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Commentary /practice framework

OSCAR and VUCA: a pragmatic cognitive framework to optimise scene time in pre-hospital care

Paul J Reeves

Office of the Chief Paramedic, Northern Territory Government, Australia
Faculty of Health, Charles Darwin University, Australia

Email paul.reeves@nt.gov.au

Abstract

Background Prolonged on scene times for physiologically critical but logistically uncomplicated pre-hospital patients are associated with delayed access to definitive care and poorer outcomes. In volatile, uncertain, complex and ambiguous (VUCA) environments, cognitive overload, stress and workflow drift commonly produce excess scene time without clear clinical benefit.

Purpose This article outlines the conceptual development of OSCAR, a pragmatic cognitive framework designed to help pre-hospital clinicians prioritise time in critical care and progress efficiently toward definitive care in VUCA contexts.

Framework Description OSCAR (Oxygenation, Stretcher, Critical care interventions, Anticipated problems, Rotate wheels or blades) reframes the traditional "stay and play" versus "load and go" dichotomy into a structured, time-focused decision aid. It emphasises early correction of immediately life-threatening problems, rapid transfer to a controllable transport platform, selective performance of only outcome critical interventions, anticipatory preparation for deterioration, and prompt initiation of transport by road or air.

Implications OSCAR functions as a temporal and cognitive scaffold rather than a competing clinical algorithm. By externalising priorities, it reduces reliance on working memory and mitigates cognitive bias under pressure. The framework is applicable across medical and trauma presentations, road and aeromedical settings and levels of paramedic practice across diverse operational contexts.

Conclusion Embedding structured cognitive frameworks, such as OSCAR, into pre-hospital education and governance may reduce avoidable scene time, improve decision-making reliability, and support timely delivery of definitive care in high risk, resource-constrained environments.

Keywords austere prehospital care, scene time optimisation, decision-making under stress, VUCA environments, time-critical transport.

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Introduction

Timely access to definitive care is a key determinant of outcome in many time-critical conditions encountered in the pre-hospital environment, including major trauma, acute coronary syndromes, stroke and critical medical emergencies.[5,6,7] Where scene times are prolonged without clear clinical justification, opportunities for earlier definitive intervention may be lost, particularly for patients who are physiologically unstable but logistically uncomplicated.[1]

This paper intentionally focuses on physiologically critical yet logistically uncomplicated patients, for whom scene time is primarily governed by clinical workflow, decision-making and team cognition rather than extrication constraints or environmental barriers. In this cohort, scene time is highly modifiable.

Traditional pre-hospital discourse has often framed this challenge as a tension between 'stay and play' and 'load and go'. This binary approach is increasingly recognised as inadequate for contemporary paramedic practice, which must integrate complex decision making, advanced life support interventions, system-level considerations, and dynamic risk management within resource-constrained and time-pressured environments.[2,8]

This article presents OSCAR, a simple cognitive framework developed through reflective practice and case review, supported by the evidence base, and intended to assist pre-hospital clinicians in prioritising truly time-critical interventions, avoiding unnecessary on-scene delay, anticipating deterioration, and progressing patients efficiently toward definitive care within a VUCA context.

The VUCA context of pre-hospital care

Pre-hospital care is inherently characterised by volatility, uncertainty, complexity, and ambiguity. Scene conditions may deteriorate rapidly, information is often incomplete or

contradictory, patient physiology and system constraints interact in non-linear ways, and the clinical picture may support multiple plausible interpretations.[4]

In such environments, paramedics and retrieval clinicians experience high cognitive load, time pressure and stress. Subjective time perception is frequently distorted under stress, and retrospective review often reveals longer objective scene times than clinicians perceived at the time.[9] Cognitive overload increases vulnerability to heuristic-driven error, fixation and premature closure.[3]

Within this setting, simple, robust cognitive anchors may help maintain shared situational awareness, align team priorities and support consistent decision-making.[4]

Combating VUCA with VUCA

Borrowing from military and high-reliability organisational theory, one approach to stabilising decision-making in volatile environments is to "combat VUCA with VUCA" by deliberately applying counterbalancing cognitive behaviours:

Volatility → Vision: A clear, shared purpose anchors the team. In pre-hospital care, this vision is typically early mobilisation toward definitive care.

Uncertainty → Understanding: Rapid assimilation of the most meaningful information allows action without requiring complete certainty.

Complexity → Clarity: Simple, ordered cognitive frameworks structure action and communication.

Ambiguity → Agility: Teams retain the capacity to adapt and pivot rapidly as new information emerges without losing momentum.

The concept of "combating VUCA with VUCA" reframes the challenges of volatile, uncertain, complex, and ambiguous environments by proposing that the clinician deliberately applies counterbalancing cognitive and organisational behaviours. This approach has roots in military command philosophy and high-reliability organisational theory, where teams operating in rapidly changing or information-poor environments must stabilise their decision-making with simple but powerful cognitive anchors.

From a cognitive load perspective, the VUCA-to-VUCA mapping serves as a deliberate load-management strategy. Vision constrains decision dispersion and task sprawl; Understanding focuses attention on high-value information while filtering noise; Clarity transforms a complex scene into a small number of ordered actions; and Agility preserves adaptability without abandoning the shared cognitive scaffold.[4,3] OSCAR operationalises this approach by translating abstract counter-VUCA principles into a practical temporal framework for scene management.[24]

In the pre-hospital environment, this approach is particularly relevant. Scene conditions may be unstable or deteriorate rapidly (volatility), information may be incomplete or contradictory (uncertainty), patient physiology and system constraints interact in non-linear ways (complexity), and the clinical picture may support multiple plausible interpretations (ambiguity). Together, these factors degrade working memory and increase cognitive load. Amplifying the risk of heuristic-driven error, such as fixation, premature closure, or defaulting to over-proceduralising, without adding value.

"Combating VUCA with VUCA" applies four deliberate countermeasures:

Volatility → Vision

In volatile situations, the clinician narrows attention to a clear, shared purpose and mission objective. Vision provides an articulated, stable reference point that anchors the team in what must be achieved now. In pre-hospital care, that vision is typically progression toward definitive care while preserving life. Clearly articulated shared goals, for example, "We need this patient on the stretcher and moving in under ten minutes," help orient all actions and interrupt drift toward low-value tasks.

Uncertainty → Understanding

Uncertainty is countered by improving situational understanding through rapid assimilation of the most relevant information: key vital signs, mechanism of injury, immediate threats to life, and transport considerations. Understanding does not require highly detailed or complete information; rather, it prioritises meaningful information that guides action. In this way, clinicians avoid paralysis caused by attempting to eliminate all uncertainty before committing to a plan or going through default motions without making a plan.

Complexity → Clarity

Complexity in pre-hospital care often arises when multiple tasks, priorities, and risks compete for attention. Clarity is created through simple, ordered frameworks that structure action and communication. Similar to the zero-point survey[10] and primary survey, OSCAR itself functions as a clarity-generating tool for VUCA environments: clinicians sequentially move through Oxygenation, Stretcher, Critical interventions, Anticipated problems, and Rotate. This structure provides a cognitive "railroad" that keeps teams aligned even when the clinical situation feels chaotic.

Ambiguity → Agility

Ambiguity requires agility, the capacity to rapidly adapt and pivot if required, as new information becomes available without losing mission momentum. In support of their purpose, agile teams are willing to modify their plans, escalate interventions, or change destinations as the patient's condition evolves. This adaptability prevents commitment to outdated assumptions and supports early recognition of deterioration.

OSCAR functions as a practical implementation of this counter-VUCA approach. Vision is reinforced throughout by the explicit drive toward optimal early mobilisation; understanding is sharpened during early assessment; clarity is generated through structured sequencing; and agility is embedded through anticipatory planning.

Cognitive load and why OSCAR helps

Cognitive load refers to the working memory resources required to perform a task at a given moment. In prehospital care, cognitive load is shaped by time pressure, emotional stress, multitasking, information uncertainty, equipment management and environmental instability. When cognitive load is excessive or poorly managed, clinical performance degrades, error likelihood increases and workflow efficiency declines—often without the clinician recognising this in real time.[3, 4, 24]

Paramedic practice frequently occurs at or near the limits of working memory capacity. High cognitive load interacts with stress and emotion, distorts subjective time perception, and increases reliance on heuristics, procedural defaulting, fixation and premature closure.[3,24] In this context, avoidable scene time is often a cognitive phenomenon rather than a purely clinical necessity.

OSCAR is explicitly designed to function as a cognitive load management scaffold within VUCA pre-hospital environments. It supports cognition in three key ways. First, it reduces intrinsic cognitive load by narrowing attention to a small number of time-critical priorities relevant to physiologically unstable yet logistically uncomplicated patients. Second, it reduces extraneous cognitive load by providing a simple, ordered structure for action and communication, reducing the need for continuous reprioritisation under pressure. Third, it supports shared mental models, enabling teams to coordinate effectively with fewer verbal exchanges and less cognitive effort.[21, 22]

Recent paramedic-specific cognitive load research identifies structured frameworks, algorithms, anticipatory behaviours, cue utilisation and shared mental models as effective strategies for managing cognitive load in high-pressure clinical contexts.[24] OSCAR aligns with these evidence-based strategies, positioning it not as an informal heuristic but as an applied cognitive load intervention designed for real-world prehospital practice.[23]

Conceptual development of OSCAR

OSCAR emerged from reflective analysis of pre-hospital trauma and medical cases exhibiting disproportionately long scene times for uncomplicated but critically unwell patients. Observational and registry-based studies suggest that scene-time variation is often weakly correlated with injury severity and more strongly influenced by workflow and intervention choices.[12, 14]

Observation of air medical and retrieval practice further informed the framework. Despite greater technical capability, helicopter emergency medical service (HEMS) teams frequently demonstrate disciplined scene management and explicit thresholds for pre-departure versus en route interventions. This reflects an operational understanding that the primary advantage of the platform is speed, not procedural depth.[13, 14]

Definitions: uncomplicated and complicated patients

Uncomplicated patients

Uncomplicated patients are those for whom no physical, environmental, or technical barriers prevent early mobilisation and transport. They are physiologically unwell or at risk of deterioration, but extrication is not the rate-limiting step in their progression toward definitive care.

As a consequence, scene time is predominantly determined by clinical workflow, sequencing and team cognition—and is therefore highly modifiable. These patients are the core population for which OSCAR is designed.

For this classification of patients, scene time is not only operationally modifiable but cognitively modifiable, making them the population in which structured cognitive frameworks, such as OSCAR, are most likely to confer benefit.[24,23]

Complicated patients

Complicated patients are those whose movement or access is constrained by entrapment, hazardous environments, structural barriers or the requirement for specialist rescue. In these cases, scene time is driven primarily by extrication complexity rather than clinical decision-making.

While OSCAR will continue to support prioritisation, anticipation and preparedness in such scenarios, it is unlikely to meaningfully impact extrication-limited timelines to definitive care.

The OSCAR Framework

O = Oxygenation

Early control of catastrophic haemorrhage, airway compromise, ventilation failure and pending circulatory collapse, aligns with established trauma and resuscitation paradigms.[15,16]

The comprehensive primary survey CABCDE addresses these immediate threats, justifying delayed movement initially to optimise tissue oxygenation. In contrast, undertaking non-life-saving interventions on scene, does not confer equivalent benefit and often increases scene time without improving outcomes.[1]

S = Stretcher (mobility and platform)

Early transfer onto a controllable transport platform facilitates shorter overall pre-hospital intervals and earlier access to definitive care.[2] Remaining static while performing non-critical

procedures contributes to avoidable delay without proven outcome benefit.[12]

C = Critical care interventions required

OSCAR promotes a selective approach to advanced interventions. Only procedures that are both time-sensitive and outcome-linked justify delaying departure.[8] Indiscriminate performance of advanced life support procedures increases cognitive load and scene time without consistent evidence of benefit.[12,19]

A = Anticipated problems and deterioration

Physiological deterioration is rarely sudden and is typically preceded by abnormal vital signs and warning indicators.[18,11] Anticipatory preparation, such as early defibrillation pad placement,[17,20] airway contingency planning or pre-emptive medication preparation, supports rapid responses to patient deterioration without delaying mobilisation momentum.

R = Rotate wheels or blades

The survival benefit of HEMS is closely linked to reductions in time to definitive care and is attenuated or lost when prolonged scene times negate transport-time advantages.[13,14] Similar principles apply to ground transport, where scene time constitutes a substantial proportion of the total pre-hospital interval in rural and remote settings.[2]

Prolonged scene times erode this advantage and may negate the survival benefit associated with rapid transport platforms.

Integrating OSCAR with existing frameworks

OSCAR is intended to function as a temporal scaffold rather than a competing clinical algorithm. It complements established assessment, resuscitation, and trauma frameworks by structuring when decisions are made rather than dictating what clinical decisions must occur.

By providing a shared mental model, OSCAR supports team coordination, reduces omission of critical steps and enhances reliability in high-risk and time-pressured environments.[21, 22]

Implications for education and practice

Cognitive aids reduce reliance on working memory under stress and mitigate common biases, such as proceduralism and confirmation bias.[3,4] Embedding OSCAR within pre-hospital education, training and clinical governance frameworks may support more consistent, time-efficient decision-making across diverse operational contexts.[21]

Limitations and future evaluation

OSCAR is a conceptual, practice-informed framework. It has not yet been prospectively evaluated against patient-centred outcomes, scene-time metrics, or clinician cognitive load. Its proposed value lies in plausibility, cognitive load reduction, and improved consistency of clinical sequencing rather than demonstrated outcome superiority. Future evaluation should explore its impact on scene time, decision reliability, team performance and educational utility across a range of pre-hospital systems.

Future evaluation of OSCAR should follow a staged and pragmatic roadmap. Initial modelling should occur in simulation environments—high-fidelity or in-situ—comparing OSCAR-guided and unguided teams managing comparable cases. Outcomes of interest may include scene time, time to key actions, procedural omission or error rates and both subjective and objective measures of cognitive load.[23, 24]

Subsequent pilot implementation within operational services could embed OSCAR into cognitive aids, pre-briefs or local governance tools, allowing observational or quality-improvement evaluation of scene time and workflow metrics before and after introduction [21].

Collaboration with university paramedicine programs and simulation centres would further enable examination of learning curves, skill retention and transfer of OSCAR-based decision-making from simulation to clinical environments.[23] Iterative refinement using implementation science approaches and user feedback is essential, as cognitive load research suggests that context, task complexity and experience level all influence the effectiveness of structured cognitive tools.[24]

Conclusion

Prolonged and poorly justified on-scene times for physiologically critical yet logistically uncomplicated prehospital patients represent a modifiable contributor to delayed definitive care.[1,2] In VUCA environments, this delay is often driven less by clinical necessity than by cognitive overload, workflow drift and diffuse prioritisation under pressure.

"Combatting VUCA with VUCA" allows clinicians to stabilise decision-making under these conditions by deliberately applying Vision, Understanding, Clarity, and Agility: maintaining a shared focus on early progression toward definitive care, assimilating only the most meaningful information required to act, structuring action through simple cognitive frameworks, and retaining the capacity to adapt rapidly as conditions evolve.

OSCAR provides a pragmatic, evidence-aligned cognitive scaffold that supports early lifesaving intervention, rapid mobilisation, selective procedural decision-making, and anticipatory planning. By functioning as a temporal guide rather than a prescriptive algorithm, OSCAR stabilises decision-making while preserving clinician autonomy and adaptability.

Although conceptual in nature, OSCAR is grounded in established prehospital, retrieval, and human-factors literature. It offers a practical framework for paramedics and retrieval clinicians seeking to deliver time-critical care reliably and efficiently in austere and high-threat environments by adopting a high-performance momentum mindset.

Conflict of interest

The authors declare no conflicts of interest.

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References

1. Harmsen AMK, Giannakopoulos GF, Moerbeek PR, Jansma EP, Bonjer HJ, Bloemers FW. The influence of prehospital time on trauma patients' outcome: a systematic review. *Injury*. 2015;46(4):602–609. doi:10.1016/j.injury.2015.01.008
2. Newgard CD, Schmicker RH, Hedges JR, Trickett JP, Davis DP, Bulger EM, et al. Emergency medical services intervals and survival in trauma. *Annals of Emergency Medicine*. 2010;55(3):235–246. doi: 10.1016/j.annemergmed.2009.07.024
3. Croskerry P. A universal model of diagnostic reasoning. *Academic Medicine*. 2009;84(8):1022–1028. doi:10.1097/ACM.0b013e3181ace703
4. Flin R, O'Connor P, Crichton M. *Safety at the sharp end: a guide to non-technical skills*. Ashgate; 2008.
5. Clarke JR, Trooskin SZ, Doshi PJ, Greenwald L, Mode CJ. Time to laparotomy for intra-abdominal bleeding from trauma does affect survival for delays up to 90 minutes. *Journal of Trauma*. 2002;52(3):420–425. doi: 10.1097/00005373-200203000-00002
6. De Luca G, Suryapranata H, Ottervanger JP, Antman EM. Time delay to treatment and mortality in primary angioplasty for acute myocardial infarction. *Circulation*. 2004;109(10):1223–1225. doi:10.1161/01.CIR.0000121424.76486.20
7. Saver JL. Time is brain—quantified. *Stroke*. 2006;37(1):263–266. doi:10.1161/01.STR.0000196957.55928.ab
8. Seamon MJ, Fisher CA, Gaughan J, Lloyd M, Bradley KM, Santora TA, Pathak AS, Goldberg AJ. Prehospital procedures before emergency department thoracotomy: scoop and run saves lives. *Journal of Trauma and Acute Care Surgery*. 2013;74(2):444–452. doi: 10.1097/TA.0b013e31806842a1
9. Patterson PD, Weaver MD, Frank RC, Warner CW, Martin-Gill C, Guyette FX, Fairbanks RJ. Association between poor sleep, fatigue, and safety outcomes in emergency medical services providers. *Prehospital Emergency Care*. 2012;16(1):86–97. doi:10.3109/10903127.2011.616261
10. Reid C, Brindley P, Hicks C, Carley S, Richmond C, Lauria M, Weingart S. Zero point survey: a multidisciplinary idea to STEP UP resuscitation effectiveness. *Clinical and Experimental Emergency Medicine*. 2018;5(3):139–43. doi:10.15441/ceem.17.269
11. Andersen LW, Kim WY, Chase M, Berg KM, Mortensen SJ, Moskowitz A, Donnino MW. The prevalence and significance of abnormal vital signs prior to in-hospital cardiac arrest. *Resuscitation*. 2016;98:112–117. doi:10.1016/j.resuscitation.2015.10.030
12. Carr BG, Brachet T, David G, Duseja R, Branas CC. The time cost of prehospital intubation and intravenous access in trauma patients. *Prehospital Emergency Care*. 2008;12(3):327–32. doi: 10.1080/10903120802096928
13. Galvagno SM Jr, Haut ER, Zafar SN, Millin MG, Efron DT, Koenig GJ, Baker SP, Bowman SM, Pronovost PJ, Haider AH. Association between helicopter versus ground emergency medical services and survival for adults with major trauma. *JAMA*. 2012;307(15):1602–1610. doi:10.1001/jama.2012.467
14. Ringburg AN, Spanjersberg WR, Frankema SPG, Steyerberg EW, Patka P, Schipper IB. Helicopter emergency medical services: impact on on-scene times. *Journal of Trauma*. 2009;67(6):1323–1330. doi: 10.1097/01.ta.0000240449.23201.57
15. Holcomb JB, McMullin NR, Pearse L, Caruso J, Wade CE, Oetjen-Gerdes L, Champion HR, Lawnick MM, Farr W, Rodriguez S, Butler FK. Causes of death in U.S. Special Operations Forces in the global war on terrorism. *Annals of Surgery*. 2007;245(6):986–91. doi: 10.1097/01.sla.0000259433.03754.98
16. Kauvar DS, Lefering R, Wade CE. Impact of haemorrhage on trauma outcome. *Journal of Trauma*. 2006;60(Sup6):S3–11. doi:10.1097/01.ta.0000199961.02677.19
17. Larsen MP, Eisenberg MS, Cummins RO, Hallstrom AP. Predicting survival from out-of-hospital cardiac arrest: a graphic model. *Annals of Emergency Medicine*. 1993;22(11):1652–1658. doi:10.1016/S0196-0644(05)81302-2
18. Smith GB, Prytherch DR, Meredith P, Schmidt PE, Featherstone PI. The ability of the National Early Warning Score to discriminate patients at risk of early cardiac arrest. *Resuscitation*. 2013;84(4):465–470. doi: 10.1016/j.resuscitation.2012.12.016
19. Wang HE, Peitzman AB, Cassidy LD, Adelson PD, Yealy DM. Out-of-hospital endotracheal intubation and outcome after traumatic brain injury. *Annals of Emergency Medicne*. 2004;44(5):439–450. doi: 10.1016/j.annemergmed.2004.04.008
20. Weisfeldt ML, Sitlani CM, Ornato JP, Rea T, Aufderheide TP, Davis D, Dreyer J, Hess EP, Jui J, Maloney J, Sopko G, Powell J, Nichol G. Survival after application of automated external defibrillators before arrival of the emergency medical system. *Journal of the American College of Cardiology*. 2010;55(16):1713–1720. doi:10.1016/j.jacc.2009.11.077
21. Haynes AB, Weiser TG, Berry WR, Lipsitz SR, Breizat AHS, Dellinger EP, Herbosa T, Joseph S, Kibatala PL, Lapitan MCM, Merry AF, Reznick RK, Taylor B, Gawande AA. A surgical safety checklist to reduce morbidity and mortality. *New England Journal of Medicine* 2009;360(5):491–499. doi:10.1056/NEJMsa0810119
22. Arriaga AF, Bader AM, Wong JM, Lipsitz SR, Berry WR, Ziewacz JE, Hepner DL, Boorman DJ, Pozner CN, Smink DS, Ashley SW, Gawande AA. Simulation-based trial of surgical crisis checklists. *New England Journal of Medicine*. 2013;368(3):246–253. doi:10.1056/NEJMsa1204720
23. Fraser KL, Ayres P, Sweller J. Cognitive load theory for the design of medical simulations. *Simul Healthc*. 2015;10(5):295–307. doi:10.1097/SIH.0000000000000097
24. Zaphir JS, Murphy KA, MacQuarrie AJ, Stainer MJ. Understanding the role of cognitive load in paramedical contexts: a systematic review. *Prehospital Emergency Care*. 2025;29(2):101–114. doi:10.1080/10903127.2024.2370491