

ED PIP: Diagnostic Phase

Tools: Spaghetti Diagram

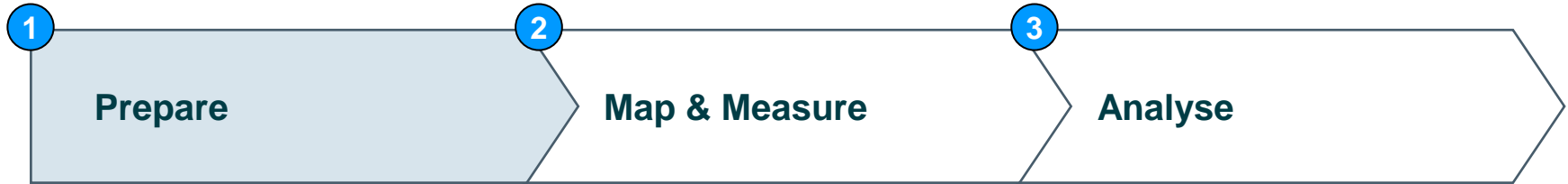
Spaghetti Diagram – Overview

Outcome	<ul style="list-style-type: none"> ■ See waste of motion and conveyance and generate solutions to eliminate it
Definition: 'What is it?'	<ul style="list-style-type: none"> ■ A visual presentation of the path a person, object or piece of information takes during a specific process
Objectives: 'What is it used for?'	<ul style="list-style-type: none"> ■ Document the current movement of people and work ■ Identify opportunities for improvement
Benefits:	<ul style="list-style-type: none"> ■ Clearly illustrate the inefficiencies in a process related to physical movement: <ul style="list-style-type: none"> - Movement of people walking around - Movement of materials through an area - Movement of hands performing a series of operations - Movement of documents through an office
When to use	<ul style="list-style-type: none"> ■ Anytime you see: <ul style="list-style-type: none"> - Excess walking or transport time, complex processes - 'Before and after' evaluation of the existence of waste

Tip for integrating Lean principles into healthcare:

- *Part of successfully implementing Lean in healthcare is adopting common language that may have originated in manufacturing and internalizing how it is used in a healthcare environment*
- *Spaghetti Diagram is appropriately named as a complex process that maps movement looks like a plate of spaghetti. This is a visual representation by drawing a line from one place to the next. It records all the back and forth and extra steps. It's a great tool to see what areas a process touches (and how much it touches it)*

Before you map out a spaghetti diagram, it's important to have done the due diligence in advance and be prepared to lead this exercise

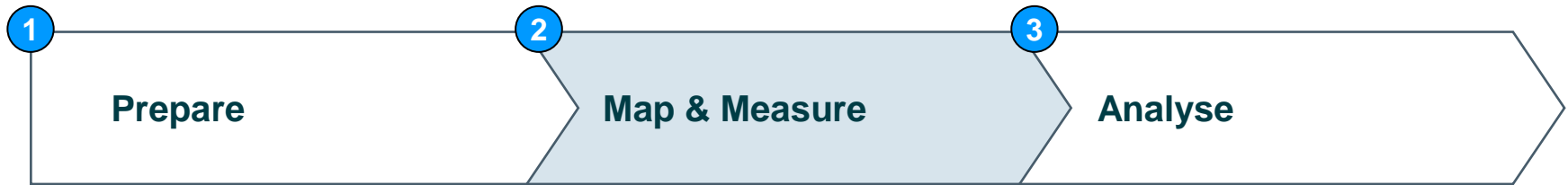


- Identify the process to be studied
- Ensure process boundaries and/or work area is clearly defined
- Determine which staff members or materials, and how many, to observe and map as they go through the process
- Arrange and confirm staff, date, time
- Ensure staff being studied understand why, how and when they will be studied and invite questions
- Visit and study the area where process is executed; understand process.
- Prepare materials:
 - White board, paper or blackboard large enough to document motion
 - Appropriate writing utensils



- If studying more than one individual or material moving through a process, you may wish to use different colours to represent parallel flows
- A pedometer may be used to measure the number of steps taken

Through preparation activities, you should have a clear sense of what it is you are measuring and should map out as accurately as possible



- Draw the floor plan or diagram of the area being studied – include equipment, work areas, doors/ windows and other relevant objects as they are currently and/or commonly placed
- Draw the floor plan to scale, where able
- Explain the need for participants to perform task as it is currently and commonly done rather than what should be done as per policy or vision of an improved state – resist the temptation to ask questions (why are you doing it that way?) which may lead the participants to perform the task differently
- Observe the work being done
- Every time the target moves, mark the paths taken directly on the floor plan as the work is being done



- Circle diagrams are similar to spaghetti diagrams and are used to map handoffs of information. The technique is similar but instead of drawing a floor plan, a simple circle is drawn to represent the process.
- Any time a piece of information is conveyed or exchanged, draw a line across the circle and identify from/to whom the flow occurred.
- Different colours can be used to denote different people, professions or parallel processes.
- To determine the number of handoffs, count the number of times a line hits the circle / 2

The team should be engaged where possible to align on potential strategies to improve unnecessary movement



- Highlight excess or redundant distances, information flow and movements
 - Count the number of times the person, material or equipment changes position or is moved
 - Measure the number of steps and/or distance travelled for each 'leg' of the process
 - Measure the number of times the person, material or equipment is transferred to another individual or place
 - Look for patterns, for example, repeated steps, key areas or workspaces, other types of waste
- Present the information on a chart and share with staff
- If possible, post the spaghetti diagram (actual or photo) as well as a tool to solicit potential solutions
- Assemble team to test potential solutions
- Follow up spaghetti diagram of streamlined workflows



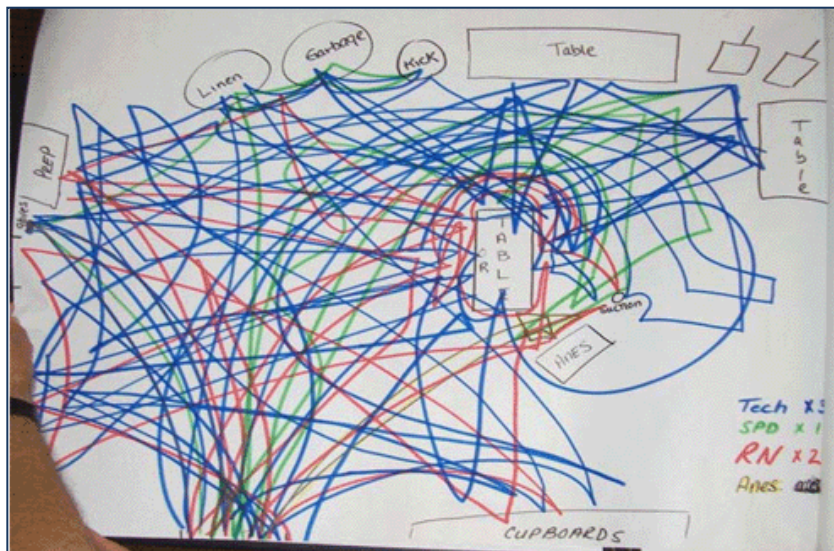
- Resist the temptation to redesign workstations, flows or policies without team input; ensure team includes those working in the area as well as immediate supervisors or managers.

Spaghetti Diagram - Example

Spaghetti Diagrams – Operating Room Redesign

Before

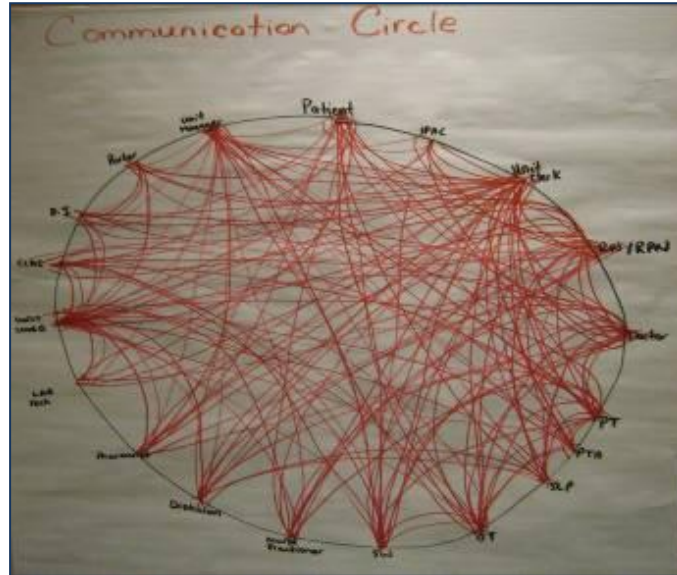
After



Source: John Toussaint. ThedaCare. Appleton Wisconsin. USA

Circle Diagram (information flow) - Example

Information flow for placement to long term care



Source: North York General Hospital. North York, ON.