



# The Impact of Systems Strengths and Weaknesses on the Safety of Surgical Patients

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# Surgical System

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- In the UK around 5% of patients suffer an avoidable adverse event when in hospital; surgical care accounts for up to two-thirds of those cases (Vincent et al., 2001)
- Most focus has been on non-technical skills of individuals NOTSS (Aberdeen) and teams OTAS (Imperial)
- Prior research reveals the importance of looking at minor problems in the system which can escalate into major problems (Catchpole, 2007)

# Surgical systems change at a rapid pace

- Changes in technology produces new constraints and demands on professional skill
- European working time now limits hours of learning (Dept of Health, 2009)
- Medical training is now condensed to allow faster routes to qualification (MMC, 2005)

# Aims

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1. Comprehensive study of surgical systems
2. To increase our understanding of the systemic influences on surgical safety
3. Develop a measurement instrument to prospectively gather data on systems strengths and weaknesses
4. To also look at strengths in the system rather than only focus on failures

# Method

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- Observational/ ethnographic study.
- Major surgical cases: colorectal and orthopaedic
- Major surgery is more complex, longer duration, requires more instrumentation, technology, staff; higher risk to patient
- Intra-operative phase only
- 5 Scottish Hospitals
- 6 Surgeons
- Ethical approval and patient consent

# Results

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- 42 major surgical cases observed from Oct 08- March 09.
- Average length of case: 2hrs 30 mins
- No patient data collected
- Data entered into Nvivo 8 for analysis
- Observations coded into 68 'nodes'

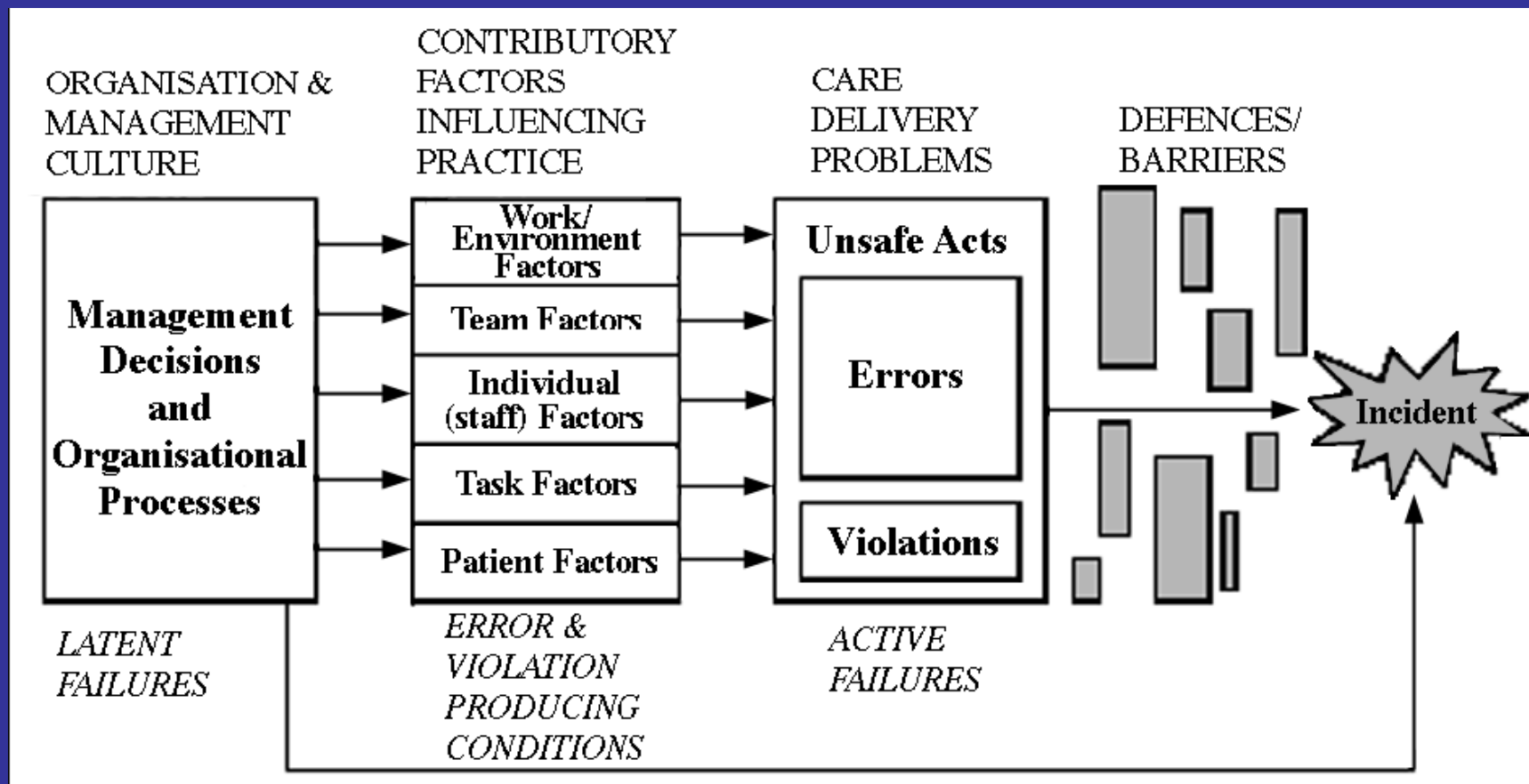
Observation	Coding/ node
Phone in theatre rings and conversation held	
Surgeon waits to get a white balance from the stack but no-one able to assist	
Registrar goes to use bipolar scissors and surgeon stops him to tell him to check the settings before using any of the equipment	
Suction machine not working, Circulating nurse tries changing bag but still not working. S says he really needs it to work immediately. CN apologises to S for it not working	

Observation	Coding/ node
Phone in theatre rings and conversation held	Disruption/ Distraction in theatre
Surgeon waits to get a white balance from the stack but no-one able to assist	Staffing levels poor
Registrar goes to use bipolar scissors and surgeon stops him to tell him to check the settings before using any of the equipment	Surgeon checks equipment
Suction machine not working, Circulating nurse tries changing bag but still not working. S says he really needs it to work immediately. CN apologises to S for it not working	Equipment not working



# 68 categories sorted into 5 factors influencing practice

*Organisational accident causation model (adapted from Reason, 2000)*



# Expert Panel: Card Sorting Task

- Chose 133 items from across the nodes
- Card sorting task following method of Smith Jengsen (2001)
- Participants: 2 surgeons, 1 Anaesthetist
- 10min presentation on systems/ human factors
- Asked them to sort into categories they felt were appropriate
- Results: 11 categories generated and labelled
- Dialogue recorded for future analysis

# Eleven systems aspects emerged

1. Preparation
2. Communication
3. Protocol/Safety checks
4. Distraction
5. Training
6. Staffing
7. Equipment
8. Policy
9. Etiquette
10. Workplace design
11. Teaching

# Current research

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- Have developed a structured form to observe systems aspects in theatre
- Testing the form vs field notes
- Inter-rater reliability check using videos of real cases – Kappa 0.79
- Also plans to test using clinical staff
- Develop a training package for staff
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