

INSARAG Medical Working Group

Medical Guidance Note - Defining Urban Search and Rescue (USAR) Medicine

Issue & purpose/background

The International Search and Rescue Advisory Group (INSARAG), supported by its Secretariat in the Office for the Coordination of Humanitarian Affairs (OCHA) facilitates coordination between the various international USAR teams who make themselves available for deployment to countries experiencing devastating events of structural collapse due primarily to earthquakes.

The INSARAG Medical Working Group (MWG) aims to enhance the INSARAG Guidelines that will enable the medical component of a USAR team and develop relevant medical guidance notes. This medical guidance note aims to explain the definition of USAR Medicine and the role of USAR Medical personnel.

This note also provides background concepts on USAR Medicine as a discipline and context that the medical component of USAR Teams plays in these incidents.

‘USAR Medicine’ is the term used to encapsulate the medical support provided to rescuers and patients in the USAR environment. For patients, this may include medical interventions from point of discovery through to point of handover to a field medical facility. USAR medicine involves both the ‘search’ and the ‘rescue’ phases of USAR operations, and the medical care that needs to be provided throughout. This can involve hazardous environments such as those relating to confined space, collapsed structure, water rescue and steep slope access incidents.

USAR Medicine can be described as ‘high-capability low-capacity’ meaning that special knowledge, skills, abilities and equipment are required for comparatively low numbers of patients.

USAR Medicine

Urban Search and Rescue in the international arena is most often discussed within the context of the response to collapsed structure incidents resulting from earthquakes. Various construction types in collapsed structures necessitate a multi-disciplinary approach (including emergency medical care) to evaluating, searching, and rescuing individuals entrapped in these structures. It should be noted, however, that USAR principles are applicable in numerous hazard scenarios including single structural failures, weather related incidents resulting in structural failures, transportation accidents involving confined space (e.g. train accidents), mining accidents, as well as other scenarios involving patient entrapment in confined spaces (e.g. industrial sites, explosions/terrorism).

USAR Medicine is an integral component of collapsed structure response and requires unique knowledge, skills, and behaviors (abilities) designed to support evaluation and treatment for the

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entrapped patient in these environments as well as rescuers themselves. Regular evaluation and treatment procedures utilized daily in the hospital setting (e.g. IV placement) become problematic in situations with limited patient access, unusual positioning of the patient, and poor light (see Table # 1 and Figure #1). Delivery of medical care to these patients while they are still entrapped is *an essential humanitarian activity* as disentanglement and rescue can take many hours. The rescue process itself can pose a risk to patients and medical input is required to prevent deleterious impacts during and after the rescue process.

Hazard recognition and mitigation is an essential skill set for USAR medical providers. Hazards can include those related to the structure (e.g. secondary collapses, loose footing, sharp objects, etc.), environment (e.g. low oxygen, volatile gasses, heat, etc.), and the patients themselves (e.g. altered mental status, body fluids pose specific challenges in this environment). Without adequate training, conditioning, and equipment for response to these scenarios, medical providers may easily become secondary victims during rescue efforts.

Table 1: Comparison USAR Medicine with Field based Medical Care

Examples	Field based medical care	USAR Medicine
Access to patient	No issues	Structural collapse may present many hour delay in actually reaching patient. Voice assessment imperative if possible.
Patient positioning	Usually supine, can be re-positioned as necessary including placed at comfortable working height for provider.	Numerous patient positions (e.g. entrapment upside down), no re-positioning until released from entrapment
Patient exposure	Easily undressed	Often not able to access full body (e.g. presenting body part may be limited to single limb), dust and debris covering skin
Entrapment	Can move/transfer patient easily	Cannot move/transfer until entrapment released. Pre-planning required for resuscitation upon entrapment release
Light	Lighting usually adequate	Environment precludes adequate lighting
Temperature	Temperature control feasible	No control over ambient temperature

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Hazards to rescuer and/or patient	Usually limited to exposure to infectious diseases (usually easily mitigated), long working hours, mental/behavioral health	All of the above (less easily mitigated) AND secondary collapse, HAZMAT, dust, sharp objects, working at heights, ropes, water, electrical, etc.
Confined space	Provider free to move around patient. Multiple providers working on one patient	Cannot stand, operate supine, prone, squatting affecting ability to intervene. Limitations on gravity assisted intravenous flow. Limits ability of others to assist primary provider.
Personal protective equipment	Gloves, gown, masks as required	Helmet, goggles, respirator, leather gloves over latex, steel toed boots, ropes (when working at height), etc as required
Diagnostics	Numerous possible	Limited, more reliant on clinical observation
Equipment	Stationary – facility based	Rugged, carried easily, modular, stand-off (e.g. extended leads for monitor), more likely battery operated, considerations related to hazards and equipment in confined space (e.g. oxygen)
Patient transfer/movement	Usually accomplished easily (e.g. stretcher, wheel chair)	Immobilization/patient packaging, special equipment to move through rubble, complex extrication (movement of patient through structure) procedures
Integration with other disciplines	Typically focused on interactions with other health providers	Members must work with rescuers, engineers, heavy equipment operators, dog handlers, etc to achieve rescue
Documentation	Easily achieved	Limited by environment, and other activities being conducted

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Abilities	Physical and mental conditioning necessary for Field Medicine environment	Physical and mental conditioning necessary for USAR environment (e.g. hazards, equipment/ropes)
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Common medical issues encountered in the collapsed structure environment that require medical intervention while the patient is still entrapped in the rubble include:

- Altered mental status (for numerous reasons)
- Agitation
- Shock (traumatic, septic, dehydration, etc.)
- Hypothermia
- Pain
- Airway dust impaction
- Crush injury and crush syndrome
- Traumatic injuries including impalement (with significant delays to initial treatment up to days) such as penetrating injuries and open fractures.
- Blast injury
- Burns
- Pre-existent medical conditions

Though training may vary country-to-country, common themes revolve around the identification and resolution of the above issues while the victim is still trapped in the collapsed structure environment to minimize morbidity and mortality.

Figure 1: Typical USAR patient treatment environment



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In addition to skill sets, specialized equipment is often necessary in caring for patients while they are still entrapped.

A critical strategic skill for USAR medical personnel relates to medical input that can be provided to team leadership regarding the potential for individuals remaining entrapped, alive. The decision to end rescue efforts is an exceedingly difficult one to make and is usually made by the LEMA. The LEMA, in turn, may turn to Team Leaders to provide input into this process. The recommendation is necessarily a multi-disciplinary one requiring input from rescue, structural engineering, and USAR medical personnel.

Roles of the USAR Medical Team

The medical component of any international USAR team plays a vital and integral role in the team. Many USAR teams prioritize the objectives of the USAR Medical Component in the following fashion:

1. Care of USAR team members themselves in the often austere environment (to include the team search canines)
2. Care of individuals entrapped in the rubble
3. Other tasks as indicated and requested by the LEMA. These tasks are often referred to as “beyond the rubble” and are to be distinguished from the traditional mission set of EMTs (for which the USAR Team would need to seek registration from the relevant authority and coordination through the EMT CC).

Medical activities that USAR Medical Teams can and historically have engaged in include many of the following and more:

- Medical monitoring, treatment, and evacuation of team members
- Evaluation, care, and stabilization of individuals entrapped in rubble (in some instances providing advanced medical care for many hours as other USAR disciplines work to free the patient)
- Initial evaluation, care, transport or referral of individuals with medical conditions encountered while the USAR team is on reconnaissance missions
- On scene triage and initial stabilization of large populations of injured individuals after significant secondary incidents (e.g. secondary collapse, aftershocks)
- Assistance with medical care during transportation of patients from field to a care facility
- Assistance with recovery of deceased in the collapsed structure environment with attention to cultural sensitivities and to retrieving remains without further trauma and with managing risk for workers
- Advice as part of multi-disciplinary input into LEMA decision making on when emergency response to the collapsed structure incident transitions to a recovery effort (i.e. when the

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potential for survivability for those still entrapped)

In addition, they have many times at the request of LEMA undertaken broader healthcare activities such as:

- Healthcare infrastructure assessments (USAR is often in country early in the post-impact phase and/or may have more mobility to assess remote outlying locations. An additional benefit may be found in structural engineering personnel who may accompany the USAR medical personnel on the assessment)
- Health needs assessments (for same reasons as above)
- Provide advice on or facilitate health and medical donations

A new potential role for USAR Medical personnel is worth examining. As the rescue phase is usually completed much earlier than the need for general medical care, some USAR teams might wish to examine loaning medical personnel to support EMT Coordination Cell efforts (would require adequate training). This happened in the response to the Nepal earthquake 2015.

Repeat review & MWG consensus September 2018