JOHNS HOPKINS
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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

                                                         -- Binomial Exact --
    Variable |        Obs        Mean    Std. Err.       [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 $\pm 2 \times \hat{SE}(sample\ estimate)$"
     (of parameter)