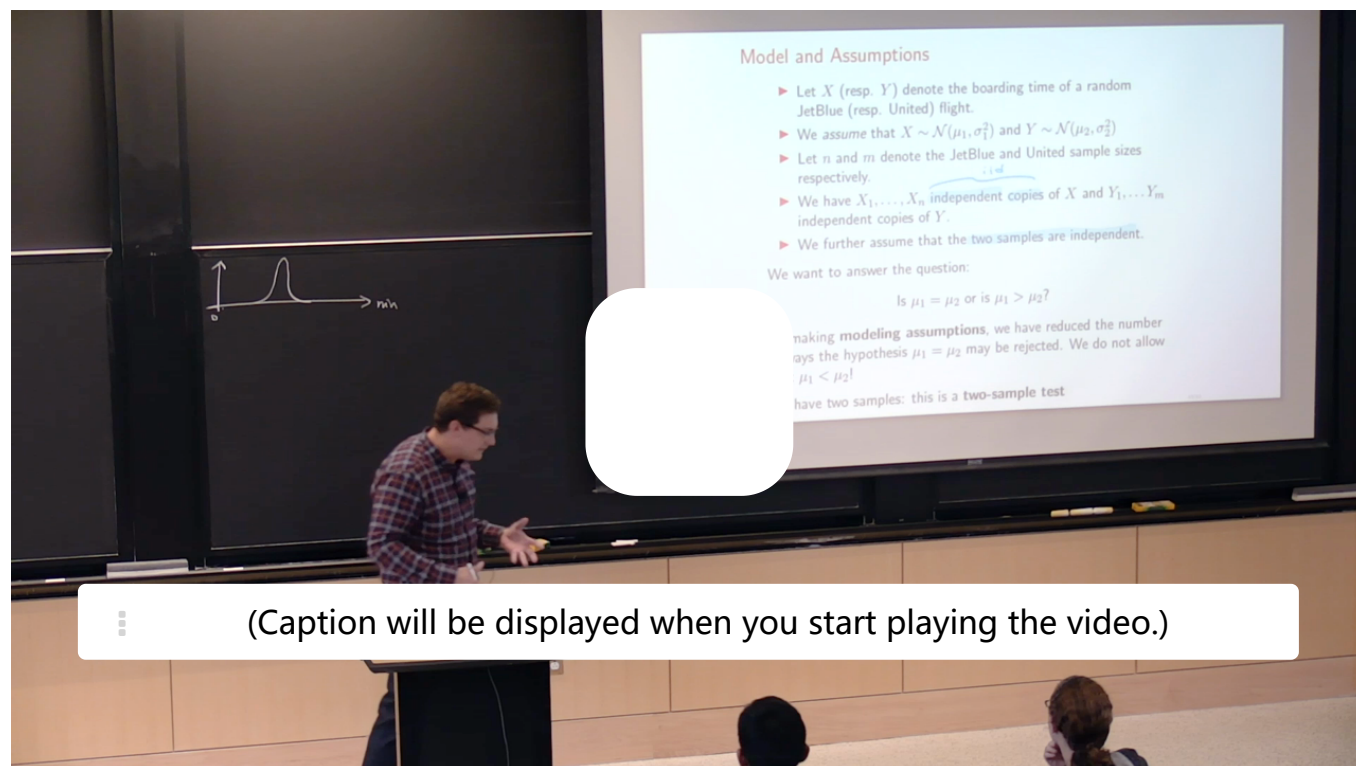


## 4. Introduction to Hypothesis Testing 3

### Comparing Two Boarding Methods: Hypothesis

[Start of transcript. Skip to the end.](#)

So now what we're doing is-- remember when we did this modeling, when we did the entire modeling, we were trying to say, well, there's all these probability distributions that may have generated data. First, we're going to reduce it to a parametric family. Now, we're actually referencing, oh, among

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## Modeling Clinical Trials II

2/2 points (graded)

Let's use the same statistical set-up as in an earlier question. Recall that  $X_i$  denotes the **number of coughs per hour** for individual  $i$  in the treatment group, and  $Y_i$  denotes the number of coughs per hour for individual  $i$  in the control group. Assume the distributions on coughs per hour to be  $X_1, \dots, X_n \sim \text{Poiss}(\mu_{\text{drug}})$  for the treatment group and  $Y_1, \dots, Y_n \sim \text{Poiss}(\mu_{\text{control}})$  for the control group.

What is(are) the unknown parameter(s) in this example?

- ☐ Only  $\mu_{\text{drug}}$
- ☐ Only  $\mu_{\text{control}}$
- ☒ Both  $\mu_{\text{drug}}$  and  $\mu_{\text{control}}$  ✓
- ☐ Neither  $\mu_{\text{drug}}$  nor  $\mu_{\text{control}}$

Which of the following statement about the efficacy of the cold remedy corresponds to  $\mu_{\text{drug}} < \mu_{\text{control}}$ ?

- ☐ This drug is less effective than the placebo.
- ☒ This drug is more effective than the placebo. ✓

☐ This cold remedy is more effective than the most commonly used one in the US

☐ None of the above

Solution:

Consider the first question. Since a priori (*i.e.*, before running the clinical trial), we do not know what the true mean of the control group or treatment group will be, this implies that  $\mu_{\text{drug}}$  and  $\mu_{\text{control}}$  are unknown parameters. Since there are two unknown parameter corresponding to two *different* samples, this is an example of a **two-sample hypothesis test** .

Now consider the second question. We examine the choices in order.

- "This drug is more effective than the placebo." is correct. If we knew the true parameters  $\mu_{\text{control}}$  and  $\mu_{\text{drug}}$ , we could just compare their values to determine if the drug was more effective than the placebo. And if  $\mu_{\text{drug}} < \mu_{\text{control}}$ , this implies that the number of coughs per hour is lower when the drug is administered vs. the placebo. Thus, it is reasonable to conclude that the drug is more effective than the placebo.  
  
**Remark:** In actual clinical trials, we do not have access to the true parameters, which is why we need to employ the methods of hypothesis testing to determine whether the treatment or placebo is more effective.
- "This drug is less effective than the placebo." is incorrect. See the explanation of the previous choice to understand why this is not a reasonable interpretation.
- "This cold remedy is more effective than the most commonly used one in the US" is incorrect. We have only compared this drug to the placebo, not to any other drug. Thus this is not a reasonable conclusion.

提交

你已经尝试了1次（总共可以尝试2次）

**i** Answers are displayed within the problem

讨论

显示讨论

主题： Unit 2 Foundation of Inference:Lecture 6: Introduction to Hypothesis Testing, and Type 1 and Type 2 Errors / 4. Introduction to Hypothesis Testing 3

认证证书是什么？