

# Lecture 27: Chapter 10, Sections 2-3

## Inference for Quantitative Variable

### Hypothesis Test with $t$

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- Compare  $z$  and  $t$ ;  $t$  Test with Software
- How Large is “Large”  $t$ ?
- $t$  Test with Small  $n$
- What Leads to Rejecting  $H_0$ ; Errors, Multiple Tests
- Relating Confidence Interval and Test Results

# Looking Back: *Review*

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## □ 4 Stages of Statistics

- Data Production (discussed in Lectures 1-4)
- Displaying and Summarizing (Lectures 5-12)
- Probability (discussed in Lectures 13-20)
- Statistical Inference
  - 1 categorical (discussed in Lectures 21-23)
  - 1 quantitative:  $z$  CI,  $z$  test,  $t$  CI,  $t$  test
  - categorical and quantitative
  - 2 categorical
  - 2 quantitative

## Standardizing Sample Mean to $t$ (Review)

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For random sample of size  $n$  from population with mean  $\mu$ , standard deviation  $\sigma$ , sample mean  $\bar{X}$  has

- mean  $\mu$
  - s.d.  $\frac{\sigma}{\sqrt{n}}$  (may have to substitute  $s$  for  $\sigma$ )
  - shape approximately normal for large enough  $n$
- For  $\sigma$  unknown and  $n$  small,  $\frac{\bar{x} - \mu}{s/\sqrt{n}} = t$
- $t$  (like  $z$ ) centered at 0, symmetric, bell-shaped
  - $t$  has  $n-1$  df (spread depends on  $n$ )