

Pareto charts and the 80/20 rule

Overview

Pareto analysis is a technique that helps you to focus efforts on the problems that offer the greatest potential for improvement by showing their relative frequency or size in a descending bar graph.

The **Pareto principle**, also known as the 80/20 rule, states that 'roughly 80% of the effects come from 20% of the causes'. For example:

- 80% of complaints come from 20% of customers
- 80% of sales come from 20% of clients
- 80% of computer crashes come from 20% of IT bugs

Vital few: the factors that have the largest contribution to the effect (problem) and therefore warrant the most attention.

Useful many: the factors that, while useful to know about, have a relatively smaller contribution to the overall effect (problem).



Using a Pareto chart to inform decision making and prioritisation

Pareto charts can be helpful in your improvement journey when you need to:

- analyse data about the frequency of problems or causes in a process
- determine the most significant problems, causes or change ideas to focus on
- analyse broad causes by looking at their specific components
- communicate to stakeholders about the problem you are trying to solve.

Anatomy of a Pareto Chart

A Pareto chart is a combination of two different graphs: a bar chart and a line chart.

- **Bar Chart:** displays the individual values as bars in descending order (left to right) by highest to lowest frequency
- **Line chart:**
 - Curved line represents the cumulative total percentage of the sample.
 - 80% cut-off-line indicates 80% cumulative frequency of the sample.
- the vital few box indicates where the 80/20 rule applies. The factors that warrant the most attention sit under the 80% cut off line.
- **X-axis:** Categorical or nominal data, i.e. data that can be grouped.. Each category normally relates to a problem area or cause of a problem and are ordered in descending order of frequency.
- **Dual y-axis:**
 - Lefty-axis: frequency
 - Right y-axis: cumulative percentage

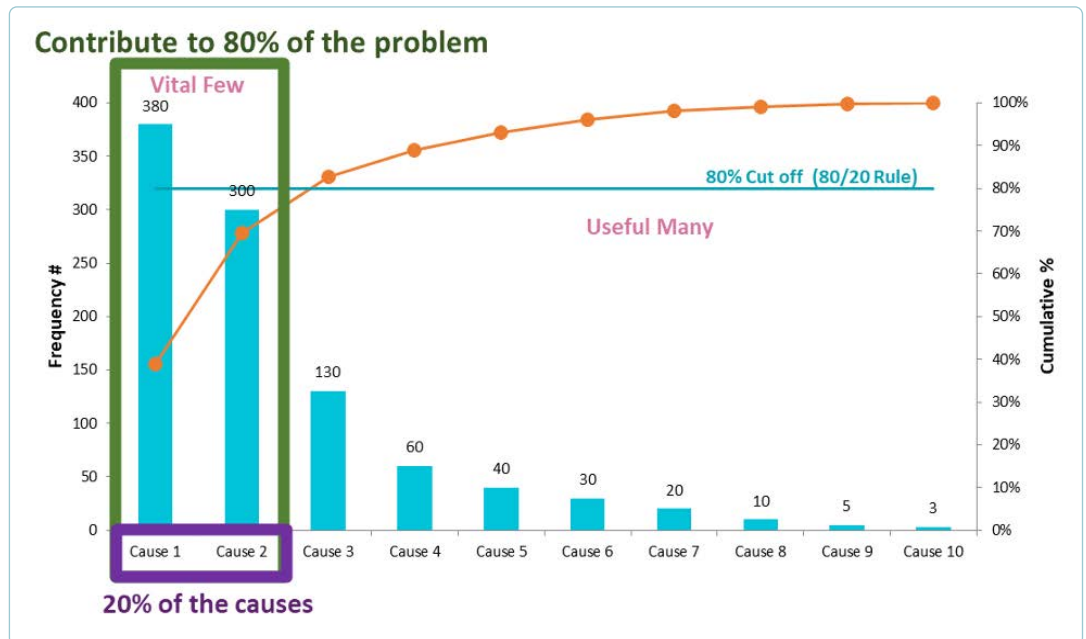


Figure 1: Anatomy of a Pareto chart

How to interpret a Pareto chart

To find the vital few (the factors that have the largest contribution to the effect (problem) and therefore warrant the most attention), locate the spot where the cumulative percentage line crosses the 80% cut off-line. The bars (causes) that fall to the left of this point make up the vital few. These are the causes that you should focus on as a priority (See Figure 1).

Be aware: Pareto charts don't explicitly consider the severity or magnitude of the effects, but rather look at the frequency of occurrence of different causes.

Examples of using a Pareto Chart to support quality improvement

Example: Medication errors

An audit of 426 medication errors was conducted to determine the categories (types) of errors and their frequency. The results were collected and the data was placed in descending order of frequency in a Pareto chart template in Excel.

Based on the Pareto chart, to have the greatest impact on reducing the frequency of medication errors, improvement activities should focus on reducing the following types of errors (the vital few)

- Dose missed
- Wrong time
- Wrong drug
- Overdose

The types of medication errors that sit above the 80% cut-off-line (and to the right of the intersection) are known as the 'useful many'. Addressing these factors is a lower priority than addressing the 'vital few' factors.

Be aware of severe incidents and causes that occur infrequently and those that occur frequently but have very low impact.

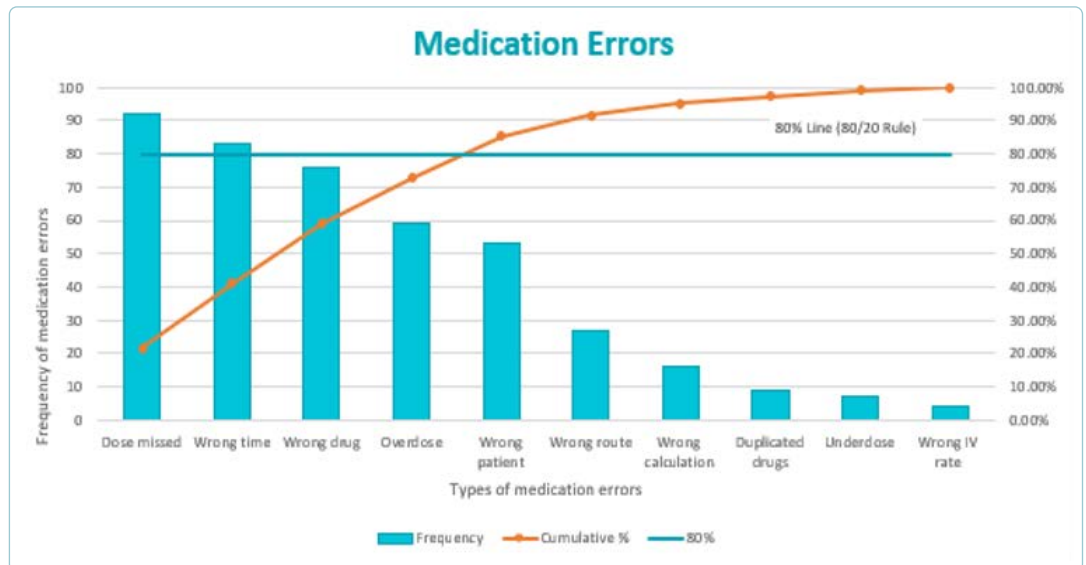


Figure 2: Pareto chart example –Medication errors

How to create a Pareto chart

You can create a Pareto chart using pen and paper or in excel. You can also find a Pareto chart template in the [SCV Quality Improvement Toolkit](#).

It is important to remember that the minimum number of observations of occurrences required to create a pareto chart is 30. With less than 30 observations it is possible that the most frequently occurring categories simply have occurred by random chance.

Additional resources

To learn more about Quality Improvement you can access the following resources:

- [SCV Quality Improvement Toolkit](#)
- [Institute for Healthcare Improvement website](#)
- [NSW Clinical Excellence Commission Quality Improvement Tools](#)
- Video Institute for Healthcare Improvement (IHI) video [Pareto Analysis and the 80/20 Rule](#) (~7 mins)

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