COVID-19

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A new virus emerged in late 2019 and has now spread worldwide. You may have heard different names associated with this virus, but there is a logical explanation for what those names mean:

- **Coronavirus** refers to the *type* of virus. We have seen other coronaviruses in the past, such as the virus that caused severe acute respiratory syndrome (SARS) in 2003.

- **SARS-CoV-2** refers to the specific coronavirus. Just as SARS-CoV and MERS-CoV are the specific viruses that caused SARS in 2003 and Middle East respiratory syndrome (MERS) in 2012, SARS-CoV-2 is the specific virus that causes the current illness.

- **COVID-19** refers to the specific illness caused by *SARS-CoV-2*. This is the disease that people are experiencing in the current crisis.

COVID-19 emerged in China in late 2019 and has since spread rapidly to virtually every country in the world. In early March, the World Health Organization (WHO) classified COVID-19 as a global pandemic.

A pandemic occurs when a disease spreads to a large number of countries, typically affecting a large number of people.

As a pandemic, COVID-19 requires a coordinated effort to manage. Each of us has an important role to play in this effort.

Past Pandemics	Duration
Spanish Flu	1918–1920
Asian Flu	1957–1958
Hong Kong Flu	1968
H1N1 Swine Flu	2009–2010
COVID-19	2019–present

How do we know if we have COVID-19? What are the specific symptoms?

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What Are the Symptoms of COVID-19?

One of the challenges with COVID-19 is that its symptoms are so easily mistaken for more common illnesses, such as the flu or the common cold. Also, some patients never develop symptoms despite becoming infected.

Doctors who have studied COVID-19 have provided insight into the most common symptoms.

Who is at risk?

This disease and its progression are not yet fully understood. It appears that not all people are affected equally by COVID-19. For example, people over 55 years old or with diabetes appear to be more susceptible to experiencing severe or critical symptoms.[1] There are other factors that appear to increase risk of more severe illness. In fact, recent research indicates that nine out of ten COVID-19 hospitalizations involve patients that already had one of the following conditions:

High blood pressure

Obesity

Cardiovascular disease

Diabetes

Chronic lung disease

Loss of taste or smell
(60%)*

Fever
(83–99%)*

Phlegm (mucus)
(28–33%)*

Cough
(59–82%)*

Shortness of breath
(31–40%)*

Fatigue
(44–70%)*

Muscle aches
(11–35%)*
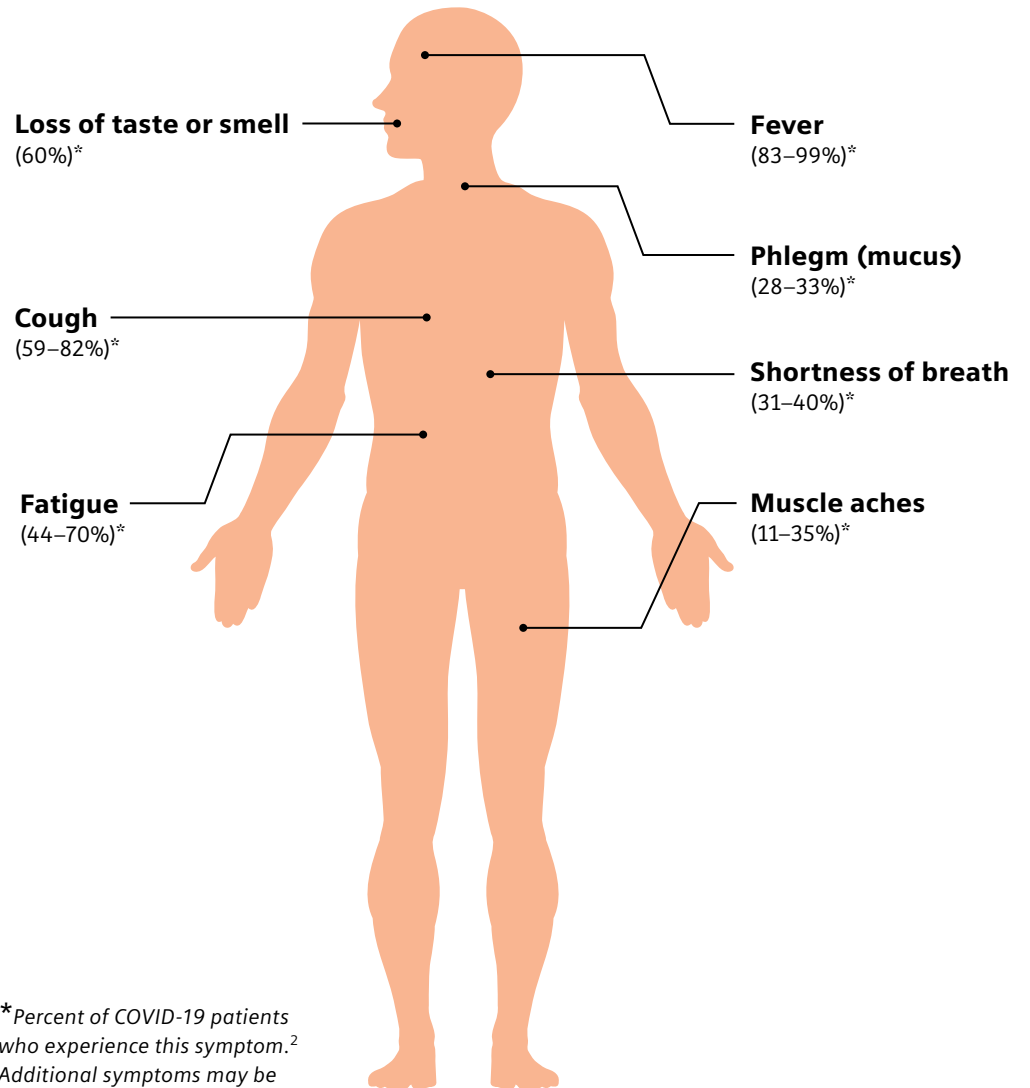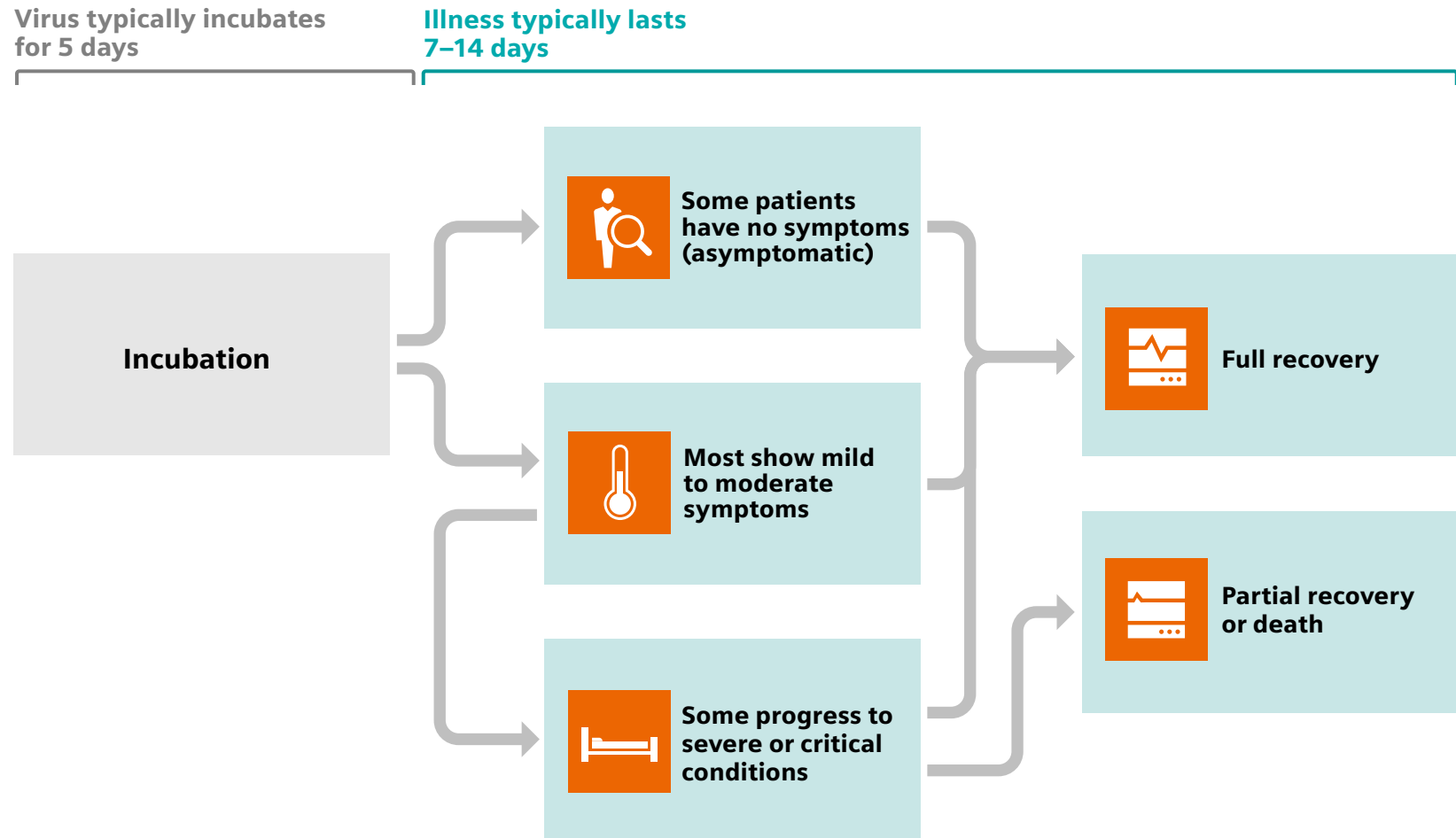
Percent of COVID-19 patients who experience this symptom.[2] Additional symptoms may be present.

How Does COVID-19 Progress?

For most people, COVID-19 progresses much the same way as the flu. For some people, however, the progression can accelerate quickly and profoundly. It is important to know that not all patients have the same experience.[3]

Virus typically incubates for 5 days

Illness typically lasts 7–14 days

Incubation

- Some patients have no symptoms (asymptomatic)
- Most show mild to moderate symptoms
- Some progress to severe or critical conditions

Full recovery

Partial recovery or death

How to Test for, Treat, and Immunize against COVID-19

What makes COVID-19 so concerning is that it is a new virus. When it entered our world last year, we had no test to detect it, no approved drugs to treat it, and no vaccine to prevent it. Almost immediately, researchers and major healthcare companies began work to catch up. The goals are to have accurate tests and effective treatments approved by the government and to have manufacturers produce enough so they can be provided to anyone who needs them.

In a broad sense, there are three things we need to manage the threat of COVID-19:

COVID-19 testing

There are two types of COVID-19 tests:

- One test uses a nasal swab and indicates if a person has the virus. There are multiple automated and near-patient tests in use and in development.
- The other test is a blood test to determine if someone has developed antibodies to the virus.

The human body develops antibodies to fight an infection, for example COVID-19. Tests for the presence of those antibodies in the blood check whether someone's immune system has responded to the infection. This would indicate that the person either actively has the virus or has had it in the past. Currently, it is unclear when and how the presence of antibodies affects development of immunity to COVID-19.

Treatment

Many drugs are being investigated to determine if they are effective at fighting the virus in the body. It is still early, but promising clinical trials are underway.

Some existing drugs are being tested to see if they can work effectively for COVID-19 and are safe.

There is currently no timetable for when any drugs may be approved for use. One drug, Remdesivir, has FDA Emergency Use Authorization for treatment of COVID-19 and permits the emergency use of the drug in adults and children hospiitalized with severe COVID-19.
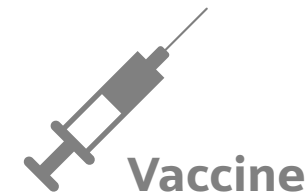
Vaccine

A vaccine helps the body develop antibodies to the virus. After being vaccinated, those who don't have COVID-19 may be much less likely to contract it, and those who do are likely to have milder symptoms.

According to the WHO, as of May 2020 there are 70 vaccines under development, and 6 have already progressed to human trials.

Typical development of a vaccine can take years to more than a decade. The earliest we may have an approved vaccine is 12-18 months from March 2020. There is a focused effort to produce successful vaccines much faster than the typical timelines.

How Are COVID-19 Tests Administered?

Here is what to expect when someone is tested for the SARS-CoV-2 virus or to detect antibodies to the virus:

Testing for the virus

1 **The healthcare professional will collect material from the patient's nostril.** They use a fairly long swab, which they insert and twirl in each nostril for about 15 seconds. In some cases, the technician may insert the swab deep into the throat instead.

2 **Next, the technician will carefully pack the material** into a special container designed to make sure the virus doesn't die on its way to the lab. They then send the test kit to the lab for analysis. The timing of results can vary depending on the lab.

3 **A positive test result** indicates that the patient likely has COVID-19. As stated earlier, most people recover after a week or two experiencing mild symptoms, although some people can progress to having more severe symptoms. A person with COVID-19 should stay at home and away from others to avoid spreading the virus.

A negative test result indicates that the patient likely does not currently have COVID-19 but offers no guarantee that they won't get it in the future. The patient should continue following precautions.

Testing for antibodies to COVID-19

1 The healthcare professional will draw a blood sample.

2 The sample is then sent to the lab for analysis.

3 The lab returns results to the healthcare professional.

4 The healthcare professional reviews the results and discusses them with the patient.

Major reference labs now offer antibody testing and many academic medical center labs are preparing to launch testing.

How to Avoid Spreading COVID-19

We have all been asked by our governments to participate in a wide range of behaviors designed to slow the spread of the COVID-19 disease. We have been asked to practice "social distancing," wear masks and gloves in public, and wash our hands frequently. Let's examine how COVID-19 is transmitted among humans to understand why these measures are so important.

We can catch COVID-19 through small droplets that are spread from the nose or mouth when a person with COVID-19 coughs or exhales. We can also catch COVID-19 by touching contaminated surfaces with infected droplets and then touching our mouth or rubbing our nose or eyes. The virus can be spread even when the infected person is not showing symptoms, making it impossible to be sure a given surface is safe.

Based on this, public health officials suggest a variety of practices designed to slow the spread of COVID-19:

Social distancing
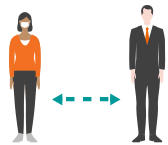
Avoid physical contact by maintaining distance from others in public and those who are sick.

Self-quarantine for those who have tested positive for COVID-19.

Keeping clean

Wash your hands often with soap and water.

Avoid touching your eyes, nose and mouth with unwashed hands.

Clean and disinfect frequently touched objects and surfaces.

Masks

How to wear masks to protect against COVID-19
If you wear a mask, you must know how to use and dispose of it properly.

Before putting on a mask, clean hands with alcohol-based hand rub or soap and water.

Cover mouth and nose with the mask and make sure there are no gaps.

Replace the mask as soon as it is damp, and do not reuse single-use masks.
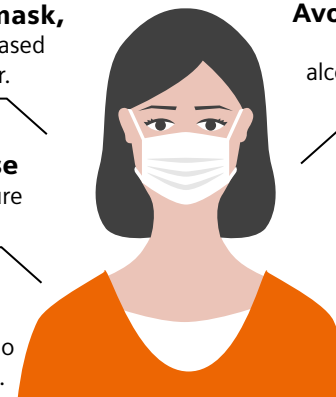
Avoid touching the mask, but clean your hands with alcohol-based hand rub or soap and water if you do.

To remove the mask, do not touch the front of the mask. Discard it immediately in a closed bin, and clean your hands immediately after.

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We are a leading medical technology company with over 120 years of experience and 18,000 patents globally. Through the dedication of more than 50,000 colleagues in 75 countries, we will continue to innovate and shape the future of healthcare.

References:

1. https://www.cdc.gov/mmwr/volumes/69/wr/mm6915e3.htm?s_cid=mm6915e3_w
2. https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-guidance-management-patients.html
3. https://www.cebm.net/covid-19/in-patients-of-covid-19-what-are-the-symptoms-and-clinical-features-of-mild-and-moderate-case/
4. https://www.goodrx.com/blog/coronavirus-covid-19-testing-updates-methods-cost-availability/
5. https://www.centerforhealthsecurity.org/resources/COVID-19/serology/Serology-based-tests-for-COVID-19.html#sec3
6. https://www.goodrx.com/blog/coronavirus-treatments-on-the-way/
7. https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public/when-and-how-to-use-masks
8. https://time.com/5819887/coronavirus-vaccines-development-who/