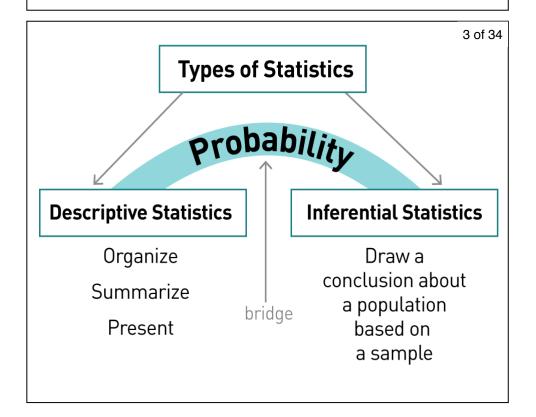
1.3 Fundamentals of Statistics and DMAIC

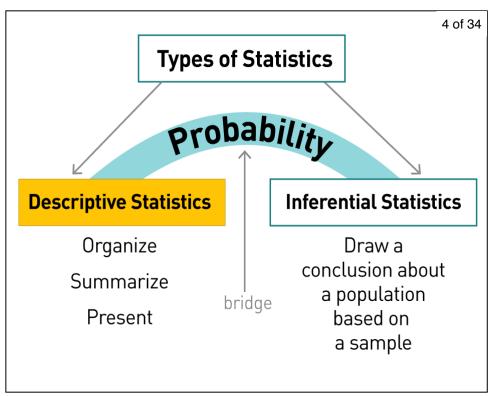
MBC 638

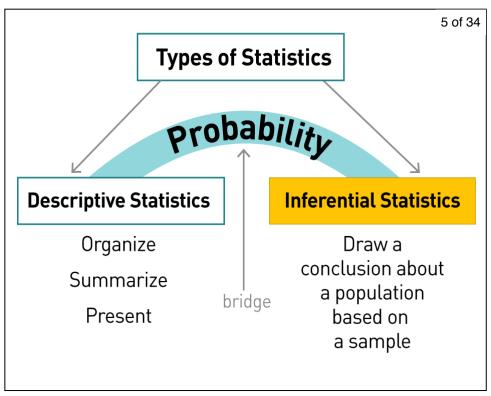
Data Analysis and Decision Making

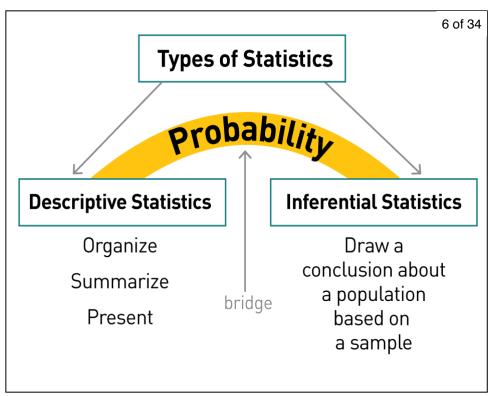
2 of 34

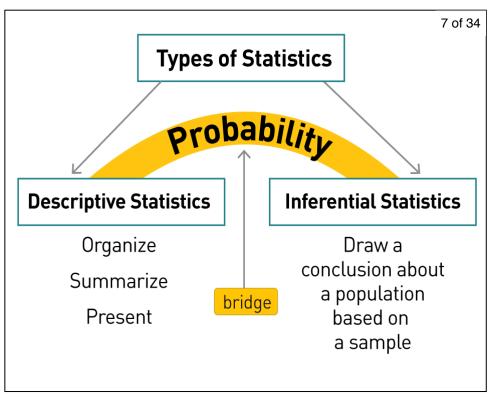
Statistics provides the means to collect, organize, analyze, present and interpret numerical information in order to make more informed and effective decisions.

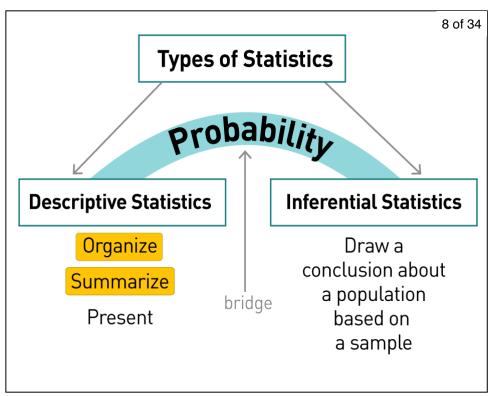


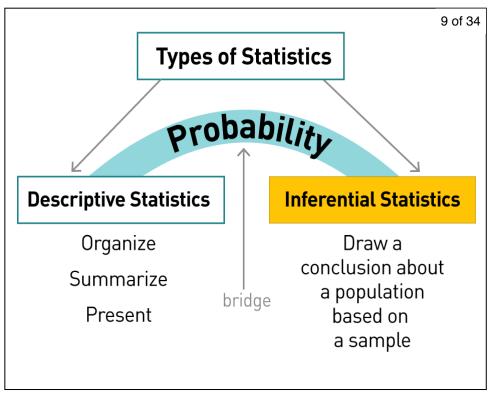


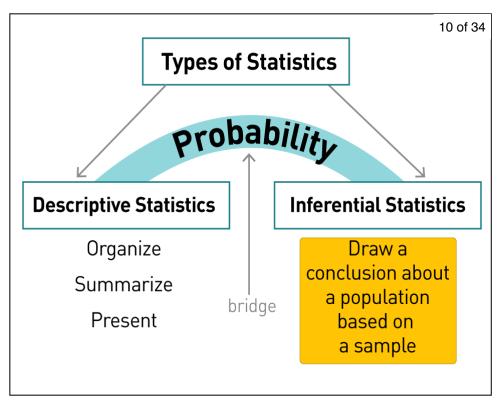












Overarching Framework

DMAIC

Define

Measure

Analyze

Improve

Control

Overarching Framework

DMAIC

Define

Measure

Analyze

Improve

Control

Overarching Framework

DMAIC

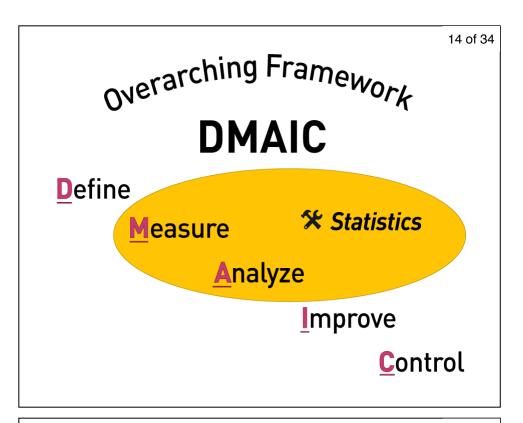
Define

Measure

Analyze

Improve

Control



15 of 34

DMAIC

16 of 34

DMAIC

• **D**efine: Identify the problem and the team's scope.

17 of 34

DMAIC

- **D**efine: Identify the problem and the team's scope.
- Measure: Develop data collection plan and implement it

DMAIC

- Define: Identify the problem and the team's scope.
- Measure: Develop data collection plan and implement it.
- Analyze: Determine root causes; identify and verify critical variables.

19 of 34

DMAIC

- **D**efine: Identify the problem and the team's scope.
- Measure: Develop data collection plan and implement it.
- Analyze: Determine root causes; identify and verify critical variables.
- Improve: Develop/select/pilot and then implement a solution.
- Control: Put a control plan in place; ensure the problem stays fixed.

20 of 34

DMAIC

- Define: Identify the problem and the team's scope.
- Measure: Develop data collection plan and implement it.
- Analyze: Determine root causes; identify and verify critical variables.
- Improve: Develop/select/pilot and then implement a solution.
- Control: Put a control plan in place; ensure the problem stays fixed.

DMAIC

- **D**efine: Identify the problem and the team's scope.
- Measure: Develop data collection plan and implement it.
- Analyze:Determine root causes; identify and verify critical variables.
- Improve: Develop/select/pilot and then implement a solution.
- Control: Put a control plan in place; ensure the problem stays fixed.

22 of 34

Discover... Y = f(x)

23 of 34

24 of 34



the inputs of the process
(Predictors)

Discover... Y = f (x)

output of a process
(Results)

is a function of

the inputs of the process
(Predictors)

25 of 34



output of a process

(Results)

is a function of

the inputs of the process

(Predictors)

26 of 34

Y = f(x): Example

$$Y = f(X_1, X_2, X_3, X_4, X_5, ...)$$

27 of 34

Y = f(x): Example

$$Y = f(X_1, X_2, X_3, X_4, X_5, ...)$$

• Y: travel time to school or work (output)

28 of 34

$$Y = f(X_1, X_2, X_3, X_4, X_5, ...)$$

- Y: travel time to school or work (output)
- Many factors (inputs) affect the resulting output

Y = f(x): Example

$$Y = f(X_1, X_2, X_3, X_4, X_5, ...)$$

- Y: travel time to school or work (output)
- · Many factors (inputs) affect the resulting output
 - o X₁: distance

30 of 34

Y = f(x): Example

$$Y = f(X_1, X_2, X_3, X_4, X_5, ...)$$

- Y: travel time to school or work (output)
- Many factors (inputs) affect the resulting output
 - o X₁: distance
 - o X₂: weather

31 of 34

$$Y = f(X_1, X_2, X_3, X_4, X_5, ...)$$

- Y: travel time to school or work (output)
- Many factors (inputs) affect the resulting output
 - o X₁: distance
 - ∘ X₂: weather
 - X₃: vehicle type

Y = f(x): Example

$$Y = f(X_1, X_2, X_3, X_4, X_5, ...)$$

- Y: travel time to school or work (output)
- Many factors (inputs) affect the resulting output
 - o X₁: distance
 - o X₂: weather
 - X₃: vehicle type
 - o X₄: traffic

33 of 34

$$Y = f(X_1, X_2, X_3, X_4, X_5, ...)$$

- Y: travel time to school or work (output)
- · Many factors (inputs) affect the resulting output
 - o X₁: distance
 - ∘ X₂: weather
 - ∘ X₃: vehicle type
 - ∘ X₄: traffic
 - ∘ X₅: speed

$$Y = f(X_1, X_2, X_3, X_4, X_5, ...)$$

- Y: travel time to school or work (output)
- Many factors (inputs) affect the resulting output
 - X₁: distance
 - X₂: weather
 - X₃: vehicle type
 - X₄: traffic
 - ∘ X₅: speed
- Goal: Select the key inputs and implement a focused solution.