Combining FMEA and FRAM in Healthcare Settings

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(Lack of) Maturity of Patient Safety as a Discipline

• We know patients are harmed (e.g. 1/10 patients admitted to UK hospitals suffer an adverse event)

• Approaches are predominantly reactive, e.g. National Reporting & Learning System

• JC requires 1 proactive risk analysis of a process per year. No such requirements within the NHS.
Emergency Care Handover (ECHO) Project

• To conduct a risk analysis of handover within the emergency care pathway

• To explore common organisational deficiencies and the impact on the quality of handover
Patient Handover

• Safe transfer of information + responsibility for patient care

• Medical handover is
  – far more complex
  – far less standardised
  – within a far more safety-critical environment
  – but conducted with far less training!
Root Causes of Sentinel Events

- Communication
- Assessment
- Physical Environment
- Information Management
- Operative Care
- Care Planning
- Continuum of Care
- Medication Use
- Special Interventions
- Anesthesia Care

TOTAL

Joint Commission 2004 - 11
A few issues with Handover

- Ambulance crew waiting in queue & patient deteriorates

- Paramedic hands over social information ("79-year old wife requires care at home"), but A&E staff are already working on the patient

- Patient is referred to medical ward, but remains on A&E without clear allocation of responsibility
A few solutions

• Standardisation (e.g. SBAR)

• Electronic Patient Report Form (ePRF)

• Electronic referrals

• Often solutions do not achieve the anticipated improvements or lead to other problems
FMEA in Healthcare

- Sequential map of the process

- 3 half-day workshops with paramedics, A&E nurses & doctors, AMU nurses & doctors at each site (9 total)

- Participants have no prior experience with proactive risk assessment methods

- Consultants (Senior doctors) have some time set aside, but paramedics, nurses, junior and middle-grade doctors not.
FMEA – Nature of Results

• Focus on single failures
  – Sometimes difficult to identify failure modes because there is no clear right and wrong

• Difficulty of establishing worst credible effect
  – Depends on patient condition and context
  – Single failures usually have no immediate adverse effects by themselves
Hollnagel’s Concept of Functional Resonance

Pooled variability may lead to a situation of resonance

Every function has a normal, weak variability
FRAM Analysis

- Identify + describe functions
- Describe their potential variability
- Define functional resonance based on couplings between functions

(Hollnagel E. The Functional Resonance Analysis Method. 2012)
Before patient arrives

Trigger tool to identify specialist teams required

Notification

ED room prepared

Specialist teams, equipment, bed in resuscitation

Bring patient

National Institute for Health Research

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FRAM – Nature of Results

• Qualitative reasoning about variability and couplings

• Not linked to failures, retains some of the context to explain consequences

• Theory intuitive, adoption in practice difficult
Conclusions

• Little awareness in healthcare about methods for safety analysis

• Healthcare organisations + regulators need to understand limitations of techniques such as FMEA

• Safety engineering community needs to understand requirements of healthcare domain
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Comments & Questions

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