

4. Epidemiology

4.1 Transmission routes

Early analysis of the transmission of COVID-19 was thought to occur mainly via respiratory droplets¹⁻¹⁰ generated by coughing and sneezing, through direct contact^{1,3,6-11} and indirect contact with contaminated surfaces.^{1,6,7,9,10} These transmission routes were supported by early National¹²⁻¹⁴ and international guidance.^{15,16} The World Health Organization (WHO) in a scientific brief published July 2020 supported that the main mode of transmission was via respiratory droplets, which are expelled when an infected person coughs, sneezes, talks or sings.¹⁷ Transmission through contact with contaminated surfaces (fomite transmission) is considered possible due to the presence of COVID-19 viral RNA on surfaces (see section 6 – survival in the environment in archived version [21 – December 2021](#)) however there has so far been no published evidence to demonstrate singularly in real-life scenarios, as it is impossible to separate the contribution from other transmission modes.

As the pandemic has progressed, there have been growing calls to acknowledge a potential airborne transmission route. The European Centre for Disease Prevention and Control (ECDC) describe transmission as occurring via respiratory droplets, either by being inhaled or deposited on mucosal surfaces, including aerosols produced when coughing and speaking, however acknowledge that the relative role of large droplet, aerosol and fomite transmission remains unclear.¹⁸ The US Centers for Disease Prevention & Control (CDC) stated in a scientific brief published 7th May 2021 that exposure to respiratory fluids occurs via inhalation of fine droplets and aerosol particles, deposition of droplets and particles onto exposed mucous membranes, as well as touching mucus membranes with hands soiled by exhaled respiratory fluids.¹⁹ Risk of transmission is considered to be greatest within three to six feet of an infectious source where the concentration of emitted particles is greatest. The CDC also stated that airborne transmission may be possible under special circumstances, specifically: in enclosed spaces where there is inadequate ventilation or air handling, during prolonged exposure to respiratory particles, and where ‘increased exhalation’ may have occurred (exercising, singing, shouting).¹⁹ The WHO published an updated scientific summary of COVID-19 transmission in December 2020, stating that outside of medical facilities, in addition to droplet and fomite transmission, aerosol transmission could occur in specific settings and circumstances, particularly in indoor, crowded and inadequately ventilated spaces, where infected persons spend long periods of time with others.²⁰ In interim IPC guidance published 12th July 2021, WHO stated that the virus spreads mainly between people who are in close contact with each other, typically within