

EPIDEMIOLOGY OF CORONAVIRUS DISEASE 2019 (COVID-19)

What is Covid-19?

On 31 December 2019, World Health Organization (WHO) was informed of a cluster of cases of pneumonia of unknown cause detected in Wuhan City, Hubei Province, China. On 12 January 2020 it was announced that a novel coronavirus had been identified in samples obtained from cases and that initial analysis of virus genetic sequences suggested that this was the cause of the outbreak. This virus is referred to as SARS-CoV-2, and the associated disease as COVID-19.

As of 8 April 2020 (10:20am), more than 1,441,589 cases have been diagnosed globally, with over 82,933 fatalities. The WHO coronavirus dashboard has country by country information. WHO also publishes a daily international situation report.

What is the nature of the virus?

Coronaviruses are a large family of viruses with some causing less-severe disease, such as the common cold, and others causing more severe disease such as Middle East respiratory syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS) coronaviruses. On 11 February, WHO named the syndrome caused by this novel coronavirus COVID-19 (Coronavirus Disease 2019) using its best practice guidance.

The Coronavirus Study Group (CSG) of the International Committee on Taxonomy of Viruses has designated the aetiological agent 'severe acute respiratory syndrome coronavirus 2' (SARS-CoV-2). Characterisation of SARS-CoV-2 is on-going. Initial information shared by China and WHO indicates that SARS-CoV-2 is a beta-coronavirus that is genetically similar to SARS-like coronaviruses obtained from bats in Asia.

How is it transmitted?

The source of the outbreak has yet to be determined. Preliminary investigations identified environmental samples positive for SARS-CoV-2 in Huanan Seafood Wholesale Market in Wuhan City, however, some laboratory-confirmed patients did not report visiting this market. A zoonotic source to the outbreak has not been identified yet, but investigations are on-going.

According to current evidence, the COVID-19 virus is primarily transmitted between people through respiratory droplets and contact routes. Human-to-human transmission is occurring extensively. Hence, precautions to prevent human-to-human transmission are appropriate for both suspected and confirmed cases. In addition to respiratory secretions, SARS-CoV-2 has been detected in blood, faeces and urine. In the context of COVID-19, airborne transmission may be possible in specific circumstances and settings in which procedures or support treatments that generate aerosols are performed.

What are the signs and symptoms of Covid-19?

Fever, cough or chest tightness, myalgia, fatigue and dyspnoea are the main symptoms reported. A variety of abnormalities may be expected on chest radiographs, but bilateral lung infiltrates appear to be common (similar to what is seen with other types of viral pneumonia).

How can you protect yourself and help prevent the spread of the disease?

You can protect yourself and help prevent spreading the virus to others if you:

- Wash your hands regularly for 20 seconds, with soap and water or alcohol-based hand sanitizer
- Cover your nose and mouth with a disposable tissue or flexed elbow when you cough or sneeze
- Avoid close contact (1 meter or 3 feet) with people who are unwell
- Stay home and self-isolate from others in the household if you just returned from abroad
- Don't touch your eyes, nose, or mouth if your hands are unwashed
- ADHERE TO SOCIAL DISTANCING DIRECTIVE BY THE GOVERNMENT
- STAY AT HOME

What are the principles guiding the preventive measures?

Infection control advice is based on the reasonable assumption that the transmission characteristics of COVID-19 are similar to those of the 2003 SARS-CoV outbreak. The initial phylogenetic and immunologic similarities between COVID-19 and SARS-CoV can be extrapolated to gain insight into some of the epidemiological characteristics.

The transmission of COVID-19 is thought to occur mainly through respiratory droplets generated by coughing and sneezing, and through contact with contaminated surfaces. The predominant modes of transmission are assumed to be droplet and contact. During AGPs (aerosol generating procedures) there is an increased risk of aerosol spread of infectious agents irrespective of the mode of transmission (contact, droplet, or airborne), and airborne precautions must be implemented when performing aerosol generating procedure (AGPs), including those carried out on a suspected or confirmed case of COVID-19.

Initial research has identified the presence of COVID-19 virus in the stools and conjunctival secretions of confirmed cases. All secretions (except sweat) and excretions, including diarrhoeal stools from patients with known or possible COVID-19, should be regarded as potentially infectious.

The incubation period is from 1 to 14 days (median 5 days). Assessment of the clinical and epidemiological characteristics of COVID-19 cases suggests that, similar to SARS, most patients will not be infectious until the onset of symptoms. In most cases, individuals are

usually considered infectious while they have symptoms; how infectious individuals are, depends on the severity of their symptoms and stage of their illness.

The median time from symptom onset to clinical recovery for mild cases is approximately 2 weeks and is 3 to 6 weeks for severe or critical cases. There have been case reports that suggest possible infectivity prior to the onset of symptoms, with detection of SARS-CoV-2 RNA in some individuals before the onset of symptoms.

Further study is required to determine the frequency, importance and impact of asymptomatic and pre-symptomatic infection, in terms of transmission risks. From international data, the balance of evidence is that most people will have sufficiently reduced infectivity 7 days after the onset of symptoms.

Survival in the environment

In light of limited data for SARS-CoV-2, evidence was assessed from studies conducted with previous human coronaviruses including MERS-CoV and SARS-CoV. Human coronaviruses can survive on inanimate objects and can remain viable for up to 5 days at temperatures of 22 to 25°C and relative humidity of 40 to 50% (which is typical of air-conditioned indoor environments). Survival on environmental surfaces is also dependent on the surface type. An experimental study using a SARS-CoV-2 strain reported viability on plastic for up to 72 hours, for 48 hours on stainless steel and up to 8 hours on copper. Viability was quantified by end-point titration on Vero E6 cells. Extensive environmental contamination may occur following an AGP.

The rate of clearance of aerosols in an enclosed space is dependent on the extent of any mechanical or natural ventilation – the greater the number of air changes per hour (ventilation rate), the sooner any aerosol will be cleared. The time required for clearance of aerosols, and thus the time after which the room can be entered without a filtering face piece (class 3) (FFP3) respirator, can be determined by the number of air changes per hour (ACH) as outlined in WHO guidance; in general wards and single rooms there should be a minimum of 6 air changes per hour, in negative-pressure isolation rooms there should be a minimum of 12 air changes per hour.

Where feasible, environmental decontamination should be performed when it is considered appropriate to enter the room or area without an FFP3 respirator. A single air change is estimated to remove 63% of airborne contaminants, after 5 air changes less than 1% of airborne contamination is thought to remain. A minimum of 20 minutes that is 2 air changes, in hospital settings where the majority of these procedures occur is considered pragmatic.

Source: Public Health England