A better option to fight the coronavirus

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The COVID-19 coronavirus pandemic is a major threat to human health and global economy. Quarantine is the traditional method to fight the coronavirus, and it can be cost effective at the initial stage. A successful quarantine can end the spread of the coronavirus in about two months. However, for an already spread coronavirus, quarantine can be costly and difficult to implement. A new method of reverse quarantine is proposed to fight the coronavirus. The reverse quarantine is cost-effective and easy to implement, and it can also end the coronavirus pandemic in about two months. At this stage of the coronavirus pandemic, it is a better option for the United States to switch from social distancing to the reverse quarantine.

A normal quarantine is to put the infected in isolation. The key is active testing to track down all the infected. Regions with a well executed quarantine have a population death rate below 10 per million, such as Taiwan, Hong Kong, Singapore, Vietnam, and South Korea. However, this can be costly or impossible to do for an already spread coronavirus.

The proposed reverse quarantine is the opposite, and it puts the uninflected but vulnerable in isolation for protection. People are voluntarily divided into two groups, a normal group and a reverse quarantine group. The normal group has a normal life, and businesses stay open as they wish. The infected stay with the normal group to infect more people until no more people are available for infection and the virus will die. This is against the conventional wisdom of social distancing. There will be a jump in the number of infected cases in the first month, but only small increases in the numbers of hospitalizations and deaths since the vulnerable people are removed from this group. In the second month, the numbers of infections, hospitalizations, and deaths will drop to zero. The reverse quarantine puts the elderly and a small number of people with preexisting conditions in voluntary isolation to protect them from infection.

The key for the reverse quarantine is to identify the vulnerable people and to separate them. There are always some uncertainties as to the risks to an individual. It is a personal choice of lifestyle and risk. People have the freedom of choice. At least 10% of the population need to be in the reverse quarantine to protect the majority of the vulnerable people. The more people choose the reverse quarantine, the better the outcome will be. The population death rate for the reverse quarantine is estimated at 20 to 200 per million. In other words, the number of deaths will be from 6,000 to 60,000 for the United States. For comparison, there are about 5,000 chocking deaths every year and the CDC estimates that 12,000 and 61,000 **deaths** annually due to flu in the United States.

There are three basic assumptions for the reverse quarantine. First, an infected person is only contagious for a short period, say 14 days, and either the virus dies or the the infected person dies. Second, an infected person has immunity to the virus immediately after recovery for at least a short period, say two months. Third, most deaths are people with preexisting conditions. The three assumptions should generally be true for the reverse quarantine to work as expected. Isolated exceptions will not change the result.

The attached figure further illustrates the reverse quarantine. At the initial state, the number of the infected people is 1% of the population. In a city of 100,000 people, the number of infected people will be 1000. In this example, 80% of the population choose the reverse quarantine and 20% choose normal life. One month later, 15% of the population will be infected. Then the coronavirus cannot find more people to infect and will die. The coronavirus virus needs a chain of infection to survive. In the reverse quarantine group, a chain of infection will not happen. In the normal group, the very contagious coronavirus will quickly spread, and the chain of infection will stop when the coronavirus cannot find more people to infect. In about two months, it will be all clear.

This is how the reverse quarantine will work in theory. There are some indirect evidences that the method will work in practice. In areas with a young population and a slack government control, such as Cambodia, Niger, Nigeria, and slums in India, there are no reports of mass deaths due to the spread of the coronavirus. This is an approximation of the normal group. Direct proof needs an experiment in a city. The experiment costs almost nothing and will show promising results after about a month.

It is up to the government to implement the idea. The government needs to provide a list of vulnerable conditions and a guideline to help people make their choices, and closely monitor the status of hospitalizations and deaths. No needs for aggressive testing. There are no additional costs for the government. As everyone's choice is voluntary, the program is easy to implement. In a quarantine program, constant vigilance is required about reoccurrence of cases since a single case can destabilize the whole system. The reverse quarantine is error-tolerate since an individual's wrong choice does not have system consequences.

The reverse quarantine is not something from a textbook but a special option based on the characteristics of the coronavirus now. As the virus mutates, the assumptions may no longer be valid, and the window of opportunity may disappear. It is important to take the action quickly. A major risk for the virus to stay around us longer is that the virus may become deadly to kids and healthy adults as the Spanish flu did. Then we will be in a devastating situation and millions of people might die in the United States alone.

The reverse quarantine seems insane at first glance. In the first months, people will see a jump of cases. However, if you look a little further, in two months we are clear and safe. By comparison, the death toll has already surpass 170,000 in the United States for the flattening the curve or social distancing approach, and the death toll will be over 600,000 for two years or even millions if we stay the course. At the system level, the reverse quarantine is a better option.

In today's environment of global economy and international travel, there should be coordinated actions among countries in the world to fight the coronavirus. Travelers from countries with the reverse quarantine program are presumably infected and will go through a mandatory quarantine for 14 days in a country with a quarantine program. Travelers from countries with a quarantine program will be put into mandatory reverse quarantine for two months in a country with the reverse quarantine program. Otherwise, the uninflected travelers will continually fuel the infection process in the normal group and defeat the purpose of the reverse quarantine. Only when it is all clear with the virus, people are truly safe and free to travel around the world.

At this stage of the coronavirus pandemic, it is a better option for the United States to switch from social distancing to the reverse quarantine. Around the world, each country needs to make a clear and quick decision of either quarantine or the reverse quarantine. Working together, we can end the pandemic in about two months. It can save lives and save trillions of dollars to workers and businesses.
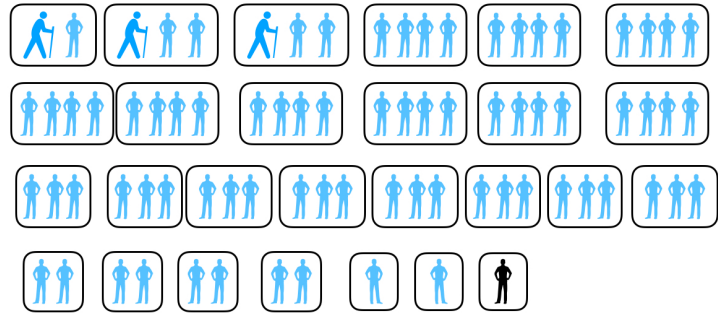
About the author: Dr. Hengning Wu has been an inventor focusing on fundamental ideas since 2000. A fundamental idea may not make immediate sense at first glance, but will make sense on second thought. As Einstein said, for an idea that does not at first seem insane, there is no hope. Dr. Wu does not have any conflicts of interest.
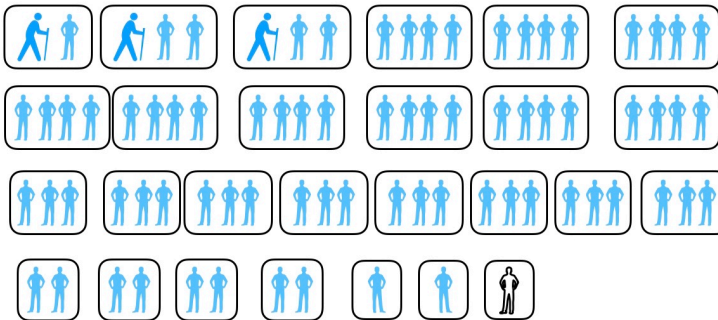
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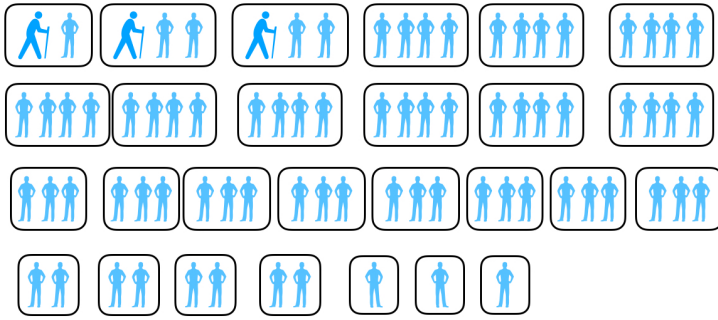
(a) Initial state

(b) One month later

(c) Two months later