

STAT 450 Lecture 1
Fall 2018
5 September 2018

- We covered slides on “Overview”.
- We discussed the 1954 Salk Polio Vaccine trials
- On Monday we will start the slides on “Distribution Theory”.
- I am working on material in Chapters 2.1, 4.1 and 4.6 in the text.
- Next class I will be trying to get to the end of slide 20.
- You should be reviewing Chapters 1 through 4 and reading particularly 2.1, 4.1 and 4.6.
- The first assignment is posted. Question 1 is to be emailed to me by noon this coming Sunday, 9 September. The remaining questions are due Monday 17 September in class.
- Handwritten slides.
- Some polio details.
 - Two experiments run
 - Experiment A: Consent sought from Grade 2s.
 - Consenters receive vaccine.
 - Grade 1 and 3 serve as controls.
 - Results on non-consenters recorded.
 - Experiment B: Consent sought from all.
 - Consenters randomly assigned 50/50 to Vaccine or Placebo.
 - Total sample sizes: 1,080,000 and 750,000 (including non-consenters).
 - Polio is contagious, hard to diagnose.
 - Experiment B is double blind.
- I should have made students think about how to analyze the results before seeing the results.
- This is important for *reproducibility*.
- In Expt B we had $n_T = 201,000$ vaccinated and $n_c = 201,000$ given placebo.
- Important to introduce *notation*.
- Let T and C be the numbers of cases in the two groups.

- Suggested *model* for T is $\text{Binomial}(n_T, p_T)$; for C $\text{Binomial}(n_C, p_C)$.
- To see if the drug works test $H_o : p_T = p_C$.
- Alternative of interest is *one-sided*.
- I criticized Binomial assumption; children not independent because polio is contagious.
- Nice suggestion from student last year: think of T as sum over schools not sum over students. Base test on averages – paired comparisons I guess.
- Second strategy. If vaccine is useless then all students who got polio in experiment would have got it anyway.
- So given $T+C$ the number of cases in the control group would be Binomial with $p = 1/2$ and $n = T + C$ (because of the randomization).