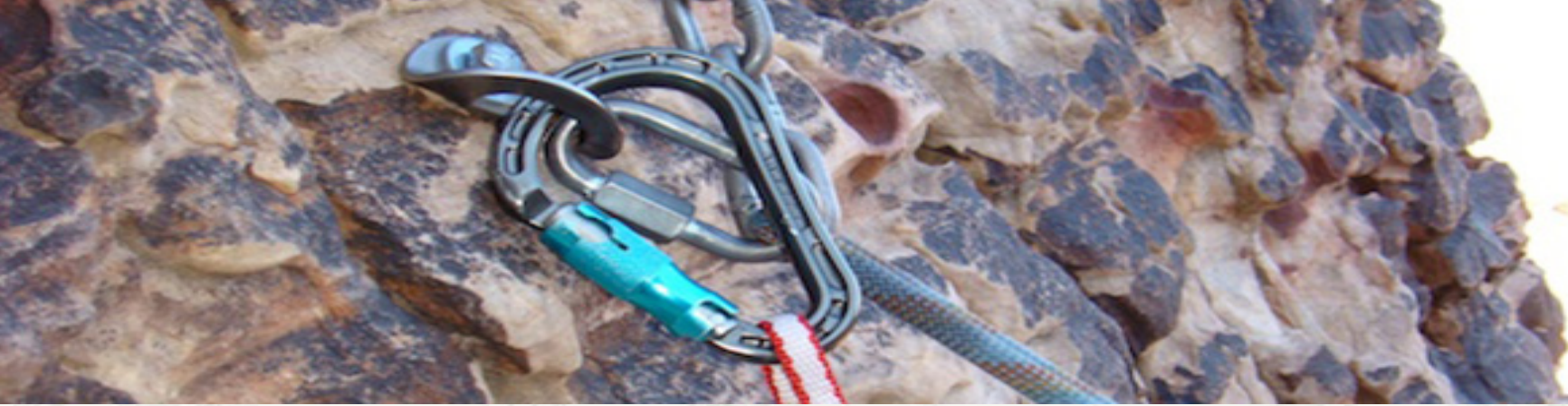

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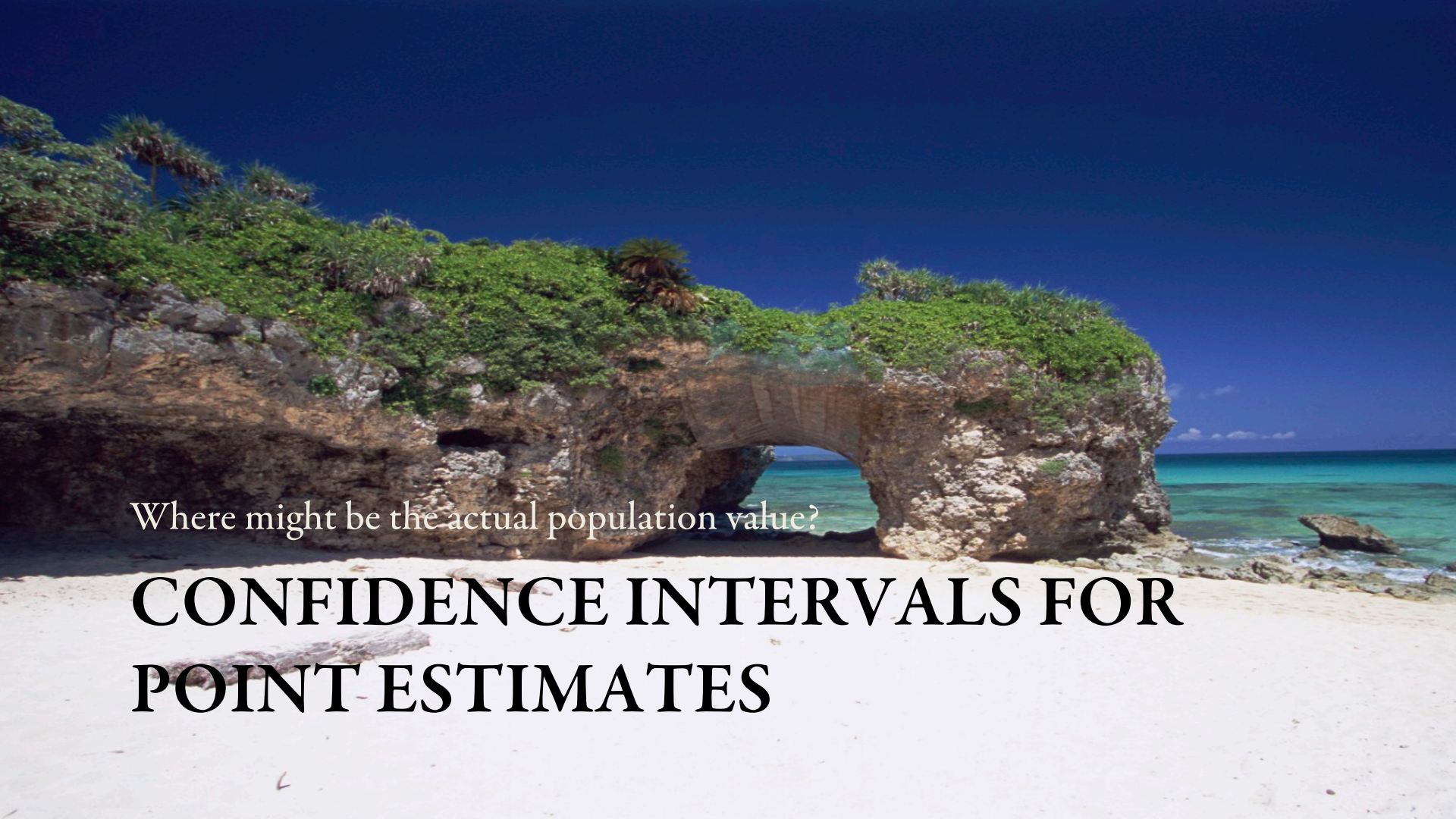
Statistical Interval Estimates

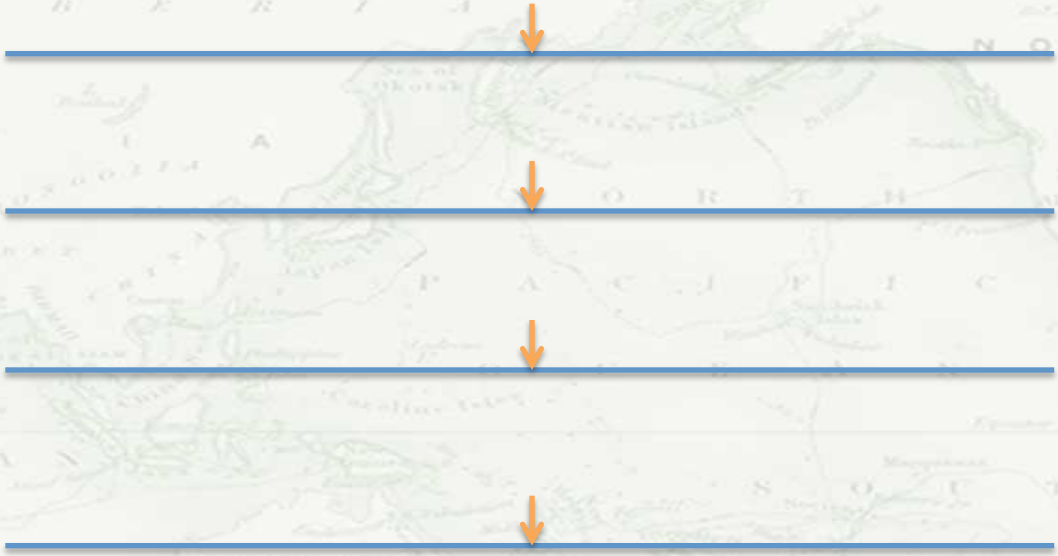
About Point Estimates



Where might be the actual population value?

CONFIDENCE INTERVALS FOR POINT ESTIMATES

Confidence Interval Concept



Mean

Continuous Data Large Sample

- **With 200 samples**
- **Sample mean is 23 &**
- **Population standard deviation is 4.5**
- **What is 95% confidence interval about the mean?**

$$\bar{X} \pm Z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

Mean

Continuous Data Small Sample

- **With 20 samples**
- **Sample mean is 23 &**
- **Sample standard deviation is 4.5**
- **What is 95% confidence interval about the mean?**

$$\bar{X} \pm t_{\alpha/2,(n-1)} \frac{\sigma}{\sqrt{n}}$$

Variance

- **Sample of 25 systems**
- **Variance is 47**
- **What is 90% confidence interval about variance?**

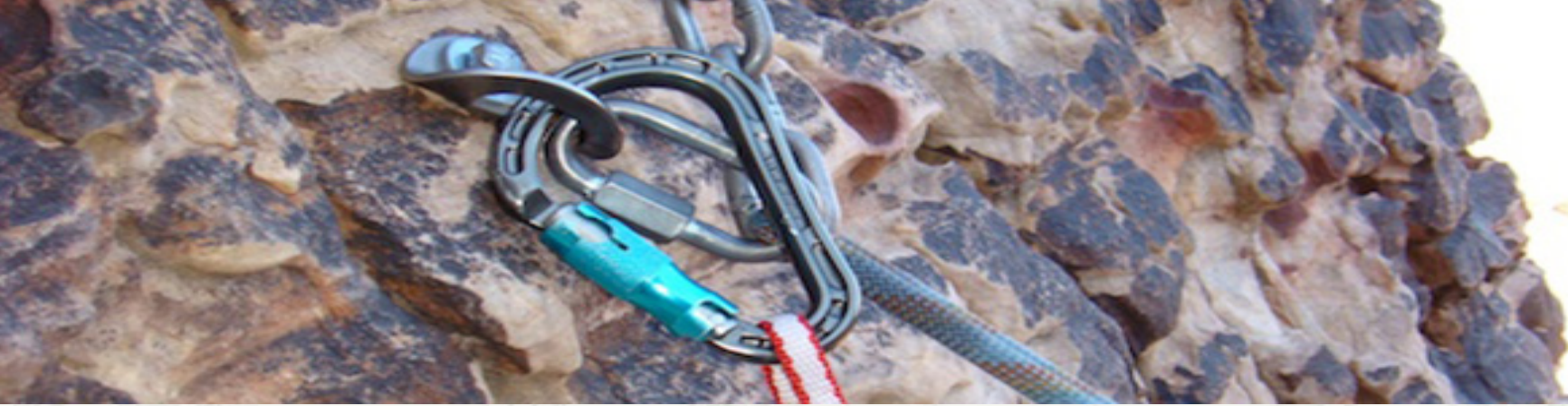
$$\frac{(n-1)s^2}{\chi^2_{\frac{\alpha}{2},\,(n-1)}} \leq s^2 \leq \frac{(n-1)s^2}{\chi^2_{1-\frac{\alpha}{2},\,(n-1)}}$$

Proportion

- **(if np and 1-np ≥ 5 we can use normal)**
- **23 Defective bolts in lot of 150**
- **What is 90% confidence interval for defect rate (proportion)?**

$$p \pm Z_{\frac{\alpha}{2}} \sqrt{\frac{p(1-p)}{n}}$$

What is chance the sample is misleading?



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Statistical Interval Estimates

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