

Scenarios and consequences of the Wuhan coronavirus pandemic

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This content is almost 2 years old

Crude translation into English, the original in Spanish is [here](#).

By Javier

A new human pathogen has made its appearance and due to its characteristics poses a clear risk to health and the global economy. In a preliminary way and without yet having reliable data I make a first analysis, wishing and hoping that the most favorable scenario will be the one that finally occurs.

1. Pandemics

It is considered a pandemic when a new species, strain or antigenic type of microorganism spreads over wide regions of the planet seriously affecting the health of people. Seasonal influenza caused by the influenza virus is not considered a pandemic and occurs every year. However, every decade there is usually a change of the antigens on the surface of the virus that are recognized by the antibodies of our defenses giving rise to a pandemic. In the last 200 years there have been about 30 flu pandemics, the most serious being that of 1918, known as **the Spanish flu**. The name comes from the fact that the reports of the Spanish press were not subject to the censorship of the First World War and gave the impression that the situation was much worse in Spain, where even King Alfonso XIII fell ill.

Seasonal flu severely affects five million people each **year, killing 290,000 – 650,000** of them, according to the [WHO](#). Deaths occur disproportionately among those under 5 in undeveloped countries and those over 65 in all countries. The flu infects 10-20% of the world's population every year, a third of whom do not develop any symptoms but transmit them. The morbidity rate (development of disease with serious symptoms) is around 0.45% and the mortality rate **is 0.045%**. People who die from the flu usually do so by developing either primary or secondary bacterial pneumonia, although people with compromised or weak immune systems (children, the elderly, pregnant women) may die from other complications.

Flu pandemics are a separate case. The main pandemics took place in 1889, 1918, 1957 and 1968. Pandemics are usually characterized because they infect a higher percentage of the population and have a higher mortality. **Mortality from the pandemics** of 1889, 1957 and 1968 was around **0.1 - 0.15%**.

2. The flu pandemic of 1918

The Spanish flu of 1918 has been **the deadliest pandemic in history**. It killed **50-100 million people in just two years**, between 3 and 6% of the population of the time (1.8 billion). By comparison the First World War, which took place at the same time, caused 16 million deaths. It is thought that between 30 and 50% of the world's population was infected, so the **mortality rate** could be **around 5-10%**. The bubonic plague had a much higher mortality rate, but there were far fewer people at the time. The Spanish flu spread around the world, and only the island of American Samoa and New Caledonia were spared through very strict quarantines. The flu pandemics of 1957 and 1968 killed two million and one million people respectively.

Some flu pandemics have the particularity of greatly increasing the **deaths of young adults**, and that was the case with the Spanish flu. Scientists aren't sure what it's due to, though the most widely accepted hypothesis is that it's due to what's called a **cytokine storm**. Cytokines are signaling molecules released by white blood cells to activate and attract other white blood cells to the area of infection. When released in excess, they produce [cytokine release syndrome characterized](#) by a generalized inflammatory response. The most severe cases are known as cytokine storms. In essence, you are killed by the response of your immune system, which in young adults is stronger because you have a stronger immune system. Additionally, the flu of 1918 caused damage to the walls of blood vessels which caused bluish skin and hemorrhages that could be fatal, and pulmonary edema that could become lethal in a matter of hours drowning the sick. Secondary bacterial pneumonias were also an important factor as they are in all flus.

3. The SARS coronavirus epidemic of 2003

An influenza-like illness, later called **severe acute respiratory syndrome (SARS)**, appeared in Guandong Province, China, in November 2002. WHO requested information but China did not provide it. In February 2003, the alert went off when an American business traveler fell ill on a flight to Hanoi after being infected in Hong Kong. One of the doctors at the French Hospital in Hanoi alerted the WHO which finally issued the global alert on March 12. China apologized for its behavior in delaying measures to control the epidemic by several months.

Known human coronaviruses prior to SARS do not produce serious illness, so **there are no vaccines or treatment for coronavirus infection**. Symptoms are treated by antipyretics for fever, steroids for lung inflammation, and oxygen or assisted ventilation for pneumonia or edema. The SARS epidemic affected 8100 people from 17 countries, killing 774(**11% mortality**), and was declared contained in July 2003.

Certain characteristics of SARS facilitated containment. It has an incubation period of 4-6 days so the identification of a patient allows to identify and find their contacts before they become contagious, and especially apart from some superinfectors SARS was relatively little contagious, nothing to do with the flu for example. Although the basic reproduction number R_0 (number of cases that each case is expected to generate in a fully susceptible population) of SARS is estimated at 2-5, and that of influenza at 2-3,

the contagion of SARS except in the case of superinfectors used to occur by close contact with a patient, in many cases family members and health personnel, while the flu is easily contracted from casual contact with strangers. Although China delayed reporting on the disease for months, the disease was able to be contained and the number of total cases in the nine months that passed from when it began until it was declared contained is less than the number of cases that the Wuhan coronavirus has produced in its first two months.

4. Avian influenza (H5N1)

The H5N1 strain of influenzavirus is common in bird epidemics, but not in humans. However, the large expansion of the poultry population has led to the virus spreading creating serious epidemics in birds and increasing the chances of jumping to humans in an infectious way, which **makes epidemiologists' hair stand on end**. Since 1997, human H5N1 infections have been occurring from contact with birds, although experts believe that there may have been up to half a dozen cases of human-to-human transmission. Since 2003 there have been more than 700 cases, and **mortality is appalling ranging from 50 to 100% of cases**, although the numbers are very small and there may be more unconfirmed cases that reduce that number. Even so, vaccines against H5N1 have been developed that although no one knows if they work or not some countries are accumulating them just in case. Japan also vaccinates poultry farm workers just in case.

5. The Wuhan coronavirus

On December 1, 2019, the first in a series of cases of pneumonia of unknown cause appeared in Wuhan, the capital of Hubei province that is an important travel nexus both in China and internationally, which has facilitated its early spread. A Jan. 24 article in The Lancet confirms the existence of a novel coronavirus tentatively named **2019-nCoV** 96% identical to a virus identified in bats. As of January 30, there have been 8,288 cases in 22 countries and 171 deaths all in China and the WHO has today declared an **international emergency**. The very preliminary numbers of basic reproductive number R_0 would be between 1.4 and 3.8 and a mortality of at least 3%. Mortality lags behind infectivity, because patients can take weeks to die, but at the moment the people declared cured are similar in number to the dead so it is likely to be well below 50%. The incubation period appears to vary between only 2 and 10 days. But I insist that all the data are very tentative and could vary significantly. Based on models, experts fear that infected people are about ten times more than people who have developed symptoms, so **there could already be tens of thousands of infected**.

6. Possible scenarios

6th Scenario 1: Early Containment

This is **the most favorable scenario** and the one I hope will take place. Over the next few weeks, the increase in the number of cases would be reduced until it stabilized and then began to decrease. There would continue to be new cases for months, but the incidence would decrease, as happened with SARS. By the time a vaccine is obtained, it is already unnecessary for the general population.

Economic losses would be significant in China due to the quarantine disruption and could reduce its GDP by the equivalent of a slight recession (down to 4-5%), slightly affecting the global economy. Airlines will bear the brunt of flight restrictions, followed by tourism. The price of oil should fall as a consequence.

6b Scenario 2: Late containment

The intermediate scenario. The pandemic is contained with great efforts and after many months after having infected millions of people in many countries. The dead number in the tens or hundreds of thousands. **A vaccine, which would take months** to develop and produce, may be needed to finally contain the pandemic.

The economic losses would be very large and with the current state of the economy **could cause a global recession**. Stock markets could suffer a crash. With the decline in state revenues there could be multiple debt defaults that could add a currency crisis. The powers that count could take advantage to redesign the monetary and economic system by stripping everyone of their savings by taking advantage of the emergency situation.

6c Scenario 3: No Containment

The nightmare scenario. The pandemic is not contained and manages to infect 30% of the world's population before burning when an effective vaccine has not been achieved in time. With 3% mortality (eye that may be higher) that would be **67 million dead**. In Spain alone there would be 440,000 deaths out of 16 million infected.

The global economy collapses. The bags sink. International production chains are broken. There is widespread shortage of multiple products. Health care is falling apart. A currency crisis is practically assured.

7. Considerations

I consider **the probability of scenario 3 to be extremely low**, but it is not impossible. Since the disease is progressing much faster than SARS I think we would be between a scenario 1 and 2, probably closer to 1 than 2. **The vaccine is the jackpot** of this whole story, so I think it will be produced faster than a priori seems possible and people will demand that governments pay whatever they are asked to get it. I just hope they don't sell us ineffective vaccines at a gold price.

Pandemics are probably the greatest risk to the human species. Parasitism is the dominant way of life on Earth. [The number of parasitic species](#) is much higher than the number of free species, and in number of individuals parasites are probably an order of

magnitude more abundant than non-parasitic ones. Even parasites have parasites. The most abundant group of beings on Earth are bacteriophages, the viruses of bacteria. Human beings with our medical progress and our absolutely brutal increase in number and biomass, particularly if we include our farm animals **constitute the largest food prize on the planet** for parasites capable of sinking our teeth, and that naturally includes viruses, which are the fastest to adapt. Around us we have built a barrier based on our biomedical technology and we have eliminated or reduced much of the competition, such as smallpox or polio. How long will that barrier withstand the attempts of pathogenic germs to penetrate it?

The brilliant character of the mathematician **Ian Malcolm** played by Jeff Goldblum in Jurassic Park tells us things as they are:



John, the kind of control you aspire to is by no means possible. If the history of evolution has taught us anything, it is that life cannot be contained, life is liberated, spreads through new territories and breaks down barriers painfully, even dangerously, but it is. ... I mean that, simply, life makes its way...

History shows us that major pandemics often occur when the human population is weakened by hunger, usually during periods of climate cooling when crops fail. The plagues of Antoninus and Justinian occurred after the Warm Roman Period, in the Cold Period of the Dark Ages when the period of migrations began. The Black Death spread across Eurasia with the Little Ice Age after the terrible famine of 1317 that weakened the defenses of the population. The story of the Little Ice Age is essentially a story of famines and plagues. We are now in a period of warming and better fed than ever, so our resistance to pandemics is probably high and this is just another risk overcome.

8. Health recommendations if necessary

The Wuhan coronavirus is transmitted like the flu virus or SARS, through contact and through airborne liquid particles (droplets) that are produced by breathing, talking, coughing and sneezing.



A sneeze releases a tremendous amount of virus at a distance of up to two meters in droplets of various sizes that can take hours to deposit.

The available information is sometimes contradictory, but [studies with porcine influenzaviruses](#) in particles between 0.4 and 10 μm in size seem to indicate that it is the largest particles that are most infective and in which the viruses survive the longest. These data coincide with other studies that indicate that surgeon's masks, made with several layers of paper, capable of filtering 99% of bacteria, but which are neither watertight nor capable of filtering small particles, nevertheless seem to offer 60-75% protection against the flu virus if used correctly.

If the pandemic arrives in Spain without having been contained, it is highly recommended to try by all possible means not to be infected. The period in which you have to be more careful goes from October to April. The virus survives in aerial droplets much longer when the environment is cold and dry.

8th Isolation

We must **avoid going to places where people are concentrated** such as schools, hospitals, cinemas, means of collective transport, etc. Leave the house as little as possible. If you have young children in whom mortality is usually much higher, it may be advisable to quarantine them without leaving, if possible, in an area of the house isolated from the rest where adults who enter do so after washing thoroughly and

protecting themselves with masks as if they were infected to avoid infecting them if they really are. Studies show that masks protect children very poorly so putting it on them is an ineffective measure. However, a study has shown that the use of a mask by adults at home, if done well, is effective in preventing the spread of the flu from the child to adults, so the other way around it can also work. MacIntyre, C. R., et al. "[Face mask use and control of respiratory virus transmission in households](#)." Emerging infectious diseases 15.2 (2009): 233. The main problem was that less than half of the participants in the study wore the mask most of the time.

8b General hygiene

Objects touched by patients or where droplets have been deposited **can be infective for a day** or more, so you have to wash your hands thoroughly for at least 20 seconds very often (at least 10 times a day), and no one can touch objects that other people then take to the face or mouth as glasses, dishes, cutlery, towels, etc. You should not put your hands to your mouth, nose, ears or face and if it is essential you have to wash them before and after.

8c Masks

Masks work because the paper absorbs the infective droplets and in those conditions the survival of the virus is reduced to a few minutes. They do not guarantee that one will not be infected but used correctly greatly increases the chances of not doing so. The correct use requires: washing your hands before putting it on or removing it, and after removing it in case the external surface has been touched, maintaining a distance of one or two meters with the rest of the people, changing the mask if it gets wet due to breathing, coughing or sneezing. Once wet its protective effect is compromised. If it becomes necessary to reuse it because it does not have enough, it is advisable to sterilize it in the oven at 60°C for an hour, which is enough to kill influenzaviruses and coronaviruses. Have it on whenever you are in the presence of people who may have been infected, and keep it on for at least an hour after the person has left an enclosed space so that the largest droplets are deposited and after ventilating.

If you do not get masks, which are currently sold out in pharmacies in Madrid, do not panic. The thick multi-layered handkerchiefs that come in packages can fulfill a similar function fastened with a pair of cords and small tweezers and held in place by glasses, whose use is also recommended to protect the mucous membranes of the eyes, which are believed to be a gateway for SARS.

8d Environment

A high temperature and high relative humidity (50%) reduce the time the virus remains viable in suspension. Unlike protein-coated viruses, lipid-coated viruses such as coronaviruses and influenza viruses lose viability more quickly in humid environments

than in dry environments. Likewise, a temperature of 24 °C is more recommended than one of 20 °C.

It may be necessary to accumulate groceries in case there are shortages, or simply to go less to the supermarket. It can also be a good time for those who are already prepared for the collapse of civilization to rotate those cans of tuna they store for ones with a longer expiration date (sarcastic mode).

This set of measures, although annoying and difficult to maintain, greatly increase our chances of avoiding being infected. According to Jefferson, T., et al. "[Physical interventions to interrupt or reduce the spread of respiratory viruses: systematic review.](#)" *Bmj* 336.7635 (2008): 77-80.

Meta-analysis of six case-control studies suggests that physical measures are highly effective in preventing the spread of SARS: washing hands more than 10 times a day (effectiveness 0.55); wear masks (0.68); with gloves (0.57); wearing gowns (0.67); and hand washing, masks, gloves and gowns combined (0.91).

The most effective masks are the N95 type masks, which some people use to protect themselves from allergens and which are also suitable for viruses, but have the disadvantage that they are not disposable which increases the risk of contamination if reused without re-sterilizing. However, studies show that even homemade masks that don't fit the face offer considerable protection.

van der Sande, M., Teunis, P., & Sabel, R. (2008). [Professional and home-made face masks reduce exposure to respiratory infections among the general population.](#) *PLoS One*, 3(7).

And beware of what the television says. In the last three days I have heard it said on the TVE news that negative pressure kills the virus, which is false, reducing the pressure contains the virus because the air moves from the area of highest pressure to the lowest pressure preventing it from leaving, but it does not affect it, and I have heard you say that the mortality of the Wuhan coronavirus is "**only 3%**". Alone??? 3% means many millions of dead if it is not contained, rather than a world war. Then they talk about fake news, if it's them.

P.S. Update on January 31. This photo circulating on the net is too good not to put it:

How to protect yourself from corona virus

