Practice Assignment: Sample Size for Proportions

1) Recall that the formula $E = z^* \cdot (standard\ error) = z^* \cdot \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$ used to find a margin of error, E, requires a large, random sample.

For each of the following combinations of n and $\hat{p}$, determine whether it is appropriate to use the formula above. Assume the sample is a random sample and less than 10% of the population.

n	$\hat{p}$	**Appropriate? (Yes or no)**
50	0.3	
50	0.05	
15	0.45	
100	0.01	
40	0.25	
80	0.25	

Use technology to calculate the minimum sample size needed to achieve the desired margin of error.

2) A political pollster wants to know what proportion of U.S. adults support a proposed amendment to the Constitution. The pollster will use a confidence level of 95% and wants a margin of error of 4%.

3) The health center at a college is trying to estimate what proportion of students are experiencing depression or anxiety. The health center will use a confidence level of 95% and a margin of error of 5%. Prior research shows that the prevalence of mental illness in college students is about 15.3%.

4) A dietician wants to know what percentage of the people in her community consume

more than 50 grams of sugar in their daily diets. The dietician will use a confidence level of 95% and wants a margin of error of 8%.

5) The quality control officer at a chemical plant wants to know what proportion of the chemicals produced contain some kind of impurity. Company guidelines require a 99% confidence level and a margin of error of 2%. Past audits have found impurities in 5% of the chemicals.

6) A public health official responding to an outbreak of measles needs to estimate the vaccination rate in the community. The official will use a confidence interval of 95% and a margin of error of 2%, but they do not have an estimate for the population proportion.

7) The following is an example of a meaningful paragraph that includes the terms "population," "sample," "data," and "variable."

Recently, psychologists have discovered a link between heart disease and depression. Researchers studied a sample of 100 adults, drawn from a population of 6,000. Each participant contributed two pieces of information: presence of heart disease and level of depression. Researchers also assessed additional variables such as race, gender, and age. The findings indicated that people with heart disease were more likely to suffer from depression.[1]

Choose a context that is interesting to you and use that context to write a "meaningful" paragraph that demonstrates the meanings of the words "sample," "population," "point estimate," and "margin of error." Do not define the terms, but use your paragraph to show that you know what each term means and how they relate to each other.

[1] Holmes, K. Y. (2011, December 28). *Tips for incorporating writing into an introductory statistics course*. Association for Psychological Science. https://www.psychologicalscience.org/observer/tips-for

incorporating-writing-into-an-introductory-statistics-course