Intern DETECT Jan 2024

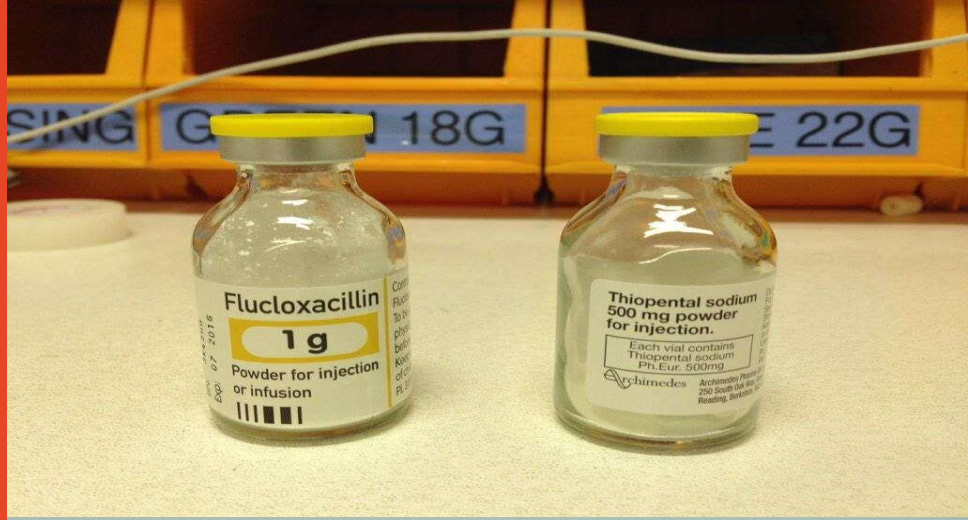
CRM and Human Factors

A very brief taster

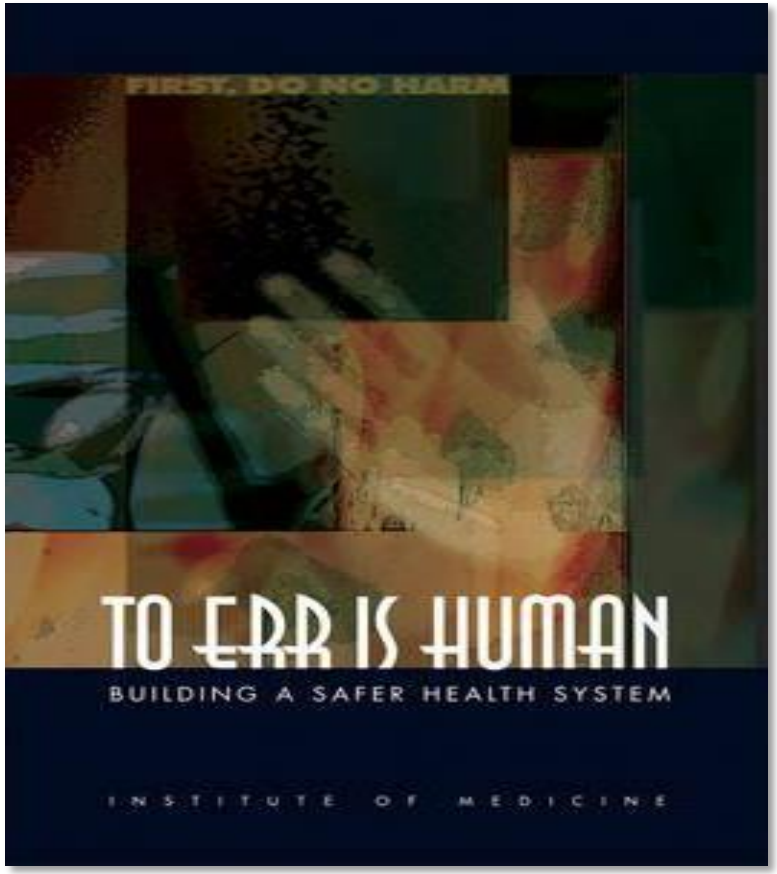
Andrew Coggins

Opinions are my own

Disclaimer at www.emergencypedia.com/about



Are healthcare “humans” the number one threat to life?



Institute of Medicine: 1999

- **44 000 - 98 000** deaths/ year from *preventable* medical errors
- We are frequently told this


COMMUNICATION
LEADERSHIP & MANAGEMENT
CO-OPERATION
SITUATION AWARENESS
DECISION MAKING
Crew Resource Management Skills

– have we learned in healthcare?


Malaysia
9M-MRO

Air Safety: Comparison with other modes of transport

Deaths per billion passenger kilometres

Air 0.05
Bus 0.4
Rail 0.6
Van 1.2
Water 2.6
Car 3.1
Bicycle 44.6
Foot 54.2
Motorcycle 108.9

DATA: Survivability of Accidents Involving. Part 121 U.S. Air Carrier Operations,1983 Through 2000
NTSB/SR-01/01 March 2001 PB2001-917001 Notation 7322

Air Safety: Comparison with other modes of transport

Deaths per billion passenger hours

Bus 11.1
Rail 30
Air 30.8
Water 50
Van 60
Car 130
Foot 220
Bicycle 550
Motorcycle 4840

Air Safety: Comparison with other modes of transport

Deaths per billion passenger journeys

Bus 4.3
Rail 20
Van 20
Car 40
Foot 40
Water 90
Air 117
Bicycle 170
Motorcycle 1640

- DATA: Survivability of Accidents Involving. Part 121 U.S. Air Carrier Operations,1983 Through 2000 NTSB/SR-01/01 March 2001 PB2001-917001 Notation 7322

Britannica

US Airways flight 1549 | Description ...

CNN

Passengers from Hudson River crash ...

National Air and Space Museum

The Crew of US Airways Flight ...

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ht Attendants of 'Cactus 1549 ...

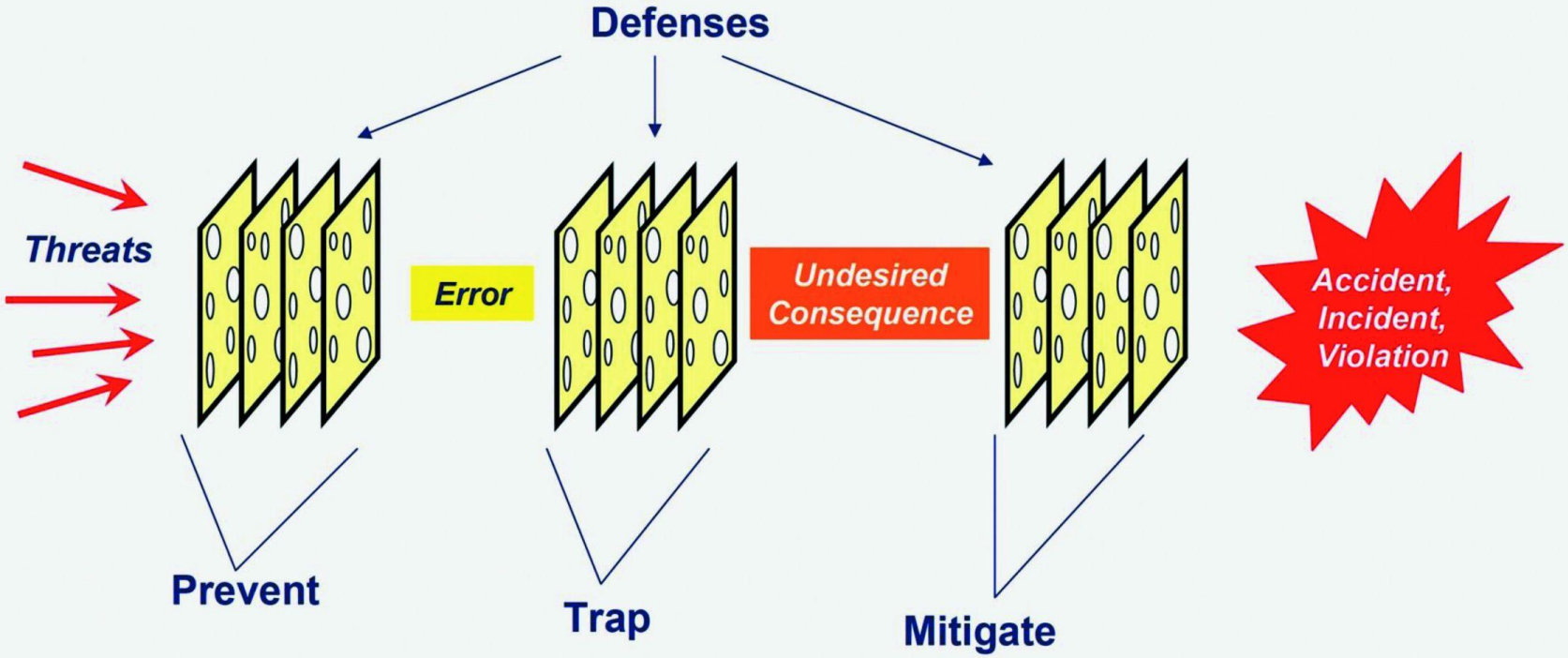
The New York Times

Lessons From Flight 1549 - The...

Carolinas Aviation Museum

US Airways Flight 1549 "Miracle on ...

Basic Threat & Error Management Model



Eisen LA, Savel RH. What went right: lessons for the intensivist from the crew of US Airways Flight 1549. Chest. 2009 Sep;136(3):910-917.

Crew Resource Management

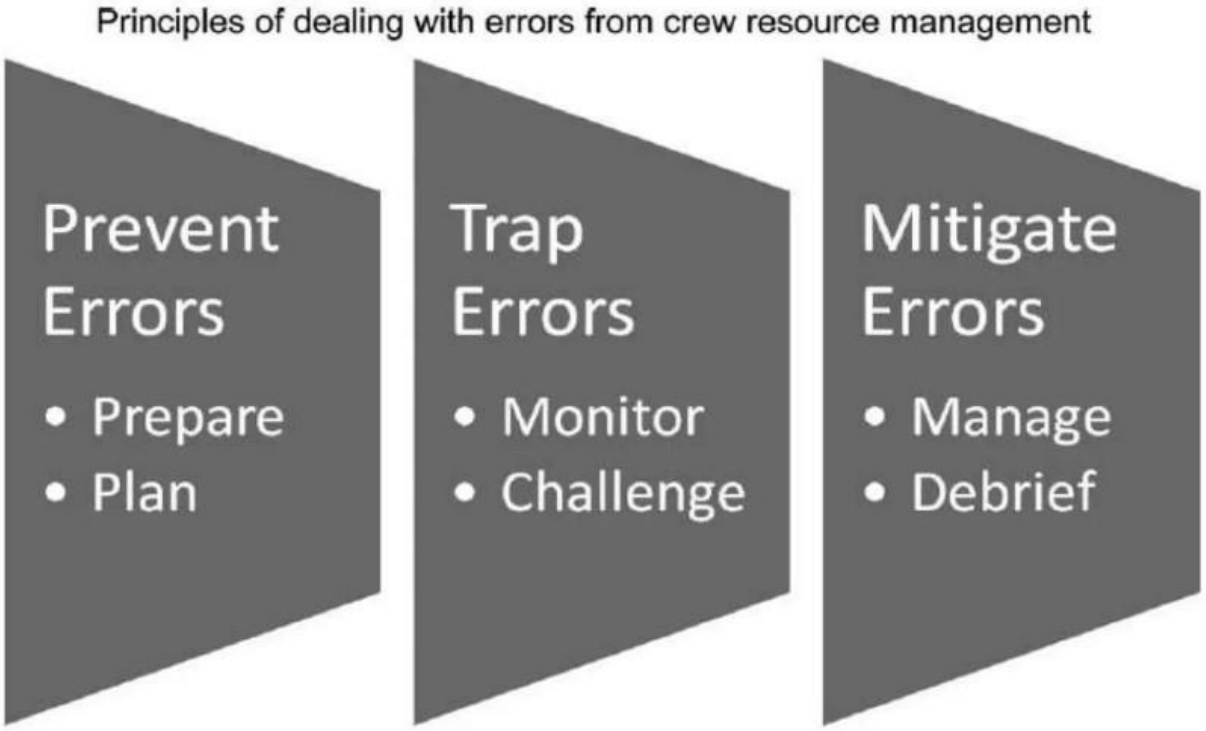


FIGURE 2. CRM principles of dealing with errors.

Britannica

US Airways flight 1549 | Description ...

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Passengers from Hudson River crash ...

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Prevent
Errors
• Prepare
• Plan

– have we learned in healthcare?

Cardiac Arrest on the Ward

Increasing number of ALS calls in hospitals (>5/day @Westmead)

Reduced number of Cardiac Arrests on Ward as a result of early detection

(<40/year)

Less working hours for healthcare staff

AND

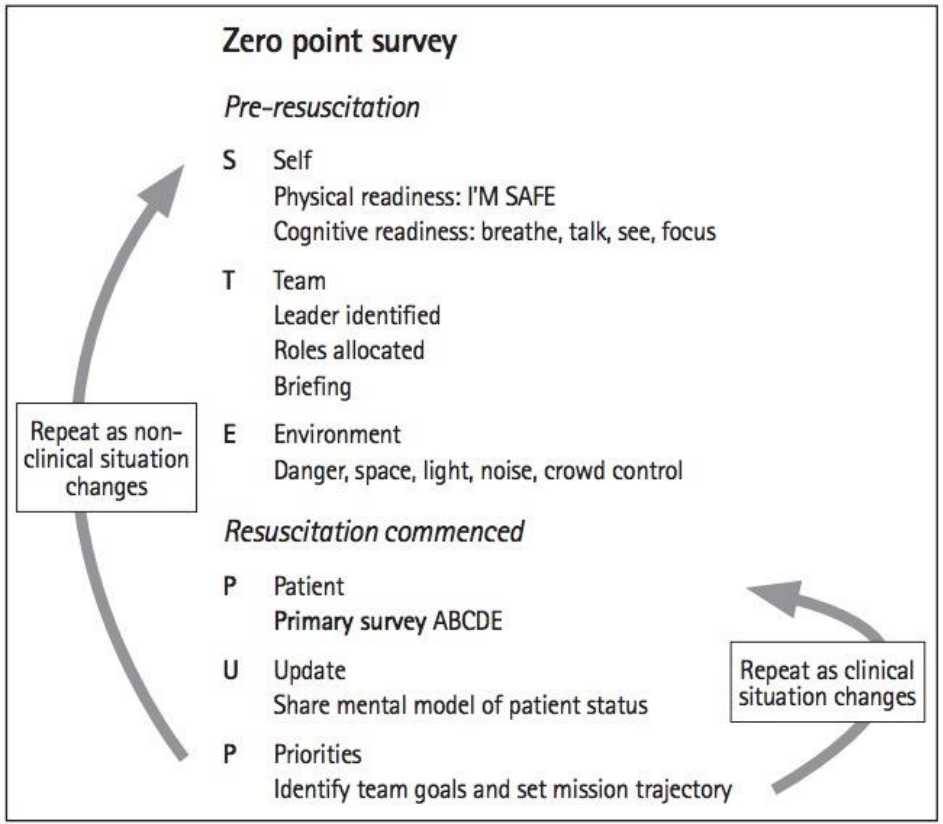
Reduced exposure

Resultant 'Gap in Training' for staff

Rates of Cardiac Arrest / M.E.T. calls

Variable	Full year 2013	Full year 2014	Full year 2015	Full year 2016	% Change 2013–2016
Number of reported in-hospital cardiac arrests (overall total)	67	45	41	38	−42.3%
Number of MET Calls—Level 1 response (a primary team review)	6409	7017	8342	8696	+26.3%
Number of MET Calls—Level 2 (a full life support team)	1266	1473	1706	2037	+37.9%

Characteristics of the Zero Point Survey

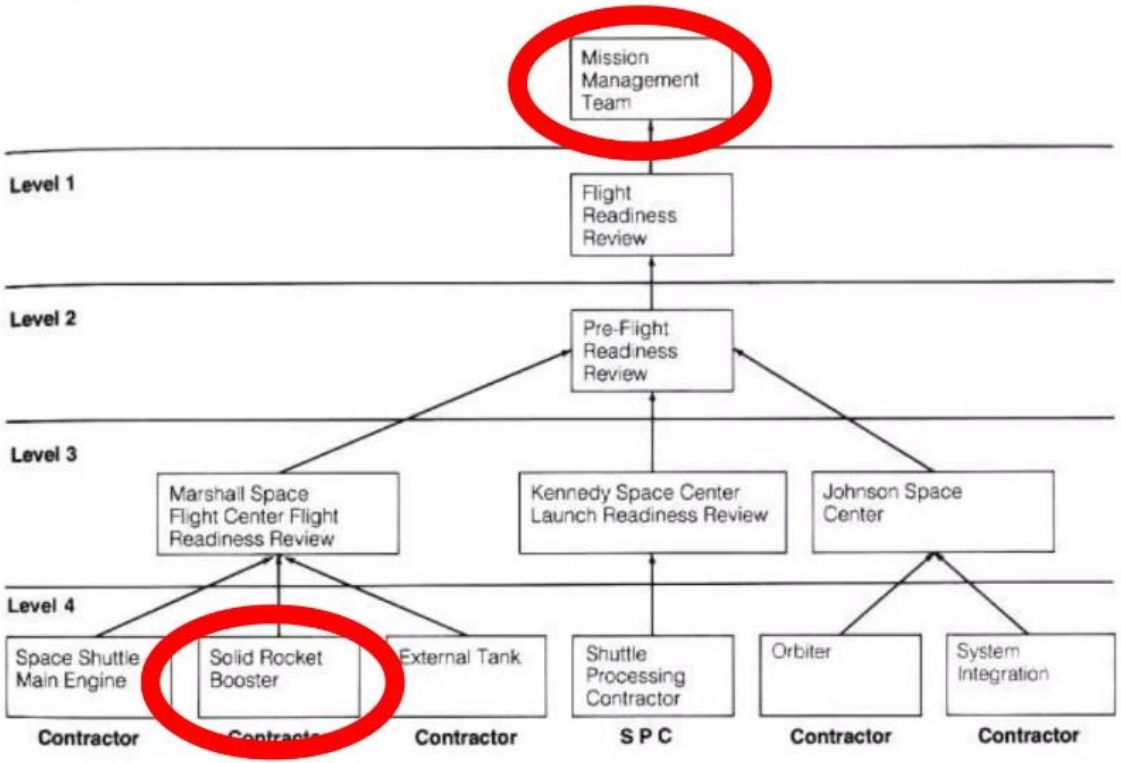


https://www.ceemjournal.org/upload/pdf/ceem-17-269.pdf


Trap
Errors
• Monitor
• Challenge

Challenger 1986

Readiness Reviews



Readiness reviews for both the launch and the flight of a Shuttle mission are conducted at ascending levels that begin with contractors.

NOTE: See Chart on page 102 for description of management "levels" and organization chain of command.

Metro South Hospital and Health Service
Organisational Structure

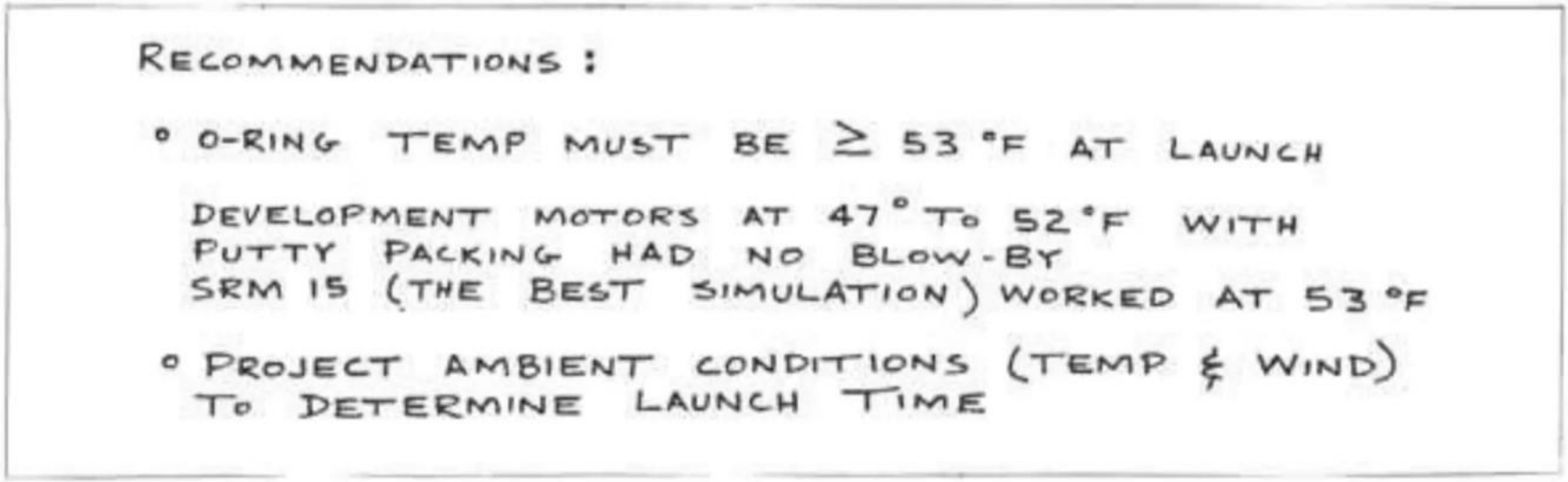
[reviewed September 2022]

ICARE² values

INTEGRITY COMPASSION ACCOUNTABILITY RESPECT ENGAGEMENT EXCELLENCE

Metro South Health | Queensland Government

Roger Boisjoly's Handwritten Note:

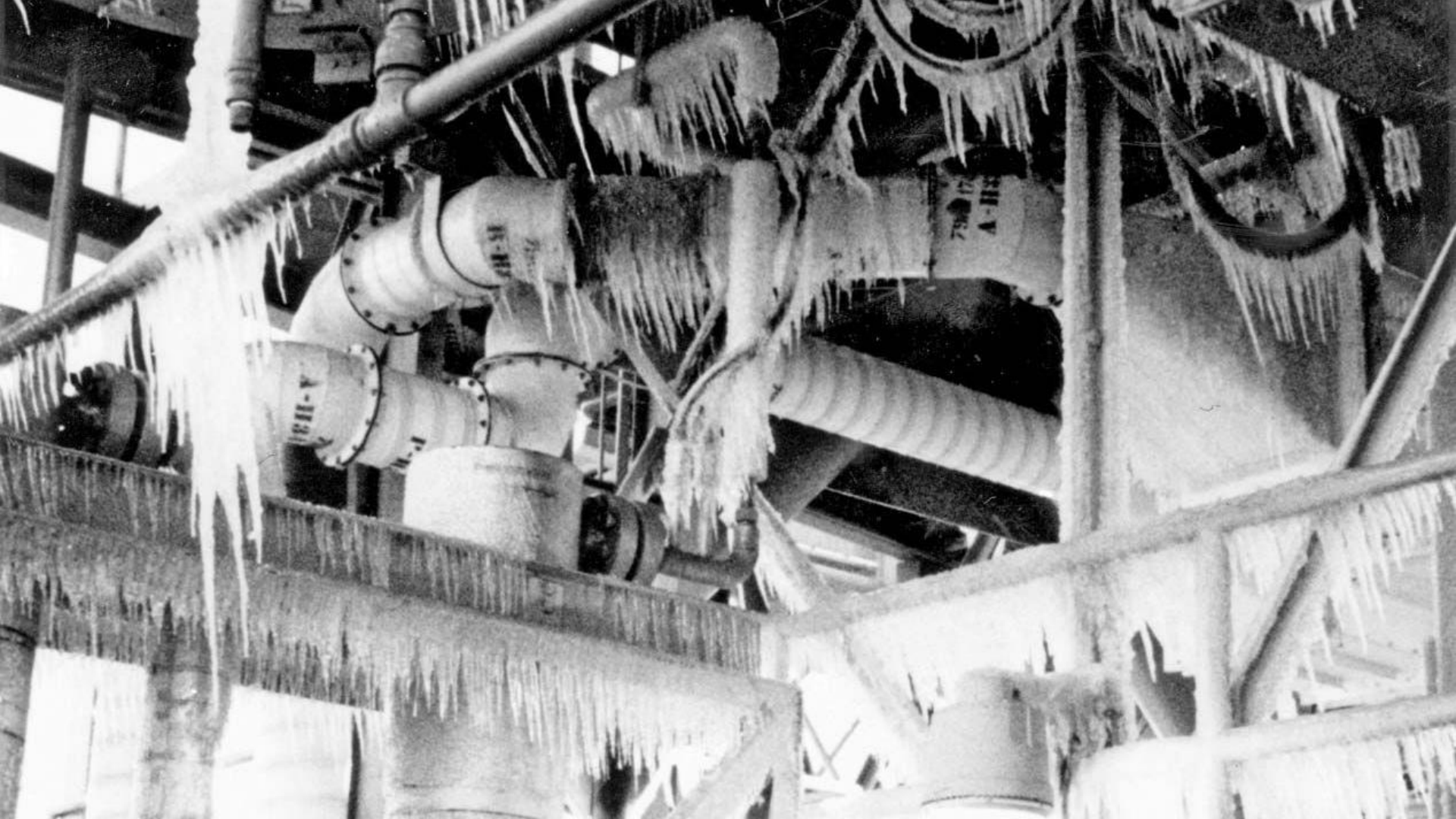

RECOMMENDATIONS :

- O-RING TEMP MUST BE ≥ 53 °F AT LAUNCH

  DEVELOPMENT MOTORS AT 47° TO 52 °F WITH PUTTY PACKING HAD NO BLOW-BY
  SRM 15 (THE BEST SIMULATION) WORKED AT 53 °F

- PROJECT AMBIENT CONDITIONS (TEMP & WIND) TO DETERMINE LAUNCH TIME

53 Degrees Farenheit = 12 Degrees Celcius (approx)



MTI ASSESSMENT OF TEMPERATURE CONCERN ON SRM-25 (51L) LAUNCH

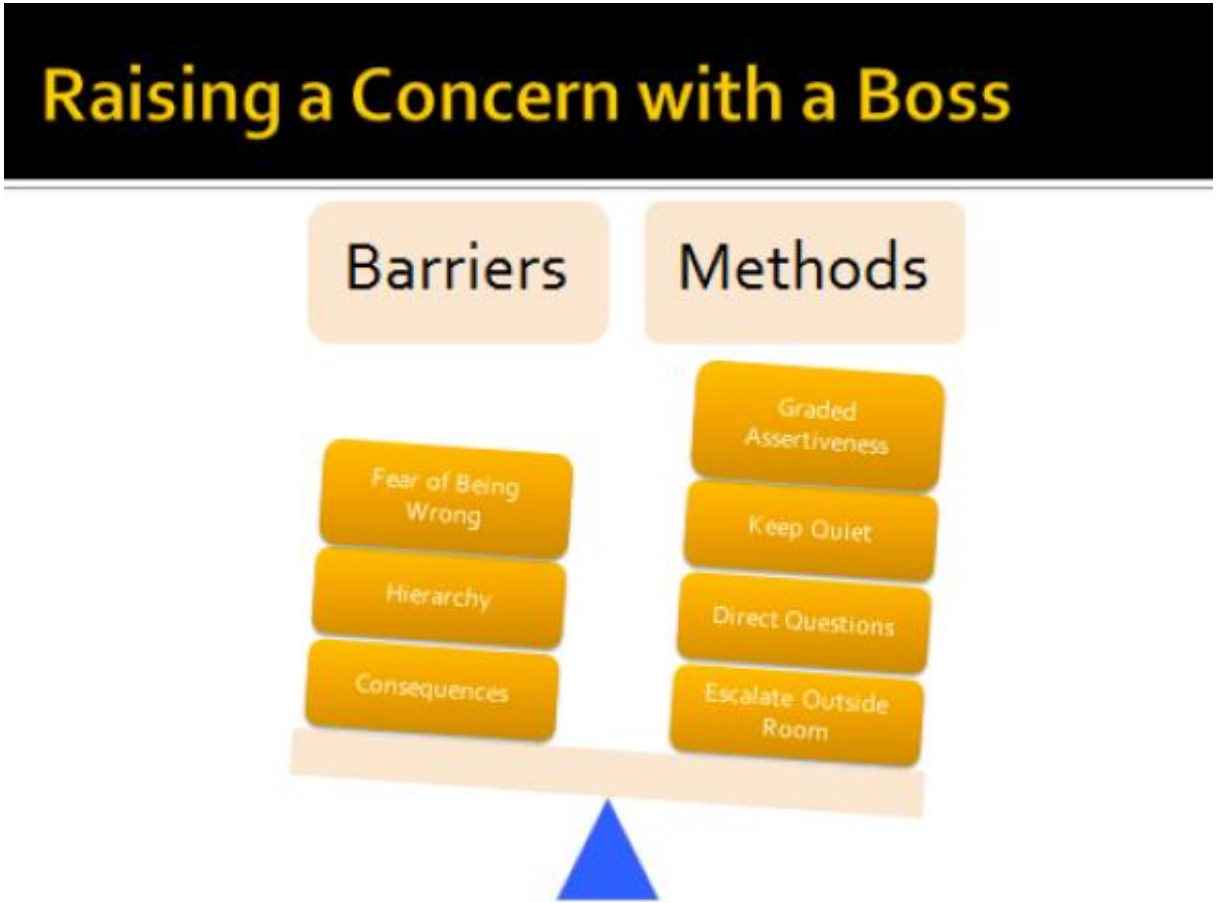
- CALCULATIONS SHOW THAT SRM-25 O-RINGS WILL BE 20° COLDER THAN SRM-15 O-RINGS
- TEMPERATURE DATA NOT CONCLUSIVE ON PREDICTING PRIMARY O-RING BLOW-BY
- ENGINEERING ASSESSMENT IS THAT:
  - COLDER O-RINGS WILL HAVE INCREASED EFFECTIVE DUROMETER ("HARDER")
  - "HARDER" O-RINGS WILL TAKE LONGER TO "SEAT"
    - MORE GAS MAY PASS PRIMARY O-RING BEFORE THE PRIMARY SEAL SEATS (RELATIVE TO SRM-15)
      - DEMONSTRATED SEALING THRESHOLD IS 3 TIMES GREATER THAN 0.038" EROSION EXPERIENCED ON SRM-15
  - IF THE PRIMARY SEAL DOES NOT SEAT, THE SECONDARY SEAL WILL SEAT
    - PRESSURE WILL GET TO SECONDARY SEAL BEFORE THE METAL PARTS ROTATE
      - O-RING PRESSURE LEAK CHECK PLACES SECONDARY SEAL IN OUTBOARD POSITION WHICH MINIMIZES SEALING TIME
- MTI RECOMMENDS STS-51L LAUNCH PROCEED ON 28 JANUARY 1986
  - SRM-25 WILL NOT BE SIGNIFICANTLY DIFFERENT FROM SRM-15

Joe C. Kilminster

JOE C. KILMINSTER, VICE PRESIDENT
SPACE BOOSTER PROGRAMS

MORTON THIOKOL, INC.

Graded Assertiveness



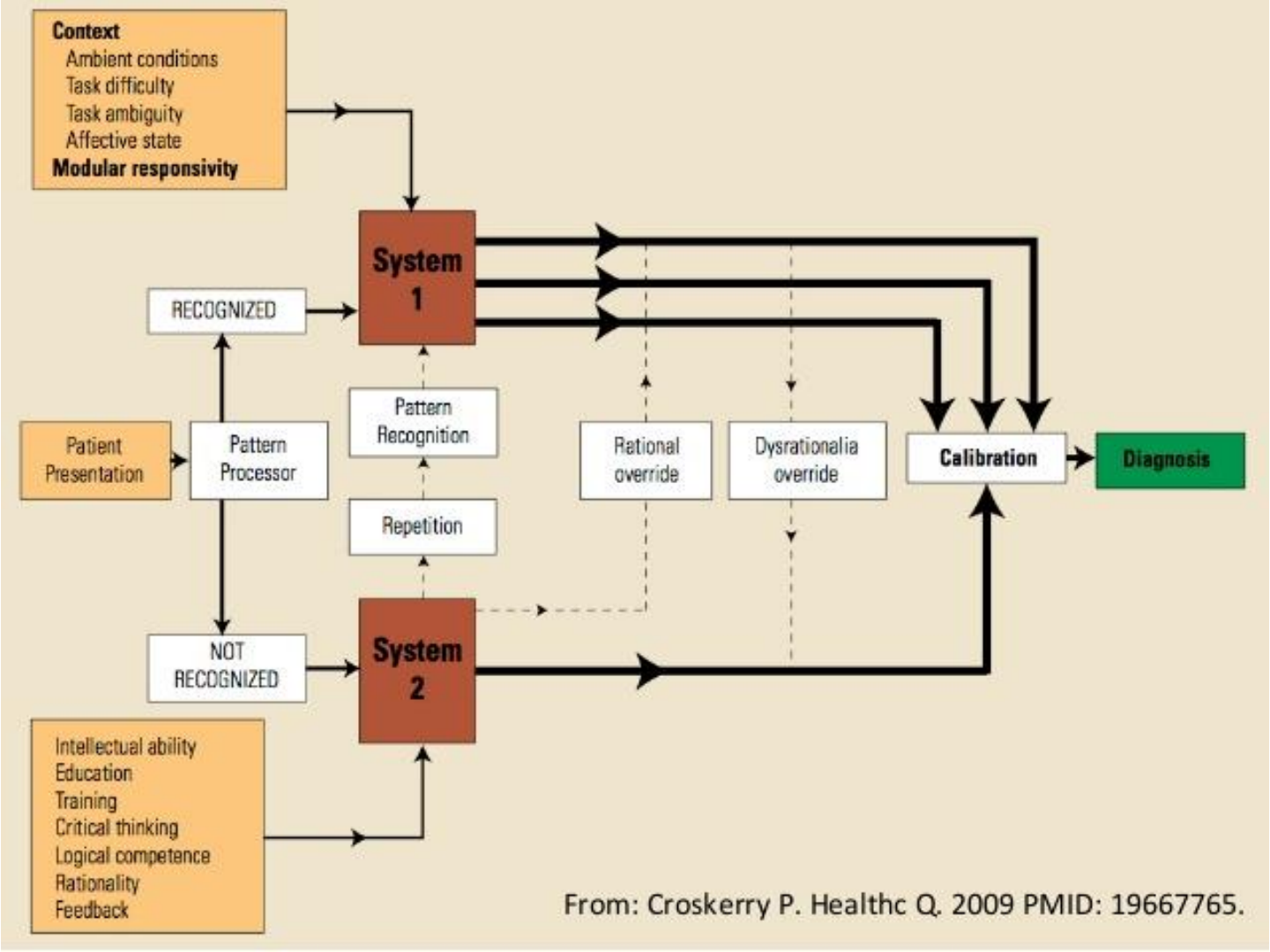
Graded assertiveness – “C U S S”


Mitigate
Errors
• Manage
• Debrief


Malaysia
9M-MRO

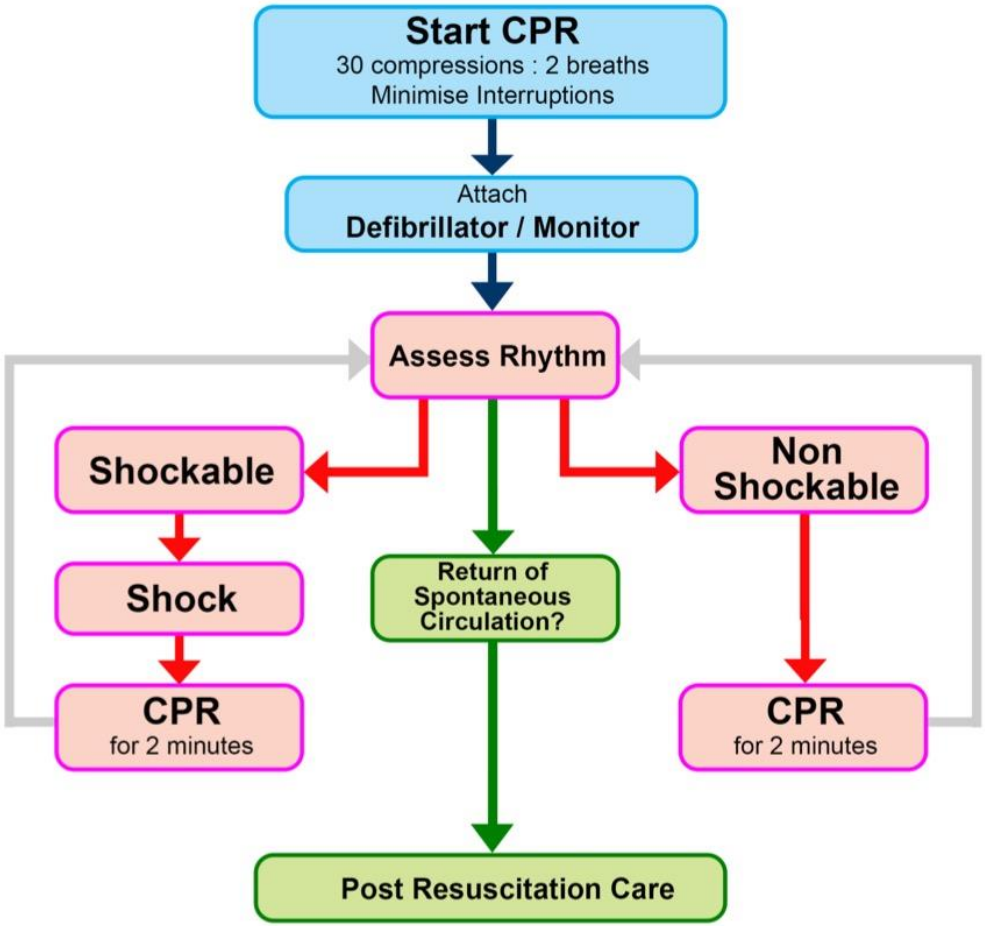
Mitigation of Error beyond better ”communication”

- Awareness and Assessment
- Culture
- Metacognition
- Checklists
- Design of the Systems
- Training in Teams



From: Croskerry P. Healthc Q. 2009 PMID: 19667765.

Advanced Life Support for Adults



During CPR

Airway adjuncts (LMA / ETT)
Oxygen
Waveform capnography
IV / IO access
Plan actions before interrupting compressions
(e.g. charge manual defibrillator)

Drugs

Shockable

* Adrenaline 1 mg after 2nd shock (then every 2nd loop)
* Amiodarone 300mg after 3 shocks

Non Shockable

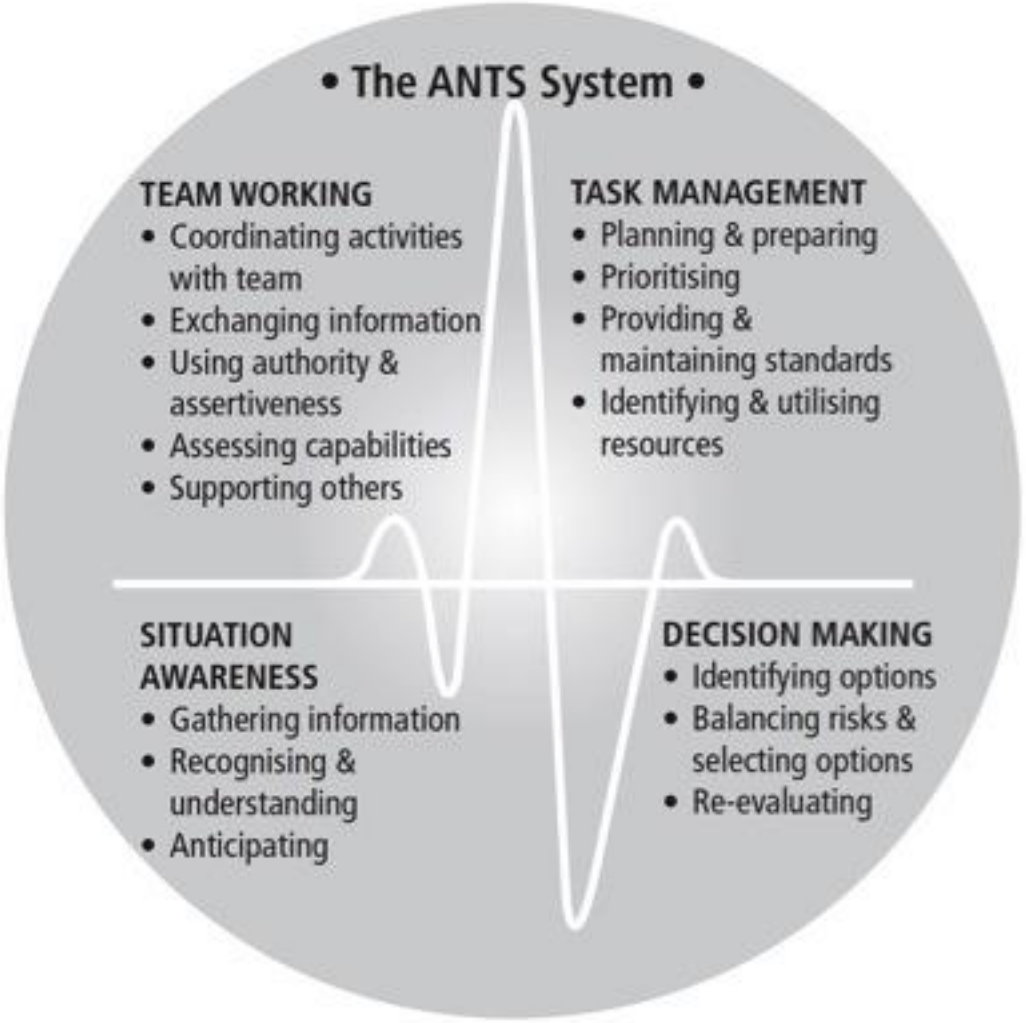
* Adrenaline 1 mg immediately (then every 2nd loop)

Consider and Correct

Hypoxia
Hypovolaemia
Hyper / hypokalaemia / metabolic disorders
Hypothermia / hyperthermia
Tension pneumothorax
Tamponade
Toxins
Thrombosis (pulmonary / coronary)

Post Resuscitation Care

Re-evaluate ABCDE
12 lead ECG
Treat precipitating causes
Aim for: SpO2 94-98%, normocapnia and normoglycaemia
Targeted temperature management



Checklist for Practical

Task Management	Planning and preparing
	Prioritizing
	Providing and Maintaining Standards
	Identifying and Utilizing Resources
Team Working	Coordinating Activities with Team
	Exchanging Information
	Using Authority and Assertiveness
	Assessing Capabilities
	Supporting Others
Situation Awareness	Gathering Information
	Recognizing and understanding
	Anticipating
Decision Making	Identifying Options
	Balancing Risks and Selecting Options. Re-evaluating


Consider the benefits of training in teams….

Post-event Debriefing STOP5 Tool:

We suggest using *RED statements

Overview

- **S** - Summarise the case
- **T** - Things that went well?
- **O** - Opportunities to improve?
- **P** - Points of action?

- **When?**
  - Debriefings using this tool should (ideally) be **immediately** after the critical event (in Resus BED 5 area, or in ambulance bay)
- **Engagement**
  - Should involve both medical and nursing staff - consider calling others back (trauma team, security, allied health etc.)
  - Any member of staff can initiate a Post-event Debrief (please call Nurse Manager XXXXX or ED Consultant XXXXX)
- **Script for Starting**
  - ***START - This quick debriefing is "not intended for any personal assessment"**
  - **"We believe that everyone here is capable and as a team we are seeking to improve for future cases"**
  - **"Let's spend five to ten minutes discussing what happened" (start a timer)**
  - **"The structure will be a summary of the case, list things that went well, discuss opportunities to improve and agree on any important action we should take."**
    - "Can we start by a "CHECK IN" with each person in the team…"
- **Triggers**
  - Consider after any critical event (i.e. challenging case, intubation, cardiac arrest etc.)
- **Meat of the Debriefing**
  - Consider Allocating a 'scribe' to time-keep and fill in the blank sections on the feedback form (provided PTO)
  - Allow all team members to state a reaction (see check in above)
  - Acknowledge how the team and individuals are feeling
  - Summarise the case (or invite a team member to summarise what happened)

  Reflections and Discussions:
  - ***MIDDLE - *"what worked well and why?"/"how could we improve by 1% next time?"***
- **Ending**
  - *"We would like to given an opportunity towards the end of this debriefing for any questions"…*
  - *"What is on your mind?"* (pause for 10 seconds to allow space for reflection) "What have we NOT covered yet?"
- **After the event (follow-up)**
  - ***END - "This concludes our quick debriefing, however, if you need to talk more I can organise extra help"**
  - **"Please stay back if you think you need more help or want to talk more…"**
  - Professional help is available - contact Donna Robertson and Kavita Varshney if a COLD DEBRIEFING is recommended….
- **Dissemination**
  - Place this form (OTHER SIDE COMPLETE) - in Debriefing box in resus

Crew Resource Management

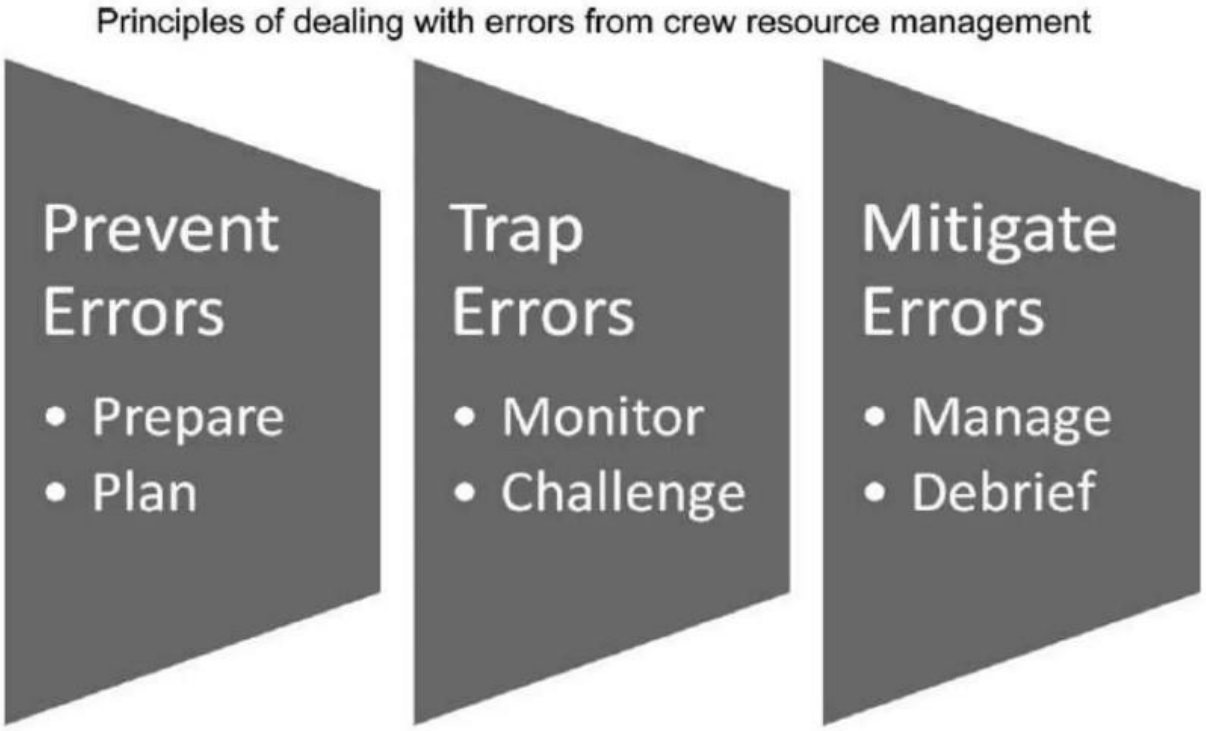


FIGURE 2. CRM principles of dealing with errors.

Wrap up and Application

Suggested Talks

- https://www.smacc.net.au/2015/12/medical-safety-lessons-from-space-by-kevin-fong/
- https://lifeinthefastlane.com/doctors-jackasses/
- https://www.youtube.com/watch?v=2FehGJQIOf0
- https://www.theguardian.com/tv-and-radio/2013/mar/22/how-to-avoid-mistakes-surgey
- https://www.ted.com/talks/daniel_kahneman_the_riddle_of_experience_vs_memory
- https://www.ted.com/talks/brian_goldman_doctors_make_mistakes_can_we_talk_about_that
- https://www.ted.com/talks/atul_gawande_how_do_we_heal_medicine
- https://www.youtube.com/watch?v=GDGMjbm24IM

CRM
Practical

Case Reviews

Task – in small groups review learnings from this talk for 2-3 mins

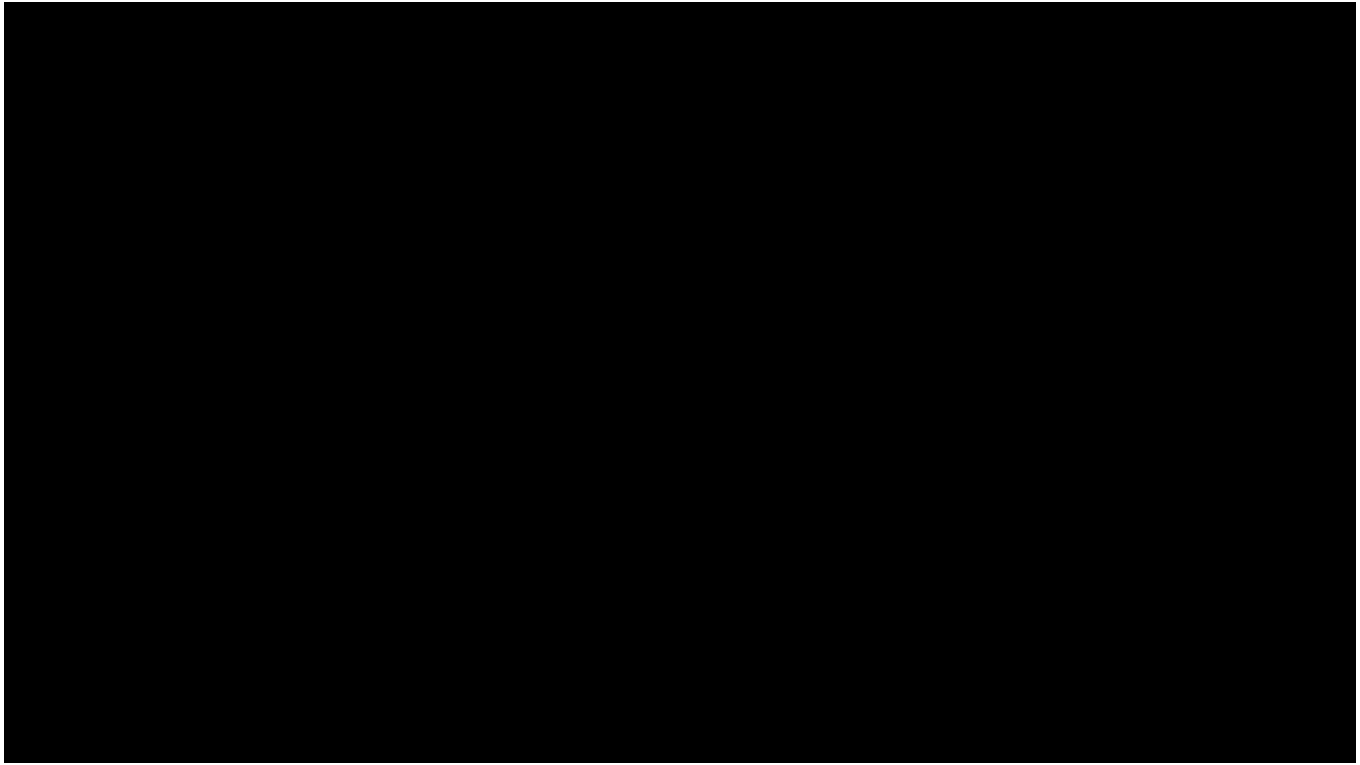
how were the elements of CRM applied to:

1) an airway emergency

Needs intubation after head trauma and reduced LOC

THE UNIVERSITY OF SYDNEY

Breakout A - Video for review…



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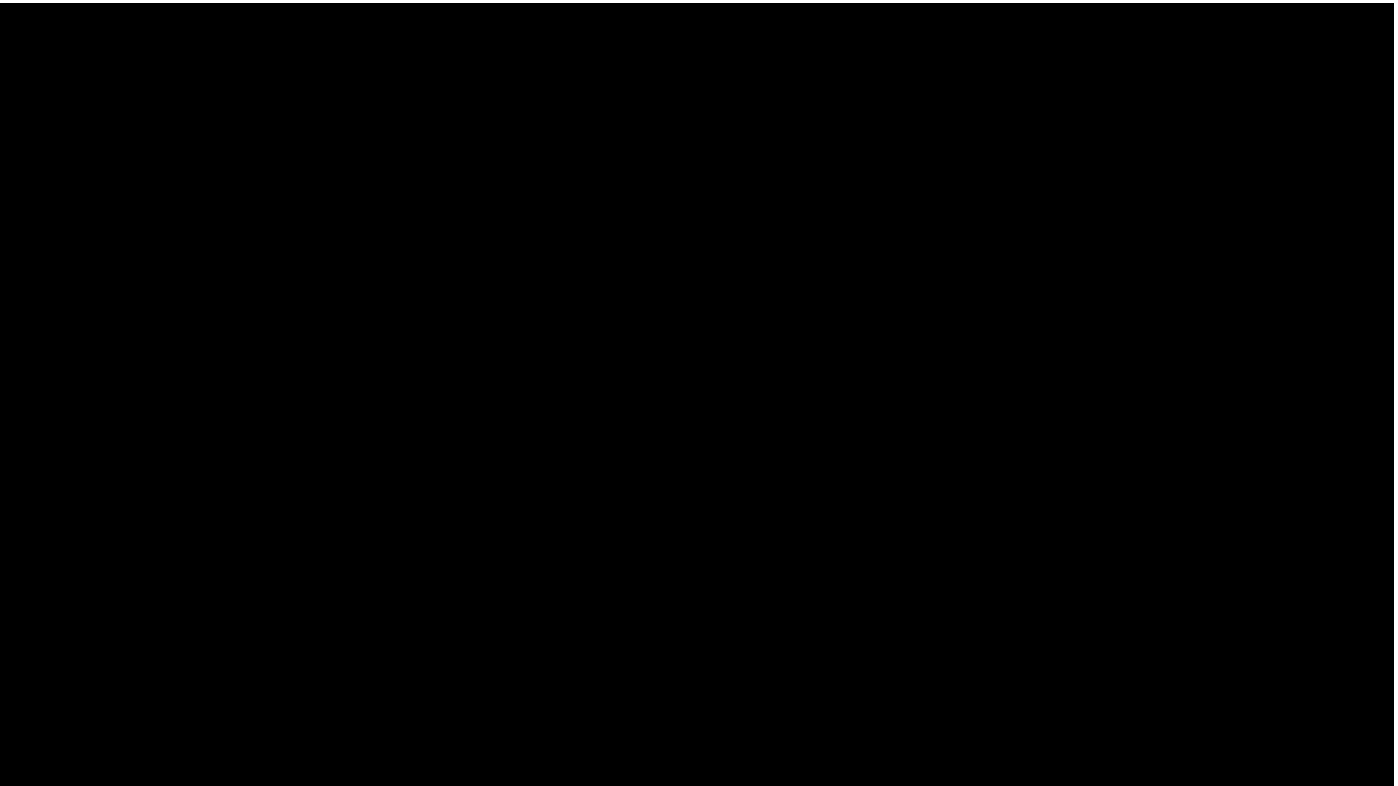
Breakout B - Video for review…



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Take Homes (GABA list for CRM)

- Know your environment
- Anticipate and plan
- Effective team leadership
- Active team membership
- Effective communication
- Be situational aware
- Manage your resources
- Avoid and manage conflicts
- Beware of potential errors