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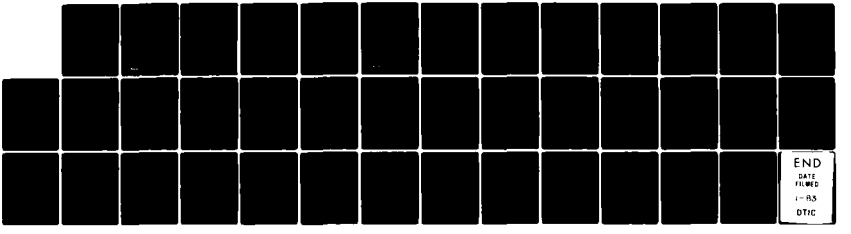

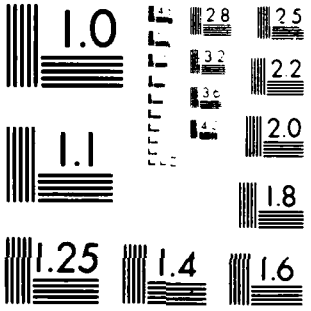

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ISRAELI MILITARY MEDICAL EXPERIENCE: IDEAS FOR THE U.S. AIR FORCE'S MEDICAL SERVICE?

George A. Goldberg, M.D.

August 1982

N-1924-AF

Prepared for

The United States Air Force

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Based on selective conversations with Israeli physicians, nurses, and administrators, the Note describes facets of Israeli military medical organization, functioning, and thinking that might be applicable to the U.S. Air Force. Some of the major strategies the Israelis have used to manage wartime casualties include: (1) Triage carried out in several stages, preferably by senior physicians; (2) A carefully designed casualty dispersal plan with ramifications for the types of services various facilities should be able to provide; (3) Pre-delegating tasks and pre-assigning the type of setting where they will be performed; (4) Pre-conflict rehearsal of functioning by the individual and by teams; (5) Re-thinking which physician specialists can perform various procedures; and (6) Changes in organization, procedure, equipment, etc. right now, not in time of war.

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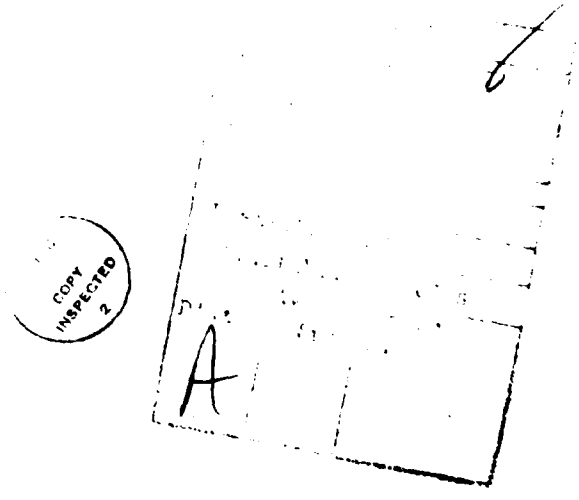

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PREFACE

In the spring of 1981, while serving as Visiting Professor of Medicine at the Medical School of Ben-Gurion University of the Negev, Beersheva, Israel, the author arranged to speak with a number of Israelis, including physicians, nurses, and administrators, about the extensive military medical experience that Israel has accumulated. The discussions were intended to provide background material for Rand researchers on the role of wartime readiness in the planning of the Air Force's peacetime medical service.

This Note, based on selective conversations conducted in 1981, does not attempt a complete description of the Israeli military medical care system. Instead, it briefly describes certain facets of Israeli military medical organization, functioning, and thinking that might be applicable, through adaptation, to the U.S. Air Force. It should be of interest to the Office of the Surgeon General and to others concerned with improving the quality of military medical readiness and functioning.

This Note was prepared as part of the "Air Force Medical Resources Planning" project, in the Project AIR FORCE Resource Management Program.

SUMMARY

This Note is based on conversations with several Israeli physicians, nurses, and administrators conducted to identify approaches the Israelis have used to treat wartime casualties. These approaches might be applicable in the U.S. Air Force. Some of the major strategies are:

1. The need for triage to be carried out in several stages and the probable superiority of using senior rather than junior physicians for this purpose;
2. The value of a carefully designed casualty dispersal plan and the corresponding attention that needs to be paid to the questions of which services will be common to all facilities and which services can be provided by partially specialized facilities;
3. The advantages of pre-delegating the tasks a physician or other health professional will perform, and of pre-assigning the type of setting or even the exact location at which the person will perform them;
4. The importance of pre-conflict rehearsal of functioning by the individual and by teams;
5. The advisability of re-thinking which physician specialists can perform various procedures within the theater and in CONUS; and
6. The superiority of introducing changes in organization, procedure, equipment, etc. right now, not in time of war.

ACKNOWLEDGMENTS

The author wishes to thank his project leader, Susan Hosek, for her encouragement, guidance, and substantial assistance in preparing this Note. Rand colleagues Albert P. Williams, Jr. and Benjamin Lambeth provided helpful reviews. A number of U.S. Air Force personnel also gave their advice. The help of the Israelis who gave their time and shared their knowledge during interviews is deeply appreciated. Preservation of their anonymity, which most of them requested, will at least partially compensate for their efforts.

CONTENTS

I. INTRODUCTION

The Israel Defense Force (IDF) functions with a small standing corps and a large reserve segment--an arrangement predicated on several factors, including types of military missions foreseen, expected duration of conflict, and the striking proximity of probable battlefields to the population centers of Israel itself (thus permitting speedy mobilization of reserves).

A parallel arrangement is used for the IDF's medical mission. Physicians and other health personnel work in the civilian sector, serve in the reserves for a fixed number of days each year, and become military physicians only in time of war. Military personnel receive peacetime medical care in civilian medical settings. In effect, then, Israel maintains no separate military medical establishment. Similarly, there are no separate military medical facilities--all hospitals in the country are civilian, even those designated to provide medical care to the military during peacetime, and they all come under military control during wartime. The same personnel, equipment, and facilities are used in peace and war.

The medical features mentioned above generally stand in marked contrast to the system functioning for the United States military, both in peacetime and in wartime. In the United States, there are separate civilian and military medical personnel and facilities. We maintain a substantial standing military medical force, our reserves constitute a very small percentage of the remaining medical pool, and in wartime any major expansion in size of the medical force would require

time-consuming drafting and training of physicians and other health personnel. Many probable locations of conflict would lie far indeed from the continental United States and even from overseas military medical facilities, so certain considerations of mobilization, triage, transportation, and treatment again may differ from those confronting the Israelis.

Given all these differences, there are nevertheless several ideas to be pondered and policies and procedures to be considered by the U. S. Air Force or other U.S. military forces, on the basis of Israeli experience and procedure. This Note, based on a series of conversations conducted with selected Israeli physicians, nurses, and health administrators in 1981, does not at all attempt to describe the Israeli military medical care system in general. It briefly highlights and describes facets of Israeli military medical organization, functioning, and thinking that might be adaptable to the U.S. Air Force.

Further comments on the gathering of this information are in order. The conversations alluded to, about a dozen, with only two exceptions were held with health professionals whose positions during past conflicts (or at present) afforded them perspective to complement their first-hand experience. Data were collected by means of an open-ended list of topics for discussion. The information presented here provides descriptions and insights rather than numbers; but I believe the reliability and validity of the information to be high, among other reasons because different individuals often brought up the same points and voiced similar opinions. A major assumption throughout is that the IDF's medical system functions well and merits attention. I believe this is a fair assumption, although it is not one for which I can present

evaluative data. For two highly recommended English-language articles supporting this assumption, see Michaeli (1979) and Naggan (1976).

II. PLANNING AND COORDINATION

MASS CASUALTY SITUATIONS

Mass casualty exercises take place at least once yearly in each Israeli hospital. However, if initial battlefield treatment, triage, transportation, and communications are properly attended to, there should never be a situation where a hospital is overwhelmed with mass casualties. Instead, there will be proper dispersal of casualties to prepared hospitals. This objective--to avoid dumping an overwhelming number of casualties on any one hospital--was apparently achieved in the 1973 (Yom Kippur) War. A mass casualty exercise is nevertheless useful as a means of rehearsal, with modified staff carrying out modified roles.

The Israelis do not draw a distinction between civilian and military mass casualty disaster planning, except as regards the distribution of illnesses; the hospital's disaster plan purposely makes no distinction. There is generally a separate area in the hospital for the initial handling and triage of casualties--separate even from the usual emergency department. This area is independently stocked with supplies and durable medical equipment; it uses pre-assigned medical personnel, depends on pre-designated nonmedical volunteers for carrying out aid functions, and functions with pre-arranged administration and civilian-military liaison. The use of a separate area for the emergency function does not extend to other hospital areas, such as laboratories, blood bank, operating rooms, intensive care units, etc. Professional personnel and nonmedical volunteers are both called in by use of a "cascade" system of telephone calls.

Members (generally chiefs or assistant chiefs) of the surgical and orthopedic departments function as head triage officers during reception of mass casualties at an Israeli hospital. They are believed to be needed in the initial triage area more than in the operating rooms, where their junior colleagues can be working. When mass casualties are not being admitted, these individuals may of course perform operations and other surgical activities. Their presence assures continuity and helps maintain quality during wartime, in that the chief and assistant chief will remain with their own department in their own hospital--even as others from their hospital are removed for duty elsewhere, and different physicians (sometimes less highly trained) are brought in to work under the chiefs' direction. It is considered important that even the physicians who remain in their own hospitals during wartime are officially mobilized and assigned.

As for the United States, the Air Force of course recognizes the need for carrying out mass casualty exercises. Within the theater, the United States cannot count on duplicating the Israelis' success in dispersing casualties and avoiding the overwhelming of its hospitals. However, an even allocation of patients should be achievable among CONUS military medical facilities and their backups in the Civilian Military Contingency Hospital System (CMCHS).[1] One requirement for minimizing in-theater hospital overloads and ensuring efficient allocation of

[1]The term "CMCHS hospital" refers to every hospital that has formally agreed to guarantee the availability of at least 50 beds to the military, in certain contingencies. CMCHS beds would be used only when CONUS military hospital space, including Army and Navy facilities, were fully utilized--presumably specialty by specialty. The nearest military hospital would handle administrative work for CMCHS patients. The CMCHS would probably be quickly needed in a major conflict.

evacuated patients is an up-to-date communications system. By 1987, the Patient Regulating On-Line Management Information System (PROMIS) will provide such a system. However, a link between PROMIS and the CMCHS hospitals, which will operate through designated military hospitals, should be put in place at the same time.

For maximum effectiveness of CMCHS hospitals, it may be wise to ensure that department heads and perhaps their assistants remain in their own hospitals. Similarly, the hospital's administrator and assistant administrator might well be left in place, because considerations of continuity and familiarity probably outweigh any advantages to be obtained from placing those individuals elsewhere.

ADVANCE PLANNING AND REHEARSAL

All physicians in Israel know where they will be working in time of war. Those who will be moved (and this is the majority) are sent to their assigned spot or unit during some or all of their annual period of reserve duty. Another type of continuity is thereby addressed: familiarity of staff with each other and familiarity of the health professional with wartime location and equipment.

Some of these procedures are relevant for Air Force in-theater care. One policy stands out--that of rehearsal of previously constituted teams. For example, one Israeli suggested that an Air Force pre-packaged field hospital would function well at the time of a military emergency in Europe or elsewhere only if it were staffed by a team that had already worked together for at least two weeks each year in a duplicate facility. Turn-key installations stored overseas might well be effective and efficient from Day One only if they were staffed by groups whose members had worked together in similar facilities in

CONUS. The recent establishment of a 250-bed contingency hospital unit at Wilford Hall and the decision to have reserve members train during normal working hours (rather than weekends) are steps in the direction mapped by the Israelis. However, the problem remains of the difference in medical tasks between typical peacetime settings and the probable war-casualty situation. How and where certain aspects of an emergency military situation might be replicated for a team deserves attention.

In planning "stored" in-theater hospitals, the Air Force might consider how close it can come to standardizing these facilities. To function well immediately after activation, these hospitals might also require support staff beyond the number planned for routine functioning.

PREDICTING CASUALTIES: A CAVEAT

One must be cautious about predicting incidence of various casualty types based on previous experience. Different geography or weapons may render predictions futile. Technological breakthroughs can have major effects on calculations. Any breakthrough in technique, equipment, or treatment must be introduced in peacetime--not in time of war--if the medical military is to reap its benefit, particularly in the first days of a conflict.

As for data from previous wars, there are many pitfalls in interpretation. For example, in one recent Israeli war, orthopedic injuries were estimated to be 60 percent of all injuries; but two-thirds of these were really soft-tissue injuries categorized in the same class. If an analyst misinterpreted the 60 percent figure, he would overestimate the need for orthopedists. In fact, soft-tissue injuries and many abdominal and chest problems can be handled by general surgeons. One interviewee suggested assuming that about 70 percent of all injuries can be handled by a general surgeon.

Although Israel has apparently had no experience treating nuclear, biological, or chemical warfare casualties, a few interviewees pondered the resources that each kind of treatment would require. For example, injuries from nuclear bombs are likely to be multisystem problems, running the gamut from trauma to burns to radiation injury. This implies that nearly all hospitals would have to be organized to handle a wide variety of medical problems.

By contrast, biological warfare is likely to lead to a heightened need for core ancillary facilities including laboratory tests and perhaps X-rays performed in the hospital; but the medical and nursing care required would probably be at a less intense level. Therefore, satellite units could be used for therapy, monitoring, and rest.

Again in contrast, chemical warfare will require extensive and intensive use of the hospital--at least for civilians. But for soldiers, it would in general be too late for treatment if such treatment were delayed until the soldier reached the hospital. It will probably be necessary, then, to give treatment right on or near the battlefield; and that treatment can probably best be rendered by "ordinary soldiers" administering basic, "cookbook" treatment of chemical injuries.

TRIAGE, STABILIZATION, AND EVACUATION

Israeli comments about triage were copious, but there were few ideas different from those currently in fashion in the United States. Therefore, the comments in this section are not strikingly novel; they are included because they were emphasized by the Israelis in what was a series of "philosophical" discussions of this problem.

Triage must be considered a dynamic, multi-stage process. As soon as action is taken, priorities may change. For example, once a patient with pneumothorax (air in the chest cavity) has been treated, this previously highest priority casualty is now stable; you do not have to evacuate him immediately, although you did have to treat him first. At this point, a second patient with an open abdominal wound, who could safely wait for initial treatment, may now become the highest priority for evacuation and operation. In summary, the principle of "getting the worst out first" applies only after initial treatment. After that treatment, you may have changed the priority for evacuation.

It is in fact the most complicated cases that must be held in the battle zone until they are stabilized enough to permit transfer. Primary treatment of these casualties must be attended to without undue regard for eventual transport or evacuation. If at all possible, it is better to delay transport until completion of initial treatment and achievement of stabilization. The medical individual or team must resist the inevitable pressure to remove the casualty as quickly as possible, before proper primary treatment has been given.

Concerning transport of casualties, one must be flexible. The United States can certainly not plan on another Vietnam and should not overemphasize the helicopter as a means of transporting casualties. Future conflicts will probably require renewed emphasis on ground transportation, including armored medical vehicles.

Because many problems require operation within the first 6 to 8 hours--for example, brain swelling, penetrating abdominal wounds, respiratory problems, and multi-organ injuries--it will be necessary to

stabilize and operate on these casualties within or near the combat zone, rather than in CONUS. Geographical considerations are particularly pertinent to the issue of trading off the level of staff and equipment against time and medium of transportation. In the Israelis' opinion, severe injuries that have been stabilized and then operated on should, as a rule of thumb, remain for 7 to 10 days in the surgical setting where the basic reparative operation was performed, before transfer farther to the rear or to a lower level of care.

In predicting length of stay, an Israeli interviewee reminded us to consider both the acute hospital level of care and a lower level of care that can be characterized as a convalescent facility. For the acute hospital only, the average length of stay for all hospitalized cases might be 2 to 3 weeks for severe injuries and 3 to 4 days for light casualties. Another week should be added to all these figures for convalescence, whether it is spent in the acute hospital or in the convalescent facility.

III. PREPARATION OF PERSONNEL

PRE-ASSIGNMENT

Israel maintains a computer file that catalogs and tracks all physician military manpower in the country. Updating is a major problem, because physicians must be followed as they change location, progress in training or in position, and pass certain age milestones. Even so, there is an up-to-the-moment plan on where each physician would go and what that person would be doing in wartime. The corollary is that each physician knows where he will be, what he will be doing, and with whom, in time of war. Periodic rehearsal makes for familiarity, efficiency, and quality.

For the United States also, for both in-theater and CONUS settings, pre-assignment appears to be an important concept. It should be possible to achieve pre-assignment for all active duty and reserve physicians, and perhaps also for all or some physicians who have staff privileges at cooperating CMCHS hospitals.

DIFFERENT WARTIME TASKS?

To what extent is it advantageous to alter the tasks of physicians and others? How do the Israelis handle this issue? First, there is striking consensus that all changes are planned, known, and rehearsed in advance. There is also agreement that changes in tasks should be minimized. It is acceptable to expand or contract a physician's role (within his specialty and interest), but if possible the physician should be kept in the same line of work. Sending a psychiatrist to be a general medical officer may well fail, while stationing an internist in

a burn unit has been notably successful. The principle applies both to physicians and nonphysicians; a laboratory technician might be switched from the (peacetime) chemistry lab to the (wartime) hematology lab, but even this small alteration should be trained for and practiced in advance.

It is also possible to transfer physicians and other personnel to a different hospital, but it is wise to transfer a whole team, not a solitary individual; and for the team to work successfully and quickly during war, it is necessary to have practiced the transfer in peacetime.

Let us examine the options for Israeli physicians. Some will stay in their same hospital, in their same job. As mentioned above, the senior staff man in each department and often his assistant fall into this category. The head of the laboratory and blood bank, key operating room nurses, and others will stay to provide continuity of policy, efficiency of familiarity, and maintenance of quality. Other physicians may stay in the same hospital but acquire a "war job." A nonphysician example is the laboratory technician cited above, and an example of a physician in this category is a pediatrician who will enter the military and be assigned back to his hospital (as he already knew he would be) to serve perhaps by helping to manage pre-operative and post-operative problems.

Other Israeli physicians will be drafted into a pool, and then sent from the pool to a (pre-specified) different hospital to perform the same job. For example, a thoracic surgeon is drafted from Hospital M and sent to Hospital N, because it is expected that casualties with chest injuries will be arriving at Hospital N, but Hospital N does not have any, or enough, thoracic surgeons. (If the thoracic surgeon is

sent to Hospital N, then extra equipment, if needed, will have been pre-positioned there.) It is also possible that a physician or nonphysician will be sent to a different hospital to perform a different job. The tasks will be related to tasks the individual is already familiar with; and such a move will be known about in advance and prepared for during periods of reserve duty. Part of that preparation will be visits by the physician to that hospital, so that he will be known there before he arrives during wartime.

I was warned that, during an emergency (whether it be in wartime or not) and during the first phase of a war (which is an emergency regardless of the casualty mix), "everyone's IQ drops, automatically." People become less inventive, less flexible, less capable. This general observation helps explain Israel's strong emphasis on introducing any new procedure, new equipment, new setting, new medical form, new team, right now--and not in time of war.

In U.S. Air Force hospitals, both in-theater and in CONUS, it should be possible to plan the same or similar tasks for physicians. However, "similar" tasks should be trained for. An oral surgeon may perform procedures related to but not the same as the ones he performs now; the internist or pediatrician may be managing pre-operative and post-operative problems of shock, fluid balance, and infection; or the thoracic surgeon may need to familiarize himself with several procedures he ordinarily is not called upon to perform. In the case of CMCHS hospitals, a plan could be worked out whereby certain physicians would know in advance of their assignment to their own hospital in time of war.

DOES MEDICAL CARE CHANGE?

An element not subject to Israeli military control has been the medical care received by patients hospitalized in nonmilitary medical facilities. This noninterference can work to the detriment of the patient, because civilian physicians and other health professionals may not be aware of, competent to use, or willing to use methods and techniques that have been learned the hard way in previous wars. Examples specifically brought up include the indications for opening the chest as opposed to closed chest drainage in thoracic injuries, or the importance of avoiding primary wound closure in nearly all situations.

Physicians generally like to work the same way, whether in peace or war. So long as an installation's capacity is not overwhelmed, my interviewees were of the opinion that physicians will practice the "same" medicine in peacetime and wartime. The patient population will of course vary, but the style of medicine will not change. Only if there is queueing in an X-ray or laboratory unit will physicians alter their practice and prioritize requests for tests; and alterations will take place in techniques of treatment only under conditions of visible jam-up or change in availability of supplies. The continued presence of senior physicians (department chiefs and often assistant chiefs) also contributes to similarity of treatment.

No matter how physicians are allocated, there will probably be a lower physician-to-patient ratio than either the patient or the physician is accustomed to. This lower ratio can be somewhat offset by treating patients "in bulk," by using the physicians as if they were on a production line. Israeli physicians may be placed in working groups,

ranked according to their experience, and, to the extent possible, assigned those tasks they can do on their own. For example, a less-experienced physician may do a series of incisions, while a more-experienced one will do the abdominal surgeries.

The Israelis brought up several medical differences in the desert that must be taken into account by any military medical service stationed or based there. Dehydration in the desert is the first and most serious problem. It must be fought against preventively, rather than after the fact. Unwounded troops must be forced to drink large quantities of liquid; to supply fluid in such quantities requires attention and commitment. A wounded soldier should have intravenous fluid "poured in," without regard to fluid overload, which is rare and (in any case) eminently treatable in this age group. Further, the wounded soldier is usually somewhat dehydrated even before he has been hit. All in all, it is possible to be extremely liberal with fluids, and it is not necessary at the scene of the injury to worry about blood, plasma, or albumin: pouring in "water" (Ringer's lactate or similar) will get the job done. The low incidence of renal failure reported among wounded Israeli soldiers attests to the success of this policy.

The medical corps can expect a different distribution of ricochet injuries--as well as fewer such injuries--because of the damping effect of the desert itself. Finally, finding one's way is a special problem in the desert, so training in map-reading is important for the medical staff in performance of its function.

The issue of military influence on the type of medical care received by patients in nonmilitary hospitals appears to be one that has not been completely addressed in Israel. In light of planning of the

CMCHS, the U.S. medical military should consider addressing the problem by developing and disseminating manuals or guides that inform civilian physicians about basic principles of management of military medical problems. Within the theater, it may be important to devote some thought to how the "production line" model of surgery could best be carried out.

A potential problem in many U.S. civilian hospitals and perhaps in some military ones, too, is the unfamiliarity of many physicians with trauma cases and battlefield casualties. A method for training physicians and other health professionals in advance of need is essential. The American analog of the time an Israeli physician spends in the reserves might be the providing of selected American civilian and military physicians with the opportunity to work in some of our major urban trauma and emergency centers, or with the opportunity to take the American College of Surgeons' Advanced Trauma Life Support Course.

IV. PREPARATION OF FACILITIES

CHANGEOVER OF HOSPITAL FROM PEACETIME TO WARTIME CONFIGURATION

In Israel, every civilian hospital becomes a military hospital in time of need. Although that action would be unnecessary in the United States, certain characteristics of the process merit careful thought.

Redundant, special communication systems are provided to connect Israeli hospitals with each other and with the military. A military administrative staff moves into the hospital for military personnel control (to keep track of all military people moving in and out) and for communications control (a direct line from the military command for optimal assignment of casualties to each hospital).

An Israeli wartime hospital is supposed to contain 80 percent or more surgical beds. A typical pattern quoted to me was: general surgery 40 percent, orthopedics 35 percent, plastic surgery and burn care 5 percent, 4-1/2 percent, ear-nose-throat 3-1/2 percent, thoracic surgery 3 percent, neurosurgery 3 percent, oral and jaw surgery 1 percent; and internal medicine 5 percent. Suggested standards per 100 beds included seven emergency room beds, one and a half pre-operative beds, one operating room, and two recovery room beds. It was also suggested that much surgery (e.g., setting simple fractures, excising fragments, treating minor burns) can often be handled right in the emergency department, and patients can be sent directly to the ward after the procedure. With expanded emergency department staffing, at any one time, one can plan on managing there a number of patients equal to 20 percent of the hospital's total number of surgical beds.

It is generally believed that there is no need to change the number of intensive care beds. However, the same number of beds, particularly those geared to respiratory care and peri-operative care, should be handled by increased staffing, in view of the more severe condition of the patients who will be treated. The hospital should also be prepared to expand its intensive care unit if need be, especially for respiratory problems.

Although trauma must be emphasized everywhere, it is important not to overdo hospital conversion: It is not easy to change a pediatric ward into a surgical ward, and such a conversion is probably not worth the effort. In general, proper triage will avoid overwhelming an individual hospital.

In Israel, bed capacity must be expanded. This is accomplished in several ways. The most obvious is to add beds, which can be done by placing more of them in standard rooms, or by putting some in dayrooms, other rooms, or even halls. It is also possible to discharge from the hospital patients whose condition is such that they can be attended to at home or in a less complex (lower level of care) medical facility. Or, patients can be transferred from a hospital that is going to be designated as a war hospital to a different hospital whose role is to continue to care for civilians during a conflict. Finally, nearby (and the importance of nearby is stressed, because it permits the same medical staff to render care) nonmedical satellite facilities, such as schools, hotels, and religious and social buildings can be converted into medical quarters capable of housing patients needing less than the intense, hospital level of medical and nursing care. The Israelis have done all these things.

The concept of a "wartime" hospital implies for the United States either an in-theater hospital, a CONUS military hospital, or a CMCHS hospital. Although their needs are not identical, they would all focus on care of trauma. In Israel, a wartime hospital is one that has converted from civilian to military, while nearby other hospitals continue at least in part to serve civilian medical needs. However, Israel also has hospitals that are "isolated," in that they are the sole hospitals in a geographical region. An American analogy might be hospitals, not necessarily small, in rural areas or in towns of moderate size in the South or Mountain West. Such hospitals cannot relinquish obstetrical, pediatric or psychiatric services, yet they too might have to expand their surgical capacity both proportionately and absolutely.

The appendix presents the "Emergency Condition" Plan for one somewhat isolated Israeli hospital. Peacetime and wartime care needs will be very different. The distribution of beds reflecting expected wartime patient mix suggests that many U.S. inner-city civilian hospitals have case mixes closer to probable wartime mixes, than do the U.S. military hospitals. The Israeli "isolated-hospital" problem may be relevant to the U.S. in-theater hospital.

ENSURING ADEQUATE SUPPLIES AND EQUIPMENT

Although information is vague, each Israeli hospital apparently stockpiles equipment for wartime. Obvious needs, such as extra beds and blankets, are stored at the hospital; so is special equipment needed to treat patients injured by gas or other means of chemical warfare. Decontamination equipment, resuscitation equipment, antitoxins, etc. are kept on hand in the hospital, in amounts calculated on a per-bed basis,

because there would not be sufficient medical time to transport these materials to the hospital if they were needed but stored elsewhere. With these exceptions, drugs and intravenous solutions and materials are stored in central warehouses under government control. Outside stockpiling prevents consumption of these materials, which might well occur if they were stored in the hospitals. Outside storage also assures proper attention to expiration dates and spoilage of drugs and materials.

In Israel, durable medical equipment will be stored partly at the hospital and partly in warehouses. The equipment kept at the hospital is routinely checked by an outside agency to ascertain that the equipment is there and in working order. The importance of sufficient food and water supply and availability of electricity is evident. Oxygen supply is estimated on the basis of daily consumption of three times the hospital's normal peacetime use.

SPECIALIZED HOSPITALS?

Should all hospitals within the system (be they all military hospitals, or the CMCHS) provide the same range of war-related services? The answer appears to be "yes, but" or "no, but." A number of Israelis, speaking from very different vantage points, reflected the consensus that every wartime hospital must be strong in general and orthopedic surgery, but that there can be carefully specified areas of specialization.

As a general rule, there should not be "specialty hospitals" in-theater. To contravene this policy would cause serious problems for triage, where it would be logistically difficult and medically dangerous to attempt to divert certain types of injuries only to certain

hospitals, and other types of injuries away from certain hospitals. After all, even seemingly complete information about a casualty's medical needs may be incorrect (or the patient's condition may change rapidly), so assigning a patient to a specialty hospital might turn into a medical disaster for the patient who reaches the "wrong" specialty hospital.

However, a certain degree of specialization of hospitals may in fact be appropriate--certainly in the CMCHS, perhaps also at CONUS military hospitals and, within limits, in some in-theater hospitals. The Israelis apparently do permit special identification and staffing of hospitals for the following problems only: neurosurgery (in particular, spinal cord injuries), thoracic surgery, and plastic surgery and burns. There are no particular disadvantages to some specialization, so long as an isolated hospital is not limited.

If an in-theater hospital lacks a thoracic surgeon, then one should be assigned to that hospital in order to introduce the capability for thoracic surgery. The story would be different if the hospital in question were a CMCHS hospital, with 15 other nearby CMCHS hospitals, half of which had thoracic surgeons available. In that case, it would be a waste of manpower to assign a thoracic surgeon to the hospital. However, when an in-theater hospital is somewhat isolated, it is uncertain that it would ever be possible, even with pre-planning, to triage all chest injuries away from that hospital, so the better approach is to introduce a chest surgeon into that hospital and avoid the necessity even of trying to divert the chest injuries. It is worth recalling too that many casualties have sustained injury to multiple systems and will therefore require care of diverse problems.

Pre-designating hospitals is therefore risky, particularly when communications are uncertain and it is difficult to predict with precision the needs of the patients who will be arriving.

ADMINISTRATIVE STRUCTURE

Based on Israeli experience, there should be no more than 15 or 20 hospitals in each local command. In the case of CMCHS hospitals, mechanisms for use in time of war should be set up during peacetime for (1) disseminating information to cooperating hospitals and (2) scheduling regular meetings attended by representatives from all the cooperating hospitals. It is also worthwhile, during peacetime, working toward coordination of a number of community agencies (governmental, institutional, and voluntary) that would need to function together during wartime.

In any cooperative arrangement of hospitals with the military, clear command and free and direct communication are crucial. The Israelis vest command in a physician who knows both the military and civilian hospitals in a given locality. This physician must be well trained, respected, and known in the community. "Known" means personally known, which is accomplished by periodic visits, carried out during peacetime, to the cooperating hospitals. Such visits are made by key administrative as well as key medical personnel, and they result in greater ease in having one's orders carried out during wartime. The commanding physician (whether a civilian or a military officer) should be in charge of all hospitals under his command and able to distribute patients to all of them. The local command will be in constant communication with higher-level, military medical commanders.

It might be preferable to have every hospital use an identical system of documentation, but it would be a bad idea to commence use of a uniform medical form during wartime. If cooperating civilian hospitals (whether in Israel or the United States) are going to use a special form, it is important to obtain agreement on the form and to introduce it and use it during peacetime.

A somber warning was raised by one interviewee who noted that enemy attacks might cause casualties in the CONUS during war. It is at least prudent to keep this possibility in mind and plan for it. CMCHS units might function as local self-sufficient groupings in such a situation. Questions of activation of these units, communication among them, and transfer within and between these units in case of damage or incapacitation of some or all of the component hospitals need to be addressed in advance.

V. CONCLUSIONS

This Note has raised a number of medically oriented military issues regarding which Israel's experience may provide insight for American planners and implementers.

Within the theater, especially at the first stages of care, one should recall the principles of dynamic triage; at least consider initial use of senior rather than junior staff to carry out triage; delay transport of the seriously injured until completion of initial care and stabilization; attempt to achieve efficiency and high quality from the first day by arranging pre-conflict practice by teams that will function together in wartime; and implement a carefully designed casualty dispersal plan that will avoid inundating in-theater hospitals.

At in-theater hospitals, a variety of specialties should be offered, but these facilities should not differ much one from the other. In other words, more than a minor amount of specialization of the hospitals is not a good idea. Staff that will serve in these facilities might well be pre-assigned, which would permit pre-conflict familiarization with each other and with tasks. Physicians' planned-for tasks should bear close resemblance to their peacetime tasks, and even small alterations should be trained for and practiced in advance. Pre-positioning and periodic maintenance of equipment and supplies should be undertaken. Redundant, reliable communication among these facilities will help avoid overflow, ensure flexibility, and best serve the wounded. Plans for "production line" surgery should be considered. In planning number of beds, realistic length-of-stay estimates should be

used. Again, a good casualty dispersal plan will facilitate rational use of CONUS hospitals.

Within the CONUS military system, overspecialization among hospitals should be avoided, but some appears reasonable. Nearby satellite facilities might be used for certain illnesses as well as for convalescent care. Do not strip these military hospitals of all their personnel; leave at least some people there who are familiar with the facility, to strengthen continuity, efficiency, and quality. Those physicians who will be assigned tasks that are the same or similar to the ones they now carry out, but in a different CONUS military hospital, should visit it during peacetime. Not all stockpiling of equipment and supplies should take place at the hospital itself. Special systems need to exist for communication with CMCHS hospitals.

Those hospitals cooperating with the military through the CMCHS will also require first-class systems to communicate with the military hospital and with each other. A data and patient tracking system will be crucial; forms necessary for its implementation need to be designed and fielded during peacetime. The need for continuity at CMCHS hospitals suggests the wisdom of ensuring that selected medical and administrative personnel will remain at their own hospital in time of war, these individuals should be aware of this plan in advance. Again, not all stockpiling of equipment and supplies should take place at the hospital itself. Finally, suitable medical manuals reiterating basic principles and techniques of war medicine should be developed and disseminated to personnel in these hospitals.

APPENDIX

HOSPITAL'S WARTIME CONVERSION PLAN

Table A.1

INTERNAL EXPANSION AND ALTERATION:
FROM PEACETIME CONFIGURATION TO EMERGENCY CONDITIONS

Department Designation in Peacetime	Existing Allotment (# Beds)	Required Addition	Allotment Under Emergency Conditions	Department Designation During Emergency Conditions
SURGERY A	36	37	85	GENERAL SURGERY
GYNECOLOGY	17		5	RESPIRATORY INTENSIVE CARE
INTERNAL MEDICINE A	32	8	65	GENERAL SURGERY
SURGERY B	25			
PSYCHIATRY	26	34	40	BURNS & PLASTIC SURGERY
			20	ORTHOPEDICS
PEDIATRICS	54	11	30	PEDIATRICS
			35	INTERNAL MEDICINE
INTERNAL MEDICINE B	30	20	60	ORTHOPEDICS
GERIATRICS	16		6	CARDIAC INTENSIVE CARE
ORTHOPEDICS	27	20	35	ORTHOPEDICS
OPHTHALMOLOGY	18		15	OPHTHALMOLOGY
			5	EAR-NOSE-THROAT
			10	MOUTH AND JAW
OBSTETRICS	44	10	44	OBSTETRICS
PREMATURE NURSERY	8		8	PREMATURE NURSERY
			10	GYNECOLOGY
NURSING SCHOOL	--	53	29	ORTHOPEDICS
			24	INTERNAL MEDICINE
DIALYSIS	5	--	5	DIALYSIS
TOTAL	338	193	531	TOTAL

Table A.2

BEDS FOR EACH SERVICE

PEACETIME Percent	PEACETIME Number	SERVICE	WARTIME Number	WARTIME Percent	
26 { 18	61	SURGERY	150	28 }	55
26 { 8	27	ORTHOPEDIC	144	27 }	
-	-	BURNS & PLASTIC SURGERY	40	8	
-	-	EAR NOSE THROAT	5	1	
-	-	MOUTH AND JAW	10	2	
5	18	OPHTHALMOLOGY	15	3	
-	-	RESPIRATORY INTENSIVE CARE	5	1	
13	44	OBSTETRICS	44	8	
18	62	INTERNAL MEDICINE	59	11	
1	5	DIALYSIS	5	1	
5	17	GYNECOLOGY	10	2	
16	54	PEDIATRICS	30	6	
2	8	PREMATURE NURSERY	8	2	
-	-	CARDIAC INTENSIVE CARE	6	1	
8	26	PSYCHIATRY	-	-	
5	16	GERIATRICS	-	-	
	338		531		

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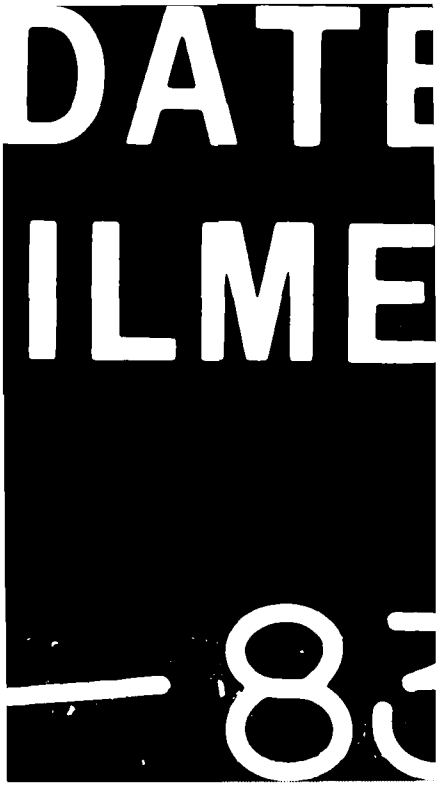
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