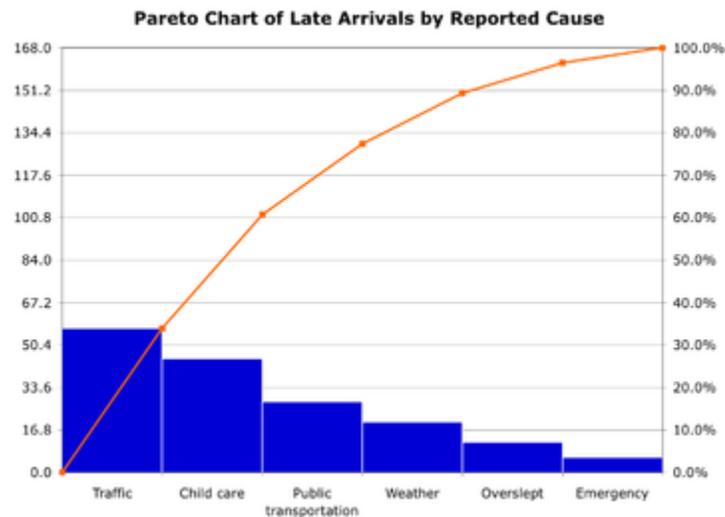


Pareto Chart

A Pareto Chart is a **static** type of chart used to help determine where to focus improvement efforts by **identifying the most significant factors contributing to a problem**. A Pareto Chart contains both bars and a line graph; individual values are represented by bars in descending order based on the magnitude of their effect, and the cumulative total is represented by the line.



The above chart is a simple example of a Pareto chart showing the relative frequency of reasons for arriving late at work (the problem). The left vertical axis is the frequency of occurrence for the problem, but it can also represent important units of measure such as cost. The right vertical axis is the cumulative percentage of the total number of occurrences, total cost, or total of the particular unit of measure being reported. Because the reasons are placed in decreasing order of frequency, the cumulative function is a concave function. The example above demonstrates that, in order to reduce the frequency of late arrivals by 78%, it is sufficient to solve the first three issues. However, Pareto Charts only provide **information** about the **relative frequency** of the reasons; it cannot tell you **why they occur** or which are the **most appropriate areas for improvement** work. The improvement team must consider the Pareto Chart information in the context of their situation to decide which of those reasons are modifiable and in their scope to address.

When to Use a Pareto Chart

- When analyzing data about the frequency of problems or causes in a process.
- When there are many problems or causes and you want to focus on (prioritize) the most significant.
- When analyzing broad causes by breaking them down into their specific components.
- When communicating with others about your data and your rationale for focusing on certain areas.

How Pareto Charts Are Constructed

- 1.** Collect data about the contributing factors to a particular problem (for example, reasons for arriving late to work).
- 2.** Order the categories according to magnitude of effect (frequency of reason). If there are many insignificant categories, group these together into one category labeled “other.”
- 3.** Write the magnitude of contribution (for example, frequency of reason) next to each category and determine the grand total. Calculate the percentage of the total that each category represents.
- 4.** Work from the largest category to the smallest and calculate the cumulative percentage for each category with all of the previous categories.
- 5.** Draw and label the left vertical axis with the unit of comparison (for example, Reason Frequency) from 0 to the grand total.
- 6.** Draw and label the horizontal axis with the categories (for example, “Reasons”), largest to smallest from left to right.
- 7.** Draw and label the right vertical axis “Cumulative Percentage,” from 0 to 100 percent, with the 100 percent value at the same height as the grand total mark on the left vertical axis.
- 8.** Draw a line graph of the cumulative percentage, beginning with the lower left corner of the largest category (the “0” point).
- 9.** Analyze the diagram to indicate the cumulative percentage associated with the “vital few” (for example, two reasons account for 80 percent of all reasons).

Videos on Pareto charts can be viewed at <http://www.youtube.com/watch?v=bxr0iL6N1g> or <http://www.ihl.org/education/IHIOpenSchool/resources/Pages/AudioandVideo/Whiteboard20.aspx>