

## Appendix 2 Evidence supporting public health and social measures to reduce COVID-19 spread

**Any activity involving other people can confer risk for transmission of SARS-CoV-2, the virus that causes COVID-19. This risk can be decreased through a variety of public health and social measures that individuals, establishments and communities may adopt.**

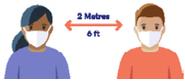
Public health and social measures (PHSMs) include [protective measures that individuals can observe](#) such as mask-wearing, physical distancing and hand washing, as well as environmental controls such as improved ventilation and disinfection protocols. Some of these PHSMs are more relevant to certain activities and settings than others, but all of them play a role in making activities safer during the COVID-19 pandemic. For example, [though restaurants are known to be higher-risk environments](#), this risk can be in part mitigated by dining outdoors, maintaining at least six feet of distance between parties and wearing a mask as much as possible. Similarly, the [risk of transmission associated with gyms](#) can be reduced by improving ventilation, wearing masks and enforcing capacity limits that allow for physical distancing. Risks associated with private social gatherings can be mitigated by reducing the number of people involved, socializing outdoors, maintaining physical distance and wearing masks.

**The following is an overview of PHSMs that can be used to mitigate risk and the scientific evidence supporting their application to reduce morbidity and mortality from COVID-19.** This should serve as a foundation for decisions around risk mitigation during the COVID-19 pandemic. Some PHSMs may be thought of as universal and some PHSMs are more critical during specific activities. One factor that impacts COVID-19 risk across all activities is the prevalence of the disease in the community. At high levels of disease activity, it may not be safe to continue some activities and temporary suspension may be the PHSM necessary to reduce disease spread.

### MASKS



**The use of face masks in the community to prevent transmission of SARS-CoV-2 is [recommended by public health authorities](#).** Masks function by providing both “source control,” where the emission of virus-laden droplets from those who may or may not be aware of their infection is blocked, and personal protection for the mask-wearer. The fact that viral loads are high during presymptomatic phases and that [asymptomatic and presymptomatic people may significantly contribute to transmission](#) provides the theoretical basis for widespread community mask use. There is mechanistic evidence that [non-medical masks significantly reduce wearer exposure to aerosols](#) and observational data suggest that [masks protect wearers from infection](#). Mask mandates have been shown to be [associated with reductions in COVID-19 transmission](#). There is evidence from a variety of settings that mask use in the community, in combination other personal protective measures, can reduce the spread of SARS-CoV-2. Mask use is most important indoors, especially in poorly ventilated areas, and when physical distancing cannot be maintained. Mask use is also important within households when a household member has been diagnosed with COVID-19, has symptoms that may be due to COVID-19 or has been exposed to someone with COVID-19.



## PHYSICAL DISTANCING

**Physical distancing can decrease the spread of COVID-19.** [Close contacts](#) of people with COVID-19 are at risk for infection in large part because they may have been exposed to virus-laden respiratory droplets. Observational data from both [within and outside the household setting](#) suggest that both reduced physical distance and longer durations of contact increase the risk of transmission. Although it can be difficult to disaggregate the effects of physical distancing from the effects of other mitigation measures, a [systematic review and meta-analysis](#) found that physical distancing of at least three feet is associated with a 70% reduction in SARS-CoV-2 infections and that risk of infection decreased over longer distances. Data suggest that [physical distancing can significantly reduce the average number of contacts](#) and thus decrease community transmission rates. Physical distancing should be widely practiced in the community because [presymptomatic and asymptomatic infected people can transmit COVID-19](#). Within households, [living with someone who has been diagnosed with COVID-19](#) is a significant risk factor for infection and physical distancing can prevent transmission. Physical distancing is particularly important within indoor spaces, especially those that are poorly ventilated, and if masks are not worn.



## HAND HYGIENE

**As with other respiratory viruses, COVID-19 may be spread when the causative virus is deposited on mucous membranes such as those lining the nose, mouth and eyes.** It is difficult to discern, from observational data on close contacts of COVID-19 cases, the relative importance of exposure to virus-laden droplets versus direct inoculation from virus-contaminated hands. However, there is a wealth of evidence that [hand washing can reduce the spread of infectious diseases](#) including those caused by [respiratory viruses](#). In addition, there are data that SARS-CoV-2 can [survive for prolonged periods on human skin](#). For those who are infected with SARS-CoV-2, including those who are presymptomatic or asymptomatic, hands may be contaminated with virus by breathing or coughing on them and/or by touching contaminated body parts. For those who are susceptible, hands may be contaminated by touching infected people or fomites (see **DISINFECTION** below) and in this way virus can be [transferred to parts of the body](#) where infection can be seeded. This makes a compelling argument for hand hygiene which can be [practiced effectively](#) by washing hands thoroughly with soap and water or using an alcohol-based hand rub.



## VENTILATION

**Enhanced ventilation is recommended by CDC as an evidence-based, sustainable strategy to reduce COVID-19 transmission.** COVID-19 is [spread mainly via virus-laden exhaled respiratory particles](#). Ventilation has been shown to [decrease the concentration of SARS-CoV-2 in indoor air samples](#). Larger infectious respiratory particles may remain suspended briefly and travel shorter distances (“droplet transmission”) while smaller respiratory particles may remain suspended longer and travel farther (“airborne transmission”). Although droplet transmission of COVID-19 predominates, airborne transmission can occur, especially in crowded indoor spaces when masks are not worn and when activities that may generate more respiratory particles are performed (e.g., [singing](#), [exercising](#) or [speaking at higher volume](#)). Indoor environments with more crowding and less ventilation may be more conducive to [superspreader events](#). Within indoor environments, the circulation of potentially infectious respiratory particles can be minimized by avoiding activities that may generate more respiratory particles and, by wearing masks and by [increasing ventilation, creating directional airflow or using specific air filters](#). Moving activities outdoors when possible is an even more effective way to minimize exposure to respiratory particles. Studies have shown that closed [indoor spaces are more conducive to transmission](#) of COVID-19 than outdoor spaces.



## DISINFECTION

**It is possible that transmission of COVID-19 could occur after touching a fomite, an object contaminated with SARS-CoV-2.** It can be difficult to conclusively link transmission to fomites, especially in the community, and this is unlikely to be a dominant mechanism of spread. However, [disinfecting surfaces is a reasonable measure to reduce any role that fomites might play](#) in the spread of disease. A number of studies have [identified SARS-CoV-2 genetic material in samples from a variety of surfaces](#) within hospital wards, isolation rooms and outbreak settings (including cruise ships and long-term care facilities). There is not conclusive evidence on the length of time SARS-CoV-2 can survive in real-world environments, or on the likelihood of infectivity when virus is detected, but [laboratory data show that SARS-CoV-2 can survive for hours or even days on some surfaces](#). Outside health care settings, surfaces that are high-touch, including doorknobs and elevator buttons, should be prioritized for disinfection. Observational data suggest that applying multiple infection prevention measures can reduce the risk of transmission. It is important that disinfection does not substitute for other, potentially more important, measures. And because there are potential health risks associated with the use of some chemicals and cleaning products, disinfection should be practiced in accordance with [public health recommendations](#).