BRAZILIAN HEALTHCARE

delegation

meets

ORTEC

15 June 2016, the Netherlands

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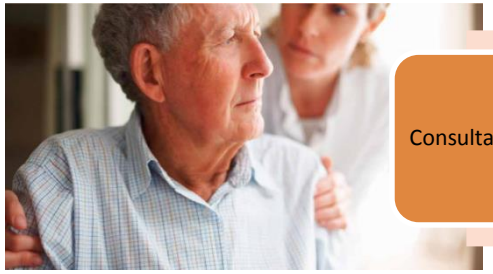
What is required to achieve highest quality of care at lowest costs?

$$\text{Patient Value} = \frac{\text{Health Outcomes}}{\text{Cost}}$$

Outstanding professionals and equipment/facilities



Consultation → Research & Diagnostics → Surgery → Intensive Care → Nursing → Discharge

Excellent healthcare delivery processes

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The future is to excellent healthcare service providers

It is about

being smart in what to do and how to deliver it…

Applied Mathematics

- ✓ Process Innovation
- ✓ Business Analytics and Optimization
- ✓ Building on the latest scientific insights in Applied Mathematics

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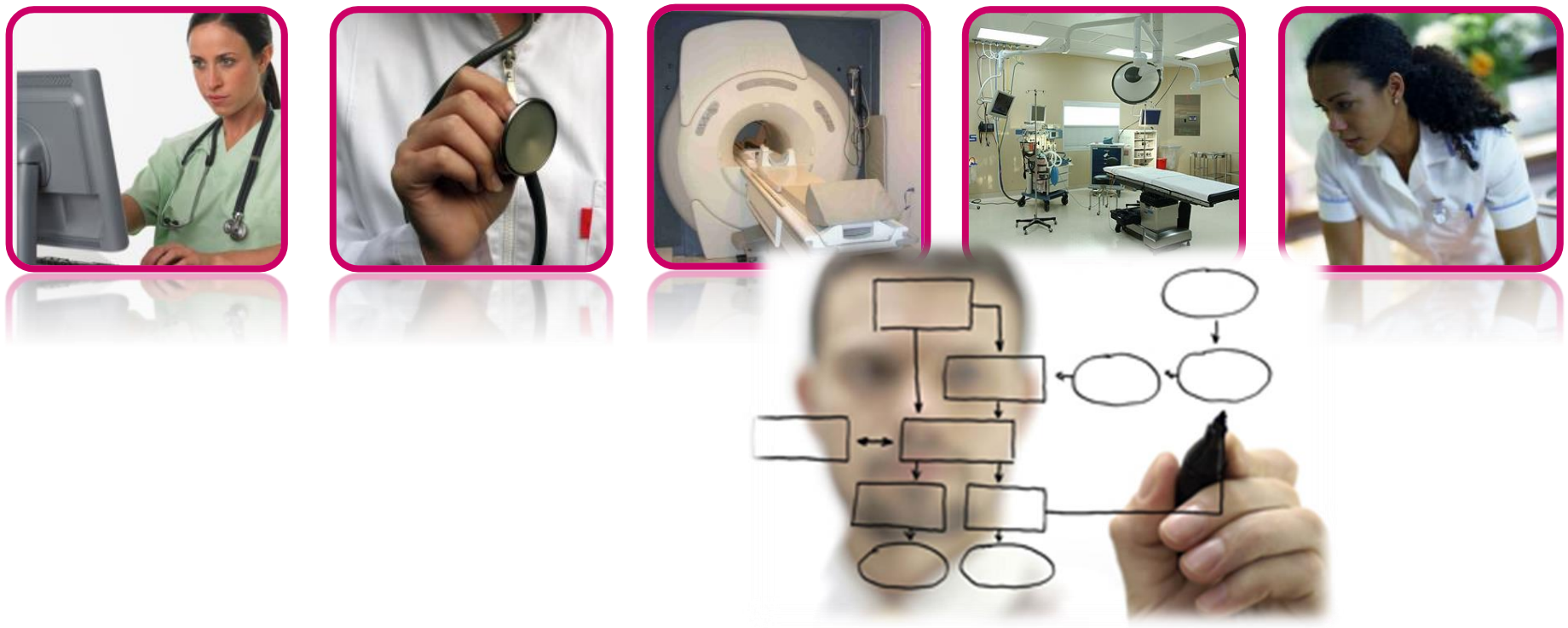
Optimizing CAPACITY & OPERATIONS MANAGEMENT



- Who is doing what, when, where, and with which equipment?
- Essence: adhere supply to demand

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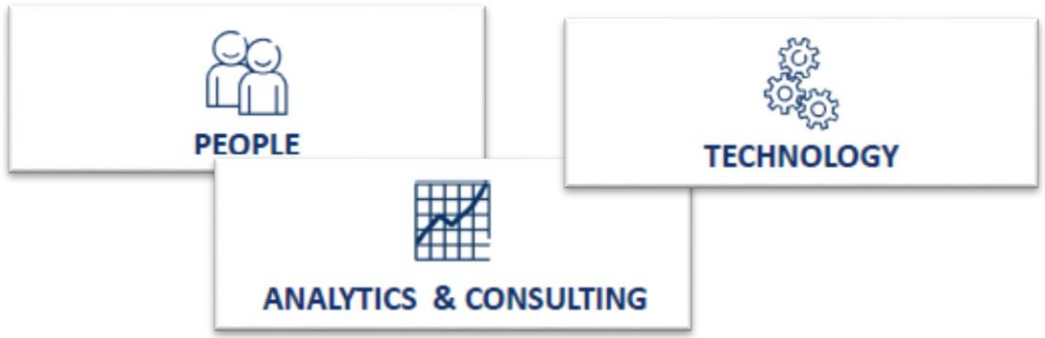

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knowledge + capabilities ► ***valorisation***
innovate practice

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WE ARE…

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dr. Bart Veltman
ORTEC, Partner
Rhythm, co-CEO
CHOIR – University of Twente

UNIVERSITY OF TWENTE. - CHOIR

Prof. dr. Richard Boucherie
Applied Mathematics

Prof. dr. Erwin Hans
Healthcare Operations Management

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dr. Nikky Kortbeek
CEO
CHOIR – University of Twente

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Market leadership

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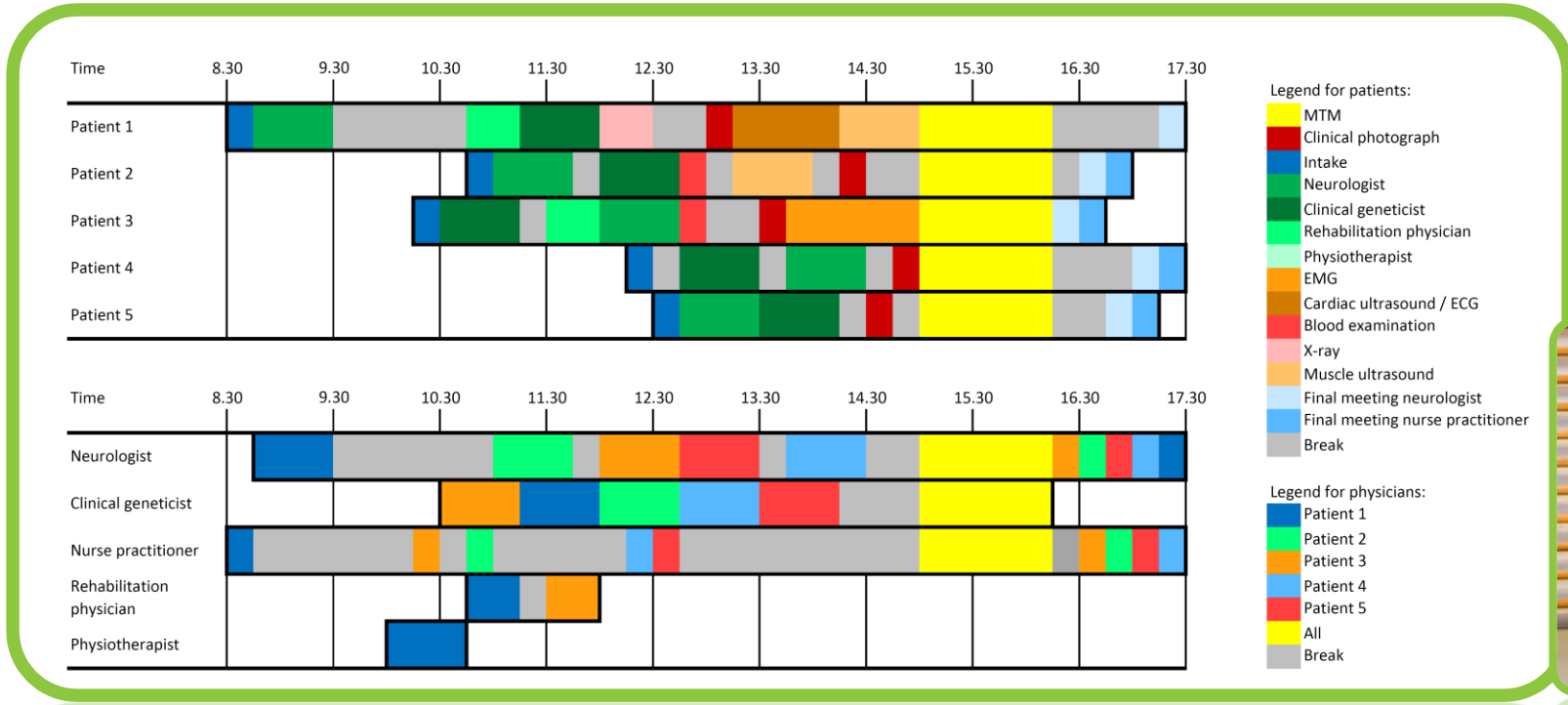
Outpatient clinic:	Reduction of 6 – 8 visits per year to 1 visit per year
CT/Radiology:	From 4 weeks waiting time to walk in (same day, next day)
Operating Theatre:	20% increase in surgeries (OT capacity) without additional capacity in nursing wards
Nursing wards:	higher quality, less capacity, higher productivity

Outpatient settings: One-stop shopping at Children's Muscle Center Amsterdam



Reducing the number of visits for these children from 6-8 times a year, to **1** time a year

Kortbeek et al. (2012). Organizing multidisciplinary care for children with neuromuscular diseases. University of Twente.

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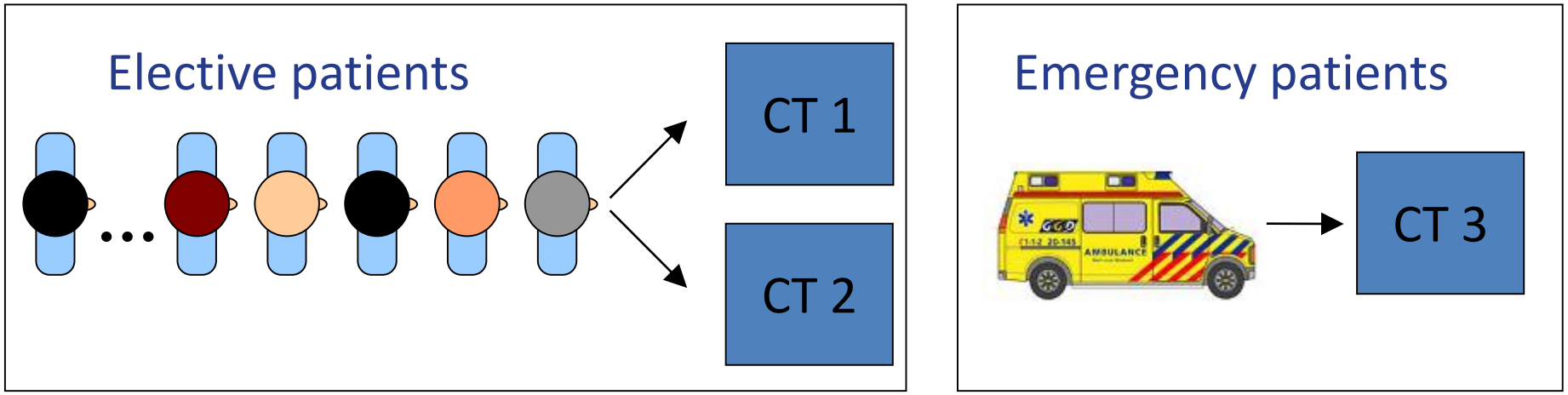
Access time to CT scanners



Problem: up to 4 weeks access time

Suggestion management: extra CT scanner

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Access time to CT scanners

Data analysis shows:

- 39% of the time the CT scanners are in use
- 39% of the time the CT rooms are empty
- 22% of the time is spent on waiting for patients

- Each patient is planned in a 20 minute slot
- For most patients CT scan requires 8-12 minutes

Variability was caused by:

- administration of contrast fluids
- patients not arriving on time

Solution: reduce load and variability

- Administer contrast fluids in adjacent room, prior to the scan
- Let patients arrive 10 minutes earlier
- Elimination of “time blocks”:

- Mathematical model to evaluate the access time
- Discrete Event Simulation to visualize improvements

Access time has been reduced to just **1 day**

And CT now implemented as a **walk-in facility**

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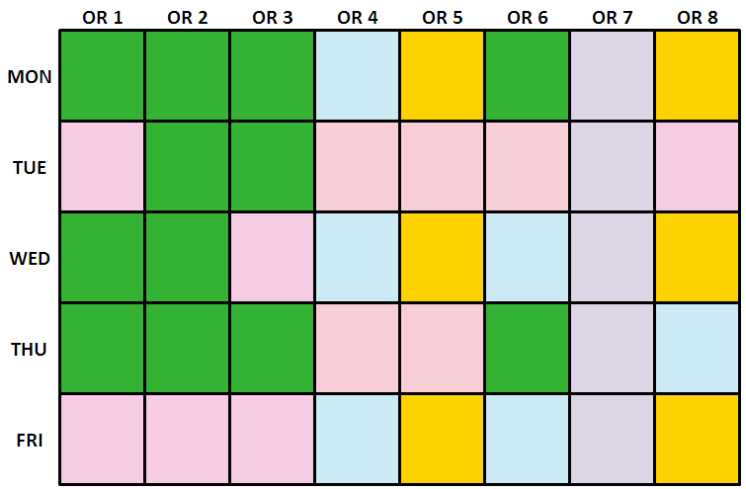
An extra Operating Theatre (higher volume of surgeries), without increase in Ward and Nursing capacity



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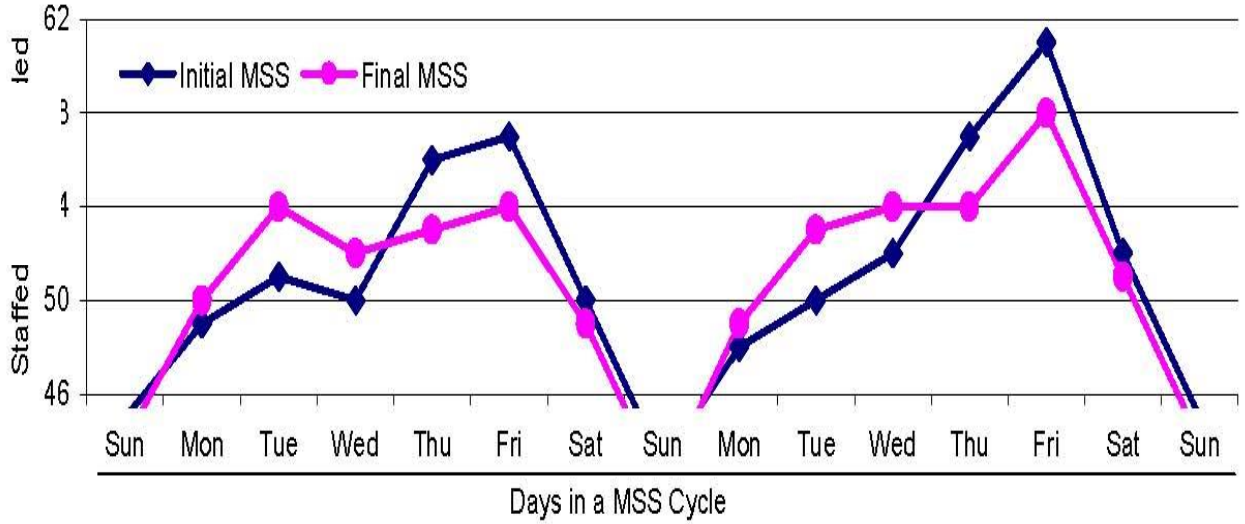
The Netherlands Cancer Institute
Antoni van Leeuwenhoek Hospital

A different assignment of OT-capacity leads to an more stable workload on nursing wards; it allows to facilitate a higher productivity of the Operating Theatre: 20% increase in productivity



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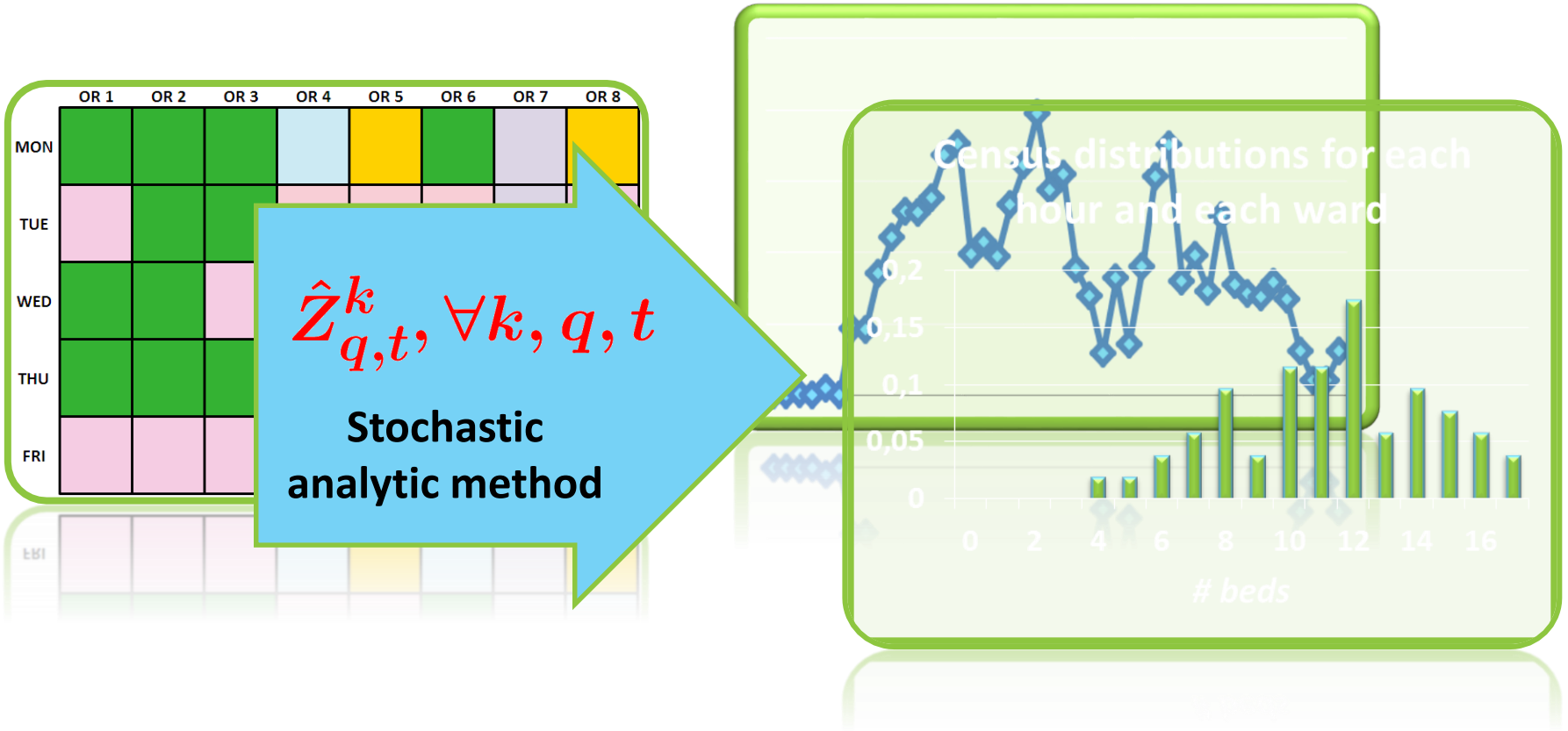
Integrally shaping inpatient care services; Predicting hourly bed census



Kortbeek et al. (2012). Integral resource capacity planning for inpatient care services based on hourly bed census predictions. Memorandum 1990, University of Twente. Submitted to: JORS.

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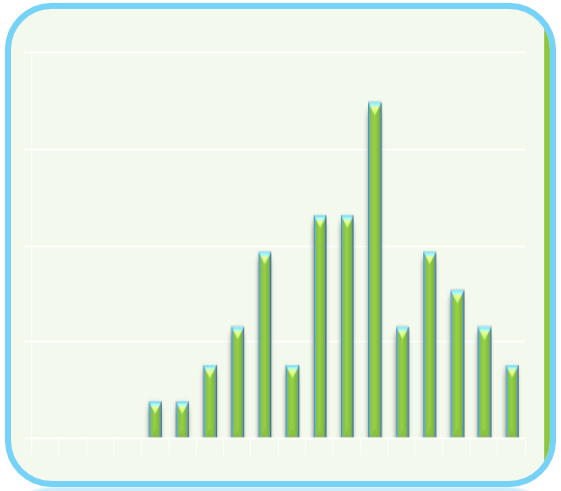
Integrally shaping inpatient care services; Flexible nurse staffing



$$\min \sum_k \omega_d d_q^k, t$$

Stochastic math. programming

- Quality: rejections, misplacements, nurse-to-patient ratios
- Efficiency: bed utilization, #FTE nurses

Kortbeek et al. (2012). Flexible nurse staffing based on hourly bed census predictions. Memorandum 1996, University of Twente. Submitted to: Operations Research.

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Integrally shaping inpatient care services; Results

- Balanced inflow of postoperative patients to inpatient facilities (reducing the OR schedule outflow variance)
- Optimized match nurse staffing decisions to actual patient inflow (prediction and optimization algorithms)

Compliance nurse-to-patient ratio's +10%	Number of beds −5 to −15%	Number of patients per FTE +10 to +20%
higher quality	less capacity	higher productivity

Sint Maartenskliniek

amc

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Antoni van Leeuwenhoek Hospital

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Examples of significant optimizations

Outpatient clinic:	Reduction of 6 – 8 visits per year to 1 visit per year
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Applied Mathematics

– Operations Research methods and software products –

essential to all mentioned optimizations

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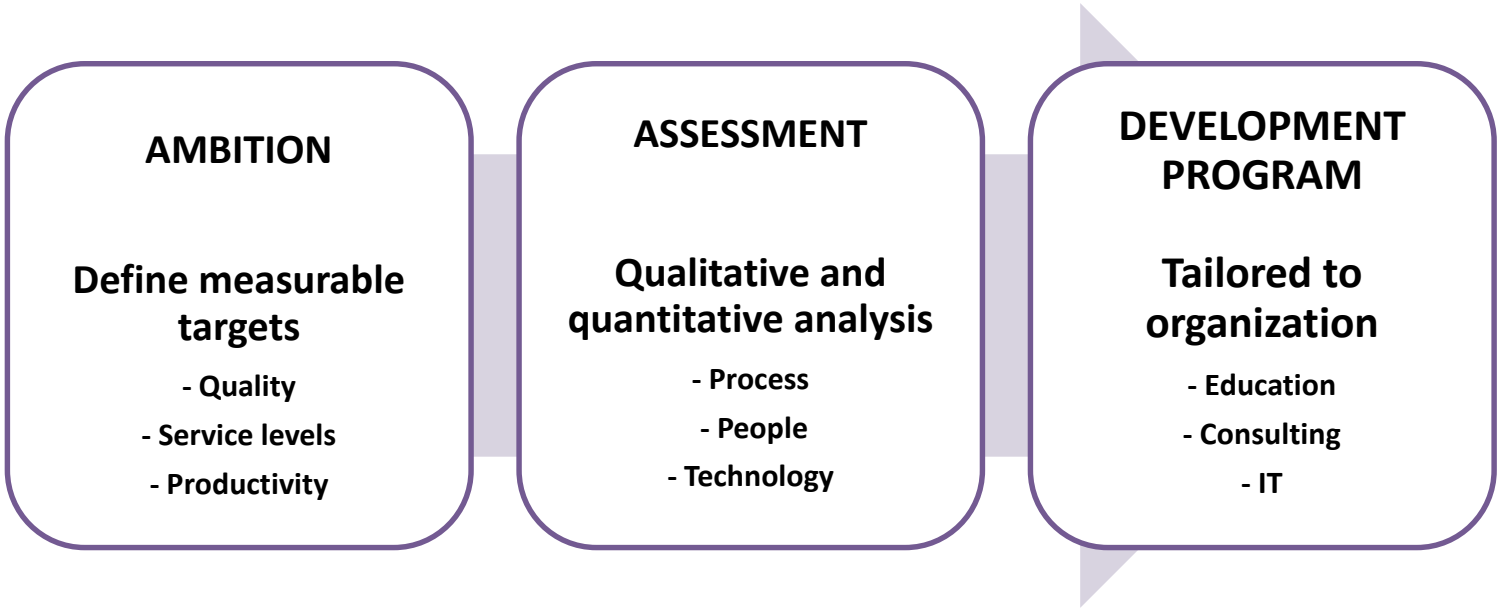
Partnering with us

"the integral scientifically-based solution concept"



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Thank you!

University of Twente

Bart Veltman

MSc. Mathematics 1987, University of Nijmegen, NL
PhD. Operations Research & Management Science 1993, CWI Amsterdam, Eindhoven University, NL

Rhythm (2014 – now); a joint venture of Univ. Twente professors/researchers and ORTEC

- Founder, co-CEO; valorization research results on patient logistics

ORTEC (1993 – now)

- Partner (2004 – now)
  - Initiated research & development on Capacity Planning & Patient Logistics solutions for Healthcare
  - Initiator and Director product management & product competence centers in the Netherlands and Germany
- Director Workforce Planning & Scheduling
  - Director competence centre Workforce Planning & Scheduling
  - Managed acquisition and merger of IKS Producten BV by ORTEC
- Member of MT Logistics
  - Initiator APS product-line for Concrete (Mortar) Production & Distribution
  - Initiator and product manager Workforce Planning & Scheduling

Supervisory Board Logiplan GmbH, Germany (before acquisition by ORTEC)
Industrial Board LANCS Initiative, UK (program to revive & strengthen research capacity in UK)
Research fellow, University of Twente, NL

- CHOIR: Center for Healthcare Operations Improvements and Research
- Co-Promotor for PhD-research

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