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How Should Air Force Expeditionary Medical Capabilities Be Expressed?

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Summary

The Air Force Medical Service (AFMS) provides care both at home stations and in deployment missions. Two platforms provide its deployment component: Expeditionary Medical Support (EMEDS) and the aeromedical evacuation system. These have evolved over the years to provide increasingly better care to service members during deployments. Much of this success can be credited to the concept of operations (CONOPS) of these systems and the tailoring of manpower and equipment to that concept.

The operational emphasis of expeditionary medicine is on patient flow. An injured patient receives limited treatment locally and is then moved from the point of injury to an EMEDS facility as quickly as possible. There, the patient is further evaluated, stabilized, triaged, treated, and evacuated to a higher level of care. Each level of care is designed to be sufficient for immediate needs, not to provide definitive care. This emphasis on flow streamlines capabilities that need to be deployed and places the definitive care in the most capable facilities. Although this framework has functioned well for the mission of supporting the warfighter, two areas need improvement.

First, the most common current measure of capability, both within but especially outside the Air Force, is the number of available "beds." Yet, other than the final inpatient facilities that provide definitive care, the components of the expeditionary en route medical system are not intended to hold patients per se. Rather, patients are processed as quickly as is prudent and handed off to the next level to receive further care. The measure of beds does not adequately reflect this concept

of operations, and requests that are stated in terms of beds are not likely to deliver the proper set of resources to meet the real requirements.

Second, EMEDS is designed to provide the needed capabilities in warfighting missions, which consist predominantly of providing trauma care to relatively young and otherwise healthy patients. However, in humanitarian relief missions and the provision of defense support to civil authorities, fewer trauma patients present. Patients range from children to the elderly, with men and women represented similarly, and many of them have chronic medical or psychiatric conditions. Sending EMEDS to meet these needs often deploys trauma and surgical capabilities that are not needed and fails to furnish the required supplies and the personnel with the appropriate range of skills to care for the full scope of patient conditions.

Both of these deficiencies can be improved with a fresh perspective on the capability metric for medical deployments. A capability metric that captures the dynamic aspects of the en route expeditionary medical mission rather than a static measure of beds can enable the right resources to be placed to meet the requirements of the full range of medical deployments.

In this study, we focused on the throughput of patients, defining a metric of capability for the *rate* at which each component of the deployment system can stabilize, triage and treat, and evacuate patients, or the *medical STEP rate*. The acronym captures the quality of flow through a system and implies that each element of the system provides an important step within it. Our concept involves determining the medical STEP rate required for deployments and building unit type codes (UTCs) to meet those STEP rates. The UTCs could be highly modular and able to be assembled rapidly to meet a wide range of needed capabilities without either deploying significant unneeded capabilities or highly tailoring the UTCs.

Medical STEP rates can be estimated in advance during deliberate planning for the mission to support the warfighter. However, predicting in advance is problematic for the humanitarian relief and defense support to civil authorities missions. Nevertheless, the metric captures more closely the requirement at the time of need than does the measure of the number of beds. Because of the aptness of the metric, it could be

used by medical planners and logisticians to recommend and request appropriate forces to meet needs during crisis action planning.

For a component such as EMEDS, the resources needed to achieve a desired medical STEP rate for a given patient condition type will depend largely on two factors of a deployment: the conditions of the patients and the rates at which patients arrive and are able to move to the next, higher level of care. We propose first defining a limited number of patient condition types. Then, UTCs could potentially be created that enable patients of a given type to be accepted at a certain medical STEP rate. Since it would be impractical to create UTCs for every patient condition, patient conditions might be grouped into a small, manageable number of types. Further research could shed more light on the choices, but one possibility would be to adopt the standard categories used in triage during any mass-casualty situation. The categories, in decreasing order of priority, are *urgent, immediate, delayed, minimal,* and *deceased* (or expectant).[1]

Patients will arrive in one of these categories at some rate that may vary over time. For each condition type, resources would be assembled into UTCs to achieve a given STEP rate. Achieving higher medical STEP rates would be accomplished by using additional UTCs of the same types. The rate at which patients arrive will not affect the *types* of resources needed, as these are determined by the patient conditions. However, the rates of arrival and outflow will affect the medical STEP rate needed. Patients with various conditions will require different levels of resources, different types of supplies and equipment, and different manpower skills. Also, the rate at which the receiving components of the en route system can accept the patients from a deployed facility will affect the holding capacity that facility needs.

If UTCs or combinations of modular UTCs existed for several medical STEP rates for each of the classical triage categories, defense coordinating officers would have an adequate vocabulary with which to relay the needs, and the Air Force could have the appropriate resources ready to meet those needs. This modularity would also facilitate the

[1] Craig H. Llewellyn, "Triage: In Austere Environments and Echeloned Medical Systems," *World Journal of Surgery*, Vol. 16, 1992, pp. 904–909.

deployment of capabilities matched to the deployment needs without significant tailoring of UTCs, thereby increasing the speed at which capabilities can be deployed and reducing the delivery of unneeded resources. The use of a medical STEP rate rather than available beds as the capability metric seems to hold the promise of providing a more agile, responsive, and effective medical deployment capability.