

Chapter 3

Mass Casualty and Triage

Introduction

Mass casualties have the potential to rapidly overwhelm multiple levels of care and evacuation. Because the Joint Theater Trauma System (JTTS) has been adapted to provide rapid movement of casualties through the continuum of care, mass casualty events may occur at military treatment facilities with little or no advance notice. Asymmetric warfare may further complicate the mass casualty event by inclusion of combatant, noncombatant, or third country nationals among the injured. The mass casualty demands a rapid transition from routine to contingency medical operations triggered by the earliest recognition of this specter within the fog of war. The transition will be eased by a mass casualty response plan that must be designed, exercised, and assessed to reflect relevant site and evacuation capability.

A mass casualty event overwhelms immediately available medical capabilities to include personnel, supplies, and/or equipment.

Effective mass casualty response is founded on the principle of **triage**, the system of sorting and prioritizing casualties based on the tactical situation, mission, and available resources. It is the best means to establish order in a chaotic environment and the best hope to provide the greatest good to the greatest number within the limitations of time, distance, and capability. Triage is a constant and dynamic process as casualties move within and through the system of care.

The ultimate goals of combat medicine are the return of the greatest possible number of warfighters to combat and the preservation of life, limb, and eyesight.

The decision to withhold care from a casualty who in another less overwhelming situation might be salvaged is difficult for any physician, nurse, or medic. Decisions of this nature are unusual, even in mass casualty situations. Nonetheless, the overarching goal of providing the greatest good to the greatest number must guide these difficult decisions. Commitment of resources should be decided first based on the mission and immediate tactical situation and then by medical necessity, irrespective of a casualty's national or combatant status.

Triage Categories

It is anticipated that triage will be performed at all levels. **Traditional categories of triage are immediate, delayed, minimal, and expectant.**

- **Immediate:** This group of injured requires attention within minutes to 2 hours on arrival to avoid death or major disability. The procedures in this category should focus on patients with a good chance of survival with immediate intervention. Injuries include:
 - Airway obstruction or potential compromise.
 - Tension pneumothorax.
 - Uncontrolled hemorrhage.
 - Torso, neck, or pelvis injuries with shock.
 - Head injury requiring emergent decompression.
 - Threatened loss of limb.
 - Retrobulbar hematoma.
 - Multiple extremity amputations.
- **Delayed:** This group includes those wounded who are in need of surgery, but whose general condition permits delay in treatment without unduly endangering life, limb, or eyesight. Sustaining treatment will be required (eg, fluid resuscitation, stabilization of fractures, and administration of antibiotics, bladder catheterization, gastric decompression, and relief of pain). Injuries include:
 - Blunt or penetrating torso injuries without signs of shock.

- Fractures.
- Soft-tissue injuries without significant bleeding.
- Facial fractures without airway compromise.
- Globe injuries.
- Survivable burns without immediate threat to life (airway, respiratory) or limb.
- **Minimal:** This group has relatively minor injuries (eg, minor lacerations, abrasions, fractures of small bones, and minor burns) and can effectively care for themselves or be with minimal medical care. These casualties may also provide a resource for manpower to assist with movement or potentially even care of the injured. When a mass casualty incident occurs in close proximity to a medical treatment facility (MTF), it is likely that these will be the first casualties to arrive, bypassing or circumventing the casualty evacuation chain. Such casualties may inundate the facility leading to early commitment and ineffective utilization of resources. To prevent such an occurrence, it is imperative to secure and strictly control access to the MTF immediately upon notification of a mass casualty event.
- **Expectant:** This group has injuries that overwhelm current medical resources at the expense of treating salvageable patients. The expectant casualty should not be abandoned, but should be separated from the view of other casualties and intermittently reassessed. These casualties require a staff capable of monitoring and providing comfort measures. Injuries include:
 - Any casualty arriving without vital signs or signs of life, regardless of mechanism of injury.
 - Transcranial gunshot wound (GSW) with coma.
 - Open pelvic injuries with uncontrolled bleeding and class IV shock.
 - Burns without reasonable chance for survival or recovery.
 - High spinal cord injuries.

Triage Management

Those previously classified as minimal injuries that are evacuated to a surgical unit should not be brought through the resuscitation area. These casualties should be diverted to an area near the facility where they are reassessed, receive care—and, condition

permitting—be available to assist with movement of the severely injured. The remaining casualties should be divided into three categories: emergent, nonemergent, and expectant. These categories are useful in dividing casualties into those requiring further immediate surgical treatment (emergent), and those that are less injured, still require care in the near term (6–12 hours), but have low expected mortality (nonemergent). It is anticipated that 10%–20% of casualties presenting to a surgical unit will require urgent surgery, but this is incident dependent. The vast majority of the wounded will not require intensive decision-making, intervention, and care.

Triage is a fluid process at all levels, with altered situations and resources requiring a change in category at any time and in any setting. In the extreme example, a casualty may be triaged from emergent to expectant during surgery, abruptly terminating the operation (“on-the-table triage”).

Special Triage Considerations

Patients who do not easily fit into the standard categories or who pose a risk to other casualties, medical personnel, or the treatment facility may require special consideration.

- **Wounded contaminated in a biological and/or a chemical battlefield environment:** These casualties must be decontaminated prior to entering the treatment facility. Prehospital care may be provided outside of the medical facility by appropriately protected medical personnel prior to decontamination.
- **Retained, unexploded ordnance:** These patients should be segregated immediately and treated last. See Chapter 1, Weapons Effects and War Wounds, which describes the special handling of these wounded.
- **Noncombatant local or third country nationals:** Due to the asymmetric nature of modern warfare, these individuals may be brought into the military trauma system for care during a mass casualty event that may or may not include United States or allied forces. Although the mission and tactical situation must be considered first, in most situations medical necessity will guide triage decisions. It is crucial to recognize

the capabilities of local national healthcare resources and to factor these limitations *prospectively* into care and triage decisions. Such decisions must be based on the best and most timely information available.

- **Enemy prisoners of war/internes/detainees:** Although treatment is based on medical necessity, it is essential that the threat of “suicide bombers” and “human booby traps” be prevented by carefully screening and disarming all casualties prior to moving into treatment areas, including the triage area. See Chapter 32, Care of Enemy Prisoners of War/Internes.
- **US, allied, and third nation contractors:** Although these individuals will also receive care based on mission, tactical situation, and medical necessity, it should be recognized that less stringent predeployment health assessments or requirements may permit a population with significant chronic health co-morbidity to enter a theater of war as a population at risk. The effect of co-morbidity on survivability may need to be considered in triage decision-making. (EXAMPLE: A casualty on antiplatelet therapy with life-threatening hemorrhagic injury in a setting where availability of blood components is limited.)
- **Combat stress:** Rapid identification and immediate segregation of stress casualties from injured patients will improve the odds of a rapid recovery. With expeditious care, these casualties can be returned to duty (80%). Do not use them as litter bearers because this may increase the trauma you seek to treat.
 - **Place patient in one of two groups.**
 - ◆ **Light stress:** Immediate return to duty or return to unit or unit’s noncombat support element with duty limitations and rest.
 - ◆ **Heavy stress:** Send to combat stress control restoration center for up to 3 days reconstitution.
 - ◆ Use the **BICEPS** mnemonic where resources/tactical situations allow:
 - ◇ **Brief:** Keep interventions to 3 days or less of rest, food, and reconditioning.
 - ◇ **Immediate:** Treat as soon as symptoms are recognized—do not delay.
 - ◇ **Central:** Keep in one area for mutual support and identity as soldiers.

- ◇ **Expectant:** Reaffirm that we expect return to duty after brief rest; normalize the reaction and their duty to return to their unit.
- ◇ **Proximal:** Keep them as close as possible to their unit. This includes physical proximity and using the ties of loyalty to fellow unit members. Do this through any means available. **Do not evacuate away from the area of operations or the unit, if possible.**
- ◇ **Simple:** Do not engage in psychotherapy. Address the present stress response and situation only, using rest, limited catharsis, and brief support (physical and psychological).
- ◇ **Or refer:** Must be referred to a facility that is better equipped or staffed for care.

If battlefield casualties do not have physical injuries, DO NOT send them out of the battle area, because this will worsen stress reactions.

Resource Constraints

Triage decisions are influenced by multiple factors. Areas to consider include:

- **External factors:** The surgeon/medic may have limited knowledge of and no control over external issues. Nonetheless, optimal casualty care requires at least an assessment of these factors.
 - **Tactical situation and the mission:** The decision to commit scarce resources cannot be based on the current tactical/medical/logistical situation alone. One severely wounded, resource-consuming casualty may deplete available supplies and thus prevent future, less seriously injured casualties from receiving optimal care. Liaison with the tactical force operating in your area is essential to making sound triage decisions. Operational security may make this kind of information difficult to obtain in a timely fashion. **Education of, and communication with, line commanders about the critical nature of this information is essential.**

- **Resupply:** Having a sense of how and when expended internal resources will be resupplied may prove critical to making the decision to treat or not treat the individual casualty.
- **Time:**
 - ◆ **Evacuation to the MTF:** The shorter the time and distance interval from injury to arrival will increase the volume and complexity of triage decisions and increase the risk of the facility to be overwhelmed by the walking wounded. Securing the facility and strictly controlling points of entry are key steps in the execution of a mass casualty response. Longer intervals will result in the opposite, with “autotriage” of the sicker patients from the emergent category to the expectant.
 - ◆ **Time spent with the individual casualty:** In a mass casualty situation, time itself is a resource that must be carefully managed. All patients receive an evaluation, but only some receive immediate or operative interventions. Time on the OR table is usually the choke point. Apply the concepts of damage control to minimize the time casualties are required to spend in surgery. On-table triage to the expectant category may be necessary due to deteriorating casualty physiological response and/or the pattern of injury (aorta-vena cava GSW, dual exsanguination sites, extensive pancreatic-duodenal injury, etc).
 - ◆ **Evacuation out:** Casualties must move expeditiously to the next level of care, otherwise valuable local resources will be consumed in maintaining patients, thereby preventing additional patients from receiving care.
- **Internal factors:** These issues are known to all medical personnel and should be factored into triage decisions.
 - **Medical supplies:** These supplies include equipment, drugs, oxygen, dressings, sutures, sterilization capability, blood, etc. **Immediate** liaison with the logistics system in the MTF and the theater of operation is essential to ensure the availability and timely resupply of these items, to include “surge” capabilities and local resource availability. Blood products may be scarce in an immature theater or during accelerated consumption in the case of

mass casualty. Hemostatic or damage control resuscitation may be precluded by the availability of hemostatic transfusion components (plasma, platelets, cryoprecipitate). Transfusion medicine in the theater of war has in the past and will likely continue in the future to rely on the walking blood bank. It is crucial that expeditionary medical units have a system in place for effective and expedient execution of a fresh whole blood drive. Early consideration of a fresh whole blood drive should be included in the response to a mass casualty.

- **Space/capability:** This category includes the number of OR tables and ICU beds (holding capacity and ward capacity), the available diagnostic equipment—ultrasound, X-ray, CT—and laboratory tests. For example, if your MTF has the only CT scanner in theater, plan for an increased number of head-injured patients. Early in the mass casualty response, an assessment should be made to clear occupied beds in the hospital, either by discharge or potential transfer of patients to other appropriate treatment facilities within theater. This should be accomplished in coordination with the theater medical regulator and occur as soon as possible following notification.
- **Personnel:** This includes knowing the professional capability (type and experience of individual physician/nurse/medic), and the emotional stability, sleep status, etc, of your personnel. This perishable resource must be preserved; for example, 24 hours of continuous operation may exhaust your only OR crew and may necessitate diversion of casualties to another facility. A response plan should include means to sustain and refresh the staff with hydration and energy-dense foods during extended periods of high activity. Robust and practical plans for personnel recall must be a component of the mass casualty response plan. Also recognize that medical professionals may possess a range of skill sets that is not reflected in their deployment specialty (eg, the Reserve Component physician who is a general surgeon in civilian practice, but who is assigned as a general medical officer or flight surgeon). Identifying and including these individuals as appropriate in a mass casualty response is a force multiplier.

- **Stress:** Soldiers, including medical personnel, are affected by the consequences of war; individual and unit capabilities are degraded during sustained operations. The personal impact of military triage on the medical team cannot be overemphasized. It is extremely emotional, and measures should be undertaken to minimize these effects. This is best provided by trained staff. Cohesive groups may tolerate stress better and assist each other in dealing with traumatic events when allowed to process the event in a group format according to their own traditions.

Triage Decision-Making

The complexity of decision-making in triage varies greatly, often depending on the level of training and experience of the triage officer, as well as the location where the triage decision is being made. In the emergent treatment area, the surgeon (ie, surgeon of the day; SOD) must make decisions about whether surgery is needed, the timing of the surgery, and the priority of multiple surgical patients. Regardless of the type of triage decision needed, the following information is of critical importance in reaching that decision:

- **Initial vital signs:** Pulse (rate and quality), mentation, and difficulty breathing (eg, a casualty with normal mentation and radial pulse quality is nonemergent). Respiratory rate alone is not predictive of the appropriate triage category.
- **Pattern of injury:** A historical perspective aids the triage decision-maker in understanding the distribution of wounds encountered on the modern battlefield and the likely mortality associated with those wounds. **The majority of combat wounded will suffer nonfatal extremity injuries.** In general, these will be triaged as nonemergent.
- **Response to initial intervention:** Does the shock state improve, remain unchanged, or worsen with initial resuscitative efforts? A patient who fails to respond rapidly to initial resuscitation should be triaged ahead of a patient with a good response; alternatively, this nonresponder in a mass casualty situation may need to be placed in the expectant category.

Data from more recent American combat operations in Iraq (Operation Iraqi Freedom) and Afghanistan (Operation Enduring

Freedom), 2003–2004—indicating the spectrum of injury type (Table 3-1), mechanism (Table 3-2), and anatomical location (Table 3-3)—are found in the tables.

Table 3-1. Type of Injury*

Type of Injury	Frequency	Percent
Penetrating	645	35.7
Blast	425	23.5
Blunt	410	22.7
Unknown	84	4.6
Crush	63	3.5
Mechanical	49	2.7
Thermal	48	2.7
Undetermined	21	1.2
Other	16	0.9
Chemical agent	10	0.6
Bites/stings	8	0.4
Degloving	8	0.4
Electrical	7	0.4
Heat injury	7	0.4
Inhalation	3	0.2
Multiple penetration system	3	0.2
TOTAL	1,807	100

*A casualty may have more than one type of injury. These numbers are based on 1,530 Role 3 injuries.

Data source: *Emergency War Surgery, Third United States Revision*. Washington, DC: Department of the Army, Office of The Surgeon General, Borden Institute; 2004.

Setup, Staffing, and Operation of Triage System

- **Initial triage area.**

All casualties should flow through a **single triage area** and undergo rapid evaluation by the **initial triage officer**. Casualties will then be directed to separate treatment areas (emergent, nonemergent, and expectant), each with its own triage/team leader. The expectant will have a medical attendant, ensuring monitoring and optimal pain control. The dead should be sent to the morgue and must remain separate from all other casualties, especially the expectant. Unidirectional flow of patients is important to prevent clogging the system. Reverse patient flow in any treatment area is highly discouraged.

Table 3-2. Mechanism of Injury*

Mechanism of Injury	Frequency	Percent
IED	310	18.4
MVA	207	12.3
GSW	188	11.1
Grenade (includes RPG)	170	10.1
Shrapnel / fragment	141	8.3
Unknown	119	7.0
Machinery or equipment	95	5.6
Fall or jump from height	90	5.3
Mortar	84	5.0
Burn	53	3.1
Aggravated range of motion	31	1.8
Landmine	29	1.7
Other	27	1.6
Knife or other sharp object	21	1.2
Helicopter crash	19	1.1
Blunt object (eg, rock or bottle)	17	1.0
Pedestrian	16	0.9
Free falling objects	14	0.8
Bomb	12	0.7
None	12	0.7
UXO	10	0.6
Environmental	9	0.5
Exertion / overexertion	5	0.3
Flying debris	5	0.3
Building collapse	2	0.1
Hot object / substance	2	0.1
Altercation, fight	1	0.1
TOTAL	1,689	100

GSW: gunshot wound; IED: improvised explosive device; MVA: motor vehicle accident; RPG: rocket-propelled grenade; UXO: unexploded ordnance.

*A casualty may have more than one mechanism of injury. These numbers are based on 1,530 Role 3 casualties.

Data source: *Emergency War Surgery, Third United States Revision*. Washington, DC: Department of the Army, Office of The Surgeon General, Borden Institute; 2004.

No significant treatment should occur in the triage area. Casualties should be rapidly sent to the appropriate treatment area for care.

Table 3-3. Anatomical Location of Injury*

Anatomical Location	Frequency	Percent
Multiple sites	761	49.7
Lower extremity	248	16.2
Upper extremity	223	14.6
Head/ face	174	11.4
Thorax/back	48	3.1
Neck	20	1.3
None	20	1.3
Abdomen	16	1.0
Unknown	9	0.6
Buttock	6	0.4
N/A	3	0.2
Genitalia	1	0.1
Soft tissue	1	0.1
TOTAL	1,530	100

N/A: not applicable.

*Casualties with more than one injury location are included in “multiple sites.” These numbers are based on 1,530 Role 3 casualties.

Data source: *Emergency War Surgery, Third United States Revision*. Washington, DC: Department of the Army, Office of The Surgeon General, Borden Institute; 2004.

- o Qualities of an ideal initial triage area should include:
 - ◆ **Proximity** to the receiving area for casualties—landing zone, ground evacuation, and decontamination area.
 - ◆ **One-way flow** both into and out of the triage area through separate routes to **easily identified, marked** (signs, colors, chemical lights, etc) treatment areas.
 - ◆ **Well-lit, covered, climate-controlled** (if possible) area with sufficient space for easy access, evaluation, and transport of casualties in and out.
 - ◆ Dedicated **casualty recorders** to identify, tag, register, and record initial triage/disposition.
 - ◇ Using an indelible marker to place numbers on the casualty’s forehead is an easy, fast way to track patients. Any method that is reproducible and simple will suffice.
 - ◇ If resources allow, casualty tracking may include stationing administrative personnel at every entry/exit.

- ◆ Sufficient **litter bearers** (controlled by an NCO) to ensure continuous casualty flow.
- Initial triage officer.
 - ◆ Ideally, a surgeon experienced in dealing with combat trauma should be used in this capacity.
 - ◆ It is essential that another physician with clinical experience be trained to assume this function (ie, Emergency Medicine physician).
 - ◆ Using mass casualty exercises or limited mass casualty situations is one way to train/identify the right person to fill this role in the absence of a surgeon.
- **Emergent treatment area.**
 - Setup.
 - ◆ Close proximity to initial triage area with direct access.
 - ◆ Administrative personnel stationed at entry and exit doors to record patient flow. Ideally, a display board or a computer should be used to record patient identity, location, and disposition.
 - ◆ Series of resuscitation bays (number depends on available resources/personnel).
 - ◇ Allow sufficient room for three-person team to work.
 - ◇ Easy access in and out of bay.
 - ◇ Availability of equipment needed for ATLS (Advanced Trauma Life Support)-style resuscitation (Figs. 3-1 and 3-2).
 - Staffing.
 - ◆ At Role 1 facilities, the most experienced healthcare provider should serve as the mass casualty Team Leader. At Role 2–4 facilities, the Chief of Trauma (most trauma-experienced surgeon) is responsible for overarching clinical management of the mass casualty response. The Chief of Trauma or a designated surgeon serves as the Chief Surgical Triage Officer at Role 2–4 facilities.
 - ◇ Determine priority for operative interventions.
 - ◇ Identify patients who require early evacuation.
 - ◇ Maintain close communication with the operating surgeon(s).
 - ◇ Reassess patients awaiting surgery or evacuation.

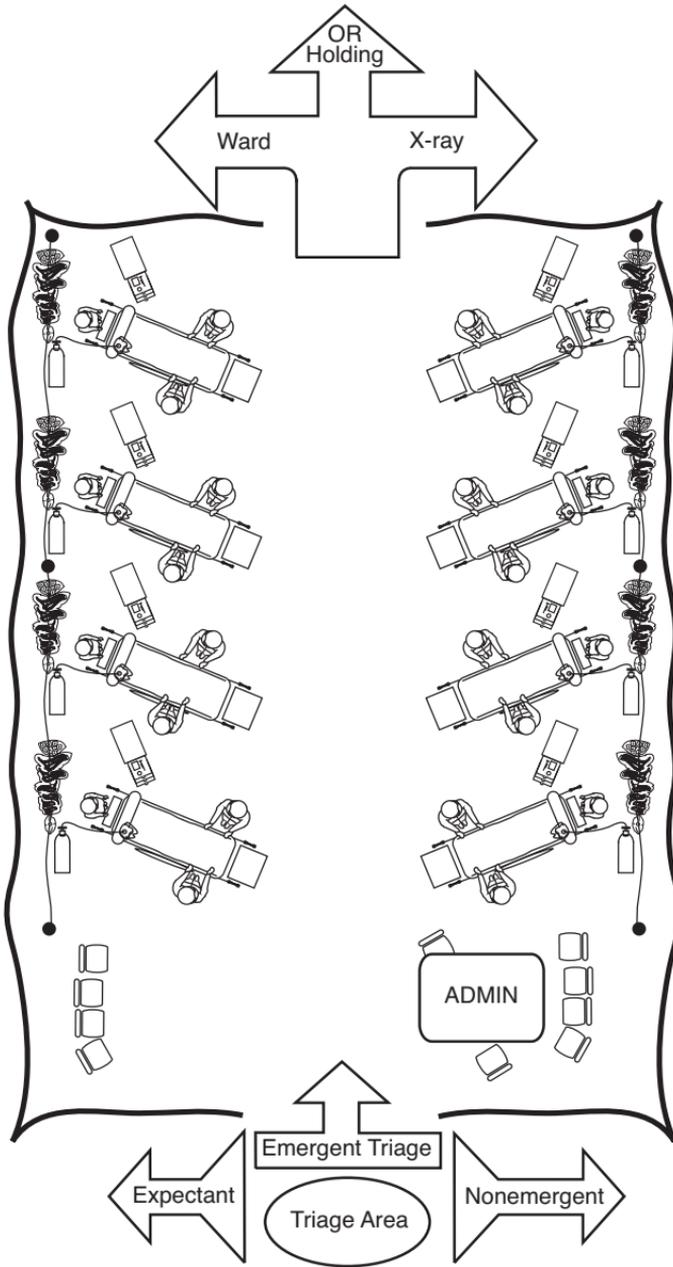


Fig. 3-1. Triage area. ADMIN: administrative personnel; OR: operating room.

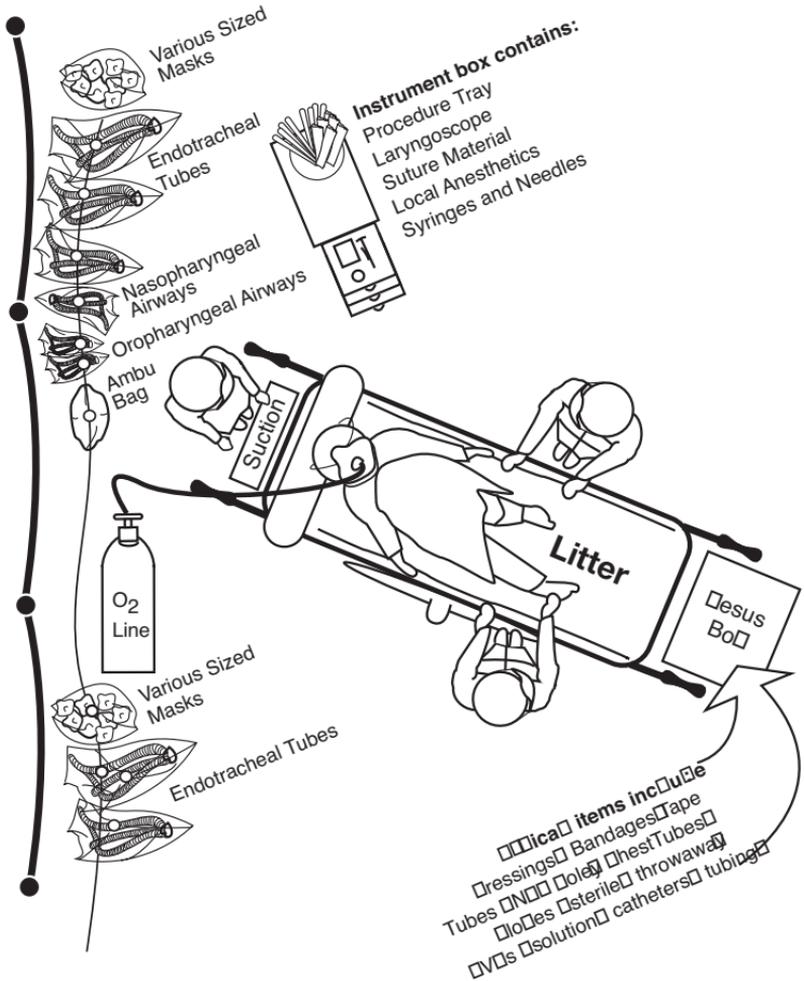


Fig. 3-2. Resuscitation station. IV: intravenous; NG: nasogastric; O₂: oxygen; Resus: resuscitation.

- ◆ Administrative person: Responsible for registering and tracking flow of patients through unit.
- ◆ Resuscitation team: A physician or physician extender, nurse, and medical technician, ideally.
 - ◇ Each individual resuscitation treatment team will coordinate movement of its patients with the Chief Surgical Triage Officer.

- Operation.
 - ◆ Manpower team delivers patient.
 - ◆ Chief Surgical Triage Officer retriages patient and assigns resuscitation team to patient.
 - ◆ Resuscitation team treats patient and coordinates required disposition (radiography, surgery, ICU, ward, and air evacuation).
 - ◆ Resuscitation team communicates to Chief Surgical Triage Officer the recommended disposition.
 - ◆ Chief Surgical Triage Officer coordinates movement of patient to next stop.
 - ◆ Administrative person records disposition.

- **Nonemergent treatment area.**

An empty ward, a cleared out supply area, or other similar space can be utilized. Appropriate medical and surgical supplies should be stockpiled and easily identifiable. A team consisting of a physician or physician extender and several nurses and medical technicians can form the nucleus of the treatment team. Lacerations can be sutured, fractures splinted, IVs placed, and radiographs taken. The team leader should be alert to changing vital signs, mental status changes, and nonrespondents to treatment. Any evidence of deterioration should prompt a retriage decision and a possible transfer to the emergent treatment area.

- **Expectant area.**

Ideally, expectant casualties should be kept in an area away from all other treatment areas. The team leader can be anyone capable of giving parenteral pain medications and monitoring the patients. The patient should be kept comfortable. **After all other patients have been treated, a retriage of these patients should be done and treatment instituted if appropriate.**

Additional Triage Operation Tips

- Diversion of casualties to another facility should be considered. Triage of inpatients should be done to identify patients who may be discharged or transferred to predetermined facilities.
- As the casualties finally clear the OR suites, the pace will slow for the surgeons. ICU and ward care will supplant operative procedures. Casualties initially undertriaged (~10%) will be

discovered and will require care. The recovery room and ICUs will become crowded, nursing shifts will have to be extended, and fatigue will rapidly become a hospital-wide factor.

- Numerous authors have stated that, after the first 24 hours of a mass casualty ordeal, the activities of the care providers must be decreased by 50%, allowing for recovery and rest for the participants. A new rotation must be established to sustain a modified, but continuous, effort. Once the acute phase is over, personnel must be required to rest.
- Prior to an actual mass casualty situation, all deployed or deployable units should exercise the mass casualty response plan to ensure smooth patient flow and identification. These exercises should evaluate patient registry and tracking, personnel, supplies, and equipment. The practical value of exercising and adapting the response plan to the changing facility, personnel, and tactical situation cannot be overstressed.
- Each mass casualty event or exercise requires debriefing, with evaluation of process and action plan to improve future response.
- Given the rotational nature of expeditionary medicine, lessons learned and after-action reports should be reviewed with incoming staff.

Triage remains our most constant and effective method of establishing order in overwhelming chaos. The organic integration of triage principles in tactical, logistical, and clinical decision-making remains the best hope for providing the greatest good to the greatest number.

For Clinical Practice Guidelines, go to
http://usaisr.amedd.army.mil/clinical_practice_guidelines.html

