

SARS-CoV-2 and COVID-19 Disease

The current novel coronavirus-induced pneumonia, named coronavirus disease 2019 (COVID-19) by the WHO in February 2020 emerged in Wuhan, China in December, 2019. The virus itself is officially known as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). COVID-19 is the third coronavirus to cause an epidemic in the past two decades after severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS). COVID-19 has surpassed the global impact of either SARS or MERS and was officially declared a global pandemic by the WHO on March 12, 2020.

Coronaviruses (Covs) are a large family of single-stranded RNA, enveloped viruses that can infect animals and humans causing illnesses such as respiratory, hepatic, gastrointestinal and even neurologic diseases. Coronaviruses themselves are not new and in fact, some are the cause of common cold syndromes. To date four coronavirus genera (α , β , γ , δ) have been identified and six human coronaviruses (HCoVs) had been previously identified including SARS-CoV1 (SARS), and MERS-CoV (MERS). SARS-CoV1 and MERS-CoV are β -coronaviruses. New coronaviruses such as the novel SARS-CoV-2 emerge periodically in humans in part due to the high prevalence of coronaviruses, the large genetic diversity and frequent recombination of their genomes plus the increasing human-animal interface opportunities.

The SARS-CoV-2 shows 88% similarity in genetic sequence to SARS-CoV and about 50% genetic similarity to MERS-CoV. SARS-CoV2, just like SARS-CoV, requires the angiotensin-converting enzyme 2 (ACE2) as a receptor to enter cells. The binding of the virus with host cell receptors is a significant determinant for the for the pathogenesis of infection.

Understanding transmission risk is incomplete however, efficient person-person spread was described early in the epidemic, and the virus is estimated to infect on average, 2 to 3 persons with each new infection. The virus has been detected in respiratory secretions, feces and blood. Clinically the virus is acquired from respiratory droplets that are expelled during a cough, sneeze, talking, or by touching surfaces contaminated with virus fomites and then touching one's eyes, nose or mouth. Although SARS-Cov-2 viral RNA has been detected in stool specimens fecal-oral has not been described as a significant factor in the spread of infection.

Asymptomatic carriage is common so transmission prior to the onset of symptoms is possible. The incubation period for development of symptoms is reported to be 1 to 14 days (mean 5.2 days), with 97% of persons developing symptoms by 10.5 days post-exposure. The most common symptoms are fever, malaise, and cough. A small proportion of cases present with severe shortness of breath or acute respiratory failure.

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