Contents

"We're on our way:" A Message from the Mountains

How do we improve the quality and safety of care? In healthcare, we commonly look at outcome measures when pondering this question. But safety-critical processes are not visible in these measures. And if they remain undetected, they can be a dormant source of sudden harm.

This past year, I have immersed myself into the study of mountain rescues as part of a funded scientific investigation.[1] At patient safety meetings, I have long encountered comparisons to the airline industry. "What can healthcare learn from aviation safety?" Patient safety research has begun to compare healthcare teams with flight crews.[2] It has implemented aviation-based "Crew Resource Management (CRM)" models into the healthcare setting.[3] But on what foundation?

From a scientific standpoint, building this bridge into practice based on purely theoretical arguments seems insufficient. Instead of accepting the validity of this comparison at face value, I decided to take a closer look at safety-relevant processes in a context where both industries work together to save patients' lives. Where this comparison is not merely a rhetorical exercise, but observable in practice. This is how I came to participate in airborne mountain rescues.

I have spent all of the past year flying along with rescue teams and analyzing hundreds of rescues at the regional emergency call center (144). I interviewed all participating actors in this highly interprofessional setting, where pilots, physicians, paramedics, mountain guides, and 144-staff must work together smoothly under high-stakes conditions to prevent harm while saving patients' lives.

One of the rescues I attended was on a warm Friday afternoon in the Fall of 2020. We had just brought an injured skier with a shoulder dislocation from a ski slope at 4,000 m elevation to the regional hospital, when we were called about a patient with cardiac arrest in a nearby mountain village. The primary difficulty of airborne rescues is always to find a place to land the helicopter. Sometimes, if there is no possibility to exit by foot, the physician or mountain guide have to rappel from the airborne helicopter on a 200 meter free-hanging rope to be with the patient. In the case of this particular rescue, there was a meadow where we could land. The son and wife of the patient waived at us frantically, signaling us to follow them. Still in glacier suits and loaded with the heavy resuscitation equipment, we followed them into their house. The physician immediately asked pointed questions to find out what happened. The son's voice shifted between hope, despair and distress as he proclaimed repeatedly: "He's dead, I think he's already dead." Through repeated questioning, the story emerged: The patient, a man of about age 60, had been chopping wood behind the house when he felt a sudden, severe pain in his chest and collapsed. The son and his wife had brought him back into the house and laid him on the couch in the living room, where the patient shortly after proclaimed: "I'm going now." The patient went into cardiac arrest about 5 min before we arrived.

There he was, lying in front of us. He looked peaceful. His mouth was slightly open, his eyes were closed as if he were sleeping. The way he was lying on the couch looked stiff and uncomfortable. His cheekbones were very visible, and his skin was grayish pale.

I felt powerless.

The physician and the paramedic however immediately went into emergency mode. The paramedic, much younger than the more experienced physician, seemed to be in a constructive panic. He knew they had to act fast At the same time, he had to attend to the needs of the physician: "Scissors!" Within less than a minute, the furniture had been moved and the patient was lifted down onto the wooden floor and stripped – a naked body with no visible signs of life. The body arched from the electric shock and fell heavily back onto the floor. Chest compressions, mouth-to-mouth breathing, and several needle injections were attempted to infuse life back into the patient's body. In the background, the unattended wife and son alternated between panic, nausea, and flight-fight-freeze responses.

After 10 min, the patient still looked the same to me, but the physician and paramedic had observed some response to their physical labor. The paramedic seemed more enthused than the physician, who whispered: "I don't

have a good feeling about this, if things don't change in the next 2 min, we should…" – he completed his sentence with brief deep eye contact to the paramedic. The paramedic, who had just recently graduated with an education in patient safety, was visibly distressed by the physician's apparent resignation. He knew that they would have to go full force ahead with this rescue to give this patient a chance of life without brain damage. A noticeable but silent interprofessional conflict arose between them, under extreme time pressure at the turning point of the patient's life versus death. The conflict remained unspoken, silenced under a thick hierarchical wall that suppressed any questioning or expressions of concern on the part of the paramedic.

About an hour later, the physician decided that it was time to bring the patient to the hospital. He called 144 and requested an ambulance. The call center receptionist responded surprised: "Why do you need an ambulance, you have the helicopter?" The physician reacted angrily. He clarified that he is the person at the scene responsible for such decision-making, repeated his command, and hung up the phone. When he saw the paramedic's startled face, he explained: "We can't rope him up to the helicopter in his condition!" The physician had evidently forgotten that the helicopter had been able to land only about 50 meters away from the house, and that there was no need to rope up the patient through the air. The physician had made a cognitive error, which could have been corrected by direct communication. But the paramedic did not dare to speak up.

We waited over an hour until the ambulance finally arrived. After the interrupted phone call with the physician, the emergency call center staff had given the ambulance unclear geographical coordinates, which caused a delay in finding us.

The living room was now crowded by two rescue teams. The physicians attempted to conduct a focused hand-off, which was interrupted by the new emergency physician's assertion that the patient needed to be transported by helicopter quickly, because his life depended on speedy hospital care. He explained that the ambulance would take over 2 h to get the patient to the hospital, whereas the helicopter would arrive there in less than 15 min. After several minutes of heated discussion, the physicians settled to a compromise: They agreed to get the patient 5 min down the hill by ambulance, to a place where the helicopter could land and load the patient for further transport.

When we arrived at the transfer point about 15 min later, the helicopter was already waiting. As I entered the helicopter, the pilot asked me surprised what was going on. I told him that we had to bring the patient to the hospital now. The pilot became very upset and said we were expected to fly back to the heliport immediately for another commitment. He also stated that there was neither enough fuel nor time available for bringing the patient to the hospital now. No one had informed him about this transport – he thought he was picking up his team to bring us back to the heliport.

The patient's condition did not allow for our return home, so further adjustments had to be made quickly to transfer the patient. By the time we finally got to the hospital, we had incurred a three-hour delay that could have been avoided by safer communication.

The sun was already setting and it was getting dark. As we lifted off from the hospital deck, the orange lights of the town faded quickly and the moonlit snow-peaks of the mountains pointed us home. Everyone was visibly exhausted. The physician and paramedic had performed enormous physical labor for over an hour in heavy glacier suits inside a sun-heated mountain cottage. The paramedic was in emotional distress he had endured under a performance-disabling relationship with the physician. And the pilot was angered by the fact that he had not been given information that would have been relevant for him to be able to perform his job properly.

But everyone was too tired for an even more tiring critical debriefing, given that the next commitment was only a few flight minutes away.

In the quality and safety metrics for this case, this rescue was registered as "very successful": The patient had been handed off to the hospital alive. The enormous interpersonal challenges that critically delayed the patient's hospital care had additional consequences that were not entered in the records. The paramedic was thrust into three days of burnout. The 144-receptionist was intimidated from speaking up the next time. The helicopter pilot was frustrated to an extent that he would rather never fly for rescues again. Also, the fact that the patient died shortly after the handoff was neither registered nor communicated at any time – because for the rescue team, at the minute of the handoff, their mission was completed.

This case conveys several key messages. First, it shows how communication is the foundation for safe interdisciplinary practice and for timely, high quality care. Second, it demonstrates that our human sense-making process is inherently flawed, which is a core axiom of communication science. Third, it illustrates how our interpersonal sense-making process does not vary by context or industry – but rather, how the communication challenges in aviation and healthcare are essentially the same. It shows how successful communication transpires *between* people, not within individuals. In both aviation and healthcare, we can try to structure our communication or delegate it to digital tools – but neither of these will bring us to a shared understanding. Shared understanding emerges between us. Therefore, safety will not improve until we have improved the resilience of this interpersonal sense-making process.

In summary, we already know that safety is not improved by singling out "bad apples." We are all fallible as individuals, but we are particularly fallible in our togetherness. If there is a "bad apple," it is *between* us. That bad apple holds a dormant potential of substantial harm that can startle us awake. Communication science can help us to improve the resilience that is needed in that space between

us. It gives us the potential to make our joint performance, our togetherness, smoother and more resilient to failure. It also provides the potential to improve "safety culture," where speaking up is expected from all participants, and everyone is a core partner in delivering safe care. Excluding a single person from the conversation can prevent the achievement of shared understanding – which is a fundamental prerequisite for safe and high-quality care.

Authors' contributions

The author is sole principal investigator and guarantor for all the work conducted under this scientific investigation.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

Ethical approval

This scientific investigation has been approved by the Institutional Review Board (IRB) of the Università della Svizzera italiana (USI).

References

1. Center for the Advancement of Healthcare Quality & Safety (CAHQS). New project: Safe communication in mountain rescues.http://patientsafetycenter.org/ourwork (last accessed October 17, 2021).
2. McConaughey E. Crew resource management in healthcare. *J Perinat Neonatal Nurs* 2008; 22: 96–104.
3. Gordon S, Mendenhall P and O'Connor BB. *Beyond the check-list: what else health care can learn from aviation teamwork and safety*. Ithaca, New York: Cornell University Press, 2013.

Annegret F Hannawa
Center for the Advancement of Healthcare Quality & Safety (CAHQS), Università della Svizzera italiana (USI), Via G. Buffi 13, 6900 Lugano, Switzerland

Corresponding author:
Center for the Advancement of Healthcare Quality & Safety (CAHQS), Università della Svizzera italiana (USI), Via G. Buffi 13, 6900 Lugano, Switzerland.
Email: hannawaa@usi.ch