

# ICU

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# IMPLEMENTATION CHALLENGES OF CREW RESOURCE MANAGEMENT

Crew Resource Management (CRM) human factors awareness training is a useable tool in medicine and may fill a void in medical education curricula. Factors impacting CRM implementation into the clinical environment are identified.

Agency (EASA) regulations. Not only do these regulations define the various subjects and the extent to which each subject should be discussed, but they also set limits for refresher training and trainer requirements. This standardisation is a major contributing factor to the success of CRM. Crew Resource Management training for aircrew consists of 2-day, full-time, interdisciplinary training. The training syllabus consists of well-defined lectures in cognitive psychology and multiple interactive sessions, including case discussions.

Evidence is increasing that CRM HF training is also a promising format for safety climate change in the clinical environment, if well standardised and supported by leadership and effective follow-up (Pratt et al. 2007; McCulloch et al. 2009; Haerkens et al. 2015).

Medical HF training has no international standard yet, and training initiatives may vary in curriculum, duration, intensity, and follow-up support. It is important to realise that it took the professional aviation environment more than ten years to position CRM as an international aircrew operational standard and fully integrate CRM into training curricula.

## Our Approach

The aim of our organisation is to generate an evidence-based standard for HF in medical training and operations in the Netherlands. To date we have implemented HF “culture-interventions” in more than 26 high-risk clinical departments in university and training hospitals.

Because the faculty of the clinical departments had no previous formal training in HF prior to this CRM initiative, we introduced a three-phase intervention approach, consisting of preparation, training and implementation.

## 1. Preparation Phase

During this phase the department’s safety climate is assessed using the Safety Attitudes Questionnaire ([med.uth.edu/chqs/surveys/safety-attitudes-and-safety-climate-questionnaire](http://med.uth.edu/chqs/surveys/safety-attitudes-and-safety-climate-questionnaire)). All healthcare providers are asked to fill out this questionnaire. Process observations are conducted by CRM-trainers on site and video footage of critical communication moments is gathered. During this phase all training participants are informed of the upcoming CRM-training and implementation flow.

## 2. Training Phase

The basis of the training phase is 2 days classroom-based CRM training using lectures, video feedback and interactive exercises.

All training sessions are conducted by two trainers, and allow for a maximum of 15 participants with a mixed background (physicians, nurses, secretaries, etc). All training is held at a training facility at some distance from the hospital to minimise interference, and is delivered within a three-month window to maximise impact.

The training comprises a well-developed standard course, including lectures on HF and principles of CRM and multiple interactive sessions using realistic data such as case studies and video footage from the trained department.

The training emphasises nine key areas:

1. Situational awareness and recognition of adverse situations;
2. Human errors and non-punitive response;
3. Communication and briefing and debriefing techniques;
4. Providing and receiving performance feedback;

**H**uman factors (HF) account for the majority of adverse events in high-risk environments, and human factors awareness is therefore essential. Aviation-derived HF awareness training entitled Crew Resource Management (CRM) focuses on teamwork, threat and error management, and blame-free discussion of human mistakes.

In aviation, CRM is a multidisciplinary non-technical skills standard for aircrew. Any CRM-training has to meet U.S. Federal Aviation Authority (FAA) or European Aviation Safety

5. Management of stress, workload and fatigue;
6. Creating and maintaining team structure and climate;
7. Leadership;
8. Risk management;
9. Decision-making (Haerkens et al. 2012).

Each training group is challenged to produce a shortlist of practical action points to be used in the following implementation phase, during which the CRM principles should be forged into custom-made and practical clinical tools to be used in daily practice.

### 3. Implementation Phase

To be successful, the intended culture change should be supported by additional implementation measures.

A core group of clinical professionals is formed, and receives additional coaching during the year following the training. This way they will be able to integrate and develop the new way of professional interaction within the department. This group consists of clinical professionals and the patient safety officer from the trained department. They coordinate the efforts to convert the CRM action points into clinical practice, thereby creating joint ownership. Initiatives include:

- Hosting a plenary kick-off meeting for all personnel;
- Development of checklists, multidisciplinary standard operating procedures and briefing guides;
- Regular information bulletins on the department's intranet page;
- A yearly dedicated week of CRM during which extra attention is given to team performance by posters, lectures and internal coaching;
- Making CRM a standard agenda item in two-weekly staff meetings and in the yearly individual evaluations;
- Ensuring all new personnel receive the full CRM initial training.

Furthermore, even though CRM relies on intrinsic motivation to be effective, the department leadership needs to clarify to all staff in advance that CRM will become the professional standard, and that it is not optional but will serve as a yardstick for professional evaluation. This requires leadership by example.

Finally, simulation is encouraged as a follow-up measure. The effect of CRM-based culture change can be reinforced by the use of scenario-based team training, again derived from aviation

simulation expertise. Simulation creates a zero-risk environment that allows medical teams to practise high-risk, low-frequency events without endangering patients. This training can be done in an artificial 'laboratory' environment or as in situ training, which is conducted on actual patient care units involving actual healthcare team members and actual organisation processes (Haerkens et al. 2012). Simulation—if well debriefed—has many advantages, but if used as a stand-alone modus without the basis of CRM-training there is a risk of focusing too much on technical skills and single-task performance. This could result in a limited impact on patient safety.

The key to the success of scenario-based team training in healthcare is the identification of the domain-specific team skills required to manage

**■ evidence is increasing that Crew Resource Management human factors training is also a promising format for safety climate change in the clinical environment - but a challenging one ■**

routine and emergency scenarios. We suggest implementing two separate phases of simulation training: the first level of training should mainly focus on technical skills. After having followed classroom-based CRM-training participants may join second level simulation sessions that focus on nontechnical performance.

### Our Experience

Our experience with CRM implementation in more than 26 high-risk clinical departments in Dutch hospitals is encouraging: the aviation-derived HF training concept was highly appreciated by medical professionals and identified as an important part of professional self-regulation. Overall, the healthcare providers' perceived safety climate usually improved (Haerkens et al. 2015).

### Barriers

Important barriers to implementation still remain (Timmon et al. 2015). First, organisational structures and existing department cultures may induce a general reluctance to change ways of working, especially if they are

thought to involve additional effort. Second, ever increasing financial and time constraints challenge the funding and time investment crucial for initial and refresher training and implementation efforts. Although one of our projects was awarded the Dutch Health Inspectorate's Patient Safety Award in 2013, to date Dutch national medical societies and health insurers have not yet agreed on funding for a national Human Factors training curriculum for healthcare professionals.

Third, the managerial challenges of integrating CRM into a department's cultural DNA should not be underestimated. Our approach to introduce CRM as an initiative led by clinicians requires a disengaged but supportive stance of the hospitals' management. This probably improves the acceptance by the professionals.

Nonetheless, managerial issues remain at both clinician and manager/administrator level. While clinicians are in general enthusiastic about initiating and leading CRM activities, they often become more ambivalent if it leads them into more formal 'managerial' activity. This deep-seated concern about managerial work may prove to be an obstacle to the development of HF in healthcare. Integrating managers/administrators into the CRM implementation process proved challenging, as expectations toward management's role varied. CRM trainees expected management to facilitate the development of an HF approach by allowing sufficient time and adequate funding, but also realised that implementing changes requires active support from and cooperation with managers, both local and corporate.

The bottom-up nature of our CRM-approach may in some cases have caused (lower) management to adopt a negative "not invented here" attitude and disengage from the implementation process, thus weakening the initiative.

Experience from past CRM / HF integration projects has helped us identify some key success factors as well as threats to success that may be of use to future clinical Crew Resource Management initiatives:

### Success Factors

- The initiative is clinically-led.
- CRM training is delivered largely by clinicians with credible HF expertise.
- Confidentiality is maintained throughout the intervention.
- Participation is non-facultative – all staff members including residents and fellows are included.

- Training is conducted in multidisciplinary groups. This increases understanding of each other's problems and limitations whilst making it impossible to apportion blame to groups not represented in the training.
- Management in the hospital takes a supportive but hands-off stance.
- Lack of a solid implementation plan and unrealistic timelines.
- Delay in initiating timely and noticeable improvements in daily practice.
- Insufficient accountable operational management.
- Disengagement of hospital management.
- CRM training is used as 'window-dressing' without adequate follow-up.

#### Threats to Success

- Poorly managed expectations of the project, resulting in the idea that implementation of CRM/HF training will yield an immediate culture change. Improvement is unlikely to be seen within one year and requires dedication and tenacity from everyone involved (Haerkens et al. 2005; Kemper et al. 2011).

#### Conclusions

Aviation-based CRM/Human Factors awareness training is a useful tool in medicine. However, adapting the organisational context to fully integrate the Human Factors principles into daily operations remains a challenge. In the future an (inter)national standard for medical CRM

training and evaluation is essential, and human factors should become a component of undergraduate curricula.

#### Conflict of Interest

MHTM Haerkens, a board-certified surgeon and retired Royal Netherlands Air Force pilot, founded the Dutch organisation "Wings of Care" with the goal to implement patient safety measures on a national level. All other authors have no competing interests to declare. ■

#### Abbreviations

CRM crew resource management  
EASA European Aviation Safety Authority  
FAA Federal Aviation Authority  
HF human factors

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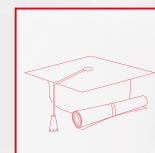
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