

Scientist  
CDC  
1600 Clifton Rd.  
Atlanta, GA 30329

November 2, 2020

Student  
P.O. Box 400135  
University of Virginia  
Charlottesville, VA 22904

Dear student,

I am writing to request your assistance with a data analysis project on which I am currently working. I am a scientist at the CDC, and I am currently working on a report about the spread of coronavirus in the Southeastern United States. I have loosely defined the Southeastern United States to be a thirteen state region including (alphabetically) Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, Missouri, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia. I am curious whether states with mask mandates tend to have fewer cases per capita, and, in turn, whether states with fewer cases per capita tend to have lower death rates.

For data, I have copied from CDC records the total number of cases and the total number of deaths in each state as of October 27, 2020. I calculated the percentage of cases in each state resulting in death by dividing the total number of deaths by the total number of cases in each state. Using the Census Bureau's 2019 estimate for each state's population, I was also able to calculate the number of cases per 1,000 people in each state. Finally, from public records, I listed the date on which each state began enforcing its mask mandate if such a mandate exists. You may find the data table on the next page of this letter.

Given the small sample size of just thirteen states, I am having difficulty identifying the appropriate statistical methodology for my data analysis. This is where I need your assistance. I need you to analyze the data to answer the following questions for my report.

- First, do states with a mask mandate tend to have fewer total cases per 1,000 people? I hypothesize that the answer to this question will be yes, as masks are believed to reduce the spread of coronavirus.
- Second, do states with a lower number of cases per 1,000 people also have a lower death rate? I again hypothesize that the answer to this question will be yes. If there are fewer cases per 1,000 people, I believe that there will be a lesser strain on medical resources, resulting in a lower death rate.

I recognize that the results of this analysis will only suggest the strength of association between statewide mask mandates, the prevalence of coronavirus cases, and the probability of such a case resulting in death. Correlation does not imply causation after all, so the results of this analysis will not be used to justify any pro- or anti-mask mandate opinions; I hope that your judgement will also not be clouded one way or another by any results of this analysis. Coronavirus is a complex disease, and there are a number of factors not considered by this analysis that affect its spread within a state and the probability of a case resulting in death, such as the prevalence of preexisting conditions and the quality of medical care, among others.

I would like you to present and interpret your analysis results in a report and sent this to me. I would also greatly appreciate if you could explain the methods used to obtain these results for my understanding. Please return the report no later than Tuesday, December 1, at 11:59 pm.

Sincerely,

Scientist  
CDC

	<b>Total Cases as of 10/27</b>	<b>Total Deaths as of 10/27</b>	<b>Death Rate (%)</b>	<b>2019 Population Estimate</b>	<b>Cases per 1,000 People</b>	<b>Mask Mandate Start Date</b>
Alabama	186,437	2,892	1.55	4,903,185	38.02	July 16
Arkansas	107,679	1,857	1.72	3,017,804	35.68	July 20
Florida	776,215	16,505	2.13	21,477,737	36.14	<i>None</i>
Georgia	353,372	7,844	2.22	10,617,423	33.28	<i>None</i>
Kentucky	99,637	1,428	1.43	4,467,673	22.30	July 9
Louisiana	184,724	5,872	3.18	4,648,794	39.74	July 11
Mississippi	117,617	3,302	2.81	2,976,149	39.52	<i>None</i>
Missouri	172,717	2,838	1.64	6,137,428	28.14	<i>None</i>
North Carolina	263,883	4,211	1.60	10,488,084	25.16	June 24
South Carolina	172,579	3,842	2.23	5,148,714	33.52	<i>None</i>
Tennessee	251,774	3,207	1.27	6,829,174	36.87	<i>None</i>
Virginia	176,754	3,616	2.05	8,535,519	20.71	May 26
West Virginia	22,706	432	1.90	1,792,147	12.67	July 6