

Should the Older Adults Remain in Quarantine as States Relax Stay-at-Home Restrictions?*

by Thomas S. Klitzner, MD-PhD⁺

Many state strategies for relaxing stay-at-home restrictions warn that the elderly should remain isolated because of the high correlation between the risk of dying from Covid-19 and advanced age. Some reports suggest that the coronavirus death rate for people in their 70s is over 6% and may verge on 15% for those older than 80. Not surprisingly, many older adults are afraid to leave their homes.

But the risk of death from Covid-19 in seniors may be greatly overestimated. While all viruses tend to be more severe in older individuals, most deaths among the elderly have been reported in people living in crowded conditions, such as nursing homes and assisted living facilities. The unique characteristics of this population do not allow for extrapolation of these results to the much larger population of older adults living independently.

The statistical phenomenon of clustering occurs in nursing homes and assisted living facilities where the vast majority of deaths in seniors have been reported. Three different factors are present in this population: advanced age, underlying medical conditions, and, perhaps most critically, group living in close quarters. Analyses should be corrected for clustering of these variables, which is not the current practice.

People living or working in close quarters, which also includes places like prisons, cruise ships and meat packing factories, are particularly susceptible to receiving a higher initial viral load. Viral load is simply the number of virus particles in the body's fluids after a person has been infected. Research on other viral infections has found that higher viral loads are associated with more severe illness and worse outcomes. Virus replication within the body is an exponential process, meaning that one viral particle produces more than one new particle when it replicates – often many more. Thus, high viral loads can occur when the virus is spreading unrecognized, as it was in Wuhan or Italy. In this situation, it multiplies unchecked until the viral load is so great that people develop severe disease.

In addition, high viral loads can occur when a large concentration of virus is present in the environment. Someone infected by touching a surface and then rubbing their eyes might have a low initial viral load, while the someone in a densely packed environment is likely to be infected by a much larger number of viral particles.

Officials need accurate information to make sound decisions as stay-at-home orders are relaxed. Older Americans also need good information to make decisions about their own behavior. I'm not suggesting that older people living independently should take unnecessary risks, but I also believe that such folks may be overly fearful at the present time because of the statistics that have been presented to the public.

We need a much more accurate measure of the risk to the elderly, which will require systematically collecting and analyzing this information following validated public health techniques. Such an effort will require testing for Covid-19 in randomly selected populations that include sufficient numbers of Americans from a variety of groups. These should include

people in different age groups and living situations, as well as those with no or various underlying medical conditions. It should also seek to measure how the disease affects folks of different races and socioeconomic status. Perhaps most importantly, the people found to be infected need to be followed for the duration of their illness to determine the severity of their disease.

This effort will require significant funding, but it is certainly not beyond the scope of what public health experts and state and local public health employees are accustomed to doing. There should be no shortage of qualified individuals to carry out such a project. Sadly, it is the lack of adequate testing and incomplete or inaccurate data analysis that has created the dearth of valid information to guide decision making regarding the current Covid-19 pandemic. Whatever the cost in time and funding, the benefits to rational policy making will be significant and the advances in understanding the risks of dying will go a long way to helping the older adults act more wisely.

Background Information

Summary

- Viral particles are not like bullets which if they hit you will cause either suffering or demise. There is a minimum viral load which is required to become infected. Of equal importance, the disease, if contracted, depends on initial viral load and therefore does not necessarily result in severe illness or death.
- The body's immune system contributes to the variation in individual responses to the virus.
- While it is quite likely that the risk of death is higher in older Americans than in other age group, the extreme anxiety created in some seniors by the reports of a high correlation between advanced age and a higher probability of death from Covid-19, is likely the result of deficiencies in statistical analysis.

The Virus

The coronavirus has an outer shell of protein with the familiar spikey configuration we've all seen in television reports. Inside are the genetic instructions (RNA) for reproducing the virus. The spikes allow the virus to attach to cells. The protein shell protects the RNA and facilitates its entry into human cells, where it utilizes the cell's own machinery to produce new virus particles.

Viral Load

Virus replication within the body is exponential. It is well established for other viral infections that higher viral loads are associated with more severe illness and worse outcomes. In addition, there is a minimum initial viral load that is required for the infection to take hold. High viral loads can occur when the virus is spreading unrecognized or when a large concentration of virus is in the environment. This is because an individual's viral load is influenced by the number of particles in their first exposure; more virus particles in the initial exposure results in a higher viral load. This may also explain why the time from infection to symptoms is much shorter in some people than in others.

The Body's Response

The rate of virus growth within its human host is only half the story. The mechanisms the body employs to mount an immune response provides further insight. The human body has two

basic immune response mechanisms, let's call one the first response and the other the reinforcing response. The first response is the same for any infection, wound, chemical exposure or other attack on the body. White blood cells create localized inflammation in the area of an injury or, in the case of an infection, a total-body response that includes fever and malaise.

The first responders may control things for a while, but for viral infections the second-line reinforcements are the key. These white cells are programmed to identify, attack and eradicate the specific virus. When the body has been exposed to the virus in the past (due to a previous infection or immunization), its characteristics are stored in the immune system's "library" of infectious agents. In this case, the new infection triggers a rapid response of ready reinforcements and, consequently, even a high initial viral load can be neutralized before the virus causes serious illness. Because the activity of the first responders continues until the reinforcements begin to gain control of the virus, fever and malaise continue until the viral load subsides and the infection is under control.

But if the virus is unknown to the body, as is the case with the "novel" coronavirus, reinforcements are not at the ready and their arrival is seriously delayed. While the first responders spring into action immediately, it may take 14 days or more for the reinforcements to arrive in sufficient numbers to control the virus. During this period, first responders continue to do their job and promote inflammation. As the viral load increases with exponential replication, inflammation also increases and, in some cases, death and severe disease may be caused by the body's inflammatory response as much as by the virus itself.

The interplay between the time to peak viral load and the time required for the body to generate an adequate immune response may help to explain why some coronavirus infections cause mild to moderate symptoms and others result in severe illness or death. This explanation is consistent with the higher death rates in New York City – with its dense population and reliance on subway transportation; Italy – where recognition of the virus was delayed; and group living situations such as nursing homes and prisons – where the number of virus particles in the environment is high and transmission is facilitated by close contact. In contrast, infections in areas with natural or enforced social distancing are more likely to begin with a lower initial viral load, allowing more time for the body's immune system to respond effectively before the virus itself and the initial inflammatory response get out of control.

Statistical Issues

While current reports suggest that the coronavirus death rate for the elderly may be as high as 15% of infected individuals, antibody data collected in California and New York suggest that the reported rates of death are overestimated. At issue, recent reports indicate that nearly half of the Covid-19 deaths in many states occurred in nursing homes and long-term care facilities, but current statistical analysis of causal determinants of death from coronavirus ignore the clustering of risk factors that occur these facilities.

Since advanced age, co-morbid conditions, and group living in close quarters are all present in nursing homes and assisted living facilities, valid statistical analysis must account for clustering of these variables. In all likelihood, this will reveal that the high apparent death rate in older Americans is affected by the preponderance of testing performed in group living facilities and does not reflect the rate of death in older adults living independently, which is undoubtedly lower.

+About the Author: Thomas S. Klitzner, MD-PhD was the inaugural Jack H. Skirball Professor of Pediatrics and Executive Vice-Chair of the Department of Pediatrics at the David Geffen School of Medicine at UCLA. He retired in 2016 but remains an active researcher in the area of public health, and a national expert in chronic diseases in children.

***Authors Note:** This opinion piece was written to help older Americans understand their risk of dying from Covid-19. It is accompanied by background material I used to form this opinion. While this writing discusses deaths in nursing homes, it is not intended to provide advice to those visiting nursing homes, but rather to help them, their loved ones and the nursing homes make more fully informed decisions about the risk of death from Covid-19.