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Medical Operational Requirements in Support of the OPLAN

Robert A. Levy • Richard D. Miller

Center for Naval Analyses
4401 Ford Avenue • Alexandria, Virginia 22302-1498

Approved for distribution: Ma

Laurie J. May, Director
Medical Team
Support Planning and Management Division

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The Director, Medical Resources, Plans and Policy Division asked CNA to determine the capabilities and limitations of the primary Casualty Receiving and Treatment Ships (CRTSs) and Hospital Ships (T-AHs) and how they will be used in support of OPLAN. The analysis calculates the requirements for medical personnel and compares them with the platform's capabilities. It finds that, given the base set of casualties, the CRTS treaters would not be stressed. On the hospital ship, however, many subspecialists will experience stress the first few days, especially on the first day that casualties arrive.

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Tasking

- **Determine the capabilities of the primary casualty receiving and treatment ships (CRTSs) and hospital ships (T-AHs) and how they will be used in support of OPLAN**
  - **In support of an amphibious landing**
  - **Follow-on to last year's C7F littoral warfare study**

This study is a follow-on to an earlier CNA study for Commander, Seventh Fleet (C7F).[1] That study examined medical casualty evacuation of an amphibious landing using the hospital ships (T-AHs) and the casualty receiving and treatment ships (CRTSs), the latter corresponding to the Navy's LHA and LHD classes of ships.

In the study, we made several assumptions that were based on the plans of the C7F surgeon in support of the OPLAN. As a result of that analysis, our sponsor, Director, Medical Resources, Plans and Policy Division (N-931), wanted a more detailed examination of the capabilities and limitations of these ships in support of an amphibious landing.

1. M. Webster Ewell, Robert E. Sullivan, and Robert A. Levy, *Korean Littoral Warfare Study* (U), Secret, May 1997 (CNA Research Memorandum 97-35).

Approach

- **Provide clear statement of ships' medical activities**
  - **Platform manning**
  - **Operating rooms (ORs) and beds**
- **Calculate medical requirements, compare with supply**
  - **Require data on**
    - ❑ **Number and types of casualties**
    - ❑ **Provision of care in-theater**
  - **Model uses expected values for treater demand**
    - ❑ **Examine need for simulation as next step**

An important first step is to state clearly the resources and capabilities of each platform. Under current medical planning, the CRTS will provide second-echelon care and the T-AHs will provide third-echelon care. Although changes in tactics (e.g., Operational Maneuver from the Sea) may lead to revisions in these concepts of care, the way platforms deliver care depends on their medical personnel, numbers and types of beds, and other medical equipment and supplies. As a result, the care provided by the CRTSs and T-AHs will differ.

In our analysis, we have calculated the requirements for medical personnel and compared them with the platform's capabilities (i.e., staffing). This required obtaining and processing data on casualties (the expected number and type) and a quantification of how care would be provided to these casualties on each platform.

This is a complex undertaking. We began by deriving demand based on calculating expected values (i.e., averages based on various planning factors that we derived from the data). Expected values provide a good starting point for determining requirements and any expected shortfalls. But, given the uncertainty associated with so many factors faced during war, we realized that we would need to consider the use of simulation, where we could introduce uncertainty explicitly, for future work.

Scope

- **Focused on methods and data**
  - **Once these are "right," any scenario—including OPLAN—would be easy to evaluate**
  - **Personnel requirements**
- **Illustrated findings with several scenarios**
  - **Unclassified version, "roughly" based on OPLAN**
  - **OPLAN itself—three different versions, including "chemical" attack**
    - ❑ **Documented in classified companion brief**

We wanted to use appropriate, but flexible, methods to avoid linking our results too strictly with any specific scenario. This would allow us to obtain new results relatively easily for any assumed scenario, including one tied to the OPLAN. Although we originally planned to derive the OR and bed requirement on each platform, we will have to postpone that work. At present, we have focused on personnel requirements for physicians, nurses, and hospital corpsmen (HMs). One reason for beginning with personnel requirements is that it allows us to examine the implications of the treatment data we have used.

In this briefing, we provide a set of unclassified results based on a set of data that was very *loosely* based on the OPLAN. To illustrate the implications for the OPLAN itself, we've derived those numbers and findings and report them in a classified version of this annotated briefing.[1]

1. Robert A. Levy and Richard D. Miller, *Calculating Platform Requirements in Support of OPLAN 5027* (U), Secret, Dec 1997 (CNA Annotated Briefing 97-120).

Summary of Results

- **Echelon 2**
  - **Supply > demand for assumed scenario**
  - **By a lot when 6 CRTSs assumed**
  - **About right with 4 ships or if casualties are actually much higher than base case**
- **Echelon 3**
  - **Supply < demand for many subspecialists (SSPs)**
  - **At least for first few days when most casualties occur**

Before we describe what we did, let us summarize our results. We find that, given the base case set of casualties, the CRTS treaters would not be stressed. Assuming that six CRTSs are on station and capable of receiving casualties, the supply of treaters would be sufficient even on the day when casualties are highest (in our assumed scenario, this is the first day when the assault takes place). Only if the assumptions change (i.e., fewer ships are actually available or the casualty rates are actually more than 50 percent higher than the base case) would the demand for treaters' time potentially overwhelm their supply.

On the hospital ship, however, many SSPs will experience stress the first few days, especially on the first day (and most stressful day) that casualties arrive.

Data

- **Casualties**
  - **Scenario leads to WIA, disease, and NBI casualties**
    - ❑ **Examine implications when casualty estimates are 50% higher or lower than base case**
- **Treatment protocols**
  - **Used Time, Task, Treater (TTT) files**
    - ❑ **For echelons 1, 2, and 3**

For our analysis, we required two types of data—casualty rates and treatment protocols that describe the appropriate treatment for all expected casualties. Our method begins with a scenario from which we derive the expected number of daily wounded-in-action (WIA), disease, and nonbattle-injury (NBI) casualties. Then, we required some way of taking these fairly aggregate kinds of casualties and dividing them further into specific types of injuries or conditions.

In this analysis, we've relied on the 320 or so patient condition (PC) codes that the Department of Defense and all three services typically use to characterize casualties. An important advantage of using the PC codes is that Time, Task, Treater (TTT) files describe the tasks required for treatment, the type of treater performing the task (i.e., HMs, nurses, or physicians), and how much time is required for each task. The files list hundreds of different tasks (particularly at echelon 3, where more complex treatment is offered), so they offer a potentially rich database for determining treater requirements.

Despite their potential for this kind of analysis, they are generally used today only for modeling logistics requirements, not personnel. But what would the data imply about the demand for medical personnel during wartime? We wanted to find out and determine whether there is some potential for using them in the future.

Casualty Data

- **TTT protocols based on patient condition (PC) codes**
  - **First, use MPM to derive expected casualties**
  - **Next, translate from WIA, DNBI to PC codes**
- **Army Medical Department Center and School (AMEDD) at Ft. Sam Houston calculated patient workload for Marines**
  - **Scenario-specific (i.e., associated with major theater war)**
  - **Includes 60 of the 300+ PC codes**
    - **Assumed representative of all casualties**

The Medical Planning Module (MPM) has been, and will continue to be for the foreseeable future, the requirements model used to generate wartime medical resource requirements. Given a scenario, which really means a set of assumed values for the daily population-at-risk (PAR) and casualty rates, this kind of model can be used to generate the number of WIAs, disease, and NBI casualties. Based on work CNA has done in the past examining the MPM,[1] we have developed spreadsheets that can calculate daily casualties. But we also needed to determine how many of the more specific types of casualties, as represented by the various PC codes, would be expected given the assumed scenario.

We relied on a set of data that was developed at the Army Medical Department Center and School, but generated for the Marine Corps. It assigned probabilities for 60 of the 320 or so PC codes. By relating these to the number of WIA, disease, and NBI casualties, we could calculate the expected number of each PC code for any scenario. Although it assigns a 0 value for most of the PC codes, the 60 remaining seemed roughly representative of the entire group. Also, given the relatively small number of casualties expected for most wartime scenarios, using all 320 codes would mean generating extremely small probabilities of occurrence for most conditions.

1. Robert A. Levy, Laurie J. May, and James E. Grogan, *Wartime Medical Requirement Models: A Comparison of MPM, MEPES, and LPX-MED*, Oct 1996 (CNA Research Memorandum 96-97).

Time, Task, Treater Files

- Two different sources for TTT data
  - AMEDD data for 1st and 2nd echelons
  - Defense Medical Standardization Board (DMSB) data for 3rd echelon
- TTT files associate all tasks with PCs
  - Assign treater and time with each task
- Aggregated time for each treater by PC code
  - Aggregated over PCs
    - ❑ Given total number of daily casualties

All TTT files were developed at AMEDD, although the DMSB has been responsible for coordinating and revising the third-echelon data with the active participation of all three services. We received the echelon 1 and 2 data from the Naval Health Research Center in San Diego, but they originally came from AMEDD. We were told that Navy treaters examined these files, but the extent of their involvement is unknown to us. Therefore, we believe that, while the third-echelon data may be representative of at least the tasks at Navy third-echelon platforms (i.e., T-AHs and fleet hospitals), we can't say the same with confidence for the first two echelons' care data. We have used these data in our analysis but, as we'll discuss shortly, we believe that all of the data, including the DMSB data, require further examination to ensure their validity for use in determining Navy medical personnel requirements.

All three of the TTT files list the tasks required to treat all PC codes. For each task, the files list the treater (sometimes more than one) and the time required to perform that task. To determine the demand for treaters, we first aggregated the times each treater would spend over the course of treatment (by day) for that PC code. Then we summed the casualties expected on each day of the conflict.

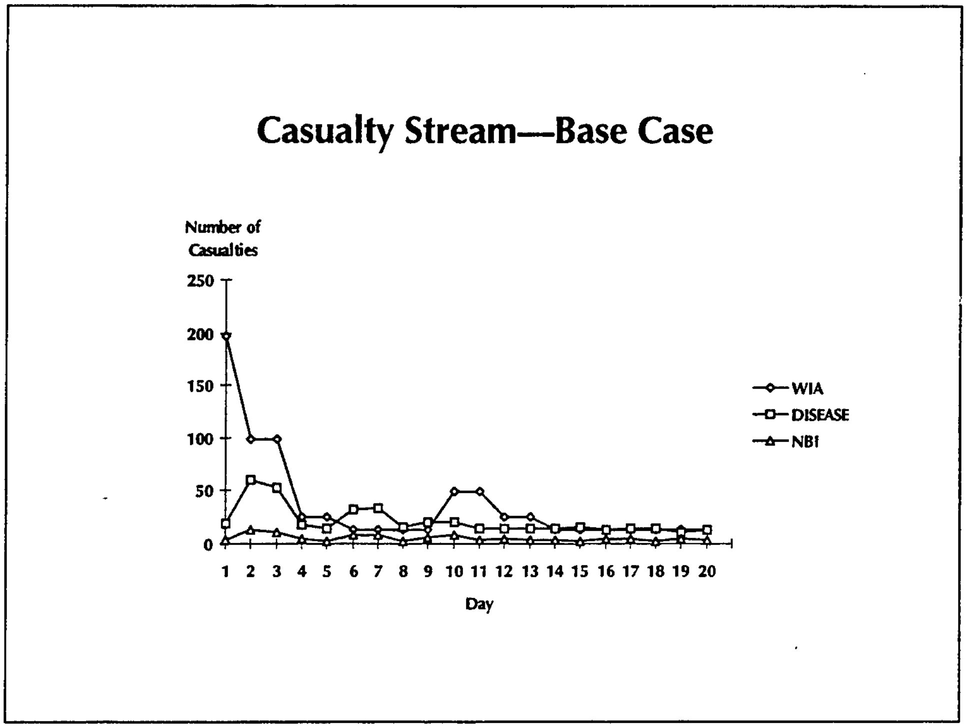
Project Accomplishments to Date

- **Processed TTT files for all three echelons**
  - **Further corrections or enhancements will require clinical help**
- **Calculated demand for all treaters at all echelons**
  - **Compared demand for treaters with supply**
- **More can be done**
  - **But, good stopping point to evaluate next steps**

The TTT files contain a lot of data to be processed, and we have completed our processing of all three echelons, at least for the medical personnel (i.e., the treaters). We corrected for duplicate records, which would have implied an overstatement of the treatment time associated with many conditions. These kinds of potential problems were relatively easy to solve. We believe that further validation of the data will require the involvement of clinicians who can determine whether the data should be used to represent Navy medical care at each echelon.

We have calculated the requirements for each kind of treater in the files and compared this demand with their supply, which we calculate by summing the number on each platform times the number of platforms in theater. We'll provide these numbers shortly. For now, we have assumed that all platforms are accessible for medical casualty evacuation and will be used to provide care. We'll discuss generalizing these assumptions later in the briefing.

We've indicated other issues that need to be resolved—some pertaining to data, others pertaining to the form of the model used. Before resolving all issues, however, we will examine the results to date to understand their implications and what we need to do next.



Before we turn to the results, let's look at the scenario and other important assumptions. As we said, the scenario allows us to generate the expected casualty stream. Over the 20-day period of conflict, the assumed PAR and expected casualty rates implied a total of almost 1,300 casualties—734 WIAs and 542 DNBIs. In this assumed scenario, the assault takes place on day 1, which leads to a total of 220 casualties on this first day. Because we will focus on the peak demand for treaters' time, this number is more important than the total number of casualties over the entire period.

Days 2 and 3 experience fairly high casualties as well, but then the numbers fall dramatically (with small increases occurring on days 6 and 10). Disease and NBI are significantly lower throughout the period, but also experience increases in the early days of the conflict.

Staffing Assumptions—Echelons 2 and 3

- **Based on activity manning documents (AMDs)**
- **Echelon 2**
  - **CRTSs all have 100 medical personnel**
    - ❑ **42 officers**
    - ❑ **58 enlisted**
- **Echelon 3**
  - **T-AHs have 956 medical personnel**
    - ❑ **258 officers**
    - ❑ **698 enlisted**

We determined platform staffing from the activity manning documents (the AMD for the CRTSs has recently been revised). Of the 100 medical personnel (including those in the dental and medical service corps) on board both the LHA and LHD class ships, which now have identical medical augments, 42 percent are officers and 58 percent are enlisted. The T-AHs have almost 1,000 medical personnel, but only about one-quarter are medical officers.

Medical Officer Staffing on Platforms

	CRTS	T-AH
Medical corps		
01XX (medical SSPs)	**4**	**21**
0118 (anesthesiologist)	**3**	**14**
02XX (surgical SSPs)	**7**	**30**
Nurse corps		
09XX	**22**	**154**
0952 (nurse anesthetist)	**3**	**14**

Listed here are the medical and nurse corps staffing on the CRTS and the T-AH (we do not calculate requirements for dental or medical service corps personnel). The first category under medical corps represents all those whose first two digits in the NOBC are 01. This would include internal medicine physicians (NOBC 0101), GMOs (0102), emergency medicine physicians (0109), and the like. In presenting results, we will generally aggregate these different types of physicians. Similarly, all surgical specialties begin with the 02 designation, and nursing specialties begin with 09.

Anesthesiologists would normally be in the 01XX group and nurse anesthetists in the 09XX group. For purposes of our analysis, however, we have taken them out of these groups and created a separate group for them. Therefore, the table implies a total of 14 physicians and 25 nurses on the CRTS platforms.

The T-AH has many more physicians and nurses: a total of 66 physicians (the commanding officer is a physician as well but is not included in the above table) and 168 nurses.

Medical Enlisted Staffing on Platforms

	CRTS	T-AH
Hospital corpsmen		
Without NECs	**28**	**471**
With NECs	**29**	**214**

We listed two groups in the HM community—those HMs who don't have an NEC and are general duty corpsmen, and those with the additional training required to receive a specific NEC. There are a total of 57 HMs on the CRTS and 685 on the T-AH. The TTT files often list the specific NECs that would provide the care, but in reporting results we will generally put the two groups together and simply report the demand for HMs as a group.

Other Important Assumptions

- Evacuation assets not constrained; evacuation takes place "seamlessly"
  - Patients at 1st and 2nd echelons are seen by treaters on day of casualty
  - Patients treated 2 days later at 3rd echelon
- Six CRTSs on station, all available for treatment of patients
  - Implies 600 total medical personnel at 2nd echelon
- One T-AH on station

We made several other important assumptions. First, as we've already indicated, we handled evacuation of patients in a simple way. Casualties were assumed to have been seen at both first and second echelons on the day they were hurt. In other words, evacuation assets are adequate to bring to any of the CRTSs in the area. Those who require third echelon care would be transported to the hospital ship 2 days later. We recognize that the evacuation of patients can be complicated by numerous factors, including the type and availability of medevac helicopters, and we plan to generalize these assumptions in later work.

In our scenario, we assume six CRTSs with 100 treaters each in support of the amphibious landing. Finally, we assume one hospital ship is on station for the entire 20-day period to receive patients from the CRTSs.

Substitution and Other TTT File Issues

- **TTT files often assign more than one treater to a task**
  - **In general, CNA assumed "lowest" skilled treater**
    - ❑ **But it is sometimes difficult to choose between HMs and nurses**
  - **Assumption affects calculated demands for treaters**
- **Aggregation reduces possibility of error**
- **TTT files list the task—don't assign priorities or indicate sequence of events**

An important issue in using the TTT files is determining which treaters are likely to perform the treatment task. For many of these tasks, the file lists two or more treaters. In general, we assumed that the lowest skilled treater would provide the care. For example, the file might state that an HM, a nurse, or a doctor could perform the task. Rather than use all three, we generally assumed that the HM would do it, although in some cases we assumed that the nurse would provide the care. We had to make an assumption here in order to determine the care requirements for individual treaters. But, the results for one type of treater might seem high and another low simply because of the assumptions we made.

This is one reason we often took the results for individual treaters (i.e., at the 4-digit NOBC/NEC level) and aggregated to the 2-digit level. It lessens the importance of an assignment we might make. Unfortunately, where the task can be assigned to an HM or a physician, this aggregation won't work; they belong to two separate groups.

Another issue we couldn't deal with yet concerns information not clearly provided in the TTT files. The file doesn't prioritize PC codes or the tasks to be performed. Although it lists tasks in order, many could undoubtedly be done at the same time.

Comparing Supply and Demand for Treaters (Echelon 2)

Treater	Peak demand (1)	Total supply (2)	Excess demand (1) – (2)
HMs	125.4	342	-216.6
Medical SSPs	16	24	-8
Surgical SSPs	18.6	42	-23.4
Anesth/NA	10	36	-26
Nurses	19.6	132	-112.4

We will present our results in a few different ways. First, we compare the *peak* demand for treaters at second echelon with their supply, given the base case number of casualties. The calculation of demand assumes that medical personnel spend a 12-hour day treating casualties. Then, in the next slide, we show how demand would vary under alternative casualty rate assumptions, but with all other assumptions remaining the same. Finally, several backup slides that follow the main briefing provide daily demand and supply for treaters at echelons 2 and 3 (for echelon 1, we present treater demand *only*).

This slide summarizes the results for the second echelon. The peak demand, measured in person-days, is about 125 HMs. The next column shows the total supply of HMs on the six ships, or a total of 342 HMs. The peak demand is much less than the supply (hence, the negative values for excess demand in the last column).

The same holds true for the other groups. The total supply on the six ships appears to be sufficient, even on the first day when the number of casualties is largest. That does not mean that a more realistic set of assumptions, such as some ships unavailable for receiving patients or groups of patients arriving at nearly the same times, couldn't overwhelm some of the second-echelon treaters. As an example, if there were only four ships on station, there would still be sufficient numbers of all groups with the exception of the medical subspecialists.

Comparing Demand and Supply for Alternative Casualty Rates (Echelon 2)

Treaters	Demand Min — Max	Total supply	Is D ≥ S at Min?	Is D ≥ S at Max?
HMs	63 — 189	342	No	No
Medical SSPs	8 — 24	24	No	Yes
Surgical SSPs	9 — 28	42	No	No
Anesth/NA	5 — 15	36	No	No
Nurses	10 — 30	132	No	No

Predicting just what will happen during war is, at best, a speculative analytical exercise. Some ships may be unavailable or the casualty rates may be different from what's anticipated. This slide compares the supply on the six CRTSs for a range of assumed casualties, the low value representing only half the assumed casualties as the base case, and the higher value representing rates 50 percent higher than the base case.

Our model is linear in terms of the initial casualty rates assumed. In other words, other than rounding differences, casualty rates that are 50 percent higher than in our base case imply that the demand for treaters should be about 50 percent higher as well. Other factors, of course, may change the mix of casualties and the subsequent demand for treaters. For example, chemical or biological weapons would probably lead to different types of casualties than those expected under "normal" battlefield conditions. Here, we've made it fairly simple and applied a straight percentage change to the base case. But, we wanted to show the extent to which our results would change if the assumed casualty rates were inaccurate.

We saw in the previous slide that supply was more than sufficient for the expected demand assumed in the base case. Here, assuming casualties are 50 percent higher than the base case, the supply of treaters would still be sufficient with one exception—the medical subspecialties.

Comparing Supply and Demand for Treaters (Echelon 3)

Treater	Peak demand (1)	Total supply (2)	Excess demand (1) – (2)
HMs	279	685	-406
Medical SSPs	67.2	21	46.2
Surgical SSPs	58.7	30	28.7
Anesth/NA	49.1	28	21.1
Nurses	175.1	154	21.1

Turning to echelon 3, which in our analysis refers to the T-AH, the findings indicate that there would be excess demand during the peak period for four of the five treater groups. There appear to be more than enough HMs, but not enough physicians and nurses, at least for a few days during the initial assault. In some cases, the excess demand is relatively small. Even at the peak, the shortfall in nurses is only about 14 percent. On the other hand, the excess demand for medical SSPs is more than twice as high as the supply and about 75 and 99 percent higher than the supply of anesthesiologists and surgeons, respectively.

Under the assumptions we've made, treaters working longer than 12 hours per day could reduce some, though not all, of the excess demand. We've assumed in our model that casualties arrive evenly over the day, whereas in reality they would tend to arrive in waves. This would tend to worsen the potential problem of any shortfalls in medical personnel, at least over some temporary period.

Comparing Demand and Supply for Alternative Casualty Rates (Echelon 3)

Treaters	Demand Min — Max	Total supply	Is D ≥ S at Min?	Is D ≥ S at Max?
HMs	140 — 419	685	No	No
Medical SSPs	34 — 101	21	Yes	Yes
Surgical SSPs	30 — 88	30	Yes	Yes
Anesth/NA	25 — 74	28	No	Yes
Nurses	88 — 263	154	No	Yes

As we did for echelon 2, we present the implications of the casualty numbers being 50 percent lower or higher. For HMs, there doesn't appear to be a problem, even if casualties were 50 percent higher. All of the other groups would experience excess demand when casualties are 50 percent higher. Even when casualties are only half that assumed in the base case, the medical and surgical SSPs would have a problem.

Admittedly, the problem is temporary and would tend to disappear in just a few days. Nonetheless, the results point out the need to further examine the implications for care on the T-AH when casualties and the subsequent care requirements are likely to be highest. Even assuming that the casualty rates are correct, there are some ways to reduce the problem, including providing more of the care, when possible, on the CRTS (which our numbers imply would not be stressed). To ensure that appropriate care could be provided will take additional analysis of the TTT protocols on care and a more detailed look at treater availability.

Summary of Results

- **Echelon 2**
  - **Supply > demand**
  - **By a lot when 6 ships assumed**
- **Echelon 3**
  - **Supply < demand for many SSPs**
  - **At least for first few days when most casualties were assumed**

To summarize again, it appears that the total supply of treaters at echelon 2, which we've calculated to be 600, is more than sufficient to take care of the demand. This holds for all treaters. Even when we examined the results for individual treater SSPs (such as orthopedic surgeons), this held true, although it was close for some of them. We also have shown that even when casualties are 50 percent higher, the ships should be able to handle the flow of casualties.

At echelon 3, many more shortages occur, at least in the early part of the "war" when casualties are assumed to be highest. This held for many individual treaters as well as when we aggregated to the 2-digit groups. Even when casualties are assumed to be only half as many as the base case, several kinds of treaters may be stressed, at least temporarily.

Implications and Caveats

- **Too many personnel at 2nd echelon; seems about "right" at 3rd echelon**
- **But, premature to reach firm conclusion**
  - **Too many assumptions need further look**
    - ❑ **Evacuation of patients will complicate matters**
    - ❑ **Platforms may not follow guidelines as laid out in TTT**
    - ❑ **Some ships may not be available to render care**
- **Resolving these issues calls for additional analysis**

An implication of having too many medical personnel at echelon 2 is that the echelon 2 treaters could do more. Given the proposed CRTS manning, the ships would clearly not be capable of providing much of the specialized surgery available on the T-AH. It is conceivable, however, that their general and orthopedic surgeons have time to undertake some additional tasks that the data imply would be provided at echelon 3.

But, given some of the assumptions we made about evacuation and the data describing care in the TTT files, particularly for the first and second echelons, we're hesitant to draw any strong conclusions at this time. We recommend doing further work to confirm the validity of what we've found.

Questions for Additional Tasking

- **How good are the data?**
  - **TTT file for 3rd echelon needs Navy validation**
  - **AMEDD data may be too "Army-like"**
    - ❑ **Suggest clinicians examine the TTT files**
- **Should we expand modeling to include simulation?**
  - **More realistic than expected value approach**
  - **Examine other existing models—e.g., MAT**
    - ❑ **Currently inadequate—MAT's definition of echelons different from Navy's**

Two major questions remain. First, how good are the treatment data? Over the years, DMSB has examined and revised the third-echelon data, but controversy persists about the validity of the TTT files when applied to personnel requirements. Echelon 1 and 2 data have similar problems. They were developed at AMEDD and probably require a close examination by Navy clinicians if they are to be used for staffing Navy platforms.

Second, we need to examine the need for simulation. It's often a useful tool, but we believe that the first step is to develop the requirements, as we've done here, and determine the need for more complex models later on. If the demand for treaters was always much higher or much below the supply, we would question the need for additional modeling. But that's not the case here. We do observe that the demand and supply for treaters is close in some cases.

Can existing models be used? Possibly, but that needs to be explored as well. The Medical Analysis Tool (MAT), which we've examined fairly thoroughly in the past, is a possibility, but it currently defines the echelons of care differently from the way the Navy does. At a minimum, it doesn't include any real treatment at echelon 2 facilities. There are other problems as well. We wouldn't rule it out, but we believe it needs to be examined.

Next Steps

- Present initial findings to interested parties from N-931 and BUMED at 1- or 2- day conference at CNA
  - Hope to have clinical and fleet participation
- Set up working group to examine and "bless" TTT protocols
- Resolve other data and modeling issues
  - Introduce evacuation explicitly
  - Introduce prioritizing patients and time phasing of tasks
  - Examine substitutability among treaters

Here are a few of the steps we would like to take next. We'd like to continue to work with N-931 and BUMED to resolve some of these data and modeling issues. One way to start is to present our findings, and others from related studies, at a 1- or 2-day conference that we can host at CNA during the early part of 1998. We'd like to include personnel representing N-931 and BUMED as well as those representing the fleet and those with clinical knowledge. Next, we probably need some kind of working group that can examine the TTT files. Finally, CNA can work on resolving additional modeling issues and present our findings to N-931 to determine whether we'll proceed with new tasking.

Backup Slides

Comparing Supply and Demand—by Day

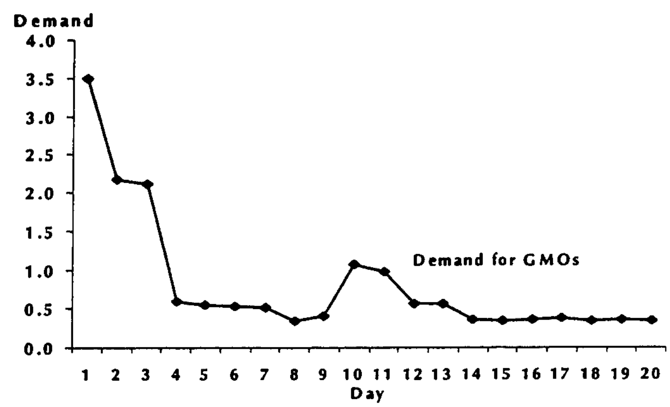
- **Figures all begin at day 1**
  - **Remember for echelon 3, shift of 2 days from time of casualty**
- **Casualties highest on day 1, and decrease steadily after**
  - **Demand for treater typically follows that pattern**
- **As stated earlier**
  - **Supply > demand at echelon 2**
  - **Demand > supply for many specialties at echelon 3**

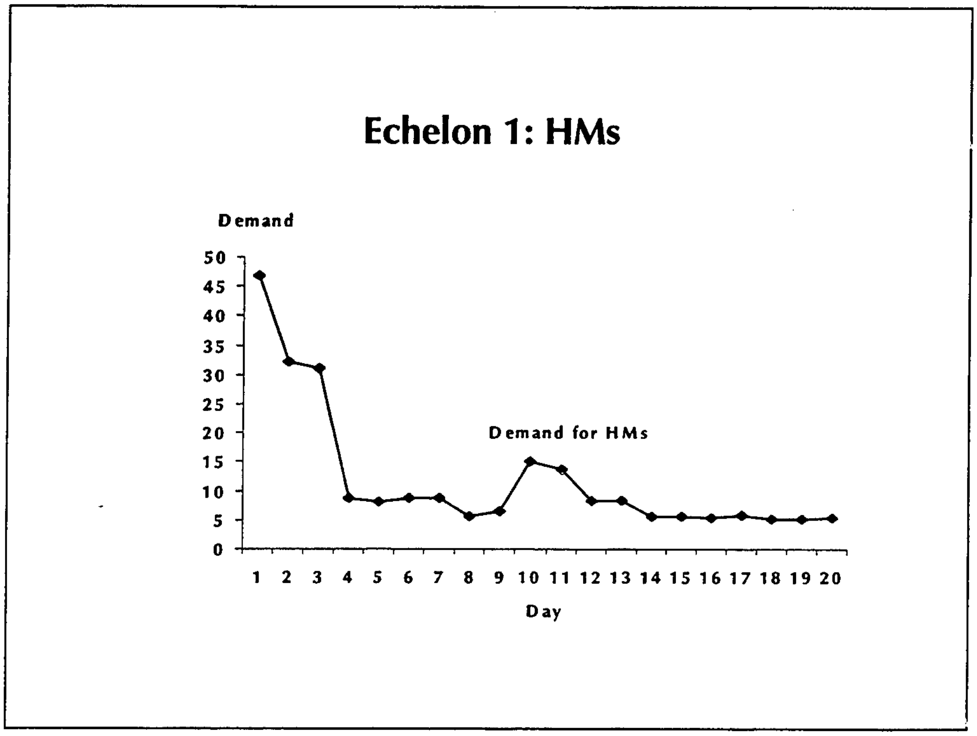
In the set of backup slides, we include more detailed information showing demand and supply of treaters for the 20-day period of the (base case) scenario. The amphibious assault takes place on day 1, which means casualties are highest; given our assumptions, the demand for treaters is highest as well.

Note that we provide only the demand for echelon-1 treaters, not the supply. Because of the fairly complicated organizational structure of Marine Corps units—including their attached medical personnel—we felt that, without stating explicitly the types of units that actually *landed* on the beach, we couldn't get a good count of medical personnel available. Rather than exclude all values for echelon 1, we felt it would be of interest to show at least what the implied demand would be given the scenario assumed.

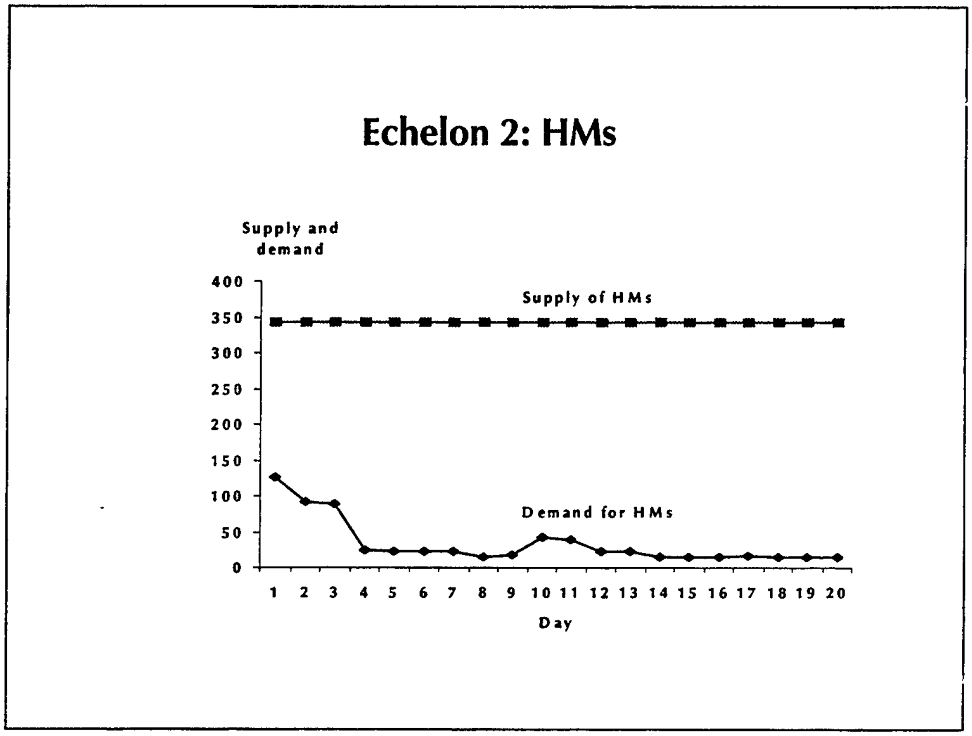
Echelon 1

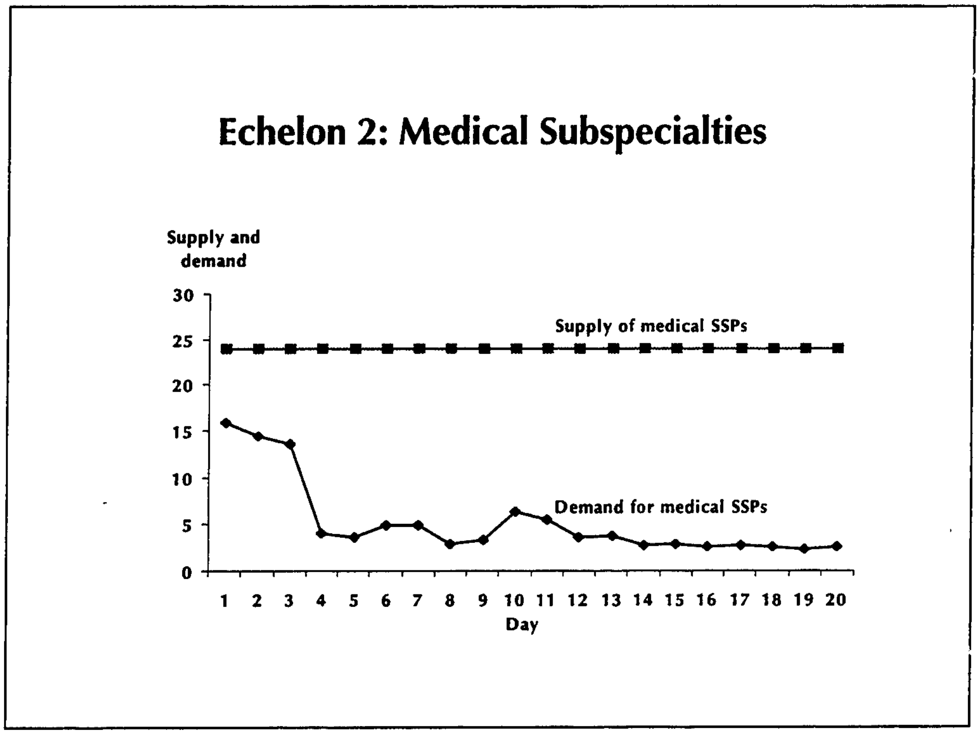
Echelon 1: GMOs



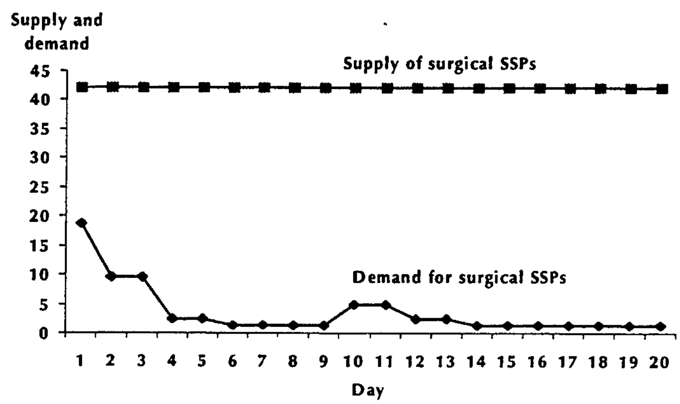

Echelon 1: HMs
Demand
50
45
40
35
30
25
20
15
10
5
0
Demand for HMs
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Day

Echelon 2

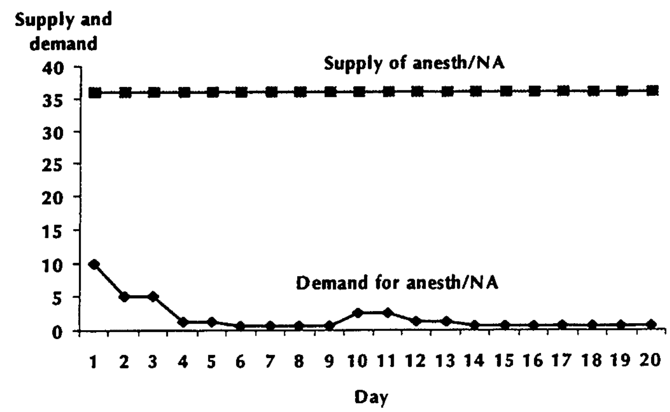

Echelon 2: HMs
Supply and demand
400
350
300
250
200
150
100
50
0
Supply of HMs
Demand for HMs
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Day


Echelon 2: Medical Subspecialties
Supply and demand
30
25
20
15
10
5
0
Supply of medical SSPs
Demand for medical SSPs
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Day

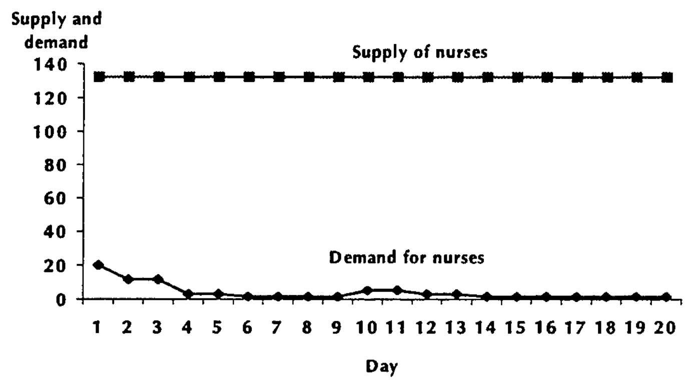
Echelon 2: Surgical Subspecialties



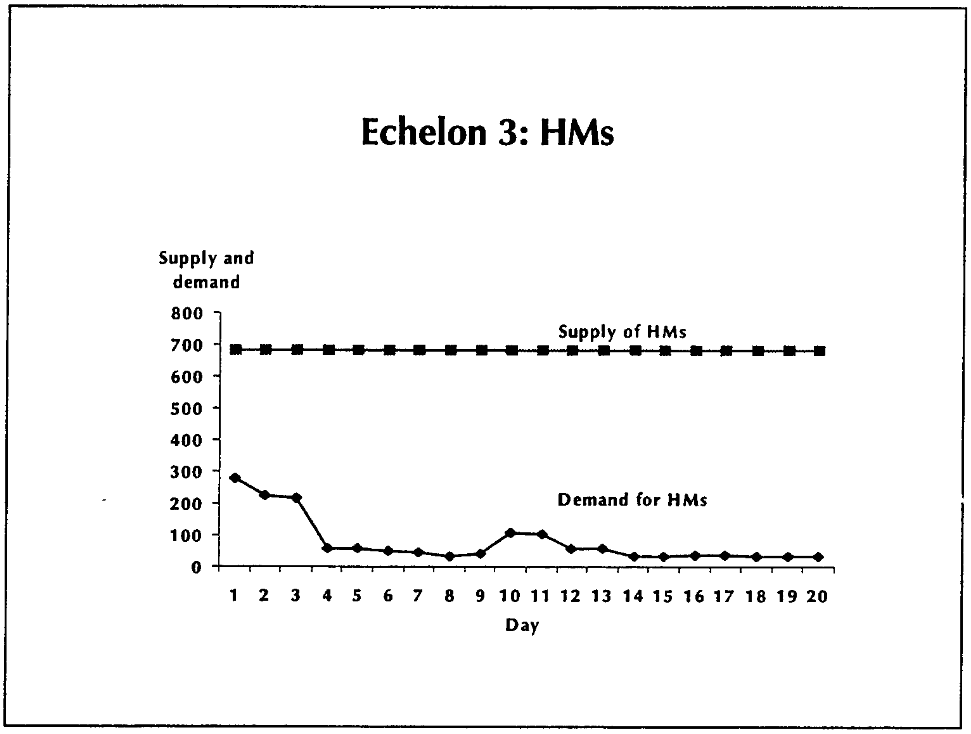
Echelon 2: Anesthesiology/Nurse Anesthetist



Echelon 2: Nursing Subspecialties

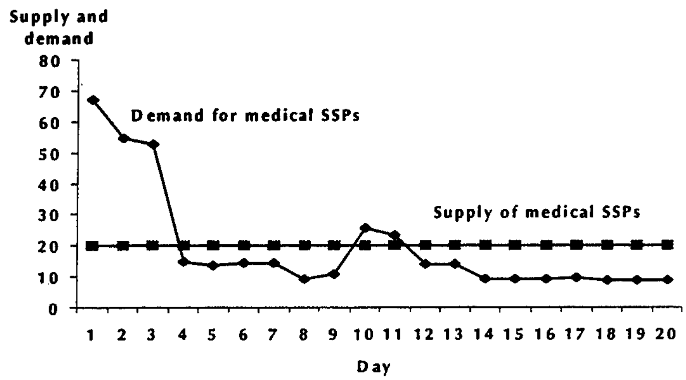


Echelon 3

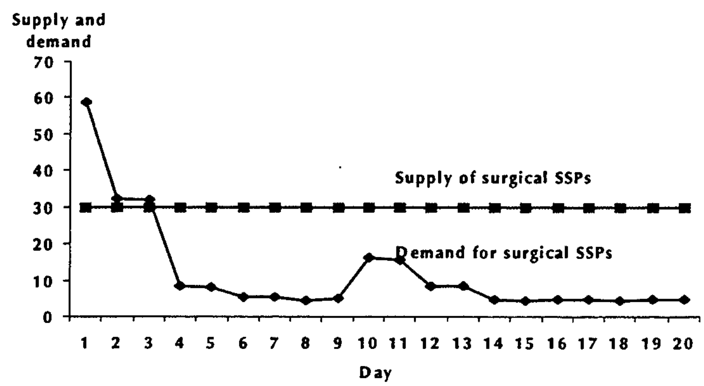


Echelon 3: HMs
Supply and demand
800
700
600
500
400
300
200
100
0
Supply of HMs
Demand for HMs
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Day

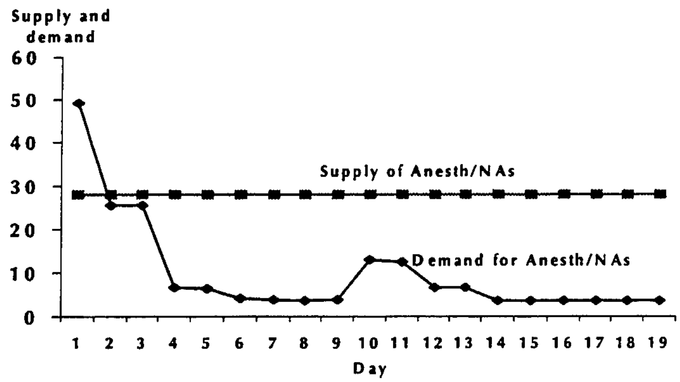
Echelon 3: Medical Subspecialties

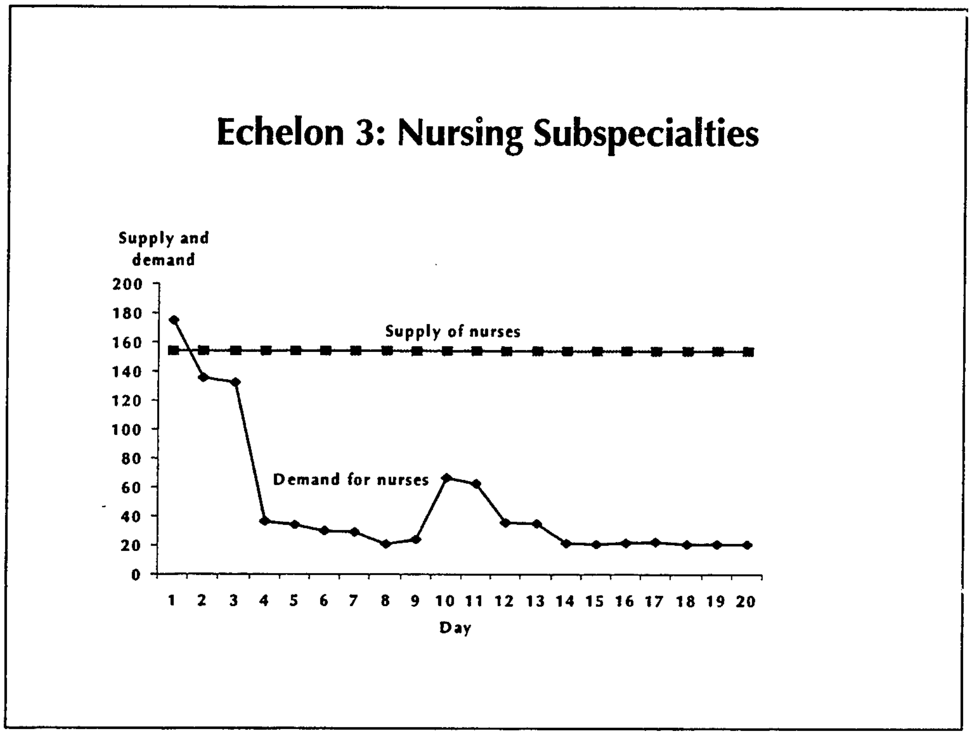


Echelon 3: Surgical Subspecialties



Echelon 3: Anesthesiologists/Nurse Anesthetists




Echelon 3: Nursing Subspecialties
Supply and demand
200
180
160
140
120
100
80
60
40
20
0
Supply of nurses
Demand for nurses
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Day

Distribution list

Annotated Briefing 97-118

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Attn: FORCE SURGEON
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