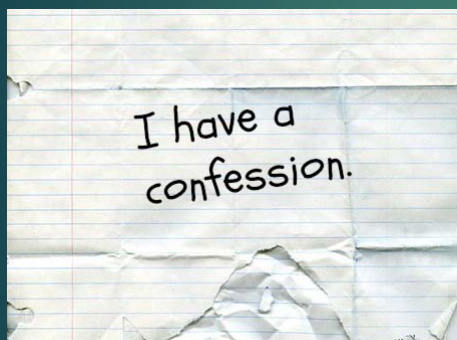


# Crew Resource Management

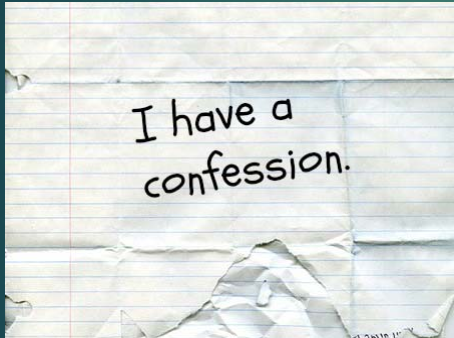
DR TIMOTHY BRAKE,  
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HONORARY SECRETARY HKSSIH



# Crew Resource Management



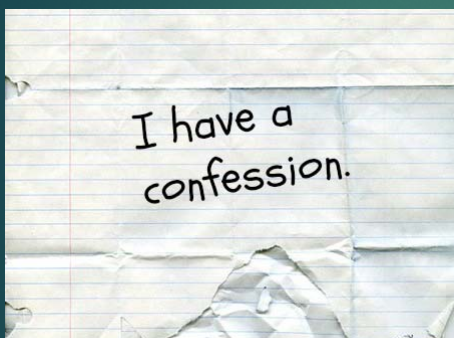
# Crew Resource Management



- ▶ I am not an expert in CRM
- ▶ CRM participant
- ▶ KEC just starting
- ▶ KEC no simulation centre
- ▶ ACRM/ EMAC



# Crew Resource Management



- ▶ CRM Experts in the audience
- ▶ CRM instructors
- ▶ CRM participants



## Intended Learning Objectives

- ▶ Define what CRM is in the healthcare industry.
- ▶ Decide which educational methods are best to deliver CRM.
- ▶ Analyse the evidence for effectiveness of CRM teaching.

## Definition of CRM

- ▶ Definitional ambiguity
  - ▶ Attitudes toward teamwork, pilot personality, social interactions
  - ▶ V's behavioural skills
    - ▶ Which skills are needed for CRM?
    - ▶ How to train CRM behaviours?
- ▶ Lack of standardization in CRM training
  - ▶ Lecture based & role play
  - ▶ Simulation based

## Definition of CRM

- ▶ FAA definition of CRM:
- ▶ CRM can be broadly defined as the utilization of all available human, informational, and equipment resources toward the goal of safe and efficient flight. CRM is an active process by crewmembers to identify significant threats, to communicate them, and to develop, communicate, and carry out a plan and actions to avoid or mitigate each threat. CRM also deals directly with the avoidance of human errors and the management and mitigation of those errors that occur. CRM reflects the application of human factor knowledge to the special case of flight crews and their interactions with each other, with other groups and with the technology in the system. (FAA 1989)

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## Development of CRM in aviation

- ▶ 2<sup>nd</sup> generation: Name change from Cockpit to Crew Resource Management occurred
- ▶ 3<sup>rd</sup> generation: *Line Orientated Flight Training*: LOFT is the environment, whether in simulators or actual aircraft, in which CRM is merged with the traditional technical elements of flight training.
- ▶ *Advanced Qualification Program*: (AQP) The incorporation of CRM / LOFT topics into the AQPs has been termed 4<sup>th</sup> generation CRM
- ▶ 5<sup>th</sup> generation CRM, the major philosophical change has been to assume human error is pervasive and cannot be totally eliminated. Error avoidance, trapping error before it is committed, and mitigation of error consequence.

## Institute of Medicine (IOM) Reports Making the Case for Change



- **More deaths from medical mistakes than AIDS, Breast Cancer or Car Accidents**
- **Epidemic proportions**
- **\$29 billion per year**
- **1 out of 5 errors serious or fatal**
- **Most injured patients never know that it happened to them.**
- **Communication and coordination are not taught as skills in professional training**

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## Transfer of CRM to medicine

- ▶ 1999: Institute of Medicine (IOM) *to err is human: Building a safer health system* advocated translating concepts of aviation CRM to the healthcare sector to improve patient safety.
- ▶ 2001: Agency for Healthcare Research and Quality (AHRQ) questioned the quality of evidence regarding CRM's effectiveness at improving patient safety outcomes, citing the method limited track record in medicine and the paucity of outcome studies in aviation

## Transfer of CRM to medicine

- ▶ I am not suggesting the mindless import of existing programmes; rather aviation experience should be used as a template for developing data driven actions reflecting the unique situation of each organisation. Helmreich
- ▶ Dekker S. Crew resource management gold rush: resisting aviation imperialism. *ANZ J Surg* 2008; 78:638-639
  - ▶ Differences between aviation and surgery
  - ▶ Aviation does not have the evidence that CRM training actually improves safety
  - ▶ Spending scarce resources on safety improvements rather than giving it to mercenaries who have found a new cash cow

## Industry Similarities

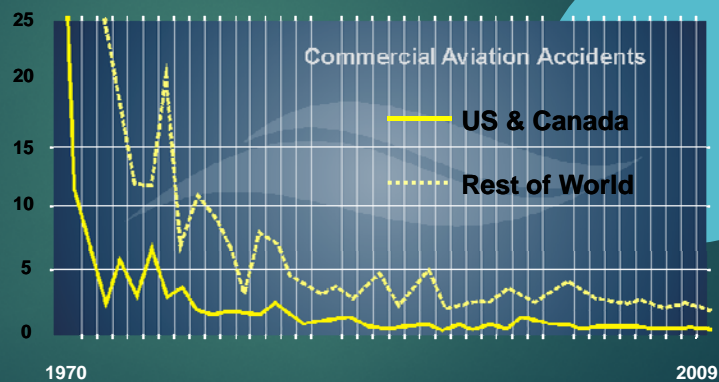
### Attitudes of Pilots & Doctors

- Decision making as good in emergencies as normal
- Effective pilot/doctor can leave behind personal problems
- Performance the same with inexperienced team
- Perform effectively when fatigued

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## Dramatic Results

### A Sustained Safety Record



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## Methodology of CRM training

## Skill acquisition

Salas E, Rhodenizer L, Bowers CA. The design and delivery of crew resource management training: Exploiting all available resources. *Human Factors* 2000; 42, 3: 490 - 511

- ▶ 1<sup>st</sup> stage: Declarative (factual) knowledge
  - ▶ Knowing *what* to perform
- ▶ 2<sup>nd</sup> stage: Procedural knowledge
  - ▶ Knowing *how* to perform
- ▶ Declarative -> Procedural: Process of practice or rehearsal
- ▶ Lectures provide information but do not teach how and when to use the knowledge.
- ▶ Active practice



## Feedback

- ▶ Feedback about trainee performance can enhance learning
- ▶ Determining which aspects require attention and guidance on ways to improve
- ▶ Feedback focussed on the process involved in performing the task rather than the outcome enhances trainee performance
- ▶ Teamwork feedback on team outcomes fails to reveal the information trainees can use to improve their performance
  - ▶ Making the right decision does not mean the right process was used
  - ▶ Reinforce sub-optimal team process
  - ▶ Team process will be more diagnostic in determining a teams weakness

## Modelling

- ▶ Social learning theory; trainees learn by observing others
- ▶ Modelled behaviours:
  - ▶ attend -> remember -> reproduce -> motivated to perform
- ▶ Optimise behavioural modelling training
- ▶ Trainees who viewed both positive (correct) and negative (incorrect) models were better able to transfer into other setting
- ▶ Trainees who observed and rated a model's behaviour demonstrated post-training improvements



- ▶ Metacognition: the knowledge about one's own cognitive process or thinking.
  - ▶ Junior first officers with metacognition training exhibited better team performance
- ▶ Summary: Incorporate known principles of practice and feedback into the design and delivery of training. Relevant information about CRM training, active participation, and remedial feedback.

## A systems view of training effectiveness:

Salas E, Rhodenizer L, Bowers CA. The design and delivery of crew resource management training: Exploiting all available resources. Human Factors 2000; 42, 3: 490 - 511

- ▶ Training effectiveness:
  - ▶ those factors outside the program itself that influence training outcomes
- ▶ Pre-training
- ▶ During training
- ▶ Post-training

## Pre-training

- ▶ Supervisor support for attending training related to stronger beliefs that training will be useful and greater attempts to transfer the training
- ▶ Supervisor participation in goal setting – positive effects on performance
- ▶ Trainee: choice to participate, expectations, pretraining experiences, pretraining motivation and self efficacy
- ▶ The number of negative experiences prior to training predicted the trainees ability to apply their training (motivation)

## During training

- ▶ Practice schedules and designs that degrade performance during acquisition tend to promote long term retention
- ▶ Mastery goals
  - ▶ Placing emphasis on learning and mastering the task
- ▶ V's performance goals
  - ▶ Placing emphasis on correct performance and few errors
- ▶ Mastery goals help the trainee focus on the learning process rather than on the outcome

## Post training

- ▶ Positive transfer climate encourages training transfer
  - ▶ Practice
  - ▶ Goal setting
  - ▶ Social and performance cues
  - ▶ Positive or negative reinforcement
- ▶ Organisational climate and continuous learning culture
- ▶ Supervisor support



## Organisational culture:

Fisher J, Phillips E, Mather J. Does crew resource management training work. *Air med J* 200;19: 137-139

- ▶ Culture: shared norms, beliefs or values among a specific group
- ▶ "Its just the way we do things here"
- ▶ Organisational culture has the strongest impact on the perception of safety and its importance
- ▶ It is important that organisational culture is strong, congruous and practiced at all levels within the organisation
- ▶ Managers must believe strongly in their values because the heart of changing cultural beliefs and behaviours lies in the value structure
- ▶ If the management expects employees to believe in the safety culture the organisation must allocate funding and resources for training

Salas E, Wilson K, Murphy CE, King H, Baker D. What crew resource management training will not do for patient safety: Unless. *Pat Saf* 2007;3: 626

- ▶ Physician serve as champions by understanding, valuing and embracing team training. The physician sets the tone for the entire healthcare team.
- ▶ Teamwork must be embedded throughout all activities conducted by health care professionals (e.g. briefings in the OT)
- ▶ Recurrent training is critical to maintaining high levels of performance in teams.

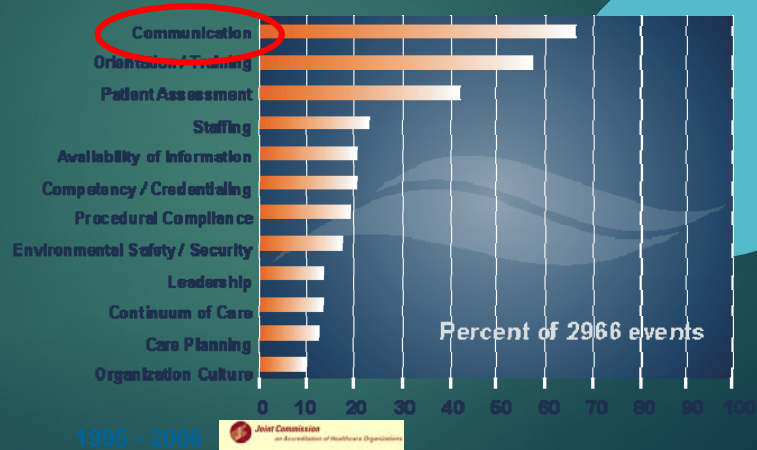
- 
- ▶ Simulation bridges the gap between knowing and carrying out the task. Practising in a safe environment without risk of patient harm

## Scenario based training



- ▶ Determine training requirements
  - ▶ Identify operational requirements
  - ▶ Assess team training needs
  - ▶ Identify teamwork competencies
  - ▶ Determine team training objectives
- ▶ Design training method and material
  - ▶ Determine instructional delivery method
  - ▶ Design scenarios and create opportunities for practice
- ▶ Training evaluation
  - ▶ Design assessment measures
  - ▶ Design and tailor tools for feedback
  - ▶ Evaluate effectiveness of the training

## Sentinel Events Joint Comm. Root Cause Aggregate



## Simulation V's Classroom teaching

- ▶ Gaba: only simulation can provide near real-life experience necessary to practice teamwork skills and deal with complex real-life scenarios
- ▶ Beaubien and Baker low fidelity techniques such as; case studies and role plays
- ▶ Shapiro added simulation to didactic teamwork curriculum
- ▶ Sim group marginal improvement in BARS


## Evaluation of CRM training

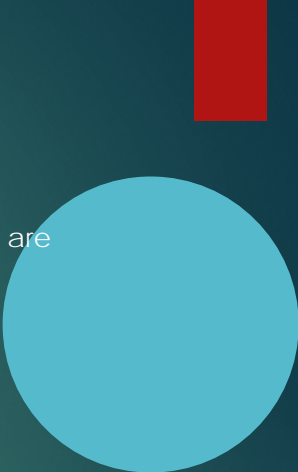


## Evidence for the effectiveness of CRM

- ▶ Grogan EL. The impact of aviation-based teamwork training on the attitudes of health-care professionals. *J Am Coll Surg* 2004; 199: 853-848
- ▶ Pre and post CRM course Human Factors Attitudes Questionnaire 20 of 23 items show positive impact
- ▶ End of course critique: low score in expectation of CRM to "change the way you do things"
- ▶ Acquisition of the CRM skill set is not a "single dose" safety intervention, but requires continual training, coaching and feedback to attain proficiency.



- 
- ▶ France DJ. An observational analysis of surgical team compliance with perioperative safety practices after resource management training
  - ▶ Entire clinical workforce through CRM
  - ▶ Procured services using aviation CRM model and examples
  - ▶ Perioperative setting closest analogue to the cockpit
  - ▶ Surgical team performance on CRM and perioperative safety practices was low (60%)
  - ▶ Surgeon led segments: time out and debriefing lowest team compliance scores

- 
- ▶ CRM must be translated through tools and processes that are domain specific
  - ▶ CRM should include individual and team training
  - ▶ Work incentives that trigger behaviour modification