Creating a Control Chart

Data Science for Quality Management: Process Control and Control Charts

with **Wendy Martin**

Learning objectives:

Describe the 7 step process to create a control chart

Discern between attribute and variables data control charts
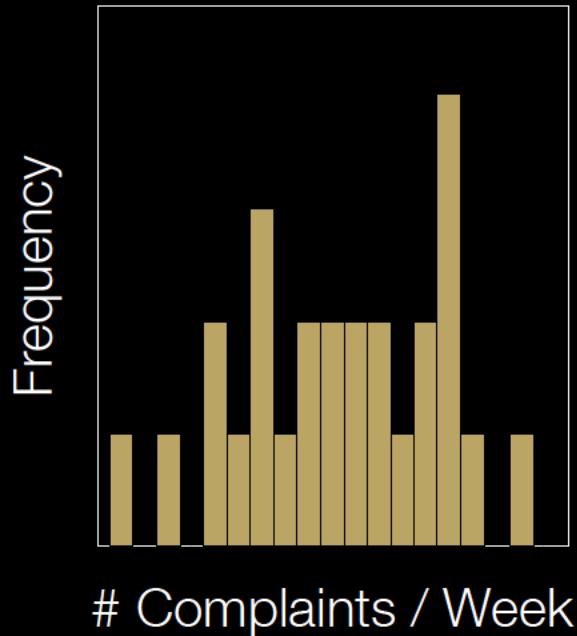
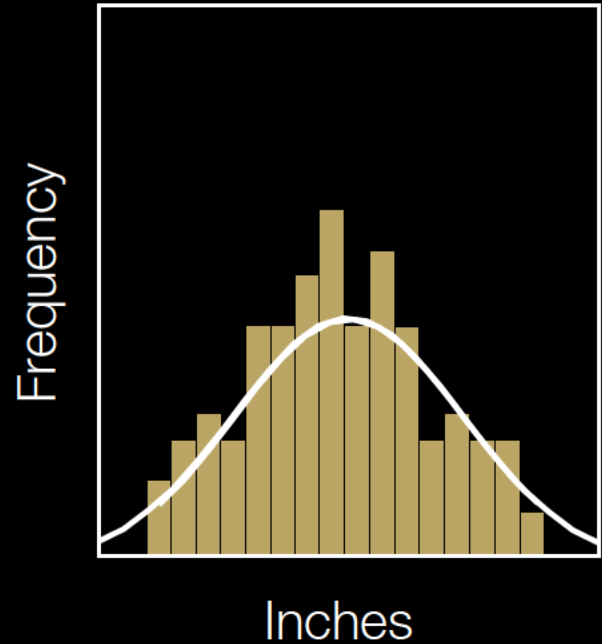# 3. Select the Chart Type

Chart Selection will be based on:

- Whether you are using Attributes or Variables data; and

- Sample size

Attributes vs Variables Data

Attribute Data - Discrete
Things we count

Variables Data - Continuous
Things we measure

Frequency

Complaints / Week

Frequency

Inches

Control Charts for Attribute Data

- Attributes charts are used to monitor processes measured with count data
- Attributes charts may be used for data reflecting:
  - Binomial Proportions
  - Poisson Rates

Control Charts for Attribute Data

- Counts may be the number of items, occurrences, or events
- The number, or count, may be plotted or this may be converted to a proportion or rate
- Different charts exist if you have equal or unequal sample size

Attributes Control Chart Types

- p chart (Binomial) - Percent or proportion of units

- np chart (Binomial) - Number of units

- c chart (Poisson) - Number of events per unit

- u chart (Poisson) - Average number of events per unit

Choosing an Attributes Control Chart

|		Sample Size Condition	
		Equal n	Unequal n
Counting	# units	np chart (or p chart)	p chart
	# per unit	c chart	u chart

Control Charts for Variables

- Variables charts are used to monitor variables or characteristics generating continuous data (interval or ratio data)

- Samples may consist of individual units/items or a group of units/items

Variables Control Chart Types

- $\bar{X}$ & R Sample of similar units
- $\bar{X}$ & s Larger sample of similar units
- X & MR Sample individual units

Selecting a Control Chart
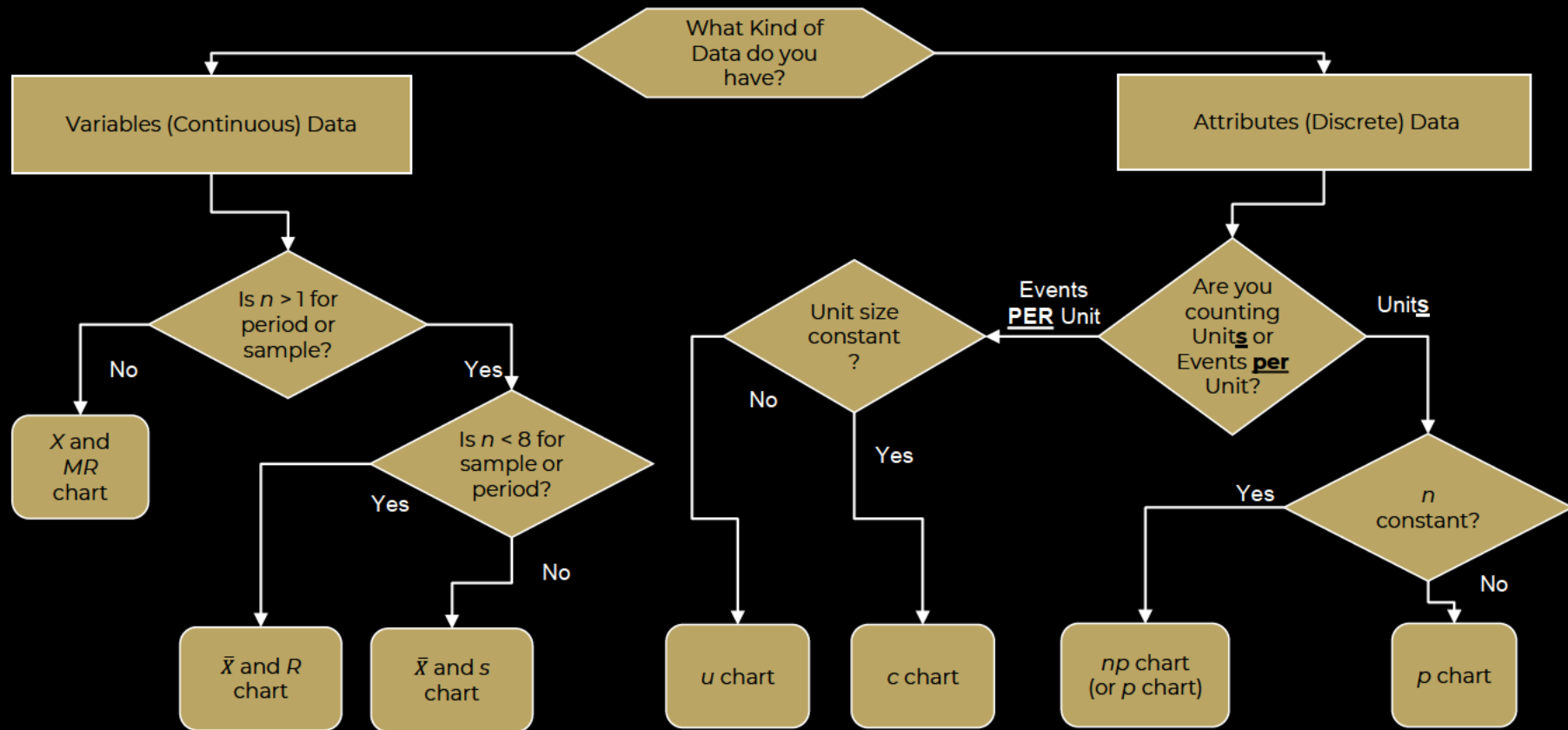
Sources

The material used in the PowerPoint presentations associated with this course was drawn from a number of sources. Specifically, much of the content included was adopted or adapted from the following previously-published material:

- Luftig, J. An Introduction to Statistical Process Control & Capability. Luftig & Associates, Inc. Farmington Hills, MI, 1982
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