\[ y_i = \theta + b + e_i \]

\[ \uparrow \quad \uparrow \quad \text{random error} \quad \uparrow \]

\[ (+ i = 1, \ldots, n) \]

\[ (e_i | \sigma^2) \sim \text{IID } N(0, \sigma^2) \]

\[ \theta + b \sim N(0, \sigma^2) \]

\[ E(e_i) = 0 \]

\[ \sigma = 0.15 \]

\[ E(\varepsilon) = \]

\[ E(\theta + b + e_i) \]

\[ = \theta + b + E(e_i) \]

\[ = \theta + b = 5.1 + 0 + 0 \]

\[ \sqrt{V(\varepsilon_i)} = \sigma \]

\[ V(\varepsilon_i) = V(\theta + b + e_i) \]

\[ = V(e_i) = \sigma^2 \]
all British adult hypertensive patients

population

sample

representative

hypothesis

like IID

repeated

simple

possible

\[ D = 18.6 \]

\[ \bar{d} = 17.1 \]

\[ h = 12 \]

\[ n = 12 \]

mean \( \bar{d} = 18.6 \)

SD \( \sigma_d = 10.1 \)

\[ E(\bar{d}) = \Delta \]

sample hist.

\[ V(\bar{d}) = \frac{\sigma_d^2}{n} \]

\[ \text{estimated SD(\( \bar{d} \))} = \sqrt{V(\bar{d})} \]

\[ \text{estimated SD(\( \bar{d} \))} = \sqrt{\frac{\sigma_d^2}{n}} \]

\[ \text{estimated SD(\( \bar{d} \))} = \frac{\sigma_d}{\sqrt{n}} \]

\[ \text{estimated SD(\( \bar{d} \))} = \frac{10.1}{\sqrt{12}} \approx 2.82 \text{ mm Hg} \]

t distribution
Confidence Intervals

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.96 * σ</td>
<td>2.92</td>
</tr>
<tr>
<td>z</td>
<td>1.5</td>
</tr>
<tr>
<td>p</td>
<td>0.025</td>
</tr>
<tr>
<td>t</td>
<td>2.962</td>
</tr>
</tbody>
</table>

For C:

- SE (p) = 2.92
- 99.9% CI

- Lower Bound: 0.05
- Upper Bound: 0.21

The population mean is likely to be bracketed by

The significance level is 0.025.

Significance level is valid for non-central t.

Significant at 0.025.