Using Walk-Through Talk-Through to Understand Work-as-Done in Ambulance Care

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SUMMARY

Walk-Through Talk-Through (WTTT) sessions were conducted with ambulance crews to explore how they manage patient restraint and seatbelt use within the rear workspace. The study revealed a gap between policy and legal expectations and operational realities, shaped by ergonomic design, workflow pressures, and cultural norms. Findings highlight how Human Factors methods can uncover system barriers and inform design changes that enhance both staff and patient safety.

KEYWORDS

Human Factors, Ergonomics, Ambulance Design, Work-as-Done, Patient Safety

Introduction

Clinical work in the rear of ambulances is shaped by competing demands such as, delivering safe, timely patient care while managing personal safety in a moving, restrictive environment. Policy and legal expectations emphasise restraint use and safe storage of equipment (work-as-imagined and work-as-prescribed), yet national reviews and incident data suggest that in practice, ambulance clinicians frequently adapt procedures to fit real operational conditions (work-as-done) (Shorrock, 2020; AACE, 2026).

Within the ambulance service involved in this study, concerns regarding staff injury, variation in patient restraint practice, equipment movement and vehicle layout inconsistencies led to the creation of a Safe in the Back (SITB) Task & Finish Group. Although the wider programme considered a range of rear-compartment safety issues, the primary focus and boundary of the Human Factors (HF) assessment reported here was the use of seatbelts and restraint systems. Three Operating Units (OUs) were therefore selected for Walk-Through Talk-Through (WTTT) evaluation, and this paper describes the findings and how HF insights have begun to inform emerging system-level decisions across policy, culture, fleet design and procurement.

Method

A WTTT is a practical, person-centred HF method used to understand how work is actually carried out in real operational settings (HPOG, 2026). It involves walking through a task step-by-step with frontline staff while they describe what they are doing, what helps or hinders their performance, and how they adapt to challenges or unexpected conditions. This approach is designed to reveal real-world constraints, informal adaptations, and potential points of failure that are not always visible in procedures or policy. The method focuses on performance-shaping factors such as:

- Clarity and usability of procedures.
- Equipment design, layout and availability.
- Environmental conditions (lighting, space, noise, movement, interruptions).

- Cognitive load, fatigue and competing demands.
- Organisational constraints, work pressures and cultural norms.

By grounding the assessment in work-as-done rather than work-as-imagined, WTTT supports the identification of system-level barriers and opportunities for improvement, particularly in safety-critical environments such as the rear compartment of an ambulance.

Application to this study

In this evaluation, WTTT sessions were conducted with critical care paramedics, paramedics, student paramedics, emergency care support workers and operational team leaders.

Participants demonstrated:

- Patient loading and positioning.
- Patient restraint and seatbelt application.
- Clinician self-restraint and seating.
- Equipment access and storage.
- Portable gas cylinder handling.
- Monitoring lead management and monitoring tasks.

Observations, photographs and field notes were collected to capture the physical, cognitive and environmental constraints shaping real-world practice. All sessions were framed as learning-focused, not compliance checks. The analytical boundary for this fieldwork was seatbelt and restraint use, though other constraints (e.g., equipment storage, layout issues) were documented where they directly influenced safe restraint practice.

Findings

Participants described a strong awareness of legal and procedural expectations but identified multiple environmental and system factors that make compliance difficult. Themes emerging from the analysis are summarised below.

System-Level Constraints

- Restricted reach envelope when belted
- Poor sightlines from forward-facing seating
- Straps that tangle / snag / dangle
- Wall-side access requiring deep leaning across patients
- Paediatric harness instructions were faded and hard to read
- Portable O_2 with no mount, leading to improvised securing
- Cupboards too deep/low; kit stored on floor
- Trailing cables around Lifepak monitors

Predictable Goal Conflicts

- Clinician safety vs patient safety
- Restraint compliance vs realistic clinical task demands
- Policy vs physical reality
- Standardisation vs fleet variation

Table 1: Summary of Key Themes and Constraints

Theme	Constraint / Barrier	Impact
Ergonomic Design	Long, trailing straps; poor storage; stiff seat swivel mechanisms; LifePak monitor fixed forward with limited swivel range.	Physical strain, delayed restraint use, restricted patient visibility.
Workflow & Task Demands	Time pressure, multitasking, patient movement, need for quick access to kit.	Crews often prioritise care actions over restraint fitting.
Cultural Factors	Variable peer norms; reluctance to challenge colleagues; patient expectations.	Mixed compliance and psychological discomfort raising issues.
Patient / Clinical Context	Conditions (e.g., breathing difficulty, pregnancy, mental health, dementia).	Straps removed or adapted for comfort and clinical access.

Discussion

The findings demonstrate that the rear compartment of an ambulance is a highly dynamic workspace in which clinical, ergonomic and social demands continually interact. Although safety motivation among clinicians was consistently high, the physical environment and workflow demand often created unavoidable trade-offs between policy expectations and the realities of practice. In particular, the use of seatbelts and patient restraint systems (nominally straightforward safety measures) became complex when overlaid with clinical urgency, limited reach, restricted visibility, equipment placement, and processes that require rapid adaptation.

A key insight is that instances of non-use or delayed use of restraints were not attributable to disregard or lack of awareness but instead reflected predictable system-level constraints. These include limited bracing points, poor line-of-sight when seated, restrictive belt geometry, and the need to prioritise emergent tasks such as airway management, behavioural support, or portable oxygen handling. The result is a consistent pattern of adaptation that aligns with the literature on normalisation of deviance in safety-critical settings - behaviours evolve when the system makes the *ideal* behaviour disproportionately difficult, misaligned or incompatible with real work.

The WTTT method was particularly valuable in exposing the subtle and interdependent nature of these constraints. The combination of walk-through demonstration and in-the-moment explanation enabled staff to articulate not only what they do, but why they do it. This uncovered a series of hidden constraints and mismatches between work-as-imagined (e.g., always remain restrained, always fully secure the patient before departure) and work-as-done (e.g., needing to repeatedly unclip to maintain patient safety, modifying strap sequences due to geometry). These insights support a more nuanced interpretation of compliance data and create a clearer pathway for addressing risk through design rather than behavioural enforcement.

It was also notable that more experienced clinicians, particularly those in senior roles such as critical care paramedics, reported fewer difficulties applying or maintaining restraints. Their exposure to higher-acuity cases and greater familiarity with complex, fast-moving situations appeared to reduce the cognitive load associated with managing both the patient and the environment, which may partly explain variations in restraint use across experience levels.

Although this study focused primarily on seatbelt and restraint use, the assessment naturally surfaced related ergonomics issues such as, storage, oxygen securing, monitor leads routing, seating movement that directly influence restraint practices. These findings reinforce the importance of

considering systems holistically: restraint-related decisions do not occur in isolation but are embedded within broader workflow patterns shaped by design.

The pattern across clinicians in the three OU's indicates that these challenges are not site-specific, but instead systemic suggesting that improvements must be addressed at organisational and fleet levels rather than relying on local adaptations or repeated staff reminders. This resonates with emerging organisational discussions showing interest in fleet standardisation, improved storage solutions, engineering-led approaches to equipment securing, and more compassionate, context-sensitive policy interpretation.

Emerging Impact

Although the recommendations are still being considered, the early findings have already driven tangible changes in how the organisation interprets, reviews, and anticipates safety issues relating to seatbelt restraint. Several aspects of governance, incident investigation practice, and design discussions have already drawn directly on this work. The table below summarises these emerging areas of influence.

Table 2: Emerging Impact of WTTT Findings

Area of Influence	What Has Changed / Emerged So Far	Nature of Evidence
Strategic Understanding of Non-Compliance	Restraint-related deviations increasingly viewed as system-driven rather than performance issues.	Findings presented to senior and executive leadership; used to support a more system-wide interpretation of rear-compartment safety.
Incident Investigation	Greater consideration of ergonomic, workflow and layout constraints during post-incident reviews.	HF outputs referenced in discussions about how incident investigation frameworks account for real-world constraints.
Pre-emptive Safety Activity	Identification of predictable error traps (e.g., reach limitations, strap geometry, cable hazards) informing proactive hazard mitigation.	WTTT findings used to support conversations about designing out risks rather than relying on reminders or monitoring.
Fleet and Equipment Layout Considerations	Monitor placement, storage configuration and cable routing now under review in wider fleet improvement work.	Early indications from fleet development discussions; alignment noted with WTTT findings.
Organisational Decision-Making	HF considered a meaningful contributor to safety and design decisions.	Work used at Board level to provide a clearer evidence base for decision-making.
Ongoing Programme Development	Recommendations acknowledged for incorporation into future improvement planning once all OU assessments are complete.	Formal implementation pending; HF insights positioned as inputs for upcoming planning cycles.

Recommendations

The recommendations that follow were collated from the WTTT assessments and submitted to the SITB Task and Finish Group to inform their ongoing review of rear-compartment safety.

Short-term

To improve safety within existing vehicle constraints, several pragmatic measures can be implemented:

- Strap management improvements, such as shortening or retracting excess webbing and providing storage clips or pouches to reduce snagging.
- Clear, accessible visual guides for routing both adult and paediatric restraints, including colour-coding and correct fit indicators.
- Interim solutions for portable oxygen, reducing reliance on improvised positioning during conveyance.
- Cable management enhancements, including clip points or coiled leads to address monitor-related entanglement.
- Additional handholds to improve clinician stability during leaning tasks.
- Simulation-based training, incorporating realistic scenarios that reflect the ergonomic limitations identified in WTTT sessions.
- Just culture messaging, reinforcing shared accountability and acknowledging system-driven factors that shape restraint use.

Medium- to long-term

Long-term improvements will require engineering-led change and should be articulated within procurement and design cycles:

- Develop and implement integrated securing systems for portable O_2 and other routinely accessed equipment.
- Repositioned or redesigned clinical seating, enabling reach, visibility and torso rotation while restrained.
- Retractable or simplified single-motion restraint systems, reducing cognitive and physical workload.
- Fleet standardisation, ensuring consistency in layout, equipment placement and restraint systems to support clinician familiarity and reduce habituation errors.
- A formal HF position within procurement processes, ensuring rear-compartment designs are evaluated against realistic operational tasks prior to acceptance.

Broader organisational considerations

The findings also carry cultural and policy implications. The organisation may wish to:

- Re-examine compliance expectations through a systems lens, recognising that restraint-related ‘non-compliance’ is often predicted by design, not behaviour.
- Embed HF insights into safety incident categorisation, separating system-driven exposure from true conduct issues.
- Align policies with operational feasibility to reduce cognitive dissonance for staff.
- Use WTTT findings to inform ongoing organisational improvement programmes, such as rear-environment redesign, crew safety strategies and high-risk equipment transport reviews.

Key takeaways / learning points

- WTTT is an effective, low-resource method to capture work-as-done and identify design-level contributors to risk.
- Ergonomic and layout constraints, rather than knowledge deficits, drive much non-use of restraints.

- Clinical presentation often necessitates adaptation of restraint use, especially when managing distressed or high-acuity patients.
- More experienced clinicians, such as critical care paramedics, reported fewer difficulties with restraint use, reflecting the influence of familiarity with high-acuity work and competing demands.
- Design solutions (e.g., retractable straps, repositioned LifePak mounts, standardised seat mechanisms) could reduce cognitive and physical load.
- Cultural and system interventions are required alongside engineering fixes.

Conclusion

This study demonstrates how HF fieldwork can surface not only design and ergonomic improvements, but also cultural insights that inform how safety is led. The findings suggest that leadership behaviours and accountability systems benefit from a balanced approach - one that emphasises learning and context, not just compliance to sustain safer work in complex operational settings such as ambulance services.

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