**Patient safety in Air Rescue:**

Pre- and Post-Training Self-assessment of medical and non-medical (CRM) skills in prehospital emergency helicopter teams. Results from 130 participants of mobile in-situ simulation team trainings by TuPASS and Team DRF Air Rescue.alliance Europe.


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**Introduction:**

Team DRF German Air Rescue and TÜPASS developed and performed a continuous simulation training program for their professional teams to improve quality and safety in HEMS operations. Nineteen 202 Team DRF and TÜPASS trained 1300 emergency physicians and paramedics in teams with realistic simulation sessions and video debriefing. The trainings were mainly performed in Germany but also included transnational trainings in Austria, Italy and Denmark (EC-funded InterReg-Project). To evaluate the impact of mobile in-situ simulation team training, 130 participants were evaluated using a pre/post training self-assessment questionnaire.

**Methods:**

More than 50 in situ team trainings with focus on CRM aspects were performed under realistic settings in helicopters, ambulances, ER or in-field situations. Eight scenarios per full day training were designed, trauma, internal medicine and pediatric emergency cases using SimMan and Simbaby. The scenarios were live transmitted and video-debriefed. Among 50 full day CRM-courses 130 participants were evaluated with the pre-post questionnaires. After the training participants completed a questionnaire to self-assess 13 competencies for treating emergency patients before and after the training. (Results see Figure 1) The competencies were: “How do you judge your ability in an emergency case to ...”

1. ... realize when a situation gets critical,  
2. ... keep the overview,  
3. ... set priorities,  
4. ... to delegate and monitor the tasks,  
5. ... coordinate selected tasks,  
6. ... keep track of the delegated tasks and their effects,  
7. ... keep track of other problems to be solved,  
8. ... communicate your plans effectively,  
9. ... consider all available resources,  
10. ... integrate all available information,  
11. ... consider the risks of open or closed system,  
12. ... be assertive even with more experienced colleagues,  
13. ... handle an emergency successfully.

The evaluation was done using a 6 point scale (very good – very bad). Paired t-test was used to check for significant differences. Hypothesis: the training improves the rating of the 13 competencies of experienced air rescue teams in simulated emergency situations.

**Results:**

As shown in figure 1: There are significant improvements in the pre-post evaluation for all subjectively rated competencies (p<0,001).

Looking closely to the self assessments related to crisis resource management the most significant improvement is demonstrated on “Communicating plans effectively” and in “Setting priorities dynamically”, as well as “taking all resources and information into account” during critical situations. Concerning the highly experienced trainees in Air Rescue another relevant improvement was: “recognizing when a situation is going to be critical” and following “close the loop in communication”.

**Discussion Conclusion:**

Due to the fact, that the personnel in air rescue are among the most experienced pre-hospital emergency teams, it is amazing that even one training day improved their subjective self-assessment significantly. The methods of highly realistic team trainings, using live video transmission and video-based debriefing with a focus on CRM aspects and techniques to stimulate self-reflection, seem to be very beneficial even, or especially, for experienced team members. The exchange of many tips, tricks and traps in the debriefing sessions may be another contributor to this fact. In addition there are anecdotal information from participants reporting months after a training course, that they felt an improvement in real patient care due to their participation in the simulation team training. The benefit is most often reported in the field of human factors and team related issues (CRM), by physicians as well as paramedics. These preliminary data are encouraging to continue the efforts to improve the medical and non-medical skills of professional rescue teams. As the effort for these in-situ trainings is very high, it is essential to have some, even subjective, data supporting the impact in improving skills and patient safety.

**Future prospects of risk management in air rescue:**

After this unique start of the systematic teaching program using mobile simulation by DRF and TÜPASS, these results represent a convincing argument to improve quality and patient safety in the preclinical settings and interaction fields with the hospitals. A new questionnaire will be designed for delayed assessment six to eight months after the training. It shall help to find out if the immediate subjective personal learning effect after the simulation course is maintained after many months and has an impact on the real routine preclinical work. The scenarios will be further refined, including real incident analysis data from the national incident reporting system of DRF (run by TuPASS). In the sense of our concepts „Train-where-you-work“ (in-situ training) and “Train-together-who-work-together” (team training), pilots and mission control center personnel will be integrated. The integration of the data from the incident reporting system PaSiS into the design of the simulation team trainings, will allow to continuously “learn from your own and others critical incidents”. This also forms the basis for a totally integrated patient safety improvement system.