MEDICAL CREW RESOURCE MANAGEMENT
Team Resilience Training

Safety-engineered knowledge™
Moving us towards zero-harm

Human Factors Awareness & Non-Technical Skills

DR JOHN ROOS

MAY 2016

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Crew Resource Management (CRM) is an aviation concept, initially developed by NASA as an error-management and risk-containment system, pioneered during the Apollo space missions of the 1960s and 70s.

CRM has been in use by the international commercial aviation industry for the past 40 years, to reduce commercial airline accidents to imperceptible (‘ultrasafe’) levels. Major airline accidents occur with a frequency of 1 in 10 million, whereas the World Health Organisation estimates that preventable medical error causes significant harm in one out of every ten patients admitted to hospitals worldwide, in both rich and poor countries.

This implies that significant harm from preventable medical error is one million times greater than airline accidents.

CRM embraces an organisational culture that comprises a comprehensive risk and error management system. CRM recognises that in order to improve safety, we must maximise upon every possible resource at our disposal. Consequently, CRM allows risk to be managed in a rational and appropriate way, where human error is seen as a consequence, and not as a cause, of failure.

CRM thus accepts that humans are fallible and that errors are to be expected – and so the emphasis lies in a team culture of fixing bad systems (by removing latent errors) rather than by firing good people. CRM accepts that human error can never be eliminated from the workplace, but it can be managed!

The principles of aviation CRM are increasingly being applied to other ‘high-reliability’ industries, such as nuclear power plants, oil drilling platforms, high speed rail networks, air traffic control towers, industrial chemical plants and the like.

Understandably, CRM is increasingly being applied within the medical profession, such as the Emergency Unit, Intensive Care Unit and Operating Theatre environments. Medical CRM also confers huge benefit to prehospital Emergency Medical Services and aeromedical providers. CRM is steadily gaining both credibility and traction within the medical profession, as the body of published evidence in support of Medical CRM grows.

In order to achieve ‘high-reliability’, CRM focuses on the human-technology interface through the non-technical skills of teamwork, leadership and followership, interpersonal communication, assertiveness training, conflict resolution, briefing and debriefing, situational awareness, decision-making, and stress and fatigue management. These elements are the major thrust of this workshop.

James Reason’s “Swiss cheese model” linear theory of accident causation, including the person-based versus systems-based approach to error prevention and mitigation of harm receive much focus. Additionally, emphasis is placed on the establishment of an
organisational safety culture and the non-punitive incident-reporting systems upon which such a culture is based.

This workshop will be of benefit to all grades of frontline clinical staff – doctors, nurses and paramedics, as well as unit and hospital managers – who work in, or manage, time-pressured, high-acuity, error-prone clinical environments.

All tiers of management, from the Chief Executive Officer to junior managers and shift leaders will benefit from this workshop.

**HPCSA Continuing Professional Development Accreditation:**

<table>
<thead>
<tr>
<th>This workshop has been accredited by the University of Cape Town for:</th>
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<tbody>
<tr>
<td>Level 1 CEUs</td>
<td>11</td>
</tr>
</tbody>
</table>
MEDICAL CREW RESOURCE MANAGEMENT:
HUMAN FACTORS AWARENESS
AND NON-TECHNICAL SKILLS

DR JOHN ROOS

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Mitchells Plain Hospital, Cape Town

S.A. Red Cross Air Mercy Service
Department of Anaesthesia, University of Cape Town
Formerly Metro Emergency Medical Services (Ambulance and Rescue) &
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Clinical Director

Dr Roos started his career as a paramedic with the Western Cape Government Emergency Medical Services, before studying medicine and subsequently specialising in Anaesthesiology.

Dr Roos is currently the Head: Department of Anaesthesia at Mitchells Plain Hospital in Cape Town. He has considerable experience in Anaesthesia and Intensive Care in both South Africa and the United Kingdom, where he worked as a specialist for a number of years.

He is the honorary Chief Medical Officer of the SA Red Cross Air Mercy Service and is an honorary senior lecturer with the Department of Anaesthesia of the University of Cape Town. He is also an examiner for the College of Anaesthetists of the Colleges of Medicine of South Africa, and has previously held the appointments of honorary senior lecturer and external examiner for the Division of Emergency Medicine, Faculty of Surgery, of the Universities of both Cape Town and Stellenbosch.

Dr Roos spent many years as a paramedic, medical student, rescue doctor and consulting specialist with the Provincial Government Emergency Medical Services (Metro Ambulance and Rescue) and with the South African Red Cross Air Mercy Service.

He has lectured extensively at the Metro EMS Academy of Emergency Care, lectures on the Red Cross Air Mercy Service and Provincial Government Emergency Medical Services aeromedical courses, and is an invited guest lecturer at the Cape Peninsula University of Technology. He currently leads the Red Cross Air Mercy Service Continuous Quality Improvement review process, and has been instrumental in the development of this programme. He has authored, and regularly convenes, a three-day Advanced Airway Management and Emergency Ventilation workshop.
He has considerable experience in Wilderness Search and Rescue activities, and has actively participated on the South African Air Force 22 Squadron and Red Cross Air Mercy Service helicopter rescue teams. He has also undertaken a considerable number of helicopter-borne maritime rescue missions in collaboration with CHC Helicopters, the National Sea Rescue Institute and the Provincial Government Metro Rescue service.

Dr Roos has served aboard the S.A. Navy’s ‘SAS Protea’ hydrographic research vessel, worked as ship’s doctor aboard the ‘RMS St Helena’, and has accompanied the South African Government’s ‘SA Agulhas II’ oceanic research vessel on a rescue mission to Marion Island.

Dr Roos regularly delivers presentations at local and international symposia, seminars and congresses, both within the private and government sectors, on topics spanning Anaesthesia, Emergency Medicine and Human Error in Clinical Medicine.

His special interests lie with trauma anaesthesia, difficult airway management and aviation medicine. He has increasingly been applying his efforts to the introduction of Medical Crew Resource Management training, Human Factors Awareness and Patient and Healthcare Worker Safety principles to clinical practice.

Considering Dr Roos’ extensive experience locally and abroad, in Anaesthesia, Intensive Care, Emergency Medicine, Prehospital Emergency Care and Wilderness Search and Rescue, in military and civilian spheres, on land, sea and air – including fixed-wing and rotor-wing platforms – he is ideally positioned to lecture on Human Factors Awareness and the management of Human Error at the clinical coalface.

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MEDICAL CREW RESOURCE MANAGEMENT WORKSHOP
Human Factors Awareness and Non-Technical Skills

Table of contents:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Programme timetable</td>
<td>6</td>
</tr>
<tr>
<td>1 Introduction</td>
<td>7</td>
</tr>
<tr>
<td>2 Situational Awareness</td>
<td>21</td>
</tr>
<tr>
<td>3 Clinical decision-making</td>
<td>27</td>
</tr>
<tr>
<td>4 Communication</td>
<td>43</td>
</tr>
<tr>
<td>5 Teamwork</td>
<td>63</td>
</tr>
<tr>
<td>6 Leadership</td>
<td>73</td>
</tr>
<tr>
<td>7 Stress and fatigue management</td>
<td>89</td>
</tr>
<tr>
<td>8 Creating a culture of safety</td>
<td>115</td>
</tr>
</tbody>
</table>

Please note that the accompanying presentation notes in this workshop manual follow the exact order of the slides.

Presentation notes are fully referenced for your convenience and further reading.
## MEDICAL CREW RESOURCE MANAGEMENT WORKSHOP
### Human Factors Awareness and Non-Technical Skills

### Day 1:

<table>
<thead>
<tr>
<th>D1</th>
<th>Time</th>
<th>Topic</th>
<th>Mins</th>
<th>Presenter</th>
</tr>
</thead>
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<td>0730 - 0800</td>
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<td>CRM, HFA &amp; NTS Introduction</td>
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<td>0945 - 1015</td>
<td>Morning tea</td>
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<td>1015 - 1100</td>
<td>Clinical decision-making 1</td>
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<td>4</td>
<td>1100 - 1145</td>
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<td>1145 - 1230</td>
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<td>1230 - 1330</td>
<td>Lunch</td>
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<td>6</td>
<td>1330 - 1415</td>
<td>Communication 1</td>
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<td>7</td>
<td>1415 - 1500</td>
<td>Communication 2</td>
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<td>8</td>
<td>1500 - 1545</td>
<td>Communication 3</td>
<td>45</td>
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<td></td>
<td>1545 - 1600</td>
<td>Wrap-up and feedback</td>
<td></td>
<td></td>
</tr>
</tbody>
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### Day 2:

<table>
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<th>Presenter</th>
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</thead>
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<td>30</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>0800 - 0845</td>
<td>Teamwork</td>
<td>45</td>
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<td>10</td>
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<td>Leadership 1</td>
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<td>Morning tea</td>
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<td>1045 - 1130</td>
<td>Stress and fatigue management 1</td>
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<td>1130 - 1215</td>
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<td>1215 - 1315</td>
<td>Lunch</td>
<td>60</td>
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<td>14</td>
<td>1315 - 1415</td>
<td>Creating a culture of safety</td>
<td>60</td>
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<td>1400 - 1430</td>
<td>Wrap-up and feedback – farewell</td>
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## INTRODUCTION

### Time allocation: 60 minutes

- Medical error, Human Factors Awareness and Non-technical Skills
- Medical error vs aviation error – statistics
- What is the airline industry getting right that the medical profession is getting wrong?
- Medical Team Training – the scientific evidence that Medical CRM works
- NASA and CRM – where it all began
- CRM philosophy – how it all works
- Systems-based approach – the paradigm revolution in error management
- James Reason and the holes in the Swiss cheese
- Mayo Clinic ‘Never Events’ study
- Human Factors and non-technical skills – how excellent anaesthetists perform; and what makes a good airline captain – the similarities
- High-risk industries – technically relevant skills in high-reliability organisations

## SITUATIONAL AWARENESS (REDUCING MEDICAL ERROR)

### Time allocation: 45 minutes

- Definition
- Elements of Situational Awareness
- Information processing
- Factors affecting Situational Awareness
- Onion-peel layers of Situational Awareness
- Distributed/shared Situational Awareness
- Stimulus overload
- Workload capacity
- Maintaining Situational Awareness

## CLINICAL DECISION-MAKING

### Time allocation: 135 minutes

- Decision quality
- Metacognition
- Components of decision-making
- Naturalistic decision-making
- Models of decision-making:
  - Recognition-primed (intuitive)
  - Rule-based
  - Choice (analytical)
  - Creative
- Factors affecting decision-making
- Training decision-making

- Reasoning strategies
- Cognitive forcing strategies
- Skill sets and error types
- Affective error
- Transference and countertransference
- Cognitive error
- Dual process theory
- Metacognition
- Heuristics
- Cognitive error biases
### COMMUNICATION

**Time allocation: 135 minutes**

- Types of communication – verbal, non-verbal, written, etc.
- Failures, hazards and barriers to communication
- Improving clinical communication - methods
- Patient handover – hazards and barriers
- Shift handover
- Briefing and debriefing – safety and learning
- Assertiveness training, status barriers and command gradients
- Transactional Analysis – unravelling difficult interpersonal communication

### TEAMWORK

**Time allocation: 45 minutes**

- The “I” in team – fact and fiction
- The changing nature of teams
- Team performance, efficacy and outputs
- Elements of teamwork
- What makes a good team?
- Teamwork behaviours
- Groupthink
- Teamwork training
- What can we learn from Google’s quest to build the perfect team?
- Trust

### CLINICAL LEADERSHIP

**Time allocation: 90 minutes**

- Characteristics of good leaders
- Leadership and respect
- Richard Branson’s take on Leadership
- Cultural entropy (Barrett)
- Leadership in healthcare
- Leadership in relation to safety
- Leadership essential skills
- Authority and assertiveness
- Setting and maintaining standards
- Managing workload
- Leadership styles – Hersey & Blanchard
- Followership
- Followership styles
- Groupthink
- Characteristics of good followers
- Managers in the medical workplace
- Self-awareness and leadership
- Emotional intelligence
- Gallup’s 12 questions

### STRESS & FATIGUE MANAGEMENT

**Time allocation: 90 minutes**

- Basic conditions of Employment Act
- Code of good practice on the arrangement of working time (Dept. of Labour)
- Judicial decisions and fatigue
- Fatigue in health care kills
- European work time directive
- Effects of sleep deprivation
- Sleep homeostasis
- Circadian rhythms
- Ergonomic shift design
- Stress
- Stress and accidents
- Acute stress
- Chronic stress
- Stress and safety
- Coping strategies
- Symptoms of stress
- Organisational indicators of stress
- Chronic work stressors
- Burnout
| Guide to surviving the night shift (MPS) | The Dark Side of the medical profession |
| Effects of fatigue | Burnout prevention |
| Training for fatigue? | Sharpening the saw |
| Congruent leadership | |

<table>
<thead>
<tr>
<th>A CULTURE OF SAFETY</th>
<th>Time allocation: 60 minutes</th>
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<tr>
<td>Safety I vs Safety II – opposing philosophies on safety</td>
<td></td>
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<td>Workplace culture</td>
<td></td>
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<td>Organisational safety</td>
<td></td>
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<td>Good vs bad organisational culture in terms of safety management</td>
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<tr>
<td>Keeping the safety conversation alive – don’t drive the conversation underground</td>
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<td>Just Culture – Sidney Dekker</td>
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<tr>
<td>Risk management</td>
<td></td>
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<td>Critical Incident reporting</td>
<td></td>
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<tr>
<td>Free lessons</td>
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<td>Identifying error traps</td>
<td></td>
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<tr>
<td>Signposting the potholes in the road</td>
<td></td>
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<td>Checklists – their value in medicine</td>
<td></td>
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<tr>
<td>Multi-tasking – the myth</td>
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<td>Normalisation of deviance – ‘drift’ – the insidious development of bad habits</td>
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