Sampling and Proportions

1. Because it would take too much time and money to ask every single household in Puerto Rico, the group of researchers that conducted the "Mortality in Puerto Rico After Hurricane Maria" study, supported by the School of Public Health at Harvard University, instead took a sample of 3,299 households carefully chosen to include people in cities as well as more remote places. They found that 38 people had died in the households from all causes in the 102 days since the hurricanes, and that 9,522 total people lived in those households. What is the proportion of deaths according to this survey?

2. If we assume there was the same proportion of deaths as found from this sample for all of Puerto Rico, and there are approximately 3 million people in Puerto Rico, how many deaths would we predict from all causes for the entire territory over this time period?

3. The number calculated above is deaths from all causes. We want to know how many of those deaths might have been caused by the hurricanes, over and above the usual number of deaths. The researchers used the previous year for comparison. In 2016, the death rate from all causes for the entire year was 8.82 deaths per 1,000 people. If that death rate had continued, how many deaths would be predicted for 2017, if the population of Puerto Rico was approximately 3 million?

4. Using your result from the previous question that used 2016 data, calculate how many deaths would be predicted to occur from all causes in a 102-day period, rather than the entire 365-day year.

5. Compare the number of deaths estimated to occur in the 102-day period (September 20 to December 31, 2017) from the survey results and the number of deaths predicted to occur over a 102-day period from 2016 data. How many "excess deaths" are estimated to have occurred after the hurricanes? This is, approximately, the number published by the researchers.