"Welcome to Advocate Aurora Medical Group. Do you have an appointment?

To keep our patients and team members safe, we are screening everyone that enters our facilities. We ask that anyone that is not essential to your appointment please wait in the car."

Does patient **or** patient's household members have the following?

- Temperature: fever > 100.4
- Respiratory symptoms: New or worsening cough, shortness of breath, sore throat.
- GI: New onset nausea, vomiting or diarrhea? Any new onset of loss of taste or smell?
- Chills, repeated shaking with chills, muscle pain or headache?
- Has the Patient or a household member tested positive for COVID-19 in the last 14 days?

If Yes to any of the above, the screen is positive. Call department/provider (where appointment is

major respiratory virus transmission pathways: contact (direct or indirect between people and with contaminated surfaces) and airborne inhalation.

In addition to contributing to the extent of dispersal and mode of transmission, respiratory droplet size has been shown to affect the severity of disease. For example, influenza virus is more commonly contained in aerosols with sizes below 1 μm (submicron), which lead to more severe infection (*4*). In the case of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), it is possible that submicron virus-containing aerosols are being transferred deep into the alveolar region of the lungs, where immune responses seem to be temporarily bypassed. SARS-CoV-2 has been shown to replicate three times faster than SARS-CoV-1 and thus can rapidly spread to the pharynx, from which it can be shed before the innate immune response becomes activated and produces symptoms (*6*). By the time symptoms occur, the patient has transmitted the virus without knowing.

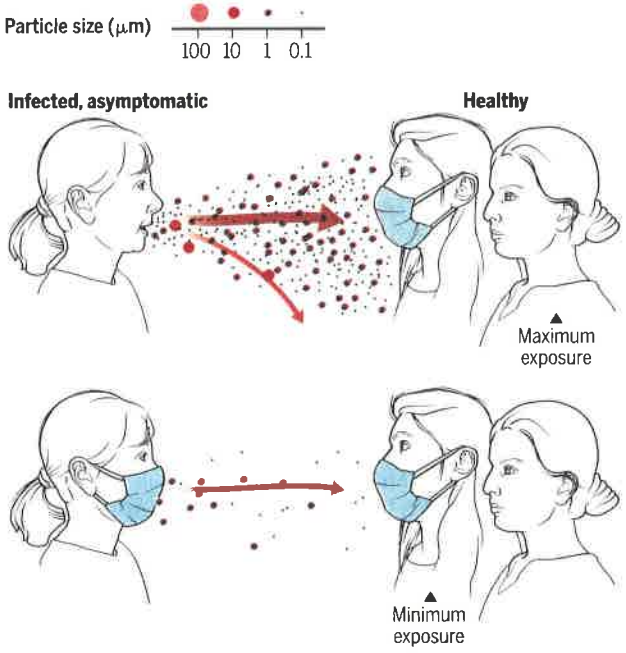
Identifying infected individuals to curb SARS-CoV-2 transmission is more challenging compared to SARS and other respiratory viruses because infected individuals can be highly contagious for several days, peaking on or before symptoms occur (*2, 7*). These "silent shedders" could be critical drivers of the enhanced spread of SARS-CoV-2. In Wuhan, China, it has been estimated that undiagnosed cases of COVID-19 infection, who were presumably asymptomatic, were responsible for up to 79% of viral infections (*3*). Therefore, regular, widespread testing is essential to identify and isolate infected asymptomatic individuals.

Airborne transmission was determined to play a role during the SARS outbreak in 2003 (*1, 4*). However, many countries have not yet acknowledged airborne transmission as a possible pathway for SARS-CoV-2 (*1*). Recent studies have shown that in addition to droplets, SARS-CoV-2 may also be transmitted through aerosols. A study in hospitals in Wuhan, China, found SARS-CoV-2 in aerosols further than 6 feet from patients, with higher concentrations detected in more crowded areas (*8*). Estimates using an average sputum viral load for SARS-CoV-2 indicate that 1 min of loud speaking could generate >1000 virion-containing aerosols (*9*). Assuming viral titers for infected super-emitters (with 100-fold higher viral load than average) yields an increase to more than 100,000 virions in emitted droplets per minute of speaking.

The U.S. Centers for Disease Control and Prevention (CDC) recommendations for social distancing of 6 feet and hand washing to reduce the spread of SARS-CoV-2 are based on studies of respiratory droplets carried out in the 1930s. These studies showed that large, ~100 μm droplets produced in coughs and sneezes quickly underwent gravitational settling (*1*). However, when these studies were conducted, the technology did not exist for detecting submicron aerosols. As a comparison, calculations predict that in still air, a 100-μm droplet will settle to the ground from 8 feet in 4.6 s, whereas a 1-μm aerosol particle will take 12.4 hours (*4*). Measurements now show that intense coughs and sneezes that propel larger droplets more than 20 feet can also create thousands of aerosols that can travel even further (*1*). Increasing evidence for SARS-CoV-2 suggests the 6 feet CDC recommendation is likely not enough under many indoor conditions, where aerosols can remain airborne for hours, accumulate over time, and follow airflows over distances further than 6 feet (*5, 10*).

Masks reduce airborne transmission

Infectious aerosol particles can be released during breathing and speaking by asymptomatic infected individuals. No masking maximizes exposure, whereas universal masking results in the least exposure.



GRAPHIC: V. ALTOUNIAN/*SCIENCE*

In outdoor environments, numerous factors will determine the concentrations and distance traveled, and whether respiratory viruses remain infectious in aerosols. Breezes and winds often occur and can transport infectious droplets and aerosols long distances. Asymptomatic individuals who are speaking while exercising can release infectious aerosols that can be picked up by airstreams (*10*). Viral concentrations will be more rapidly diluted outdoors, but few studies have been carried out on outdoor transmission of SARS-CoV-2. Additionally, SARS-CoV-2 can be inactivated by ultraviolet radiation in sunlight, and it is likely sensitive to ambient temperature and relative humidity, as well as the presence of atmospheric aerosols that occur in highly polluted areas. Viruses can attach to other particles such as dust and pollution, which can modify the aerodynamic characteristics and increase dispersion. Moreover, people living in areas with higher concentrations of air pollution have been shown to have higher severity of COVID-19 (*11*). Because respiratory viruses can remain airborne for prolonged periods before being inhaled by a potential host, studies are needed to characterize the factors leading to loss of infectivity over time in a variety of outdoor environments over a range of conditions

Given how little is known about the production and airborne behavior of infectious respiratory droplets, it is difficult to define a safe distance for social distancing. Assuming SARS-CoV-2 virions are contained in submicron aerosols, as is the case for influenza virus, a good comparison is exhaled cigarette smoke, which also contains submicron particles and will likely follow comparable flows and dilution patterns. The distance from a smoker at which one smells cigarette smoke indicates the distance in those surroundings at which one could inhale infectious aerosols. In an enclosed room with asymptomatic individuals, infectious aerosol concentrations can increase over time. Overall, the probability of becoming infected indoors will depend on the total amount of SARS-CoV-2 inhaled. Ultimately, the amount of ventilation, number of people, how long one visits an indoor facility, and activities that affect airflow will all modulate viral transmission pathways and exposure (*10*). For these reasons, it is important to wear properly fitted masks indoors even when 6 feet apart. Airborne transmission could account, in part, for the high secondary transmission rates to medical staff, as

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