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Get Them Out - But Then What?

Medical planning for confined space operations

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PLANNING QUESTION When rescue and clinical priorities collide, which actions belong inside the space - and which must wait for the hatch?

EXECUTIVE BRIEF

The rescue plan is trying to move a body through a hostile space. The clinical plan is trying to preserve circulation, an airway and a brain. They are not separate plans.

"Get them out" is often the right answer. An oxygen-deficient atmosphere, toxic exposure, fire, flooding, engulfment or machinery that cannot be made safe may leave no useful treatment option except rapid removal from the cause. But extraction is not clinically neutral. Packaging can restrict access to the airway. A haul may interrupt ventilation or haemorrhage control. A vertical change can alter venous return in a patient whose circulation is already failing. A casualty may emerge alive but physiologically worse.

The purpose of medical planning is therefore not to turn a rescue team into a mobile emergency department. It is to decide, before entry, which clinical actions genuinely change survival, where they can be delivered, and how they will continue while the casualty moves.

The Confined Spaces Regulations require suitable and sufficient arrangements for rescue. Where resuscitation is a likely consequence of the identified risk, the necessary equipment must be provided and maintained. HSE guidance is explicit that public emergency services cannot be the planned immediate rescue arrangement (Confined Spaces Regulations, 1997; HSE, 2014). A technically competent recovery system is essential, but it is incomplete if nobody has considered what state the casualty may be in when that system reaches them.

01 | S.P.A.C.E.: a proposed pre-entry emergency record

Most plans start with atmosphere, access, communications and retrieval. Confined-space entry systems record the space, task, atmosphere, isolation, equipment and people authorised to enter. Yet if an entrant becomes unconscious, the information most useful to the receiving clinical team may remain unknown: who the casualty is, which medicines they take, what they are allergic to, which conditions may alter treatment, and who should be contacted.

Compass Prehospital proposes S.P.A.C.E. as a simple structure for capturing that information before higher-risk entry. The S.P.A.C.E. Emergency Information Record is intended to travel with the emergency response, not to duplicate the permit. It creates a concise clinical bridge between the individual entering the space, the rescue team, the onsite clinical lead and definitive care.

S.P.A.C.E. records five groups of information:

S	Staff identity: full name, date of birth and a reliable identifier;
P	Prescriptions and past history: medicines, relevant conditions, implanted devices and baseline limitations;
A	Allergies: clinically significant allergies and adverse reactions;
C	Contact in an emergency: next of kin or nominated emergency contact;
E	Entry details: task, role, entry time, PPE or breathing apparatus, and credible exposures.

The value is not in the acronym alone. It is in making a usable record available at the point where ordinary history-taking may be impossible. An unconscious casualty can reach definitive care with an identity, relevant medical background, credible exposure history and named contact. The record can support the first ATMIST handover, inform differential diagnosis and reduce avoidable delay while details are reconstructed by colleagues or family.

S.P.A.C.E. is proposed as an industry tool for discussion and testing; it is not an established statutory or clinical standard. It does not determine fitness for confined-space work, replace occupational-health assessment or authorise entry. Organisations adopting it should decide when the record is proportionate, who may access it, how it accompanies a casualty, how accuracy is confirmed and when it is securely destroyed or updated.

Health information is special-category personal data. A completed S.P.A.C.E. record should not be displayed on the entry board or made routinely available to colleagues. The organisation needs a defined purpose, lawful basis, secure access, a retention period and a clear rule for necessary and proportionate disclosure to emergency clinicians. The ICO advises high-risk industries to plan in advance for emergency sharing of workers' health information (ICO, 2025).

The proposal is simple: if an entrant cannot speak after an incident, the rescue system should still be able to tell the receiving clinician who they are, what may affect their treatment and what happened during the entry.



02 | Extract or treat: the decision that cannot wait for the incident

"Stay and play" is usually a poor description of confined-space medicine. The relevant question is narrower: is there a short intervention that is both deliverable here and likely to improve the casualty's chance of surviving the extraction?

Removal should dominate when the environment remains immediately dangerous, the casualty is still exposed to the cause, airway or circulation cannot be supported effectively, or treatment would obstruct the rescue system. Treatment at the casualty is more defensible when it corrects an immediate reversible threat without creating a second casualty or materially delaying removal.

That judgement should be rehearsed between rescue and clinical leads. It should not be improvised over a deteriorating patient.

03 | HOTT in the hole?

Cardiac arrest is the elephant in the room. It should be uncommon inside a confined space, but it cannot be dismissed as an implausible edge case when several foreseeable hazards can produce it. A fall, crushing or entrapment can cause major haemorrhage or obstructive injury. Fire and explosion can combine trauma, burns and hypoxia. Engulfment, drowning, toxic exposure and an oxygen-deficient atmosphere can progress rapidly from impaired consciousness to respiratory and cardiac arrest. The rescue plan therefore has to confront an uncomfortable question: if the casualty arrests at the least accessible point, is there any resuscitation that can genuinely be delivered there?

The first distinction is between a medical arrest that happens during the work and a traumatic arrest caused by the incident. CPR and early defibrillation remain central to many medical arrests, but respiratory protection, restricted access and vertical geometry may make compressions, ventilation, rhythm analysis or pad placement impossible. Resuscitation should only begin where it can be delivered effectively and continued.

Traumatic cardiac arrest exposes the collision more sharply. UK guidance prioritises reversible causes using HOTT: hypovolaemia, oxygenation, tension pneumothorax and cardiac tamponade. Interventions follow clinical priority rather than a rigid sequence (Resuscitation Council UK, 2025).

Two priorities may sometimes be addressed before extraction. Controlling external catastrophic haemorrhage can limit further hypovolaemia. Oxygenation may be improved by protecting or opening the airway, administering oxygen or providing ventilation. Profound blood loss is not corrected by a dressing, and respiratory equipment must reach the casualty, function in the atmosphere and remain connected during movement. Tension pneumothorax and tamponade require clinical judgement and interventions beyond ordinary workplace first aid; inside some spaces they will be inaccessible or unsafe to attempt.

The plan must therefore decide what haemorrhage-control, airway, oxygen and ventilation equipment enters, whether it will pass every restriction, who is competent and governed to use it, and whether treatment can continue through packaging and the haul. Extra kit occupies space, adds weight, creates snag and contamination risks and may increase rescuer air consumption. An intervention that blocks the route or destabilises recovery can reduce the chance of survival.

HOTT can be taught formally, but learning outcomes must match the role. Operatives can recognise mechanisms, summon the correct capability, protect oxygenation and control accessible catastrophic haemorrhage. Clinicians need scenario-based training combining HOTT with respiratory protection, restricted access, equipment, packaging, command and extraction. Teaching the acronym does not confer

competence for invasive procedures.

David Nice's FAMOUS PE provides an industry example. Developed for confined-space casualty care, it moves from foreseeable risk and initial assessment through airway and bleeding priorities to packaging and extrication. It is separate from HOTT, but both challenge the assumption that clinical thinking begins only after removal (Brooklyn Specialist Training Solutions, 2026).

The elephant in the room is not whether CPR appears in the plan. It is whether the rescue system can reach reversible causes, carry the necessary capability and sustain meaningful care without creating another casualty.

04 | The post-ROSC vertical haul

A patient with return of spontaneous circulation may have severe circulatory instability. Motionless vertical suspension can reduce venous return and contribute to hypotension and loss of consciousness. However, direct evidence that a vertical haul after ROSC causes re-arrest is lacking, and the optimal position after ROSC is not established (Pasquier et al., 2011; Debaty et al., 2021).

That uncertainty should produce preparation rather than a categorical rule. Where the space permits, minimise prolonged vertical suspension and use the most physiologically tolerable position compatible with safe extraction. Where a vertical haul is unavoidable, reduce the time unsupported, maintain oxygenation and essential treatment, protect lines and airway devices, monitor whenever practicable, and have the emergence team ready for immediate deterioration. If the casualty has been suspended in a harness, current evidence supports prompt safe release, supine positioning for peri-arrest, and standard advanced life support rather than historic advice to keep the patient upright (Thomassen et al., 2009; Strapazzon et al., 2023).

05 | Train the people who will reach the casualty first

Confined-space operatives are not substitute clinicians, but they may be the only people who can reach a casualty during the first decisive minutes. Generic workplace first aid may not prepare them to work in respiratory protection, communicate through a rescue chain, package a patient in restricted geometry or decide when care must yield to extraction.

Role-specific casualty-care training could include:

- recognising hypoxia, toxic exposure, heat illness, major trauma and deterioration;
- immediate removal from exposure when safe to do so;
- airway positioning, effective oxygen or ventilation within the agreed scope;
- catastrophic haemorrhage control and AED use;
- casualty packaging that preserves essential clinical access;
- relaying an ATMIST-style handover through communications;
- working with the clinical lead without disrupting entry control or technical rescue.

Direct trials of confined-space casualty-care training are scarce. Evidence from construction and industrial injury is supportive but indirect: trained construction workers have shown lower injury-claim rates in some cohorts, and timely onsite first aid has been associated with lower subsequent healthcare use after industrial injury (Dong et al., 2004; Kim et al., 2023). The defensible conclusion is not that a short course guarantees better rescue outcomes. It is that relevant training, equipment and realistic rehearsal give the first available responder a better chance of recognising the problem, doing the few useful things and avoiding harmful improvisation.



06 | What successful and unsuccessful rescues do differently

Published confined-space evidence is weighted towards fatalities because serious failures are investigated more often than successful everyday rescues. Even so, the contrast is striking.

Failure pattern: the rescue creates more casualties

NIOSH examined 903 deaths in 681 US confined-space incidents between 1980 and 1988. About one quarter of those who died were attempting rescue. In the 62 incidents investigated in depth, 35 people died during rescue attempts; 31 were co-workers, and all but one were overcome by atmospheric hazards (Suruda et al., 1994). Separate NIOSH surveillance of 70 incidents found 109 deaths, with multiple fatalities in 25 incidents. Failure to recognise or control the hazard and inadequate emergency response were recurring features (NIOSH, 1994).

The lesson is not simply "do not enter". It is that urgency without a rehearsed system converts one patient into several. The clinical plan must never normalise unprotected entry, even when the casualty is visible.

Failure pattern: the space was never recognised

In 2012, a worker at a food-processing plant was sealed inside an industrial pressure cooker and exposed when the steam cycle began. The employer had procedures for other permit spaces, but this vessel had not been identified as one and the relevant workers had not received confined-space training (California FACE, 2015). There was no meaningful clinical opportunity because the prevention and accountability system had already failed.

The lesson is uncomfortable: medical planning cannot compensate for missing isolation, entry control, identification or supervision.

Success pattern: rescue and medicine share the same design

The 2018 Tham Luang cave rescue was far outside normal industrial practice, but its clinical lessons are transferable. Thirteen patients were moved through a hostile, partially submerged route using a deliberately integrated medical and technical plan. Oxygenation, anaesthesia, hypothermia, packaging, handover and a receiving field hospital were designed around the extraction. After the first group, the medical team reviewed the process and tightened warming, monitoring and role allocation for those who followed (Lawthaweesawat et al., 2019).

The lesson is not to reproduce an exceptional sedation strategy. It is that clinical care was engineered into the route, reviewed in real time and continued across interfaces.

Success pattern: create access, communication and a controlled sequence

At Quecreek Mine in 2002, nine miners trapped after an inundation were brought out alive after more than three days. Rescue teams drilled communication and rescue shafts, controlled the sequence of extraction and used a purpose-designed capsule; all nine emerged safely (MSHA, 2002). Again, this is not a direct template for a short-duration industrial entry. It demonstrates the value of deliberate access, communication, patient preparation and a defined receiving pathway.

The difference

Unsuccessful rescues repeatedly feature hazard misidentification, improvised entry, poor information, delayed specialist capability and rescuers becoming patients. Successful complex rescues feature early command, protected rescuers, continuous communication, a route designed around the casualty, clear clinical ownership, prepared receiving care and rehearsal or rapid learning.

07 | What the rescue plan should now contain

The clinical annex should be short enough to use and specific enough to test. It should define:

- the credible casualty states created by the space, task and atmosphere;
- a controlled emergency-information process for each entrant, potentially using the suggested S.P.A.C.E. record;
- time to first safe contact and time to unrestricted clinical care;
- who can reach the casualty and what they are trained to do;
- the extract-versus-treat triggers, including cardiac arrest and HOTT priorities;
- what care continues during packaging, horizontal movement and vertical haul;
- the casualty-management area, equipment, medicines and clinical governance;
- the handover pathway to ambulance and definitive care;
- exercise measures: alarm, access, first intervention, extraction and handover times.

The strongest test remains simple: if the casualty becomes critically ill at the furthest point in the space, can every person involved explain what happens next?



Summary

The casualty does not become a patient at the hatch. Medical planning belongs inside the rescue plan from the moment entry is authorised.

- Consider a proportionate S.P.A.C.E. record before higher-risk entry, while protecting it as confidential health data.
- Treat only where an intervention is safe, achievable and likely to improve survival; otherwise extraction is the clinical priority.
- Plan cardiac-arrest care around what can actually be sustained. Use HOTT to prioritise reversible causes in traumatic arrest.
- Treat vertical movement after ROSC as a foreseeable risk, while acknowledging that direct evidence of re-arrest from a vertical haul is absent.
- Give operatives role-specific casualty-care training and test it through realistic rescue exercises.
- Measure the whole pathway: alarm, protected access, first useful intervention, extraction, unrestricted care and handover.

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