Step 1.5 Overview of the coronavirus and COVID-19

In this mini-lecture, Dr Anna Seale describes the new coronavirus, comparing it to other coronaviruses, and telling us where it came from, how it spreads, and what the symptoms are (recorded 2nd May 2020). When you watch it, try and think back - had you heard about coronavirus before 2020? How is COVID-19 changing how we think about respiratory viruses?

Many of the participants on the first run of the course found the article where Peter Piot answers 100 Questions about the outbreak useful, recommending it to others, so you may want to look at that in the See Also information below.

NB Thanks to those who have noted at the end of the lecture it should say "not touching your eyes or mouth".

Video transcript:

DR. ANNA SEALE: Coronaviruses are a large family of viruses. They get their name from the crown-like spikes that can be seen on their surface with electron microscopy. They were first identified in the middle of the 1960s, and they can cause very mild symptoms like a common cold, or in some cases the viruses can cause severe disease.

There are many coronaviruses circulating in animals, and some that are circulating in humans. Rarely, one of the viruses infecting animals may evolve to infect humans and spread between them. The virus causing the disease Severe Acute Respiratory Syndrome - SARS - in 2002 originated from bats, but then passed through Civet cats and onto humans. The virus causing Middle Eastern Respiratory Syndrome - MERS - in 2012 may have originated from bats, but was in dromedary camels for a long time before it was able to infect humans. These viruses didn't always, but could, cause severe disease in humans.

The new type of coronavirus, SARS CoV-2, causes COVID-19, and cases were first reported in Wuhan, a city with a population of around 11 million and the capital of Hubei Province, China. Preliminary investigations identified environmental samples positive for SARS CoV2 in Huanan Seafood Wholesale

Market in Wuhan City. However, some early laboratory confirmed patients did not report visiting this market, so it's still not clear whether this was the site of the emergence.

Genetic data suggests that the novel coronavirus originated from bats, but it may have had an intermediary host. Which animal this was is still uncertain, but pangolins had been suggested.

Coronaviruses primarily affect the airways, the breathing passages, or respiratory tract. In the course of infection, as the virus replicates people may not actually develop symptoms, and these people are called asymptomatic. Others who were infected develop symptoms after a period. Before they develop symptoms they're called pre-symptomatic. For those FutureLearn 2 with symptoms of infection, these may be mild, like the common cold, or more severe with breathing difficulty as seen in MERS and SARS.

For COVID-19, common symptoms include fever, cough, and feeling tired. Some people become seriously ill and develop difficulty breathing. This is more likely in older people and/or those who have existing health problems. For example, diabetes or asthma. People with symptoms, especially at the start of them, would be expected to be infectious to others. But importantly for this disease, asymptomatic or pre-symptomatic people may also be infectious to other people.

So how can we measure severity of disease? Case fatality risk or rate is a measure of how serious a disease is, as it tells you the proportion of people who die from the disease out of those who have it. For MERS, CFR was high, as over a third of cases died. In SARS it was lower, with one in 10 people dying. For COVID-19, many different case fatality rates have been reported worldwide. Globally CFR is around 2%, which is 1 in 50 people infected with the disease dying.

Respiratory viruses have been traditionally categorised as being transmitted by droplets, aerosols, or contact. Droplets are larger particles and considered to generally travel less than a metre. Smaller particles make up aerosols, and may travel further. Contact is usually from droplets landing on objects which are then touched by another person who then touches their eyes, nose, or mouth. Whilst these categories are useful to understand the main modes of transmission for respiratory viruses, many respiratory viruses will not fall exclusively into one category.

The main ways the virus causing COVID-19 spreads is via droplets, for example when someone coughs, and via contact with a contaminated object. For example, touching a door handle with your hand and then touching your eyes, nose, or mouth. Transmission by aerosol has been investigated for SARS CoV-2,

and whilst there is some evidence that this is possible, particularly in health care settings where there are aerosol generating procedures, it is not considered a major mode of transmission. Transmission by other routes is also theoretically possible, as SARS CoV-2 has also been found in blood, urine, and faeces. But these are not considered important modes of transmission for this virus.

How a virus spreads informs the measures to prevent it. So for individuals to prevent droplet or contact transmission, washing hands, not touching your hands or mouth, and maintaining distance between people can help prevent infection. Specific guidance for individuals from healthcare, national, or local authorities and employers should be followed.

See Also:

World Health Organization Q&A on Coronaviruses

https://www.who.int/emergencies/diseases/novel-coronavirus-2019/question-and-answers-hub/q-a-detail/q-a-coronaviruses

Professor Peter Piot, Director of LSHTM, answers 100 questions on the topic

https://www.lshtm.ac.uk/newsevents/expert-opinion/100-questions-peter-piot-lshtm-director

LSHTM Viral podcast series

https://anchor.fm/lshtm