Smoking and stroke prevalence across the United States

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An important public health issue is the prevalence of tobacco. Cigarette smoking is associated with various health risks. Research has shown that smoking leads to an increased risk of stroke by three to fourfold (Shah 2010). My hypothesis is that this relationship is nonlinear, and that other risk factors or geographic factors may be shaping it.

Role of GIS
Compile and present spatial information on smoking and stroke rates using a bivariate choropleth map, using data downloaded from Data Planet.

Findings
The bivariate choropleth map shown in Figure 1, which was produced with ArcGIS, displays the relationship between the stroke rate and the smoking rate for adults in 2015 across the United States. This relationship seems to be nonlinear. There are states, such as Texas and other states in the Midwest, with high rates of smoking but low rates of stroke.

What could be driving the nonlinearity?
1) There are other risk factors aside from smoking associated with lifestyle. For example, sleeping habits, eating habits, exposure to stress, etc. For example, obesity seems to be positively related to the rate of stroke. Figure 2 shows the map relating both variables, and while the north of the US displays a low-low stroke-smoking relationship, the south displays higher rates of obesity and stroke.

2) Weather conditions in different locations may also affect the relationship between smoking and stroke. For instance, the South exhibits a warmer climate, at times with extreme temperatures, that may lead to higher rates of stroke even with low rates of smoking.

Conclusions and Further Work
The relationship between stroke and smoking seems to be nonlinear. Moving forward I will explore the role of other variables affecting the risk of stroke aside from smoking. Even for smoking, I will consider both extensive and intensive margins. I will also explore variation not only at the state level, but also at the county level.

References