Source: *The Straits Times,* pB8
Date: 15 February 2020

ScienceTalk

Coronavirus: Making sense of data for practical decisions

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The Singapore Government recently raised the alert level to Dorscon (Disease Outbreak Response System Condition) orange in view of the emergence of recent coronavirus cases with no known links to any previous cases or clusters, and the possibility of wider spread in the community.

I laud this decision as appropriate because we do not have an entirely clear picture of what is going on.

However, there are many misconceptions regarding the virulence of the virus, exacerbated by the online spread of misinformation.

Person-to-person spread occurs and probably has been already occurring in the weeks before this.

When we combine this fact – person-to-person spread – with the knowledge that the virus was likely already circulating since December, it is likely that the recent, currently unexplained cases in Singapore are through contact-with-contacts-who-had-contacts-who-had-other-contacts with a traveller from China in the last two months.

Given what we know of the virus, there is no other likely explanation.

Estimates and opinions on the virus' virulence are not entirely accurate because most of the reports have not accounted for ascertainment bias and for the immune system's variation in response – two empirical concepts proven through everyday medical care.

Ascertainment bias in this situation refers to the increased detection of cases of the coronavirus because we are looking harder and testing people, which we would not have otherwise done, because they are well.

In the more recent reports after screening efforts were stepped up, there are reportedly asymptomatic cases – people who test positive for the virus without any signs of illness.

There are also many others who would not have been detected without aggressive health checks, such as the more than 170 people who tested positive on a quarantined cruise ship docked in Yokohama, Japan.

When the news of the situation first broke, the initial fatality estimate was 2 per cent to 3 per cent.

This percentage was obtained by the number of deaths, divided by the number of laboratory confirmed cases.

However, there are likely to be many more unreported cases in China and other countries.

Some experts had estimated the true infection rate to be as much as five times higher than what the reports suggest.

The reason that we are not aware of the unreported cases is because the infections tend to be milder in some of the cases or the affected display no symptoms at all.

In such situations, the sick do not see a doctor or try to get themselves tested, and therefore do not get detected.

As the number of reported cases outside China increases over time, it is clear that the initial 2 per cent to 3 per cent estimate was an overestimate, because the number of deaths in the cases outside China is far lower than what the estimate suggests.

People wearing face masks at Changi Airport on Wednesday. The author says there are many misconceptions regarding the virulence of the coronavirus, exacerbated by the online spread of misinformation. ST PHOTO: LIM YAOHUI

The second concept, immune system variation, is evident in other infectious diseases, for instance tuberculosis and hand, foot and mouth disease (HFMD).

Tuberculosis is an infection that usually involves the lungs.

Some people – specifically, some strong, young, healthy adults with robust immune systems – do worse than older adults and children when they acquire this infection.

HFMD is an infection that causes rashes and painful ulcers in the mouth; it usually affects children.

When an adult contracts HFMD – usually the young, strong, healthy adult parent of the infected child – the adult tends to have more pain and more ulcers, compared with the average child.

These observations illustrate how the virulence of the disease is not the only factor defining the severity of the infection.

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The immune system variation explains the patterns that we are seeing on the number of cases and deaths.

The patterns suggest that it is the immune system's response to the virus which contributes to the more obvious symptoms, and makes the infection more dangerous, in adults.

Most of the patients sick enough to seek medical attention (and thus are picked up and reported), are adults; the rest do not get reported.

Of the ones who do seek medical attention and are sick enough to require hospitalisation and intensive care, the death rate is higher because they are more sick.

Attempts at explaining the serious illness seen in some Covid-19-infected patients by other means include "genetic susceptibility" and "the virus by itself is more virulent than other viruses".

These arguments are refuted by the population-strata-level patterns we are seeing.

Children share the same genes as the adults, so the genetic susceptibility argument does not hold.

Likewise, if the virus itself was more virulent than other viruses, then the infected children should be even worse off than the adults – but this is not the case.

An article in The Straits Times on Feb 6, Reporter's Notebook: Life And Death In A Wuhan Coronavirus ICU, illustrates this contrast between what is being seen inside the intensive care unit and outside the hospital (and Wuhan).

At the time of writing, almost all the reported cases in Singapore are adults. There is no reason for people to panic.

There are likely more cases of this virus in every country that has reported it, but they are not being reported because no one is aware they have the virus.

Good hand hygiene, sensibly avoiding crowded places, not exposing others to your illness if you have the flu – all this is common sense and socially responsible behaviour that we should be observing.

However, we should not be complacent. Adults should observe the protocols required to protect themselves and their loved ones, and teach children to do the same.

Containment is everyone's responsibility. Let's be vigilant, but we should control our fears. Do not let your fear control you, which can drive you to behave irrationally.

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