



# THE 2022 TECHMED EVENT



# Healthcare from a different perspective

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TECH-MED  
EVENT**





# CHOIR

Center for Healthcare Operations  
Improvement & Research

<http://www.utwente.nl/choir>



# Staffing crisis

Adding capacity or increasing funding does not solve the problem

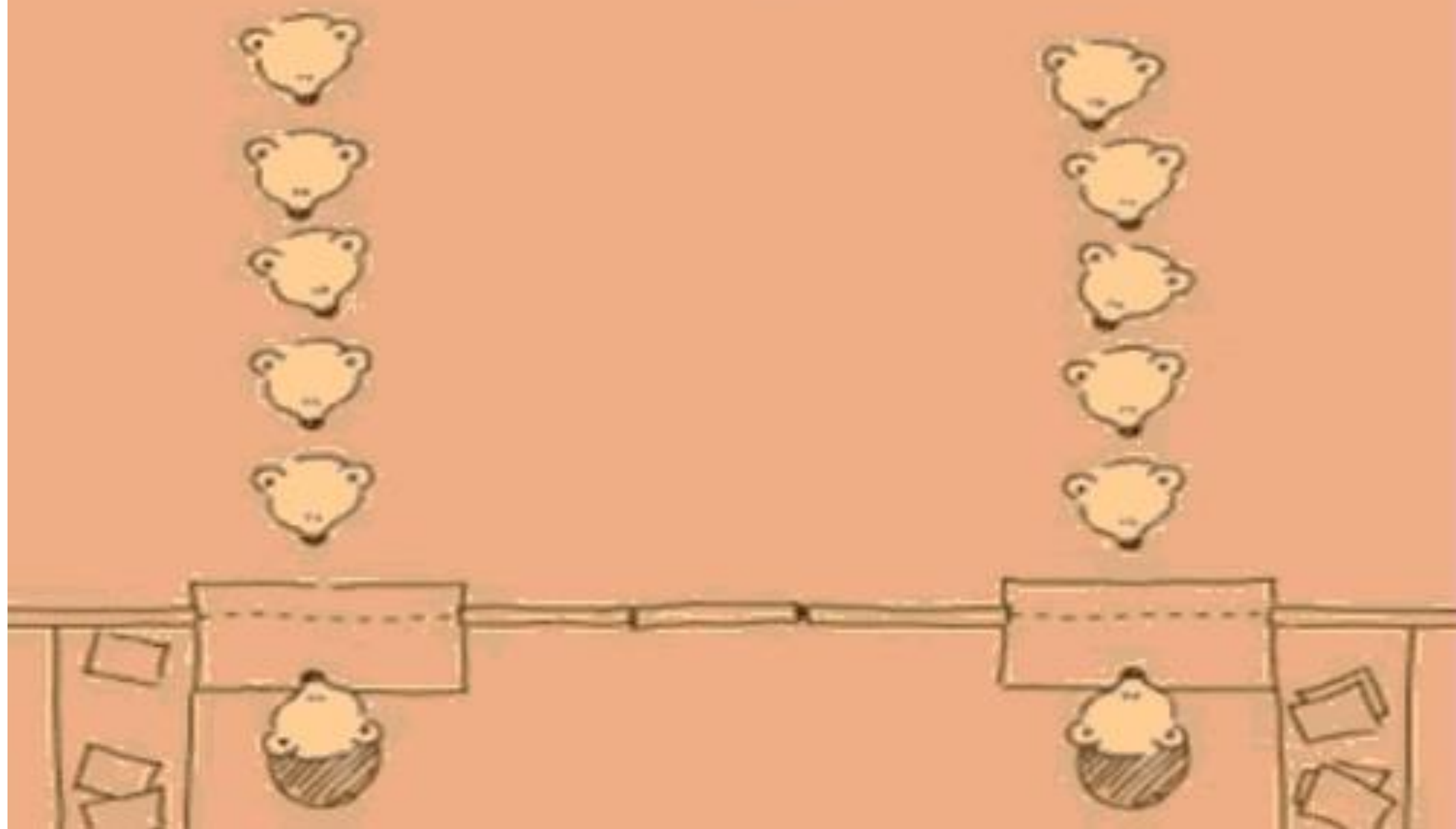
... it kills organizational innovation, thus worsens the problem !

# Transforming healthcare

- More focus on prevention, rather than cure & care
- ‘Zinnige zorg’ (appropriate care)
- Responsible, cost-effective implementation of technology
- *Our focus:* capacity pooling

## **Capacity pooling**

***'a little flexibility goes a long way'***



# VARIABILITY CAUSES BAD PERFORMANCE



Waiting time

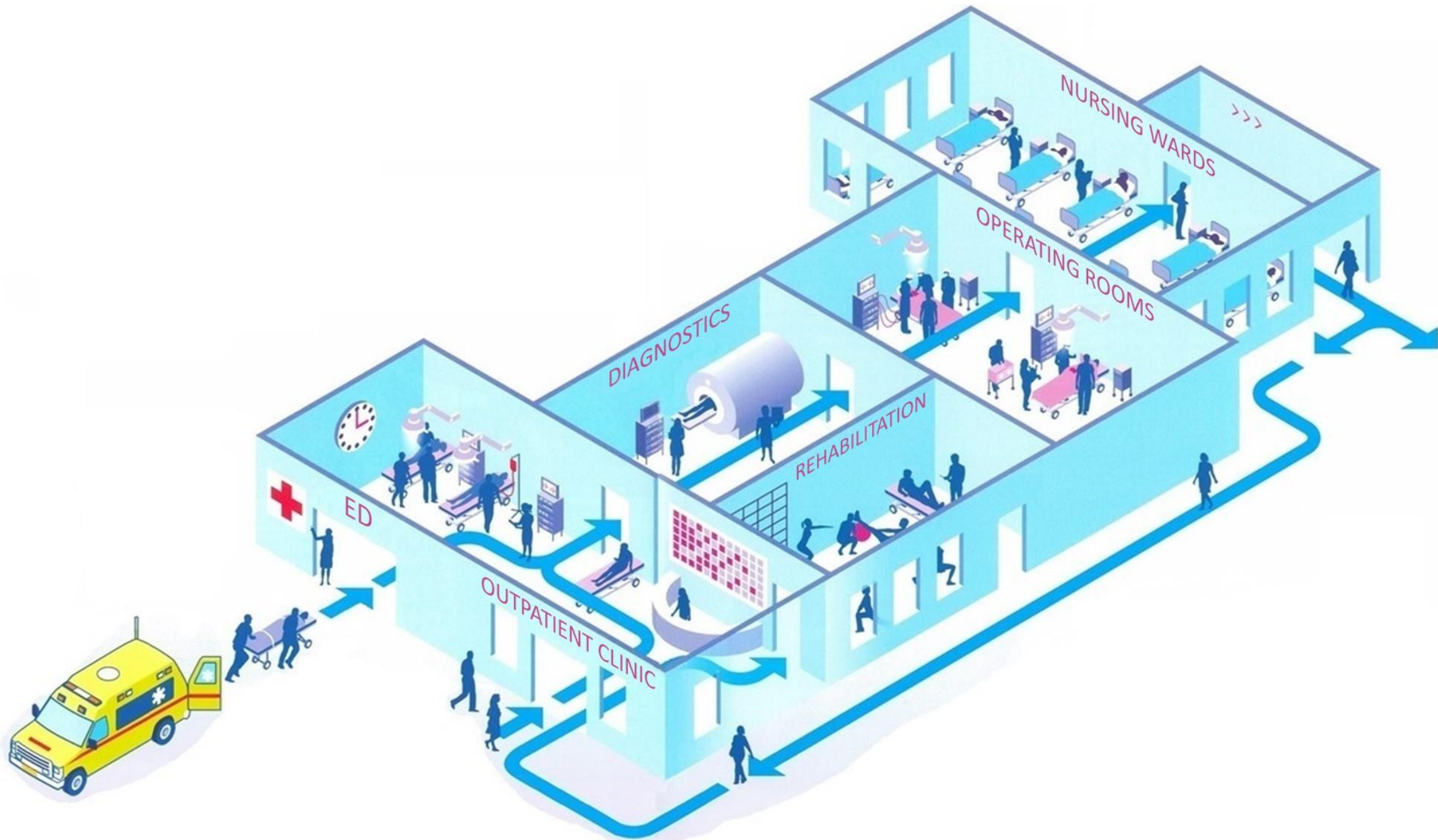


Overtime

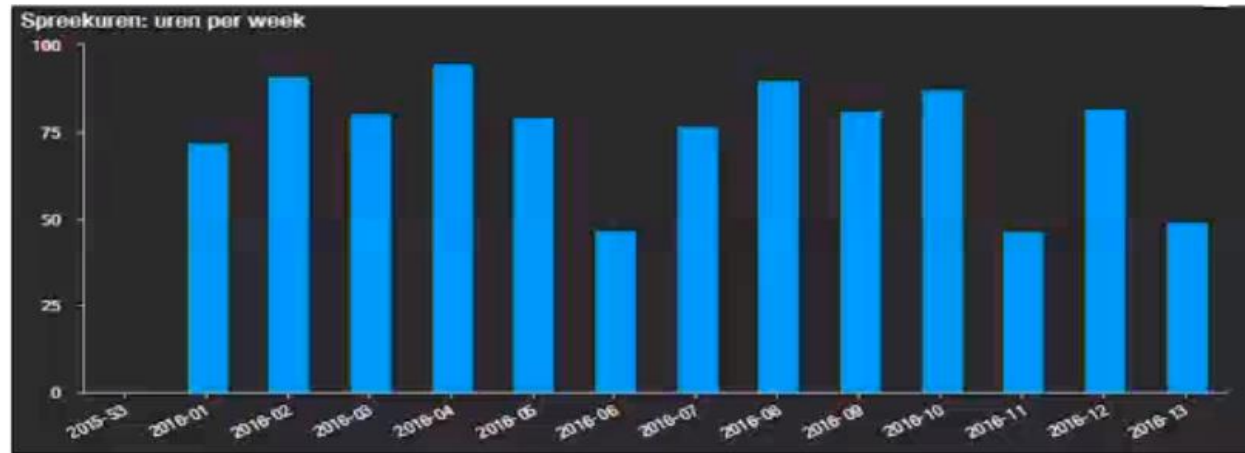


Underutilization

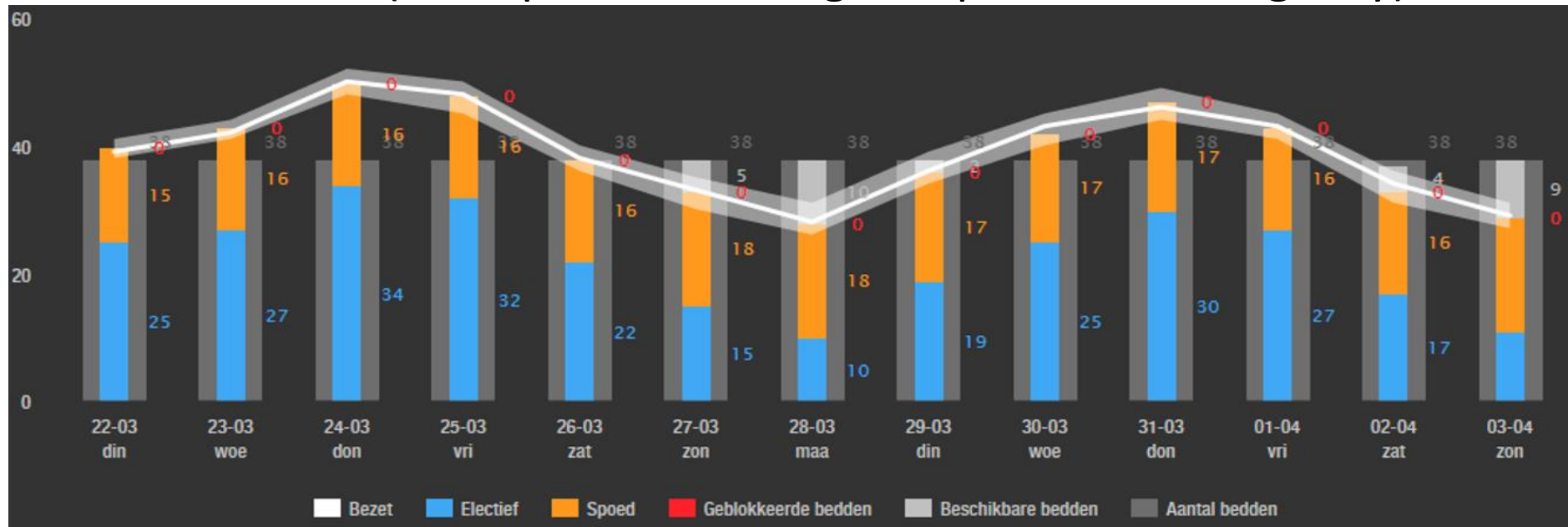


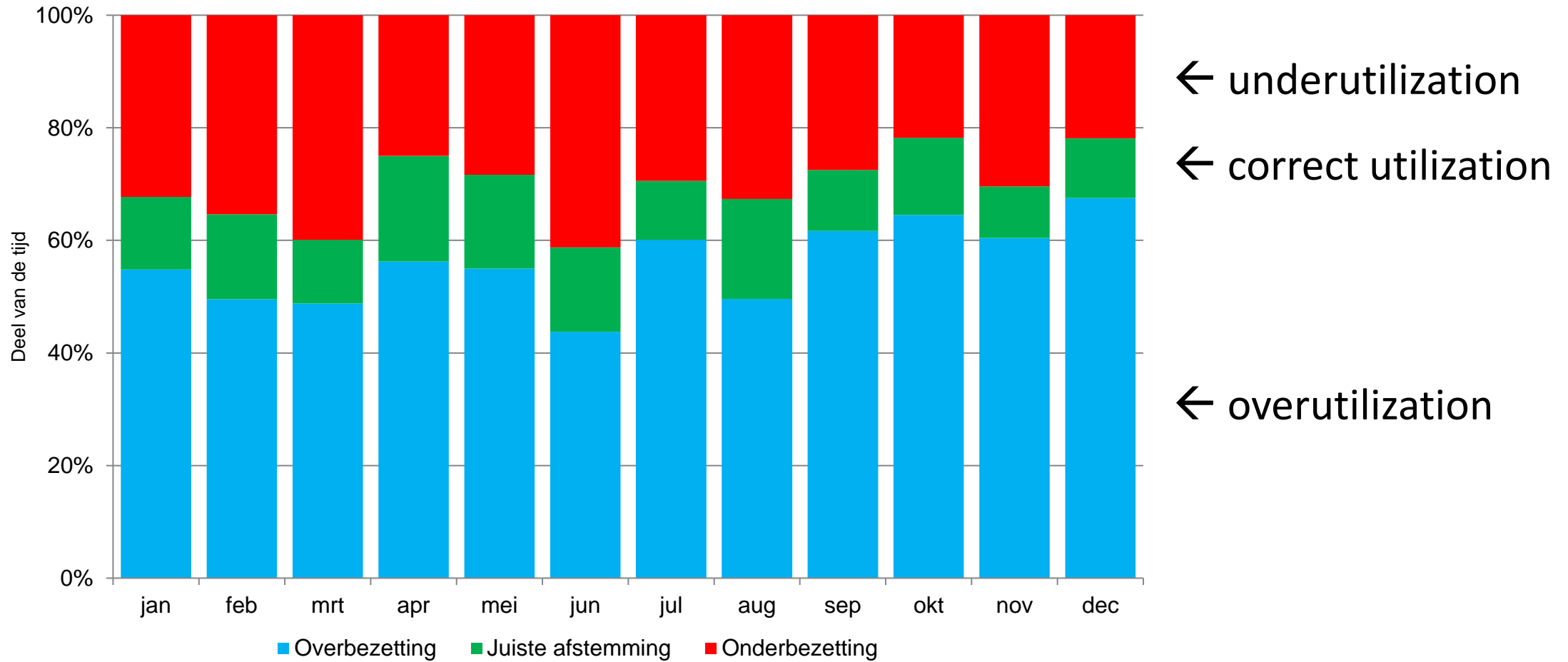


## Outpatient consultation hours (per week)



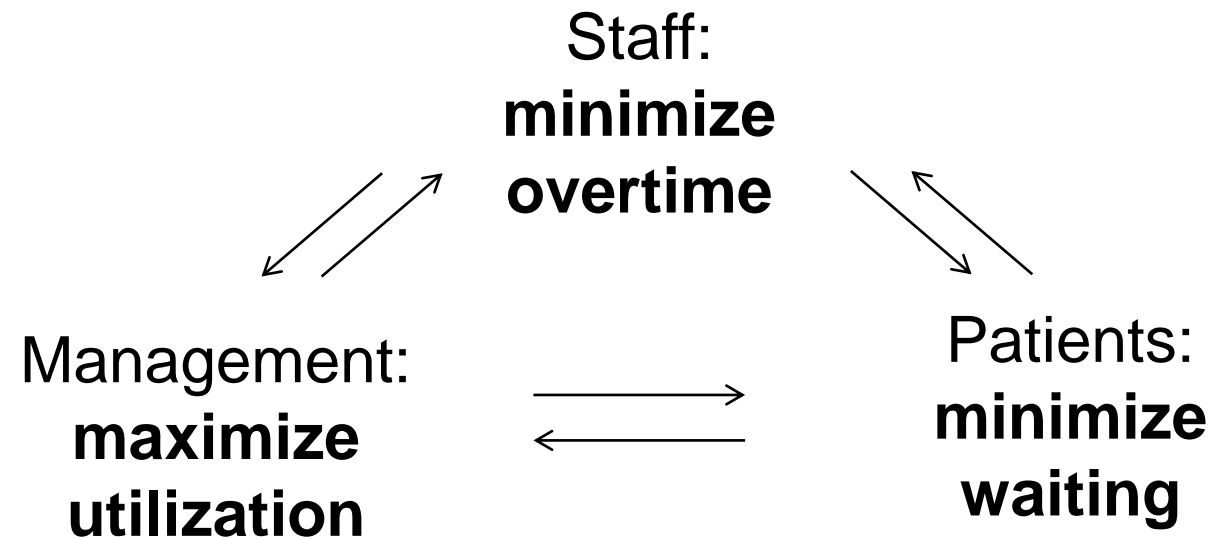
## Ward utilization (blue: planned, orange: unplanned/emergency)



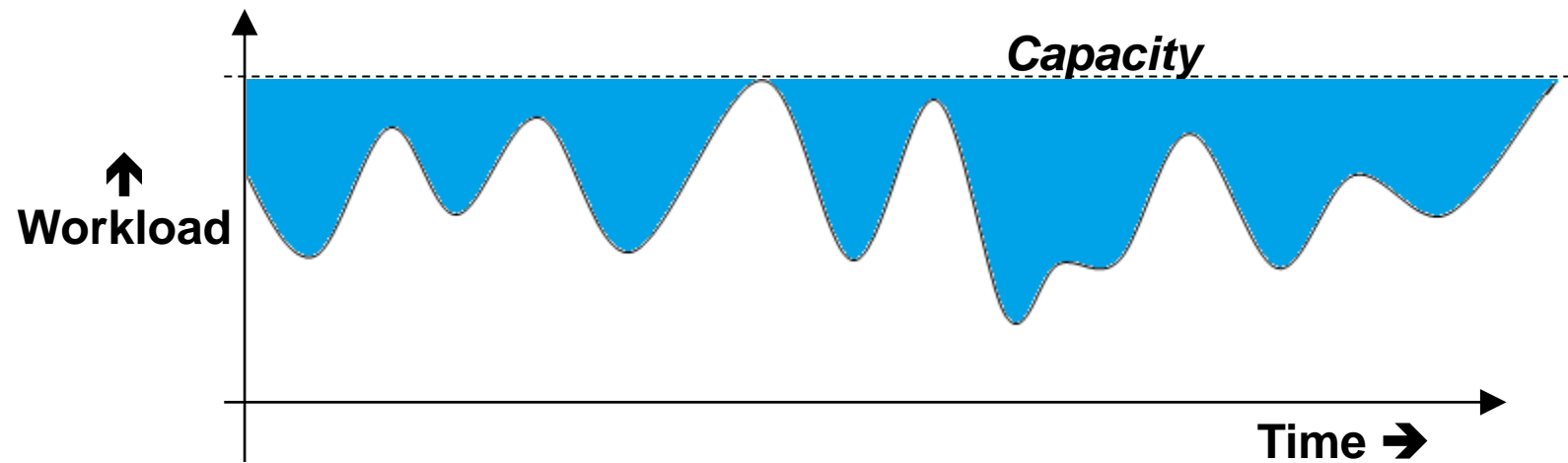


# Planning = variability management

Apparent contradictory objectives:



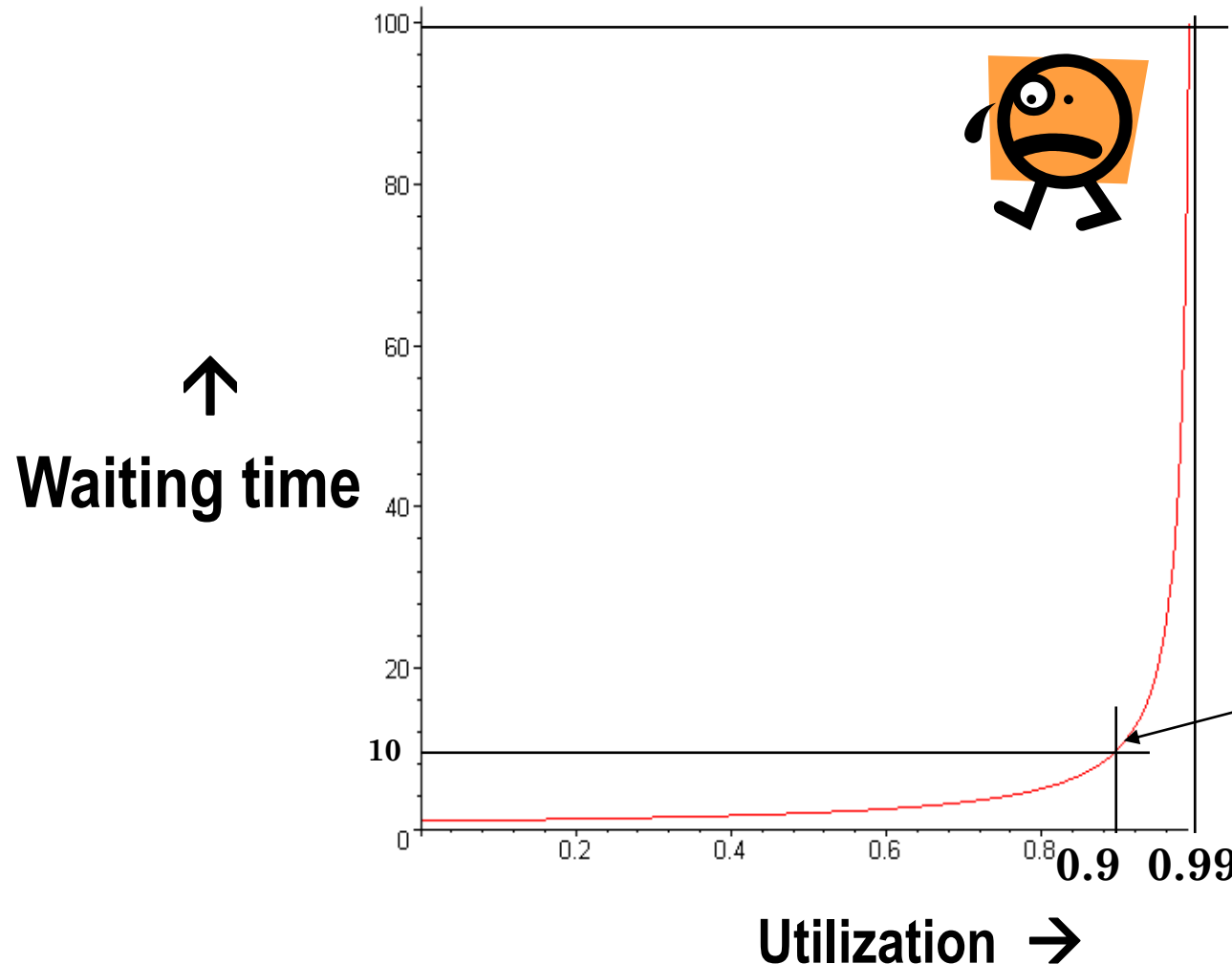
Management dogma: maximize utilization







## Effect of variability in queues



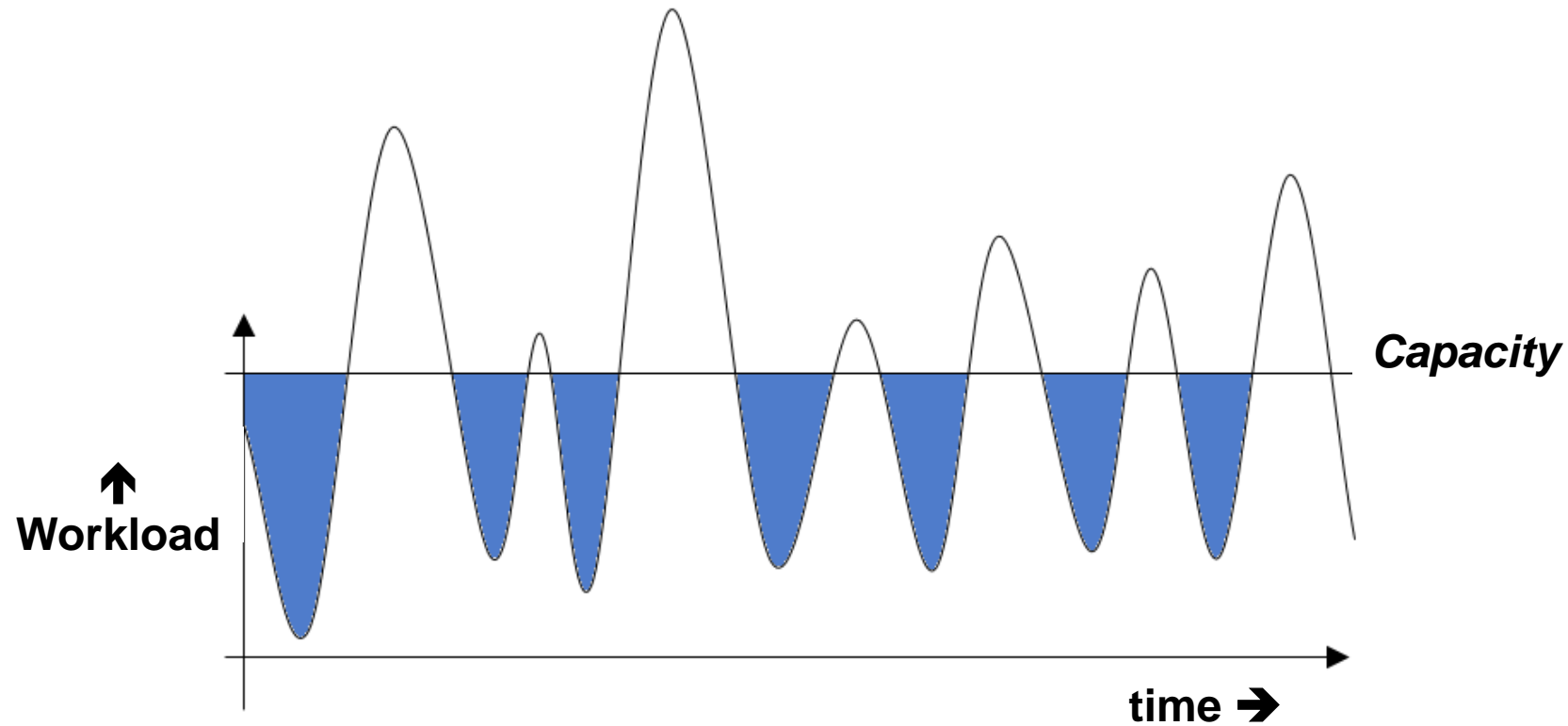
**Pollaczek-Khinchine  
formula**

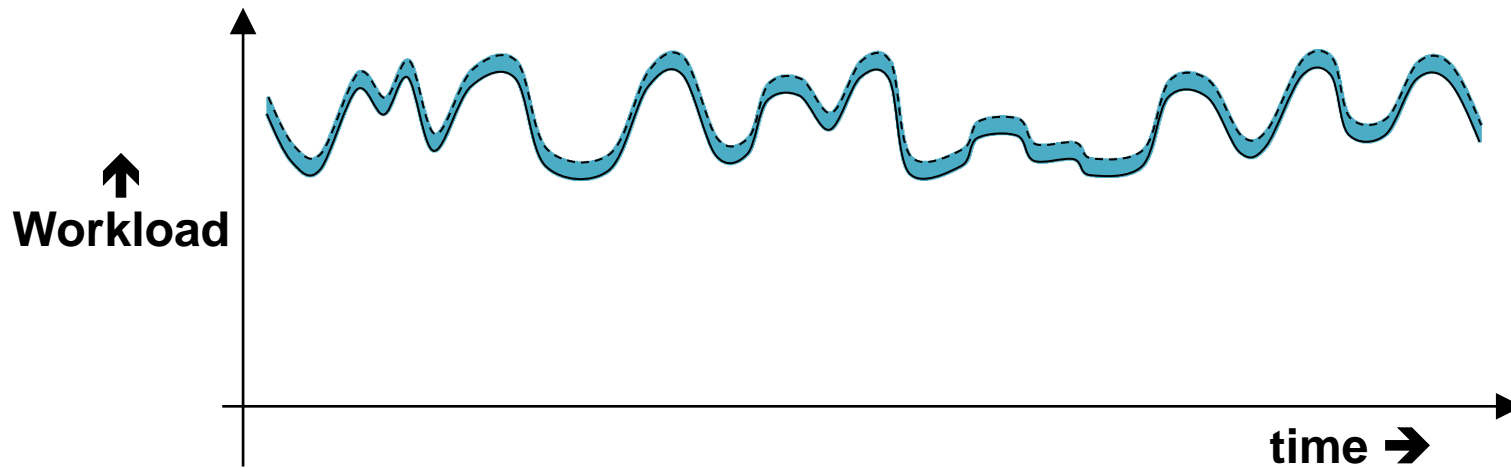
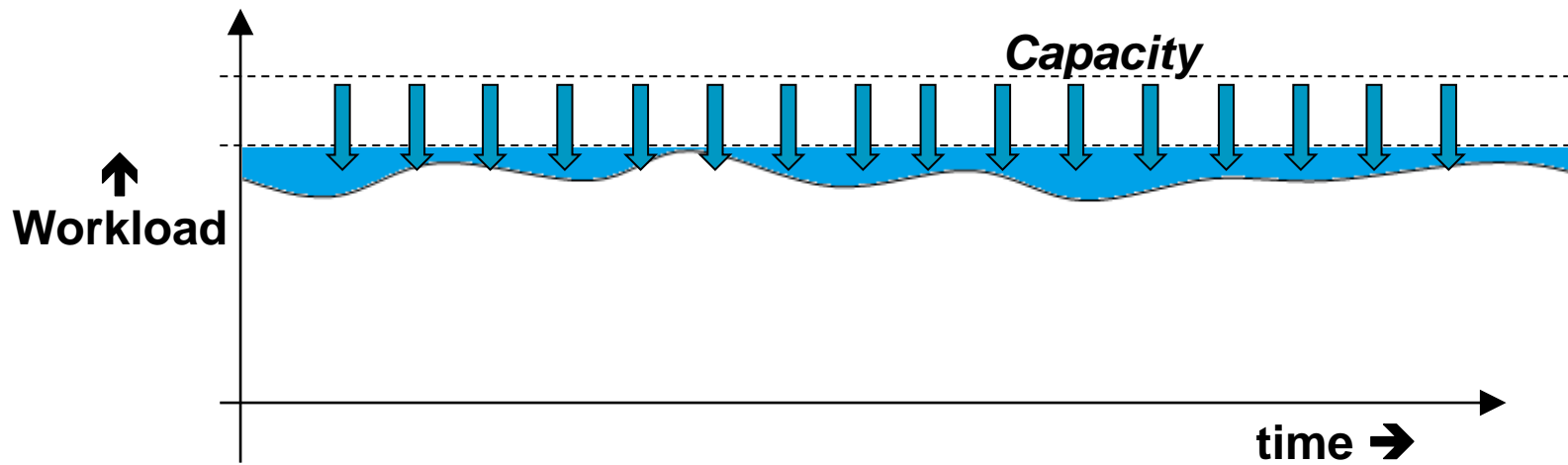
$$W = \frac{\rho + \lambda \mu \text{Var}(S)}{2(\mu - \lambda)} + \mu^{-1}$$

$$L = \rho + \frac{\rho^2 + \lambda^2 \text{Var}(S)}{2(1 - \rho)}$$

**Waiting time =  
10 x service time**

Maximizing utilization leads to even more:  
maximizing patient waiting  
maximizing overtime





**Higher utilization with less capacity  
and reduced overtime!  
More flow, so also reduced waiting!**

# Examples of capacity pooling

- Within the surgical care chain of hospitals:
  - Improved access,
  - 10-30% more production,
  - Reduced work pressure,
  - Fewer beds
- Between ICUs in the region
- Between home care organizations and hospitals
- Between NICUs in the Randstad ([MSc thesis Kimberley Morris](#))
- Between maternity care organizations
- Etc.





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Thanks!

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