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# Pareto



# Pareto

## What is it?

Pareto analysis is a simple 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.

Pareto's 80/20 principle states that roughly 80% of the effects come from 20% of the causes.

## When to use it

When analysing a problem, this tool will quickly identify the major causes so that resources can be directed accordingly. You may find it helpful to use a Pareto chart after you have completed a [cause and effect \(fishbone\) diagram](#) to identify which causes to work on first.

## How to use it

1. Identify the problem area you want to know more about and the possible causes. This can be done using a [cause and effect \(fishbone\) diagram](#) or [brainstorming](#).
2. Collect and analyse data to verify the causes you have identified. Choose the most meaningful unit of measurement that relates to your problem – often frequency or cost. Rank the causes from largest to smallest ie compare the relative frequency of the cause.
3. Draw a Pareto graph to illustrate the findings by listing the problem categories on the x-axis (horizontal) and the frequency or cost on the y-axis (vertical). This simple bar chart will help to ensure that your findings are quickly and easily understood by others (see figure 1).

You can further enhance this by using a cumulative frequency graph (see figure 2):

- Draw the cumulative percentage line showing the proportion of the total number that each problem category presents.
- On the y-axis line, record 100% opposite the total number and 50% at the halfway point. Fill in the remaining percentages drawn to scale.
- Starting with the highest problem category, mark the upper right hand corner with an X or a dot.
- Add the total of the next problem category to the first and draw a dot above the bar showing both the cumulative number and percentage. Connect the dots and record the remaining cumulative totals until 100% is reached (see example two).

You can use the Pareto principle to give an insight into a wide variety of issues, for example:

- 80% of interruptions come from 20% of the people
- 80% of an equipment budget relates to 20% of the items
- 80% of benefits come from the first 20% of effort
- 80% of complaints are about 20% of your services
- 80% of a nurse's time is spent on 20% of the patients
- 80% of the decisions made in meetings come from 20% of the meeting time
- 80% of innovation comes from 20% of the staff
- 80% of staff problems come from 20% of the staff
- 80% of your success comes from 20% of your efforts.

## TIPS

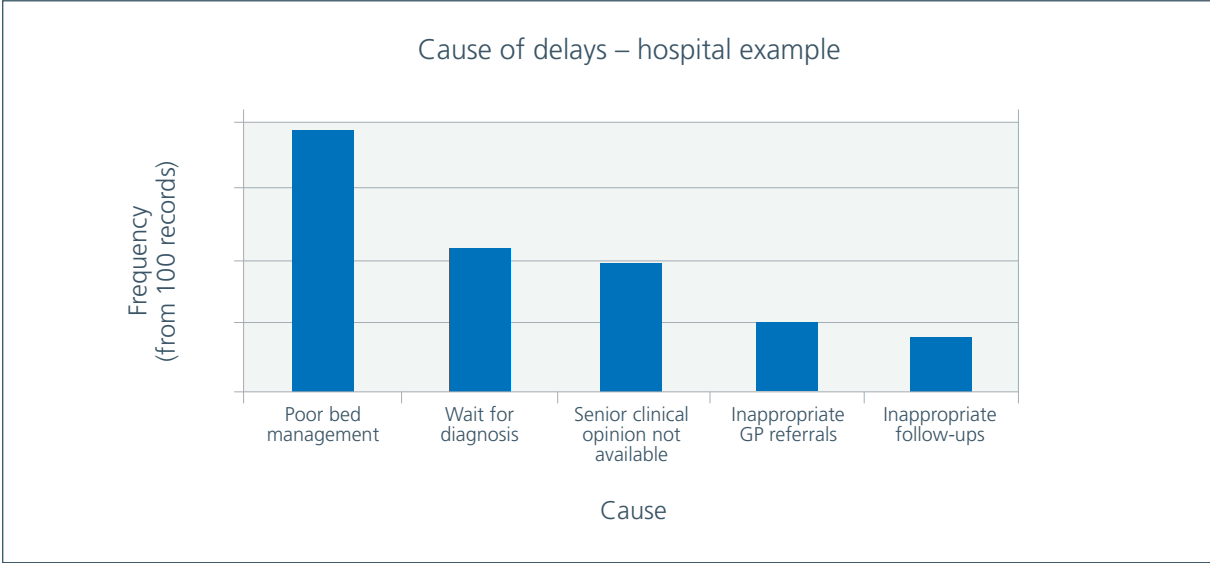
**Tackle the causes with the highest score/frequency first as these offer the greatest benefit if resolved. Causes with the lowest scores/frequencies may not be worth tackling as solving these problems may not give a good return on investment of time or resources.**

The 20–20–60 rule claims that in most organisations, 20% of people support process improvement and 20% do not. The people in these two groups are basically fixed and no amount of persuasion is likely to change their view. People in the remaining 60% are interested, but need to be convinced. Applying the 20–20–60 rule suggests focusing on the 60% by addressing their questions and concerns – these are the people who are most likely to get involved in service improvement in the future.

## Examples

1. An improvement team set out to reduce delays in its hospital but was unsure which of the most common causes to tackle first. After collecting data on the causes of delay, the team produced this Pareto chart:

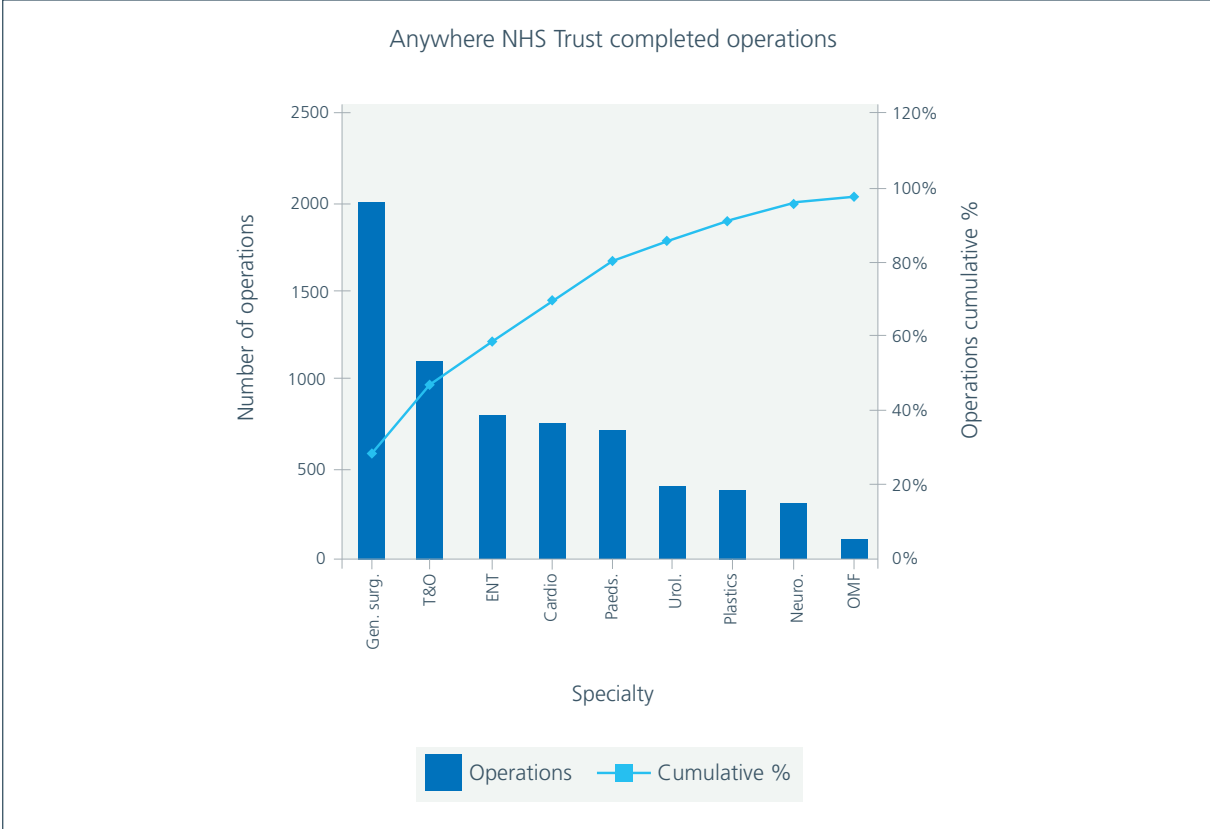
**Figure 1: Pareto chart showing cause of delays**



This graph shows that the main cause of delay was poor bed management. Prior to the Pareto analysis, diagnostics was assumed to be the main cause. As a result, the team allocated resources to improving bed management, significantly reducing delays.

2. This Pareto chart shows that the highest volume operations within a hospital are in general surgery:

**Figure 2: Pareto chart showing kinds of surgery**



## What next?

After using the Pareto technique to identify the causes that have the most potential for improvement when solved, you can produce an [action plan](#) to outline the next steps.

## Additional resources

Koch, R (2014) *The 80/20 Principle: The Secret to Success by Achieving More with Less*, Bolinda Audio: MP3 Una edition

## Background

The Pareto principle was first suggested as an improvement tool by management thinker Joseph Juran in the 1940s and was named after the Italian economist Vilfredo Pareto. In the early 20th century, Pareto observed that 80 percent of income in Italy was received by 20% of the Italian population. Joseph Juran, the renowned quality management author, built on this idea and came up with the assumption that the majority results of any situation can be determined by a small number of causes.

This idea is often applied to data such as sales figures ie 20% of clients are responsible for 80% of sales volume, but can easily be applied to the NHS, eg 80% of a nurse's time is spent on 20% of the patients.

Statements of 80/20 principles can be tested using the Pareto chart and are useful to support decision making. Richard Koch has written many books on how Pareto can be applied.