

Crisis Communication for Anaesthesiologists: Lessons From Emergencies and Mass Casualty Events

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Abstract

Communication failures are a leading contributor to adverse events in anaesthesiology, particularly during emergencies and mass casualty events. Anaesthesiologists, by virtue of their central role in airway management, resuscitation, and perioperative decision-making, often function as team leaders in high-stakes environments. In this review, we summarize principles of crisis communication, common barriers, and evidence-based strategies including simulation training, structured tools such as closed-loop communication, and lessons from recent global emergencies, including examples from the crises in Lebanon. In this review, we highlight the importance of integrating communication frameworks into daily anaesthetic practice and disaster preparedness, with practical strategies applicable across both high- and low-resource settings.

Key Points

- Effective crisis communication is essential in anaesthesiology because communication failures contribute significantly to adverse events, particularly during emergencies and mass casualty situations.
- Structured frameworks such as closed-loop communication, and simulation-based training among others strengthen team coordination, improve situational awareness, and mitigate barriers related to stress, fatigue, hierarchy, and system overload.
- Lessons from recent crises—including the COVID-19 pandemic and disasters such as the Beirut Port explosion—highlight the importance of redundancy, interdisciplinary collaboration, and family communication as critical components of disaster preparedness.

Key words: Crisis communication, Communication standards, Mass casualty events, Simulation training

INTRODUCTION

Effective communication during emergencies is a cornerstone of safe anaesthetic practice. Failures in communication account for a significant proportion of adverse events within the health care setting, with estimates as high as 43% in perioperative care.¹ Unlike technical errors, which may be limited to a single step of a procedure, communication failures often cascade across multiple domains: They can delay recognition of deterioration, disrupt coordination of resuscitative efforts, or lead to duplication and omission of critical tasks. Anaesthesiologists occupy a uniquely central position in emergency care. They are often the first to secure the airway, lead resuscitative efforts, and coordinate with surgical, nursing, and critical care colleagues under conditions of extreme time pressure. Beyond their clinical interventions, anaesthesiologists act as information brokers—translating rapidly changing physiological data,

anticipating needs, and directing team priorities. This dual role as both technical expert and communication hub places them at the heart of crisis management.

Structured communication frameworks were first introduced in aviation through crew resource management (CRM), which emphasized role clarity, flattened hierarchies, and standardized exchanges to prevent catastrophic errors. Adapted to anaesthesiology, CRM principles evolved into tools such as closed-loop communication (CLC), situation-background-assessment-recommendation (SBAR), and the Anaesthetists' Non-Technical Skills (ANTS) system.²⁻⁴ Emergencies, however, present unique challenges: Stress, environmental noise, fatigue, and emotional pressure degrade the accuracy of exchanges, while hierarchical culture and cognitive overload can

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silence junior voices. During the COVID-19 pandemic, infection-control measures and personal protective equipment (PPE) further impaired verbal and nonverbal communication.⁵ The Beirut Port Explosion and subsequent national crises in Lebanon similarly demonstrated how infrastructure breakdown and resource scarcity magnify these communication barriers, testing team adaptability and system resilience in real-world settings.^{6,7}

In this review, we synthesize evidence from simulation studies, disaster medicine, and real-world emergencies to highlight practical strategies for crisis communication in anaesthesiology. We focus on 3 complementary domains:

- (1) Team communication—frameworks, barriers, and structured approaches.
- (2) System communication—preparedness, coordination, and interagency response during mass casualty events (MCEs).
- (3) Patient and family communication—emerging lessons from COVID-19 and other crises.

By integrating lessons from both high- and low-resource contexts and drawing on recent experiences from Lebanon's health care system, in this review, we aim to provide anaesthesiologists worldwide with a practical and adaptable framework for strengthening communication during emergencies.

PRINCIPLES OF CRISIS COMMUNICATION

High-stakes medical environments demand communication that is clear, concise, and closed-loop. Unlike casual dialogue, where redundancy and ambiguity may be tolerated, crisis communication must achieve immediate comprehension and execution. Several structured approaches have been developed to support this goal, each with direct relevance to anaesthesiologists.

CLC is one of the most widely studied communication strategies in emergencies. It requires the sender to issue a directive, the receiver to acknowledge it, and the sender to confirm the correct action. This cycle reduces ambiguity and ensures that critical instructions are not lost in the noise of crisis events. For example, during a difficult airway scenario, an anaesthesiologist may instruct: "Prepare the video laryngoscope." The assistant replies: "Video laryngoscope ready." The anaesthesiologist then confirms: "Yes, that's correct." Authors of observational studies in anaesthesia teams, however, have revealed that CLC is employed in less than half of exchanges.⁸ Interestingly, it is more likely to occur when instructions are given with eye contact or by name, underscoring the role of directed communication.⁸

Beyond CLC, structured call-out tools improve team situational awareness. The stop, notify, assess, plan, prioritize, invite ideas (SNAPPI) framework has been tested in simulated intensive care crises, where it enhanced information sharing and broadened diagnostic discussions.⁹ The SBAR tool, although initially designed for handovers, has proven useful in anaesthesia emergencies by structuring reports to surgical and critical care colleagues.^{1,4} Similarly, team strategies and tools to enhance performance and patient safety (TeamSTEPPS) integrates communication strategies with leadership and mutual support, promoting consistency across departments.⁴

The ANTS system embeds communication within broader domains of task management, teamwork, situational awareness, and decision-making.³ In practice, communication deficits often cascade into failures in these other domains. For instance, delayed communication of blood loss to the surgical team can impair situational awareness and delay activation of a massive transfusion protocol. Conversely, timely, structured communication often enables faster decision-making and coordinated task delegation.

While frameworks differ in detail, they share several principles: clarity and brevity, directed communication, verification through acknowledgment, and shared mental models.^{2-5,8,9} For anaesthesiologists, embedding these principles into routine practice is critical. Emergencies are not the time to learn new behaviours; teams that habitually use structured tools during routine handovers and debriefings are more likely to retain them under the stress of crises.

BARRIERS AND CHALLENGES

Despite the availability of structured communication tools, multiple barriers undermine their use during crises. These barriers exist at the individual, team, and system levels, often interacting to create cumulative risks.

At the individual level, anaesthesiologists in crises face intense cognitive load, juggling monitoring, drug administration, airway interventions, and hemodynamic support. This multitasking can impair working memory and reduce the ability to both issue and process communication effectively. Under stress, communication often becomes abbreviated, vague, or omitted, as clinicians focus on technical tasks. Fatigue is another critical factor, with sleep-deprived clinicians more likely to miss verbal cues, misunderstand instructions, or forget to close the communication loop. Experimental simulation data also show that acute post-night-shift sleep deprivation impairs crisis management performance among anaesthesia residents, with more drug-dose errors and slower recognition of hypotension.^{2,3} Emotional stress, particularly when managing critically ill children or colleagues, further degrades clarity of expression and attentiveness.

At the team level, hierarchy remains a dominant barrier. In some cultures, junior staff hesitate to question or clarify instructions from senior physicians, even when they recognize potential errors. Authors of studies have documented how this reluctance reduces communication flow and may delay life-saving interventions.¹⁰ Role ambiguity further complicates team interactions, as multiple providers attempt to direct tasks simultaneously, while in other situations, no one assumes explicit leadership. Noise and environmental factors, such as alarms and overlapping conversations, also impair communication, making undirected instructions easily lost; directed communication by name and with eye contact can mitigate this but is inconsistently practiced.⁸ Real-world emergency teams also move between task-focused dialogue, metacommentary, and contextual talk; these modes shape decisions, yet closed-loop remains underused.¹¹

At the system level, barriers include insufficient disaster drills, fragile infrastructure, and information overload. Traditional telephone recall systems, for example, may fail during surges; SMS-based or automated alert systems can help but require resilient infrastructure.^{12,13} The Beirut Port Explosion exemplified these vulnerabilities: Hospitals

were overwhelmed with casualties while simultaneously experiencing infrastructure damage and communication breakdowns. Some hospitals even had to be evacuated due to damage incompatible with continued function. Emergency medical services struggled to coordinate with remaining hospitals, while overloaded networks and compromised roads delayed staff mobilization.^{6,7}

The COVID-19 pandemic introduced additional barriers. PPE significantly impaired speech intelligibility, particularly in noisy environments such as intensive care units (ICUs).⁵ PPE also obscured facial expressions, reducing the role of non-verbal cues. Rapidly evolving guidelines further overwhelmed clinicians, with institutions that adopted daily interdisciplinary huddles being better able to maintain shared mental models.¹⁴ Infection-control restrictions often reduced the number of staff present, heightening the need for concise, accurate exchanges among smaller teams.

Barriers to crisis communication are multifactorial. Individual stress and fatigue, team hierarchies and role ambiguity, and health system fragility all interact to degrade information exchange. Global emergencies such as the Beirut Port Explosion and COVID-19 have shown how these barriers can be magnified under disaster conditions, reinforcing the need for resilient strategies.

COMMUNICATION IN MASS CASUALTY EVENTS

MCEs represent a unique communication challenge, straining systems well beyond routine emergency preparedness. They are defined not simply by the number of casualties but by the degree to which demand overwhelms local resources. Whether arising from explosions, natural disasters, or pandemics, MCEs disrupt communication channels at precisely the moment they are most needed.

Anaesthesiologists' responsibilities in MCEs extend far beyond the operating theatre. They frequently assist in triage, secure airways in emergency departments, and provide resuscitative care in ICUs. In surgical suites, anaesthesiologists manage surge capacity, coordinating with surgeons to prioritize cases. They also play a role in critical decision-making at the system level, including allocation of scarce ventilators, blood products, and operating space. Because of this broad reach, their ability to communicate clearly across departments is essential to an effective response.^{15,16}

Preparedness frameworks traditionally divide disaster response into 4 phases: mitigation, planning, response, and recovery.¹⁵ Each phase places different demands on communication, from policy-level agreements and drills to real-time updates and transparent debriefings. When communication fails at any phase, coordination falters.

The Beirut Port Explosion of 2020 remains a stark reminder of how fragile communication systems are in sudden-onset disasters. Hospitals were overwhelmed with hundreds of casualties while simultaneously facing infrastructure damage and communication breakdowns. EMS coordination was delayed by congested networks, while intrahospital communication struggled under resource shortages. These conditions forced reliance on improvised, low-technology methods such as hand-carried notes and the use of walkie talkies to facilitate communication.^{6,7}

By contrast, the COVID-19 pandemic represented a prolonged, global MCE. Instead of an immediate surge, health care systems faced

sustained strain over months and years. Communication barriers emerged not only from PPE but also from rapidly changing protocols. Hospitals that implemented daily interdisciplinary huddles and structured updates fared better at reducing health care worker confusion.¹⁴ Pandemic conditions also required transparent, compassionate communication with families, often through digital platforms.^{17,18}

Experiences from Beirut, the COVID-19 pandemic, and other disasters highlight recurring communication principles such as redundancy aiming at successfully transmitting the message, directed leadership, information triage, communication drills, and family integration that need to be implemented to successfully navigate these events. For anaesthesiologists, MCE preparedness must treat communication with the same urgency as clinical resources.

PATIENT AND FAMILY COMMUNICATION IN EMERGENCIES

While most researchers of crisis communication have focused on intrateam exchanges, the COVID-19 pandemic underscored the equally vital role of communication with patients and families. In anaesthesiology, this responsibility often arises at the most difficult moments: urgent informed consent, explaining risks and uncertainties, or updating families during resuscitations and MCEs.

Emergencies compress time frames for decision-making. In elective care, patients and families typically receive detailed explanations of anaesthetic risks and alternatives. In crisis situations, anaesthesiologists may have only minutes to obtain consent or convey information. Striking a balance between honesty, brevity, and reassurance is challenging. A further dilemma arises in disclosing uncertainty. Emergencies often evolve unpredictably, and anaesthesiologists may lack complete information about prognosis. Communicating uncertainty transparently, while maintaining confidence in immediate management, requires skill and emotional intelligence.

The pandemic amplified these challenges by separating families from patients through strict visitation bans. In the United Kingdom, more than 180 ICUs rapidly established family liaison teams and virtual visiting programs, which improved satisfaction and reduced distress.¹⁷ Surveys from South Asia and the Middle East documented similar adaptations, though barriers such as limited Internet access and difficulties conveying empathy via digital platforms persisted.¹⁸

Practical strategies to improve patient and family communication include structured updates using SBAR, designating specific team members for updates or even a group of individuals acting as a liaison body with families, brief but empathetic reassurances, real-time documentation, and careful integration of technology. These approaches preserve trust and continuity during crises. The lessons of COVID-19 extend beyond pandemics. Any MCE may separate families from patients, whether through infrastructure collapse, security restrictions, or public health measures. Planning for crises must therefore incorporate family communication as a core element of disaster preparedness.

TRAINING AND SIMULATION

Simulation has emerged as one of the most effective modalities for teaching and reinforcing crisis communication skills. Borrowed from aviation's CRM, simulation provides a safe environment for rehearsing structured communication, leadership, and decision-making under stress.² Unlike classroom-based teaching, simulation allows teams to practice in real time, exposing gaps in role clarity, situational awareness, and communication habits.

Authors of multiple studies have confirmed the educational value of simulation for anaesthesiologists. In joint trauma courses where surgeons and anaesthesiologists trained together, participants reported improved use of structured briefings, CLC, and situation updates.¹⁹ Randomized controlled trials of tools such as SNAPPI further demonstrated enhanced diagnostic flexibility and information sharing.⁹ Qualitative analyses show how simulation reveals latent threats such as hierarchical barriers or assumptions about roles, which can be addressed during debriefing.¹⁰

Simulation is not limited to high-resource environments. Evidence from low- and middle-income countries (LMICs) demonstrates that interactive, workplace-based training is more effective than classroom-only teaching.²⁰ Programs such as Helping Babies Breathe and Practical Obstetric Neonatal Training and On-site simulation, which use low-cost, portable kits, have improved teamwork and reduced neonatal mortality in resource-limited settings.²¹ These programs illustrate that simulation does not need to be high-tech to be impactful if it is context-appropriate and sustainable.

Despite its benefits, simulation faces barriers including high costs, the need for skilled faculty, and time constraints in busy health systems. Future directions may mitigate these limitations. Hybrid models using low-fidelity mannequins, online and virtual simulations, and artificial intelligence-assisted debriefing tools show promise for broadening access and providing objective feedback on communication behaviours.

For anaesthesiology training, crisis communication should be regarded as a core competency. Just as airway management and regional anaesthesia require deliberate teaching and assessment, so too should structured communication under stress be systematically practiced.

CULTURAL AND LINGUISTIC BARRIERS

Emergencies rarely occur in culturally or linguistically homogenous settings. In many health care systems, anaesthesiologists work within multicultural teams and care for patients from diverse backgrounds. These contexts introduce unique communication challenges that are magnified during crises, when clarity and speed are essential.

Language barriers between clinicians can delay or distort instructions. Misinterpretation of a drug dose or airway command can have immediate consequences. Patients and families with limited proficiency may misunderstand urgent explanations, complicating consent and increasing distress. In a review, Horváth and Molnár emphasized that multilingual and multicultural health care environments are at higher risk of preventable adverse events and highlighted the importance of interpreter services, bilingual staff training, and institutional

language-access policies; ad hoc strategies such as family translation are insufficient.²²

Cultural expectations also shape communication. In some societies, junior staff may hesitate to challenge seniors, while gender norms may determine who speaks and who is heard. These dynamics can silence critical voices. Structured frameworks such as SBAR and CLC provide a neutral language that helps counteract hierarchy and cultural barriers. Building psychological safety within teams is equally essential.¹⁰

For anaesthesiologists in humanitarian or international settings, cultural competence is not optional—it is a practical tool for patient safety. Incorporating cultural awareness into crisis training can help teams anticipate and navigate these challenges.

FUTURE DIRECTIONS AND LIMITATIONS

Despite recognition of the importance of communication in emergencies, gaps remain in research and practice. While structured tools are supported by simulation and observational studies, the direct link between communication training and patient outcomes is less established. Authors of future studies should measure not only behavioural changes but also clinical outcomes such as error reduction and morbidity.

The COVID-19 pandemic accelerated the adoption of digital tools such as secure messaging, real-time dashboards, and video-enabled family liaison systems. These innovations may improve communication in future crises, but technology must be supported by redundancy planning, as digital systems remain vulnerable in disasters.^{14,17,18} Automated triage systems and artificial intelligence-driven analytics also hold promise for reducing delays and providing objective feedback on communication quality.

Global collaboration is critical. Standardized communication protocols that transcend linguistic and cultural boundaries would strengthen international disaster response. The World Federation of Societies of Anaesthesiologists is well positioned to promote such consensus frameworks. LMICs require sustained investment in faculty training, interpreter services, and low-cost technologies to ensure that advances are equitably distributed.^{20,21}

Current evidence is limited by heavy reliance on simulation studies and reports from high-income settings. Research from non-English-speaking countries and LMICs remains sparse, particularly regarding cultural and linguistic barriers. More inclusive, globally representative research is needed to inform future practice.²²

SUMMARY

Communication is the backbone of safe anaesthetic practice, and its importance becomes magnified during emergencies and MCEs. Anaesthesiologists, positioned at the crossroads of airway management, resuscitation, and perioperative decision-making, serve as vital communication nodes linking patients, teams, and health systems. Failures in communication—whether from individual stress, team hierarchy, or system fragility—can rapidly cascade into preventable harm.

Over the past decades, structured frameworks such as CLC, SBAR, and SNAPPI, together with broader non-technical skills programs like ANTS and TeamSTEPPS, have provided strategies to strengthen

team interactions.^{2-4,8,9} Simulation-based education has proven to be one of the most effective approaches for embedding these skills, not only in high-resource environments but also in LMICs where innovative, low-cost models have demonstrated impact.²¹

Recent emergencies provide sobering lessons. The Beirut Port Explosion highlighted the vulnerability of communication infrastructures in sudden disasters,^{6,7} while the COVID-19 pandemic exposed the barriers created by PPE, rapidly evolving protocols, and family separation.^{5,14,17}

REFERENCES

- Subramani Y, Wong DT. Workplace communication in anesthesiology: principles and practices. *J Anaesthesiol Clin Pharmacol*. 2018;**34**(4):449-454.
- Gaba DM. Crisis resource management and teamwork training in anaesthesia. *Br J Anaesth*. 2010;**105**(1):3-6.
- Fletcher G, Flin R, McGeorge P, Glavin R, Maran N, Patey R. Anaesthetists' Non-Technical Skills (ANTS): evaluation of a behavioural marker system. *Br J Anaesth*. 2003;**90**(5):580-588.
- Weller J, Frengley R, Torrie J, et al. Evaluation of an instrument to measure teamwork in multidisciplinary critical care teams. *BMJ Qual Saf*. 2011;**20**(3):216-22.
- Hampton T, Crunkhorn R, Lowe N, et al. The negative impact of wearing personal protective equipment on communication during critical care procedures. *J Laryngol Otol*. 2020;**134**(7):577-581.
- El Sayed MJ. Beirut ammonium nitrate explosion: a man-made disaster in times of the COVID-19 pandemic. *Disaster Med Public Health Prep*. 2020;**14**(5):e34-e36.
- El Zahran T, Geha M, Sakr F, Bachir R, El Sayed MJ. The Beirut Port Blast: spectrum of injuries and clinical outcomes at a tertiary center. *Eur J Trauma Emerg Surg*. 2021;**47**(6):1797-1804.
- Gjøvikli AS, Valeberg BT. Closed-loop communication in interprofessional anesthesia teams during critical situations: an observational study. *J Patient Saf*. 2023;**19**(8):579-586.
- Weller JM, Torrie J, Boyd M, et al. Improving team information sharing with structured communication protocols in emergency care: a randomized controlled trial. *Br J Anaesth*. 2014;**112**(6):1135-1144.
- Weller J, Boyd M, Cumin D. Teams, tribes and patient safety: overcoming barriers to effective teamwork in healthcare. *Med Educ*. 2014;**48**(5):444-454.
- Gundrosen S, Thomassen G, Wisborg T, Aadahl P. Team talk and team decision processes: a qualitative discourse analytical approach to 10 real-life medical emergency team encounters. *BMJ Open*. 2018;**8**(10):e023749.
- Epstein RH, Dexter F, Christo DK, Ehrenfeld JM. Development of a staff recall system for mass casualty incidents using text messaging. *Anesth Analg*. 2010;**110**(3):871-878.
- Murray MJ. Disaster preparedness and anesthesiology. *Anesth Analg*. 2010;**110**(6):1737-1738.
- Hung DY, Martinez M, Rakowsky A, Sweis RF, Sullivan JL, Singer SJ. Adapting lean daily management to support hospital COVID-19 response: a multiple case study. *J Healthc Manag*. 2022;**67**(4):270-283.
- Lam CM, Murray MJ. The multiple casualty scenario: role of the anesthesiologist. *Curr Anesthesiol Rep*. 2020;**10**(4):308-316.
- Kuza CM, McIsaac JH. Mass casualty events: the anesthesiologist's role. *Adv Anesth*. 2018;**36**(1):53-66.
- Rose L, Cook A, Casey J, et al. Communication and virtual visiting in intensive care during COVID-19: a UK national survey. *Ann Am Thorac Soc*. 2021;**18**(10):1685-1692.
- Chanchalani G, Verma A, Bhatnagar S, et al. Family communication and visitation in ICUs during the COVID-19 pandemic: a cross-sectional survey in South Asia and the Middle East. *Indian J Crit Care Med*. 2022;**26**(11):1201-1209.
- Alexandrino H, Baptista S, Vale L, et al. Improving intraoperative communication in trauma: the educational effect of the joint DSTC-DATC courses. *World J Surg*. 2020;**44**(6):1856-1862.
- Rowe AK, Rowe SY, Peters DH, Holloway KA, Chalker J, Ross-Degnan D. Effectiveness of strategies to improve health-care provider practices in low- and middle-income countries: a systematic review. *BMJ Glob Health*. 2021;**6**(2):e003229.
- Robinson T, Aftab W, Chmielewska B, Perry H, Walker D, Evans CL. Simulation-based education in low- and middle-income countries: a systematic review. *Glob Health Sci Pract*. 2024;**12**(2):e2300175.
- Horváth A, Molnár P. A review of patient safety communication in multicultural and multilingual healthcare settings with special attention to the U.S. and Canada. *Dev Health Sci*. 2021;**4**(3):71-79.