Preventing Covid Transmission: The Basics

Basic understanding of how Covid is transmitted is important for developing and adapting preventive measures to reduce risk for spread. Information in this section is based on current information regarding Covid transmission and—where systematic data are lacking or insufficient—on observational studies and reports and expert.

VACCINATION AND COVID SPREAD

- Covid can be transmitted by people who are infected with the virus and do not have any symptoms, as well as those who do have symptoms
- Covid vaccines have been shown to be effective at protecting vaccinated people from developing symptomatic, laboratory-confirmed Covid; however, it is not known whether they prevent asymptomatic infection or whether they prevent infected people from spreading the virus to other people
- Numerous Covid variants are rapidly emerging, and the effectiveness of currently available vaccines against some of these variants is uncertain
- Because it is not known whether vaccination prevents spread of Covid—and because questions remain about the effectiveness of currently available vaccines against all emerging variants—people who are vaccinated should still wear masks, practice physical distancing, frequently wash or sanitize their hands, and follow all other recommendations for preventing spread of Covid

HOW COVID SPREADS AND HOW RISK FOR SPREAD CAN BE REDUCED

- Covid is an infectious disease, caused by an RNA virus, SARS-CoV-2, that is transmitted from person to person
- Accumulating evidence suggests that the most common way Covid is spread is through the air by infectious respiratory droplets and aerosols propelled into the air by a person with Covid
  - Many people with Covid have typical symptoms including fever or chills, cough, shortness of breath or difficulty breathing, or new loss of taste or smell
  - Some people do not have these characteristic symptoms, but may have more general or less common symptoms like fatigue, muscle or body aches, headache, sore throat, congestion or runny nose, nausea or vomiting, or diarrhea
  - Many people with Covid—probably the majority—do not report symptoms when diagnosed; they may be “pre-symptomatic,” meaning they have just recently been infected and have not yet developed symptoms; or they may be truly “asymptomatic,” meaning they never have any identifiable symptoms
  - Anyone infected with Covid—even someone without symptoms—can infect other people
  - Covid can also be spread through direct contact with a contaminated surface or object, although this is not thought to be a common mode of transmission
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- The single most effective way to protect against spread of Covid is to exclude or control the source of infection: people infected with Covid. In a restaurant, this can be accomplished largely—though not completely—in three ways:
  - Screening people—workers and diners—before they enter the restaurant and excluding any who report having been diagnosed with Covid in the past 10 days; having had fever or other symptoms of Covid—or having tested positive for Covid, even if they do not have symptoms—in the past 10 days; or having been exposed to someone with Covid in the past 14 days
  - Having people leave if they develop fever or other symptoms of illness while in the restaurant
  - Requiring all people in the restaurant to wear masks at all times except while actively eating or drinking; maintain at least six feet between themselves and anyone else—for diners, from anyone outside their party—as much of the time as possible; and wash or sanitize their hands frequently

Transmission Through the Air

- When a person with Covid talks, laughs, sings, shouts, coughs, sneezes, or even just breathes, they propel a large number of virus-containing respiratory droplets into the air. Droplets vary greatly in size, ranging from very large (100 microns or greater) to very small (less than 5 microns)
  - Larger droplets tend to travel in straight lines and, because of their size and weight, travel only a short distance—usually no more than six feet or so—before falling to the ground or landing on a nearby surface or object
  - Smaller droplets in aerosols are lighter and can travel farther before falling to the ground or landing on surfaces or objects
  - In transmission through the air, an uninfected person can become infected in two ways: (1) spread by inhalation, if they inhale smaller, virus-containing droplets in aerosols through their nose or mouth into their airways, or (2) droplet spread, if larger virus-containing droplets land directly on their mucus membranes (for example, their mouth, nostrils, or eyes)

Spread by Inhalation

- People with Covid can produce thousands of virus-containing aerosols, but many fewer larger droplets; thus, other people are much more likely to be infected by inhaling aerosols than by being sprayed by larger droplets that land on their mucus membranes
- Some experts now think that spread by inhalation of virus-containing aerosols—mostly at close range—is the predominant way that Covid is transmitted. This is consistent with the extensive and rapid spread of the epidemic seen in the fall of 2020 and winter of 2020-2021, and highlights the importance of good ventilation in reducing risk for transmission of Covid indoors
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- Close-range airborne infection
  - When virus-containing aerosols are propelled into the air by a person with Covid, they tend to be most concentrated in the area immediately around the person—usually within around six feet, though sometimes somewhat farther if carried by air currents—where they can be inhaled by and infect nearby people

- Distant or long-range airborne infection
  - The farther the distance from the source, the lower the concentration of active, infectious virus in the air—and the lower the likelihood that another person will inhale enough active virus to become infected
    - As droplets and aerosols travel farther from the source, those that are larger and heavier fall to the ground, reducing the concentration of those remaining in the air
    - Also, while the SARS-CoV-2 virus is very likely to be active and infectious immediately upon being expelled into the air, exposure to air appears to reduce its infectiousness
    - Aerosols can, though, be carried a considerable distance by air currents. Indoors, in enclosed spaces and in the absence of good ventilation, they may remain suspended and infectious long enough, from many seconds to hours—and accumulate to sufficient concentration—to be inhaled by and infect people considerably farther from the source than six feet (some studies suggest at least 20-30 feet)

Reducing Risk for Spread by Inhalation

- Masks
  - Masks that cover the nose and mouth can reduce risk for both close- and long-range airborne infection
    - The degree of protection varies widely, depending on the type of mask, the material used in its construction, how it fits, whether it is worn correctly, and how consistently it is used
    - When worn by people with Covid, masks reduce transmission by trapping virus-containing droplets and aerosols before they are expelled into the air; this is a form of source control. For this to work, all people—whether or not they have been diagnosed with Covid, have fever or other symptoms, or have been vaccinated—must wear a mask to prevent spread from asymptomatic people who do not suspect that they have Covid
    - Plastic or polycarbonate face shields worn by people with Covid may catch some virus-containing droplets and aerosols as they exit the person’s nose and mouth, before they are released into the surrounding air and inhaled by people nearby. However, the extent to which this happens—if at all—is not known; therefore, face shields are not a substitute for masks for source control
    - When worn by people who do not have Covid, masks reduce transmission by decreasing the likelihood that virus-containing aerosols will be inhaled; this is a form of personal protection
    - Face shields worn by people who do not have Covid do not reduce their risk for inhaling Covid virus and are not a substitute for masks for personal protection
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- Masks should, at minimum, meet current CDC guidance
  - Some experts recommend layering or double masking to increase protection against spread by inhalation, and CDC has recently included this in its guidance
  - Hospital-grade N95 masks are not needed in restaurants for protection against Covid. They remain in short supply and should be reserved for healthcare workers and other medical first responders

- Physical distancing and barriers
  - Risk for spread by inhalation is greatest in the area immediately around a person with Covid, generally within around six feet, because this is where virus-containing aerosols are most concentrated. Consequently, risk for close-range airborne infection can be substantially reduced—though not eliminated—by maintaining at least six feet of distance from other people
  - Physical partitions such as Plexiglass or polycarbonate cough and sneeze barriers can help reduce risk for close-range airborne infection by blocking horizontal airflow between people and helping to divert it upward

- Ventilation
  - The lower the concentration of virus-containing droplets and aerosols in the air, the less likely it is that any virus will be inhaled by uninfected people; come into contact with their eyes, nose, or mouth; or contaminate nearby surfaces or objects
  - Spread of Covid is far less likely outdoors, where breezes rapidly reduce the concentration of virus-containing droplets and aerosols in the air, and much more likely indoors, where the absence of natural breezes can allow virus-containing droplets and aerosols in the air to accumulate to relatively high concentrations
  - Ventilation, natural or mechanical, can reduce risk for indoor spread of Covid by inhalation in three ways:
    - Diluting room air with fresh or filtered air
    - Removing virus-containing droplets and aerosols from the air
    - Controlling the direction of airflow to move air upward away from people and avoid creating horizontal air currents that may carry virus-containing droplets and aerosols from one person to another
  - Natural ventilation is accomplished by opening windows to let fresh air flow into a room and contaminated air flow out, sometimes assisted by window or through-the-wall fans
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- **Mechanical ventilation** uses systems of ductwork, supply and exhaust vents, fans, and filters to remove contaminated air from a room and replace it with fresh air, with recirculated room air that has been filtered to remove virus-containing droplets and aerosols, or with a mixture of fresh and filtered recirculated air.
  - Direction of airflow within a room is determined by where supply vents are located in relation to exhaust vents.
- **Portable air purifying units** use fans and filters in a portable device that draws room air in, passes it through a high-efficiency filter to remove virus-containing droplets and aerosols, and discharges filtered air back into the room. There is no need to buy costly add-ons like ultraviolet filter cleaners, titanium di-oxide, ionization, or carbon filters. What matters most is high-efficiency HEPA filters.
  - Direction of airflow in the area around the unit is affected by the location of the unit’s air intake and discharge ports.
- **Upper-room ultraviolet germicidal irradiation**
  - Upper-room ultraviolet germicidal irradiation—which is different from ultraviolet lamps contained in portable units or located in ductwork—has been used for decades to reduce risk for the airborne transmission of tuberculosis.
  - Ultraviolet germicidal irradiation has been shown to inactivate Covid. Therefore, upper-room ultraviolet germicidal irradiation may help reduce risk for transmission in situations where an existing ventilation system is inadequate and cannot easily or affordably be upgraded, or where there is no existing ventilation system.

**Droplet Spread**

- In droplet spread, larger, virus-containing droplets are propelled into the air by a person with Covid.
  - Being relatively heavy, these droplets usually fall to the ground in seconds within about six feet of the source, but they can be sprayed through the air directly onto the mucus membranes (mouth, nostrils, or eyes) of nearby people, thereby infecting them.

**Reducing Risk for Droplet Spread**

- **Masks**
  - When worn by people with Covid, masks that cover the nose and mouth reduce droplet spread by trapping virus-containing droplets before they are expelled into the air (source control). For this to work, all people—whether or not they have been diagnosed with Covid, have fever or other symptoms, or have been vaccinated—must wear a mask to prevent spread from asymptomatic people who do not suspect that they have Covid.
  - When worn by people who do not have Covid, masks reduce droplet spread by preventing droplets from landing on their mouth or nostrils (personal protection).
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- **Goggles and safety glasses**
  - Goggles and safety glasses play no role in Covid prevention when worn by people who have Covid (that is, as source control)
  - When worn by people who do not have Covid, goggles and safety glasses reduce risk for droplet spread to some extent by preventing droplets from landing in the eyes (personal protection); however, they do nothing to protect the mouth and nostrils and are only a supplement to—not a substitute for—masks

- **Face shields**
  - When worn by people with Covid, plastic or polycarbonate face shields may catch some virus-containing droplets and aerosols as they exit the person's nose and mouth, before they land on people nearby (source control); however, masks are more effective at doing this
  - Because they cover the entire face, face shields worn by people who do not have Covid reduce risk for wearers becoming infected through droplet spread by preventing expelled droplets from landing on their face, mouth, nostrils, or eyes (personal protection). However, while face shields reduce risk for droplet spread, they do not reduce risk for spread by inhalation. Consequently, while they supplement masks, they do not replace them

- **Physical distancing and barriers**
  - Because large droplets travel only short distances, risk for person-to-person transmission by droplet spread can be substantially reduced by maintaining at least six feet of distance from other people
  - Physical partitions—such as Plexiglass or polycarbonate cough and sneeze barriers—can also reduce risk for droplet spread by blocking movement of droplets from one person to another

**Transmission Through Direct Contact**

**Spread by Direct Contact**

- In some cases, Covid may be spread by direct contact with a contaminated surface or object. This can happen if an infected person coughs or sneezes and virus-containing droplets land on nearby surfaces or objects, or if the person coughs or sneezes into their hand and then touches nearby surfaces or objects. Uninfected people who touch the contaminated surface or object and then touch their mouth, nose, or eyes can become infected
- Covid can also be spread by direct contact if an infected person touches an uninfected person, such as shaking hands
- Although Covid can be spread through these forms of direct contact, this is not thought to be a common mode of transmission
Reducing Risk for Spread by Direct Contact

Reducing risk for transmission through direct contact is best accomplished by the following:

- Avoid touching surfaces and objects that may be contaminated
- Avoid touching one’s face, mouth, nose, or eyes with unwashed hands
- Practice good hand hygiene by frequently washing hands with soap and water or sanitizing them with alcohol-based hand sanitizer if soap and water are not available
- Avoid direct physical contact with other people
- Frequently clean and sanitize or disinfect high-touch surfaces and objects that may be contaminated
- Wearing masks also reduces risk for transmission through direct contact by trapping virus-containing droplets before they are expelled into the air and contaminate nearby surfaces or objects (source control)

Gloves and Covid

- For control of Covid in commercial kitchens and dining rooms, gloves are not needed; washing hands frequently with soap and water for at least 20 seconds is sufficient
  - Wearing gloves does not replace or modify the need to maintain good hand hygiene or the need for hand washing
  - If gloves are required by FDA Food Code recommendations, state or local public health food safety regulations, or other applicable food safety regulations, they should be worn and used as directed by those recommendations and regulations
  - If used, gloves should be removed and disposed of, hands should be washed, and new gloves should be donned under any of the following circumstances:
    - When switching tasks or handling different foods
    - After touching potentially contaminated high-touch surfaces or objects
    - If accidentally touching one’s face, or coughing or sneezing into the glove or a tissue held in the gloved hand
    - If the integrity of a glove is compromised—for example, ripped or punctured
  - If required for food safety, gloves should be made of a non-latex material—such as nitrile or vinyl—because many people are allergic to latex