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Cause and effect (fishbone)

NHS England and NHS Improvement

Cause and effect (fishbone)

What is it?

Cause and effect analysis helps you to work through the possible 'underlying factors' of a problem - ie the possible contributory and causal factors (not just the symptoms), before you start to work on designing effective solutions.

Working through cause and effect analysis enables those involved to create a snapshot of the team's collective knowledge of the issue, gain a shared insight into the problem, and start to consider the design of possible improvements / solutions.

When to use it

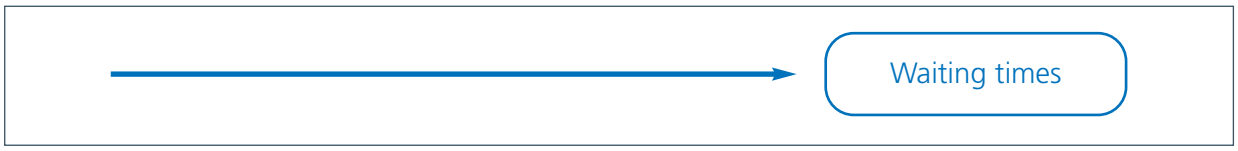
Use this tool when you are trying to determine why a particular problem is occurring. It will help you to better understand the issue and to identify a wider range of possible underlying factors – not just the most obvious.

How to use it

1. Identify the problem and then consider and describe it in detail: who is involved, when and where it occurs. Write the problem in a box and draw an arrow pointing towards it.

For example:

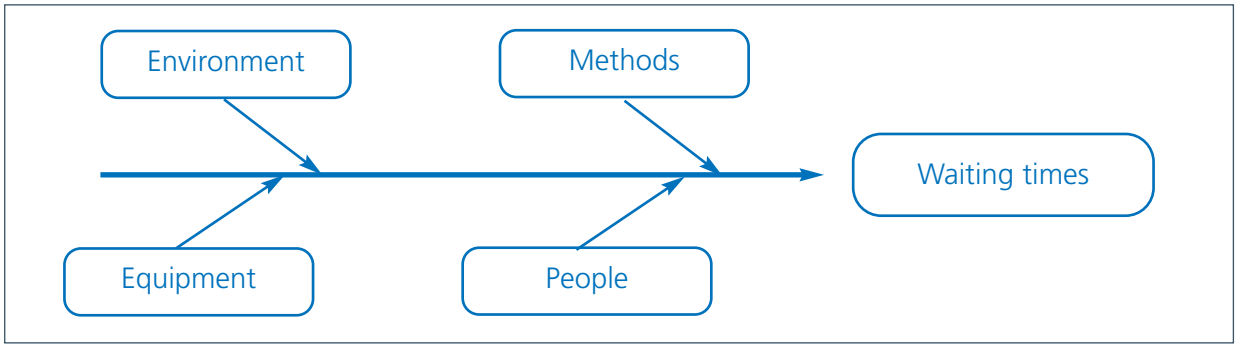
Figure 1. Identify the problem



2. Identify the major factors and draw four or more branches off the large arrow to represent main categories of potential underlying factors and label each line. Categories may include for example: equipment, environment, procedures and people. Make sure the categories are relevant to your particular problem. Alternatively, you could use the **affinity diagram** technique and group headings.

For example:

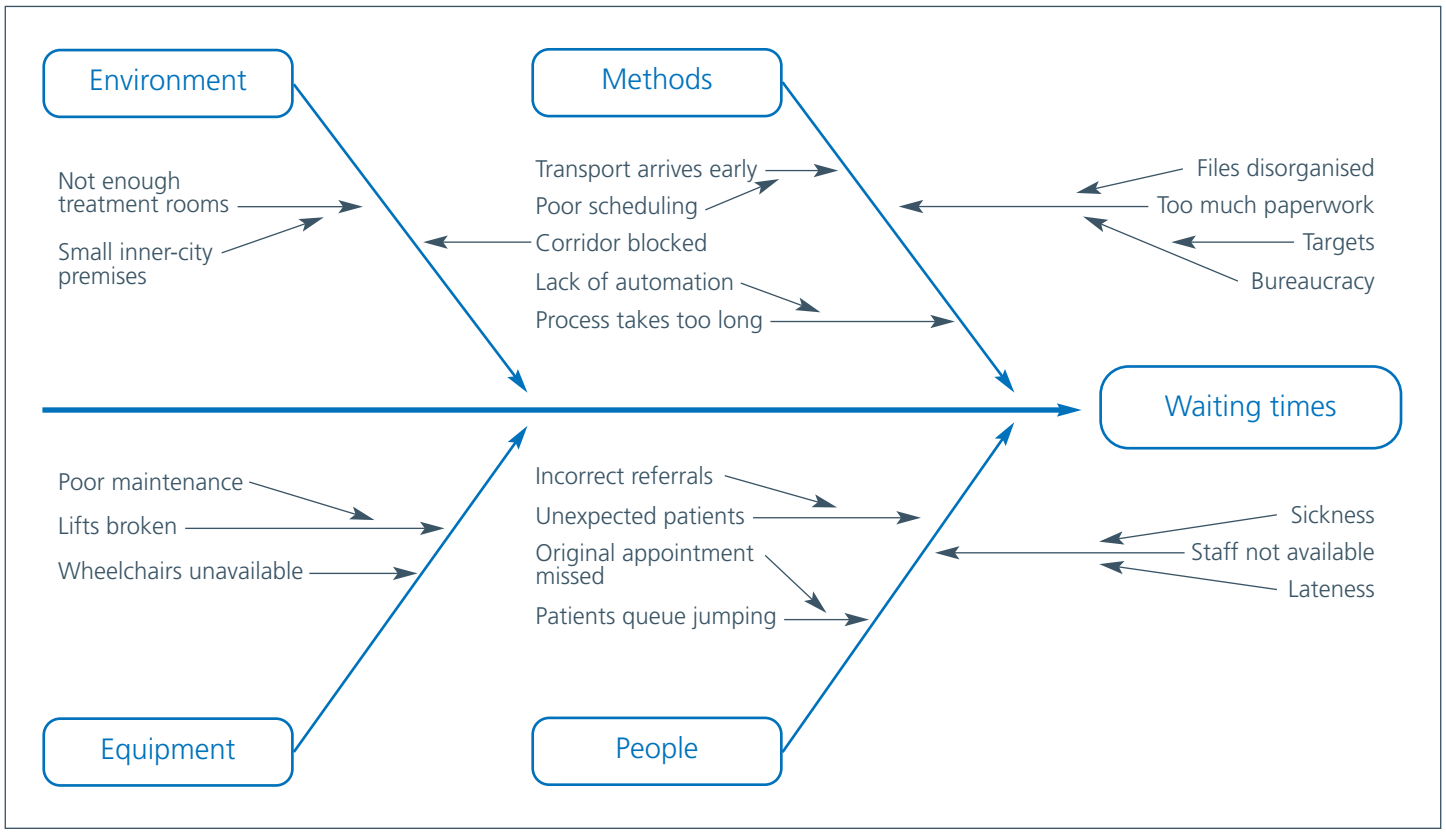
Figure 2. Identify the major factors



3. Take each of the main categories and identify possible factors contributing to the problem. Explore each one to identify more specific factors, adding and labelling more lines off the spine as you go. Continue branching off until the means of identification used has been exhausted. It may be necessary to break complex factors down into sub-factors. Show these as lines coming off the line it relates to.

4. By this stage you should have a diagram showing a wide range of possible underlying factors for your problem. Depending on its complexity and importance, you can now investigate underlying factors further. This should involve using robust identification tools such as data check sheets, setting up interviews (see **patient stories**), carrying out a cognitive walkthough, task analysis, **process mapping** or surveys that you can use to determine the underlying factors that are key and most accurate.

Figure 3. Analyse your diagram



TIPS

- **Engage your team to agree the problem statement. Include as much information as possible in the 'what', 'where', 'when' and 'how much' of the problem. Use data to specify the problem if possible.**
- **Aim to construct the diagram with the people involved in the problem.**
- **You can use a cause and effect diagram as a working document that is updated as and when you collect more data, or to test possible solutions.**
- **Produce your diagram on paper so that it can be transported.**
- **Ideally, underlying factors should appear in only one category, although some may overlap.**
- **You may also find driver diagrams a useful way of planning activities which may be used to help solve problems.**

Background

The cause and effect diagram is sometimes called a fishbone diagram (because the diagram looks like the skeleton of a fish) or an Ishikawa diagram (after Professor Kaoru Ishikawa of Tokyo University who invented it in 1968).

The cause and effect diagram was adopted by Dr W Edwards Deming as a helpful tool for improving quality. Dr Deming taught total quality management in Japan after World War ll. He also helped develop statistical sampling approaches for national census purposes in the USA and taught methods of quality management to the military. Both Ishikawa and Deming use this diagram as one of the first tools in the quality management process.

References

Ishikawa, K (1968) *Guide to Quality Control*, JUSE, Tokyo