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Spaghetti diagram



Spaghetti diagram

What is it?

The spaghetti diagram is a tool to help you establish the optimum layout for a department or ward based on observations of the distances travelled by patients, staff or products, eg x-rays. Spaghetti diagrams expose inefficient layouts and identify large distances travelled between key steps.

The spaghetti diagram is a simple mapping tool for Lean process improvement. The tool helps you identify areas where time can be saved by visualising unnecessary movement of products, staff or patients and it gives you a visual overview of the geography of the process. The time saved can be used more productively to add value to patient care.

When to use it

The spaghetti diagram is useful when you want to assess time wasted through unnecessary movement through a ward, clinic, department or whole hospital.

By reviewing the 'current' spaghetti map, you can see where there is potential to make processes more efficient and improve layouts to reduce distances travelled.

How to use it

1. Decide what you are going to observe – eg product, staff or patient flow. You may decide to analyse a number of these simultaneously by using different coloured lines to represent each flow.
2. Involve representatives from your team in the process of drawing the spaghetti diagram. Explain what is being done and what the potential benefits may be for both the team (minimising waste of effort) and patients (improved experience).
3. Ask estates for a diagram (or draw your own) of the floor plan of the area you are working with. Draw lines on it to show the flow of movement as it is now, eg a patient attending a diabetic review, or a nurse on a ward changing a patient's catheter.
4. By analysing the lines, you can identify any areas with unnecessary movement.
5. Next, assess your diagram to help you redesign the process. Can you bring two points closer together to optimise the flow? This can act as a starting point for redrawing a new spaghetti diagram to reflect the desired flow.

TIPS

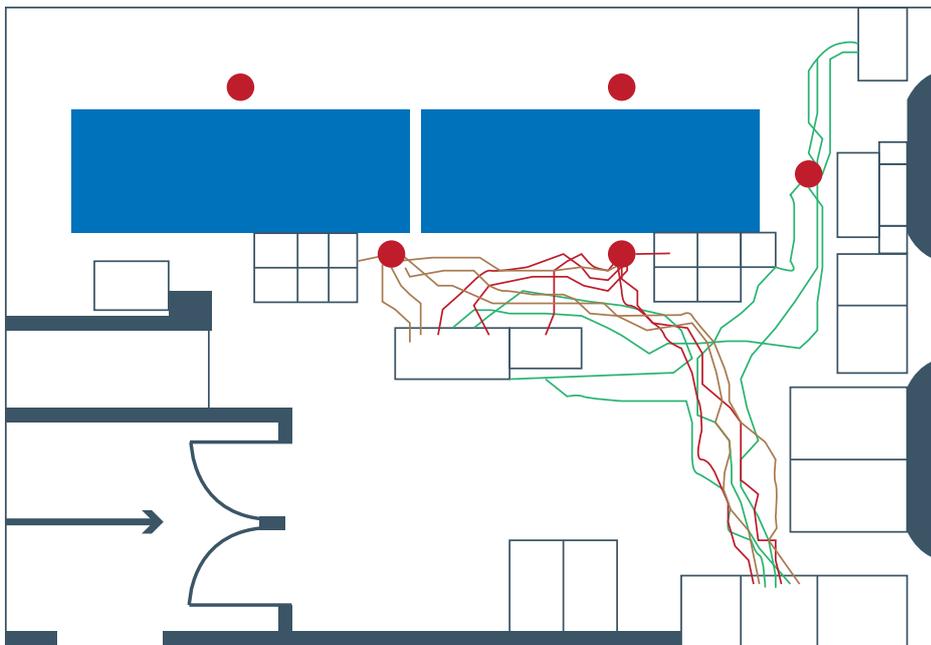
When completing the spaghetti map:

- Note the time, date and process being evaluated, but not the name of individuals
- Explain to the team what's being done and ask for a volunteer
- Trace the actual steps taken
- Note any stops with sequential numbers and mark the time for each stop
- Note any awkward elements in the line taken
- Mark any inherent interruptions in the path – such as a surgeon 'gowning up' in theatre
- Note why certain trips are made, eg getting necessary supplies or signatures
- Ask questions and seek suggestions from the team – the best ideas often come from those who live the process.

Examples

The spaghetti diagram tool was successfully used to help redesign the pathology department at Hereford Hospital. The diagram below shows movement of staff in the department, helping to visualise waste in movement. The red dots represent the main positions of the staff. Red lines show wasted movement.

Figure 1: Spaghetti diagram showing movement of staff



What next?

Spaghetti diagrams are best used in conjunction with other tools and techniques that help build a visual picture of the workings of a department, eg [process mapping](#) or [value stream mapping](#).

Additional resources

Bicheno, J (2014) *The New Lean Tool Box*, PICSIE Books: Buckingham

George, M et al (2005) *The Lean Six Sigma Pocket Toolbook*, McGraw Hill

Liker, J (2004) *The Toyota Way Fieldbook: A Practical Guide for Implementing Toyota's 4Ps*, McGraw-Hill