

# NOTATION

**For Sampling  
Distributions**

Mean

Proportion

Standard

Deviation

**POPULATION**

$\mu$

$p$

$\sigma$

**SAMPLE**

$\bar{x}$

$\hat{p}$

$s$

# SAMPLING DISTRIBUTIONS FOR PROPORTIONS ( $\hat{p}$ )

Mean

$$\mu_{\hat{p}} = p$$

Standard  
Deviation

$$\sigma_{\hat{p}} = \sqrt{\frac{p(1-p)}{n}}$$



NORMAL IF...

Large Counts Condition

$$np \geq 10$$

$$n(1-p) \geq 10$$

10%  
Condition

$$n \leq \frac{1}{10} N$$

# SAMPLING DISTRIBUTIONS

## FOR MEANS ( $\bar{x}$ )

Mean

$$\mu_{\bar{x}} = \mu$$

Standard  
Deviation

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

CHECK 1ST

NORMAL IF...

Central Limit Theorem

$n > 30$  OR ( Population is Normal )

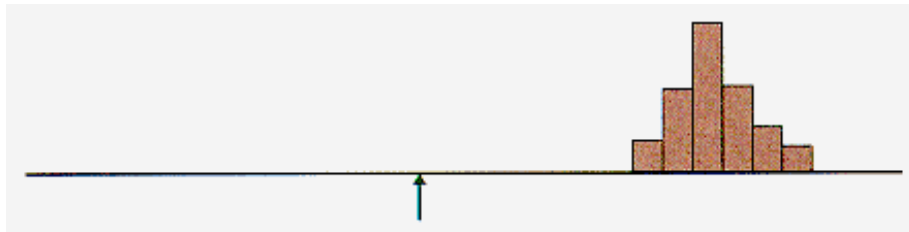
10%

Condition

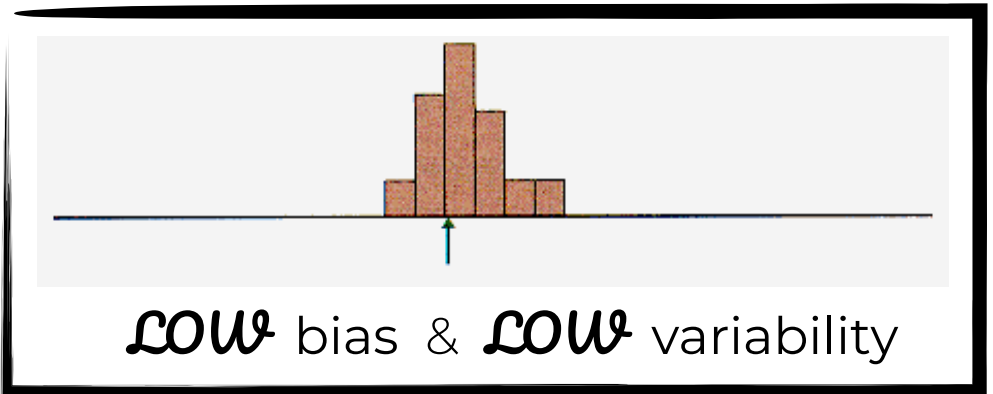
$$n \leq \frac{1}{10} N$$

# Unbiased Estimators

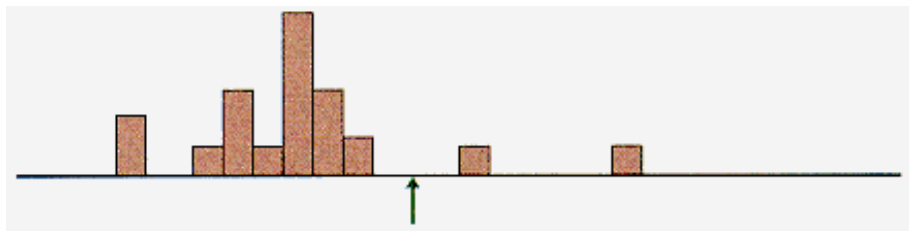
*LOW* bias & *LOW* variability



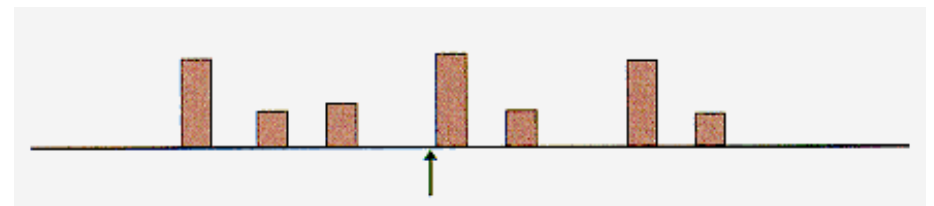
*HIGH* bias & *LOW* variability



*LOW* bias & *LOW* variability



*HIGH* bias & *HIGH* variability



*LOW* bias & *HIGH* variability