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.

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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

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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!

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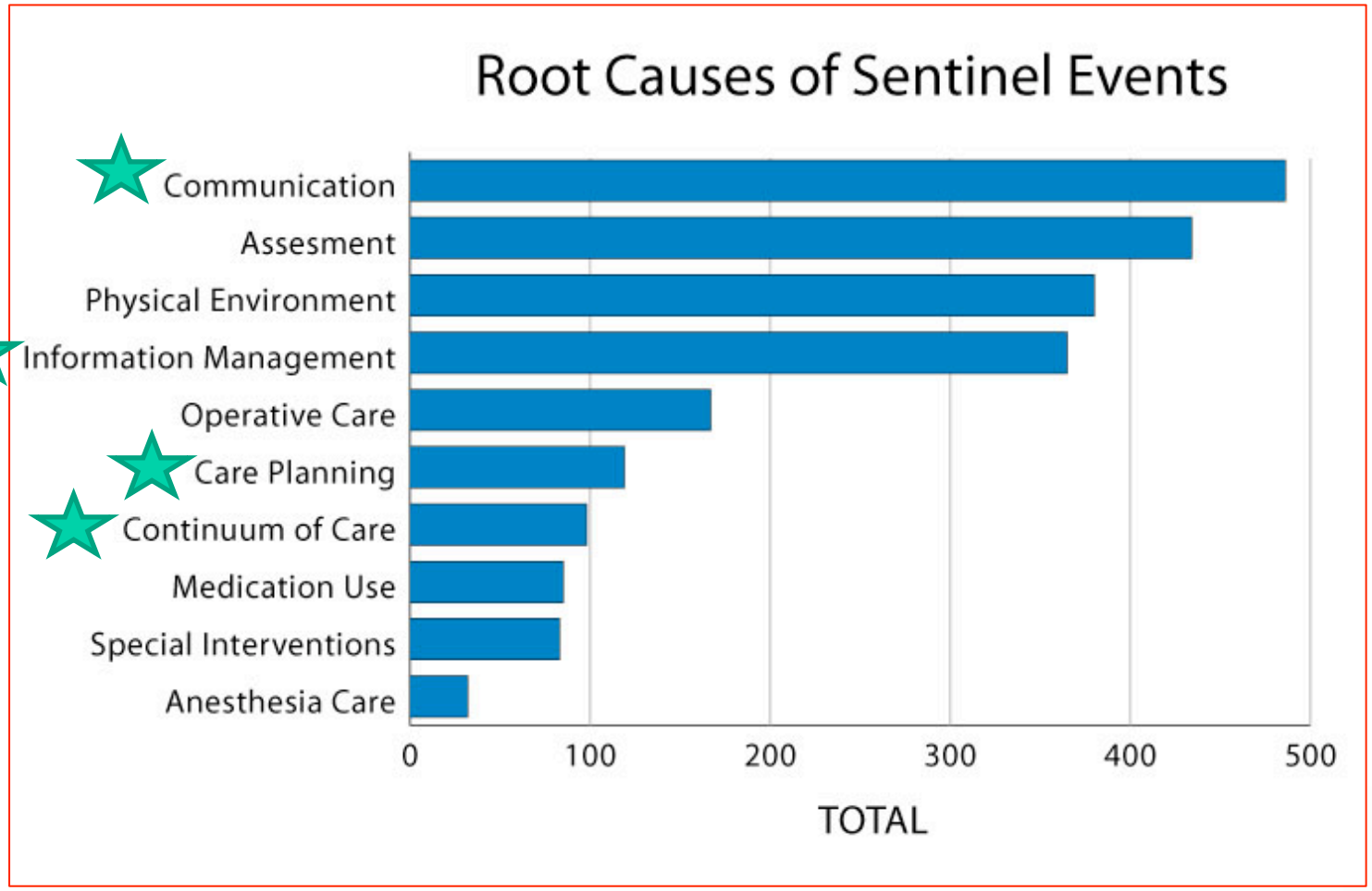
Joint Commission 2004 - 11



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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

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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

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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.

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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

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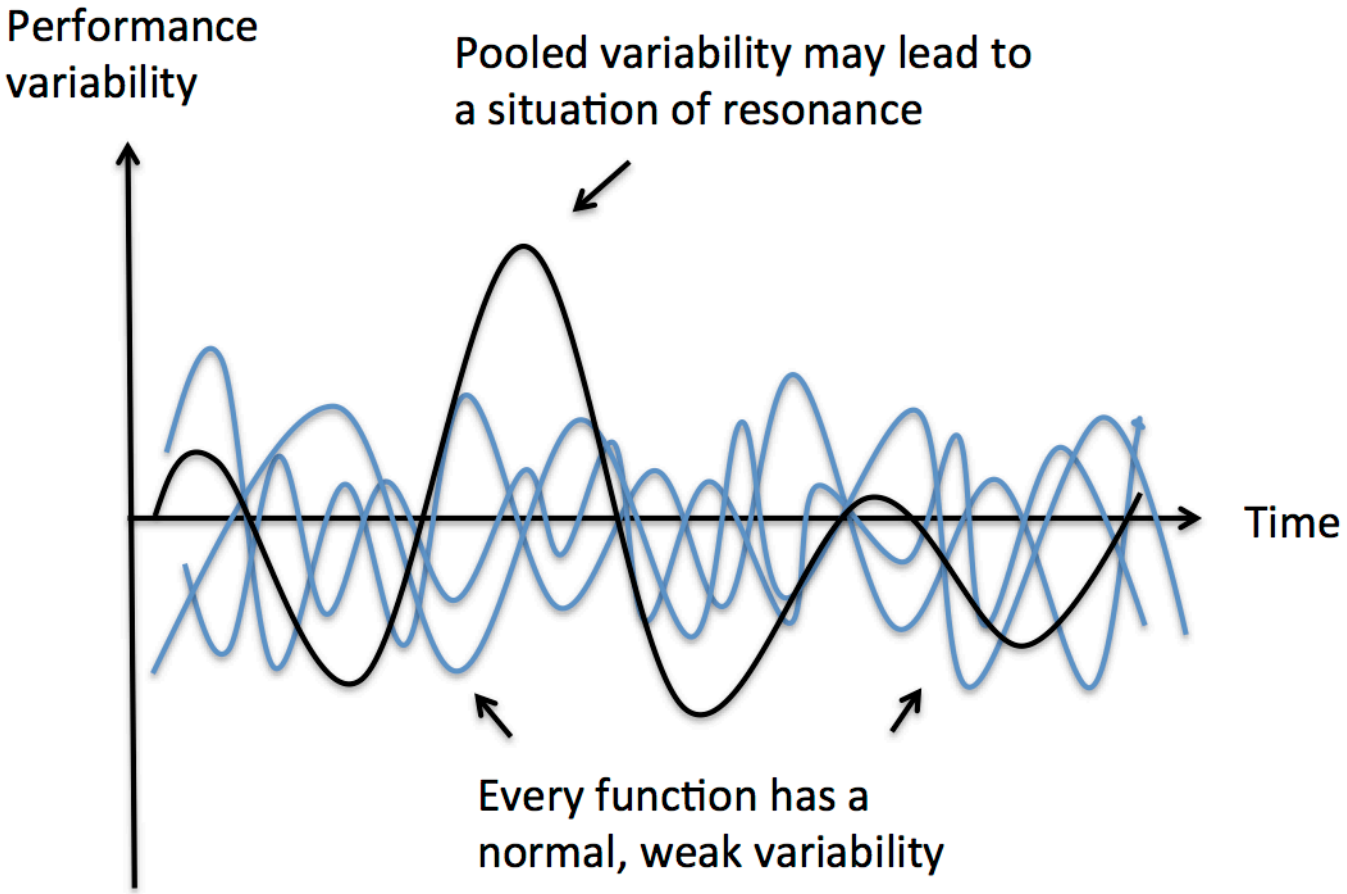
Hollnagel's Concept of Functional Resonance



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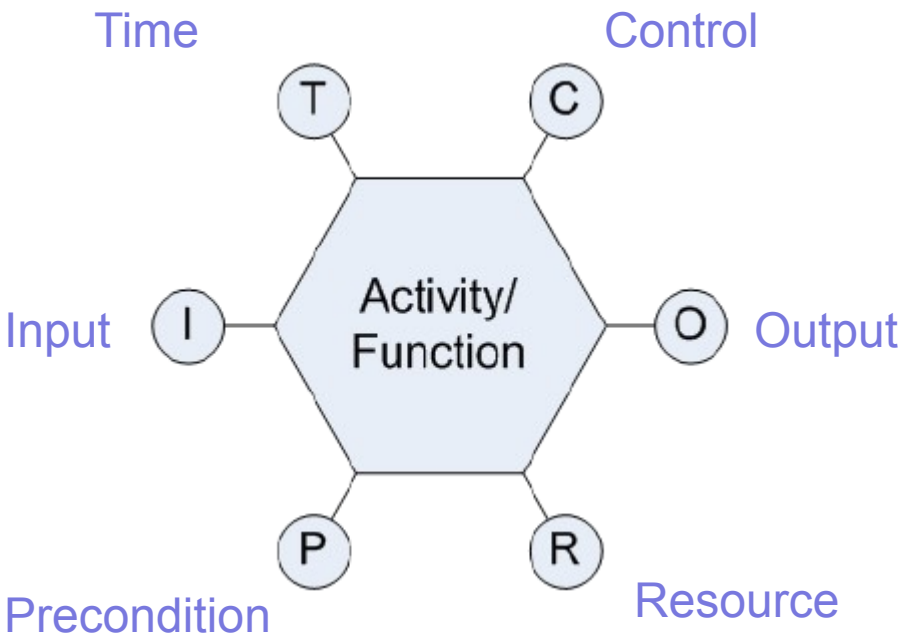
FRAM Analysis

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



(Hollnagel E. The Functional Resonance Analysis Method. 2012)

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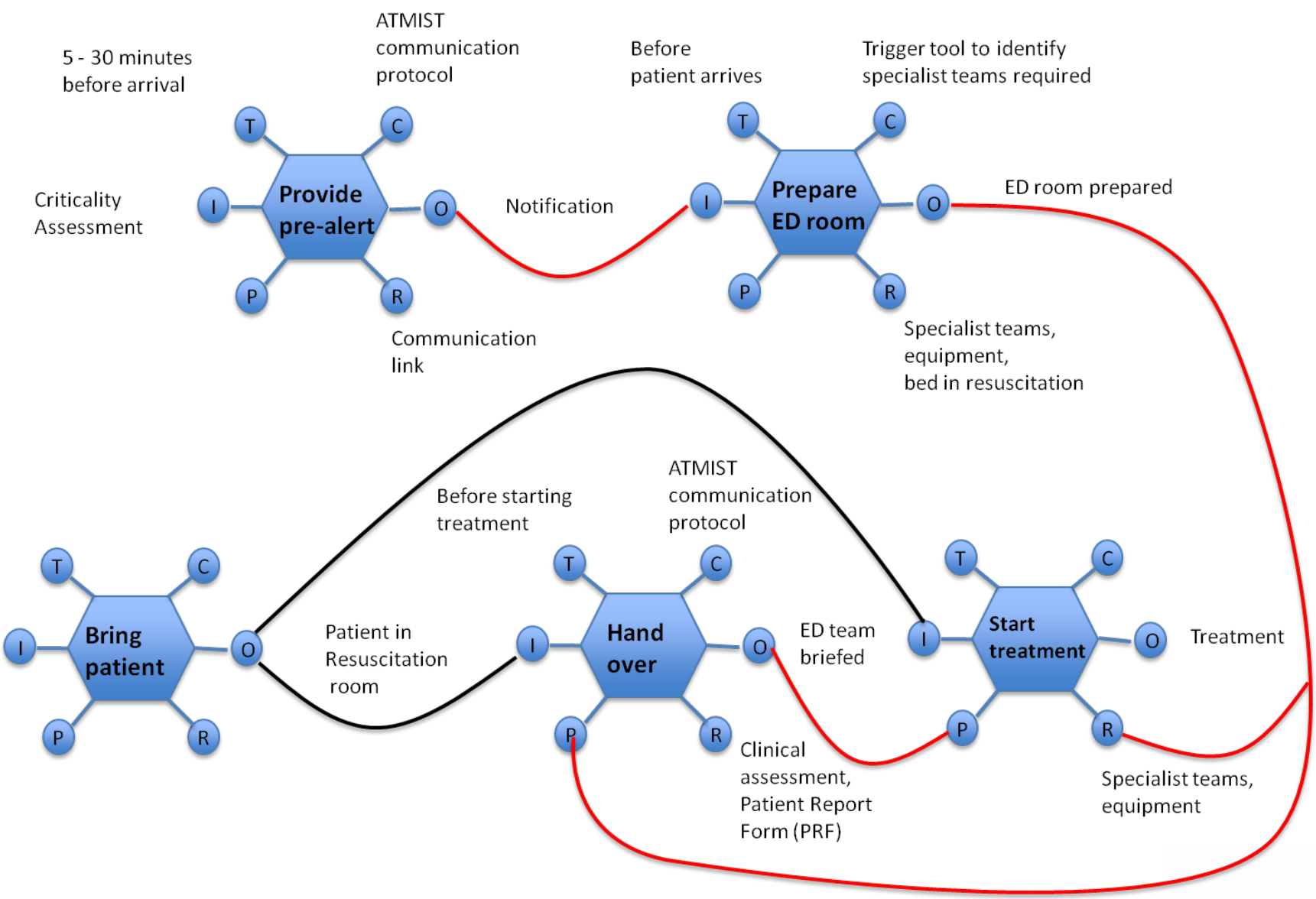

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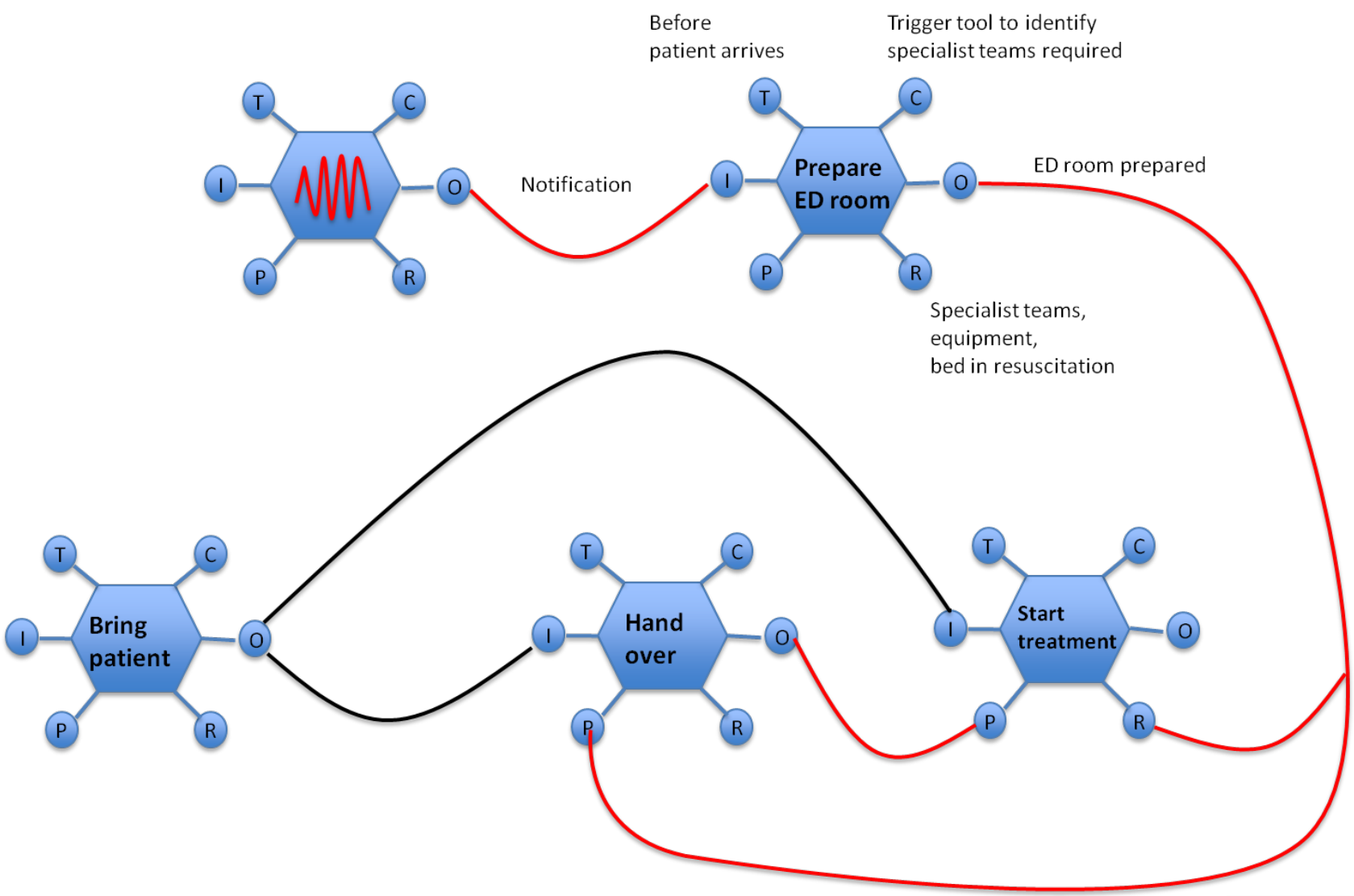

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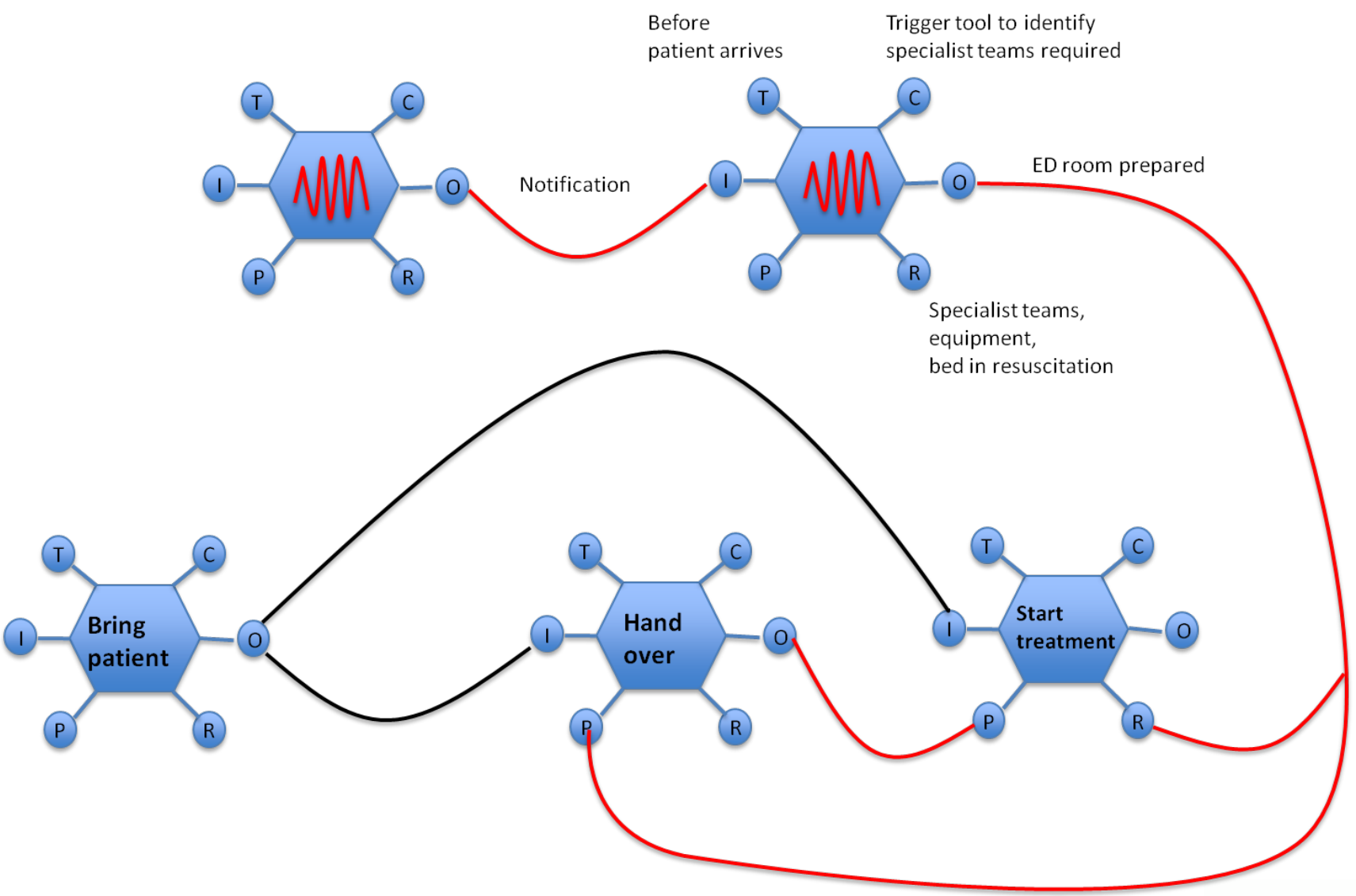

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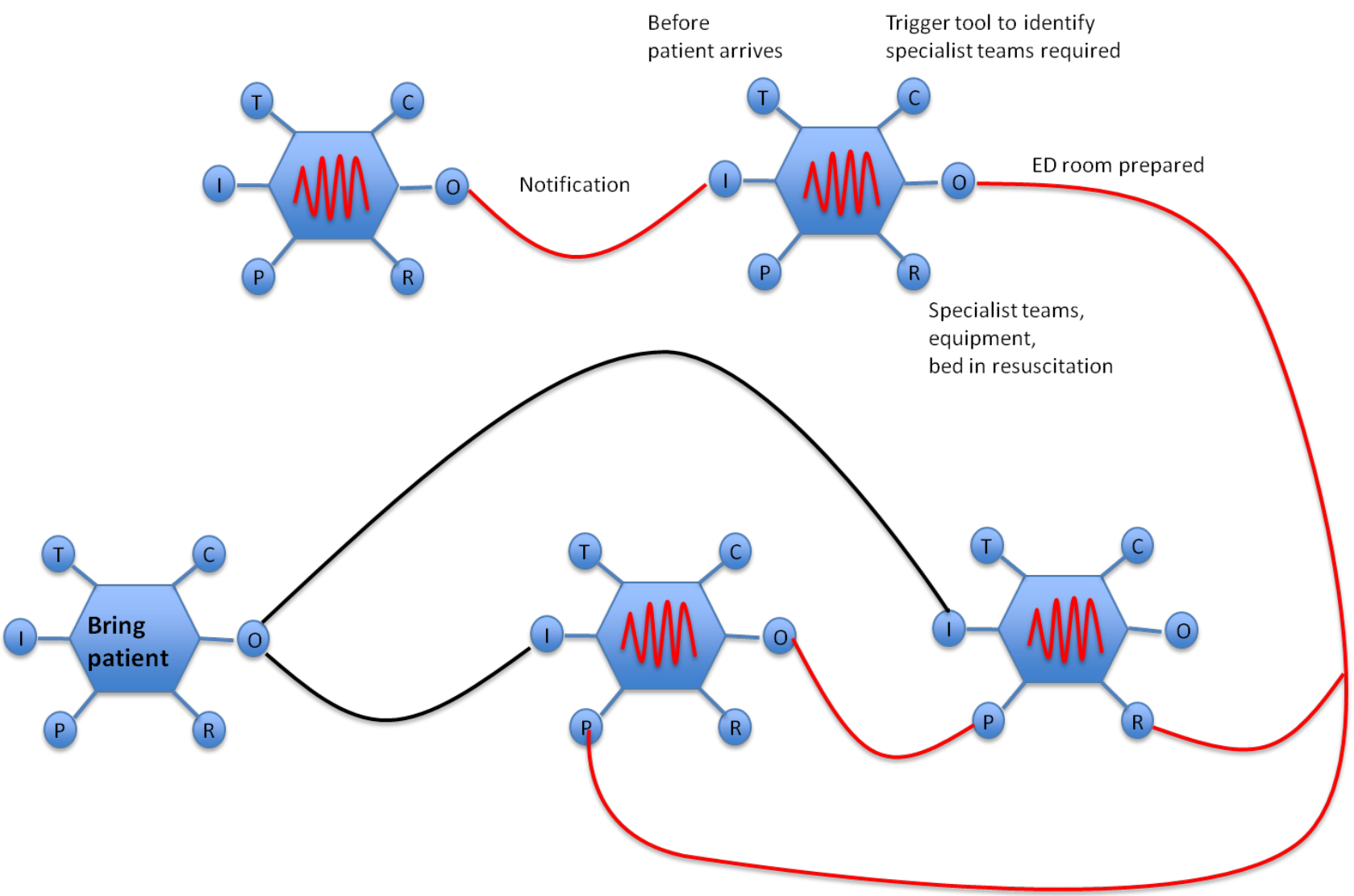

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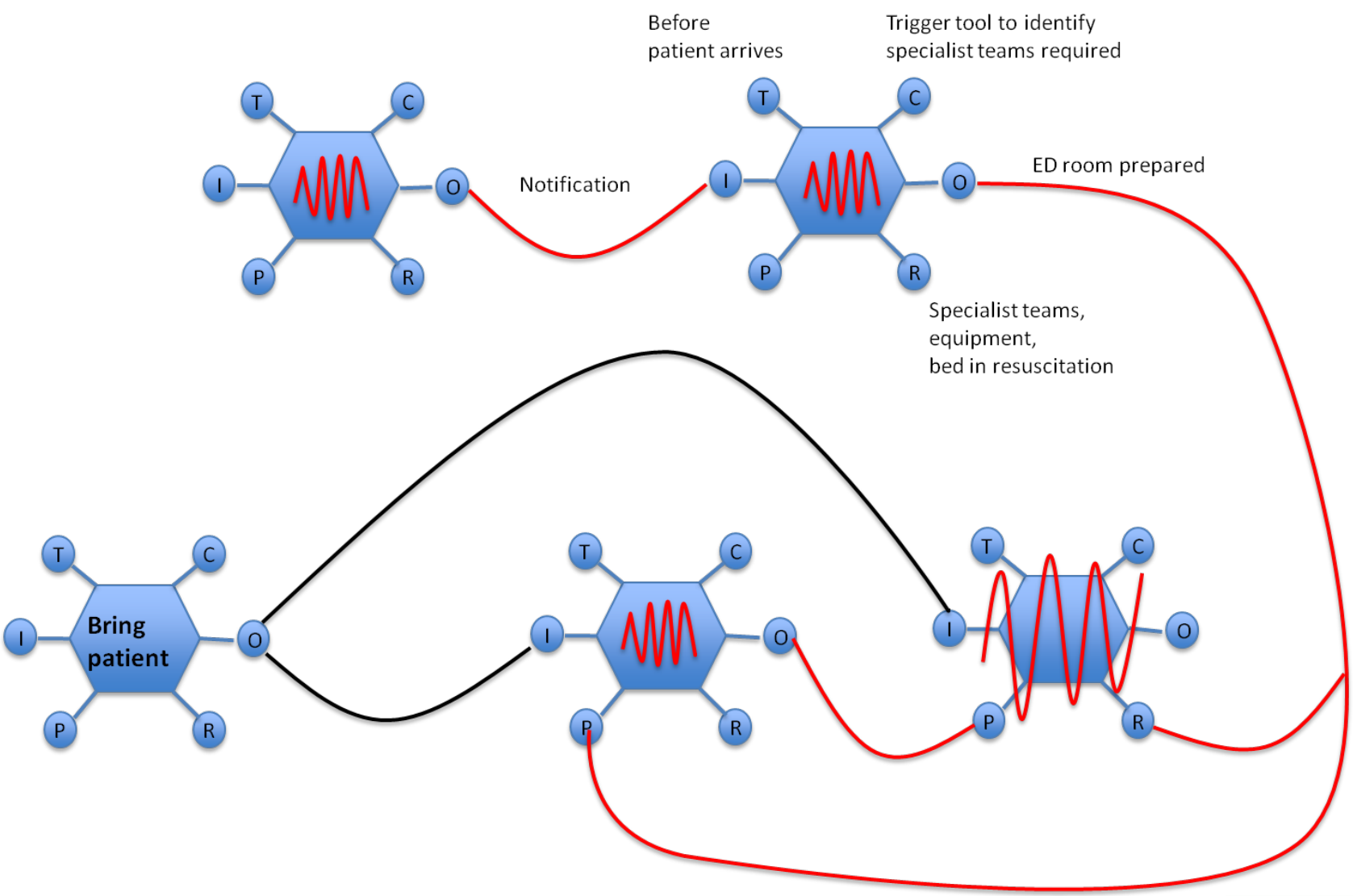

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FRAM – Nature of Results

- Qualitative reasoning about variability and couplings
- Not linked to failures, retains some of the context to explain consequences
- Theory intuitive, adoption in practice difficult

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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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