A virus is a microscopic piece of genetic material (a strip of ribonucleic acid or RNA) surrounded by a capsule made of protein. If you've had a cold, the flu, or chicken pox, you've had experience with viruses. They can make you sick.

A virus cannot survive by itself. It needs to get inside a 'host.' Often the host is an animal, but sometimes the **pathogen** is transmitted to a human host.

Some viruses are highly contagious, while others spread less easily. COVID-19 is very infectious. It spreads through **respiratory** droplets coughed out by those infected with the virus. The virus may also linger on surfaces after sick people cough into their hands and then touch those surfaces.

Those exposed to the pathogen may not show symptoms for two to 14 days, with the average **incubation period** being five days. Yet even without symptoms, infected people can pass the virus on to others.

## "I'VE BEEN INFECTED!"

Inside a host, COVID-19 – a spherical capsule covered with spikes – latches onto a healthy cell in the respiratory tract. It breaks into the cell and makes copies of itself, before breaking out of the cell again, killing it in the process.

Fortunately, the body's immune system is designed to fight off invaders like viruses. While the battle rages, the sick person will exhibit symptoms such as fever, a cough, and tiredness.

The good news is that about 80 percent of COVID-19 cases are relatively mild. With a strong immune system, the body will win. After a very unpleasant couple of weeks of self-isolation, rest, and drinking plenty of fluids, most patients recover.

More serious cases usually feature pneumonia. The virus is able to travel down to the lower respiratory system and attack the lungs. Patients may need to be hooked up to a **ventilator** to help them breathe and circulate oxygen through their bodies.

In Canada, seven percent of COVID-19 cases are serious enough to require hospitalization, with three percent requiring intensive care. One percent of Canadian COVID-19 cases are fatal. Usually these patients are older or have underlying medical conditions that have weakened their respiratory or immune systems.

## FLATTENING THE CURVE

Without a COVID-19 vaccine, there is no way to stop the pandemic. So the strategy is to slow its spread.

## DEFINITIONS

**CORONAVIRUS:** a family of viruses that can infect animals and humans, and that causes the common cold and COVID-19

**EPIDEMIOLOGIST:** a medical scientist who studies the transmission and control of epidemic diseases

**INCUBATION PERIOD:** the period between infection and the appearance of symptoms of a disease

**PATHOGEN:** something such as bacteria or a virus that causes disease

**RESPIRATORY:** relating to the process of breathing air in and out

**VENTILATOR:** a machine that pushes air in and out of someone's lungs when they cannot breathe on their own



Although only a small fraction of the total infected population requires hospitalization, a small fraction of a very large number is a large number – certainly enough to overwhelm Canada’s health system.

Were the virus to spread too quickly, as it did in Italy, for instance, the number of very sick people would skyrocket. But if the spread was slower, these seriously ill patients would appear over a longer period of time. That would be more manageable for Canada’s health care system.

Imagine a graph with a sharply rising line showing the increase in cases of COVID-19. By “flattening the curve” of this line, we would avoid overwhelming our hospitals. That’s our country’s urgent focus: to flatten the curve.

### PREVENTION - WE’RE ALL IN THIS TOGETHER

The best way to avoid getting COVID-19 is to wash your hands with soap and water often. Don’t touch your face with contaminated hands.

Health educators say a good hand wash takes at least 20 seconds, enough time to sing “Happy Birthday” twice. Scrub all parts of your hands – palms, backs, between the fingers, the finger tips, and the thumbs. Hand washing with soap is best, but alcohol-based hand sanitizer also works.

The other way to slow the spread of the virus? Get serious about social, or physical, distancing. Stay two metres away from everyone except members of your household. That’s about two arm lengths, which is further than the droplets from someone’s cough will travel.

Staying home as much as possible also helps contain the virus. The more

### A HISTORY OF INFECTIOUS DISEASES

Throughout history, nothing has killed more human beings than infectious disease. It’s only in the last century that the development of sanitation, along with medical advances like vaccines and antibiotics, has changed all that.

For example, the plague of Justinian struck in the 6th Century and killed as many as 50 million people, perhaps half the global population at the time. The Black Death of the 14th Century – likely caused by the same pathogen – may have killed up to 200 million people. Smallpox is thought to have killed as many as 300 million people in the 20th Century alone. When European colonists introduced smallpox and other infectious diseases to North America, Indigenous populations were **decimated**.

Some 50 to 100 million people died in the 1918 influenza pandemic – the so-called “Spanish flu.” It infected one in every three people on the planet.

These viral epidemics were simply a terrible fact of life back then. But COVID-19 reminds us that infectious diseases haven’t vanished. We had outbreaks of polio in the 1950s. Severe acute respiratory syndrome (SARS) in 2003. HIV (human immunodeficiency virus) is still **prevalent**; it has killed an estimated 32 million people and infected 75 million. And now COVID-19.

There are several reasons we are seeing these new infectious diseases. For one, over the past 50 years, we’ve more than doubled the number of people on the planet. This means more human beings to get infected and in turn to infect others, especially in densely-populated cities. We also have more livestock now, and some viruses can leap from those animals to us. And we have an integrated global economy, which enables new infectious diseases to spread around the world as fast as a jet plane.

citizens stay home, and don’t go to work, school, or anywhere else, the less likely it is that the virus can spread within the community.

Meanwhile, anyone showing symptoms of COVID-19, or anyone who could have come into contact with an infectious person, or anyone returning to Canada from elsewhere, should self-isolate for two weeks at home and monitor themselves for symptoms.

### NO TIME TO REST

Behind the scenes, scientists are busy on multiple fronts. They are testing to see if anti-viral drugs used to fight other kinds of viral attacks can be re-purposed for use on COVID-19. They are experimenting with injecting

ill patients with blood plasma taken from recovered COVID-19 survivors to boost their immunity. Dozens of companies are racing to create a vaccine, although that is probably more than a year and a half away.

In the meantime, we must do all we can to stay healthy. Every time we stop one case of infection, we not only keep that person healthy, but we break the chain of transmission. We protect all the people that person might have infected, and the people who those people would have infected, and so on. It makes a big difference.

“If we act now, even if it seems like a big ask, things will be better tomorrow,” says Prime Minister Justin Trudeau. ★

### DEFINITIONS

**DECIMATE** to kill or destroy in very large numbers

**PREVALENT**: very common



SCIENCE, TECHNOLOGY, AND THE ENVIRONMENT  
**COVID-19 BACKGROUNDER**  
– WHAT DOES THE SCIENCE SAY?

**ON THE LINES**

Answer the following in complete sentences:

1. Explain what a **virus** is.

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2. Explain how a virus usually spreads from person to person.

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3. How infectious is COVID-19? How long is the average incubation period for this coronavirus?

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4. How does a virus survive?

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5. How does the COVID-19 coronavirus attack the human body? How does the body's immune system respond?

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6. What happens to most people who come down with COVID-19?

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7. How does COVID-19 affect the minority of infected people who develop serious complications? Explain.

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8. Explain what '**flattening the curve**' means. What can happen if the disease curve is not flattened?

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9. List the three strategies health authorities are asking people to do to help flatten the COVID-19 curve.

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