How Dangerous Is the Wuhan Coronavirus?

by Alex Berezow - February 17, 2020

The political and economic effects of the new coronavirus – both in China and across the globe – hinge overwhelmingly on just how successful efforts to stop its spread are likely to be. Forecasting these, therefore, requires us to take a closer look at the mechanics of both contagion and containment.

When determining how dangerous an infectious disease can be, microbiologists and epidemiologists need to know two numbers: R_0 (called R-naught) and the case-fatality rate (which is actually a ratio, not a rate). The former estimates how infectious the disease is, while the latter provides an insight on its virulence.

R_0 is an attempt to calculate how many people will catch a disease from an infected person. An R_0 of 2, for instance, means that an infected person will spread the disease to two other people. But this is not an easy number to calculate. A **paper published in the scientific journal PLOS One** describes two methods for finding R_0. One involves hunting down every contact of several infected people to determine how many get sick and averaging the results; the second involves calculating an estimate by plugging cumulative data into equations that serve as infectious disease models.

But, as **an article in The Atlantic explains**, R_0 is even trickier than that. It can change depending on external circumstances. A public health campaign or an effective quarantine could lower R_0, while the virus' spreading to a region with poor health care could increase R_0. Perhaps the most salient point is that an R_0 greater than 1 suggests that the infection will spread, while an R_0 less than 1 suggests it will fizzle out.

As its name implies, the case-fatality rate estimates the percentage of deaths that occur among infected people. The Wuhan coronavirus has an estimated case-fatality rate of about 2 percent, meaning that there are two fatalities for every 100 cases of the disease. **Science News reports** that "the [World Health Organization] says less than 2 percent of patients who have fallen ill with 2019-nCoV have died, most often from multi-organ failure in older people and those with underlying health conditions."

But just like R_0, this number can be tricky to calculate and interpret. First, the true number of cases is hard to know for sure, since people who contract a mild version of the disease don't go to the

hospital, don't get tested, and don't become tallied in the official statistics. Second, the case-fatality rate will vary inversely with the quality of a health care system. Wuhan was so overwhelmed by the coronavirus that **hospitals were turning away patients**. It is quite likely that some people who died could have been saved had they received treatment. Combined, these facts would suggest that the case-fatality rate for the Wuhan coronavirus is lower than 2 percent, especially if an infected person is treated in an advanced nation with a good health care system. Indeed, **an article in Reuters concluded that infections have been underreported**. As of publication, **data from Johns Hopkins** show that of the more than 1,000 deaths, only two have occurred outside mainland China (in the Philippines and Hong Kong).

Despite the difficulty in calculating R_0 and the case-fatality rate, these numbers are worth estimating because they help place a new disease in the context of what is known about other diseases. The R_0 of measles could be as high as 18, while the case-fatality rate of seasonal influenza is approximately 0.1 percent. Thus, preliminary numbers suggest the Wuhan coronavirus is less infectious than measles but deadlier than seasonal flu. But, because of the sheer number of cases of seasonal flu (which number in the millions), the global death toll from influenza is far greater, estimated to be approximately **300,000 to 500,000 deaths annually**.

Containing the Coronavirus

The **global economy** surely will take a substantial hit from the coronavirus. This will be the result of China's massive, citywide quarantines, a decrease in industrial output, and travel restrictions and supply chain disruptions. Many such efforts to contain the coronavirus are disproportionate to the threat.

China's massive quarantines will probably work to an extent – after all, preventing people from traveling within and between cities will help curb transmission of the virus – but this measure cannot be implemented in free societies. In non-authoritarian countries, only individuals can be quarantined, and this has been adequate to prevent the spread of disease. (When Ebola came to the United States, it didn't spread far thanks to effective treatment and isolation procedures.) Citywide quarantines also aren't necessary because the best way for uninfected people to remain that way is to wash their hands frequently and to avoid touching their face while in public. It's difficult to say whether wearing a mask accomplishes anything. On the one hand, masks catch respiratory droplets, which is why sick people and those with whom they are in close contact absolutely should wear them. On the other hand, viruses are so tiny, they can pass right through masks. To the extent that a mask prevents a person from touching his or her face, then a mask may provide some protection.

However, the **Centers for Disease Control and Prevention does not recommend** that healthy people wear a mask in public.

While coronaviruses can spread via frequently touched fomites (objects, such as doorknobs, that can transmit an infection indirectly to another person), it is not known how long they can survive outside the body on surfaces. While some scientists believe that coronaviruses can last **only a few hours**, a newly published **literature review** in the Journal of Hospital Infection concludes that they "can persist on inanimate surfaces like metal, glass or plastic for up to 9 days, but can be efficiently inactivated by surface disinfection procedures… within 1 minute." Because exports from China take **30 to 40 days to arrive in the United States** (if shipped via ocean freight), there is virtually no chance that exported products could infect Americans – unless the export is an infected human, animal or animal product.

When Overreactions Are Rational

The most serious threat to the global economy is not from the virus itself but from overreaction. Chinese manufacturing plants sit idle due to sick or quarantined workers. Travel into and out of China has been reduced. These overreactions are understandable, however, because scientists and public health officials have expressed a lot of uncertainty about the virus. When faced with uncertainty – particularly when that uncertainty potentially involves death – people (especially politicians) behave cautiously. (From the American perspective, restricting travel to China has the side benefit of squeezing that nation's economy even further.)

The general public hates uncertainty. But scientists live in a world of probability and are very comfortable dealing with uncertainty. This is also why scientists rarely use words like "never" and "always." (We know better from experience. At one time, we thought all swans were white, until we went to Australia and found black swans.) This difference between the public and scientific community on the relationship to risk creates a communication gap that further feeds the uncertainty.

Ultimately, the future of the Wuhan coronavirus is not knowable. Like the other major coronavirus epidemics that preceded it, the Wuhan virus is thought to have jumped from animals to humans. SARS terrified the world, but then quickly vanished. MERS, on the other hand, is now endemic, meaning there are a few cases that occur all the time. The Wuhan virus could follow either path or some other path entirely.

Just like an economic recession, an infectious disease outbreak provokes strong psychological responses. Life will return to normal when enough people believe that it's okay to return to normal.

Author: Alex Berezow

Read more from this author on geopoliticalfutures.com

