

# AP Statistics

## Chapter 7: Sampling Distributions

Day 2

HW: Finish Practice Worksheet

### Example

Suppose that 70% of all dialysis patients will survive for at least 5 years. In a SRS of 100 new dialysis patients, what is the probability that the proportion surviving for at least 5 years will exceed 80%?

$$\hat{p} = .70$$

$$\sigma_{\hat{p}} = \sqrt{\frac{(.70)(.30)}{100}} = .046$$

$$P(x > .80)$$

$$Z = \frac{.80 - .70}{.046} = 2.17$$

$$P(Z > 2.17) = 1 - .9850 = .015$$

10% condition

$$100 \leq \frac{1}{10} N$$

$$1000 \leq N$$

\*we can assume that there are at least 1000 dialysis patients

Normal condition

$$100(.70) \geq 10$$

$$70 \geq 10$$

$$100(.30) \geq 10$$

$$30 \geq 10$$

## Example

It is estimated that 48% of all motorists use their seat belts every time they drive. If a police officer observes 400 cars go by in a hour, what is the probability that the proportion of drivers wearing seat belts is between 45% and 55%?

$$\hat{p} = .48$$

$$\sigma_{\hat{p}} = \sqrt{\frac{.48(.52)}{400}} = .025$$

$$P(.45 < x < .55)$$

$$Z = \frac{.45 - .48}{.025} = -1.2$$

$$Z = \frac{.55 - .48}{.025} = 2.8 \rightarrow P(-1.2 < Z < 2.8) = .9974 - .1151 = \boxed{.8823}$$

10% condition

$$400 \leq \frac{1}{10} N$$

$$4000 \leq N$$

\* We can assume there are at least 4000 motorists.

Normal Condition

$$400(.48) \geq 10$$

$$192 \geq 10$$

$$400(.52) \geq 10$$

$$208 \geq 10$$