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## Lecture 3h: Practice Problem Solutions

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## Practice Problems

1. In a study of patients hospitalized after myocardial infarction and treated with streptokinase, 2 of 15 patients died within 12 months.
  - a) Calculate by hand an approximate 95% CI for the one-year mortality rate (proportion) using the CLT based approach.

– Here  $\hat{p} = \frac{2}{15} \approx 0.13$ . Using the formula  $\hat{p} \pm 2 \times \sqrt{\frac{\hat{p} \times (1 - \hat{p})}{n}}$

– yields:  $0.13 \pm 2 \times \sqrt{\frac{0.13 \times .87}{15}} \rightarrow 0.13 \pm 2 \times 0.087 \rightarrow$   
 $(-0.04, 0.30)$  or  $(-4\%, 30\%)$ .

# Practice Problems

1. In a study of patients hospitalized after myocardial infarction and treated with streptokinase, 2 of 15 patients died within 12 months.
  - b) How does the interval in part a compare to the exact interval estimated by Stata?

```
cii 15 2
```

Variable	Obs	Mean	Std. Err.	-- Binomial Exact -- [95% Conf. Interval]	
	15	.1333333	.0877707	.0165759	.4046027

The exact interval is quite different than the one using the CLT based approach - here is an example of a “small sample” binary situation.

## Practice Problems

2. Devise a one sentence “recipe” for calculating an approximate 95% CI for a parameter, whether it be a proportion or a mean (assume a large sample) using results from a single random sample.

– The recipe has consistently been:

“sample estimate  $\pm 2 \times S\hat{E}(\textit{sample estimate})$ ”  
(of parameter)