

Covid-19 Transmissibility

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Droplets - Respiratory droplets carrying pathogens that transmit infection when they travel from the respiratory tract of an infected individual to the eyes, nose, or mouth of the recipient (generally over short distances).

Bottom Line: Currently cited by WHO¹ and CDC² as the primary mode of COVID-19 transmission, based on available evidence.

- In a study of 205 patients hospitalized with COVID-19, viral RNA was found in 93% of bronchoalveolar lavage fluid, 72% of sputum samples, and 63% of nasal swabs.³
- Throat and nasal swabs from 9 patients with mild symptoms found virus RNA in upper respiratory tract tissues, with the highest amount of virus shedding in the first 5 days after symptom onset. Live virus was found in 17% of nasal/throat swab samples and 83% of sputum samples in the first week but not after day 8 of symptom onset, implying patients were no longer contagious via respiratory droplets.⁴

Aerosolized Particles - Small inhalable particles generated by procedures that can aerosolize respiratory droplets

Bottom Line: Close range (<6 ft) aerosol transmission of COVID-19 is likely in the setting of aerosolizing procedures (suctioning secretions, bronchoscopy, sputum induction, use of a nebulizer or non invasive ventilation), which would support the use of N95 masks for healthcare workers caring for COVID-19 patients, particularly when performing these procedures.

- Viable COVID-19 virus is detectable in aerosols for up to 3 hours.⁵
- There are no studies yet reporting how common aerosol transmission is compared to droplet transmission.

Surfaces

Bottom Line: COVID-19 can likely spread through contact with surfaces, although the virus's stability on surfaces varies greatly. Overall, surface transmission is not thought to contribute to spread as much as droplets or aerosols.

- COVID-19 virus stability on surfaces ranges from copper—where no viable virus is detectable 4 hours after application—to plastic and stainless steel where viable virus is detectable for up to 72hrs (although the amount of virus is greatly reduced over time).⁶
- These surface properties are similar to the SARS virus, so most COVID-19 spread is likely due to droplets and aerosols.

¹ [https://www.who.int/publications-detail/advice-on-the-use-of-masks-in-the-community-during-home-care-and-in-healthcare-settings-in-the-context-of-the-novel-coronavirus-\(2019-ncov\)-outbreak](https://www.who.int/publications-detail/advice-on-the-use-of-masks-in-the-community-during-home-care-and-in-healthcare-settings-in-the-context-of-the-novel-coronavirus-(2019-ncov)-outbreak)

² <https://www.cdc.gov/coronavirus/2019-ncov/infection-control/control-recommendations.html>

³ <https://jamanetwork.com/journals/jama/fullarticle/2762997>

⁴ <https://www.medrxiv.org/content/10.1101/2020.03.05.20030502v1>

⁵ <https://www.nejm.org/doi/full/10.1056/NEJMc2004973?query=RP>

⁶ <https://www.nejm.org/doi/full/10.1056/NEJMc2004973?query=RP>

Fecal-Oral - Infection is transmittable via pathogens in fecal particles to mouth, often via contaminated water sources or poor hand hygiene.

Bottom Line: COVID-19 transmission via fecal/oral route is likely, although it is unclear how much this contributes to spread.

- Viral RNA was found in 44/153 (29%) fecal samples of patients with COVID-19. Viral loads in fecal samples were similar to respiratory samples.⁷
- Anal swabs were found positive in 14/178 (8%) patients hospitalized with COVID-19.⁸

Post-Mortem

Bottom Line: There is currently no research on post-mortem (after death) transmission of COVID-19. Transmission risk would largely be related to direct contact with bodily fluids and contaminated surfaces as outlined in the sections above.

- Guidelines for post-mortem handling by CDC⁹ and ECDC.¹⁰

Tears

Bottom Line: COVID-19 is not able to be transmitted through tears/ocular secretions.

- 17 patients with COVID-19 had tear samples collected between day 3-20 from initial symptoms and neither PCR or viral culture detected the virus¹¹.

Maternal to Child - Infection crosses the placenta from mother to fetus.

Bottom Line: COVID-19 can potentially be transmitted mother to child when the mother is infected during gestation.

- 33 neonates were born to mothers infected with COVID-19, and of these 3 neonates had COVID-19 detected in nasopharyngeal and anal swabs¹². All 3 neonates survived.

⁷ <https://jamanetwork.com/journals/jama/fullarticle/2762997>

⁸ <https://www.tandfonline.com/doi/full/10.1080/22221751.2020.1729071>

⁹ https://www.cdc.gov/coronavirus/2019-ncov/faq.html#anchor_1584390222777

¹⁰ <https://www.ecdc.europa.eu/sites/default/files/documents/COVID-19-safe-handling-of-bodies-or-persons-dying-from-COVID19.pdf>

¹¹ Yu Jun Is et al. Assessing Viral Shedding and Infectivity of Tears in Coronavirus Disease 2019 (COVID-19) Patients, *Ophthalmology* (2020).

¹² <https://jamanetwork.com/journals/jamapediatrics/fullarticle/2763787>