The Principle of Limiting Factors

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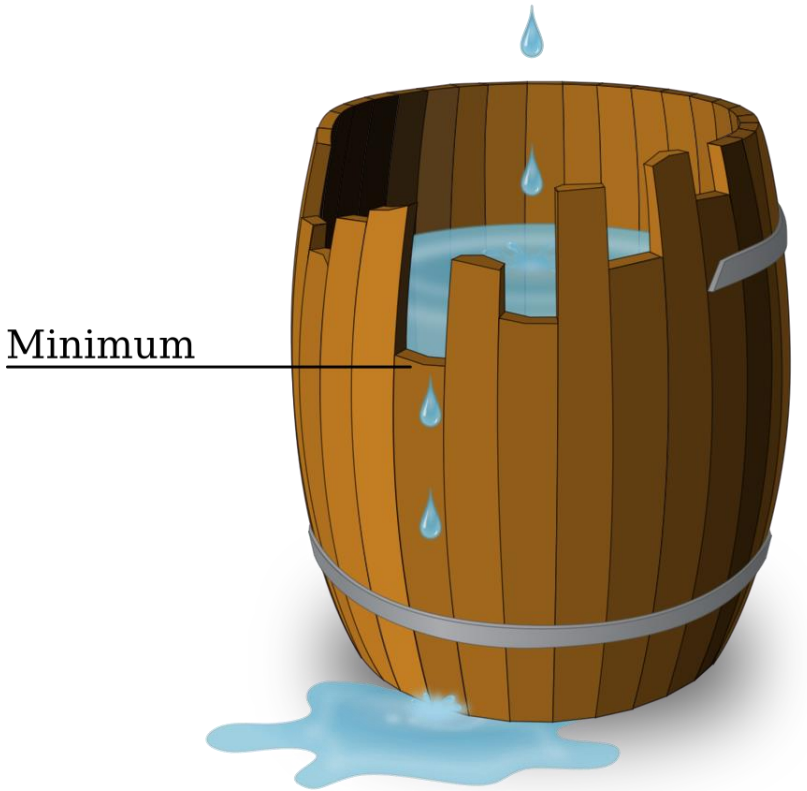
«Liebig's Barrel»

Imagine a barrel made of wooden planks.

If the planks are different heights, the barrel can only hold water up to the level of the shortest plank.

No matter how high the other planks are, water will never rise above that lowest point. Any extra water simply spills over the top.

This is the principle of limiting factors.
(introduced by Karl Sprengel in 1828 and popularised by Justus von Liebig in the 1840s)



The principle of limiting factors

The overall capacity of any system is determined by its scarcest resource

OR

A chain is only as strong as its weakest link

Hospitals can use this principle to identify the processes that are holding back their entire system:

A hospital's ability to deliver safe and high-quality care is determined by its scarcest resource.

Too many patients waiting... What is limited?

How to detect limiting factors?

- Process Mapping: Drawing a clear picture of a workflow to see all the steps from beginning to end.
- Review feedback from patients and staff to spot patterns and find their root causes.
- Study the factors whose critical impact on quality and safety is confirmed by data and research. For example, international patient safety goals.
- Use a system tool to analyse hospital potentials:

Important

The principle of limiting factors gives us a systematic approach to problem solving:

1. Find the "shortest plank" – identify the main, limiting process.

2. Don't pour water into the entire barrel at once – don't scatter your resources on improving what is already working fine. First, you need to find and lengthen the shortest plank.

3. Remember that after removing one constraint, the next one will appear.

Systematically addressing limiting factors is the fastest way to achieve hospital resilience

References

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