

# **Simulation-based training in health care to improve patient safety**

**Doris Østergaard and CAMES team**

**NSQH 2018, Copenhagen**

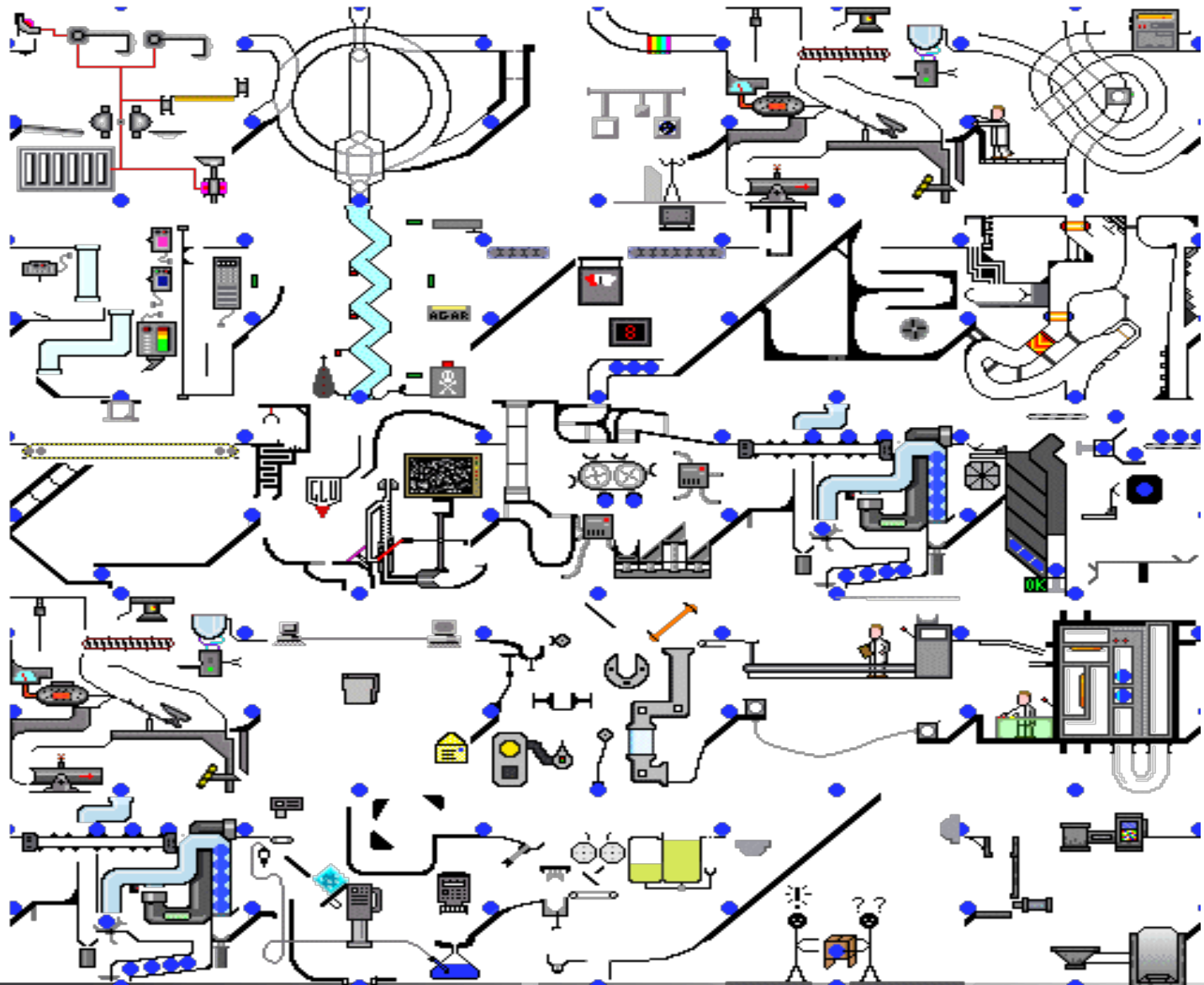


~ Ether Day, 1846 ~  
Painted and Laid Out by Gorton, 1846



Wellcome Images







# Why simulation based training?



- Increase patient safety
- Train medical expertise (knowledge and skills)
- Train non-technical skills
- Prioritize education in critical situations
- Strengthen the ability to reflect on own competence
- Compensate for lack of training possibilities in the clinical setting

*"Moving from knowing to doing"*

# Training of individuals



REGION

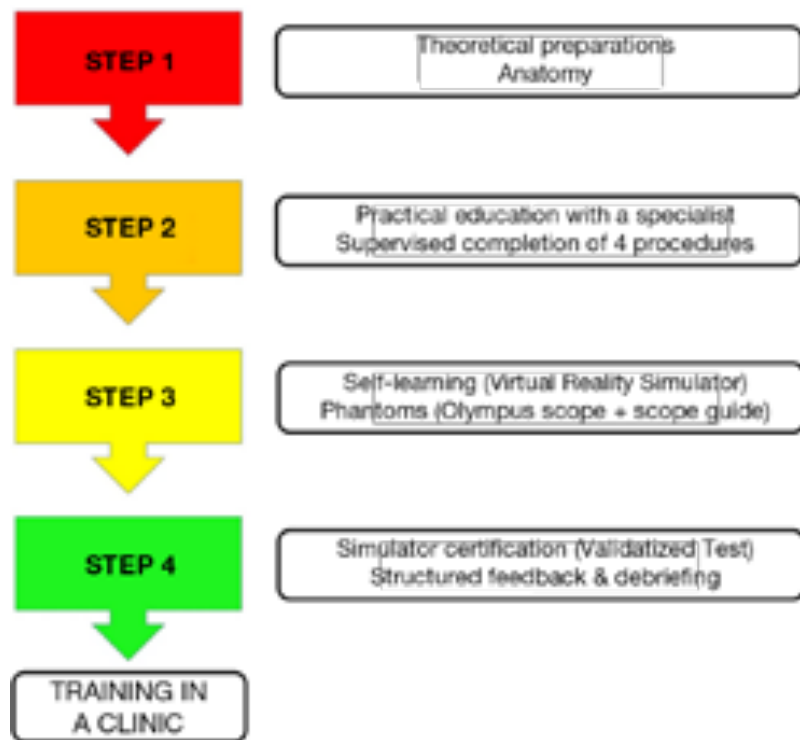
CAMES

Copenhagen Academy for  
Medical Education and Sim



# Certification – "The Drivers Licence Concept"

Skills are trained in the simulation lab. until proficiency criteria have been met – which then is validated and certified.



## Certificate

Faculty of Health Sciences



### Flexible bronchoscopy

This is to certify that

**John Doe**

has demonstrated skills in flexible bronchoscopy and passed a standardized, simulation-based test. Validity evidence for the test including a credible pass/fail-standard has been published in international, peer-reviewed journals

Competencies covered were:

Diagnostic bronchoscopy (including anatomy of the bronchial tree), broncho-alveolar lavage, and biopsy procedures.

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Rigshospitalet



# Training of individual skills – surgery

1. "There is a need"
2. Advanced surgical simulators are available
3. Assessment tools have been developed and validated
4. Surgical residents learn and can transfer skills to the clinical setting
5. Financial aspects (a business case for simulation)
6. It should be embedded in curricula worldwide

*- The big questions is: "why does it take so long?"*

## Non technical skills and the 7 doctors roles



- “Non-technical skills are cognitive, social and personal skills, which support the technical and medical skills, and contribute to safe and effective task management”

*Rhona Flin, 2008*



# Non-technical skills categories and elements

Category	Category Score	Element	Element Score	Feedback notes
Situation Awareness		Gathering information		
		Understanding information		
		Predicting and thinking ahead		
		Monitoring own performance		
Decision Making		Considering options		
		Selecting and communicating options		
		Implementing and assessing decisions		
Leadership		Setting and maintaining standards		
		Supporting others		
		Coping with pressure		
Communication and Teamwork		Exchanging information		
		Establishing a shared understanding		
		Coordinating activities		







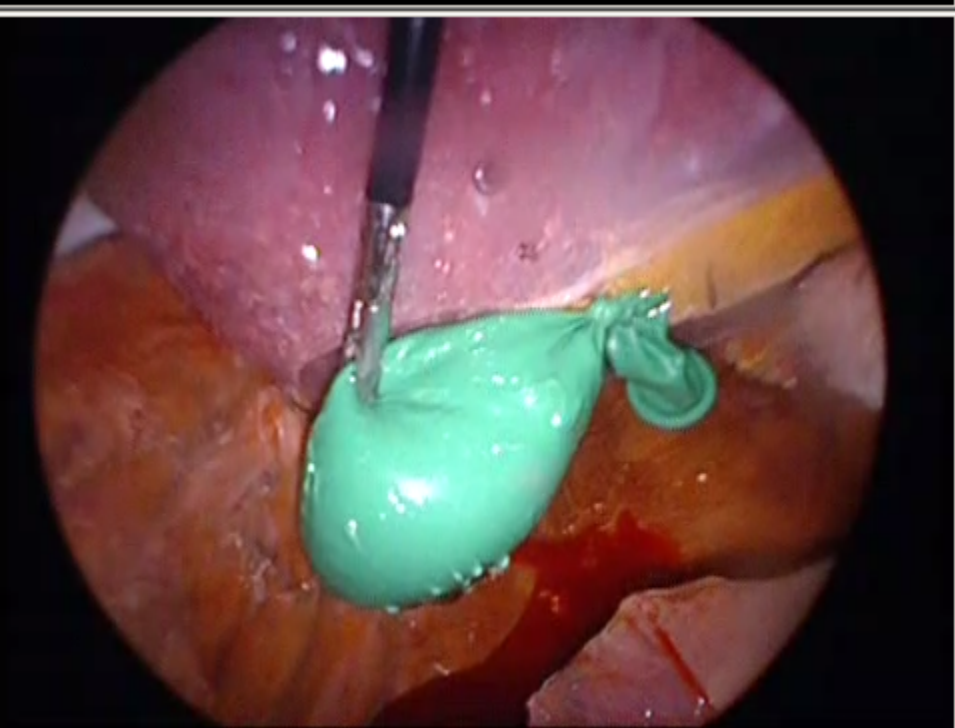
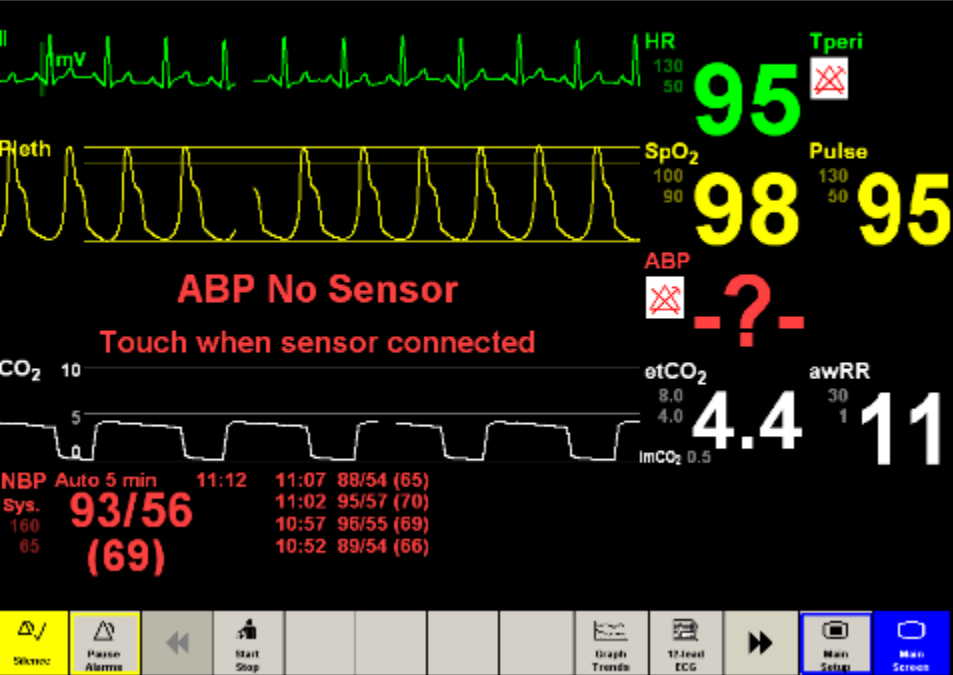


# Training of health care teams

## Team training in the OR



- Team training improves communication and collaboration in the operation theatre team (*Mazzocco K. Am J Surg 2009*)
- A systematic review indicate that communication and coordination, contribute to effectiveness of clinical performance (*Schmutz BJA 2013*) (*Systematic review*)
- Concepts for developing expert surgical teams using simulation (*Gardner AK, 2016*)
- Team training combined with the introduction of a pre-operative checklist reduces mortality with 18% compared to a 7% reduction in the control group (*Neily JAMA. 2010*)







# Kirkpatrick-Phillips Model of Measuring Learning Results



## Team work – cardiac surgery/trauma/resuscitation teams

- Higher performance teams are more resilient, displaying effective team work when the operations become more difficult. *Schrager et al. QSHC 2011, Paediatric Cardiac Surgery 2010*
- Specific team work skills and behavioural markers were associated with indicators of good team performance
- Higher and lower performing teams differed in information exchange, supporting behaviour and communication *Westh et al, STREEM 2010*
- EU and US resuscitation organisations recommend that teamwork and NTS should be implemented in training programs *Edwards et al Resuscitation 2012 (Editorial)*

# The importance of shared mental models

"The VATS teams shared mental models were predictive of surgery related time steps and of bleeding"

*Gjeraa K, Dieckmann P et al (submitted)*



# Patient Outcomes in Simulation-Based Medical Education: A Systematic Review

J Gen Intern Med 28(8):1078–89

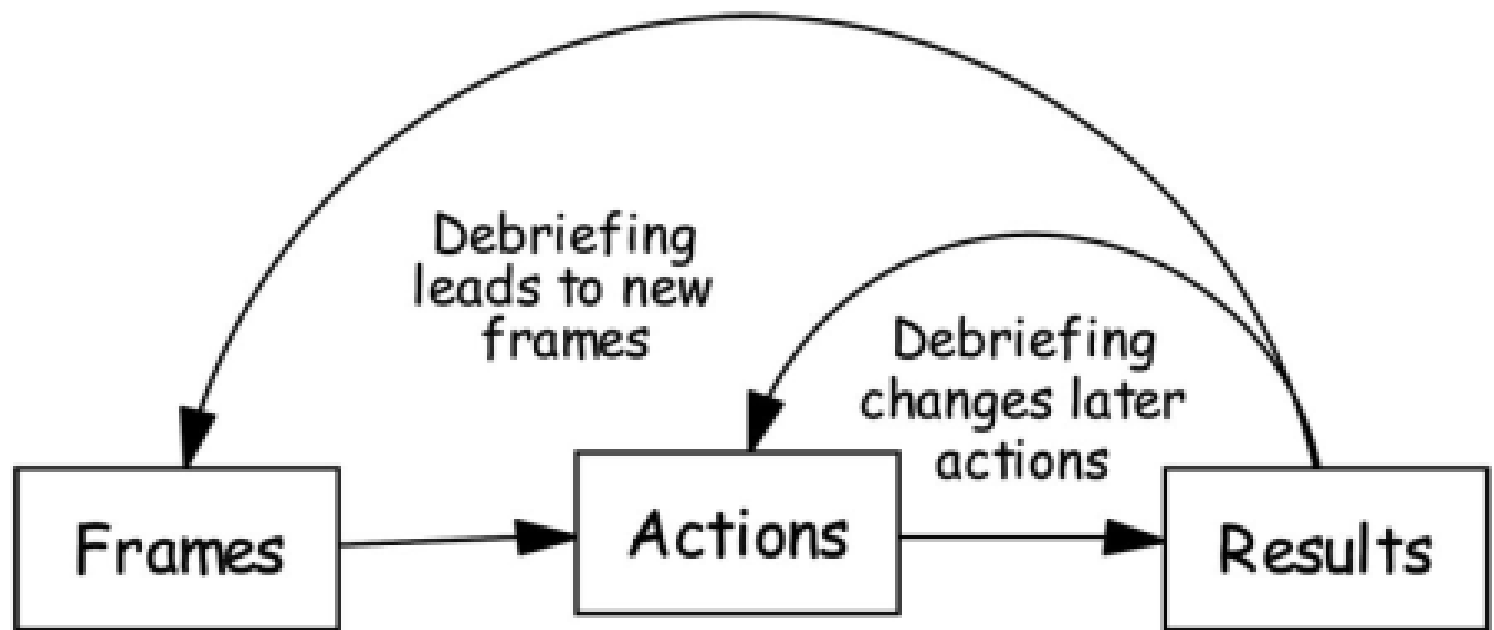
Benjamin Zendejas, MD, MSc<sup>1</sup>, Ryan Brydges, PhD<sup>2</sup>, Amy T. Wang, MD<sup>3</sup>, and David A. Cook, MD, MHPE<sup>3,4</sup>

- Simulation-based education: small-moderate patient benefits vs. no intervention and vs. non-simulation instruction (latter approached but did not reach statistical significance).
  - Airway management (14 studies)
  - Gastrointestinal endoscopy (12 studies)
  - Central venous catheter insertion (8 studies)
- [Small but real benefits](#): major complications, mortality, length of stay) vs. no intervention
- Virtual patients and technology enhanced simulation: statistically significant benefits in [patient care behaviors](#)

# Helping Babies Breathe



# Understanding the frames behind the actions





# Bringing the techniques from the simulated to the clinical environment



- "We are motivated for learning"
- "We do not always know, when we do not perform well"
- Lifelong learning and reflection
- *Feedback*
- *Psychological safety*
- *Speak Up*





Contents lists available at [ScienceDirect](#)

## Resuscitation

journal homepage: [www.elsevier.com/locate/resuscitation](http://www.elsevier.com/locate/resuscitation)



EUROPEAN  
RESUSCITATION  
COUNCIL

### Clinical Paper

# Challenges in out-of-hospital cardiac arrest – A study combining closed-circuit television (CCTV) and medical emergency calls<sup>☆</sup>

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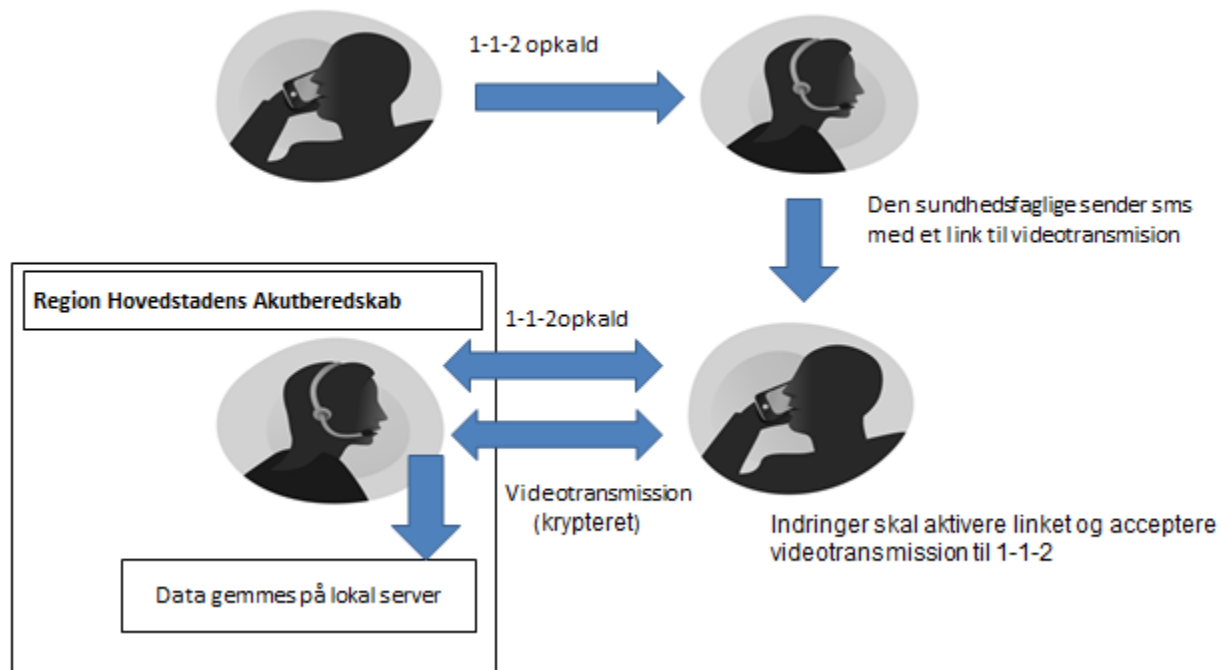


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Linderoth G et al



# The patient or the citizen as a team member

Advances in  
Simulation

ABOUT

ARTICLES

SUBMISSION GUIDELINES

INNOVATION | OPEN ACCESS

## Engaging patients and clinicians through simulation: rebalancing the dynamics of care

Roger Kneebone, Sharon-Marie Weldon ✉ and Fernando Bello

*Advances in Simulation* 2016 1:19 | DOI: 10.1186/s41077-016-0019-9 | © Kneebone et al. 2016

Received: 28 February 2016 | Accepted: 22 April 2016 | Published: 15 June 2016

## SECOND OPINION

BY ROB ROGERS



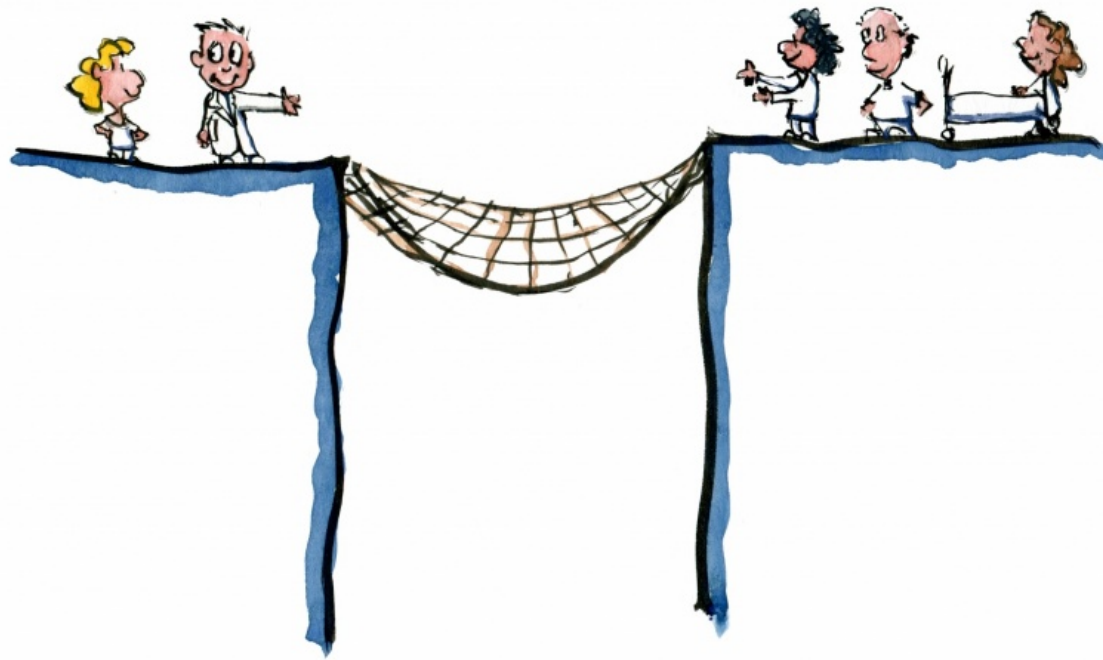
**“Houston, we have a problem”**







# Safe handover situations



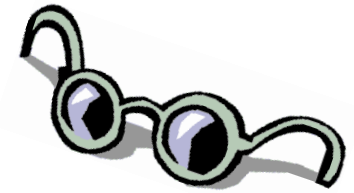
Madsen ML, Petersen LF, Siemsen IMD, Østergaard D.

# Training organisations

## *4 cases of meningitis with fatal outcome*

- Workshops involving relatives, staff, risk managers, educational experts
- Political approval of an impressive action plan
- Training of all staff members in the emergency units in the Capital Region of DK
  - HF, team skills, involving patient and relatives
  - Patient safety culture

The challenge ?

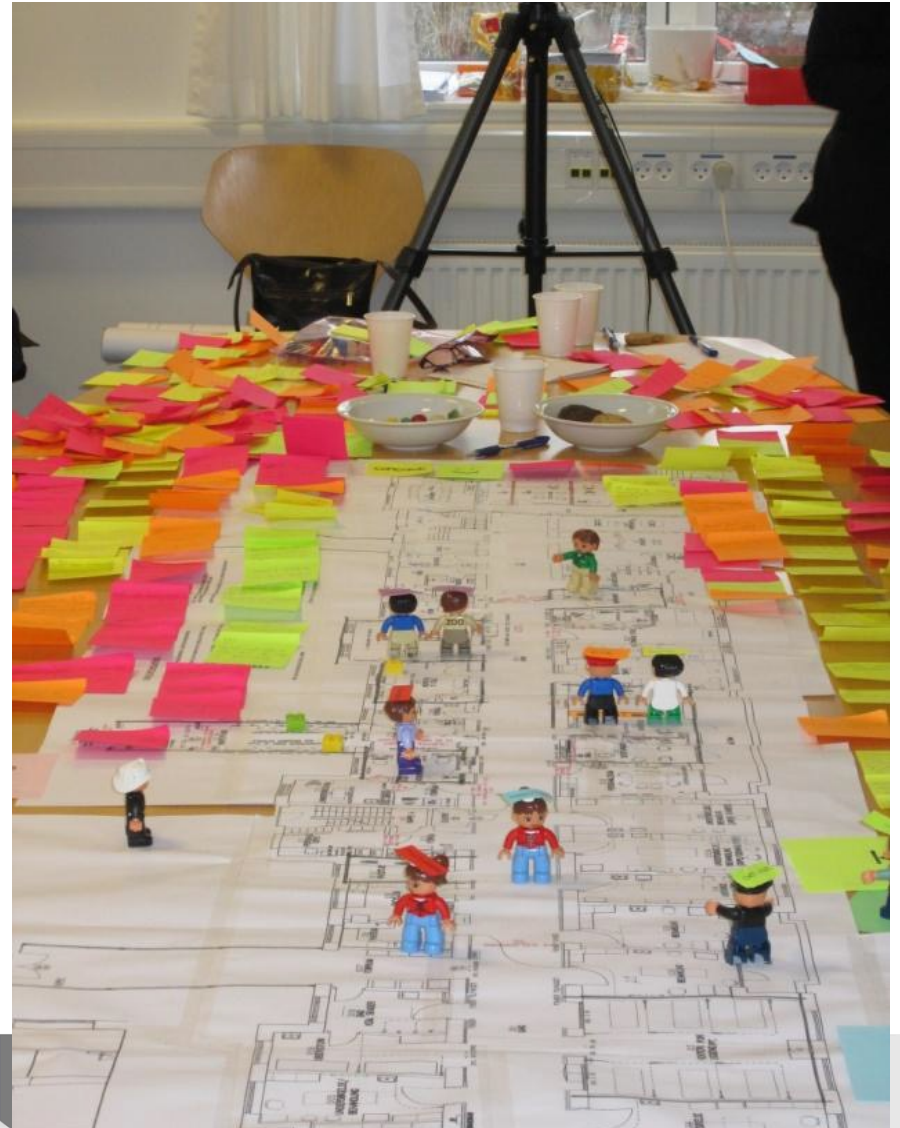


## The Emergency Unit

- buildings
- organization of work
- competencies



# Involve staff in the needs analysis









# Focus areas within simulation – the journey

Scenario based training – training anaesthesia teams in Crisis Resource Management (CRM)

- Using simulation for a broader range of learning objectives for a broader group of learners
- Technology driven - level of realism
- Pedagogical concept – instructional design – instructor training
- From training emergency teams to train all staff members in the more frequent situations
- From centres to in situ simulation (low dose/high frequency)
- Assessment of learning – formative/summative, collecting validity evidence (Messicks framework)
- Research in simulation / using simulation for research

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(31)



# Our journey - the steps we need to take



## Education and training

- Bridge between simulation and the clinical setting

## Organisation/workflow

- Facilitate the analysis of organisational challenges and present results
- Pilot test possible solutions – revise (workflow etc.)
- Develop and deliver training
- Facilitate implementation after intervention (anchoring)
- Monitor effect (collaborative effort)

## Overall

- Conduct research in the individual, team and organisational needs and in mechanism of learning in order to conduct the training and adjust the assessment instruments accordingly
- Collaborate with patient safety organisation, educators and specialist societies in order to increase patient safety





*"I cannot do it on my own – will you help me?"* (Gernes P)