RESPOND

RESCUE FOR EMERGENCY SURGERY PATIENTS OBSERVED TO UNDERGO ACUTE DETERIORATION

RESPOND

(Rescue for Emergency Surgery Patients Observed to uNdergo acute Deterioration)

Chief Investigator: Professor Peter McCulloch

UNIVERSITY OF OXFORD

NUFFIELD DEPARTMENT OF SURGICAL SCIENCES
Medical Sciences Division

SUPPORTED BY
NIHR | National Institute for Health Research

Rule 1 in clinical research

What are the most important questions about surgery?

DOES IT WORK? (Primary positive outcome?)	DOES IT DO HARM? (Complications and Mortality)

Surgical Harm

- Surgical Mortality is volume related for nearly all major surgery (Birkmeyer et al)
- Surgical Complication rates are not (Ghaferi et al), but are defined by the nature of the surgery
- Therefore the "volume effect" is brought about by rescuing patients with complications
- "Failure to Rescue" rate = [postoperative mortality/complication rate]
- Where is the highest FTR rate in our hospitals?

What is the most dangerous operation done in your hospital?

(a) Oesophagectomy? (b) Cardiac transplant? (c)Brain tumour resection? (d) None of the above?

ANSWER: Emergency laparotomy (average mortality 11%, NELA figures)

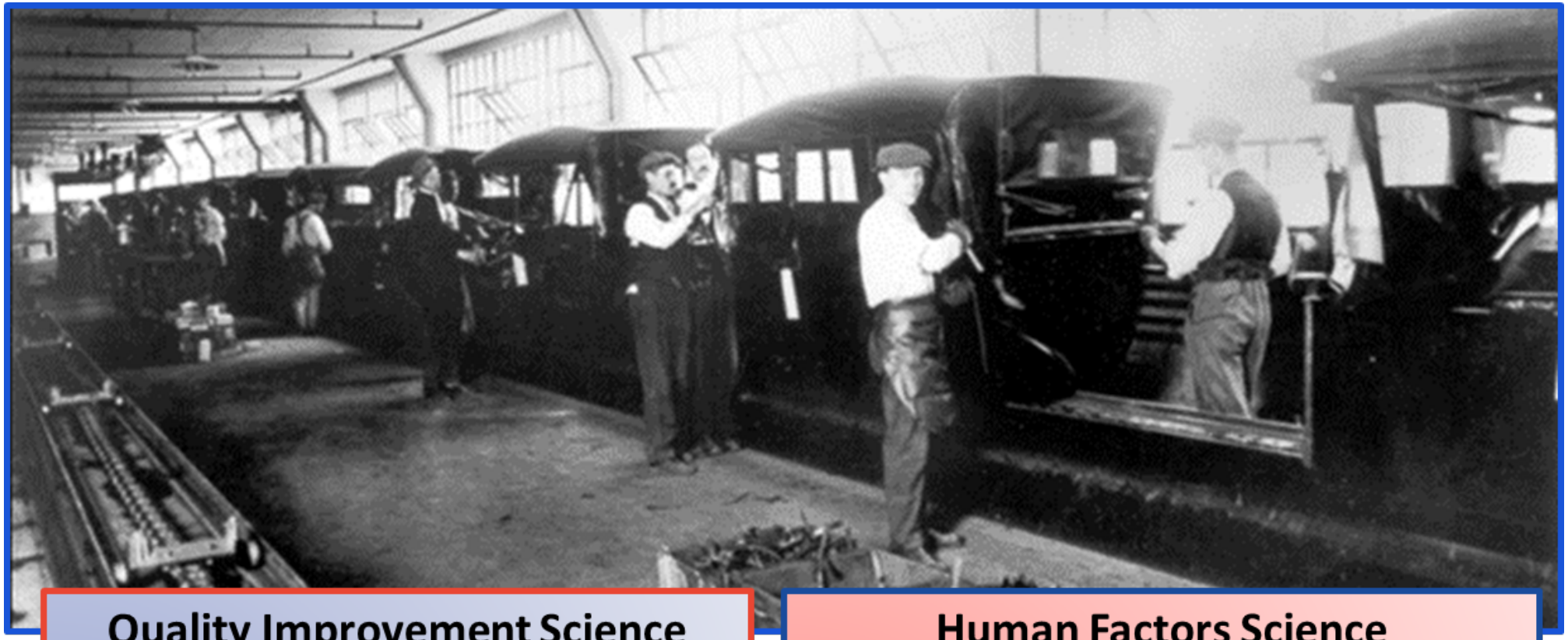
WHY?

Patients acutely and often chronically unwell

- **Fatigue**
- **Unfamiliar team**
- **Less experienced surgeon**
- **Less access to imaging, intensive care etc.**
- **Delays (Silo working, CEPOD system)**

RESPOND
Rescue for Emergency Surgery Patients Observed to uNdergo acute Deterioration

How can we improve the existing system?



Quality Improvement Science
systematically analyses and perfects systems by eliminating sources of inefficiency and error

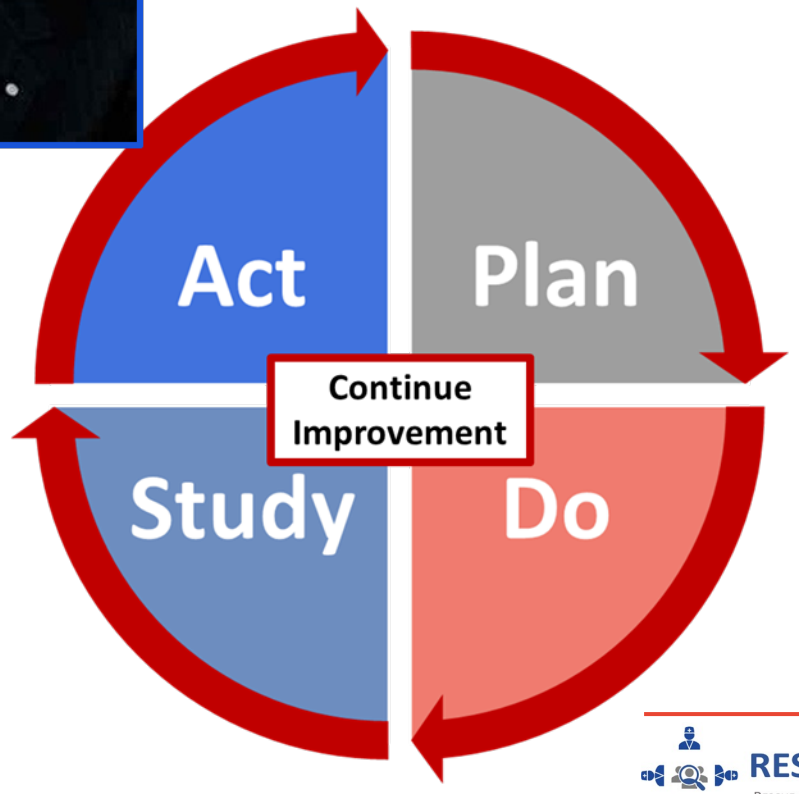
Human Factors Science
adds to this by factoring in the humans working in the system, including their perceptual, cognitive, communications and cultural issues

RESPOND
Rescue for Emergency Surgery Patients Observed to uNdergo acute Deterioration

1. Quality Improvement Science

Systematically analyses and improves effectiveness of work processes

- Detailed measurement, analysis and improvement of process
- **Involvement of frontline staff in designing change ("Lean")**
- "PDSA" rapid cycles – Plan, Do, Study, Act – to quickly find best solutions



2. Human Factors Science

Studies and improves work processes involving humans
Takes into account human strengths (common sense, adaptability, imagination) and weaknesses (perception, memory, fatigue, attention)

Involves predicting and learning from errors (Safety 1) and also from successful team adaptation and resilience (Safety 2)

How to improve: The Plan

NIHR Programme Grant (£2.5M)

Series of Preliminary Studies leading up to and including a randomised controlled trial

STEP 1 Understand what we do now *(WP1: 9 months)*

↓

STEP 2 Identify areas for improvement and design changes *(WP2: 9 months)*

↓

STEP 3 Develop and perfect interventions *(WP3, 1 year)*

↓

STEP 4 Trial interventions against what we do now (*WP4, 2.5 years)*

RESPOND

Rescue for Emergency Surgery Patients Observed to uNdergo acute Deterioration

RESPOND PROGRAMME STEP 1: ANALYSIS

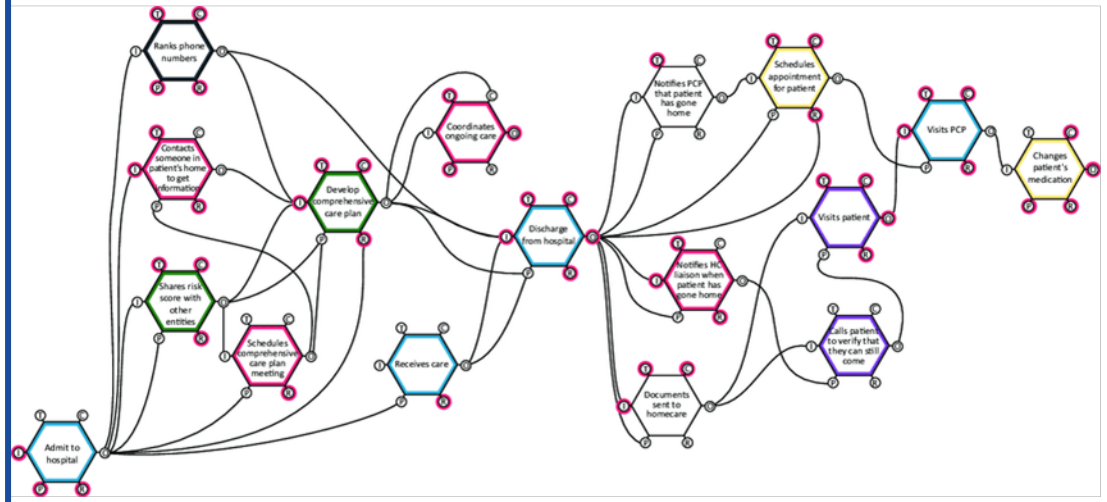
FMEA

Failure Modes & Effects Analysis

Probability						
	6	12	18	24	30	36
	5	10	15	20	25	30
	4	8	12	16	20	24
	3	6	9	12	15	18
	2	4	6	8	10	12
	1	2	3	4	5	6
	Severity					

FRAM

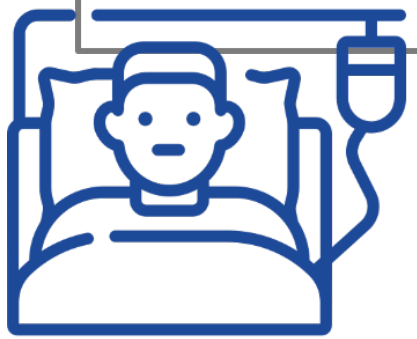
Functional Resonance Analysis Method



RESPOND
Rescue for Emergency Surgery Patients Observed to uNdergo acute Deterioration

WP1: FINDINGS

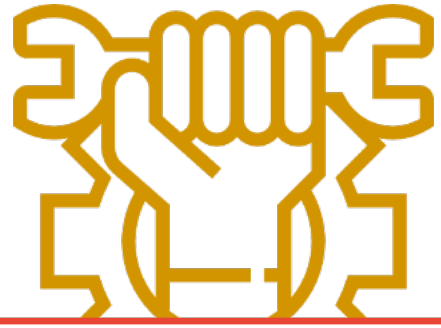
- Patients are not involved in the alert system
- Systems for escalation are complex and unclear
- Staff work in silos, with cultural differences which hinder communication
- Departments don't always co-operate smoothly



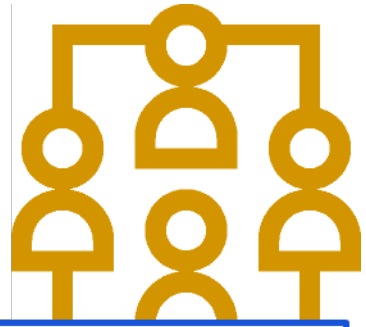
- Staff are highly motivated to help patients
- Staff routinely juggle responsibilities and actions to respond to the unexpected and optimise patient care (resilience)
- Staff often form close collaborative relationships and teams

WP2 PROPOSALS

PATIENT INVOLVEMENT IN RESPONSE SYSTEM



HUMAN FACTORS SYSTEMS REDESIGN OF ESCALATION



ENHANCING SHARED OWNERSHIP BETWEEN DEPARTMENTS

SPORTS/MILITARY BASED TEAM STRENGTHENING PROGRAMME

Pilot Study

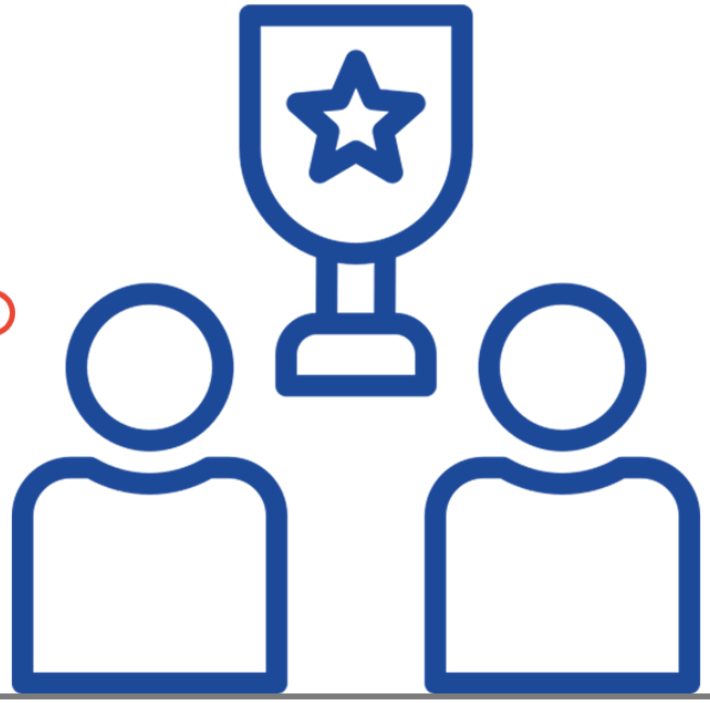
3 Trusts (Oxford, Stoke Mandeville and West Middlesex)

- 1 year study of all 4 interventions introduced using QI methodology
- Comparison with 3 months baseline data collection before interventions (NOW)

Aim to show that improvements of at least 20% can be achieved in SPEED and QUALITY of responses to deteriorating patients

Supported Champions

Funding provided for ½ day per week for first 3 months for each Champion to support interventions and data collection

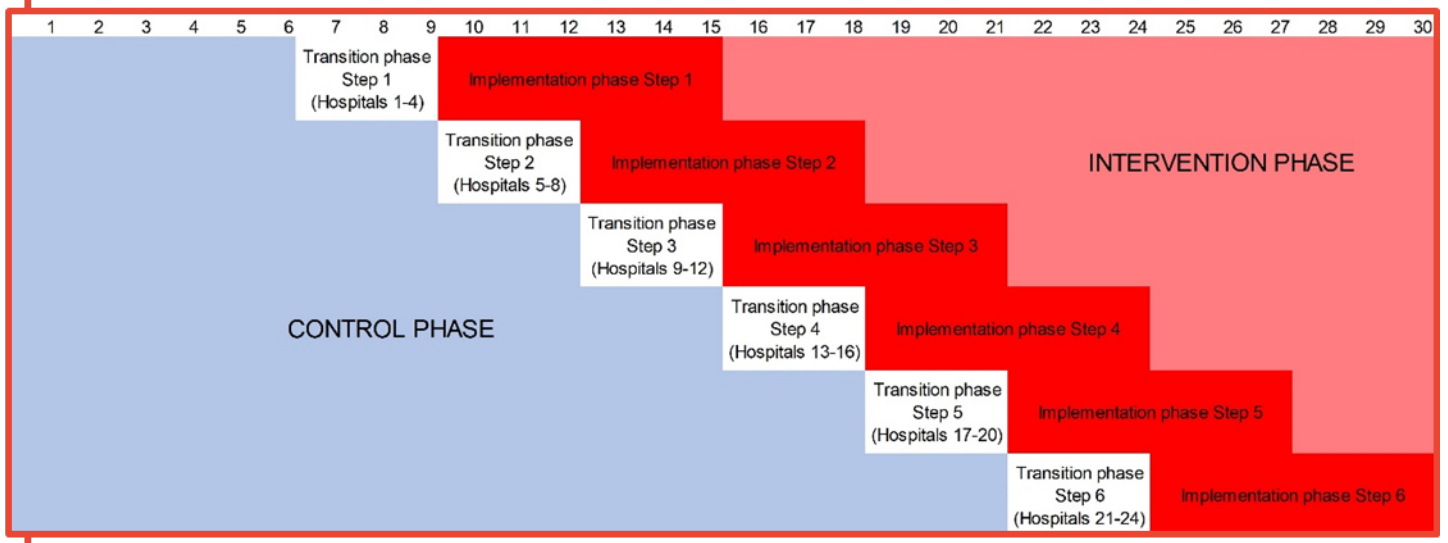


Mix of senior and junior people, Drs and Nurses – discuss with your Consultant or Ward manager if interested.

6 staff from each hospital will be given 3 days training in Human Factors and Quality Improvement

Definitive Study 2023

- **24 hospital randomised trial**
- **Stepped Wedge design – everybody gets the intervention but at different times**
- **Will only proceed if the Pilot Study indicates a good chance of success in reducing mortality**



RESPOND
Rescue for Emergency Surgery Patients Observed to uNdergo acute Deterioration

RESPOND

RESCUE FOR EMERGENCY SURGERY PATIENTS OBSERVED TO UNDERGO ACUTE DETERIORATION

Patient Involvement Intervention

Mudathir Ibrahim, MD

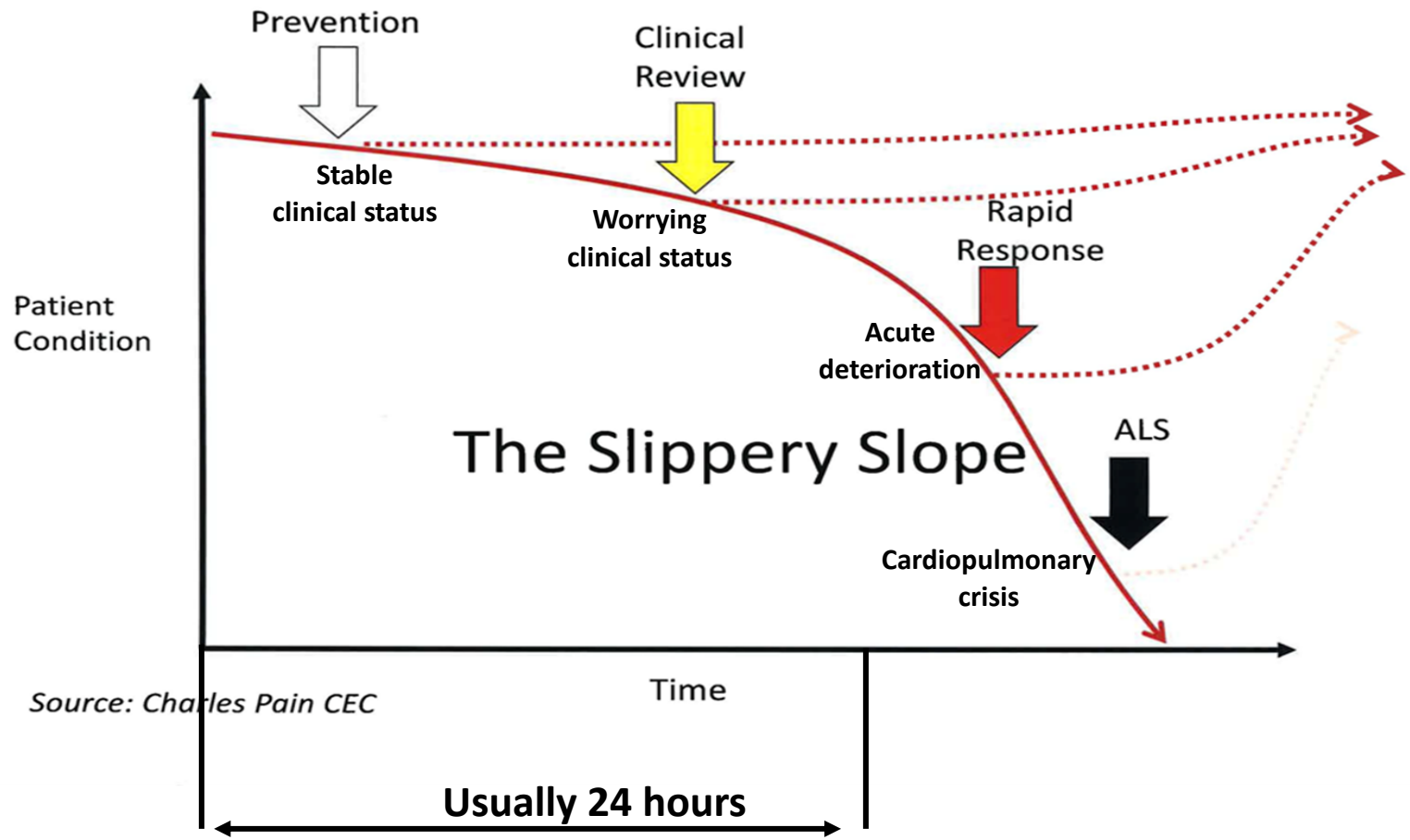
Clinical Research Fellow, Evidence-based Surgery

UNIVERSITY OF OXFORD

NUFFIELD DEPARTMENT OF SURGICAL SCIENCES
Medical Sciences Division

SUPPORTED BY NIHR | National Institute for Health Research

The slippery slope



RESPOND
Rescue for Emergency Surgery Patients Observed to uNdergo acute Deterioration

Current situation

- Current Response system solely relies on clinical staff to monitor and escalate deterioration
- Delay in detection of deterioration lead to delay in escalation and responding, collectively contributing to failure to rescue
- Patients know their body well and can sense any occurring problems before the clinical staff do.
- Efforts to involve patients and their relatives in monitoring to improve early detection and escalation of care is being explored
- So far, evidence show that patients/relatives involvement in care escalation did not overwhelm the health system or increase burden of clinical staff.

Plans and Goal

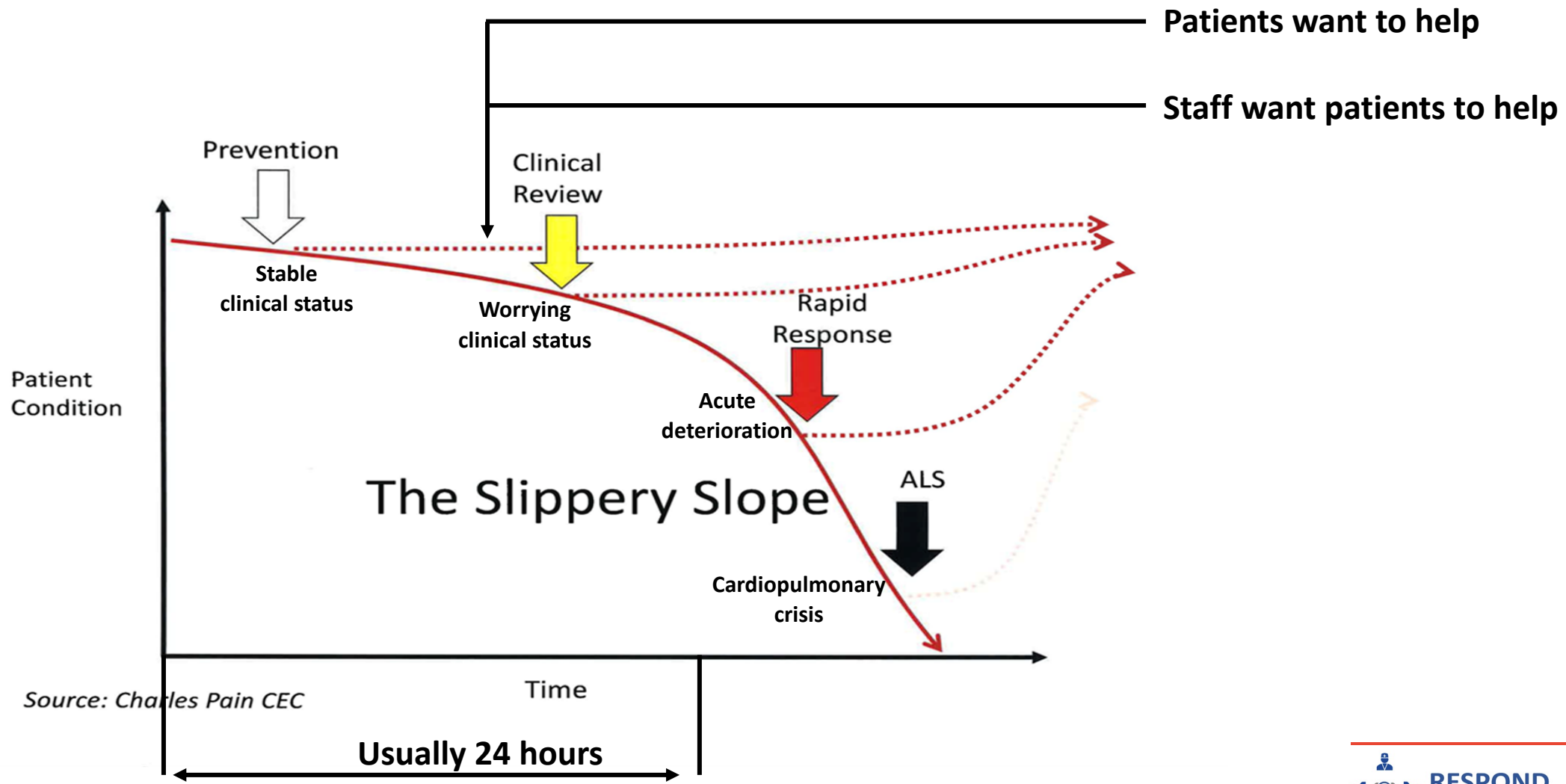
Plans for improvement

- Develop a simple but standardized system that enables patients/relatives to monitor and escalate concerning changes in their health conditions
- A system that prioritize listening and responding to patients health concerns in a timely fashion.

End Goal

- Increase the **awareness and confidence** of patients/relatives in monitoring and escalating health concerns
- Enhance **early detection and response** to deterioration
- Ultimately **decrease failure to rescue** in surgical patients

Staff and patient input



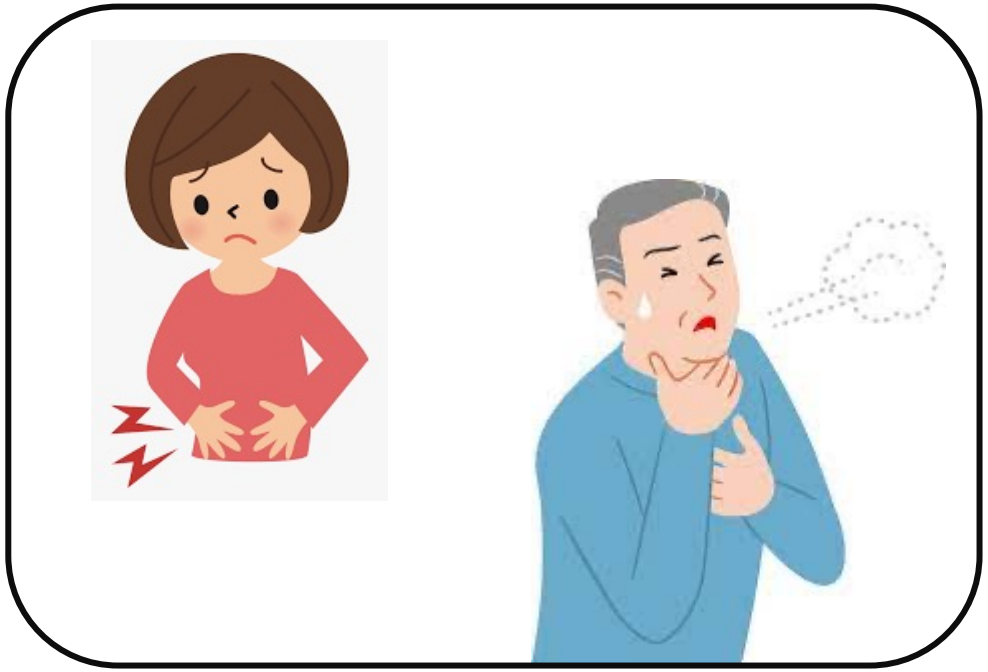
RESPOND
Rescue for Emergency Surgery Patients Observed to uNdergo acute Deterioration

Intervention : Early 3S

RESPOND
Rescue for Emergency Surgery Patients Observed to uNdergo acute Deterioration

Search Early

- This serves to encourage and empower patients/relatives to watchout for any sudden worrying changes in their health condition or that of other patients.
- A new pain ---------- difficulty with breathing



RESPOND
Rescue for Emergency Surgery Patients Observed to uNdergo acute Deterioration

Speak Up Early

- If patients/relatives finds any sudden worrying changes in their health or that of other patients, this serves to empower them to raise their hands and seek help.

Who will the patients seek help from?

The RESPOND person

Who is the RESPOND person?

When Early 3S can not be used?

1. **Emergencies. Like – someone stopped breathing or fainted**
2. **Issues unrelated to health. Like – food, parking or room service**

Who can call the RESPOND person?

1. **Patients**
2. **Patients relatives**
3. **Patient roommates**
4. **Staff**

What to say when calling t
Use the 3 Ws

1. **Who: say relati**
2. **Where: say pat**
3. **What: say worries**

e RESPOND person?

t own cellphone

phones

DIAL: 12345

RESPOND
Rescue for Emergency Surgery Patients Observed to uNdergo acute Deterioration

Save Lives Early

- This enables the RESPOND person to coordinate with the clinical team to resolve patients worrying health changes.

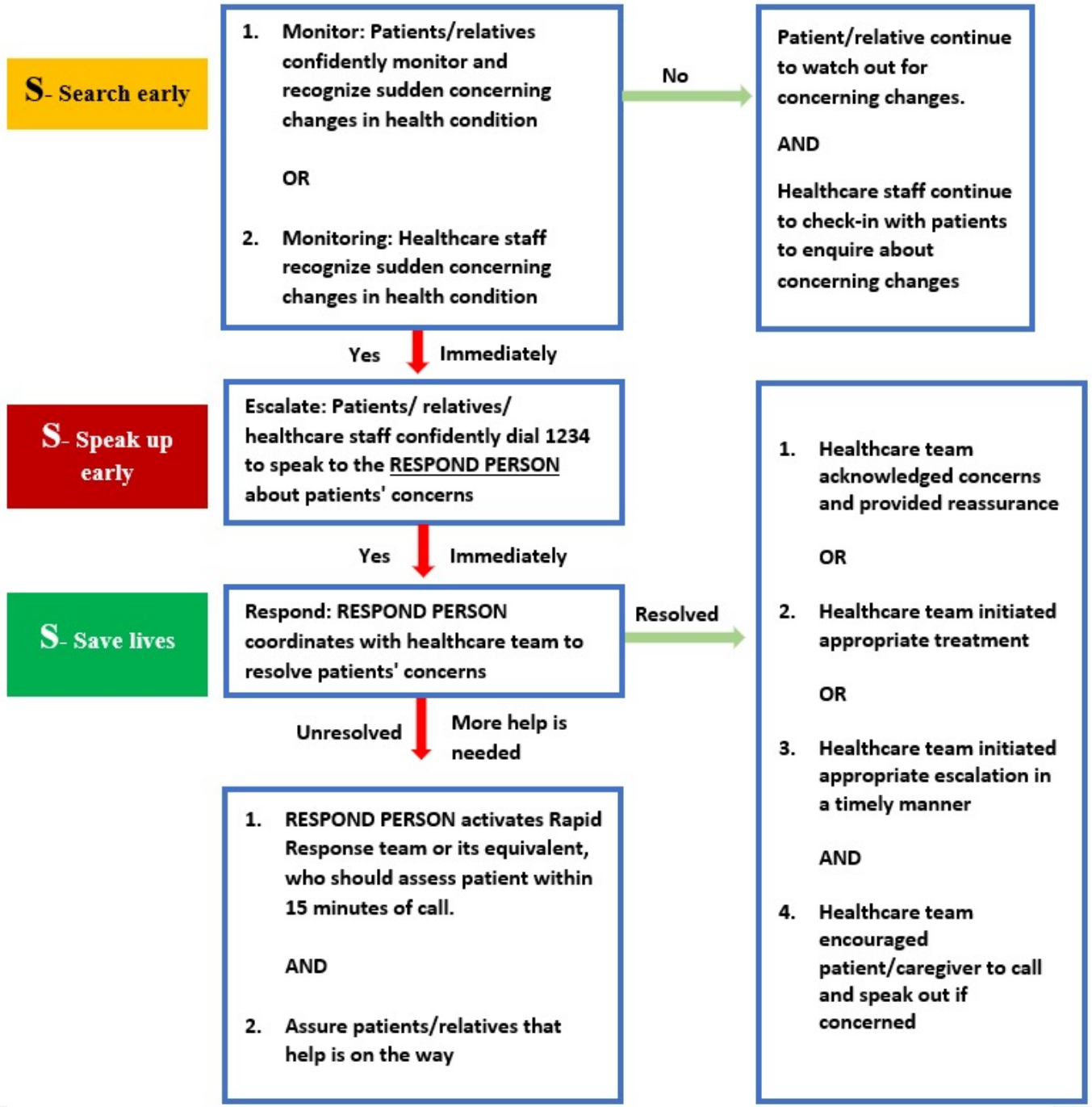
Actions from the RESPOND person

1. **Coordinate with clinical team to resolve patients worrying changes**
2. **Encourage patient/relatives to call if still worried about health changes**
3. **Debrief with clinical team after event**
4. **Complete a log of the event**
5. **Call RRT/MET if no resolution of patient worrying health changes**

Resolution points

1. **Reassure patient to satisfaction. OR**
2. **Initiate treatment. OR**
3. **Initiate escalation of care**

RESPOND
Rescue for Emergency Surgery Patients Observed to uNdergo acute Deterioration



RESPOND
Rescue for Emergency Surgery Patients Observed to uNdergo acute Deterioration

Evaluation

1. System process
   - Number of calls to the RESPOND person
   - Source and reason for calls (Patients/ relatives/ Patient's roommate/ health care staff)
   - Confirmation of information delivery by staff to patients/relatives
2. Staffs' impact and experience
3. Patient Impact and Experience
4. Clinical effectiveness of the system.
   - Changes in the rate of detected post-op complications
   - Proportion of patients with change in care plan (Transfer to ICU)

RESPOND

RESCUE FOR EMERGENCY SURGERY PATIENTS
OBSERVED TO UNDERGO ACUTE DETERIORATION

Human Factors Systems Redesign of Escalation

Dr Saydia Razak

UNIVERSITY OF OXFORD

NUFFIELD DEPARTMENT OF SURGICAL SCIENCES
Medical Sciences Division

SUPPORTED BY
NIHR | National Institute for Health Research

Overview

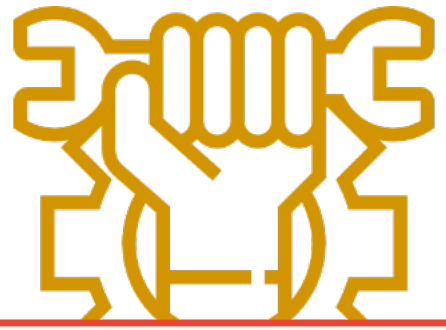
Resilience Engineering

WAI vs WAD

Safety

Work System

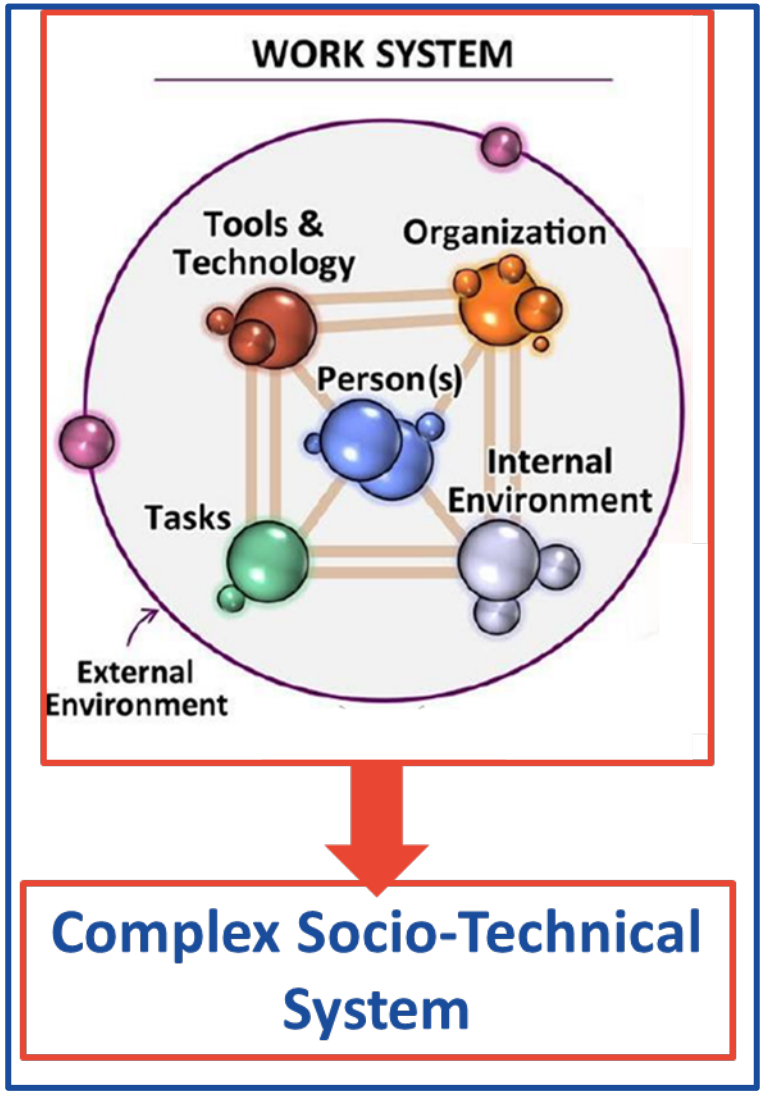
Standardisation

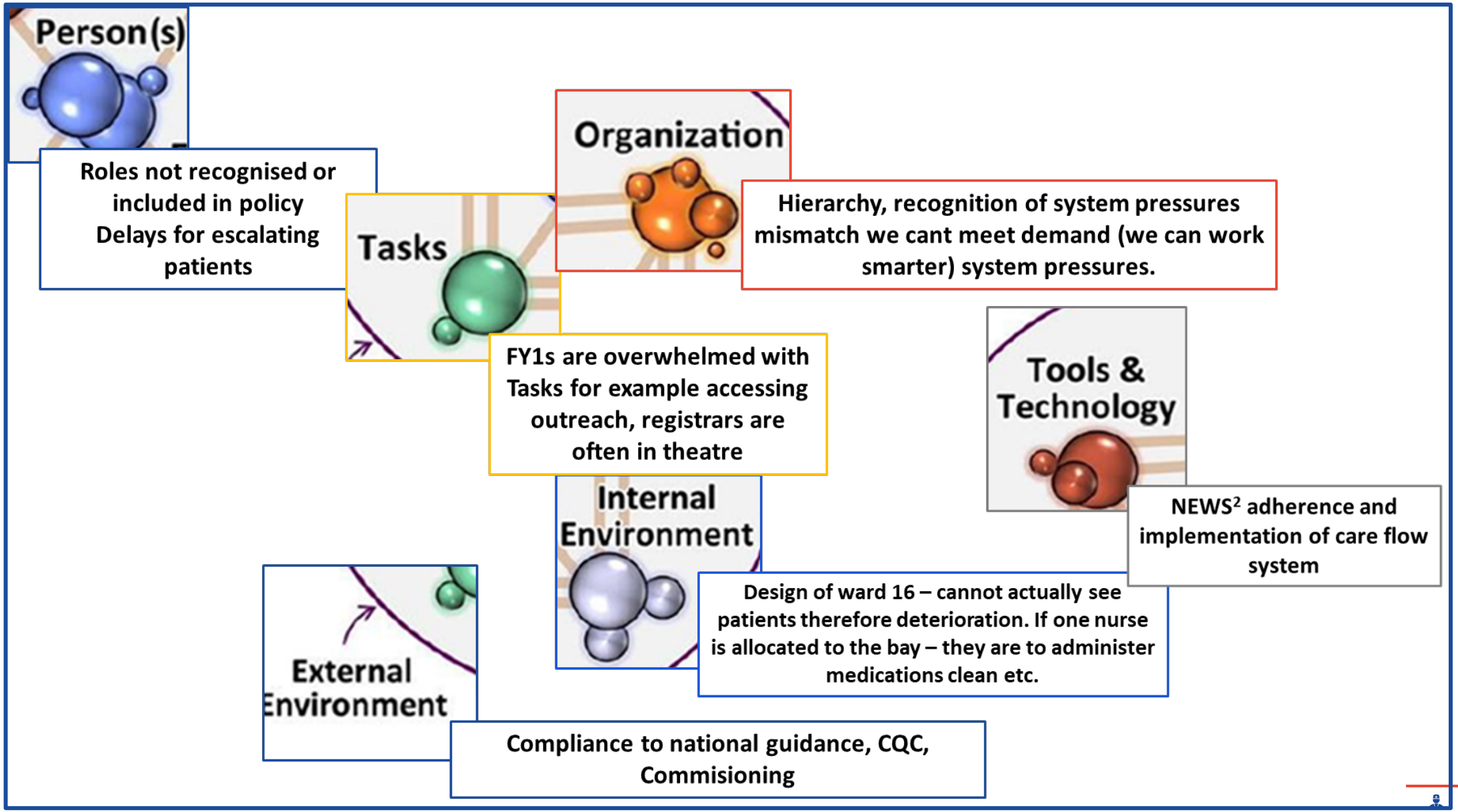


HUMAN FACTORS SYSTEMS
REDESIGN OF ESCALATION

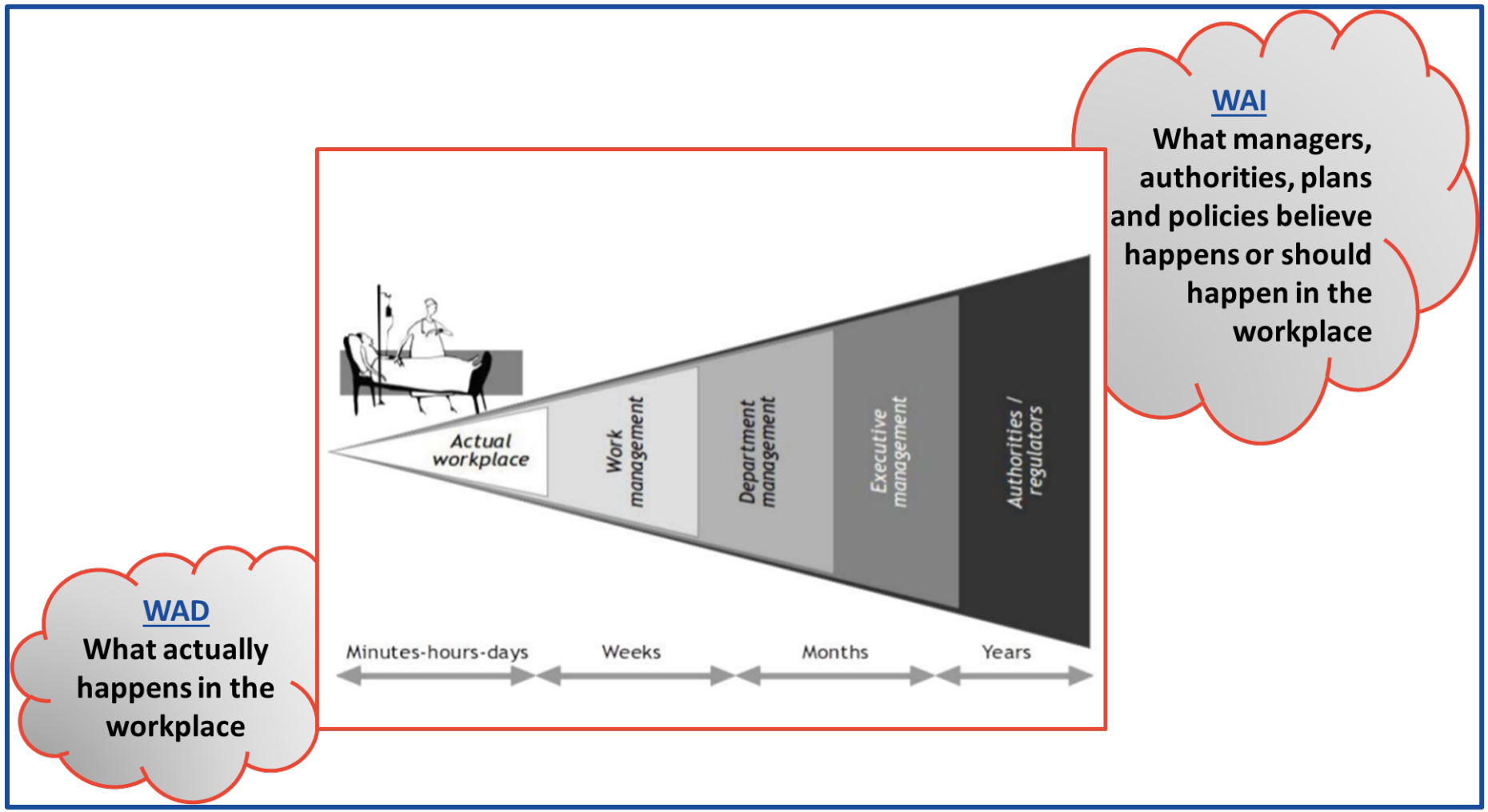
RESPOND
Rescue for Emergency Surgery Patients Observed to uNdergo acute Deterioration

Systems Engineering Initiative for Patient Safety (SEIPS)




Person(s)
Roles not recognised or included in policy
Delays for escalating patients
Organization
Hierarchy, recognition of system pressures mismatch we cant meet demand (we can work smarter) system pressures.
Tasks
FY1s are overwhelmed with Tasks for example accessing outreach, registrars are often in theatre
Tools & Technology
NEWS2 adherence and implementation of care flow system
Internal Environment
Design of ward 16 – cannot actually see patients therefore deterioration. If one nurse is allocated to the bay – they are to administer medications clean etc.
External Environment
Compliance to national guidance, CQC, Commisioning

WAI vs WAD


WAI
What managers, authorities, plans and policies believe happens or should happen in the workplace
Actual workplace
Work management
Department management
Executive management
Authorities / regulators
Minutes-hours-days
Weeks
Months
Years
WAD
What actually happens in the workplace

Resilience Engineering

Resilience is the intrinsic ability of **a system to adjust its functioning prior to, during, or following changes and disturbances,** so that it can sustain required operations under both expected and unexpected conditions.

The aim of **Resilience Engineering** is not only to prevent things from going wrong, but also to ensure that things go right

Applied Ergonomics

journal homepage: www.elsevier.com/locate/apergo

Failure to rescue following emergency surgery: A
management of the deteriorating patient

M. Sujan [a,b,*], N. Bilbro [a,c], A. Ross [d], L. Earl [a], M. Ibrahim [a,c], C
L. Pickup [f], P. McCulloch [a]

[a] Nuffield Department of Surgical Sciences, University of Oxford, UK
[b] Human Factors Everywhere Ltd., UK
[c] Maimonides Medical Center, Brooklyn, NY, USA
[d] Dental School, University of Glasgow, UK
[e] Department of Surgery, University of Michigan, USA
[f] LP Human Factors Ltd., UK

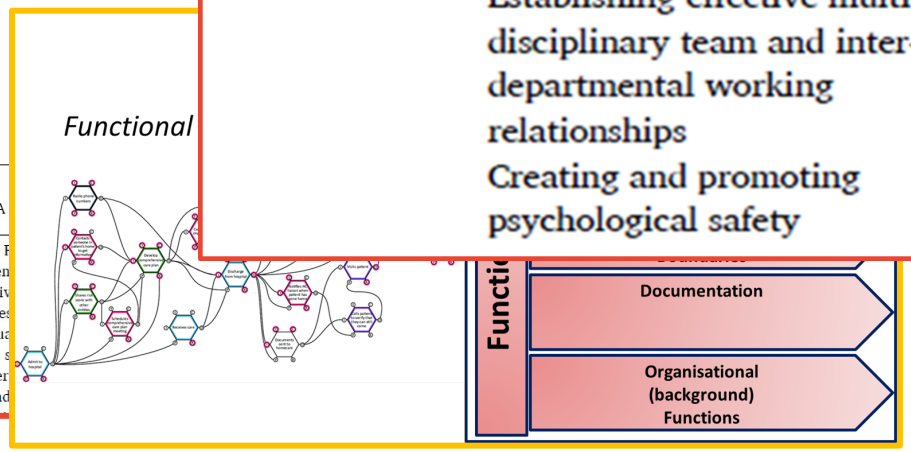
ARTICLE INFO

Keywords:
Failure to rescue
Emergency surgery
Patient safety
FRAM
Resilience engineering

ABSTRA

Background: F
curative inten
rates. Effectiv
mortality. Res
rioration usua
Methods: We s
surgical emer
flicts and trad

Learning	Appreciating gaps between work-as-imagined and work-as-done (trade-offs) Establishing effective multi-disciplinary team and inter-departmental working relationships Creating and promoting psychological safety	Implement organisational learning processes that capture everyday work. Design resilient procedures and work processes that explicitly consider the need for trade-offs.



RESPOND
Rescue for Emergency Surgery Patients Observed to uNdergo acute Deterioration

Safety

Safety-I

- Few things as possible go wrong
- Reactive, respond when something happens
- Humans are a liability
- Accidents are caused by failures
- Purpose of investigation is to identify the causes

Safety-II

- As many things as possible go right
- Proactive, continually trying to anticipate developments and events
- Humans are seen as a resource and necessary for system flexibility and resilience
- Purpose of investigation is to understand how things usually go right as a basis for explaining how things occasionally go wrong
- To better understand conditions where performance variability can become difficult

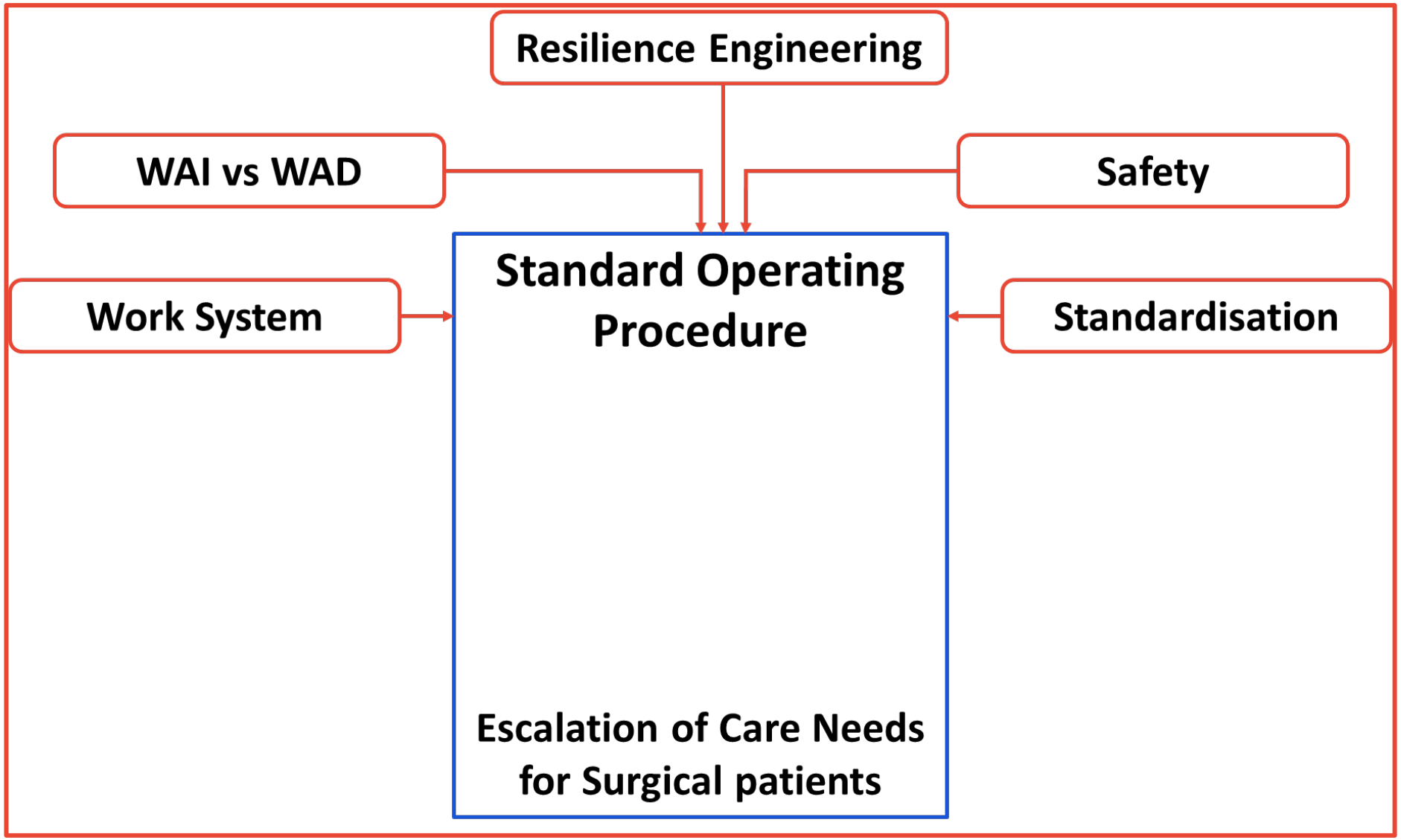
Standardisation

"The process of developing, agreeing upon and implementing uniform technical specifications, criteria, methods, processes, designs or practices that can increase compatibility, interoperability, safety, repeatability, and quality"
(Leotsakos et al., 2014, p. 111)

"Standardisation aims to embed best professional practice whilst minimising the risks of variation, consequently maximising consistency of actions across teams, organisations, and the health system"
(NHS/E, 2014)

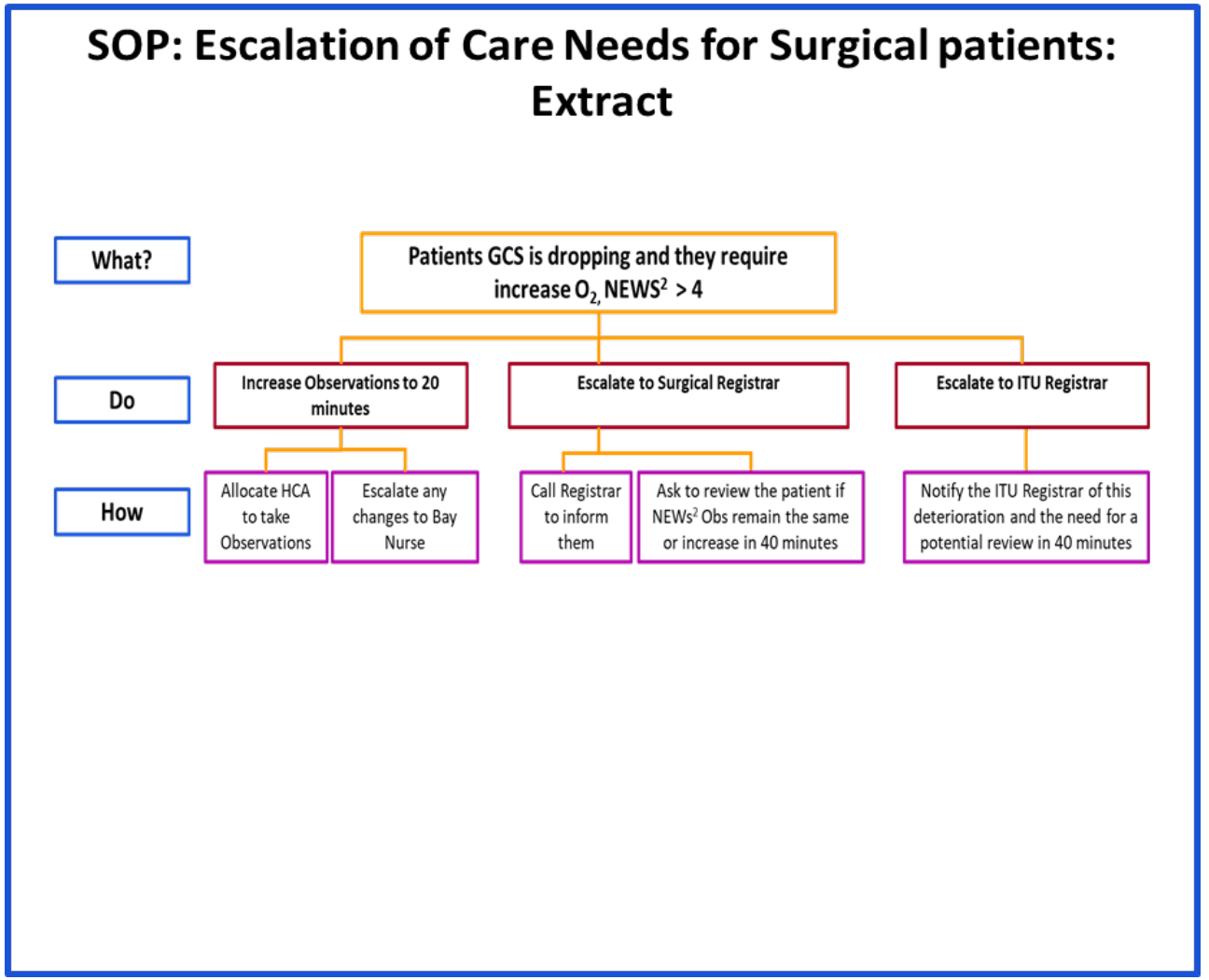
Focus Groups: Escalation Knowledge is Assumed…

(a) Co-design of a standard operating procedure (SoP) for the escalation of deteriorating surgical patients with front-line healthcare professionals and senior management. Interviews and discussions with key departmental stakeholders will inform a standard procedure for the detection and escalation of deteriorating patients. Outputs from work conducted in WP1&2 will initially inform an escalation procedure template, at which each site will modify to suit their own working practices. Dissemination and training of the new SoP will be conducted during the team training intervention strand.



RESPOND
Rescue for Emergency Surgery Patients Observed to uNdergo acute Deterioration

For example…



RESPOND
Rescue for Emergency Surgery Patients Observed to uNdergo acute Deterioration

RESPOND

RESCUE FOR EMERGENCY SURGERY PATIENTS OBSERVED TO UNDERGO ACUTE DETERIORATION

Team Strengthening Programme

Dr Laurie Earl and Dr Abhishek Dey

UNIVERSITY OF OXFORD

NUFFIELD DEPARTMENT OF SURGICAL SCIENCES
Medical Sciences Division

SUPPORTED BY
NIHR | National Institute for Health Research

Team Strengthening Intervention Strand #3

The aim of this intervention strand is to design a training programme, focussing on Human Factors and Safety II principles whilst fostering collaboration between teams

It covers the four areas of interventions defined from the FRAM analysis (Monitoring, Responding, Anticipating and Learning) and areas of improvement from the FMEA study

An awareness of the general principles of Human Factors together with a robust HF training programme can strengthen team cohesion, disseminate and solve cultural differences and increase resilience under stressful situations

SPORTS/MILITARY BASED TEAM STRENGTHENING PROGRAMME

This stream has been devised by a number of interviews and focus groups with staff, interviews with elite sportsmen and military leaders and discussions with members of the SEU at OUH

Team Strengthening - Development of Strand

- Begin with VALUE and IDENTITY SETTING
- Establish NORMS OF BEHAVIOUR
- DEVELOP and USE symbols of IDENTITY
- TRAIN TOGETHER- brief, intense
- “Gamify” training – MAKE IT FUN
- Make SOCIAL EVENTS part of TEAM BONDING

RESPOND
Rescue for Emergency Surgery Patients Observed to uNdergo acute Deterioration

Away Days

As it is difficult to get staff it is possible that this could be done as a social occasion with a game of rounders, an escape room game, murder/mystery night etc. A debriefing/discussion after over food would enable the HF messages to be passed

To include facilitated meetings of staff from all areas to discuss a shared vision for the team including a set of team values; developing the team culture; consideration of rituals and symbols and identifying buddies and champions

A series of away days for front line staff to encourage HF awareness

SPORTS/MILITARY BASED TEAM STRENGTHENING PROGRAMME

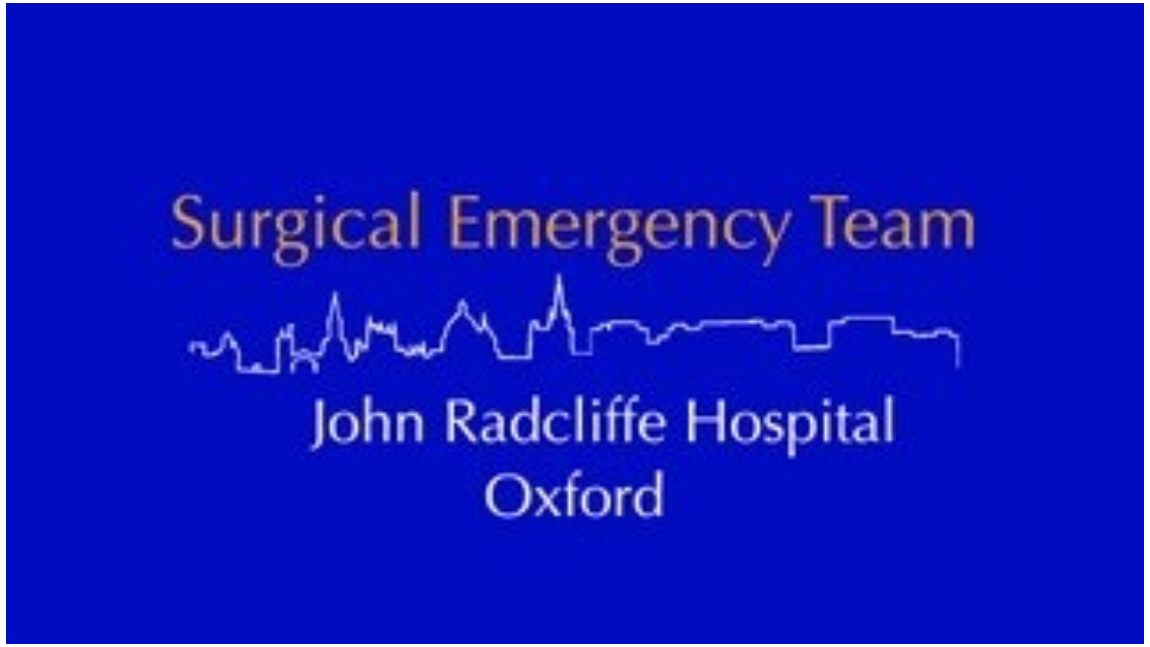
This intervention will establish a common goal for the team and enhance working relationships

Away Day follow up

Incorporating into Everyday Life

- Working with staff to incorporate regular reminders of their agreed values and commitment to each other into the routine of daily work in a way they are comfortable with.
- Include motto and/or ritual on handovers, team briefings, meetings etc.
- Display mission statement on posters, merchandise etc.
- Use Champions as ‘enforcers’ and role models and in training new staff
- Use logo/emblem on T-shirts, scrubs, hoodies (example)

Example of a Logo



RESPOND
Rescue for Emergency Surgery Patients Observed to uNdergo acute Deterioration

Team Training Simulation

Regular team training simulations in situ or using the simulation suite

A series of exercises have been developed using realistic scenario's

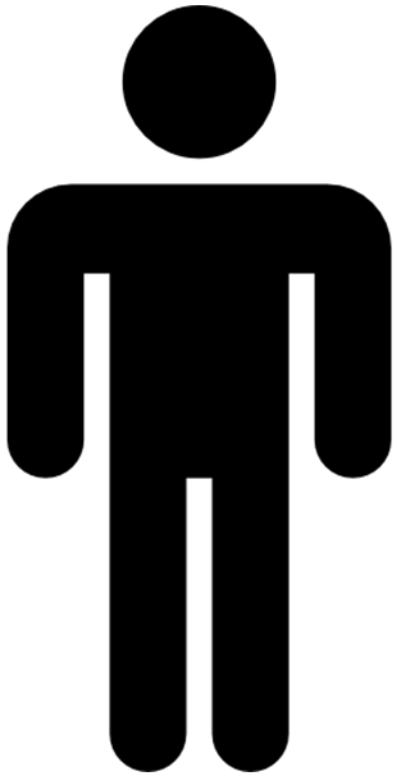
Although the participants will practise their skills and knowledge we will be primarily looking at how they work as a team

In the simulator suite these will use recent live events with design and facilitation by staff as well as research team.

Teams will be under some pressure, not overloaded. Debriefing will be of an equal time and involve learning from good practice

Ad hoc on the wards, no more than 15 minutes using mannequins or actors and realistic scenario's. Several during the day to enable as many people as possible to engage

Example of Scenario



Situation

- 43 year old Male
- Sent to SAU by Ambulance from GP at 16:30
- Patient is shivering

Background

- Patient has had *flu like* symptoms for a week - Covid-19 negative
- Patient discharged from Surgical Ward following appendicectomy 10 days ago
- Current NEWS2 Score: 8

Physiological Parameters	At GP (15:00)		Ambulance (16:00)		On Arrival to SAU (16:30)	
		NEWS²		NEWS²		NEWS²
Respiratory Rate	25	2		2	23	2
SPO_2	96 on Air	0	97	0	94% on Air	1
Blood Pressure	103/120	1	107/115	1	94/101	2
Pulse	130	2	115	2	120	2
Temperature	36.0	1	35.8	1	35.6	1
GCS	15	0	15	0	15	0
AVPU	Alert	0	Alert		Alert	0
Total		**6**		**6**		**8**

Figure 1: Sepsis: Potential Peritonitis Scenario Card (Source: The UK Sepsis Trust, (2016)

Team Cohesion by Gamification

Fun, Fast and Focussed

- League based gaming suite where a new app based game is introduced each week.
- Staff to make mixed teams of 4 – 6 people who will compete as a team, with their scores calculated each week.
- A weekly leader board will be produced and prizes awarded for winning teams.
- Co-operation between team mates is the key to success.

Team Cohesion by Gamification

Possible games

Septris : A web-based game developed by Stanford University with case scenarios of best practice guidelines for sepsis. Players are scored based on their management of simulated patients.

CogniFit : Interactive gaming app designed to train cognitive skills, including short-term memory, planning, hand-eye coordination, and auditory perception.

Clinical Sense : Gaming app involving role playing for healthcare professional to solve clinical scenarios.

Stanford | Septris

Blood Cultures results are in for patient Matt

-400
SCORE

Matt

SIRS + Sepsis | Severe + Shock

Temp:	BP:	HR:	RR:	UO:
101.7F 38.7C	**64/31**	**157**	**38**	**0.2 cc/kg/hr**

Chart | H&P

Physical Exam:

General: Day of admit: 39.3. Pulse 112, resp 18, BP 108/45. Somnolent but arousable. Site of RUE PICC: erythema, induration, purulent drainage. Diaphoretic. Tachycardic, but otherwise normal cardiac exam. Normal lung exam. Remainder of exam normal.

Labs/Diagnostics:

Blood Cultures
Blood Cultures: Results Pending

CBC

Treatments:

IV NS, 1000 ml Bolus 24
Remove Central Line 990
Cefepime 993

Physical Exam | ▼ Labs | ▼ Imaging

▼ Treat | ▼ Consult | ▼ Cultures

RESPOND

RESCUE FOR EMERGENCY SURGERY PATIENTS OBSERVED TO UNDERGO ACUTE DETERIORATION

Enhancing Shared Ownership

Professor Peter McCulloch & Dr Andile Dube

UNIVERSITY OF OXFORD

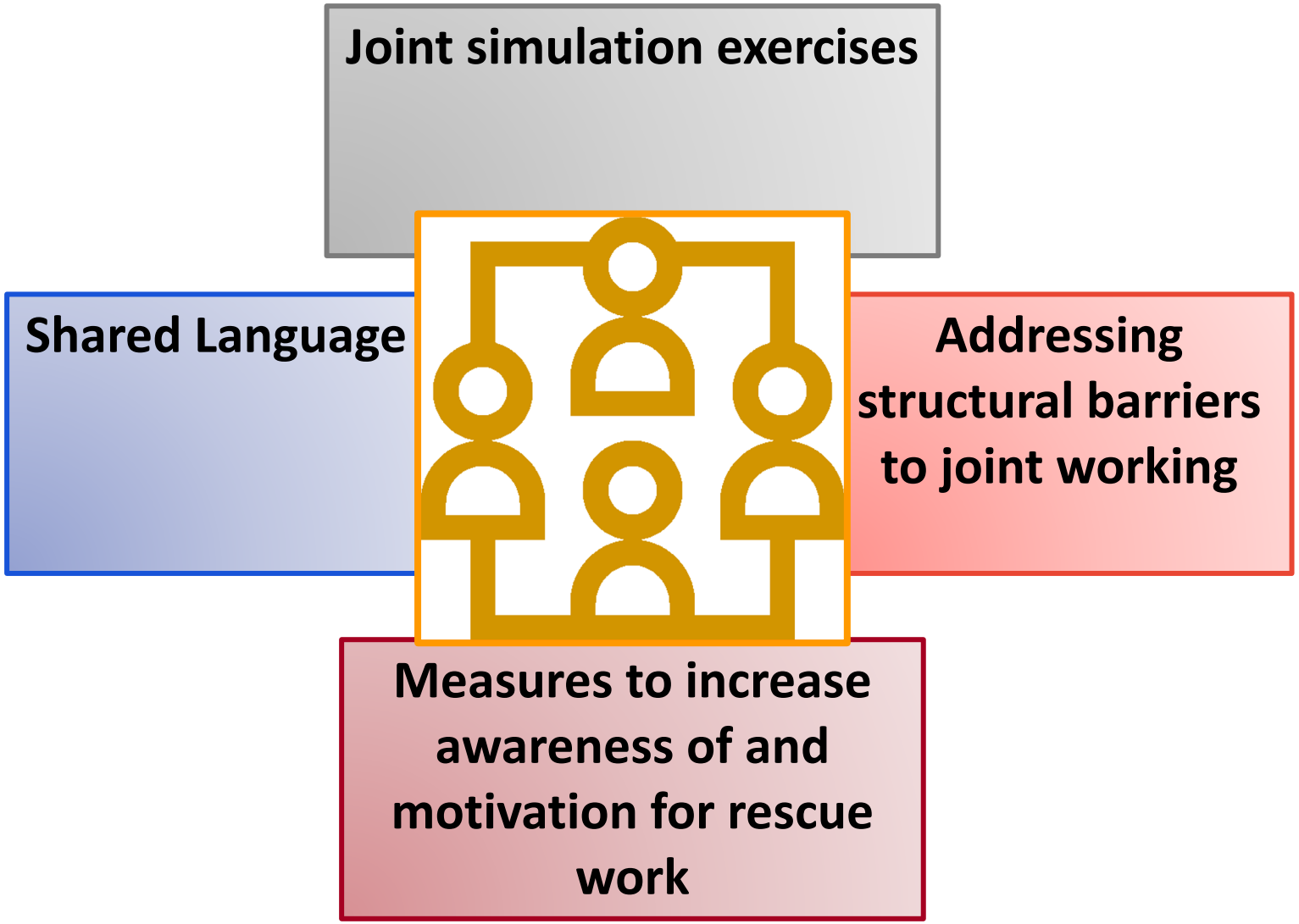
NUFFIELD DEPARTMENT OF SURGICAL SCIENCES
Medical Sciences Division

SUPPORTED BY
NIHR | National Institute for Health Research

Aims

- **Increase mutual understanding between departments**
- **Improve sense of united purpose in dealing with emergency patients**
- **Identify and draw senior management attention to structural issues**
- **Identify system and culture issues and address through QI process**

Consists of…



RESPOND
Rescue for Emergency Surgery Patients Observed to uNdergo acute Deterioration

Shared Language

SEU Requester

REQUEST

- Patient, Age, Sex & Ward
- Working diagnosis if any
- Degree of urgency

BACKGROUND

- **Criticality:**

Evidence:NEWS2, ASA, Lactate, CRP, WBC

- **Chronic Health Status:**

Any moderate or severe systems impairment: Cardiac, pulmonary, renal, hepatic, cerebral , other.

Service Department Receiver

LISTEN and do not interrupt!

- Read back request and summary
- Specify additional info needed

Give provisional decision

ACCEPT: give estimate of WHEN

PROVISIONAL ACCEPT: explain dependency/actions required

REJECT: give explanation

RESPOND
Rescue for Emergency Surgery Patients Observed to uNdergo acute Deterioration

Joint Simulations

Pre-declared exercises with a carefully developed scenario and detailed “washup” feedback session

Will require co-operation of most or all service departments (radiology, anaesthesia, ICU, Theatres)

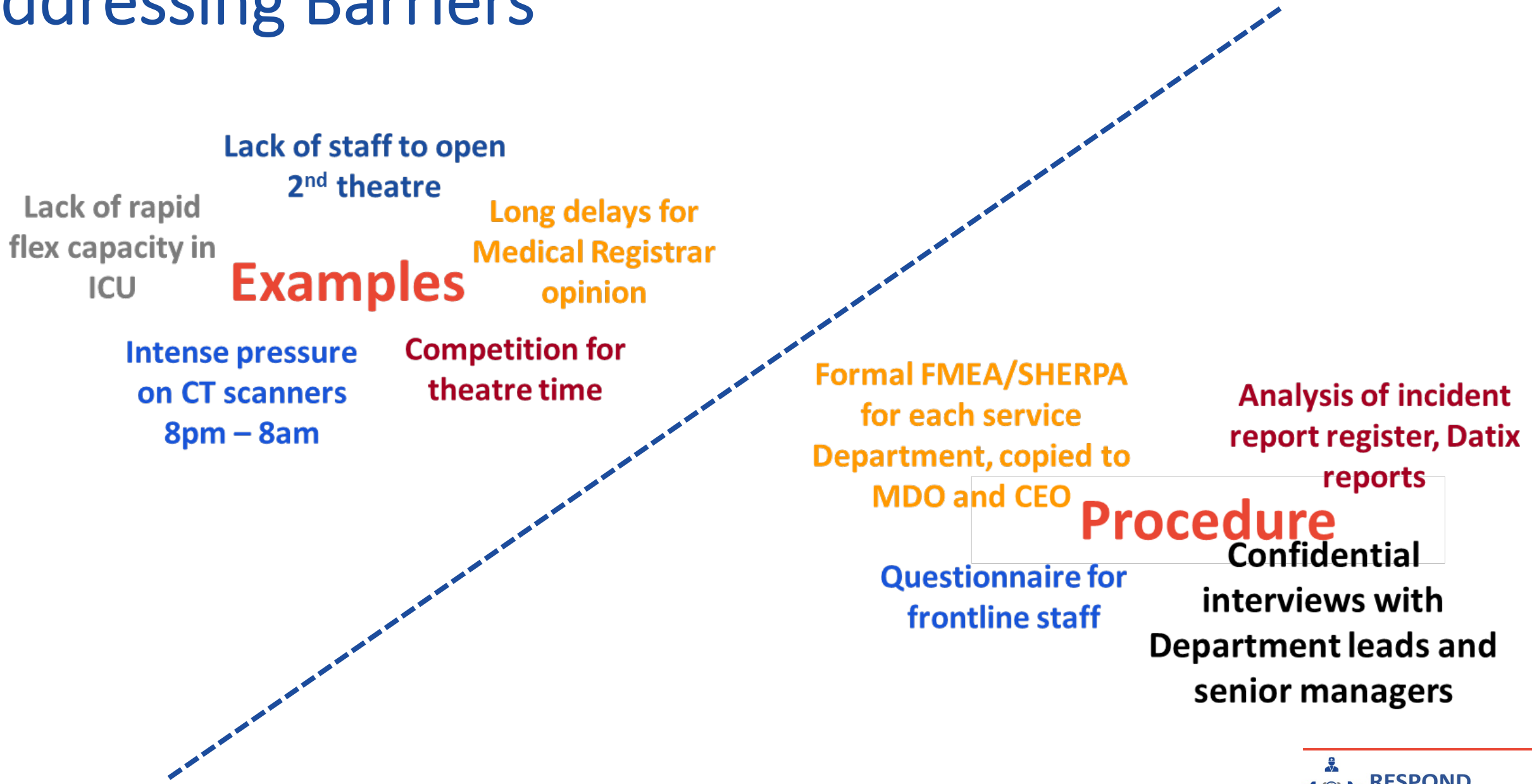
1 per month during initial implementation phase of WP3 Feedback sessions will focus on systems issues and generate changes to be PDSA’d.

Possible Scenarios

34 year old severe Cerebral Palsy patient with feeding gastrostomy recently revised, now peritonitic and distended, high lactate. PMH includes repeated aspiration pneumonia. Deformity and spasm make intubation challenging.

65 year old patient on dialysis with failing transplant and closed loop obstruction of colon: rising sepsis indicators and can’t sing in tune

Addressing Barriers



Increasing awareness and motivation

Updated scorecard – made constantly visible

Measure of Department performance in emergencies without additional comment e.g. time to delivery

Display In rest areas and workplace

Celebration of excellent performance/appreciative enquiry board

Links to team (uniform, merchandise, games, social events)

Official recognition and certificates, endorsement

Please send interest, feedback, and questions to:

Dr Claudia Grimaldo

RESPOND Programme Manager

claudia.grimaldo@nds.ox.ac.uk