

Focus On....Managing Health Services Support to Military Operations.

Executing military medical operations

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Abstract

This is the seventh in a series of monographs that examine some of the principles and factors involved in managing health services support to military operations. This paper assimilates all of the previous papers to describe the actual management of medical operations – the regulation of casualties through the medical system. This paper builds upon the papers on medical planning, including casualty estimation which defines the capacity and laydown of the medical system. The papers on medical evacuation describe how patients are moved between medical units. The paper on deployed hospital care will describe the issue surrounding managing military hospitals on operations. This paper will consider the casualty flow throughout the system looking at how demand (or access), capacity and evacuation must be balanced. If the balance is broken, either the medical system has been over resourced which is inefficient or the medical system has been overwhelmed which is ineffective. Finally the paper will discuss how the medical system should respond to a casualty surge. A further paper will describe how all of the concepts described in these papers were combined into the medical arrangements for Operation MOSHTARAK in Southern Helmand in February/March 2010.

Introduction

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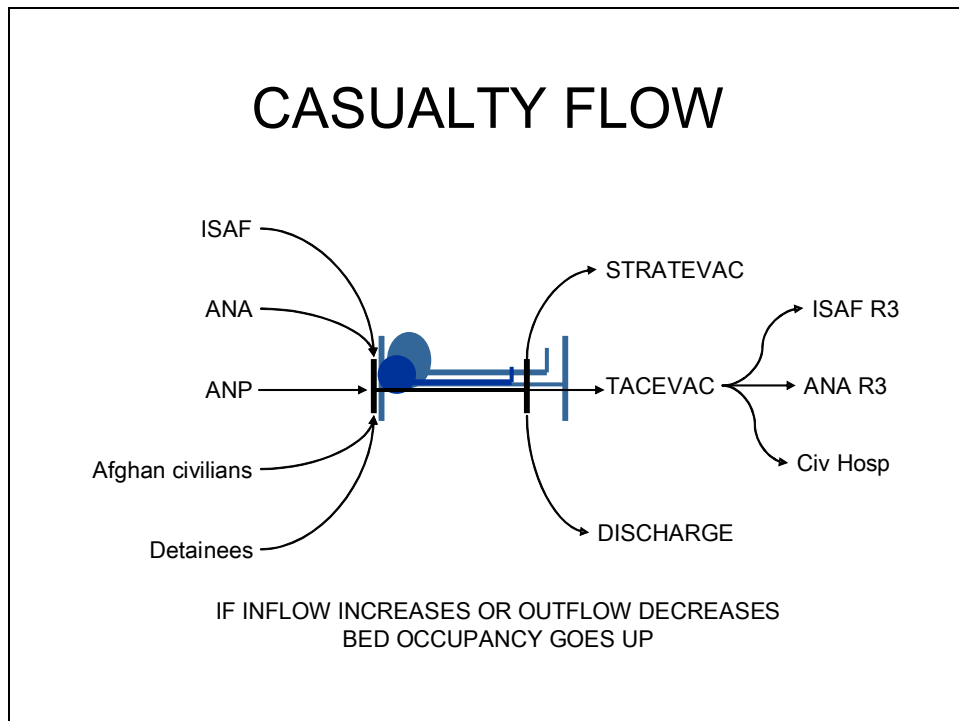
Casualty Flow

The management of medical operations can be considered as the relationship between three processes: demand, capacity and evacuation. This relationship is summarized in Figure 1. As described in the papers on medical planning, the casualty estimate is the critical component of medical planning. This determines the predicted demand. The

casualty estimate needs to consider all patient groups within the Population At Risk (PAR). Medical resource planning will determine the capacity of the treatment system. As illustrated in the paper on casualty estimation, each group within the PAR may have differing medical treatment and evacuation requirements with indigenous casualties likely to have a longer length of stay than international military casualties. The paper on tactical medical evacuation (TACEVAC) described how each patient group may have different medical evacuation requirements with the movement of severely injured indigenous casualties being likely to be more difficult than international military casualties. The medical plan should ensure that these three processes are in balance. However the casualty estimate is only a prediction and the military maxim that ‘no plan survives contact with the enemy’ is the reason why medical staff need to actively manage the system. This is primarily directed by the Patient Evacuation Control Cell through the management of both MEDEVAC and TACEVAC. The Medical Operations function should be thinking 12-48 hours ahead to answer the question ‘does the evidence of the medical workload for the last 24 hours suggest that there is likely to be any shortfall of capacity in the medical system in the next 48 hours?’ The medical system could be unbalanced for two reasons; over or under capacity. If there is excess capacity, demonstrated by a low bed occupancy, then the system is inefficient and too many medical resources have been deployed. The casualty estimate provides a prediction of the number of patients who require entry into the medical system. The prediction is a single number based on a summary statistic of the precision of the estimate. The actual daily demand is likely to be highly variable, particularly in a COIN campaign. There may be occasions when the actual number of casualties exceed the casualty estimate. If there is

under capacity, occupancy is too high with insufficient beds to support the risk of casualties from future operations. This is clearly ineffective – and both militarily and politically unacceptable.

Figure 1. Casualty Flow

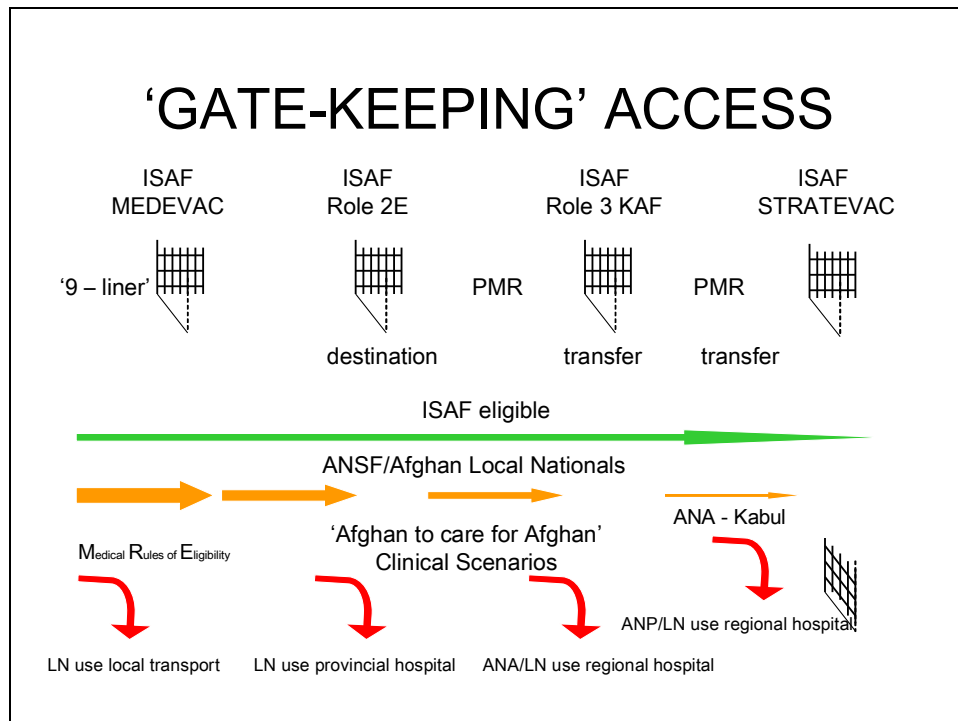


Controlling Demand/Access

The strategic medical plan will define the patient groups who are eligible for access to the international military medical system. The system comprises initial medical evacuation, entry to first ISAF hospital, in-theatre transfer to either ISAF hospitals or Afghan hospitals and strategic medical evacuation. The PAR is likely to include all international

forces, international civilians supporting military forces, and opposing forces detained by the international force. In a stabilization or counterinsurgency (COIN) operation, eligibility may be extended to indigenous security forces and the civilian population. There may be a substantial disparity between the capabilities of the international military medical system and the indigenous health system however it is clear that the international military medical system cannot underwrite all of these deficiencies. This may cause ethical challenges such as that described by Henning in regard to intensive care (1). This issue is summarised as ‘gate-keeping access’ shown in Figure 2.

Figure 2 ‘Gate-keeping’ Access.

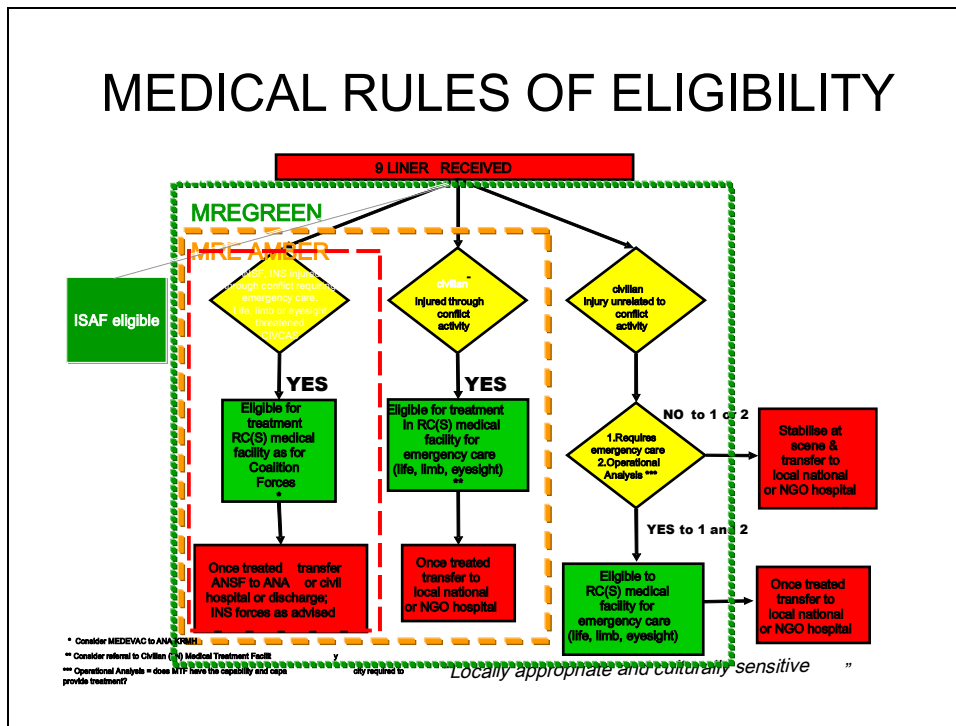


Clearly international forces are eligible for access to all aspects of the ISAF medical system including STRATEVAC. As a matter of principle, Afghans are not evacuated from Afghanistan except in specific circumstances, perhaps under the care of an international, humanitarian NGO. Furthermore, Afghans should receive care from Afghans unless there are over-riding reasons why the international military medical system should provide this care. The medical system requires a management process that controls entry and can be adjusted according to capacity – this is known as ‘Medical Rules of Eligibility’ (MRE). Control of medical evacuation through the ISAF system is balanced between increasing levels of care and the complexity for the family for supporting the patient. The reality is that all personal care for patients in Afghan hospitals is provided by family members and much of the in-patient medical care has to be paid for even in the ‘free’ public hospital system. Therefore the social costs of healthcare escalate in direct relation to the distance the patient moves from their locality.

The MRE process defines patient groups by their level of access to the international military medical system. International forces have absolute right of access. Indigenous security forces may have right of access for emergency medical care (LLE - life, limb or eye sight saving care) in order to achieve the same effect on the moral component of their fighting power as the medical system achieves for international forces. It is unlikely the international medical system will provide routine medical care for indigenous forces. Care for indigenous civilians may follow the same principles but could be further limited to injury from conflict in order to reduce access for normal medical and surgical emergencies. The description and application of these rules have to be carefully balanced

to ensure the international military medical system follows internationally agreed ethical principles and supports consent building without undermining the development of the indigenous health economy. An example of the MRE for the ISAF operation is shown in Figure 3.

Figure 3. ISAF Medical Rules of Eligibility



This diagram is colour-coded to allow an adjustment to the MRE for access by indigenous patients dependant on the unoccupied capacity in the medical system. MRE GREEN describes the normal situation in which Afghan civilians may be admitted for emergency medical care to receive LLE saving treatment. MRE AMBER excludes those Afghan civilians with LLE conditions that are not conflict related unless by prior

agreement with the Regional Command Medical Director and the hospital commander. MRE RED is imposed when the ISAF hospital system is full and therefore no Afghan civilians can be accepted unless injured as a direct result of ISAF actions. The MRE were further refined with clinical guidance for specific cases such as severe burns, closed head injuries with low Glasgow coma scales and neonatal emergencies. If the MRE is insufficient to control access, it is then necessary to examine whether the risk to security forces should be controlled in order to reduce demand for medical care. It is not appropriate to provide an explanation of this process in this document.

Medical Capacity and Evacuation

The capacity of the medical system is determined by the medical resource analysis subsequent to the casualty estimate. Actual demand is variable and dependant on factors such as operational activity, opposition activity, environmental conditions, incidence of disease etc. It is essential that the medical command system has accurate and timely information on bed occupancy in order to monitor the availability of **unoccupied** beds against the anticipated casualty flow. This is counter-intuitive. Although the clinical focus is on the care of those casualties who occupy the beds, the capacity of the medical system actually depends on unoccupied beds!

The nuances of medical evacuation planning and execution are covered in the papers on Forward Medical Evacuation and Tactical Aeromedical Evacuation. Those papers and the

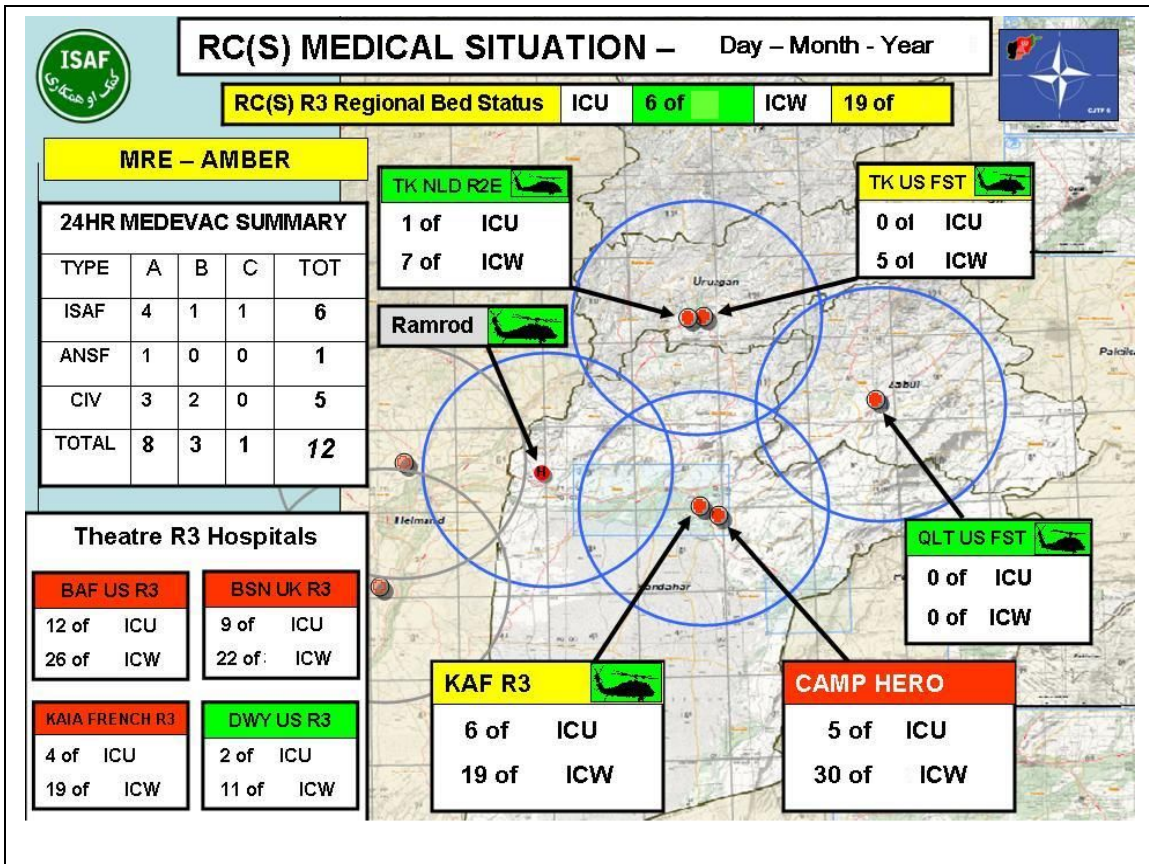
section on controlling demand/access highlighted the considerations in managing medical evacuation from hospital for each population within the PAR.

Monitoring the performance of the system

The numbers of casualties moved by the medical system should be tracked within the time period determined by the casualty estimate. This allows a continuous rolling comparison between the casualty estimate and actual experience as described in the papers on Medical Planning and Casualty Estimation.

The frequency of reporting of bed occupancy should depend on the rate of change of demand and evacuation. This is not likely to be less than every 24 hours and may be as frequent as 4 or 6 hourly in periods of high casualty numbers. The percentage of beds occupied may be colour coded in order to give a quick assessment of the bed occupancy – e.g. <50% Green, 50-74% Amber, 75%-99% Red, 100% Black. In addition to daily reporting, it is also necessary to track the range of bed occupancy over a defined time period to determine if the mean occupancy is within the tolerance of the medical capacity requirement determined by the casualty estimate. It is likely that an increase in capacity is needed within the hospital system if the peak daily occupancy is above Amber. An example of the daily commander's update slide from Afghanistan is shown in Figure 4. Capacity figures have been left out for security reasons.

Figure 4 Daily Commander's Update Slide



Another measure of hospital workload is surgical hours. This can be measured by the cumulative number of hours of surgery per surgeon, per surgical team or per patient. One measure of maximum productivity is seven hours of ‘skin to skin’ surgical time per surgical team per day. This assumes that pre and post operative clinical care, and surgical administration is also provided by the same surgical team with recognition that the requirement to conduct surgery varies across a 24 period. There also comes a point in surgical demand where surgical teams need to be rostered for shift work rather than routine ‘day working’. This would be when more than 3 surgical teams are required to meet the workload.

The aeromedical evacuation requirement can be tracked using a hospital status report that provides a bed census by patient with the evacuation plan (aeromedical evacuation, ground evacuation and discharge). This can be used to forecast when occupied beds will be vacated and should be matched to the medical evacuation requests as they are submitted. The periodic hospital commander's Medical Situation Report (MEDSITREP) provides a summary of the data described above and the commander's assessment of the match between the hospital capacity and workload.

Response to a 'casualty surge'

Whatever the medical plan, there will be a finite limit to the capacity of medical assets under a medical commander. Therefore it is possible that the medical system may become overwhelmed through either a single medical major incident, or else through a protracted series of high casualty events. The term 'casualty surge' is chosen to encompass both of these scenarios. Neither of these is necessarily a Mass Casualty (MASCAL) event. The term MASCAL has a specific military meaning in which there is an excessive disparity between casualty numbers and medical capacity such as after a nuclear or chemical attack (2). In these circumstances the triage categories change from P to T and care is provided on basis of the greatest good to the greatest number rather than to the sickest first. The use of the term MASCAL to describe a specific incident is only authorised by the chain of command on advice from the theatre medical commander.

The term 'Medical Major Incident' is taken from the Medical Major Incident Management and Support (MIMMS) to describe a single of incident or multiple incidents in a short timeframe where the location, number, severity or type of casualties requires extraordinary medical resources to resolve (3). In the military environment, it is essential to add the adjective 'Medical' as there may be other types of major incidents that require extraordinary resources to resolve but have less impact on the medical services. The PECC in the CJOC should detect the possibility of medical major incident through the reporting of events by the operations staff. They should follow the standard actions of a Silver or Gold command as described within the MIMMS framework. The first action is to issue the standard codewords to inform the medical system (Major Incident – Standby, Major Incident – Declared, Major Incident – Standdown). The response options are: to surge medical treatment capabilities to assess the situation and provide on-scene medical care, to surge medical evacuation to clear the point of injury and to regulate the patient load across the medical system both by regulating to initial destination and re-distribution between hospitals.

A sustained high rate of casualties beyond the casualty estimate may not cause a medical major incident but could cause a rise in the bed occupancy and surgical activity. This in turn may reduce the capacity of the medical system to respond to a medical major incident and may also place excessive strain on the medical personnel in the system. The most immediate response is to increase the evacuation capacity of the system and to reduce the Theatre Patient Holding Policy, thus increasing the throughput in the system by reducing hospital length of stay. The enduring solution is to increase hospital capacity

by reviewing the casualty estimate and medical resource requirement. It is useful to develop a series of triggers to provide medical augmentation until the full analysis can be performed. An example of triggers for medical augmentation is shown at Figure 4.

Figure 4. Example of triggers for medical augmentation.

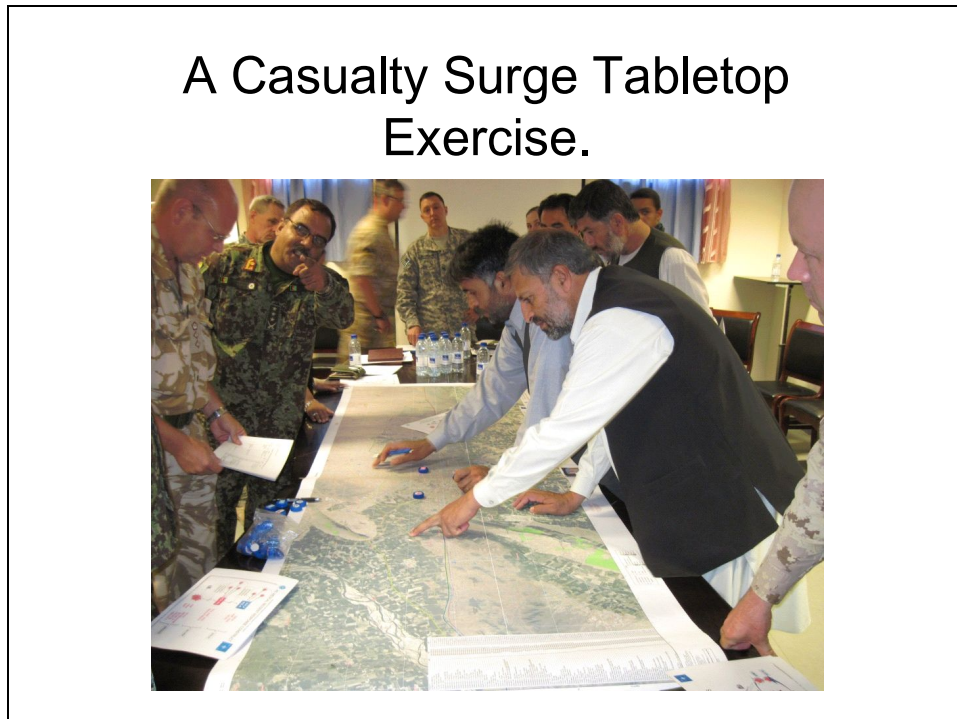
EXAMPLE OF TRIGGERS FOR MEDICAL AUGMENTATION

- If the Hospital commander requests assistance
- If surgical teams have 3 or more consecutive days of more than 10 hours of surgery
- If ICU bed capacity exceeds 75% bed occupancy for more than 3 days
- If ICW bed capacity exceeds 75% for more than 3 days
- If the average for 0600 reported ICU bed occupancy exceed 75% for more than 50% in a 2 week rolling average
- If the average for 0600 reported ICW bed occupancy exceed 75% for more than 50% in a 2 week rolling average

It is vital that the most probable and most dangerous casualty surge scenarios are included as specific contingency plans (CONPLANS) within the Standard Operating Procedures of the medical staff. They should be regularly rehearsed as both tabletop exercises and field exercises. Figure 5 shows an example of such a tabletop exercise held

between the medical services of ISAF, Afghan security forces and the Afghan civilian health sector.

Figure 5



Conclusion

This paper has assimilated all of the previous papers to describe the actual management of medical operations – the regulation of casualties through the medical system. It built upon the papers on medical planning, including casualty estimation which defines the capacity and laydown of the medical system. The papers on medical evacuation describe how patients are moved between medical units. The paper on deployed hospital care

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