

Exam I

Administered: Wednesday, September 14, 2020

20 points

For each problem part: 0 points if not attempted or no work shown,
 1 point for partial credit, if work is shown,
 2 points for correct numerical value of solution

All 95 counties of Tennessee have experienced some COVID-19 cases. In the Excel data file on the course website, you will find the following data for all 95 counties. A small sample of the data is shown below.

County	Cases	Deaths	Population	Death/Cases	Income	% white
Anderson	1237	10	76978	0.008084	52585	91.7
Bedford	2345	28	49713	0.01194	34946	87
Benton	1770	43	16160	0.024294	30193	94.7
...
White	2289	26	27345	0.011359	34863	95.5
Williamson	1918	13	238412	0.006778	51914	88.7
Wilson	2104	21	144657	0.009981	43314	88.6

The columns are defined as follows.

Cases	definition:	total confirmed positive cases of COVID-19 per 100,000 in county as of 09/08/20
	source:	https://www.nytimes.com/interactive/2020/us/tennessee-coronavirus-cases.html#county
Deaths	definition:	total confirmed deaths due to COVID-19 per 100,000 in county as of 09/08/20
	source:	https://www.nytimes.com/interactive/2020/us/tennessee-coronavirus-cases.html#county
Population	definition:	county population
	source:	https://www.tennessee-demographics.com/counties_by_population
Death/Case	definition:	calculated as the ratio of deaths to cases above
	source:	https://www.nytimes.com/interactive/2020/us/tennessee-coronavirus-cases.html#county
Income	definition:	median household income
	source:	https://en.wikipedia.org/wiki/List_of_Tennessee_locations_by_per_capita_income
% white	definition:	percentage of the population who report as white
	source:	https://www.indexmundi.com/facts/united-states/quick-facts/tennessee/white-population-percentage#table

Based on this data, answer the following questions.

- What is the mean value of the number of cases per 100,000 in a county?
- What is the mean value of the number of deaths per 100,000 in a county?
- What is the standard deviation of the number of cases per 100,000 in a county?
- What is the correlation coefficient between the number of cases in a county and its population? Based on this answer, do urban (high population) or rural (low population) counties experience more cases on a per capita basis?
- What is the correlation coefficient between the number of cases and deaths? Interpret this correlation.
- What is the correlation coefficient between county population and income? Interpret this correlation.
- What is the correlation coefficient between county population and the percent of the population that is white? Based on this correlation, are urban (high population) or rural (low population) counties more diverse?
- What is the correlation coefficient between deaths and the percent of the population that is white? Based on this correlation, does this support the reported observation that communities of color are more impacted by Covid-19?
- What is the correlation coefficient between income and the percent of the population that is white? Carefully interpret this correlation, keeping in mind the correlations calculated in parts (f) and (g).
- Do masks reduce the likelihood of transmitting Covid-19?