

Science You Can Use

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Dear Science: My cousin told me that President Trump's event at Mt. Rushmore will likely kill thousands of people because of COVID-19 infections. Is this true? -- Buck R.

Dear Buck: The short answer to your question is that between 1 and 18,000 people will likely die from COVID-19 because they attended the Rushmore event, depending on how many people attended the event, how many people were infected at the time they arrived at the event, how fast the infection can spread from person to person in that setting, what the attendees did when they returned to their home communities, what those communities did to help contain the spread of the disease, and how we attribute responsibility through the chain of infections that began with the Rushmore event, among other things.

Here's a more detailed answer.

On the surface, based on the things we need to know to get a precise answer, it might seem that we could not collect enough information to determine how many people will likely die from COVID-19 infections. We can, however, make good assumptions about specific best- and worst-case scenarios. Based on those scenarios, we can estimate the number of deaths that will likely result from each.

Basic Assumptions. For both the best and worst cases, let's assume the following, based on widely accepted data:

- About 7,500 people attended the event. This is approximately the number of tickets collected at the gate to the event.
- About one percent (or 75) of the people who arrived at the gate were already infectious, i.e., could transmit the disease to others. One percent is national average COVID-19 infection rate in the US, as of 6 July 2020.
- About three percent of those who are infected will die. This is the US national average death rate for those who are infected by COVID-19, as of 6 July 2020).
- No anti-COVID-19 drug or vaccine is available.

Best case scenario. Assume the Basic Assumptions and that each of those who were already infected by the time they arrived infected only one other person at the event. As a consequence, 75 newly infected people depart the event and return to their home communities. Suppose those newly infected individuals infected no one else -- a highly unrealistic assumption.

Best case conclusion. The total likely number of COVID-19 deaths attributable to attendance at the Rushmore event would be about one person.

Worst case scenario. Using the Basic Assumptions, some arithmetic, and assuming that:

- Each of the those who were infected at the time they arrived at the gate to the event infected two other persons there. As a consequence, 150 newly infected people departed the event.
- Those 150 people infect others on return to their home communities. These, in turn, infect others, and so on, for several months.
- The time to double the number of infected people in the attendees' home communities is two weeks. The time it takes to double the number of people infected by a given disease in a given population is called the *doubling time* of that disease in that population. As of 6 July 2020, North Carolina and Arizona each had an infection doubling time of two weeks.

Worst case scenario conclusion. Nine of the people who are infected within the first two weeks after the Rushmore event will likely die because of the chain of infections that began at that event. 300 of those who are infected by the chain within the first three months after the event will likely die. And 18,000 of those people who were infected by the chain within the first six months after the event will likely die. 18,000 deaths is equivalent to 15% of the total number of COVID-19 deaths in the US as of 6 July 2020.

Summary of both scenarios. Within six months after the Rushmore event, 1 – 18,000 deaths could be attributed to the chain of infections that began at that event. If the event had not occurred, none of those particular deaths would have occurred.

Would wearing masks at the event have helped? Most COVID-19 infection is transmitted by respiratory droplets. So-called N95 masks can theoretically block 95% of the transmission by airborne respiratory droplets, but they are primarily used by healthcare workers and first responders. Simple cloth masks (e.g., a cloth bandana) can block 50% to 80% of airborne respiratory droplets. For practical purposes, this means that if everyone wore cloth masks while in public, we could at least halve the number of deaths caused by public airborne COVID-19 transmission.

Politics. COVID-19 is an equal-opportunity killer. It doesn't care about your personal views.

What you can do. Wear your mask every time you leave your house and while you have visitors in your house. Wherever possible, distance yourself from others at least 6 feet, and avoid gatherings of more than 10 people, until we have a safe and effective vaccine for the COVID-19 virus. With some luck, such a vaccine could be available about a year from now.

For further information, see <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/prevention.html>.

Jack Horner is a systems engineer. Thanks to Clancey Maloney, John Symons, and Larry Platt for discussions about this topic.