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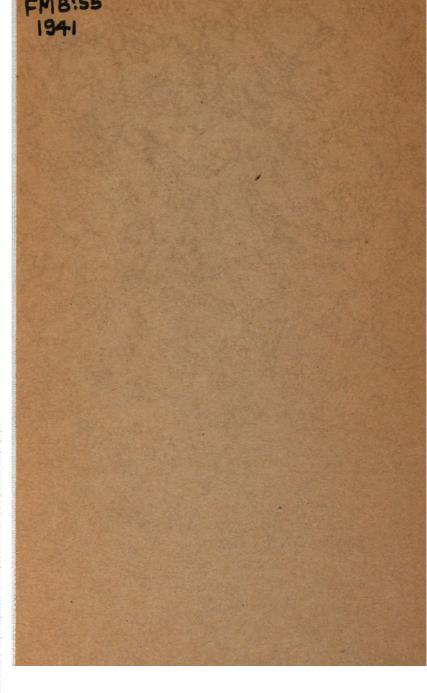
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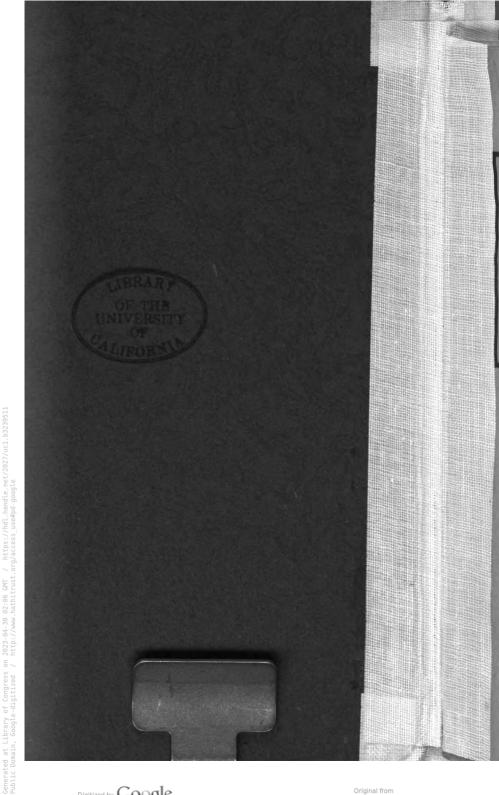FM 8-55

WAR DEPARTMENT

MEDICAL FIELD MANUAL

REFERENCE DATA

March 5, 1941

FM 8-55

MEDICAL FIELD MANUAL

REFERENCE DATA

Prepared under direction of
The Surgeon General

WAR DEPARTMENT,

WASHINGTON, *March 5, 1941.*

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II

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MEDICAL FIELD MANUAL

REFERENCE DATA

CHAPTER 1

GENERAL

■ 1. PURPOSE AND SCOPE.—*a.* The purpose of this manual is to furnish to medical officers a compact source of information bearing upon the military aspects of their profession.

b. This manual includes the logistical data required for the movement of medical units and for the evacuation of the sick and injured; experience tables to serve as points of departure in medical planning; medical plans and orders; command and staff relationship.

■ 2. REFERENCE DATA.—*a.* Military technique is an art rather than a science. The many imponderables present in military situations make precise measurements impossible. Certain yardsticks are, of course, essential in planning; but it is dangerous to rely with complete confidence upon an average experience in each special situation. The data contained herein are to be regarded as general guides rather than as authoritative predictions applicable to every situation. To them must be applied as factors the special conditions obtaining in each situation. For example, it will be found in paragraph 35 that the average rate of march of foot troops during daylight hours is 2½ miles per hour, and that an average day's march for a unit as large as a division is 12 to 15 miles for foot marches. Yet, upon many occasions in war, foot troops have materially exceeded this rate; and, upon more than one occasion, large units have marched 35 miles or more in 1 day and subsequently engaged immediately in severe combat.

b. For military symbols for medical units, see FM 21–30.

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CHAPTER 2

COMMAND AND STAFF CONSIDERATIONS

■ 3. COMMAND AND STAFF.—A general and a special staff are provided in the division and higher units to assist the commander. The commander and his staff, together with their commissioned and enlisted assistants, constitute the headquarters.

■ 4. HEADQUARTERS.—The headquarters of the division and higher units is organized into two echelons.

a. Forward echelon.—The forward echelon, known also as the CP (command post), includes the commander, his general staff, and such of his special staff whose functions are associated primarily with tactical operations.

b. Rear echelon.—The rear echelon is composed of the special staff sections whose functions are primarily administrative. Representatives of the G–1 and G–4 sections of the general staff may also be located at the rear echelon. Conversely, a special staff section at the rear echelon may have a representative at the forward echelon when required by the situation. (See FM 101–5.)

■ 5. CHIEF MEDICAL OFFICER.—*a. Designation.*—The chief medical officer of the division and higher units is designated "the surgeon." His capacity comprises both staff and command functions. Every staff officer, in his staff capacity, exercises authority only in the name of the commander. In his command capacity, however, the chief medical officer exercises, by inherent authority, all the functions pertaining to his particular command. For example, supply is a command responsibility. In exercising his functions of medical supply, the surgeon is acting as an assistant to the commander. But, insofar as the supply of a medical unit of which he is the commander is concerned, the medical officer is directly and wholly responsible himself. A clear conception of the distinction between these two capacities, in which the chief medical officer serves, is necessary to prevent the confusion of his various functions.

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b. Selection.—Surgeons of divisions and higher units are specially selected and must be senior in rank to every medical officer over whom, by virtue of their office, they exercise direct command. However, since in their staff capacities their authority derives from, and is exercised in the name of, their commanders, it is not necessary that they be senior in rank to surgeons of subordinate echelons.

■ **6. STAFF FUNCTIONS OF SURGEONS.**—*a.* To keep the commander and his general staff constantly informed as to the conditions in, and the capabilities of, the medical service for which the commander is responsible.

b. To elaborate the medical details necessary to carry the commander's decisions into effect.

c. To initiate measures for the prevention or reduction of disability and death in the command. Such of these measures as involve command responsibility, except in the case of medical units commanded by the surgeon, are initiated in recommendations to the surgeon's commander; but such as pertain only to technical procedures to be followed in the prevention, care, or treatment of disease and injury may, within the scope of the commander's responsibility therefor, be initiated by direct instructions to the medical officers concerned.

d. To advise the commander and his general staff upon all aspects of medical training for which the former is responsible.

e. To advise the commander and his general staff regarding the allocations of medical replacements and medical reinforcements.

f. To make for the commander the necessary inspections to insure that his instructions pertaining to the medical service in all echelons, including the medical aspects of training, are being carried out.

g. To advise the commander concerning all command decisions pertaining to, or involving, the medical service.

h. To procure, store temporarily, and distribute all medical, dental, and veterinary supplies for which the commander is responsible; to study medical supply requirements, and to advise the commander thereon.

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i. To prepare and forward consolidated reports and returns of the sick and injured, and to furnish this information to other staff officers who are concerned therewith.

j. To keep the surgeon of the next higher echelon informed of the medical situation within his own echelon.

k. To examine and report upon captured medical equipment.

■ 7. COMMAND AND STAFF RELATIONS OF SURGEON.—*a. With commander.*—The commander is responsible for his medical service. The surgeon is the special staff officer charged with keeping the commander informed as to the conditions and capabilities of the medical service, and with elaborating the details necessary to carry the decision of the commander, as it affects medical matters, into effect. (See FM 100–5.) As in the case of any staff officer, the commander may utilize the services of the surgeon in a purely advisory capacity; or he may delegate to the surgeon authority to act in the commander's name, within established policies, in affairs that fall properly within the jurisdiction of the medical service. The general responsibilities of the surgeon to his commander are—

(1) To inform and advise the commander upon all matters that affect the health of the command and the care of the sick and injured. The commander is charged with having ever before him a conception of the physical state of his command. Of certain factors governing physical state the surgeon alone can inform him. (See FM 100–5.)

(2) To submit to the commander plans for the training and employment of medical units. Responsibility for the medical service includes the responsibility for its training. Every command that has a medical service comprises other subordinate elements. To act effectively a command must operate as a coordinated whole. The medical plan is a part of the general plan of a command, and must be fitted with the other subordinate plans. For this reason medical plans must be submitted for the approval of the commander.

(3) To exercise supervision for the commander over the technical aspects of the training and operation of the medical services of subordinate elements. This is purely a staff function and does not encroach upon the prerogatives of sub-

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ordinate commanders. It is the duty of the surgeon to follow up the execution of the instructions issued by the commander which apply to any phase of medical service. He may call for such technical reports from surgeons of subordinate units as are necessary in supervising the execution of the work with which they are charged. (See FM 101–5.)

(4) When, in addition to his staff duties the surgeon commands a medical unit, his responsibilities to his commander are the same as those of any subordinate commander. (See FM 100–5.)

b. *With general staff.*—The diversified activities of the medical service require the surgeon to deal with all sections of the general staff or, in commands lacking one or more general staff sections, with the staff officers discharging such general staff functions. Insofar as the surgeon is concerned with any of the matters listed below, he deals with the general staff sections indicated.

(1) *G–1 section.*—(a) Sanitation; measures for the control of communicable diseases of men and animals.

(b) Medical problems associated with prisoners of war, refugees, and inhabitants of occupied territory.

(c) Personnel matters, and replacements for medical units.

(d) Reports of human casualties.

(e) Employment of prisoners of war to reinforce the medical service.

(2) *G–2 section.*—(a) Nature and characteristics of weapons, missiles, gases, and other casualty-producing agents employed by the enemy.

(b) The character of the organization and operation of the medical service of the enemy, especially as it relates to new methods which may deserve study and trial.

(c) Communicable diseases in enemy forces.

(d) Supply of maps.

(3) *G–3 section.*—(a) Current information of the tactical situation; future plans.

(b) Mobilization, assignment, and training of medical units; training of all personnel in military sanitation and first aid.

(c) Signal communications in medical installations.

(d) Troop movements affecting medical personnel.

(4) *G–4 section.*—(a) Tactical dispositions of medical units.

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(*b*) Supply matters, both general and medical.

(*c*) Transportation of medical units.

(*d*) Evacuation by higher echelons.

(*e*) Reinforcement of the medical service by a higher echelon.

(*f*) Hospitalization.

(*g*) Shelter for medical troops and installations.

(*h*) Coordination of nonmilitary welfare and relief agencies in medical installations.

(*i*) Traffic control and restrictions affecting medical vehicles.

(*j*) Reports of animal casualties.

(*k*) Animal replacements for medical units.

(*l*) All other matters which have not been specifically allotted to another general staff section, or wherein there is doubt as to which section has jurisdiction.

c. With special staff.—The expenditure of much time and energy may be spared the general staff by the close cooperation of the surgeon with other members of the special staff. In war, time is ordinarily too precious to be wasted in ponderous methods of formal staff procedure. Informal agreements among special staff officers, succintly submitted for approval when necessary, promote efficiency as well as foster the friendly personal relations that are so essential to the smooth functioning of a staff. The more important contacts of the surgeon with other special staff officers will be in connection with—

(1) *Engineer.*—(*a*) Water supplies; sewerage systems; electricity.

(*b*) Road construction and maintenance in and around medical installations.

• (*c*) Construction, repair, and maintenance of roads and structures used by the medical service.

(*d*) Preparation of signs.

(*e*) Camouflage.

(*f*) Maps.

(2) *Quartermaster.*—(*a*) Disposition of the dead at medical installations; the sanitary aspect of the disposition of all dead.

(*b*) Bathing, delousing, and laundry facilities for all troops.

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(c) Clothing for gassed cases, and other patients returning to duty.

(d) General supply of medical units.

(e) Procurement of land and existing shelter for medical troops and installations.

(f) Procurement and operation of utilities allocated to the Quartermaster Corps. (See FM 100-10.)

(g) Transportation, land and water; motor and animal transport of medical units.

(3) *Chemical warfare officer.*—(a) Gas defense of medical troops and installations; gas masks for patients.

(b) Types of gas used and methods of identification.

(c) Toxicology and pathology of new gasses.

(4) *Adjutant general.*—(a) All official correspondence through command channels.

(b) Personnel matters.

(c) Postal service for medical units and installations.

(5) *Signal officer.*—Signal communication for medical installations.

(6) *Judge advocate.*—(a) Questions of military and civil law.

(b) Administration of justice in medical units.

(7) *Headquarters commandant and provost marshal.*—(a) Physical arrangements for the surgeon's office.

(b) Custody of sick and injured prisoners of war.

(c) Disposition of stragglers and malingerers in medical installations.

CHAPTER 3

MEDICAL PLANS AND ORDERS

SECTION I

MEDICAL ESTIMATE OF SITUATION

■ 8. REFERENCES.—For general discussions of an estimate of the situation, see FM 100–5 and FM 101–5.

■ 9. PREPARATION.—Every medical officer responsible for the execution of a military task, whether it is to direct the medical service of a theater of operations or to lead a bearer platoon into action, must make an estimate of the situation before arriving at a decision. Formal written estimates are rarely made except in the advance planning of large units. A rapid mental estimate is the rule in the field. Nevertheless, the same process of thought is followed. The estimate is a continuing process of thought. New situations arise constantly. A running estimate of the situation revised as events transpire will be the constant preoccupation of the surgeon, because a planned medical service must be furnished a command from the time it is mobilized until it is disbanded.

■ 10. MISSION.—The mission must never be lost sight of in any of the considerations that follow. Broadly speaking, the mission of all medical units under all conditions is to provide medical service. The mission of the troops served determines the general type of medical operations and a mission to provide medical service for the regiment in the attack of a position implies a different type of medical operation than a mission to provide medical service for the division in a daylight withdrawal. For this reason the medical mission should be stated specifically in conformity with the operations in which the troops supported are engaged.

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■ 11. SITUATION.—*a. Elements of the situation.*—A medical situation may comprise few or many elements. Certain elements will be present in most situations. Others will appear only occasionally. In considering the discussion that follows, it must not be inferred that all the elements discussed are present in every situation or that each is equally important.

(1) *Enemy capabilities.*—The capabilities of the enemy are a most important factor in any military estimate of the situation; but the surgeon considers them from his specialized point of view. Insofar as the medical service is concerned, they are limited to his potential power of inflicting physical damage upon personnel and animals, and of impeding or prohibiting evacuation. These capabilities result from his strength, his combat efficiency, his position, his weapons, and any other attributes that may be converted into casualties.

(2) *Own situation.*—(a) *Plan of commander.*—The medical service must be adapted to the operations of combat elements. The plan of the commander must be known as the nature of the operations is a factor in the estimation of the probable number and distribution of casualties.

(b) *Strength.*—Strength is one index of the actual number of casualties to be expected; and, when considered in connection with the capabilities of the enemy and the plan of the commander, it is a factor in estimating the rate of casualty incidence.

(c) *Position.*—In defense, the characteristics of the position, particularly its natural strength and the degree of organization, influence the incidence of casualties.

(d) *Movements.*—Movement under fire is productive of casualties; and the difficulties of evacuation increase in proportion to the rate of movement. The probable extent, direction, and rate of movement of the force, or any major components thereof, should be considered.

(3) *Physical factors.*—There are always physical factors in the situation to influence medical service, either in the number of casualties or in their collection and evacuation. Some of these are—

(a) *Terrain.*—Consider the terrain features that may influence favorably or unfavorably the task of the medical service, such as cover, protection, shelter, and sources of water supply.

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(b) *Communication.*—Avenues of communication are terrain features; but their importance in evacuation warrants special consideration because of susceptibility to air attack. Roads, railroads, and water routes must be considered as their condition, practicability, and availability influence the medical task.

(c) *Weather.*—Weather is a factor in the health of the command, in the shelter required for casualties, in the move ments of medical units, and in collection and evacuation. The meteorological service is in a position to make long-range predictions with reasonable accuracy, and since plans are drawn for future operations, predicted weather is more important than conditions prevailing at the time of the estimate. Moonlight may be a factor to be considered.

(d) *Other physical factors.*—In special situations other physical factors may have to be considered, such as contamination of the soil with pathogenic organisms, noxious vegetation, and the pollution of streams with industrial wastes.

(4) *Supply.*—The general and special supply situation is a restrictive factor, and its present status, sources of replenishment, and difficulties of distribution must be considered

(5) *Physical condition of command.*—Poor physical condition will multiply the numbers of casualties requiring evacuation during prolonged combat. Not only does poor physical condition produce actual disability but it also results in a state of mind that encourages the magnification of minor afflictions and even frank malingering. The mere sorting of such cases places a heavy burden upon the medical service. Physical condition is affected by—

(a) *Origin of troops.*—Soldiers drawn from densely populated urban centers will usually have, until they are well seasoned, less physical stamina than those reared in rural areas. On the other hand, those of urban origin will prove more resistant to communicable diseases.

(b) *Presence of communicable diseases.*—The presence of communicable diseases in a command increases the burden upon the medical service out of all proportion to the numbers of cases involved. Such cases must be isolated during evacuation as well as during treatment; and, in an epidemic, new cases will occur during combat as well as at other times.

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(c) *Food supply.*—The adequacy and quality of food are most important factors in physical condition, but never is their influence greater than in combat. The unusual exertion, the lack of rest, and the increase in metabolic rate caused by excitement increase the food requirements of the soldier in combat; and inability to supply him will result in the impairment of physical condition that is reflected in the medical task in the manner described above.

(d) *Water supply.*—For a detailed discussion of water supply, see FM 8–40. An adequate supply of potable water is essential both for the effective soldier and for the casualty.

(e) *Clothing.*—Proper clothing has bearing upon physical condition and is to be considered in connection with the weather.

(f) *Fatigue.*—Fatigue is a most important factor in physical condition. The state of the command with regard to fatigue must be given full consideration in a medical estimate of the situation.

(g) *Other factors in physical condition.*—In special situations other factors may affect physical condition, such as extreme heat, insanitary conditions in field fortifications, deficiency diseases, foot injuries, and foot diseases other than communicable.

(6) *Other elements of the situation.*—In special situations, other elements that will influence the medical task may have to be considered. Morale may have a special importance in a given situation. Another is any restriction upon the freedom of action of the medical service imposed by the commander in the interests of secrecy, deception, or other military necessities.

b. Analysis of the situation.—The individual qualitative values of the elements of the situation are considered in *a* above. In medical planning they must be reduced and analyzed in terms of the premises upon which a medical plan is based. These premises are—

(1) *Estimated number of casualties.*—The number of casualties is a product of the combined influences of enemy capabilities, relative strength, position, own scheme of maneuver, physical factors, morale, and physical condition upon the standard expectancy shown in experience tables.

(2) *Distribution of casualties in time.*—This is important in planning the movement of medical units, the establishment of medical installations, and the arrangements for support by higher echelons; and it will depend upon the enemy capabilities and the plan of the commander.

(3) *Distribution of casualties in space.*—The probable distribution of casualties in space is a most important consideration in the allotment of medical means.

(a) *Areas of casualty density.*—These are predictable from a consideration of enemy capabilities, position, terrain, and the plan of the commander. If the factor of physical condition be not uniform throughout the command, it will also exert an influence.

(b) *Lines of natural drift of wounded.*—This is a planning factor only in forward areas where walking wounded must be considered. They may be deduced from a consideration of the terrain and the plan of the commander.

(4) *Medical means required.*—From the estimates of the number of casualties and their distribution in time and space are calculated the number and types of medical units required for the various phases of medical service, such as first aid, collection, evacuation, and hospitalization, including medical support by higher echelons. Neither the means available nor the allotment of specified units should be considered at this stage. This is merely an estimate of the medical means required.

(5) *Supply requirements.*—The supply requirements will depend upon the number of casualties and upon the number of medical units, and to a lesser degree upon the distribution of the casualties in space.

■ 12. MEANS.—Having arrived at the medical means required, the next step is a consideration of the means at hand or readily available. To prevent confusion, these should be separated into four categories.

a. *Organic medical units.*—The medical units, agencies, and installations that are organic components of the command are listed, and under each is stated its location, strength, and readiness for action.

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b. Attached medical units.—Both medical units already attached and those that may be readily had are considered in the manner described in *a* above.

c. Support by higher echelons.—Here is considered the evacuation and other support that will be furnished by higher echelons.

d. Supply.—This includes the supply agencies and the amount of supplies on hand and the facilities for replenishment.

■ 13. PLANS.—A plan is the application of the means at hand to accomplish a task. In arriving at a plan the various factors involved in the task are considered, together with the means available. The many variables usually present in any situation will usually permit more than one plan to be formulated. For this reason the main features of all workable plans should be considered in arriving at a decision.

■ 14. DECISION.—The decision is the result of the estimate expressed in the form of a brief statement clearly setting forth the line of action adopted. The decision is the basis of the plan and states in general terms only the plan adopted after considering all possible plans. The details will be added in the development of the plan. (See sec. II.)

SECTION II

MEDICAL PLANS

■ 15. DEFINITIONS.—*a.* A *medical plan* is a plan for the operation of the medical service of a command prepared by the surgeon acting in his capacity of a staff officer. (See FM 101–5.)

b. A *unit plan* deals only with the operations of the particular unit to which it pertains. It is prepared by the unit commander, based upon the decisions and orders of the next higher commander which prescribe the essential elements of other subordinate plans as well as of the medical plans.

■ 16. PURPOSE AND SCOPE.—*a. Medical plan.*—The scope of a medical plan depends upon the size and complexity of the command to which it pertains. The medical plan of a battalion usually will include little more than the location of the aid station. That of a regiment may include, in addition.

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arrangements for supply or for some redistribution of medical means; while the medical plan of a division must deal with more functions because of the greater extent of the medical responsibilities.

b. Unit plan.—The purpose of a unit plan is to break down a mission into its component tasks. Its particular virtue is that it visualizes the entire task before allotting specific tasks to subordinate elements. Prodigal dissipation of means is avoided. Committed to action without a plan, a unit may waste its strength in uncoordinated effort. For this reason careful planning is an essential precedent of effective execution. The scope of a unit plan depends upon the situation. In general, it must provide for the accomplishment of the mission and for the disposal of all means, including the means held in reserve.

■ 17. CHARACTERISTICS OF A SATISFACTORY PLAN.—*a. Comprehensiveness.*—A medical plan provides not only for the roles to be played by medical units but also other information required by the commander.

b. Flexibility.—Military situations change frequently and often with little warning; and a plan must be so drawn that, without fatal delay, it may be modified to meet changes in the situation arising either before or after the plan is placed in operation.

c. Simplicity.—Plans are the bases of orders. Elaborate plans require complex orders for expression. A simple plan has a greater chance of success than an involved plan.

■ 18. PREPARATION.—*a. Medical plan.*—The preparation of a medical plan is a responsibility of the surgeon. If he has no assistants he must prepare all the details himself; but, in larger units, the surgeon ordinarily will indicate by a directive the general scheme to his assistants who develop the details.

b. Unit plan.—The unit commander prepares his unit plan with or without the assistance of a staff. *A complete formal plan* (par. 23c) *will rarely be prepared.* The ordinary plan will consist merely of the unit commander's basic decision and the supplemental decisions made by him or an authorized staff officer which, if made of record at all, will be in the form of memoranda.

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■ 19. APPROVAL.—*a. Medical plan.*—A complete plan of operations includes the commander's decision and the elaboration of all the details necessary to carry this decision into effect. To insure a well integrated general plan, all staff plans must be coordinated to reconcile conflicting interests and to promote complementary action. This is a function of command, exercised in small units by the commander himself, and in larger units through his general staff or comparable assistants. In common with other staff plans, a medical plan is not operative until it has been approved by the commander. It may be approved item by item; or, if time permits, it may be submitted for approval in its complete form prior to the start of the operation.

b. Unit plan.—Since a unit plan is limited by the decisions, directives, and announced policies of the next higher commander, it does not ordinarily require the approval of higher authority. However, the higher commander may at any time call for the plans of his subordinate commanders.

■ 20. MEDICAL ANNEX.—When the details of a medical plan are too voluminous to be included in an administrative order, or are not of general interest or concern, they may be published in an annex to that order, with a reference in appropriate paragraphs as follows: *See Annex No. —, to F. O. —, Medical Plan.*

■ 21. SCOPE OF ARMY MEDICAL PLANNING.—*a. General.*—The scope of medical planning far exceeds the brief details submitted in any one medical plan; for planning is continuous and contemplates all reasonable contingencies whereas a plan is the solution of a fairly well-defined problem. Successive plans are the periodic dividends of continuous planning.

b. Prior to concentration.—The army commander is designated and his staff assembled some time in advance of concentration. Planning commences at once; and the army surgeon must make the most of this opportunity to assemble from every possible source the pertinent data bearing upon the medical problems that will be encountered in the theater.

c. Supply planning.—Considered separately, the scope of medical supply planning in the army is relatively restricted.

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If properly stocked supporting depots be constantly at hand, the army problem is limited to the disposition and stockage of the army medical depot. But the army medical supply problem cannot be separated from that of the supporting echelon since the supply plan of the latter will depend, in large measure, upon the requirements of the army. Consequently, initially and throughout operations there must be close supply liaison between, and joint planning by, the army and the next higher supply echelon. The latter must be informed in advance of unusual requirements and anticipated variations in the rate of consumption.

The yardstick of supply planning is the day of supply (see par. 42). The components of a day of medical supply will be influenced by many factors, the more important of which are the epidemiological characteristics of the theater, the nature of the operations, and the amount and type of supply transport available. The only point of departure in the initial estimate of a day of medical supply is the accumulated experience of United States troops in the same or similar theaters. The component items are selected from the Medical Department Supply Catalog, and the number of items should be held to the minimum consistent with proper medical service in the army area, dispensing with unnecessary equipment and with articles of individual preference. The daily rate of consumption can only be estimated by applying to past experience the factors expected to be operative in the situation at hand. Subsequent adjustments can be made as the experience in the theater accumulates, and supply planning thereby will become increasingly accurate.

d. Evacuation and hospitalization.—For detailed discussions of the estimation of requirements for evacuation and hospitalization, see chapter 7, this manual, and Army Medical Bulletin No. 24. The more important factors to be considered are—

(1) *Disease and nonbattle injuries.*—Admission rates and duration of treatment by classes of disease. These casualties are the backlog of medical service and enter into every estimate.

(2) *Battle casualties.*—Total numbers, distribution by units, and classification by transportation required (sitting or

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prone); classification by causative agent (such as casualties from chemical agents), and classification by type of injury (such as head injuries) when these require special provisions for evacuation or treatment.

(3) *Transport required and available.*—Ambulances, cargo trucks, light railways, special transport.

(4) *Surgical hospitals.*—Numbers and disposition.

(5) *Evacuation hospitals.*—Numbers and disposition; availability of routes to the front and rear.

(6) *Convalescent hospital.*—Location, available capacity.

(7) *Veterinary hospitals.*—Necessity for, if none are already available. Factors similar to those considered in the case of human casualties.

(8) *Evacuation policy.*—The proper evacuation policy for an army will vary within wide limits, depending upon the military situation, prevailing causes of admission, the chain of evacuation, and other factors. In general, it may safely be longer than that of a corps under similar circumstances, but no rigid rules can be laid down.

e. Preventive medicine.—It is an axiom in health administration that the first requirement in prevention and control is information of the sources and distribution of disease and injury. The best method of obtaining such information is by a thorough sanitary survey, but this frequently is impossible prior to the occupation of a theater of operations. Other sources of information must be exploited until first-hand information can be obtained. Some of these sources are the offices of the surgeons general of the Army, the Navy, and the Public Health Service; the G–2 division of the War Department General Staff; published public health reports from the area in which the theater is located, ordinarily to be found in the Army Medical Library; and international health research organizations such as those maintained by the League of Nations and certain universities and philanthropic foundations. All available data bearing upon the health of troops should be collected, evaluated, and tabulated in the medical section of army headquarters prior to concentration. After concentration a continuing sanitary survey adds to such information, both in quantity and in reliability. There is a sanitary aspect to almost every military plan and the army

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surgeon must be prepared to advise the commander accordingly. There is rarely time to obtain sanitary information after the need for it arises. Therefore, the surgeon must anticipate such need and collect in advance all possible sanitary information. There is scarcely a limit to the information that may be at some time of great importance; and the following list of the more important subjects is not intended to be restrictive:

(1) Prevailing diseases, human and animal, among the civil population of the theater—character, geographic distribution, and other epidemiological features; reservoirs of infection.

(2) Animate vectors of disease, actual and potential; identification, distribution, methods of control.

(3) Climate—seasons and seasonal distribution of disease.

(4) Noxious vegetation—poisonous and irritant plants, their distribution and means of prevention of disabling effects.

(5) Venomous reptiles and insects, and dangerous animals—distribution, means of protection and treatment.

(6) Susceptibility of the command—race, nativity, seasoning, and immunity.

(7) Local food and forage supply—character, sources, quality, and hygiene; diseases transmitted by food stuffs.

(8) Local water supplies—sources, potability, treatment—both that applied and that required, and capacities of all public supplies.

(9) Sewage disposal—type, efficiency, and capacity of each local sewerage system in the theater.

(10) Local civil health agencies—organization, scope of activities, and efficiency of all civil health agencies in the theater.

(11) Sanitary habits of the civil population—sanitary conscience and level of instruction in hygiene.

(12) Disability among troops—current information of the incidence of all disease and injury. This information is of no value whatsoever unless it be properly classified and closely analyzed. Admission rates for the army as a whole are not very helpful; and graphs depicting such experience are of little value other than decorative or to impress the

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uninitiated. Admission rates must be broken down by causes and by organizations. In this way only can unusual incidence be localized and investigated. If, for example, two organizations are equally exposed to the risk of injury by animals and one of them shows a much higher admission rate from this cause than the other, there is a presumption of faulty management or want of care in the one with the higher rate which should be inquired into. Organization showing a higher or a lower admission rate than the average for intestinal infections should be carefully investigated—the former to unearth defects in sanitation and the latter to discover practicable measures of general application. Within the registers of sick and wounded are locked all the problems of preventive medicine; and competent search will reveal the keys to the solution of most of them.

■ 22. SANITARY ORDER.—The sanitary order publishes to the entire command the sanitary measures to be enforced. It is drafted by the army surgeon and, as approved, issued by the army commander, usually as a general order. This order should cover only the routine instructions of general application. Special instructions, applicable to only a fraction of the command, should be issued in communications or other suitable form; and special instructions, of general application but for limited periods, should be issued as paragraphs in administrative orders or in memorandums. (See FM 8–40.)

■ 23. CHECK LISTS.—a. *General.*—The check lists (apps. I and II) are intended as guides to the preparation of a complete formal plan. Rarely will plans of a surgeon or a medical unit commander include all of the items in these lists. Many of the items are covered habitually by standing operating procedures; but they must be provided for in some way in the situations in which each is involved.

b. Medical plan.—As approved, a medical plan will appear in whole or in part in the administrative order of the command or in the administrative paragraph of the field order. It will facilitate the preparation of such orders if the medical plan follows the sequence of an administrative order. A check list along these lines appears in appendix I; only the items pertaining to the command in question are to be considered.

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c. Unit plan.—A complete plan for a medical unit may take the form outlined in appendix II.

SECTION III

COMBAT ORDERS OF MEDICAL UNITS

■ 24. REFERENCES.—For a detailed discussion of combat orders, see FM 101–5.

■ 25. PURPOSE.—The purpose of orders is to place in effect the decisions and plans of a commander. The adequacy and clarity of orders become, therefore, vital factors in the execution of plans.

■ 26. SCOPE.—An order must include all the information and instructions required by subordinates to execute their tasks, but nothing more. It should not trespass upon the province of subordinates; and the general rule is that a subordinate should be told what he is to accomplish, but not how to do it. The scope of an order, not to be confused with its length, will depend upon—

a. Establishment of standing operating procedures.—A standing operating procedure may be prescribed by the commander in order to reduce the volume of orders and instructions, and to establish in the command a common understanding of routine operations to be executed. The adoption of such a procedure will save time in the preparation and issuance of orders, minimize the chances for confusion and errors when under stress of combat, and greatly simplify and expedite the execution of operations in the field. (See FM 100–5.)

b. Situation.—A plan may project operations into the future; but plans can be modified without creating confusion as the situation develops. On the other hand, orders should prescribe only so far as conditions can be foreseen. When details are arranged too far in advance, orders usually have to be countermanded with consequent confusion and misunderstanding, possible needless hardships on the troops, and injury to their morale (FM 100–5). Considerations of secrecy may also limit the scope of orders.

■ 27. TYPES.—*a. General.*—A medical unit will rarely issue any type of combat order other than a field order. For a discussion and form of a field order, see FM 101–5.

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b. Warning orders.—In certain situations it may be necessary or desirable to issue a warning order. A warning order usually consists of a brief message giving information which will enable subordinate commanders to make the necessary preparations for a contemplated operation. Its principal purpose is to gain time for preparatory measures and to conserve the energy of the troops. (See FM 100–5.)

c. Field order.—A field order is divided into four principal parts—the heading, the distribution of troops (rarely applicable in the field order of a medical unit), the body, and the ending. (See FM 101–5.)

d. Examples.—Examples of field orders of medical units appear in appendix III.

■ 28. PREPARATION.—The unit commander is responsible for the preparation of all orders issued in his name. The details of preparation of orders are a staff function; but, if there is no staff, the commander must prepare his orders without assistance. Orders frequently are issued in fragmentary form as the situation develops and supplemental decisions are made. Such fragmentary orders may be extracts from a complete order, or they may cover various phases of an operation successively. A medical battalion or regiment rarely will be able to issue a complete formal field order prior to initiating operations. A series of fragmentary orders will be the rule.

CHAPTER 4

TROOP MOVEMENT

■ 29. BASIC ROAD SPACES.—*a. Foot and animal elements.*

Element	Yards
Animals:	
In single file, per animal_____	4
In column of twos, per animal_____	2
In column of fours, per animal_____	1
Animal-drawn transport:	
Vehicles drawn by 2 animals, not tandem_____	15
Vehicles drawn by 4 animals_____	20
Foot troops:	
In single file, per man_____	2
In column of twos, per man_____	1
In column of threes, per man_____	⅔
In column of fours, per man_____	½
Units, minimum distances between:	
Companies, foot or mounted_____	50
Battalions, foot or mounted_____	50

b. Motorized elements at halt.

Element	Yards
Ambulances, per vehicle_____	10
Car, 5-passenger, per vehicle_____	10
Motorcycles, per vehicle_____	5
Trucks:	
½-ton to 3-ton, per vehicle_____	10
½-ton to 3-ton with trailer_____	13
Over 3-ton, per vehicle_____	13
Units, distances between_____	50

c. For the length of moving motorized columns, see paragraphs 32 and 33*b*.

■ 30. ROAD SPACES OF MEDICAL UNITS.—In tables I, II, and III are shown the road spaces of medical units when halted and closed up. The figures given include 50 yards between battalions, squadrons, companies, or troops to facilitate control and servicing. All personnel, other than the mounted personnel

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of veterinary units, are assumed to be transported in vehicles, which is the normal manner of marching these units.

For the lengths of moving motor columns, see paragraphs 32 and 33*b*, and for the lengths of columns of foot elements, when not transported in vehicles, apply the basic data in paragraph 29*a*.

TABLE I.—*Road space of motor columns when halted and closed up*

Unit	Road space
Medical regiment, square division (8—21):	*Yards*
Collecting battalion (8–25)	290
Collecting company (8–25)	65
Ambulance battalion (motor) (8–35)	835
Ambulance company (8–35)	245
Ambulance company less 1 platoon	145
Ambulance platoon	100
Medical clearing battalion (hospital) (8–45)	505
Clearing company (8–45)	135
Headquarters and service company (8–22)	170
Total	2,490
Medical battalion, triangular, division and corps (8–65):	
Headquarters detachment (8–66)	155
Collecting companies (8–67)	570
Clearing company (8–68)	215
Total	940
Medical battalion, armored division (8–75):	
Headquarters detachment (8–76)	180
Collecting company (8–77)	365
Clearing company (8–78)	280
Total	825

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TABLE II.—*Road space of medical squadron when halted and closed up (T/O 8–85)*

Unit	Road space	
	Motor elements	Animal elements
	Yards	*Yards*
Collecting troop (8–87)	240	
Clearing troop (8–88)	150	
Veterinary troop (8–89)	123	12
Headquarters detachment (8–86)	75	
Total	588	12

TABLE III.—*Road space of army medical units and additional motor transport required for their movement*

Unit	Additional truck-tons required to move equipment only	Additional 1½-ton trucks required for personnel and equipment	Road space when halted and closed up [1]
			Yards
Surgical hospital (8–231)	60	51	565
Evacuation hospital (8–222)	184	155	1,625
Convalescent hospital (8–233)	232	169	2,030
Medical laboratory (8–234)	5	5	50
Medical depot (8–235)	90	77	930
One section	30	26	285
Veterinary evacuation hospital (8–236)	9	13	175
Veterinary convalescent hospital [2] (8–237)	24	34	340

[1] Includes both the organic and the additional motor vehicles required to move personnel and equipment.

[2] Less animal elements.

■ 31. ADDITIONAL TRANSPORT REQUIRED BY ARMY MEDICAL UNITS.—In table III is shown the amount of motor transport, *over and above the organic transport of the units,* that is required to move certain medical units.

■ 32. TRANSPORTATION OF DUTY PERSONNEL IN MOTOR VE-HICLES.—*a. Trucks.*—Motor transport requirements for duty

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personnel, with individual equipment, moved by trucks are computed on the basis of 12 men per 1½-ton cargo truck and 20 men per 2½-ton cargo truck.

b. Ambulances.—An average of 8 men, with individual equipment, may be transported in a motor ambulance in addition to the driver and his assistant. For short trips over good roads the number may be increased to 10.

■ **33. AVERAGE ROAD SPACE OCCUPIED BY MARCHING COLUMNS.—** *a. Foot and animal elements.*—See paragraph 29*a*.

b. Motor columns.—The length of motor columns varies with the speed with which they are moving. Special instructions may prescribe a given road density per mile, or a given extended distance between vehicles. Table IV is based upon road movements in which vehicles keep closed up to *safe* driving distances. Safe driving distance is assumed to be constant (15 yards, center to center, for cars or trucks up to 3-ton) for speeds up to 5 miles per hour, and to increase with the speed for rates above 5 miles per hour. This table gives average road space. Actual road space may vary 25 percent either way, depending upon conditions.

Example: Find the road space of the medical battalion of the triangular division traveling at 30 miles per hour.

From table I, the road space, when halted and closed up, is 940 yards. From table IV, the road space of a motor column. which is 900 yards in length when halted and closed up and which is traveling at 30 miles per hour, is 6,390 yards; and each yard in length, when halted and closed up, increases to 7.10 yards at 30 miles per hour. So:

Length of 900-yard column at 30 mph=6,390
Length of 40-yard column at 30 mph
   (40×7.10)   =   284
                                       ‾‾‾‾‾‾‾
Length of 940-yard column at 30 mph=6,674

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TABLE IV.—*Average road space of moving motor columns*
(See par. 33 in connection with this table)

Road space occupied when at a halt and closed up [1]	Road space, in yards, occupied when moving at [1]—								
	5 mph or less	6 mph	10 mph	15 mph	20 mph	25 mph	30 mph	35 mph	40 mph
Yards									
1 [2]	1. 45	1. 64	2. 35	3. 50	4. 70	5. 90	7. 10	8. 30	9. 50
5 [2]	7. 25	8. 20	11. 75	17. 50	23. 50	29. 50	35. 50	41. 50	47. 50
50	75	80	120	175	235	295	355	415	475
100	145	165	235	350	470	590	710	830	950
200	290	330	470	700	940	1, 180	1, 420	1, 660	1, 900
300	435	490	705	1, 050	1, 410	1, 770	2, 130	2, 490	2, 850
400	580	655	940	1, 400	1, 880	2, 360	2, 840	3, 320	3, 800
500	725	820	1, 175	1, 750	2, 350	2, 950	3, 550	4, 150	4, 750
600	870	985	1, 410	2, 100	2, 820	3, 540	4, 260	4, 980	5, 700
700	1, 015	1, 150	1, 645	2, 450	3, 290	4, 130	4, 970	5, 810	6, 650
800__	1, 160	1, 310	1, 880	2, 800	3, 760	4, 720	5, 680	6, 640	7, 600
900	1, 305	1, 475	2, 115	3, 150	4, 230	5, 310	6, 390	7, 470	8, 550
1, 000	1, 450	1, 640	2, 350	3, 500	4, 700	5, 900	7, 100	8, 300	9, 500
1, 500	2, 175	2, 460	3, 525	5, 250	7, 050	8, 850	10, 650	12, 450	14, 250
2, 000	2, 900	3, 280	4, 700	7, 000	9, 400	11, 800	14, 200	16, 600	19, 000

[1] Since this table is based upon factors introduced by speed, feet or miles may be substituted for yards if the substitution is made in both columns used.
[2] To be used in interpolation.

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TABLE V.—*Average time lengths of moving motor columns*
(See par. 34*b* in connection with this table)

Road space occupied when at a halt and closed up	Time length, in minutes, when traveling at—						
	2 mph	2.5 mph	3 mph	3.5 mph	5 mph	6 mph	10 to 35 mph
Yards							
1 [1]	0.025	0.020	0.01667	0.01425	0.010	0.00933	0.008
5 [1]	.125	.10	.08333	.07125	.050	.04665	.040
50	1	1	1	1	.5	.5	.5
100	3	2	2	1	1	1	1
200	5	4	3	3	2	2	2
300	8	6	5	4	3	3	2
400	10	8	7	6	4	4	3
500	13	10	8	7	5	5	4
600	15	12	10	9	6	6	5
700	18	14	12	10	7	7	6
800	20	16	13	11	8	7	6
900	23	18	15	13	9	8	7
1,000	25	20	17	14	10	9	8
1,500	38	30	25	21	15	14	12
2,000	50	40	33	29	20	19	16

[1] To be used in interpolation.

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■ **34. AVERAGE TIME LENGTHS OF MOVING COLUMNS.—***a. Foot and animal elements.*—There are no foot and animal elements in medical troops of sufficient size to make such computations necessary.

b. Motor columns.—Table V is based upon road movements in which vehicles keep closed up to safe driving distances. At 5 miles per hour or less the safe driving distance is assumed to be constant at 15 yards between centers of vehicles up to 3-ton trucks, and the time length of a column varies inversely with the speed. From 10 to 35 miles per hour the safe driving distance varies directly with the speed, and the time length of the column therefore is constant. Above 35 miles per hour the safe driving distance increases so rapidly as the speed is increased that the time length of such columns tends to increase even though the speed of the individual vehicles is greater. Table V gives average time length. Actual time length may vary 25 percent in either direction, depending upon conditions.

Example: Find the time length of the medical battalion of the triangular division traveling at 30 miles per hour.

From table I, the road space, when halted and closed up, is 940 yards. From table V, the time length of a column, which is 900 yards in length when closed up and which is traveling 30 miles per hour, is 7 minutes; and each yard of increased length when closed up adds 0.008 minutes in time length. So:

Time length of 900-yard column at 30 mph_ =7.
Time length of 40-yard column at 30 mph
   (40×0.008) _____ =0. 32
                                      ———

Time length of 570-yard column at 30 mph_ =7. 32 (or
   7 minutes).

■ 35. RATES AND LENGTHS OF MARCHES.—The following rates and lengths of marches are based upon modern vehicles, trained personnel, and favorable conditions of roads and weather.

Unit	Average rates of march (miles per hour)				Lengths of march (average)	Remarks
	On roads		Across country		On roads (miles per day)	
	Day	Night	Day	Night		
Foot troops..........	2½	2	1½	1	12–15 for a division. 15–20 for smaller units.	Length of march increased with well-seasoned troops on good roads in favorable weather, when required by the tactical situation.
Animal-drawn trains.	3½	3	1½	1	20	May cover greater distances for short periods.
Trucks, ambulances, motorized units.	25	25 (lights), 10(no lights).	8	5	175	May cover considerably greater distances for short periods.
Cars and motorcycles, passenger.	35	35 (lights), 10(no lights).	8	5	250	

■ 36. RAILWAY CAR SPACE REQUIREMENTS.—The following space requirements are used as a basis for computing car requirements for movements by rail. The figures show the space requirements, in inches of lineal car length, of items of equipment and transport. The length of flatcars is assumed to be 40 feet. (See FM 25–10.)

291816°—41——5   29

⅛ Flatcar: *Inches*

     Motorcycle, with side car_____ 80

     Trailer, 2-wheel, ¾-ton (empty)_____ 80

¼ Flatcar:

     Trailer, 2-wheel, ¾-ton (loaded)_____ 112

⅓ Flatcar:

     Trailer, water, 250-gallon_____ 128

½ Flatcar:

     Ambulance, field motor_____ 225

     Car, light, passenger _____ 188

     Car, medium, passenger_____ 208

     Trailer, command post, 2-wheel_____ 240

     Trailer, cargo, 4-wheel_____ 204

     Truck, automotive repair_____ 240

     Truck, cargo, 1½-ton_____ 220

     Truck, cargo, 2½-ton_____ 234

     Truck, kitchen, 1½-ton_____ 220

     Truck, pick-up, ½-ton_____ 191

     Truck, pick-up, 1½-ton_____ 220

     Truck, reconnaissance, 8-passenger_____ 195

     Truck, spare parts_____ 240

     Truck, tank, 500-gallon_____ 240

1 Coach:

     30 men.

1 Boxcar (modified):

     36 men.

1 Stock car or boxcar (modified):

     20 animals.

■ 37. STANDARD RAILWAY TRAINS.—There are two types of standard railway trains for troop movements. Medical units almost invariably require type B trains for movement.

| Type of train | Composition | | | | Total number of cars |
	Box [1]	Flat	Coach	Caboose [2]	
A_____	18	14	1	1	34
B_____	9	23	1	1	34

[1] One for kitchen and supplies.   [2] For train crew.

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■ **38. Standard Railway Train Requirements for Medical Units.**

Unit	Type B standard railway trains required to move personnel and equipment
Medical regiment, division (army)	4
Medical regiment (corps)	3
Medical battalion (triangular division and corps)	2½
Medical battalion (armored division)	1⅔
Medical squadron	1⅓
Surgical hospital	⅓
Evacuation hospital	⅔
Convalescent hospital	½
Medical laboratory	⅙
Medical supply depot	½
One section medical supply depot	⅙
Ambulance battalion (motor)	2
Veterinary evacuation hospital	⅙
Veterinary convalescent hospital	½

CHAPTER 5

SUPPLY

■ 39. CLASSIFICATION OF SUPPLY.—Supplies are classified in several ways, depending upon the purposes of the classification. The principal classifications are—

a. By using arm or service.—This classification is fixed by law and regulation and there are many exceptions to the general rule. Except for the purposes of original procurement, however, the following definitions are sufficiently accurate. *General supplies* are those used by two or more arms or services, such as rations, clothing, cleaning materials, etc., with the exception of certain special and technical articles such as arms, compasses, first-aid packets, etc. *Special supplies* are those used by a single arm or service together with the special and technical articles excepted from the general supplies such as surgical instruments, map-making equipment, telephones, and airplane parts.

b. By procuring arm or service.—(1) *General supplies.*—General supplies, insofar as the army is concerned, are procured by the Quartermaster Corps.

(2) *Special supplies.*—Special supplies are procured by the several supply arms and services, according to allocations made by the War Department, and are known by the name of the procuring arm or service, such as engineer supplies, ordnance supplies, quartermaster supplies, medical supplies, etc.

c. By necessity for accountability.—The necessity for accountability is fixed by regulations or orders for each item of supply. In general, however, articles which are "consumed" in use, such as ammunition, foot powder, paint, fuel, forage, cleaning and preserving materials, surgical dressings, drugs and medicines, etc., and such articles as spare or repair parts, which are used to repair or complete other articles and thereby lose their identity, are classified as *expendable*. Such articles as are "worn out," rather than consumed, such as arms, surgical instruments, X-ray apparatus, motor transport, etc., other than spare or repair parts therefor, are classified as *nonexpendable*.

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d. For distribution in field.—For simplicity and conveni-ence in administration, all supplies required by troops in the field, regardless of other classifications, are divided into five classes as follows:

(1) *Class I.*—Those articles which are consumed at an approximately uniform daily rate irrespective of combat oper-ations or terrain, and which do not necessitate special adapta-tion to meet individual requirements, such as rations and forage. These supplies are distributed automatically on the basis of strength returns, and no requisitions are necessary.

(2) *Class II.*—Those authorized articles for which allow-ances are established by Tables of Basic Allowances and Tables of Allowances, such as clothing, gas masks, arms, trucks, radio sets, tools, and instruments (including medical).

(3) *Class III.*—Engine fuels and lubricants, including gaso-line for all vehicles and aircraft, Diesel oil, fuel oil, and coal.

(4) *Class IV.*—Those articles of supply which are not cov-ered in Tables of Basic Allowances and the demands for which are directly related to the operations and contemplated or in progress (except for articles in classes III and V), such as fortification materials, construction materials, and machinery.

(5) *Class V.*—Ammunition, pyrotechnics, antitank mines, and chemicals.

■ **40. RATIONS.**—*a. Field ration.*—The field ration is that pre-scribed for use only in time of war or national emergency when the garrison ration is not used. It is issued in kind and no ration savings are allowed. Its components and substi-tutes are prescribed by the War Department or the com-mander of the field forces. There are four kinds of field rations—

(1) *Field ration A* corresponds as nearly as practicable to the components or substitutes therefor of the peacetime gar-rison ration, and is generally perishable.

(2) *Field ration B* corresponds as nearly as practicable to the components of field ration A with the exception that non-perishable processed or canned products replace items of a perishable nature. This ration is suitable for reserve pur-poses.

(3) *Field ration C* consists of previously cooked or prepared food, packed in hermetically sealed cans, which may be eaten

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either hot or cold. Each ration includes 3 cans containing a meat and vegetable component and 3 cans containing crackers, sugar, and soluble coffee.

(4) *Field ration D* consists of three 4-ounce bars of concentrated chocolate. It is a nonperishable ration and is suitable for use as an individual reserve.

b. Grains.—The grain component of the animal ration averages 10 pounds of grain per animal.

c. Hay.—The hay component of the animal ration averages 14 pounds per animal.

■ 41. MOTOR FUELS AND LUBRICANTS.—The *unit mile* is a unit of measure for requirements of motor fuels and lubricants. It is the amount (in gallons or pounds) of such supplies required to move *all* motor vehicles of a specified unit a distance of 1 mile. Service records of individual vehicles should be maintained as completely as practicable, and the unit mile value should be revised from time to time as indicated by experience.

■ 42. DAY OF SUPPLY.—*a. General.*—The term "day of supply" is a unit of measure in the operation of supply of large units in campaign, and is used to express collectively, in pounds per man per day, the estimated average expenditure of the various items of supply, per day, in campaign. It is a yardstick used by the higher echelons of the staff for determining levels, credits, transportation requirements, etc.

b. Day of medical supply.—(1) A day of medical supply includes hundreds of items of medical supply. The exact composition is fixed from time to time as experience indicates. While a unit of measurement based upon bulk or weight is well adapted to the broader aspects of supply administration, it does not meet the requirements of procuring and distributing agencies. They must define a day of supply in terms of specific articles and unit quantities thereof.

(2) The quantities of the various items which, taken collectively, represent a day of medical supply are determined by the commander upon the recommendations of the surgeon. These recommendations are based upon experience tables, the size and composition of the army, the character of the operations, the nature of the enemy, and the climatic

and epidemiological characteristics of the theater of operations.

(3) For a list of Medical Department chests, with contents, and individual equipment, see the appendixes III and IV, FM 8–10, or the current Medical Department Supply Catalog.

■ **43. DEPOT STOCKAGES AND SUPPLY CREDITS.**—*a. Depot stockages.*—(1) The level at which depot stockages will be established or maintained is a command decision. It is ordinarily prescribed in terms of days of supply, and will vary with the situation and the plan of the commander. Stockages in army depots usually are maintained at relatively low levels— 3 to 5 days of supply on the average.

(2) It is the duty of the army surgeon to keep the medical supply officer informed of anticipated variations in the rate of consumption; and it is the duty of the army medical supply officer to initiate, in ample time, the necessary steps for the replenishment of stocks so that prescribed levels are approximated at all times.

b. Supply credits.—In order to simplify supply administration and to expedite the replenishment of supplies in army depots, credits may be established in favor of the army in supporting depots—in the communications zone or the zone of the interior, as the case may be. Such a credit is an allocation of a definite quantity of supplies, placed at the disposal of the army commander for a prescribed period of time. Credits are ordinarily measured in terms of days of supply. The amount of credit will vary with the situation and the levels of stockage maintained in supporting depots. A credit of from 10 to 15 days of supply might be considered suitable for an army.

CHAPTER 6

RATES USED BY THE MEDICAL SERVICE

■ **44. GENERAL.—*a. Definition.*—**A rate is an abstract number by means of which concrete frequencies are reduced to common bases. The occurrences of any event in two or more groups cannot be accurately compared until the influences of such factors as the duration of the experience and the numbers involved have been equalized.

b. Basic formula.—The basic formula for all rates is—

$$\text{Rate} = \frac{\text{Number experiencing a specified event}}{\text{Number that might have experienced the specified event}}$$

If the numerator of the above formula is designated as f (frequency), and the denominator by n (mean strength, or numbers involved), then—

$$\text{Rate} = \frac{f}{n}$$

■ **45. RATES PER CONSTANT.—**Fractions are more difficult to visualize and to remember than whole numbers; and, to avoid them, it is customary to express rates in terms of occurrences per 1,000, per 10,000, per 100,000, or, in general, per K of those exposed to the occurrence of the event. When this constant (K) is introduced, the general formula becomes—

$$\text{Rate} = \frac{K \times f}{n}$$

In most rates used by the medical service, $K=1,000$. The case fatality rate is an exception (see par. 50).

■ **46. TIME FACTOR IN RATES.—**The n in the general formula in paragraph 45 resolves differences in the numbers exposed to the occurrence of any event; but in many rates the duration of the experience is also an essential element. For example, a rate which measures the actual admissions to sick report over a period of 10 days is not comparable to one which measures actual admissions over a period of 3 weeks. Experiences are reduced to a common base as regards duration by the introduction into the formula of a factor express-

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ing time. It is assumed arbitrarily that the experience lasted a certain time, and the relationship of the actual duration to this arbitrarily selected duration is expressed as a fraction. This is to say, that—

> Where T=the arbitrarily assumed duration—ordinarily 1 day, 1 week, 1 month, or 1 year; and
> t=the actual duration of the experience in days, weeks, months, or years;

then the factor of T/t, introduced into the rates measuring two or more experiences, will reduce all to a common base as regards duration. So, when duration is an essential element, the formula becomes

$$\text{Rate}=\frac{K \times f \times T}{n \times t}$$

It is obviously necessary that T and t be expressed in the same unit of time—months, weeks, or days. T will always be either 12, 52, or 365, depending upon whether t expresses months, weeks, or days, respectively. Where T and t are the same, they cancel and the factor is 1 (see par. 47b(1)); n, of course, is the *mean* strength during the experience.

■ **47. The Admission Rate.**—*a. General.*—The force of morbidity is expressed, in the military service, in terms of admissions (to sick report) per 1,000 mean strength. The time element must always be stated when referring to this rate, as "the daily admission rate" or "the annual admission rate." The formula for deriving this rate is that given in paragraph 46; in this case—

K=1,000.

f =the number of admissions to sick report.

T =the time base of the rate—1 day, 365 days, 12 months, etc.

n =mean strength of the command during the experience.

t =the length of time required for f admissions.

b. Examples.—(1) On July 7, there were 35 admissions to sick report in a command, the strength of which on that day was 1,856. What was the daily admission rate for July 7?

$$\text{Daily admission rate}=\frac{1,000 \times 35 \times 1}{1,856 \times 1}=18.85$$

(2) In a command with a mean strength of 3,467, there were 254 admissions to sick report during the month of February. What was the annual admission rate for the month of February?

$$\text{Annual admission rate} = \frac{1,000 \times 254 \times 12}{3.467 \times 1} = 879.1$$

(3) In a command with a mean strength of 3,467, there were 131 admissions to sick report during the first 2 weeks of February. What was the annual admission rate for these 2 weeks?

$$\text{Annual admission rate} = \frac{1,000 \times 131 \times 52}{3.467 \times 2} = 982.4$$

■ 48. DEATH RATE.—Death rates are derived similarly to admission rates—f denoting the number of deaths instead of the number of admissions. Unless otherwise specified, death rates are ordinarily rates per annum.

■ 49. CASUALTY RATES.—Casualty rates are derived similarly to admission rates—the f denoting the number of casualties instead of the number of admissions. It must be remembered that casualties include the *killed in action* as well as those admitted to sick report. The time base of the rate must always be specified, such as the daily casualty rate, the casualty rate for a specified operation, or the casualty rate for the entire war.

■ 50. CASE FATALITY RATES.—Case fatality rates measure the force of mortality in a specified group suffering from disease or injury. Such a rate may measure the fatality from a specific disease or injury, or may be used to measure the fatality of all diseases or all injuries, or both. The scope of the exposure to risk must be stated, for example, case fatality from pneumonia, case fatality from gunshot injuries, etc. They are ordinarily computed as percentages, rather than as rates per 1,000, and the formula is—

$$\text{Case fatality rate} = \frac{100 \times f}{n}$$

where n is the number of cases that occur and f is the number of deaths among such cases.

■ 51. NONEFFECTIVE RATES.—Loss of time from disease and injury is measured, in the military services, by noneffective

rates. The same general rules apply. The noneffective rate is the ratio of days lost from disease or injury to the total number of days that could have been lost had every man been incapacitated every day. It is expressed in terms of 1,000 mean strength (per K), and the formula is—

$$\text{Noneffective rate} = \frac{1,000 \times \text{days lost}}{n \times \text{days of experience}}$$

For example, during July, in a command of 5,147 (mean strength) there was a total of 6,504 man-days lost from all causes, an average of 209.8 men on sick report each day. The noneffective rate per 1,000 for the month of July would be—

$$\begin{aligned}
\text{Noneffective rate} &= \frac{1,000 \times 6,504}{5,147 \times 31} \\
&= \frac{6,504,000}{159,557} \\
&= 40.76
\end{aligned}$$

which is to say that there was an average of 40.76 men in each 1,000 men constantly noneffective from disease and injury during that month.

■ 52. RATIOS.—Ratios express relationships between frequencies of occurrence of more or less related events as, for example, the ratio of head injuries to all injuries. Ratios are usually expressed as percentages, and the general formula is the ratio $a:b$ expressed as a percentage:

$$\frac{100 \times \text{number of } a\text{'s}}{\text{Number of } b\text{'s}}$$

where a and b are the two variables being prepared.

CHAPTER 7

ESTIMATIONS OF MEDICAL REQUIREMENTS

Section I

GENERAL CONSIDERATIONS

■ 53. Reference.—The greater part of this chapter is an adaptation of the material in Army Medical Bulletin No. 24 (War Casualties). The data have been condensed and, for the most part, rearranged in the interest of simplicity. However, this chapter in nowise supplants Bulletin No. 24; and the fundamentals set forth therein must be mastered before any serious medical planning is undertaken.

■ 54. Strength.—*a. General.*—Strength is a most important factor in estimating medical requirements. It is represented by the n in the formulas given in chapter 6. Unless otherwise specified, military strength includes all military personnel but none other. In estimating medical requirements, however, to military strength must be added all other elements of the population for which medical service must be provided.

 b. Mean strength.—Military strength, especially in war, varies from day to day and, in smaller commands, within wide limits. Mean strength is the average daily strength of a command or other group. It is computed by adding the strength on each day of the period under consideration and dividing by the number of days in the period.

■ 55. Causes of Sickness and Injury.—Admissions to sick report are caused either by sickness or injury; and injuries are classified into—

a. Nonbattle injuries.—Those sources of disability or death arising out of external causes other than hostile acts of a military enemy are classified as nonbattle injuries.

b. Battle injuries.—Wounds caused by primary or secondary missiles, or by chemical agents, set in motion by the hostile act of a military enemy are classified as battle injuries. Wounds or injuries from projectiles dropped by airplanes at considerable distances from the operations of ground troops, and those resulting from torpedo attacks on ships, are properly included among battle injuries. On the other hand, accidental injuries, although received in battle, are not to be regarded as battle injuries.

■ 56. PLACE OF TREATMENT.—Cases of sickness and injury that are incapacitated for duty are treated either in hospital or in quarters. In the latter instance, no hospital beds are required. Dispensary cases include the less serious cases that, although they require medical attention, are not excused from duty. Dispensary cases must be considered in estimating the requirements of medical personnel and supply; their care increases these two requirements by about 50 percent over similar requirements for cases admitted to sick report.

<div align="center">SECTION II</div>

<div align="center">ADMISSIONS FROM DISEASE AND NONBATTLE INJURIES</div>

■ 57. AVERAGE PEACETIME EXPERIENCE.—The average daily admission rate for sickness and nonbattle injuries for troops serving in the United States during time of peace is about two per thousand. This rate is influenced by many factors, the more important of which are discussed in succeeding paragraphs.

■ 58. SEASONAL VARIATION.—The incidence of sickness varies with the season. Seasons, in turn, vary with the climate. The seasonal variation in troops for the United States is shown

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in the following table, which sets forth the experience from
1920 to 1927, inclusive:

Month	Daily admission rate per thousand	Percent of mean daily rate for the year
January	2.63	137
February	2.62	136
March	2.47	129
April	1.90	99
May	1.68	88
June	1.55	81
July	1.56	81
August	1.65	86
September	1.59	83
October	1.66	86
November	1.65	86
December	1.82	95

■ 59. EFFECT OF CLIMATE.—Climate is so closely associated
with other environmental factors, such as density of popula-
tion, sanitation, etc., that it is difficult to evaluate the effect of
climate alone. However, it is estimated that under favorable
conditions the sickness in temperate climates should not ex-
ceed that expected in the United States; and in tropical cli-
mates it may be expected, under similar conditions, to be
somewhat greater. Under unfavorable conditions, however,
it may be expected to exceed United States experience by 30
percent in temperate climate, and 40 percent in the Tropics.

■ 60. EFFECT OF RACE.—While the peacetime experience
shows that the admission rate for colored troops is slightly
less than 75 percent that of white troops, it is believed that
the effect of seasoning is largely responsible for this. (See
par. 62.) There is considerably less turn-over in colored
troops than in white troops in time of peace. The experience
of the World War showed the admissions for sickness and
nonbattle injuries in colored troops to be 50 percent higher
than among white troops.

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■ 61. EFFECT OF NATIVITY OF TROOPS.—The origin of the troops profoundly affects the admissions for sickness and nonbattle injuries. During the World War, for example, the admission rate for troops from Montana was only 37 percent of the average admission rate for the Army as a whole while the admission rate for troops from Mississippi was 205 percent of the average. The following table shows the ratio (as percentages) of the admission rates for the white troops only, of the several states to the general admission rate for all white troops:

Nativity of troops, States of—	General admission rate for entire Army
	Percent
Montana and Wyoming	31– 40
Arizona and Idaho	41– 50
District of Columbia, Nevada, and Washington	51– 60
North Dakota, California, Oklahoma, New Jersey, and Connecticut	61– 70
Colorado, New York, Rhode Island, Massachusetts, South Dakota, and New Mexico	71– 80
Oregon, Michigan, Utah, Pennsylvania, Ohio, Minnesota, and Delaware	81– 90
Maryland, New Hampshire, Illinois, and Wisconsin	91–100
West Virginia and Maine	101–110
Iowa, Indiana, Nebraska, and Vermont	121–130
Missouri, Virginia, and Kansas	131–140
Florida, North Carolina, South Carolina, Texas, and Louisiana	141–150
Tennessee and Arkansas	151–160
Alabama, Kentucky, and Georgia	161–170
Mississippi	201–210

The average admission rate for white troops from the southern states (Virginia, Florida, North Carolina, South Carolina, Texas, Louisiana, Tennessee, Arkansas, Alabama, Kentucky, Georgia, and Mississippi) was 156 percent of the general admission rate for all white troops.

■ 62. EFFECT OF SEASONING OF TROOPS.—All other factors being equal, the admission rate for disease is always higher among recruits than among seasoned troops. In all the wars of the United States, the sick rate of volunteers or newly inducted personnel has been much higher than that of regu-

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lar troops under exactly the same conditions. At least two factors are involved in this—improvement of sanitary discipline with training, and an increase in immunity resulting from the close associations in military units. The daily admission rates for troops in the United States in the year 1918 exceeded comparable experience in the Regular Army in the post-war years by an average of 70 percent. Although the influenza pandemic months of September and October, 1918, are excluded from this comparison, the endemicity of influenza throughout the year 1918 does introduce an unusual factor into the experience of that year. However, the sick rate of recently mobilized units should be expected to exceed the recent experience of the Regular Army by 50 to 60 percent.

■ 63. RANGE OF VARIATION FROM AVERAGE EXPERIENCE.—a. In the foregoing paragraphs are discussed certain factors which influence the admission rate for disease and nonbattle injuries, such as the constitution of the command as regards race and nativity, the location of the command as regards climate, the season of the year, and local sanitary conditions. The variation from average experience that may result from combinations of these factors is considerable. The following table shows the average daily admission rates in 30 large camps during the year 1918 together with the maximum daily rate for any one month. The influenza pandemic months of September and October are excluded. It will be seen that not only does the average daily rate vary widely with local conditions but also that the deviation from the average local rate varies within wide limits.

Camp	Average daily rate		Maximum daily rate		
	Average daily admission rate for year	Percent of average daily admission rate for all troops	Maximum daily admission rate for any one month	Percent of average local daily admission rate	Percent of maximum daily admission rate for all troops
All camps	3.50	100	4.80	137	100
Travis	5.98	171	9.79	164	204
Beauregard	4.18	119	8.66	207	180
Wheeler	3.69	105	7.92	215	165
Pike	5.21	149	7.62	146	159
Funston	5.43	155	7.18	132	150
Jackson	4.02	115	7.14	178	149
Dodge	4.11	117	6.90	168	144
Sherman	4.29	123	6.73	157	140
Logan	3.26	93	6.72	206	140
Mills	2.13	61	6.52	306	136
MacArthur	3.65	104	6.10	167	127
Taylor	3.76	107	5.61	149	117
Sevier	3.53	101	5.53	157	115
Dix	2.75	79	5.45	198	114
Shelby	3.42	98	5.42	158	113
Bowie	3.75	107	5.32	142	111
Lewis	3.56	102	5.27	148	110
Kearney	3.23	92	5.14	159	107
Wadsworth	2.67	76	5.08	190	106
Upton	3.23	92	5.05	156	105
Custer	2.59	74	4.99	193	104
Gordon	3.81	109	4.79	126	100
Lee	2.74	78	4.53	165	94
Meade	3.23	92	4.42	137	92
Cody	2.28	65	4.28	188	89
McClellan	2.58	74	3.84	149	80
Sheridan	2.65	76	3.74	141	78
Hancock	2.41	69	3.72	154	78
Devens	2.42	69	3.68	152	77
Grant	2.23	64	3.39	152	71

b. It will be seen, in the foregoing table, that the experience of no one camp is identical with average experience. While Camp Mills enjoyed an average rate 39 percent below the average for all camps, this average rate was more than trebled (306 percent of its average) in its peak month. On the

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other hand, Camp Funston with an average rate 55 percent higher than the average for all camps, showed a less-than-average increase (32 percent against 37 percent) during its maximum month.

SECTION III

BATTLE CASUALTIES

■ **64. INTRODUCTION.**—The experience set forth herein is largely that of the World War. Weapons and methods of warfare have changed since that time and such changes have always been reflected in battle casualties. The experience of the American Civil War would have proved to be largely unreliable in 1917–18; and it may well be that the experience of the World War will prove to be equally unreliable in future wars. But, even if such experience is of no greater value than to serve as the basis of an educated guess, it is still better than no experience at all. (See also FM 101–10.)

■ **65. CASUALTY ESTIMATES—GENERAL.**—*a. Classification.*—All casualties are classified as follows:

Sick {Communicable	Slight_____Walking	
{Noncommunicable	Medium____Transportable	{Recumbent
Gassed		{Sitting
Wounded	Severe_____Nontransportable	
Dead		

b. Sick casualties.—(1) Casualties from sickness and nonbattle injuries from front-line troops of a seasoned command in campaign, except in a particularly unhealthful region, cause an average daily increment of sick of about 0.6 percent. Of these, two-thirds will remain under treatment in their own organizations (at aid station or dispensary) or in the division clearing station; one-third will be evacuated outside the division area, half of them recumbent and half of them sitting.

(2) The daily admission rate to the hospital for an entire field force for sick and nonbattle injuries will be approximately 0.165 percent (based on A. E. F. experience). This rate will vary depending on the location of the theater. After some months, this will cause a constant noneffective rate of about 4.5 percent.

(3) Of the sick admitted to hospitals in the theater of operations about 1.5 percent die, 3 percent will be invalided home, and 95.5 percent will be returned to duty eventually. The average stay in the hospital is 27 days.

c. Battle casualties.—(1) The following table has been developed from American experience in active operations of the World War:

Battle casualties, including killed, in percent of the unit strength

Unit	Average for all days in line	Severe battle day	Maximum battle day
	Percent	*Percent*	*Percent*
Infantry regiment	2. 5	12–15	35
Division	1. 0	6–8	12
Corps	. 5	2–3	5
Army	. 35 [1]	. 7–1. 5	2. 5

[1] As this is for sustained active operations, the average for one or several armies over a long period of time would be less, and may be taken as 0.2 percent.

(2) In estimating battle casualties in an army, an estimate based on front-line divisions engaged will usually be more accurate than if based on a rate for corps or the army as a whole.

(3) The battle casualties of an entire expeditionary force or theater of operations can best be estimated by using the rates incurred in the component divisions or armies, as the relative proportion of front-line troops to the total force will vary widely in each situation.

(4) The following data relative to battle casualties are approximately accurate for a severe engagement and can be used as the basis for calculations:

(a) In Temperate and Tropical Zones, the ratio of killed to wounded is as follows:

Open operations _____ about 1: 5
Trench operations _____ about 1: 4

Hence from 16⅔ percent to 20 percent of all battle casualties may be expected to be classed as killed. In the Arctic Zone,

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the ratio of killed to wounded will be considerably higher due to death of the wounded from exposure to cold.

(b) The transportation requirements for battle casualties of a division are as follows:

                                                                    Percent
Dead _____ 20
Able to walk to collecting station but requiring transportation
   (sitting) to rear_____ 40
Require transportation (recumbent) _____ 40
   Of all casualties, about 1 percent are nontransportable beyond
the surgical hospital, except by air.
                                                                    ‾‾‾‾
    Total_____ 100

■ 66. DISTRIBUTION OF CASUALTIES BY ARM AND SERVICE.—In the A. E. F., for the entire period of the war, battle casualties were distributed as shown in the following table:

Arm or service	Rate per 1,000 mean total strength in the A. E. F. for entire war			Relative rate with infantry taken as 100 [1]
	Killed in action	Wounded in action	Total	
Infantry_____	85. 79	498. 17	583. 96	100
Signal Corps_____	7. 70	94. 04	101. 74	17. 4
Artillery_____	7. 56	65. 55	73. 11	12. 5
Corps of Engineers_____	6. 47	52. 77	59. 24	10. 1
Medical Department_____	2. 25	49. 37	51. 62	8. 8
Quartermaster Corps_____	. 96	17. 85	18. 81	3. 2
Cavalry_____	. 56	17. 25	17. 81	3. 0
Air Corps_____	5. 00	8. 64	13. 64	2. 3
Ordnance Department_____	. 09	10. 27	10. 36	1. 8
All arms and services_____	34. 98	213. 65	248. 63	42. 6

[1] These figures vary slightly from those given in paragraph 44, Army Medical Bulletin No. 24. The basic data for this table were taken from vol. XV, pt. 2, the Medical Department of the U. S. Army in the World War.

However, the foregoing table does not portray accurately the relative hazards of front-line service. The greater proportion of infantry and artillery were engaged at the front. A much less proportion of engineers and Signal Corps were so engaged; and, among the services, the greater proportion were employed in rear areas. For example, by assuming that all battle casualties in the Medical Department occurred in

medical personnel with infantry divisions, the battle casualty rate for the Medical Department would have been around 125 per thousand instead of approximately 52. The truth lies somewhere between these two extremes; and the same principle applies in the case of other arms and services engaged in rear areas as well as at the front.

■ **67. RATIO OF KILLED TO WOUNDED IN ACTION.**—The experience of the A. E. F., considered as a whole, was that 14 percent of all battle casualties were killed in action and 86 percent were wounded in action. This proportion of killed in action varied directly with the severity of combat, reaching 18 percent in severe engagements. This ratio is also affected by the proportion of gas casualties among all battle casualties, since relatively few gas casualties die on the field. (See also par. 68.)

■ **68. DISTRIBUTION OF CASUALTIES BY PRODUCING AGENT.**—*a. Classification.*—Battle casualties are classified as those due to missiles and those due to chemical agents. The latter are known as gas casualties, although the chemical agent need not be a gas, and the former as gunshot wounds (GSW) regardless of the character of the missile.

b. Killed in action (KIA).—In the A. E. F., the cause of death of 93.2 percent of the KIA was GSW; and only 6.8 percent died on the battlefield as the result of the action of a chemical agent.

c. Wounded in action (WIA).—The average distribution, by producing agent, of battle wounds in the A. E. F. was 31.5 percent from gas and 68.5 percent GSW. This proportion, however, varied within wide limits with the type and severity of combat. The proportion of gas casualties rose when troops occupied relatively quiet sectors where field fortifications afforded considerable protection against missiles but none against gas. In severe open combat, however, gunshot wounds increased greatly, rising to 82 percent of all wounded while the proportion of gas casualties fell to 18 percent.

■ **69. DISTRIBUTION OF CASUALTIES WITHIN UNITS.**—Rarely are casualties equally distributed throughout a unit larger than a company. Normally some fraction of a unit is in reserve

and the tasks of other fractions actively engaged are not ordinarily equally productive of casualties. This unequal distribution within units must constantly be recognized in estimating probable casualties. (See also pars. 73a and 75d.)

■ 70. INFLUENCE OF TYPE OF ACTION.—The type of military operation determines, to a large extent, the casualty rate. With the advent of automatic weapons attack became generally more costly than defense. Organization of the ground by the defender further increases the disadvantage of the attacker in the matter of casualties. The usual dispersion of covering forces and security detachments reduces the casualty rates in the actions that they engage in.

■ 71. CASUALTIES IN AN INFANTRY REGIMENT.—*a. Average.*— The average battle casualties of an infantry regiment in combat in the A. E. F. was around 2 percent per day of combat, but this rate is based upon time spent in reserve as well as time spent in active combat.

b. Maximum.—The heaviest loss suffered in any one day of combat by an infantry regiment in the A. E. F. was 35 percent. The average of the 20 heaviest casualty days of infantry regiments was about 20 percent per day.

c. Frequency of occurrence of heavy losses.—The following tabulation shows the frequency of heavy losses in casualties in infantry regiments in the A. E. F. The casualty rate was more than—

Percent per day in	Percent of combat days
20	0. 29
18	. 44
16	. 69
14	1. 08
12	1. 74
10	2. 85
8	4. 79
6	8. 30
4	15. 11
2	30. 00

These rates are also based upon time spent in reserve as well as time spent in active combat.

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■ **72. CASUALTIES IN AN INFANTRY DIVISION.**—*a. General.*—
These data are also based upon the experience of infantry
divisions in the A. E. F., including time spent in reserve as
well as in active combat.

b. Maximum.—The heaviest losses sustained by any one
division in 1 day of combat were 10.56 percent of its
strength. The average of the five heaviest daily battle losses
in divisions was 8.15 percent. These figures are comparable
with British experience in the World War.

c. Frequency of occurrence of heavy losses.—The following
tabulation shows the frequency of heavy losses in casualties
in infantry divisions in the A. E. F. The casualty rate was
more than—

Percent per day in	Percent of combat days
6	0.83
5	1.20
4	2.48
3	4.80
2	12.00
1	31.00

■ **73. CASUALTIES IN A CORPS.**—*a. General.*—As units increase
in size, a greater proportion of their personnel is less exposed
to the risk of battle injury. While a corps may be engaged
in active fighting, one or more of its divisions may not be in
contact with the enemy. Elements of corps troops serving
in rear areas suffer relatively few casualties. While the
strength of corps troops approximates the strength of a divi-
sion, they consist of artillery, engineers, signal troops, and
service troops, the casualty rates of which are low compared
with those of infantry. All these factors operate to reduce
the casualty rates of a corps as a whole far below those of its
infantry divisions actively engaged with the enemy.

b. Maximum.—The heaviest losses sustained by any one
corps in 1 day of combat were 2.13 percent. The average
of the six heaviest daily battle losses in corps was 1.92 percent.
This also compares with British experience in the World War.

c. Frequency of occurrence of losses.—The following tabula-

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tion shows the frequency of occurrence of certain casualty rates in a corps in the A. E. F.   The casualty rate was more than—

Percent per day in	Percent of combat days
2.0	1.95
1.6	3.31
1.2	6.99
.8	17.08
.4	44.79
.2	73.41

■ 74. CASUALTIES IN AN ARMY.—*a. General.*—The factors discussed in paragraph 73*a* (large units in reserve and a considerable strength of troops in rear areas) operate with even greater effect in the army; and army casualty rates are consequently even lower than those of the corps.

b. Maximum.—The heaviest losses sustained by any one army in 1 day of combat were 0.775 percent.   The average of the five heaviest daily battle losses in an army was 0.704 percent.

c. Frequency of occurrence of losses.—The following tabulation shows the frequency of occurrence of certain casualty rates in an army in the A. E. F.   The casualty rate was more than—

Percent per day in	Percent of combat days
0.7	4.02
.6	11.91
.5	20.82
.4	31.92
.3	48.35
.2	74.47
.1	97.87

■ 75. ESTIMATION OF PROBABLE CASUALTY RATES.—*a. Casualty expectancy tables used for school purposes.*—The foregoing paragraphs clearly indicate that the estimation of probable

casualty rates in advance is not a simple matter that can be reduced to a general formula. While casualty expectancy tables have been prepared and are being used for purposes of instruction in service schools, it must be understood that such tables bear no closer relationship to actual experience than do map problems to actual combat. They are among the many arbitrary assumptions (based in general, it is true, upon experience) that are necessary to create the artificial situation wherein a battlefield is brought into a classroom; and it was never intended that any reliance should be placed upon them in actual operations.

b. Method.—The first step in estimating probable casualty rates is the selection of a point of departure. This is preferably what might be termed an *average casualty day* for the unit concerned. To this average casualty day must be applied the quantitative combined effect of all factors in each situation that may be expected to influence the casualty rate. The more important of these factors are—

(1) *Enemy capabilities.*—These include all the means and characteristics of the enemy that can be translated into casualties, such as his numerical or relative strength, the strength of his position (both natural strength and improvement by organization of the ground), his weapons, his attitude, and his morale and general combat efficiency.

(2) *Terrain.*—Terrain is not to be confused with position. Open terrain, affording little cover or protection, may favor either side, depending upon the situation.

(3) *Own scheme of maneuver.*—This is a most important factor. Attack is usually more costly than defense. Losses in defense are tempered by the type of defense, the degree of organization of the ground, and relative combat strength including the element of fire (see (4) below). Frontal attacks are, in general, more productive of casualties in the attacking force than are envelopments. Daylight withdrawals are extremely costly; and, when withdrawal becomes disorderly, losses may be staggering.

(4) *Relative fire power.*—A preponderance of friendly fire power, especially in heavy weapons including aviation, will greatly decrease the capability of the enemy to inflict casu-

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alties by smothering his weapons. Conversely, relative weakness in heavy fire power will operate to increase casualty rates.

(5) *Movement under hostile fire.*—All other factors being equal, troops moving under hostile fire suffer more heavily than those remaining in position.

c. *Sickness and nonbattle injuries in combat.*—In estimating casualties to be evacuated, it must be remembered that disease declares no armistics during combat and that soldiers do not become unusually careful to avoid ordinary injuries at such times. On the contrary, the admission rate for this class of casualties may, in combat, even rise above the average for the following reasons:

(1) Necessity for haste causes a disregard of ordinary precautions in the handling of matériel.

(2) Fatigue not only causes actual disability, but it produces a state of mind that tends to exaggerate minor ailments and injuries, if not to foster frank malingering. While careful sorting should prevent the evacuation of any great proportion of such cases, the operation of sorting alone places an additional burden on medical units.

d. *Proportion of troops actively engaged.*—The proportion of a command actively engaged in combat determines, to a considerable degree, the casualty rate of the unit as a while; and this proportion varies within wide limits in units of different sizes and operations of different types. While the retention of a reserve is habitual in all units, local reserves of smaller units are ordinarily located so near the front line that their exposure to risk is at least comparable with that of other elements of the unit. On the other hand, general reserves are ordinarily located well to the rear and outside the zone of greatest casualty incidence. Furthermore, reserves are committed to action by smaller units at more frequent intervals than by larger units. Whereas during active fighting it might be unusual for a battalion reserve to remain inactive for an entire day, in the same battle the reserve of a corps or army might not be committed for several days. All this points to the dangers in generalizations in the estimation of casualties. Each situation must be studied, and an estimate made for each major fraction of the command rather

than one estimate for the command as a whole, else the result will be no more than a poor guess. This is to say that the army surgeon should not base his estimate of probable casualties in the army upon army experience, but upon the experience of corps or, better yet, of divisions as influenced by the situation confronting them at the time.

e. Average battle casualty days.—(1) *Infantry regiment.*—The experience of the A. E. F. indicates that, in severe combat, an infantry regiment frequently loses 15 percent in casualties in one combat day. After a careful study, it is considered that the average battle casualty day for an infantry regiment in the A. E. F. was around 2½ percent.

(2) *Infantry division.*—The average battle casualty day of an infantry division in the A. E. F. was about 1 percent; and in severe combat the maximal casualty day was between 8 and 10 percent.

(3) *Corps.*—The average battle casualty day of a corps in the A. E. F. was about 0.4 percent; and in severe combat the maximal casualty day was slightly more than 2 percent. In each instance of a maximal casualty day for a corps, however, the great bulk of casualties occurred in one division— the other divisions being either in reserve or slightly engaged. It is believed, therefore, that the maximal rate for a corps should be about 3 percent.

(4) *Army.*—In paragraph 74 it will be seen that the army suffered a daily casualty rate of around 0.3 percent for about one-half of its combat days and that the maximal rate was only 0.7 percent. However, a similar situation obtained in the army experience as in the corps experience, during the maximal casualty day experiences only about one-third to one-half of the corps of the army were actively engaged; and it is believed that a maximal battle casualty day for an army should be around 1.5 percent.

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SECTION IV

EVACUATION OF CASUALTIES

■ 76. CAPACITIES OF TRANSPORT.—The following table gives the
average capacities of the various types of transport used to
move sick and injured men and animals:

Vehicle	Men			Animals
	Sitting	Recum-bent	Average	
Ambulance, air	16	10	13	
Ambulance, animal-drawn	8	4	6	
Ambulance, motor	10	4	6	
Ambulance, cross-country	6	4	5	
Truck, 1½-ton	10	4	5	
Truck, 2½-ton	16	6	7	
Railway car, coach	88			
Pullman car:				
12-section	48	24	36	
16-section	64	32	48	
Hospital train	700	300	500	
Ambulance, motor (veterinary):				
Truck, 1½-ton with trailer, 2-horse van				2
Truck, 2½-ton stock rack body				6
Stock car				18
Boxcar				18
Veterinary lead line				20

■ 77. TIME FACTORS IN EVACUATION.—*a. Litter squads.*—Under
average conditions, a litter squad will complete one round trip
of 1,000 yards in 1 hour, including the time required to load
and to unload the patient. The use of a wheeled litter car-
rier will reduce this time to 45 minutes. Fatigue of bearers is
a most important factor, and will reduce the tempo of litter
carry by hand to a marked degree.

b. Ambulances and trucks used as ambulances.—Under com-
bat conditions, motor ambulances and other motor vehicles
used in lieu thereof may be expected to average about 10 miles
per hour while in transit. Animal-drawn ambulances will
average about 4 miles per hour under similar conditions.

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c. Veterinary lead lines.—Veterinary lead lines may be expected to complete one round trip of 1,000 yards in 30 minutes, including the time required for tying and untying.

d. General formulas.—The time (1), and the number of units of transport (2), required to evacuate a given number of casualties may be computed with the following formulas:

Where: $N=$ the total number of casualties to be evacuated.

$n=$ the number that can be transported in one load.

$T=$ the total time.

$t=$ the time required for one round trip.

$U=$ the number of units of transport (litters, ambulances, lead lines, etc.).

(1)   (2)

$$T=\frac{N\times t}{U\times n} \qquad\qquad U=\frac{N\times t}{T\times n}$$

■ **78. Average Distribution of Casualties by Transportation Requirements.**—*a. General.*—The type of wound will vary within relatively narrow limits in different operations. The figures presented in succeeding subparagraphs are believed to be fair averages, although no accurate figures are obtainable from the experience of the A. E. F. These figures apply only to battle injuries. If the sick requiring evacuation during combat is added, the proportion requiring evacuation by litter or in the prone position falls somewhat. In the Meuse-Argonne offensive, for example, including the sick, 42 percent required evacuation in the prone position and 58 percent could be evacuated in the sitting position.

b. Forward of collecting station.—Eighty percent of gas patients and 44 percent of GSW cases will be able to walk to aid and collecting stations.

c. Rear of collecting stations.—Eighty percent of gas patients and 49 percent of GSW cases can be transported in a sitting position.

Section V

HOSPITAL BED REQUIREMENTS

■ **79. Governing Factors.**—The number of hospital beds required is a function of—

a. The admission to hospital rate for sickness and non-battle injuries.

b. The admission to hospital rate for battle injuries.

c. The average duration of treatment for each class of admissions.

■ 80. DURATION OF TREATMENT.—*a. General.*—Duration of treatment in any particular echelon of medical service depends upon the echelon, the type of case, and the evacuation policy (see par. 81). Forward of general hospitals the type of medical installation determines, in general, the duration of treatment although the severity of the case, particularly as it affects the transportability of the patient, also exerts an influence in individual cases.

b. Case fatality rate.—The proportion of cases that die in a medical installation, and their average longevity after admission, influence the average duration of treatment of all cases. This factor has been accounted for in the experiences set forth in *c* and *d* below.

c. Sick and nonbattle injuries.—During the World War, for cases treated in hospital only, the average duration of treatment of cases of sickness and nonbattle injuries was 20.36 days for those admitted in the United States and 27.29 days for those admitted in the A. E. F.

d. Battle injuries.—During the World War, the average duration of treatment of gas cases was 41.77 days and of GSW cases 94.84 days.

■ 81. EVACUATION POLICY.—It may be decided that only cases of relatively short expected duration will be retained for definitive treatment in a theater of operations and that all cases expected to require prolonged treatment will be evacuated as soon as possible to general hospitals in the zone of the interior. The expected duration of treatment fixed as a line of demarcation between cases to be retained in the theater of operations and those to be evacuated to the zone of the interior is usually a multiple of 30 days—such as 30 days, 60 days, 90 days, or 120 days. Such a decision is known as an evacuation policy of 30 days, of 90 days, or of whatever period may be set. The establishment of an evacuation policy is a command decision.

■ 82. DISPERSION FACTOR.—It is practically impossible, and wholly impracticable, to attempt to fill each hospital bed

with a patient. Hospital trains must deliver full loads to one installation rather than peddle a few cases here and there to fill the last few beds. Furthermore, some segregation of patients in hospital is necessary. Infected wounds must be treated in separate wards rather than with clean wounds. Contagious diseases must be isolated from each other and from all other cases. These practical considerations cause a certain proportion of beds to remain empty at all times. This proportion of empty beds due to such causes is known as the dispersion factor. The minimum dispersion factor consistent with safety is about 10 percent. That is, for every expected thousand patients, 1,100 beds should be provided. Where segregation by sex is necessary, and both sexes are well represented as in peacetime, a dispersion factor of 20 percent is necessary.

■ 83. ACCUMULATION OF PATIENTS IN HOSPITALS.—*a. General.*—Table VI shows the rate at which the three general classes of hospital patients accumulate under various evacuation policies and when all patients are retained in the theater of operations until finally disposed of. No dispersion factor having been applied to these figures, they represent merely the estimates of net bed requirements per 1,000 strength of command when the daily admission rates are 1 per 1,000.

b. Bed requirements for diseases and nonbattle injuries.— In paragraph 80c it is stated that the average duration of treatment of this class of patients in the A. E. F. was 27.29 days. This datum, however, is of no assistance in arriving at the number of beds required in the theater of operations when cases of longer duration are evacuated to the zone of the interior. Other experience indicates that approximately 28 percent of cases of disease and nonbattle injuries remain in hospital longer than 30 days, 12 percent longer than 60 days, 6 percent longer than 90 days, and 2½ percent longer than 120 days. By deducting these proportions from total bed requirements, assuming that all such cases are evacuated promptly to the zone of the interior, the approximations in table VI, which apply to the several evacuation policies, are arrived at.

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c. Bed requirements for GSW cases.—The average duration of treatment of this class of cases in the A. E. F. was 94.84 days. Approximately 66 percent remained in hospital longer than 30 days, 45 percent longer than 60 days, 35 percent longer than 90 days, and 27 percent longer than 120 days. For the application of these data in table VI, see *b* above.

d. Bed requirements for gas cases.—The average duration of treatment of injuries from chemical agents in the A. E. F. was 41.77 days. Approximately 46.5 percent remained in hospital longer than 30 days, 22 percent longer than 60 days, 11 percent longer than 90 days, and 5 percent longer than 120 days. For the application of these data in table VI, see *b* above.

■ 84. METHOD OF ESTIMATING HOSPITAL BED REQUIREMENTS.—*a. General.*—Since patients of the three general classes are admitted at different rates and accumulate at different rates, separate estimates must be made for each class and these results added to arrive at the total bed requirements.

b. Estimating admission rates.—The medical planner, by applying the various factors in the situation to general experience (see secs. II and III), estimates the average daily admission rate for each class of patients.

c. Evacuation policy.—As shown in table VI, the evacuation policy exerts a considerable influence upon the rates at which patients accumulate, and must be taken into account in the estimate of bed requirements.

d. Use of table VI.—Table VI shows the rates at which each general class of patients accumulate when the average daily admission rate for that class is 1 per 1,000 mean strength. Having estimated, for any particular situation, the average daily admission rate for each class of patients, there remains only the multiplication of the appropriate figures in table VI by the estimated admission rates and the mean strength in thousands.

e. Examples.—(1) The mean strength of a command is expected to be 575,000. All patients will be retained in the theater of operations until final disposition. After a study of

the situation it is estimated that the following average daily
admission rates will obtain:

General class of patients	Estimated average daily admissions per 1,000
Diseases and nonbattle injuries	2.6
Battle casualties:	
Average daily battle losses, 3.5 per 1,000.	
Less killed in action, .5 per 1,000.	
Admitted to hospital, 3.0 per 1,000.	
GSW admissions (70 percent)	2.1
Gas-casualty admissions (30 percent)	.9

(a) *Beds required for diseases and nonbattle injuries.—*
In 30 days: $575 \times 2.6 \times 16.78 = 25,086$. In 180 days: $575 \times 2.6 \times 27.07 = 40,470$.

(b) *Beds required for GSW cases.—*In 30 days: $575 \times 2.1 \times 26.69 = 32,228$. In 180 days: $575 \times 2.1 \times 81.07 = 97,892$.

. (c) *Beds required for gas cases.—*In 30 days: $575 \times 0.9 \times 22.24 = 11,509$. In 180 days: $575 \times 0.9 \times 41.28 = 21,362$.

(d) *Total beds required.*

	In 30 days	In 180 days
For diseases and nonbattle injuries	25,086	40,470
For GSW cases	32,228	97,892
For gas cases	11,509	21,362
Total net requirements	68,823	159,724
Dispersion factor of 10 percent	6,882	15,972
Total estimated bed requirements	75,705	175,696

(2) A theater of operations is expected to maintain a mean
strength of 1,000,000. Of these, 425,000 are expected to en-
gage more or less daily in combat. The following evacuation
policy has been established: for disease and nonbattle in-
juries, 90 days; for GSW cases, 60 days; and for gas casualties,

120 days. After a study of the situation it is estimated that the following average daily admission rates will obtain:

General class of patients	Estimated average daily admissions per 1,000
Diseases and nonbattle injuries_____	1.8
Battle casualties:	
Average daily battle losses, 2.6 per 1,000	
Less killed in action, .4 per 1,000	
Admitted to hospital, 2.2 per 1,000	
GSW admissions (78 percent)_____	1.72
Gas casualty admissions (22 percent)_____	.48

(a) *Beds required for diseases and nonbattle injuries.*— In 60 days: $1,000 \times 1.8 \times 21.21 = 38,178$. In 150 days: $1,000 \times 1.8 \times 23.65 = 42,570$.

(b) *Beds required for GSW cases.*—In 60 days: $425 \times 1.72 \times 24.91 = 18,209$. In 150 days: the same.

(c) *Beds required for gas cases.*—In 60 days: $425 \times 0.48 \times 30.70 = 6,263$. In 150 days: $425 \times 0.48 \times 37.54 = 7,658$.

(d) *Total beds required.*

	In 60 days	In 150 days
For diseases and nonbattle injuries_____	38,178	42,570
For GSW cases_____	18,209	18,209
For gas cases_____	6,263	7,658
Total net requirements_____	62,650	68,437
Dispersion factor of 10 percent_____	6,265	6,844
Total estimated bed requirements_____	68,915	75,281

■ 85. ESTIMATION OF HOSPITAL BED REQUIREMENTS IN MOBILIZATION.—During mobilization, as in certain other situations, estimates are complicated by a constantly increasing mean strength. Such estimates must be made by separate increments and the requirements of the several increments added to obtain total requirements. The bed requirements of each increment are estimated by the method shown in paragraph 84. The following example illustrates this method:

Strength of increment	Date of mobilization	Estimated admission rate	Bed requirements on—				
			30 M	60 M	90 M	120 M	Etc.
65,000	M	1.5	1,636	2,193	2,445	2,561	
47,800	30 M	1.5		1,203	1,613	1,798	
124,700	60 M	2.1			4,394	5,889	
12,500	90 M	1.8				378	
Etc.	Etc.	Etc.					Etc.
Net hospital bed requirements			1,636	3,396	8,452	10,626	Etc.
Dispersion factor of 10 percent			164	340	845	1,063	Etc.
Total hospital bed requirements			1,800	3,736	9,297	11,689	Etc.

■ 86. ESTIMATION OF HOSPITAL BED REQUIREMENTS IN DEMOBI-
LIZATION.—In commands decreasing in strength, hospital bed
requirements are estimated in a similar manner to that shown
in paragraph 85, except that the beds that would have been
required for the demobilized or detached fractions are sub-
tracted from the initial estimates.

TABLE VI.—*Accumulation of patients admitted for diseases and nonbattle injuries, gunshot wounds, and injuries from chemical agents*

Bed requirements per 1,000 mean strength of command in—	With a daily admission rate of 1 per 1,000—		
	For diseases and nonbattle injuries	For GSW cases	For gas cases
With an evacuation policy of 30 days:			
30 days and over	12.04	9.07	11.90
With an evacuation policy of 60 days:			
30 days	14.70	14.67	17.36
60 days and over	19.70	24.91	25.29
With an evacuation policy of 90 days:			
30 days	15.82	17.31	19.83
60 days	21.21	29.40	28.89
90 days and over	23.65	38.20	33.25
With an evacuation policy of 120 days:			
30 days	16.34	19.38	21.07
60 days	21.90	32.93	30.70
90 days	24.42	42.77	35.33
120 days and over	25.58	49.93	37.54
With all cases retained until finally disposed of:			
30 days	16.78	26.69	22.24
60 days	22.49	45.34	32.41
90 days	25.08	58.90	37.30
120 days	26.27	68.75	39.63
150 days	26.82	75.89	40.74
180 days	27.07	81.07	41.28
210 days	27.19	84.83	41.53
240 days	27.24	87.57	41.66
270 days	27.27	89.57	41.72
300 days	27.28	91.01	41.74

CHECK LIST OF A COMPLETE FORMAL MEDICAL PLAN

1. SUPPLY.
    a. *Class I supplies.*—Recommendations for distribution to
        hospitals, if special methods are desired (army).
    b. *Medical depot(s).*—Location(s), hour(s) of opening and
        closing, and organizations served by each, if such be
        necessary (army).
    c. *Medical supply point(s).*—Location(s), hour(s) of open-
        ing and closing, and organizations served by each,
        when necessary (division, corps, and army).
    d. *Other medical supply matters.*—Such as recommenda-
        tions concerning policies and general instructions to
        be issued.
2. EVACUATION.
    a. *Casualties.*—Pertinent data regarding the following in-
        stallations, such as location(s), unit(s) served,
        hour(s) of opening and closing.
        (1) *Personnel:*
                (a) Aid station(s) (battalion and regiment).
                (b) Collecting station(s) (division, corps, and
                    army).
                (c) Clearing station(s) (division, corps, and
                    army).
                (d) Hospital(s) (surgical, evacuation, and
                    convalescent hospitals (army)).
        (2) *Animals:*
                (a) Veterinary aid station(s) (regiment).
                (b) Veterinary clearing station(s) (division).
                (c) Veterinary evacuation hospital(s) (when
                    attached) (GHQ).
                (d) V e t e r i n a r y convalescent hospital(s)
                    (when attached) (GHQ).
                (e) Other provisions for evacuation of ani-
                    mals.
    b. *Burial.*—Arrangements for burial of the dead at army
        medical installations (division, corps, and army).
    c. *Salvage.*—Arrangements for the disposition of clothing
        and equipment of casualties, left in medical installa-
        tions.

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    d. Prisoners of war.
        (1) Arrangements for security of sick and injured prisoners of war.
        (2) Utilization of able-bodied prisoners of war to augment the medical service.
    e. Other evacuation matters.—Such as evacuation policy, special instructions to lower echelons, etc.

3. TRAFFIC.
    a. Circulation.—Special priorities desired for ambulances or other medical transport.
    b. Construction and maintenance of routes.
        (1) *Roads.*—Necessary construction and maintenance of roads and bridges in the vicinity of medical installations or for use in evacuation.
        (2) *Railroads.*—Necessary construction and maintenance of sidings and loading facilities at evacuation hospitals (army).

4. TRAINS.
  Recommendation with reference to movement of medical trains on the march, release from march control, and control in bivouac.

5. PERSONNEL.
    a. Stragglers.—Arrangements for the disposition of stragglers and malingerers in medical installations.
    b. Mail.—Arrangements for postal service for medical units and installations.
    c. Shelter.—Shelter required for medical units and installations.

6. MISCELLANEOUS.
    a. Attachment of medical troops.—Instructions desired with reference to attachment of medical units to subordinate units (division, corps, and army).
    b. Movement of medical units.—Instructions desired covering changes of location of medical units in rear areas.
    c. Arrangements with higher echelon(s) for evacuation.—The arrangements desired.
    d. Sanitation.—Any instructions concerning sanitation which should be published.
    e. Medical matters not otherwise covered.
    f. Other medical details.—No change (when applicable).

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CHECK LIST OF COMPLETE UNIT PLAN

1. SITUATION.—This paragraph is a résumé of the situation as it affects the operations of the unit. It sets forth the premises upon which the plan is based. These may include—

   a. So much of the information of the enemy as affects the operations of the unit.

   b. The decision and general plan of the next higher commander.

   c. Supplemental decisions of the commander (or responsible staff officers) that affect the operations of the unit.

   d. The conclusions arrived at in the analysis of the elements of the medical situation. (See par. 11b.)

2. DECISION.—This is the decision of the unit commander arrived at after an estimate of the situation. (See par. 14.)

3. ALLOTMENT OF TASKS.—In a separate subparagraph each task required by the decision is allotted to a subordinate unit or agency. *What* each subordinate unit is to do must always be stated clearly. *When* and *why* it is to be done may be stated; but *how* it is to be done should be left to the subordinate commander, unless there be a compelling reason to limit his discretion.

4. SUPPLY AND ADMINISTRATION.

   a. *Supply.*—The plan for the procurement of supplies of all classes, and their distribution to subordinate units. Arrangements for rationing of units not provided with kitchen facilities.

   b. *Administration.*—Special instructions to the unit staff; special reports and returns required; special instructions regarding the administration of patients.

5. COMMUNICATIONS.—Command posts and plan for maintaining communications within the unit.

COMBAT ORDERS FOR MEDICAL UNITS

■ 1. WRITTEN FIELD ORDER.—*a. Situation.*—War between Blue and Red has been going on for some time. The Blue 1st Division has been engaged with Red forces on previous occasions, and Red organization, armament, and other military characteristics are well known to this division.

A Red force has been concentrating in the vicinity of Harrisburg, Pa. The Blue 1st Division marched north from Baltimore, Md., May 13, 1940.

Normal march dispositions were made of the 1st Medical Regiment during this march, and standing operating procedures have been established for medical service in normal situations. At 4:00 AM May 15, the division field order for the occupation of a defensive position was issued.

b. The order.

FIELD ORDERS } No. 45

1st Medical Regiment,
WOODENSBURG, Md.,
15 May 1940; 9:30 AM.

Maps: Gen Map, Gettysburg (1925), 1 inch=5 mi. U. S. Geol Surv Map, 1:62,500 Westminster quadrangle, with situation overlay herewith (Annex No. 1).

1. *a.* A hostile force, estimated to be a corps of two divisions and corps troops, is marching south in three columns on the general axis: CARLISLE (355–795)—BALTIMORE (gen map). Leading elements of this force bivouacked last night on the general line: EAST BERLIN (370–760)—HAMPTON (365–760)—BIGLERVILLE (345–760) (gen map). No hostile combat aviation has been reported.

   b. The 1st Div (rein) will organize and defend the position shown in Annex No. 1. Formation: brigs abreast. Inf. and arty elements will be in position by 11:00 AM 15 May. The present adv gd will outpost the position. The 1st Sq, 1st Cav, is in contact with the enemy.

   No restrictions on reconnaissance.

The det, 1st Med Regt, now atchd to the adv gd, will be atchd to the outpost when march conditions cease.

Evacuation by army, commencing 7:00 PM, 15 May. The 701st Surg Hosp (motorized) will arrive in WOODENSBURG at 11:30 PM, 15 May.

2. This regt will support the div in the defense of the position.

3. *a.* The 1st Bn (less Co B) will establish coll stas in support of the 1st and 2d Brig combat teams. It will establish liaison with the medical service of the outpost and be prepared to assist in the evacuation of the outpost.

b. The 3d Bn (less Co G), committing only one company initially, will establish a clr sta at HAMPSTEAD (386–722) (Geol Surv map). (See par. 4*a*.)

c. The 2d Bn (less Co F) will evacuate the coll stas established by the 1st Bn. The CO, 2d Bn, will select the ambulance routes, and inform this CP of his selections without delay.

d. Co G, when notified of the opening of the new clr sta at HAMPSTEAD, will prepare to close the clr sta now operating at PIKESVILLE (395–690) (gen map).

e. The elements of Cos B and F, when relieved from attachment to the outpost, will proceed without delay to HAMPSTEAD and report to their respective companies.

f. Cos B and F (less elements atchd to the outpost) will proceed to HAMPSTEAD and there await orders in reserve, prepared to move on 15 minutes' notice. The movement to HAMPSTEAD will be directed by the CO, Co F.

x. (1) The 2d Bn will transport all foot elements of the 1st Bn into positions.

(2) All movements into positions will commence at 11:30 AM, 15 May.

(3) All units will be in position with necessary stations established and ready to operate by 3:00 PM, 15 May.

(4) Bn comdrs will report without delay the exact locations of their stations.

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(5) Parking of vehicles on the BALTIMORE AND HAN-
OVER ROAD is prohibited.

(6) The use of the following roads by med vehicles is
prohibited:

      (a) Road: ALESIA (388–732) — MILLERS
         (386–730);

      (b) Road: BECKLEYSVILLE (393–727)—
         ALBANTOWN (390–727); (all Geol
         Surv map).

4. *a.* The Hq and Serv Co, moving with the 3d Bn, will
proceed to HAMPSTEAD and establish sta in the
vicinity of the clr sta thereat.

  b. Army medical depot: BALTIMORE.

  c. Distribution of all classes of supplies: standing operat-
ing procedure.

5. CPs: 1st Med Regt: WOODENSBURG, closing 12:45 PM,
                  15 May.

                  HAMPSTEAD, opening 12:30 PM, 15
                  May.

    1st Bn: Vicinity of GREENMOUNT (385–725) (Geol
        Surv map), to open not later than 1:30 PM,
        15 May.

    2d Bn: Vicinity of GREENMOUNT, to open not
        later than 1:30 PM, 15 May.

    3d Bn: HAMPSTEAD, to open not later than 1:30
        PM, 15 May.

OFFICIAL:

                    JOHN C. DOE,
                    Col, 1st Med Regt,
                        Commanding.

   RICHARD C. ROE,
      Capt, 1st Med Regt,
      S–3.

Annex No. 1: Overlay of situation (omitted).

Distribution: A.

■ 2. SPOKEN FIELD ORDERS.—*a. Dictated field order.*—(1)
Situation.—In compliance with Field Orders No. 45, 1st Medi-
cal Regiment (see par. 1, app. III), Company C has been
directed by the battalion commander to support the 2d
Brigade combat team with its collecting station located in

the general vicinity of Alesia (388–732). The commanding officer of the 2d Battalion directed Company E to evacuate the collecting station(s) of Company C.

After arriving in Alesia with his company, completing his reconnaissance, and conferring with the commanding officer of Company E, the commanding officer of Company C assembles his platoon commanders and issues the following oral field order:

(2) *Order.*—Follow me on your maps. We are now at the southwestern exit of the village of Alesia. That direction (pointing) is north. This street (pointing) runs almost due northeast. Note the high hills to the northeast; just beyond them lies the stream known as Gunpowder Falls.

Copy this order as I give it, placing as much of it on your maps as possible.

A hostile force, estimated to be a corps of two divisions with corps troops, is approaching this area from the north. No hostile combat aviation has been reported. It is estimated by the brigade staff that no attack can be made against this sector of our position before daylight tomorrow.

This division is organizing and will defend a position along the general line: Gunpowder Falls, Lineboro, Dug Hill Ridge. Formation: Brigades abreast, with the 2d Brigade on the right. The boundary between brigades is as follows: Western Maryland Railroad from Greenmount to Millers, thence the highway north through crossroads 792 to road junction 712, thence along the eastern slopes of the hills to Blackrock, and thence north along the stream to the vicinity of road junction 781—all to the 2d Brigade.

The position is outposted, and our cavalry is in contact with the enemy.

The 2d Brigade will defend its sector with regiments abreast, the 4th Infantry on the right. Boundary between regiments: the highway from Alesia to Roller and thence along Muddy Creek, all to the 3rd Infantry. The brigade is organizing and occupying that part of its sector from its left boundary to Roller; and is organizing an extension from Roller to Rockdale. After the organization of the extension is completed, the brigade reserve will be withdrawn into the valley along the railroad just southwest of where we are

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standing (pointing). One battalion of the 4th Infantry is to go to division reserve at the same time.

Company E will evacuate our collecting station, and will also operate advanced ambulance shuttles.

This company will support the 2d Brigade combat team initially with one collecting station established in Alesia.

The 1st platoon will establish the collecting station in that church (pointing). Liaison agents will be dispatched at once to establish contact with aid stations. Liaison will be established at once with the medical service of the outpost.

The 2d platoon will evacuate the aid stations of the 3d Infantry and of the artillery located in its sector. The platoon commander will submit recommendations for advanced ambulance loading posts before 2:30 PM today.

The 3d platoon will remain in reserve initially, prepared to support elements of the 4th Infantry either in the occupation of the extension or in a counterattack. The platoon commander will submit recommendations for advanced ambulance loading posts in rear of the extension before 3:00 PM today.

The use of the road between Alesia and Millers, which is that road that you see there (pointing), and of the road between Beckleysville and Albantown, is prohibited.

The 1st and 3d platoons will mess at the collecting station. Hot food in containers will be delivered to ambulance loading posts for the 2d platoon.

The Company CP will be at the collecting station.

Any questions?

It is now 1:10 PM.

Move out.

b. Oral field order.—(1) *Situation.*—Liaison agents have returned to the CP of Company C with the exact locations of all aid stations established in the brigade sector. The commanding officer of the 2d Platoon of Company C, accompanied by the junior officer of Company E, has reconnoitered all roads in the immediate rear of the position, obtained the information secured by liaison agents, and made his recommendations for the locations of advanced ambulance loading posts. These recommendations have been approved. He

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then assembles the section leaders of the 2d Platoon and issues the following oral order:

(2) *Order.*—I have prepared these road sketches of this area (issues road sketches to section leaders). We are in Alesia. At that end of this street (pointing), the road to the right leads to Roller and you can see it as it winds around that nose (pointing). On this road about 300 yards from town is a crossroads. At the crossroads the road to the left leads down the valley, parallel to the railroad. About a mile northeast of the crossroads this road crosses the railroad and shortly afterward crosses a small stream. Find that place on your sketches and mark it as the aid station of the 3d Battalion of the 3d Infantry.

At the other end of this street (pointing), the road to the right runs immediately in rear of the position of the 3d Infantry, on the average about 1,500 yards in rear of the main line of resistance and, at several points, it crosses the regimental reserve line. Just on top of that hill (pointing) there is a road junction where a road leads to the left, or southwest. About 500 yards down this road to the left, at the head of a draw, is the aid station of the 2d Battalion of the 3d Infantry. Mark that point on your sketches.

Now, coming back to this main road out of Alesia that you see there (pointing), after it crosses that hill (pointing) it dips down into a narrow valley and crosses a small stream. This stream crossing is about a mile and a half from Alesia. Downstream about 300 yards from the point where the road crosses there is a stream junction. The aid station of the 1st Battalion of the 3d Infantry is located at that stream junction. Mark that on your sketches.

There has been no change in the situation since I explained it to you earlier in the afternoon.

One section of ambulances of E company has been detailed to operate advanced ambulance shuttles in the sector of the 3d Infantry. That is the section, parked right across the street (pointing). The ambulance commander has assigned the leading three ambulances to the left shuttle and the rear two to the right shuttle. Liaison agents will accompany the litter bearer sections and guide them to aid stations.

I shall take the first section and establish loading posts for the aid stations of the 1st and 2d Battalions of the 3d Infan-

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try. The first section will entruck in the three leading ambulances.

The second section, less one corporal and three litter squads, will entruck in the two rear ambulances and proceed on the road leading down the valley there (pointing) to the aid station of the 3d Battalion of the 3d Infantry. This section will establish and operate an ambulance loading post as near to this aid station as is practicable.

The three litter squads withdrawn from the 2d section, commanded by the corporal, will remain here at the collecting station awaiting orders.

Cooked food will be delivered at all ambulance loading posts.

Send all messages for me to the collecting station.

Any questions?

It is now 2:45 PM.

Entruck your sections.

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