

# The coronavirus manual

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## The development so far

Until March 2020 it seemed like it might be possible to keep the coronavirus out of our country, and if it occasionally did get in, to contain it and prevent it from spreading. At that time, the epidemic was already ongoing in Northern Italy and Germany and France had their first tens of cases. Under these circumstances, standard epidemiologic measures were taken, resting on two pillars:

- 1) surveillance of main migration routes (esp. flights from high risk areas)
- 2) active search for suspected cases and their isolation, in case of confirmed infection contact tracing and quarantine

These steps were taken, and still are, at the maximum capacity of public health services. Yet, it seems that these measures are failing, for two main reasons.

First, the disease does not have typical clinical signs and symptoms that would allow us to tell it from common viral infections that are frequent at this time of the year. In the official documents of world and European health authorities (ECDC, WHO) you can still read that the disease presents with sudden onset fever, dry cough, shortness of breath and malaise, sore muscles. But we, healthcare workers see, that most of those tested positive for coronavirus have only mild elevation of body temperature and then symptoms of cold, mild sore throat, sometimes cough. Therefore, we are unable to use these signs to recognize those who are infected with coronavirus from those with the common cold.

The other aspect that contributed to the failure of epidemiologic measure was the skiing season that peaks in February. Thousands of families from the whole country took to the Alps, including regions of Northern Italy. It was individual travel which is almost impossible to keep track of using standard

methods. First it did not seem as a problem as there were no cases reported in the mountain regions. But some felt symptoms of having a cold after coming back and the tests for coronavirus came back positive. This demolished the hope that the plan was based on at first: the epidemic is now here, and we can no longer tell which regions are at risk and which are safe. We can only say that some are higher risk than others.

We are still trying to stop the spread of the infection but individual cases without any epidemiologic link lead us to believe that the infection is already among us, even not on a massive scale yet. Any case, even mild, of respiratory infection must be treated as a potential coronavirus case. In this situation, it does not make sense to trace contacts and quarantine them. Instead, restrictive measures are in place, mandated by the government, trying to retard the spread of the infection. And then there are individual protective measures that are the responsibility of each of us. These have a different goal: it is no longer possible to stop the epidemic; we must slow it down so that it runs its course more gradually without overwhelming the healthcare system.

## Why it is important to slow down the epidemic

The explosive course of the epidemic was apparent in the Chinese province of Wuhan and in Northern Italy. The result was a collapse of the healthcare system and a high number of fatalities. In contrast, Germany or South Korea report low numbers of fatalities, despite the high number of cases in both countries (counting in tens of thousands, see for example <https://coronavirus.jhu.edu/map.html>).

The risks associated with too rapid course of the epidemic are as follows:

- 1) If too many people fall sick at once, the society will grind to a halt, services will fail, including those that are vital for us.
- 2) This includes healthcare. If the healthcare system is overrun with a large number of cases of COVID-19, the capacity will no longer be available for standard care, because other diseases and condition will not be on pause while we fight the virus (people will still get heart attacks, cancer, gall stones and other).
- 3) The experience so far shows that the severity of the disease correlates, besides other, with the viral load. In explosive course of the epidemic, we can expect that the amount of the virus in places where patients concentrate will be very high. People who get infected in such an environment will have a higher risk of more severe course.
- 4) If the virus mutates during the pandemic and strains with different pathogenicity appear, those that are more aggressive and multiply faster are at an advantage. More aggressive clones can produce more offspring than those with standard behavior. Explosive epidemic can therefore lead to a more severe disease.

## What we know about the virus and the disease

First, the coronavirus is one of those fairly sensitive to the environment. This means that it does not like sunlight, freezing or hot temperatures, or getting dry. Outside, it can only live for tens of minutes. But indoors with steady temperature and humidity, it can survive even several days on some surfaces.

On its surface, the coronavirus has a lipid capsule that can be disrupted using alcohol or even regular soap.

The genetic code of coronaviruses is very unstable and changeable, this is one of the reasons for the large coronavirus epidemics in recent decades (SARS in 2002-2004, MERS in 2013-2015, and current pandemic

of COVID-19), but also of the selection of different variants with different pathogenicity. For the current coronavirus, two variants (L and S) were identified but it can be expected that others will follow.

The virus gets into the organism mostly by airways but can also enter via eye mucosa or other mucosal membranes. The incubation period is usually 5 days, ranging from 2 to 14 days.

The infection most commonly presents as a common cold. The patients have elevated body temperature, runny nose, cough, sore throat. Sometimes they have no symptoms at all. This mild course is typical for children and young otherwise healthy adults, especially if the viral load is not too high. This was the course often seen in those infected while on their skiing holidays. Severe course was reported in Chinese healthcare workers who were previously healthy but worked to exhaustion and were exposed to high viral loads.

A common question is whether the disease leads to permanent immunity. So far, it looks like this will depend on the severity. In very mild cases the formation of antibodies can be insufficient, and one can stay susceptible to reinfection. On the other hand, moderate and severe disease almost certainly leads to protective antibody levels and long-term immunity.

## Transmission of the infection

Virus shedding probably starts about a day before the first clinical symptoms (cold, cough, elevation of temperature) and lasts for the whole course of the disease and couple days later. The time of viral shedding after symptoms subside depends on the state of the immune system. In patients with impaired immunity virus shedding can last longer than a week after body temperature normalizes. In general it can be recommended to stay in quarantine for at least a week or two after the disease recedes.

Most patients get infected in one of two ways. The first and most visible is airborne infection via infected droplets. Infective aerosol forms when we cough and sneeze. Microscopic drops contain large amounts of the virus and can stay airborne for couple minutes and then land on objects and surfaces. If these droplets land on mucosal surfaces of a healthy person they can easily become infected.

The second, also very common way the infections spreads, is contact transmission. In this case, the secretions from the nose, mouth and airways of the infected patient, including their tears, contain the virus which can survive on different surfaces for variable length of time depending on the environment. On the skin of your hands, it can last for tens of minutes, on handkerchiefs and public transport handlebars, bank notes, buttons, keyboards and other often touched surfaces, it can survive for up to several days. The infection then occurs when a healthy person first contaminates their hands by touching a contaminated object and then introduces the infection into their eyes, nose, or mouth.

## Using surgical masks and respirators

Simple paper or cloth masks can provide partial protection for several tens of minutes, more specifically before they get moist from the breath of the wearer. Cloth masks can be repeatedly washed at temperatures over 60°C and ironed, paper masks are single use only. Respirators which provide a higher level of protection seal better and protect for longer. These are mostly used by healthcare providers who are at risk of infection for a large part of their workday.

Some respirators have a valve. Before you use one, you should make sure you understand which one you have. An exhalation valve allows for easy breathing out, the air passes through the open valve and thus is not filtered. This type of respirator is used for protection of healthy persons who are potentially exposed

in their environment. Then there are respirators with inhalation valves, where breathing in is easy and the air that is exhaled is filtered. These are used by infected people to prevent them from spreading the infection.

It is also useful to consider when you need a mask and when you don't.

When out in the open, going for a walk, going for a run or walking your dogs, when you don't have close contact with others (do not approach people, do not start conversations), the risk of contagion is very small and masks are therefore not needed. Contagion is possible when there is a high concentration of people in one place – as is typical for some Asian cities where wearing a mask in public is common. In our country such a situation would be for example waiting in line.

Someone who has been diagnosed with coronavirus or has symptoms of a respiratory infection should wear a mask. It serves two purposes – it reduces the amount of the virus that gets into the environment and also serves as a signal to the surrounding that warns others.

Indoors, the utility of wearing a mask has to be assessed case to case. It depends on four factors: density of people, risk that someone has the infection, presence of the elderly or vulnerable, effective air ventilation. Masks should be worn by everyone with symptoms of a respiratory infection but of course can also be worn by those who want to protect themselves.

## How you should protect yourself while still healthy

- 1) Avoid contact with people who show signs of respiratory infection, especially in situations where there forms infective aerosol. The risk of infection is higher with longer contact and if the contact occurs indoors. Taking the underground is riskier than a bus.
- 2) For direct personal protection from the aerosol, you can use a mask, it is also advisable to use glasses for eye protection. The protection is better if the masks fits snugly.
- 3) Meticulous hand hygiene protects you. We recommend that you wash you hands with soap every time you come home. It is best to avoid touching surfaces that many other people touch (handles, buttons, doorknobs...). If you spend more time in public space, it is useful to have a disinfectant hand spray, or use gloves. Special precautions should be taken with children who should wear gloves while in public transport. In the shop be wary of items that are on free display and are consumed without further processing (pastries, bread). It is better to use contactless payments, do not forget hand hygiene after entering your PIN.
- 4) If you touch surfaces that could be contaminated, avoid touching your face, especially around the eyes, nose and mouth before you have a chance to properly wash your hands.
- 5) Rooms where people spend more time should be aired often.

As an example from daily life, we could describe how taking a taxi should look like: a considerate taxi driver airs out the taxi after each customer. They are wearing a mask, because they do not know who the next customer will be. Each new customer also gets into the car wearing a mask, because they can not be sure who used the taxi before them. After leaving the taxi, the customer washes their hands as soon as they can, or use a disinfectant, because they had touched surfaces inside the car.

## What one should do while in quarantine, if you have been exposed but feel healthy

- 1) Someone who has been quarantined must not have contact with other people, especially those who are at risk of severe disease (the elderly, people with impaired immunity). If they must leave

home, e.g. for necessary shopping, they should wear a mask. (It is necessary to note that the mask serves as a signal to others; if you are healthy and there are no secretions from your airways, the risk of infection is very low.) People in quarantine can walk outside alone, walk their dog and so on, unless special limitations apply (make sure to check current status).

- 2) There is no point on insisting on being tested for coronavirus. A positive result will only confirm the presence of the virus, but if they still feel well, the routine in quarantine does not change. If the test is negative, it means the individual is not shedding the virus, but they could be in the incubation period and the disease could erupt the next day. A negative test can therefore only be considered valid for 24 hours.

## How to proceed if you have symptoms of a respiratory infection

- 1) At the time of an epidemic, each of us should behave as if we were diagnosed with the coronavirus. That means staying at home and not spreading the infection further.
- 2) According to rules currently in place, anyone with signs of an infection of lower respiratory tract (fever, cough, possibly shortness of breath) should report this via telephone to the staff of the nearest public health office ("Hygienická stanice"). They will decide if it is necessary to test the patient for coronavirus. Call your doctor, do not go to the waiting room, you would put others at risk!
- 3) The basic hygienic measures to prevent the spread of infections are well known:
  - a. Cough and sneeze into a single use tissue or your elbow, not your hand
  - b. Blow your nose into a single use tissue that you discard immediately. Do not put it in your pocket or handbag.
  - c. Wash or disinfect your hands after sneezing or blowing your nose.
- 4) If for any reason you need to leave your home, do so only wearing a mask. It is especially important to prevent direct and indirect contact with the elderly and other vulnerable persons, such as those with impaired immune system.
- 5) Because as of now we do not have any effective specific treatment, it is recommended to support your immune system: get enough sleep, eat well, take vitamins and such. There is an ongoing worldwide effort to find possible antiviral drugs that could be used to treat severe cases of coronavirus infection. It should also be mentioned that drugs used for the flu (*oseltamivir*, sold as Tamiflu) is not effective against coronavirus, neither does your flu shot protect you from coronavirus (it is still a good idea to get vaccinated against the flu).
- 6) Only call the emergency services if you suspect that you could have coronavirus infection, especially if you start feeling short of breath. In such a case, you may require hospitalization.
- 7) If you have a mild course of the disease and stay at home, you can take over the counter drugs for fever and pain. You do not have to suppress fever if it is not too high (less than 102-103°F or 39-39.5°C) and you are tolerating it well. You can take antipyretics for fever that is lower than this if you are unable to tolerate it. It is now recommended by some that you prefer paracetamol (acetaminophen) to ibuprofen. If you are unsure, call your doctor or a pharmacist. Do not take higher than recommended doses without a consultation.

## In conclusion

It is most important to stay calm, do not panic. For most people, the course of the disease is mild, and they fully recover. It can be expected that a large part of our population will eventually get infected and it

is now important to make sure that we protect those who are most vulnerable and at the highest risk of complications – the elderly, those with chronic diseases and those with a weakened immune system.

## Important numbers and contacts:

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**112** – Emergency services (alternatively 155). Only call if you have symptoms, feel short of breath and you need acute health care.

**1212** – A special information line for COVID-19. Call them if you have questions or you feel you might be infected but you do not require immediate help. If you feel short of breath or have severe symptoms, call 155 instead!

**List of Regional Public Health Offices** with contacts: [https://www.mzcr.cz/Verejne/dokumenty/krajske-hygienicke-stanice\\_7735\\_1206\\_5.html](https://www.mzcr.cz/Verejne/dokumenty/krajske-hygienicke-stanice_7735_1206_5.html)

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