BodyTemp 50

$$H_0 : \mu = 98.6, \qquad H_a : \mu \neq 98.6$$

generated many randomization samples

- resamples from original data $(n = 50)$
- did with replacement
- for each resample calculated a mean

$$\overline{x} = \text{resample of size } 50$$

Goal: simulate the null dist.
       want it centred at 98.6
       has roughly the SE as its std. dev.

If we had wanted to get a 95% CI for μ :

manyMeans = do(5000) * mean($\sim$ BodyTemp, data = resample(BodyTemp50))
       + 0.34

has a distribution roughly normal, s.d. is approx. SE_{mean}

- <u>Usual construction</u> (adapted to our simulation) $\dfrac{s}{\sqrt{n}}$

$$(\text{pt est.}) \pm (\text{margin of error})$$

$$\underset{\text{orig. sample mean}}{\overline{x}} \pm (t^{*}_{0.025})(\underset{\substack{\text{our sim.} \\ \text{distribution}}}{\text{s.d of}}) = 98.26$$

$$\text{margin of error} = \left(\text{critical } t \text{ or } z\text{-value} \right) * \left(SE \right)$$

chosen for
level of conf.

$$\text{Var}(aX + b) = \text{Var}(aX) = a^2 \text{Var}(X),$$

For a 95% CI constructed in (roughly) usual way

$$98.26 \quad \pm \quad \underbrace{(2.0096)}_{\substack{q \\ t^*_{0.025}}}(0.1063)$$

- another way:

  Find 2.5, 97.5 - percentiles in my $\underline{\text{simulated distribution}}$

  (not re-centered on 98.6)

  cdata ($\sim$ many Means)   defaults to finding those percentiles

$$\text{Site EUI} = \frac{\text{total energy used on site}}{\text{square footage}} \quad - \begin{array}{l}\text{numerator} \\ \text{is measurable}\end{array}$$

$$\text{Source EUI} = \frac{\text{energy generated somewhere and used in bldg}}{\text{sq. footage}}$$

Compare weighted mean $\left(\text{like } \overset{\text{Exercise}}{4.13}, \text{ w/ weights GSF} \right)$
for 2 classes of bldgs: LEED, nonLEED

$$\underbrace{\overline{X}_{w,\,nonlead} - \overline{X}_{w,\,lead}}_{\text{our test statistic}} = \text{pt. estimate for a true mean difference}$$

$$\mu_{nonlead} - \mu_{lead}$$