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The Main Mode of Transmission of 2019-Covid Is Human to Human

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Introduction

When the spread of COVID-19 began, the virus appeared to be contained within China and the cruise ship Diamond Princess, which formed the major clusters of the virus. However, as of April 2020, over 210 countries and territories are affected by the virus, with Europe, the USA, and Iran forming the new cluster of the virus. The USA has the highest number of confirmed COVID-19 cases, whereas India and China, despite being among the most population-dense countries in the world, have managed to constrain the infection rate by the implementation of a complete lockdown with arrangements in place to manage the confirmed cases. Similarly, the UK has also managed to maintain a low curve of the graph by implementing similar measures, though it was not strictly enforced. Reports have indicated that the presence of different strains or strands of the virus may have had an effect on the management of the infection rate of the virus. The disease is spread by droplet transmission. As of April 2020, the total number of infected individuals stands at around 3 million, with ~200,000 deaths and more than 1 million recoveries globally. The virus thus has a fatality rate of around 2% and an R0 of 3 based on current data. However, a more recent report from the CDC, Atlanta, USA, claims that the R0 could be as high as 5.7. It has also been observed from data available from China and India that individuals likely to be infected by the virus from both these countries belong to the age groups of 20-50 years. In both of these countries, the working class mostly belongs to this age group, making exposure more likely. Germany and Singapore are great examples of countries with a high number of cases but low fatalities as compared to their immediate neighbors. Singapore is one of the few countries that had developed a detailed plan of action after the previous SARS outbreak to deal with a similar situation in the future, and this worked in their favor during this outbreak. Both countries took swift action after the outbreak began, with Singapore banning Chinese travelers and implementing screening and quarantine measures at a time when the WHO recommended none. They ordered the elderly and the vulnerable to strictly stay at home, and they ensured that lifesaving equipment and large-scale testing facilities were available immediately. Germany took similar measures by ramping up testing capacity quite early and by ensuring that all individuals had equal opportunity to get tested. This meant that young, old, and at-risk people all got tested, thus ensuring positive results early during disease progression and that most cases were mild like in Singapore, thus maintaining a lower death percentage. It allowed infected individuals to be identified and quarantined before they even had symptoms. Testing was carried out at multiple labs, reducing the load and providing massive scale, something which countries such as the USA did quite late and India restricted to select government and private labs. The German government also banned large gatherings and advocated social distancing to further reduce the spread, though unlike India and the USA, this was done quite late. South Korea is another example of how a nation has managed to contain the spread and transmission of the infection. South Korea and the USA both reported their first COVID-19 cases on the same day; however, the US administration downplayed the risks of the disease, unlike South Korean officials, who constantly informed their citizens about the developments of the disease using the media and a centralized messaging system. They also employed the Trace, Test, and Treat protocol to identify and isolate patients fast, whereas the USA restricted this to patients with severe infection and only later broadened this criterion, like many European countries as well as India. Unlike the USA, South Korea also has universal healthcare, ensuring free diagnostic testing.

Transmission

The main mode of transmission of 2019-nCoV is human to human. As of now, animal-to-human transfer has not yet been confirmed. Asymptomatic carriers of the virus are at major risk of being super infectors with this disease, as all those infected may not develop the disease. This is a concern that has been raised by nations globally, with the Indian government raising concerns on how to identify and contain asymptomatic carriers, who could account for 80% of those infected. Since current resources are directed towards understanding the hospitalized individuals showing symptoms, there is still a vast amount of information about asymptomatic individuals that has yet to be studied. For example, some questions that need to be answered include: Do asymptomatic individuals develop the disease at any point in time at all? Do they eventually develop antibodies? How long do they shed the virus for? Can any tissue of these individuals store the virus in a dormant state? Asymptomatic transmission is a gray area that encompasses major unknowns in COVID-19.

The main route of human-to-human transmission is by droplets, which are generated during coughing, talking, or sneezing and are then inhaled by a healthy individual. They can also be indirectly transmitted to a person when they land on surfaces that are touched by a healthy individual who may then touch their nose, mouth, or eyes, allowing the virus entry into the body. Fomites are also a common issue in such diseases.

Aerosol-based transmission of the virus has not yet been confirmed. Stool-based transmission via the fecal-oral route may also be possible since the SARS-CoV-2 has been found in patient feces. Some patients with COVID-19 tend to develop diarrhea, which can become a major route of transmission if proper sanitation and personal hygiene needs are not met. There is no evidence currently available to suggest intrauterine vertical transmission of the disease in pregnant women.

More investigation is necessary of whether climate has played any role in the containment of the infection in countries such as India, Singapore, China, and Israel, as these are significantly warmer countries as compared with the UK, the USA, and Canada. Ideally, a warm climate should prevent the virus from surviving for longer periods of time on surfaces, reducing transmissibility.

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