



Quality and Safety Series

Data Visualization 101

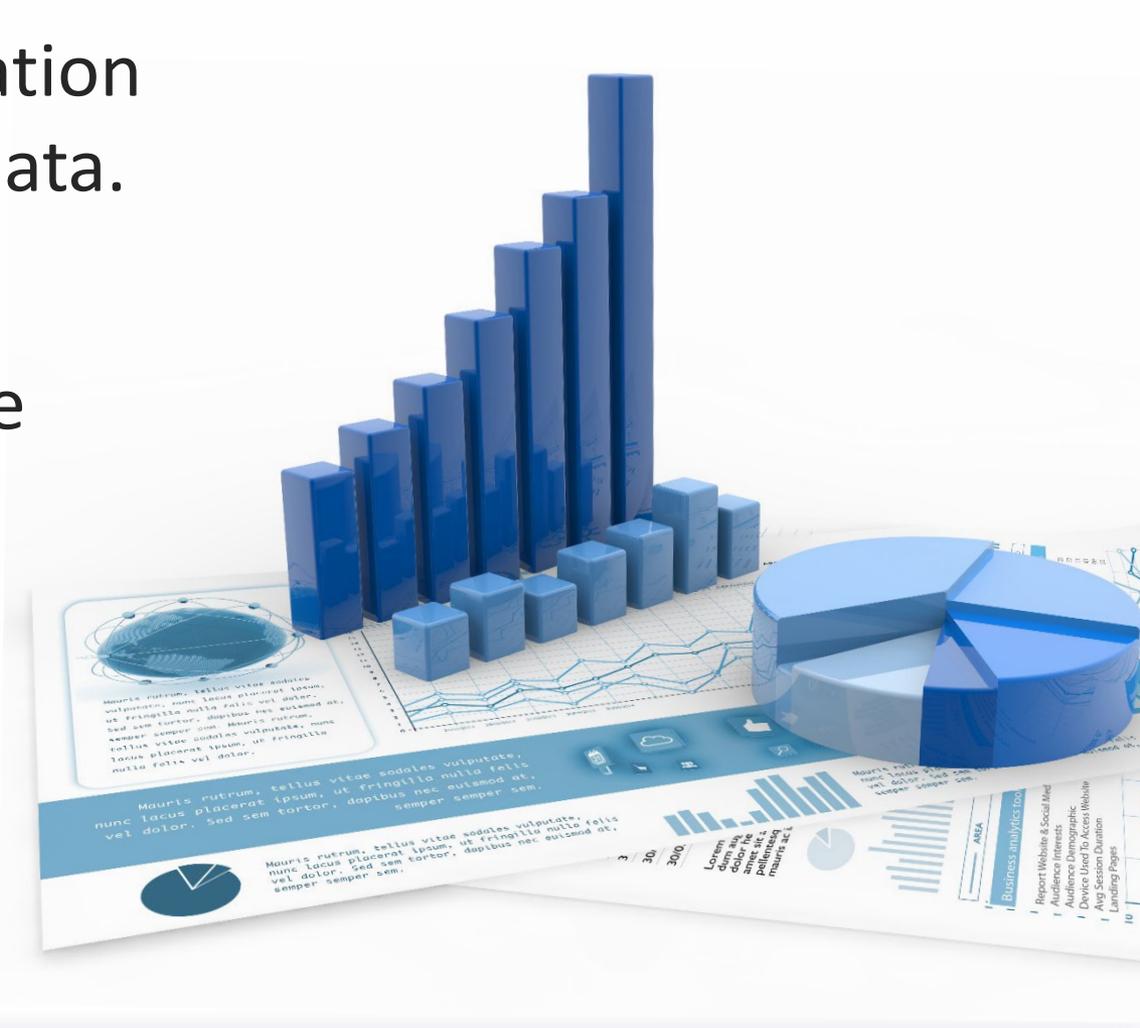
OBJECTIVES

A close-up photograph of a person's hand, wearing a dark suit jacket and a white shirt cuff, pointing towards the text. The hand is positioned on the right side of the slide, with the index finger pointing towards the word 'OBJECTIVES'.

- Describe the basics of data visualization for your quality improvement and patient safety projects.
- Identify the best tool to effectively track and communicate quality and safety data.
- Achieve the appropriate balance between form and function.

What Is Data Visualization?

- Graphical representation of information and data.
- Tools that provide an accessible way to see and understand trends, outliers, and patterns in data.



Why Is Data Visualization an Important Step?

- Aids in tracking patient safety measures to:
 - Understand baseline performance.
 - Assess the effects/analyze the results of patient safety interventions.
 - Evaluate whether changes in performance are sustained over time.
- Helps users analyze and reason regarding data and evidence.



Baseline Data/Baselining

The measurement of outcome or performance prior to an intervention.

- Confirm that the data reflect the current state.
- Use the measure definition.
- Ensure there are enough data points.
- Watch for seasonal impacts.



Analyzing the Results

- Display the data.
 - Start with run charts.
 - Use control charts or SPC* charts for more specific insight.
- Analyze the data.
 - Are these the predicted results?
 - Look for impact of the intervention.
- Examine change or variation.
 - Watch for 5–8 points above or below the mean.



The Makes and Breaks

The makes

- Make data more accessible, understandable, and usable.
- Communicate information clearly and efficiently.
- Stimulate viewer engagement and attention.

The breaks

- Create elaborate data visualizations that fail to serve their main purpose—to communicate information.
- Might create misleading or erroneous conclusions.



Best Practices for Graphical Displays



- Know your audience.
- Design graphics that can:
 - Stand alone outside the context of the report.
 - Communicate the key messages.

General Types of Data Visualization

- **Charts**

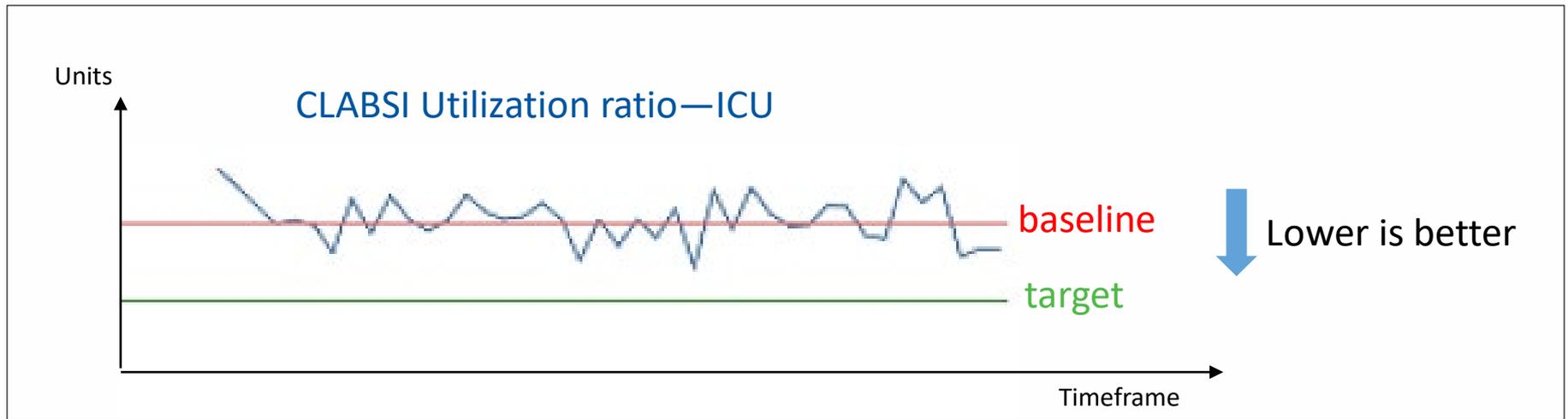
(Most prevalent type in acute care settings)

- Tables
- Graphs
- Maps
- Infographics
- Dashboards



Run Chart

- A standard quality tool used to display trends over time.



Useful to:

- Display variation.
- Discover patterns.
- Observe the effects of process improvement.

Pie Chart

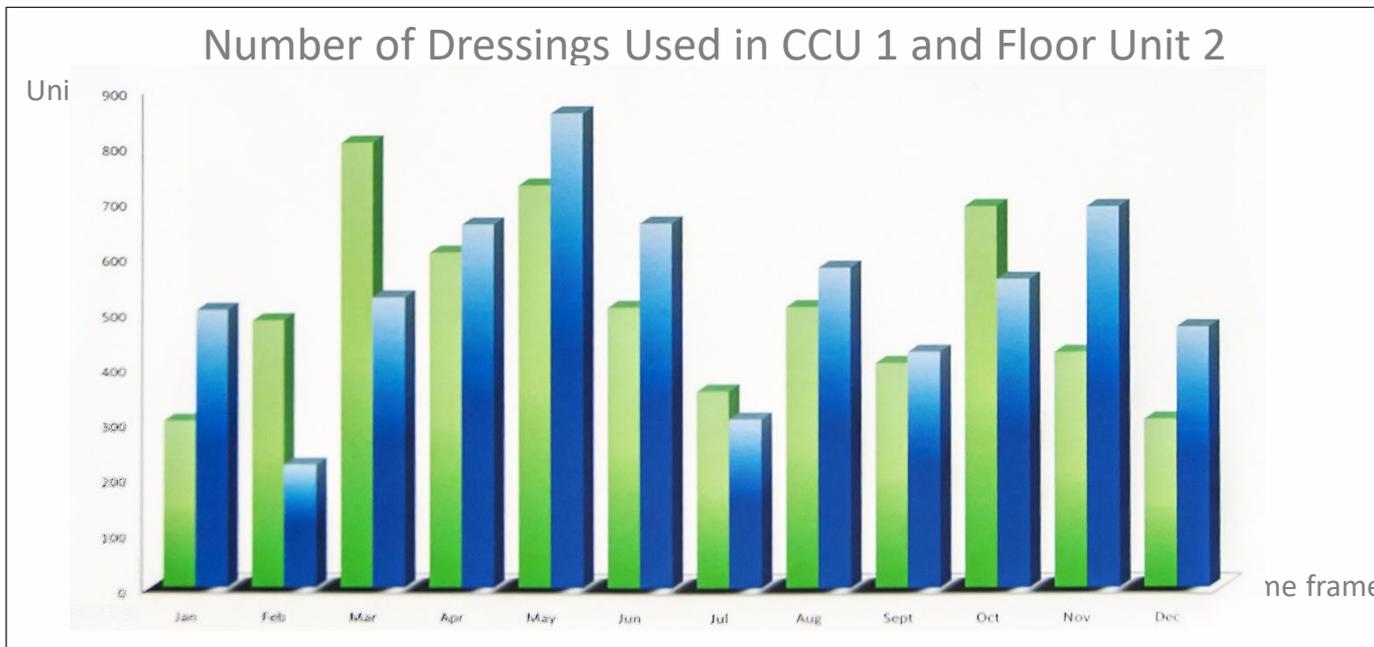
- A snapshot in time.
- Represents one variable, which is divided into slices to illustrate numerical proportion.



Useful to know and compare the importance of factors as a whole.

Bar Chart

- Used to show patterns or relationships in the data for one or more variables.

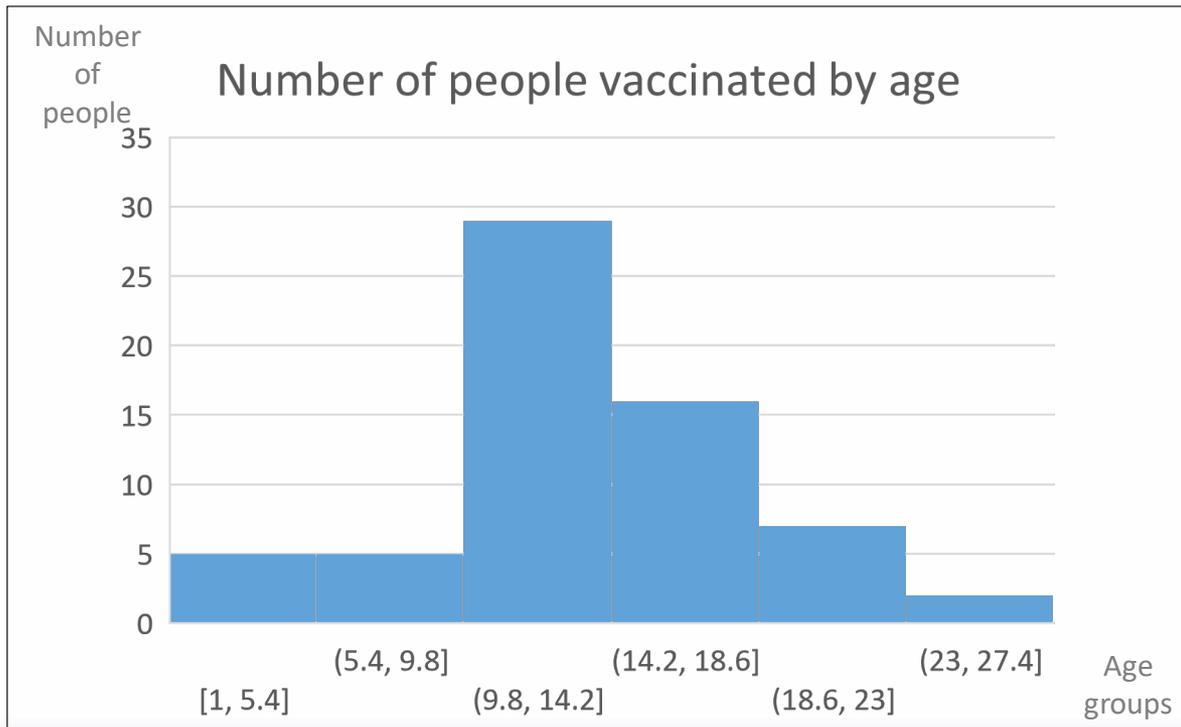


Useful to show:

- Comparisons among categories.
- Different units or sub-populations.

Histogram

- An approximate representation of the distribution of numerical data.
- A specialized type of bar chart used to summarize groups of data.

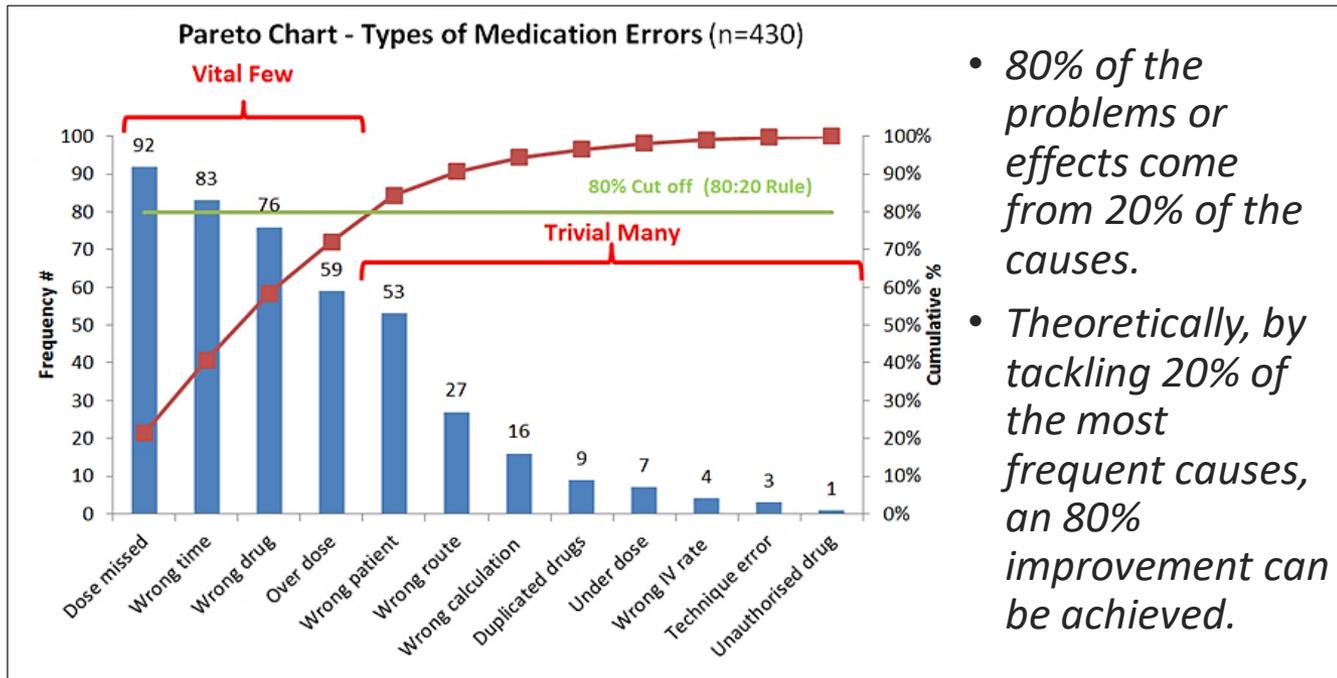


Useful to show:

- Data distribution or spread.
- Symmetric or skewed data.
- Extreme data values.

Pareto Chart

- Displays a series of bars with which the priority for problem solving can easily be seen by the varying height of the bars.

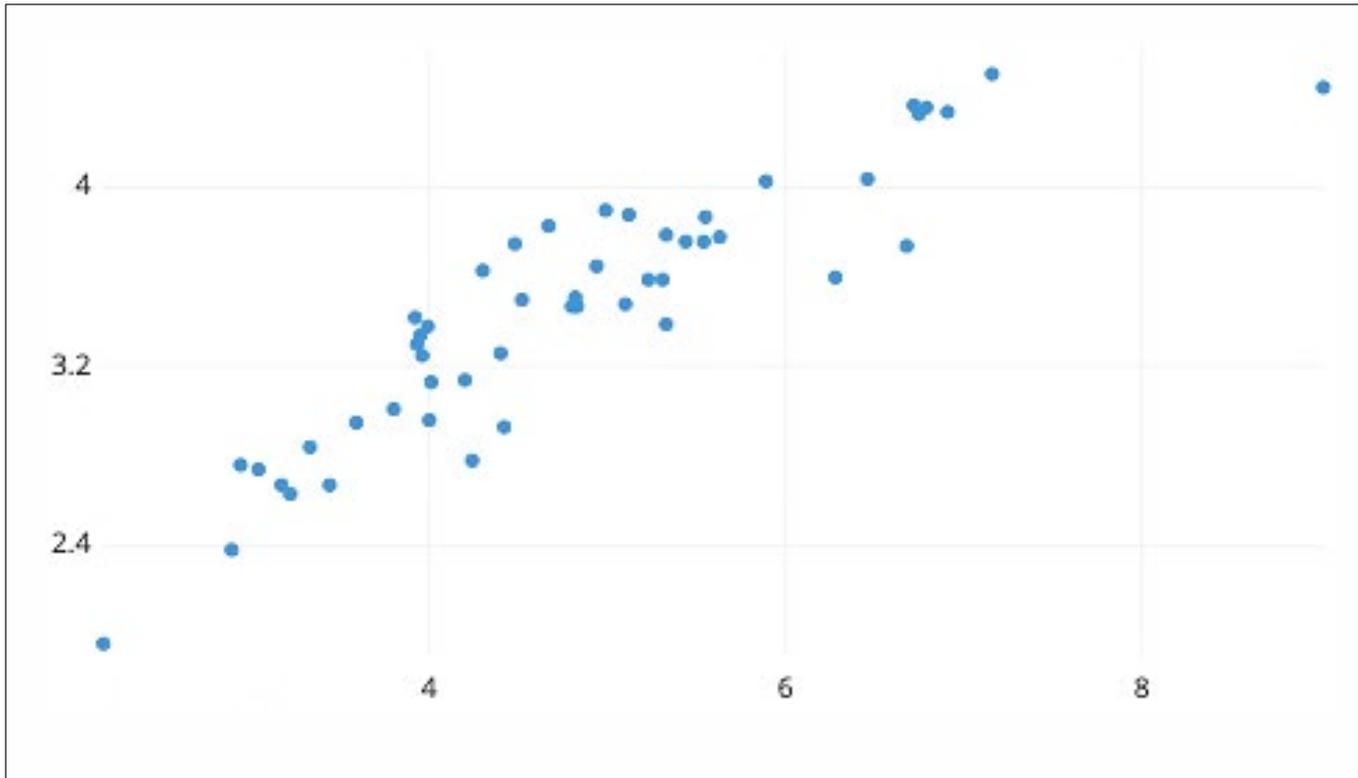


- 80% of the problems or effects come from 20% of the causes.*
- Theoretically, by tackling 20% of the most frequent causes, an 80% improvement can be achieved.*

The tallest bars are the most frequently occurring issues.

Scatter Diagram

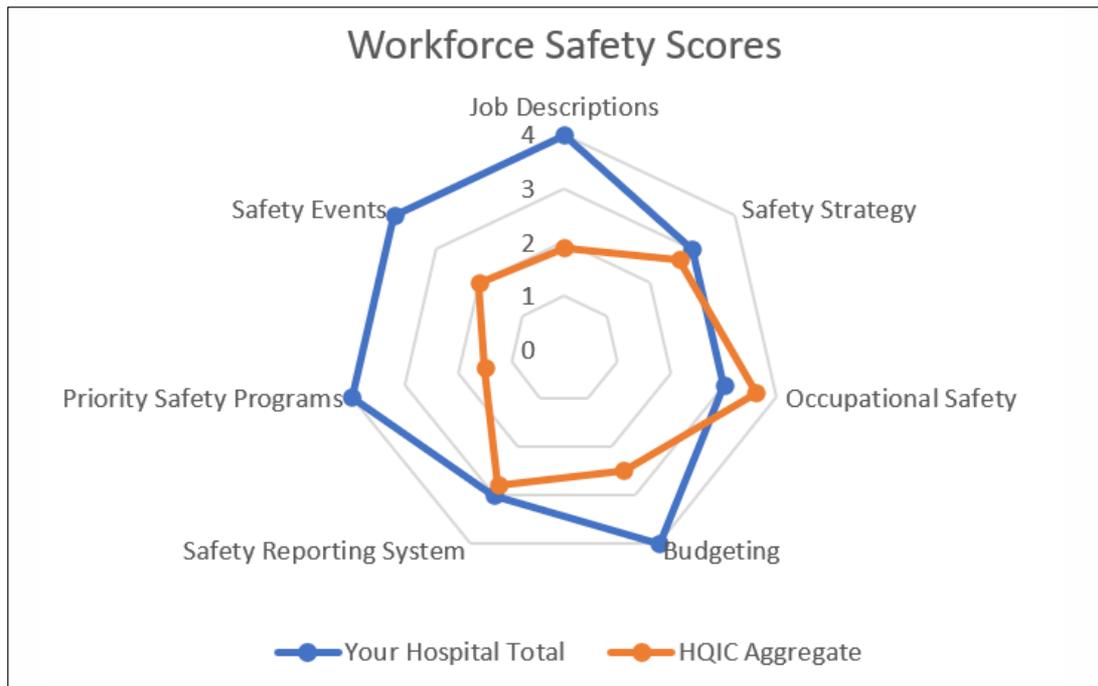
- Displays values for typically two variables for a set of data.



Useful to highlight the correlation between variables.

Radar or Spider Chart

- A two-dimensional chart designed to plot one or more series of values over multiple quantitative variables.
- Each variable has its own axis. All axes are joined in the center of the figure.



Useful to display and easily compare multiple categories.

Key Take-Aways

- Choose the most appropriate type of data visualization to engage your audience.
- Keep it simple!
- Limit the number of visual tools used for your staff.
- Limit the number of visual effects to facilitate understanding.



References

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Thank you!

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