

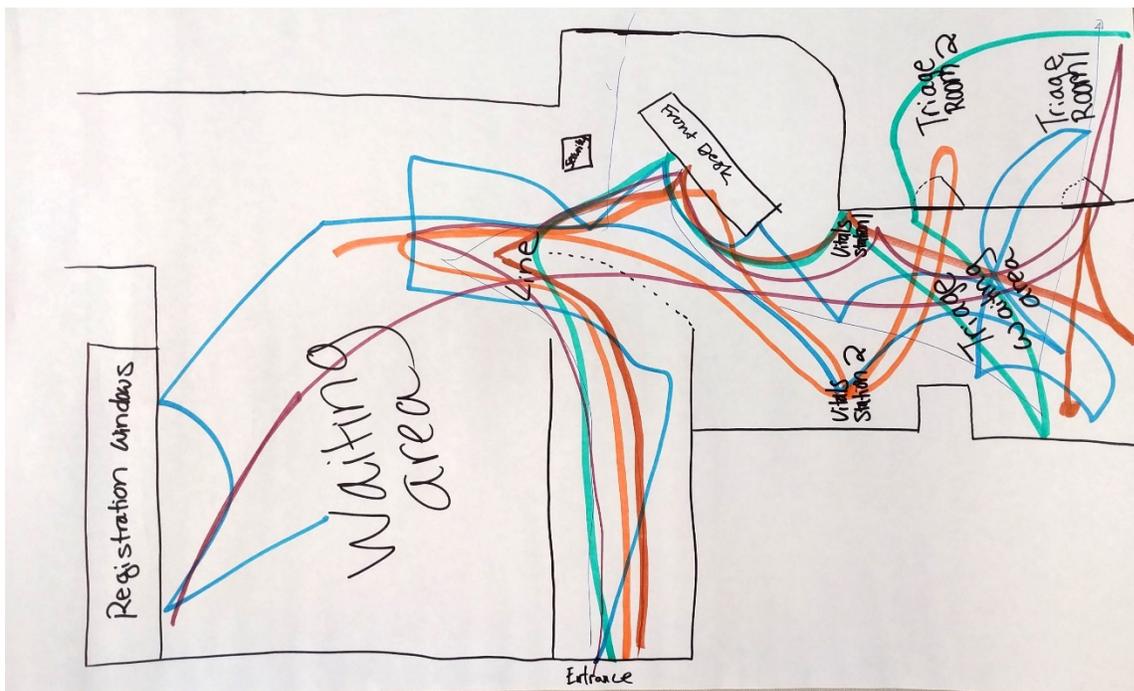
# Spaghetti Diagram

## What is a spaghetti diagram?

A spaghetti diagram, or spaghetti map, is a visual representation of physical space using a continuous flow line tracing the path of an item or person through a process. The continuous flow line enables process teams to identify movement and redundancies in the process and find opportunities to reduce motion and other obstacles. The diagram is intended to show:

1. The layout of the work area
2. The motion of how customers, staff, or objects move through the process
3. Unnecessary movement
4. Better work space layouts to minimize motion or other obstacles

**Figure 1.** Spaghetti diagram of patient movement at the former San Francisco General Hospital Emergency Department. Each color represents one patient's movement through the check-in and triage process.



SFGH E.D. spaghetti diagram highlights:

- Patients enter a narrow hallway and cannot see the front desk until they reach the end. Several patients stopped when they got to the end of the hallway and looked around, unsure where to go. The sign for the check-in line was not clearly visible to some patients.
- Two patients had to register before they could be sent to triage. They waited in line for the front desk, then talked to the front desk person and then were sent to the registration windows.
- This map does not document the motion of patients after triage, which could include waiting in the main waiting area.

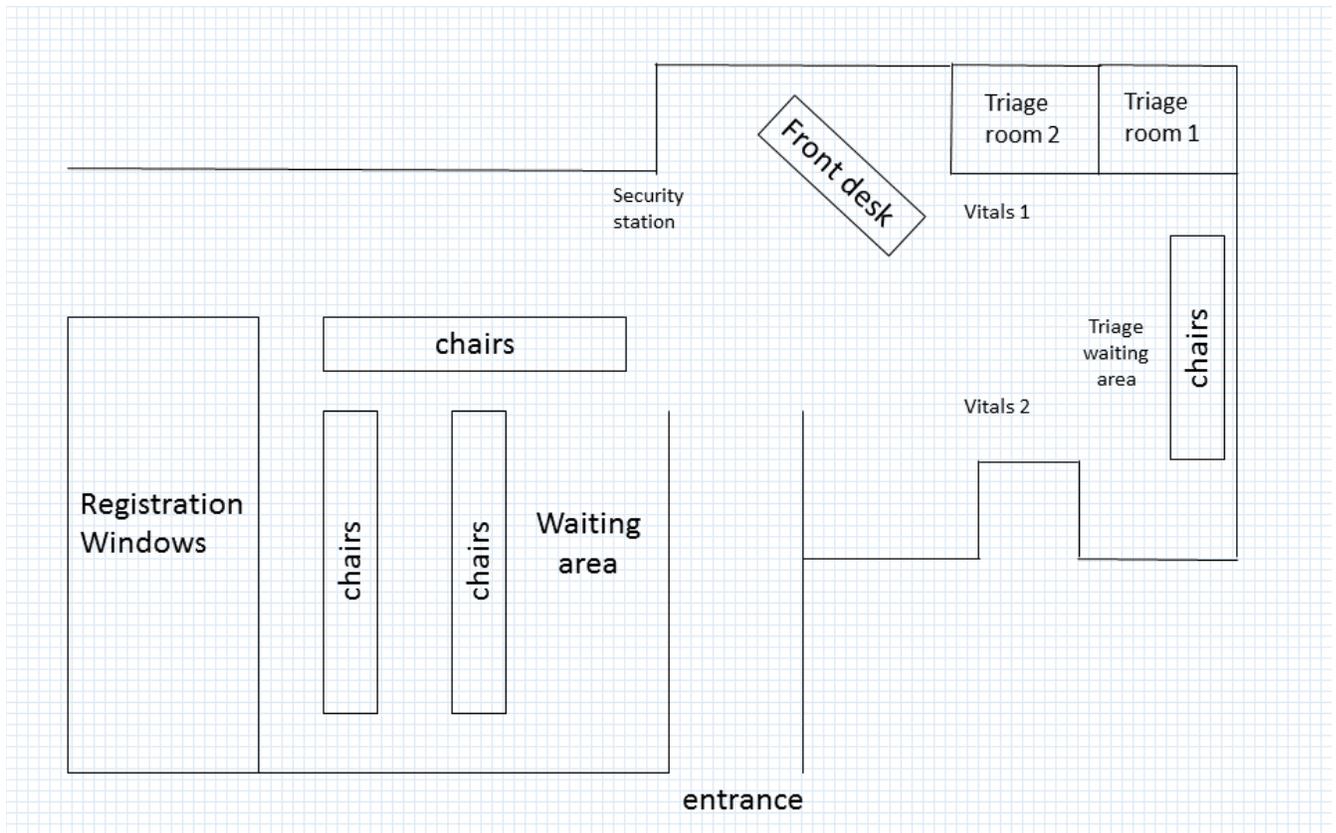
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## When should I use it?

- **When there is a lot of movement in the process** – of customers, staff, and/or items such as documents or materials. For example: customers applying for public benefits in person.
- **When you believe that physical layout is inefficient or creates obstacles in the process.** Does the mechanic have all the tools she needs for her work close at hand, or does she have to travel across a room to retrieve them? A spaghetti diagram can visualize such movement.
- **When customers or staff are confused about where to go to conduct certain activities.** For example, Library staff at the Main branch are often asked “directional” questions – questions such as “where is the history section?” or “where is the bathroom?”. The library could spaghetti diagram patron movement to better understand where to position signs or other forms of assistance.
- **When a process travels electronically or physically from one building or a floor of a building to another.** For example: a building permit application traveling from one City department to another
- **Before a work space is designed or re-designed.** For example, when Laguna Honda renovated two clinics, they used a Lean approach to create a more patient-centered design, minimizing patient motion and bringing more services to them rather than having them walk around multiple floors of a building.

## How do I facilitate or create it?

1. **Draw the layout of the work space along with the fixed objects**
  - a. Use a piece of paper – grid paper is helpful – and create a simple high-level drawing the workspace layout. You want to document furniture and equipment as well.
  - b. If a blueprint or plan of the area is available, you can use that, so long as it is sufficiently legible.



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2. **Draw a single, uninterrupted line to trace the path of the customer, staff person or object being followed.**
  - a. Hold your pen down on the paper from the time the person or object begins the process to the time they end.
  - b. If you want to document the movement of multiple customers, staff or objects, you can use different color markers/pens to denote each individual or object.
3. **Note times of each movement.** If possible, time each movement and note them on the paper.
4. **Note distances between movements.** If possible, estimate the distances between each movement
5. **Analyze the diagram.** Some key questions to ask include:
  - a. How does the customer feel when going through the motions?
  - b. Are all motions equally important?
  - c. Are there breaks in motion; why?
  - d. What steps can be eliminated?
  - e. How might the team redesign the space to reduce movement?
  - f. Can a 15-year old understand what is happening on the diagram?