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The purpose of this study is to determine a physician staffing mix which will meet the needs of the Bayne-Jones Army Community Hospital catchment area population following the down-sizing of Fort Polk. The active duty and dependent of active duty beneficiary populations at Fort Polk will be reduced by approximately one-third over the next two years due to Congressional mandates. As a result of this large reduction in the number of medical care beneficiaries, the number of authorized personnel at Bayne-Jones, to include physicians, will be reduced. The hospital commander must decide which medical specialties will absorb these reductions. After a projection of future patient demand and an analysis of several factors important in staffing decisionmaking, a staffing algorithm is presented to assist the commander in his decision making regarding physician staffing mix.

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THE DETERMINATION OF PHYSICIAN STAFFING MIX

AT BAYNE-JONES ARMY COMMUNITY HOSPITAL

A Graduate Management Project

Submitted to the Faculty of

Baylor University

in Partial Fulfillment of the

Requirements for the Degree

of

Master of Health Administration

by

Major David O. Cote, MS

July, 1992

TABLE OF CONTENTS

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ABSTRACT

The purpose of this study is to determine a physician
staffing mix which will meet the needs of the
Bayne-Jones Army Community Hospital catchment area
population following the downsizing of Fort Polk. The
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populations at Fort Polk will be reduced by
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important in staffing decisionmaking, a staffing
algorithm is presented to assist the commander in his
decision making regarding physician staffing mix.

Recent changes in world politics have led many countries to examine their military-industrial complex. The dissolution of the Soviet Union, the cooperation between member nations of the North Atlantic Treaty Organization and former Warsaw Pact nations, and the move of many former Warsaw Pact nations toward democracy have led the United States to question its need for the large military forces that existed during the cold war era.

Another situation that has caused the U.S. and other industrialized countries to examine their military forces is the state of their economies. In the U.S. and many other countries, the size of the national budget and the national debt have increased steadily for several successive years. The Department of Defense (DoD), accounting for over 25% of all U.S. government expenditures (U.S. Department of Commerce, 1990), has become a prime target for cost reductions.

Some of the methods Congress has proposed to reduce defense spending include reducing the number of military personnel, consolidating redundant operations within the armed forces, and closing some military installations. These actions will lead to changes in the military population at several installations

throughout the country. In turn, these population
changes will impact on numerous post activities which
support the soldiers and their dependents. One such
activity is medical care.

STATEMENT OF THE MANAGEMENT PROBLEM

Medical resources are not simply adjustable in
proportion to changes in a supported population. Large
increases or decreases in a population will change the
mixture of specialists necessary to meet the needs of
the population. No formalized procedure exist for
making such adjustments at individual military
installations.

Literature Review

The number of required staff members and the mix
of medical specialists at Army Medical Treatment
Facilities (MTFs) have traditionally been based on
work performed. Periodically, on-site manpower survey
teams have examined the work output of Army hospitals
and updated the Tables of Distributions and Allowances,
the manpower documents for these hospitals. During the
years between manpower surveys, adjustments in manpower
have been made when a facility could show a change in
productivity from its last manpower survey. However,
the last systematic manpower survey conducted by Health

Services Command (HSC), the headquarters of fixed Army

MTFs in the U.S., was in 1985.

One of the reasons for manpower surveys not being

conducted since 1985 is the desire of Congress for more

globally based, objectively determined staffing

standards. A Congressionally established Blue Ribbon

Panel which investigated the allocation of resources

among the medical departments of the Army, Navy and Air

Force found a lack of common standards between services

on which manpower requirements were based. However,

the Panel also found that much of the work the three

services perform is common among them (O. Lazzeri,

personal communication, April, 1992). As a result of

this finding, a tri-service Joint Healthcare Management

Engineering Team (JHMET) was established and tasked to

develop common manpower standards on which the

distribution of medical resources can be made. To

date, fifty of a target 168 standards have been

developed. Seventeen standards have been accepted by

the Surgeons General of the three military medical

departments and two more standards will be submitted

for approval by the summer of 1992.

In 1990, HSC initiated an effort to determine the

relationship which exist between manpower resources

utilized in its treatment facilities and facility work production (Braun, 1991). In this study, work production was measured in Medical Work Units (MWUs), a measurement that combines Inpatient Work Units (IWUs) and Ambulatory Work Units (AWUs). The IWUs for a facility are determined by multiplying the number of dispositions by the Relative Case Mix Index (RCMI) of a the facility. Ambulatory work units are determined for each service (e.g., family practice, optometry, and audiology) by multiplying the number of clinic visits to the service by a service weight. The total number of ambulatory work units for a facility is determined by summing the AWUs for each service. A linear regression analysis was conducted using the number of MWUs produced by Army hospitals as the predictor of the number of full-time equivalents (FTEs) utilized. An $R2$ of .97 was achieved, indicating that 97 percent of the variance in the number of FTEs utilized between facilities can be accounted for by facility productivity. The high correlation between FTEs and productivity also indicates that the efficiency of our manpower is consistent across facilities.

One reason for this HSC study was to develop an objective method for estimating changes in required

medical facility personnel when catchment area populations change due to Congressiona`¦y mandated base realignments and the downsizing of the Army. In its examination of hospital output, HSC calculated the mean number of MWUs generated per year by active duty soldiers and by dependents of active duty soldiers at selected posts. With these figures, a change in hospital workload (MWUs) could then be projected for a given change in the active duty and the dependent of active duty population. Using this projected change in workload and the regression equation that showed the relationship between MWUs produced and FTEs utilized, the number of FTEs required to serve a new catchment area beneficiary population could be computed.

A limitation of this methodology is the procedure by which MWUs are determined. Inpatient Work Units are calculated by multiplying the RCMI for an institution by its number of dispositions. Facilities with a large elderly census tend to have a high RCMI because of the complexity of the cases they present upon admission. However, this RCMI is applied to all categories of beneficiaries to determine the IWUs each category generates. Consequently, the IWU figures for active duty soldiers and their dependents at bases with a

large elderly patient census may be inflated. A

similar problem exist for the other component of MWUs,

AWUs. The AWUs for a post were allocated to each

beneficiary subgroup based on population proportions.

Thus, if a subgroup comprises 25% of a catchment area

population, it was credited with 25% of the AWUs

generated by each clinical service. This may or may

not accurately reflect the actual number of AWUs

generated by a particular beneficiary subgroup. The

reason for this assignment methodology is the inability

of centralized military medical information systems to

identify service visits by beneficiary category.

An area this study did not address was the unmet

medical needs of the non-active duty portion of the

beneficiary population. This study only examined the

patient care being rendered in Army hospitals.

Unfortunately, workload is usually much greater than

the work output at Army MTFs. Thus, some beneficiaries

must seek care from civilian sources or go without

care. This unmet demand varies from post to post and

between subgroups of the non-active duty population

(e.g., dependents of active duty soldiers versus

retirees).

Another area not addressed in the HSC study is
that of personnel mix. The models developed in the
study are only useful in determining the total number
of FTEs a facility should have to meet beneficiary
demand consistent with the level of demand that is
currently being met. The models do not attempt to
determine how many personnel should be physicians,
nurses, psychologists, etc. If a hospital is to meet
the needs of its beneficiaries, it must know the types
of professionals it needs to serve those beneficiaries.
Thus, not only does a facility need to know how many
physicians it needs, but it also needs to know the
distribution of physicians by specialty.

Numerous approaches have been taken to determine
the appropriate number and mixture of physicians
necessary to serve the medical needs of a population
(Weiner et al., 1987). However, each approach has
limitations and no one approach is agreed upon by
health care policy experts as the best method
(Schitovsky and McCall, 1976).

One method to determine physician to population
ratios is to look at an area that has its medical needs
met by the provider community and to set that provider
to population ratio as a desired ratio (Klarman, 1969).

One problem with this technique is the difference in demographics from one geographic area to another. For example, the percentage of the population over 65 years of age in many Florida cities is much higher than it is in other U.S. cities. Because the elderly typically require more care than other segments of the population, an elderly population may not be well served by a provider to population ratio that provides adequate access to a younger population (Hemenway, 1982).

Another method for determining a physician to population ratio is to have a group of experts familiar with the medical needs of a population determine the number of providers needed to serve that population (Graduate Medical Education National Advisory Committee [GMENAC], 1980). Mulhausen & McGee (1989) found that the experts used to establish these projections are usually providers who overestimate the requirement for their services. Nevertheless, this technique is preferable to a demand-based approach (Schwartz & Mendleson, 1990).

A demand-based approach follows free market economic theory and assumes demand will determine supply. In free market economic theory, suppliers

cannot influence demand, consumers are knowledgeable of the product they are purchasing, and the consumer decides the marginal utility of purchasing an extra unit of product. None of these conditions are necessarily present in the medical marketplace (Tarlov, 1990). A physician often strongly influences the type and amount of care a patient receives because of the patient's limited medical knowledge.

Regardless of the methods used to determine physician staffing ratios in the private sector, the applicability of these ratios to the Army is limited. The demographics of the Army beneficiary population is different than civilian populations, a priority of care exist for serving different subgroups of the Army beneficiary population, and the mission of the military medical system is considerably different than that of civilian healthcare. In addition, the demand generated by one large group of beneficiaries, retirees and their dependents, can vary from facility to facility. If retirees in an area are employed by employers who offer health insurance at a low cost, the retirees may place their demand at civilian institutions. However, retirees who do not have civilian health insurance and retirees who are over 65 years of age find the military

medical system to be their least-cost alternative for health care.

Because of the uniqueness of the military medical system, James and Williams (1990) examined the suggested physician staffing ratios from numerous civilian studies and many military staffing studies in an attempt to derive staffing ratios for military beneficiary populations. After an extensive review of the civilian and military literature and a thorough examination of the military healthcare system, James and Williams derived a physician to beneficiary population staffing ratio for each medical specialty in the Army. These ratios were reviewed by the consultant of each medical specialty and adjustments were made in the staffing ratios when justifiable.

James and Williams applied the agreed upon ratios to the catchment area population of each of 31 continental U.S. (CONUS) Medical Department Activities (MEDDACs) to determine a theoretical staffing level for each medical specialty at each of 31 MEDDACs. The staffing mix for each MEDDAC was then forwarded to the MEDDAC commander for comments and recommended changes. Using the replies of MEDDAC commanders, a regression analysis was conducted to determine the amount of

agreement between the staffing levels determined by James and Williams and the staffing levels desired by the MEDDAC commanders. An R^2 of .94 was obtained in this analysis, indicating that, on average, the staffing levels for a MEDDAC determined by the physician to beneficiary population ratios are very good estimates of the actual need of a medical activity as determined by its commander. However, this high correlation may have been obtained because suggested staffing levels for most specialties at most facilities exceeded actual facilities staffing levels.

The findings of this study and the high accountability for variance among staffing levels found in the HSC study (Braun, 1991) have led Army Medical Department resource managers to use the tools developed in these studies for making manpower staffing decisions. For example, the physician staffing ratios developed by James and Williams were used in making assignment decisions at the 1991 Medical Corps Physician Distribution Conference (D. Braendel, personnel communication, May, 1991) and the FTE models HSC developed will be used in determining FTE changes at CONUS MEDDACs which will experience a change in their beneficiary population due to base realignments

(W. Braun, personal communication, May, 1991). In this
latter case, HSC will identify categories of employees
in which personnel reductions will occur and the number
of reductions (e.g., x officers, y enlisted soldiers,
and z civilians). However, each MEDDAC commander will
decide which specialties within an employee category
will be reduced.

Given the number of physician specialties found in
any hospital, such a decision will not be easy. A
commander could use the suggested staffing ratios from
the Medical Corps Optimization Study (James and
Williams, 1990) in making his reduction decisions.
However, these ratios were not developed with the
intent that they would be directly applied to every
catchment area without some adjustment. James and
Williams cautioned in their study that "the ratios were
determined based on the aggregate population [Army
beneficiary], the requirements they generate must be
refined by facility" (p. 17). These ratios must be
viewed as a guide and must be validated or adjusted
after a thorough analysis of the catchment area
population and its medical demands. Without such a
validation, reductions in manpower could be made that
would: 1) not best serve the medical needs of a

specific community, 2) result in an underutilization of manpower and facilities, and 3) increase the per capita amount of money spent on medical care obtained outside the military care system.

PURPOSE OF CURRENT STUDY

Fort Polk, Louisiana is one of the many Army posts that will experience a substantial change in its beneficiary population due to Congressionally mandated force reductions. The purpose of this study was to determine the medical specialty mix at Bayne-Jones Army Community Hospital, Fort Polk that will best serve the needs of the new catchment area beneficiary population.

METHODS AND PROCEDURES

The determination of the physician specialty mix that will best meet the needs of the new beneficiary population at Fort Polk was accomplished in two phases.

Phase I: Application of the Optimization Study Ratios

In Phase 1, the number of physicians in each specialty necessary to serve the post-alignment beneficiary population in the Fort Polk catchment area was calculated using the results of the Medical Corps Optimization Study (James & Williams, 1990). Obtaining this physicians mix was a three step process.

Step 1.   Change in Active Duty Population

The change in the active duty troop population was determined from figures provided by the Fort Polk Base Realignment And Closure (BRAC) office. These figures included troop population changes due to the movement of Modified Table of Organization and Equipment (MTO&E) units and Tables of Distribution and Allowances (TDA) units to Fort Polk, the movement of MTO&E units from Fort Polk, and the overall downsizing of the Army. Because changes due to BRAC began in December, 1991, the "current" population was established as that which existed on 1 December 1991. All realignment moves are presently expected to end in February, 1994. Thus, the population following realignment was taken as the projected active duty population on 27 February 1994.

Step 2.   Change in Non-Active Duty Population

In this step, the new dependent of active duty population in the Fort Polk catchment area following realignment was calculated. To determine this population, the number of family members associated with units leaving Fort Polk was subtracted from the current family member population and the dependents associated with incoming units was added to the remaining population. To obtain the number of

departing family members, the average number of family members per soldier at Fort Polk was multiplied by the number of departing soldiers. The average number of family members per Fort Polk soldier was obtained from the Defense Eligibility Enrollment System (DEERS), a system that assigns family members to the catchment area in which they live. To obtain the number of dependents associated with incoming units, the number of family members associated with TDA soldiers and MTO&E soldiers, as derived by Braun (1990, 1991), were multiplied by the number of incoming TDA and MTO&E soldiers.

In population surveys of several Army posts, Braun (1990, 1991) found that the average number of family members per soldier at Army posts comprised mostly of TDA units is greater than the average number of family members per soldier at posts comprised mostly of MTO&E soldiers. This difference is to be expected given that MTO&E units are comprised largely of young, single soldiers and TDA units are typically comprised of older, married soldiers. In his 1990 survey, Braun found the average MTO&E soldier to have 1.438 family members and the average TDA soldier to have 2.290 family members. In his 1991 survey, Braun found the

average number of family members for MTO&E and TDA to be 1.427 and 2.003, respectively.

The number of family members per MTO&E soldier is consistent between these two surveys; however the number of family members per TDA soldier is not consistent. The difference between the 1990 and 1991 TDA figures may be due to differences in sampling between the two surveys. Because the 1990 estimates involved a larger sample of posts and they did not involve as many permanent party soldiers who were in a training status, the 1990 family member figures for TDA soldiers was used in the present study to estimate the family member population at Fort Polk following realignment.

The other segment of the beneficiary population of interest in this study is the population of retirees, retiree dependents, survivors and others eligible for care in the Fort Polk catchment area. The 1994 population of this group, hereafter referred to as "others," will be determined by modeling programs from the Defense Medical Information System (DMIS) that use the DEERS data.

Step 3. Calculation of Physician Needs

Given the new active duty population figures, the
projected family member population and the number of
other beneficiaries in the catchment area following
post downsizing, the theoretical physician specialty
mix needed to support the new beneficiary population
was determined in Step 3 using the staffing ratios
developed in the <u>Medical Corps Optimization Study</u>
(James & Williams, 1990). Because of the priority of
care system in the Army, four specialty mixes were
calculated. These are:

1. the mix necessary to meet the needs of the
active duty population,

2. the mix necessary to meet the needs of the
active duty family members,

3. the mix necessary to meet the needs of
'others,' and

4. the mix needed to meet the needs of all
beneficiaries (a sum of the first three mixes).

Phase 2: Tailoring of Physician Mix to Fort Polk

Initial Adjustments

The physician to population ratios developed by
James and Williams do not take into account the
peculiarities of a specific catchment area. For

example, the demographics of an area (e.g., a high

retiree population) or the environmental conditions of

an area (e.g., high pollen counts) may require that the

suggested ratios be adjusted. In this phase of the

study, several factors are considered in succession to

adjust the staffing mix determined in Phase 1.

Unsupportable Specialties

The specialties identified from the application of

the Medical Corps Optimization Study ratios were

examined in light of current personnel and equipment

assets at Bayne-Jones to determine if any specialty

could not be supported without major personnel and/or

equipment changes.

Projected Beneficiary Demand

To project beneficiary demand in fiscal year 1994

(FY94), beneficiary outpatient visits to military

clinics and to CHAMPUS providers in 1990 were examined.

Fiscal year 1990 data was used as opposed to fiscal

year 1991 data due to the lack of consistency in the

1991 data. Operation Desert Shield and Operation

Desert Storm caused many fluctuations in the 1991 data.

This was not a local phenomena. Health Services

Command found the data from FY91 to be so irregular that budget projections for FY92 were made based on FY90 data.

Direct care demand. Obtaining specialty demand by beneficiary category for MTF care was easily obtained from monthly MED 302 reports. These reports summarize visits on a monthly basis to each hospital clinic (e.g. orthopedics, cast, social work, etc.) and to clinics in outlying facilities such as the troop medical clinics. Within each clinic, visits are summarized by beneficiary category (e.g., active duty Army, dependent of Navy retiree, Army retiree, etc.).

CHAMPUS demand. Specialty visits by beneficiary category are not reported directly by CHAMPUS. An attempt was made to obtain specialty data by asking CHAMPUS to provide a report of claims by provider (given the name of a provider, we could look up his speciality as published by the AMA), but such a report was not available. Thus, specialty demand by beneficiary category had to be obtained indirectly.

Specialty demand by beneficiary category was derived by combining the information provided in two standard CHAMPUS reports, the FY90 Provider Participation Report and the 1990 Cost and Workload

Report. The Provider Participation Report provided a

summary, by specialty (e.g., orthopedics,

ophthalmology, general/family practice, etc.), of paid

CHAMPUS claims submitted by physicians in Louisiana who

had participated in CHAMPUS at least once during the

year. Twenty thousand claims from the Fort Polk

catchment area and the two metropolitan areas located

on the outside edge of the catchment area (Alexandria,

LA and Lake Charles, LA) were extracted from this

report. (Note: Approximately 44,000 CHAMPUS claims

were paid in FY90 for beneficiaries living in the

catchment area.) The proportion of extracted claims

submitted by each specialty was applied to the number

of CHAMPUS outpatient claims for FY90 to determine

total demand for care by each specialty. (E.g., If 5%

of the claims from participating providers were

submitted by ophthalmologists, then 5% of the 44,000

claims were assumed to have been submitted by

ophthalmologists.)

Having proportioned FY90 CHAMPUS visits by

specialty, the visits were then subproportioned by

beneficiary category using the 1990 CHAMPUS Cost and

Workload Report. This report summarized over 40,000

catchment area visits by beneficiary category and

general area of medicine (e.g., of 40,000 visits,
15,000 were to surgery specialists, and active duty
family members accounted for 10,000 of these 15,000
surgery visits). From this report, the proportion of
visits by each beneficiary category to psychiatric,
medicine and surgery physicians was obtained. These
proportions were then applied to the specialty data
obtained from the Provider Participation Report to
obtain specialty visits by beneficiary category. To
clarify this procedure for determining CHAMPUS visits
to specialists by beneficiary category, the following
example is provided.

From the Provider Participation Report, one may
have determined that ophthalmologists submitted 5% of
all FY90 claims. If 40,000 claims were submitted, than
the demand for ophthalmology was 2,000 visits (40,000 x
.05). If the Cost and Workload report indicated that
75% of all surgery visits were consumed by active duty
family members, then we could estimate that the active
duty family member demand for ophthalmology, a surgery
specialty, was 2,000 x .75, or 1,500 visits.

1994 demand. The CHAMPUS data was combined with
the MTF data to yield total FY90 demand by each of the
three beneficiary categories of interest (active duty,

family member of active duty, and 'other') for each

specialty. To obtain the projected number of 1994

visits to each specialty by active duty soldiers and

their family members, the FY90 demand was reduced by

the same percentage that the size of each of these two

populations will be reduced between December 1991 and

February 1994. Due to the stability of the size of the

'other' population, their demand was projected to be

the same in 1994 as it was in 1990.

Given the 1994 visit demand, the number of

providers needed to meet this demand was determined by

using a variety of models. Unfortunately, not all

models were applicable to all specialties. Each of the

models in discussed below.

James and Williams Productivity Model. In the

Medical Corps Optimization Study, James and Williams

(1990) suggested weekly productivity figures for each

specialty in the Army Medical Corps based on the median

productivity of civilian specialists. Median

productivity figures were obtained from Physician

Marketplace Statistics (1989), an annual publication of

the American Medical Association (AMA). Statistics in

this report are based on a survey in which specialists

are asked how many patient visits they had in their

most recent full week of practice. These were the
figures James and Williams presented to the Army
specialty consultants for adjustment to obtain Army
productivity figures that reflect the unique
requirements of military medicine. An annual
productivity figure was derived from each of these
weekly adjusted figures for each specialty by
multiplying the adjusted weekly productivity figure by
46, the number of weeks James and Williams estimated an
Army physician is available to treat patients (four
weeks of annual leave a year and two weeks of
continuing medical education per year were assumed).
To obtain the number of desired physicians in a
speciality in the present study, the number of
projected specialty visits in 1994 was divided by the
yearly productivity figure for that specialty.

American Medical Association Model. The 1990
edition of Physician Marketplace Statistics (AMA, 1990)
was used to create a model for the present study. The
productivity figure used for the model in the present
study was the average number of weekly patient visits
to a physician's office. This figure was multiplied by
46 to obtain the yearly number of office visits a
specialist could be expected to produce. A work year

of 46 weeks was used so that this model would be

consistent with the James and Williams' model.

Two differences between the AMA model developed

for this study and the James and Williams model

described above are the dates of the AMA data used

(James and Williams used spring, 1989 data, the current

study used spring, 1990 data) and the numbers used for

weekly productivity. As mentioned earlier, James and

Williams presented weekly productivity figures to Army

specialty consultants for review. However, it appears

that the productivity figures presented to the

consultants were the total number of visits a physician

performed per week. This included outpatient,

emergency room, nursing home and inpatient visits.

Because the current study used ambulatory visit data

for the basis of projecting future demand and because

Army physicians are not usually credited for visits

other than ambulatory visits performed in their regular

clinic location, only the number of visits a civilian

physician performs in his office each week were used in

the AMA model.

European Model. This model is based on a 1990

study by Travis of Army providers in Europe. In this

model, the average number of provider visits per year

were derived by examining the annual productivity of
six types of Army providers in Europe: physician
assistants, general medical officers (now designated
field surgeons), family practitioners, pediatricians,
internists and obstetricians/gynecologists. The
purpose of the study was to determine the number of
medical personnel that should be assigned to an area
given the number of beneficiaries in the area and the
known visit rate of beneficiaries in Europe. The
yearly productivity figures in this model were based on
an average work month of 15 days (2.5 days leave/month,
1 day equivalent/month in meetings, 2.5 days/month for
nonpatient care activities). This equates to a 36 week
work year ((15 days/month x 12 months) / 5 days/week).

Bayne-Jones Model. This model is based on current
provider productivity rates at Bayne-Jones Army
Community Hospital. Provider productivity for the
first six months of FY92 was obtained from the
Appointment Scheduling Module of the hospital computer
system and projected for one full year. The
productivity of department heads and civilian providers
was not included in this model due to the
administrative duties which reduce clinical
productivity.

Tri-Service Staffing Models. Since the release of

the Jones and Williams study, tri-service staffing

models for several specialties have been developed by

the Joint Healthcare Management Engineering Team.

These models derive provider needs based on a variety

of inputs. The inputs to these models depend on the

provider specialty being examined. Some common inputs

include clinic visits, bed days, number of

dispositions, and surgical procedures. All figures

input into these models were based on 1994 demand given

the volume of visits in 1990 and reductions in

beneficiary populations.

Further Adjustments to Physician Mix

The models reviewed above were used to adjust the

provider figures obtained from the application of

the Medical Corps Optimization Study physician to

population ratios. The expected number of physicians

needed to support the total beneficiary population was

more than the number of military physicians currently

assigned to Bayne-Jones. Consequently, a method for

determining what specialties should be kept and the

size of the physician staff for each specialty was

developed and applied to the adjusted provider figures.

Considerations in this methodology were: operational

needs, priority of care, ability to coordinate patient care under the Gateway to Care program, availability of civilian providers in the catchment area, and cost of care in the civilian community.

Operational Needs

The Army requires that a medical activity have two operational medicine positions: the commander and the deputy commander for clinical services. Consequently, a need for two operational medicine physicians will be established.

Active Duty Needs

The first priority of care for military medical treatment facilities is the active duty troop population. Thus, the full time equivalents in each specialty need to support the active duty population were determined by taking the adjusted needs in each specialty and rounding to the nearest whole number of physicians. If less than .5 of a full time equivalent for a specialty was needed, the specialty was not considered as needed.

Ability to Coordinate Care

A major shift in the delivery of health care services in Army treatment facilities will take place with the introduction of the Army managed care program,

Gateway to Care. An essential element of this program is the empanelment of beneficiaries with primary care physicians who serve as medical service gatekeepers. These gatekeepers will coordinate the care of all patients on their panel to help assure that beneficiaries receive appropriate care from appropriate sources. Without these gatekeepers, coordinated care will not succeed.

Ideally, the Army would like all beneficiaries to participate in the Gateway to Care Program to minimize annual health care expenses. In rural areas such as Fort Polk where sources of health care other than the military are limited, a majority of the beneficiary population can be expected to desire enrollment in Gateway to Care. To assure the capability of enrolling beneficiaries desiring participation and to reduce medical expenditures, the number of primary care providers necessary to care for 100% of the beneficiary population currently using Bayne-Jones should be available to the hospital. Thus, this number of primary care providers will be designated as necessary staff and will be added to the providers needed to care for the active duty population.

Availability of Civilian Providers

As mentioned earlier, the number of physicians needed to meet the medical needs of the catchment area population will be in excess of the number of physicians Bayne-Jones can expect to have assigned. Thus, before deciding on what other physicians (other than primary care) should be added to the staff at Bayne-Jones Army Community Hospital, the availability of civilian providers needs to be examined to determine the type and the number of specialists that are available in the catchment area in excess of civilian need. Excess availability is defined, for the purposes of this study, as a ratio of physician to catchment area population that is higher than the average physician to population ratio in the United States for any given specialty. If an excess number of physicians exist in a given specialty, this specialty should not be considered for addition to the staff at Bayne-Jones until all specialties for which an excess does not exist have been added to the staff.

Costs

The cost of services attributable to each specialty varies, with some specialties costing much more than others. To minimize Department of Defense

medical expenditures, cost should be used to prioritize
the military specialists on staff. (This assumes that
military facilities can provide care for less than
civilian facilities.)

To determine which physicians should be added to
the Bayne-Jones staff to meet the needs of the active
duty family member and 'others' populations,
specialties were rank ordered by the total expense
associated with the average provider in the specialty.
To obtain the total expense per specialist, the average
annual gross income of a physician in the specialty was
added to the total inpatient cost associated with the
specialty. To obtain gross income, specialty net
incomes as reported by the AMA (1990) were converted to
gross incomes by using the average physician's overhead
expense of 41% of gross earnings (Medical Economics,
1991). Gross income was desired because billed charges
reflect gross income, not net income. Annual inpatient
costs associated with each speciality were obtained by
multiplying the average number of admissions per year
per specialist (AMA, 1990) by the average cost of a
FY89 CHAMPUS admission for that specialty.

RESULTS

Phase 1:   Application of Optimization Study Ratios

Step 1.   Change in Active Duty Population

A summary of the change in troop population at Fort Polk is provided in Table 1.

Table 1

Summary of Active Duty Troop Population Changes

	Gains	Losses
Population loss (1 DEC 91-27 FEB 94)		(12,269)
Population of incoming TDA units	1,052	
Population of incoming MTO&E units	6,933	
Net Change in troop population		(4,274)
Current Population (1 DEC 91)	15,345	
Minus loss in troop population	4,274	
New troop strength	11,071	

Step 2.   Change in non-Active Duty Population

The results of the application of the DMIS and Braun (1990, 1991) family member to soldier ratios to the 1994 active duty population at Fort Polk are presented in Table 2.

Table 2

Change in Family Member Population

Departing active duty population	(12,259)
Family members/soldier	1.35
Loss of family members	(16,550)
Population of incoming TDA units	1,052
Family members/TDA soldier	2.29
Incoming TDA family members	2,409
Population of incoming MTO&E units	6,933
Family members/MTO&E soldier	1.43
Incoming MTO&E family members	9,914
Net population loss (2,409+9,914+(-16,550)=	(4,226)
Current family member population	20,716
Minus net population loss:	(4,226)
Post-realignment family member population	16,489

The Defense Medical Information System (DMIS) was
used to determine the 'others' population in 1994.
Using the number of 'others' enrolled in DEERS on
30 September 1989 (6,355) as a baseline, the growth
rate of retirees, and the migration patterns of

retirees, the Resource Analysis and Planning System of
DMIS estimates that this population will grow by an
average of 57 per year, reaching 6,638 beneficiaries in
1994. However, from 1989 to 1990, the number of
'other' DEERS enrollees living in the Fort Polk
catchment area dropped by 144, from 6,355 to 6,211
enrollees. Given the projected growth in this
population, the recent unexpected population decline,
the remote rural location of Fort Polk, and the poor
economic conditions of the catchment area, a
substantial change in the 'other' population from its
1989 level is not foreseeable. Consequently, the
30 September 1989 'other' population figure of 6,355
was assumed to be the 'other' population in 1994.
Consequently, 1994 demand from this population was
assumed to be equivalent to its demand in FY90.

Step 3. Calculation of Physician Needs

The results of the application of the Medical
Corps Optimization Study physician to population ratios
are presented in Table 3. Four specialty mixes are
provided: one for each of the three population segments
of interest and one for all three segments combined.
Only those specialties with a projected need of one or
more physicians to meet the needs of all beneficiary

groups are listed. The total number of physicians
determined necessary to treat all beneficiaries far
exceeds the number of military physicians currently
assigned to Bayne-Jones Army Community Hospital.

Table 3

Physician Needs Derived from Optimization Study Ratios

Specialty	Active Duty	Family Member	Others	Total
Operational Medicine	2.05			2.05
Preventive Medicine[1]	1.00			1.00
Cardiology	.41	.61	.24	1.26
Obstetrics/Gynecology	.44	1.89	1.96	4.29
Urology	.46	.68	.27	1.41
Anesthesia	.91	1.35	.53	2.79
Pediatrics		3.20	.44	3.65
Ophthalmology	.66	.98	.39	2.03
Otolaryngology	.35	.52	.21	1.07
Psychiatry	1.32	1.96	.77	4.06
Child Psychiatry		1.14	.27	1.41
Neurology	.54	.81	.32	1.67
Internal Medicine	1.79	2.66	1.05	5.49
Family Practice	3.95	5.89	2.32	12.17
General Surgery	.75	1.11	.44	2.30
Orthopedics	.76	1.13	.45	2.33
Flight Surgery	1.51			1.51
Diagnostic Radiology	.77	1.15	.45	2.38
Pathology	.58	.87	.34	1.79
Emergency Medicine	1.24	1.85	.73	3.83
Field Surgery	3.13			3.15
Total	22.64	27.80	11.18	61.64

[1]Does not include need for civilian work force.

Phase II: Tailoring of Physician Mix

Unsupportable Specialties

Only one specialty in Table 3, cardiology, was found to be unsupportable. Bayne-Jones does not have a cardiac catheterization laboratory nor does it have the surgery subspecialties that a facility should have readily available when performing invasive cardiac procedures. Thus, this specialty will no longer be considered for staffing at Bayne-Jones.

Projected Beneficiary Demand

Table 4 provides a summary of provider needs in 1994 based on the Medical Corps Optimization Study ratios and the five other models employed in this study. Not all specialties listed in Table 3 are shown in Table 4 because the models employed were not applicable to all specialties listed in Table 3. One specialty, dermatology, appears in Table 4 but was not listed in Table 3 because models other than the Medical Corps Optimization Study model justify a full time equivalent in this specialty.

Table 4

Comparison of Six Physician Need Models

		Model				
Specialty	Optimi-zation Study	James & Williams	AMA	BJACH	Europe	JHMET
Ob/Gyn	4.3	3.8	4.6	5.5	5.9	11
Urology	1.4	0.5				
Anesthesiology		2.8				2[1]
Pediatrics	3.7	2.5	3.2	6.9	4.5	
Opthalmology	2.0	0.9	1.0	2.2		
Otolarngology	1.1	0.6	0.6	1.1		
Neurology	1.7	0.1				
Psychiatry	5.5[2]	1.8	2.4	2.4		18[3]
Medicine	5.5	4.4	4.7	7.2	5.6	
Family Practice	12.2	10.1	14.1	21.7	13.0	13[4]
General Surgery	2.3	1.6	3.4	3.9		4
Orthopedics	2.3	1.3	1.8	2.8		5
Flight Surgery	1.5	1.7				4
Emergency Med	3.8	5.8	5.5		4.5	6
Field Surgery	3.2	6.2	8.7		9.3	7[5]
Dermatology	0.6	1.9		1.3		

[1]Two anesthesiologists and 3 nurse anesthetists
[2]One is a child psychiatrist
[3]Includes psychologists, social workers and nurses
[4]JHMET primary care model projection
[5]JHMET primary care model applied to troop medical clinic visits

The results of an examination of the Table 4 projections are given below and the resulting adjusted physician need for each specialty is provided.

Obstetrics and Gynecology

The estimates of the various models are similar for obstetrics and gynecology with the exception of the JHMET projection. The JHMET projection of physician need may be high because the JHMET model does not appear to consider the availability of family practice physicians and their ability to care for most obstetrical patients. Need as projected by the other models ranges from four to six physicians. The median of these model projections, five physicians, will be used as the need in 1994.

Urology

Urology is a specialty that has not been regularly available at Bayne-Jones. In addition, only one urologist has been available in the catchment area. The amount of unmet demand in this area may have been very high and thus, projections based on past demand may underestimate actual need. The best estimate to use for this specialty is one physician as projected by the Medical Corps Optimization Study.

Anesthesia

Both studies which model the need for anesthesiologists considered the availability of Certified Registered Nurse Anesthetists (CRNAs). The

JHMET model suggested two anesthesiologists and three CRNAs. Current staffing in anesthesiology consist of one anesthesiologist and four CRNAs. Because of the lack of a second anesthesiologist, patients must sometimes be sent out-of-house for surgery when the one anesthesiologist is not available. Ideally, two anesthesiologists should be assigned to Bayne-Jones.

Pediatrics

The projections for this specialty vary from less than three to nearly seven. Due to optimistic estimates of provider availability (see family practice results below), a need of five pediatricians will be established.

Ophthalmology

Although Bayne-Jones has had an ophthalmology service in the past, only one ophthalmologist has typically been assigned to the hospital. In addition to the limited amount of ophthalmology service available at Bayne-Jones, only one civilian ophthalmologist practices in the catchment area. Consequently, past demand may not actually reflect need. Thus, the projection of the Medical Corps Optimization Study, two ophthalmologists, will be accepted as the actual need.

Otolaryngology

Two models project a need for approximately
one-half of a full time equivalent while two models
project a need for a full time otolaryngologist. The
two models which predict a need for half of a full time
equivalent are based on civilian productivity estimates
which do not account for the uniqueness of practicing
otolaryngology in the Army. Due to the availability of
family practitioners and audiologists who can care for
some of the less complicated cases a civilian
otolaryngologist may see (thus increasing the case mix
level of the Army otolaryngologist), the two models
based strictly on civilian productivity most likely
underestimate the otolaryngology need. Thus, a need
for one otolaryngologist is established.

Neurology

A neurologist has not been available in the past
at Bayne-Jones and no neurologists practice in the
catchment area. Consequently, figures based on past
demand may grossly underestimate the need for this
specialty. Although the optimization study estimates a
need close to two neurologists, one would most likely
be adequate.

Psychiatry

Because much of the psychiatric care provided to dependents is in an inpatient setting, the use of outpatient visit data may have underestimated the need for psychiatrists. CHAMPUS data from 1990 shows that for every two outpatient visits, one inpatient visit was rendered. Thus, the Medical Corps Optimization Study recommended number of psychiatrists, five (4 adult, 1 child), is probably the most accurate figure to use. The extremely high number of professionals recommended by the JHMET model is due its inclusion of other mental health professionals in its need estimation. The JHMET model includes psychologists, social workers, and nurses in its count of mental health professionals.

Internal Medicine

The projected need for internists is fairly constant across the models. One reason for this may be the relative availability of internists in the catchment area (five) and a strength of three to four internists at Bayne-Jones. From the data in Table 4, a conservative estimate of the needed number of internists at Bayne-Jones is five.

Family Practice

The projected numbers of needed family practice physicians varies considerably between models. One factor that may be responsible for this variability is the difference in estimates of provider availability from model to model. The Medical Corps Optimization Study, the James and Williams model, and the AMA model all assume that Army physicians are available 46 weeks per year. However, the availability of military physicians may be substantially lower.

The 46 week work year is based on the assumption that a physician takes 4 weeks of leave each year and is not available for two weeks per year due to continuing medical education. Not taken into account in these models are official holidays (10 per year), training holidays (approximately 4 per year), readiness training (approximately 3 days per year), sick leave, in and out processing time and permissive tdy/house hunting time amortized over the tour of a physician (approximately 6 days per year), extended temporary duty (e.g., officer advanced course and flight surgeons training), and days that physicians do not have a full schedule of appointments due to no shows, cancelled appointments, unfilled appointments during the

holidays, unit activities, etc. In addition, one
family practitioner at Bayne-Jones pulls in-house call
every night and is not scheduled for clinic visits the
following day. The European model took many of these
factors into account and estimated annual physician
availability for clinical duties to be 36 weeks. If
the above considerations were taken into account in the
other models, then their projections of physician need
would be higher.

To estimate the effect of a shorter work year on
these other models, the projected need for family
practice physicians in 1994 at Bayne-Jones was
recalculated using the AMA model and a 42 week work
year. This resulted in a projected need of 15
physicians. A 40 week work year resulted in a need for
16 physicians. However, even these estimates may be
conservative.

Implicit in the AMA model (and apparently assumed
in the James and Williams model and the Medical Corps
Optimization Study since they used AMA data to generate
their estimates) is a level of nonphysician personnel
support per provider that is not available in the
military. The AMA model was based on the productivity
of civilian physicians who had an average of four

support personnel per physician: two medically trained
personnel and two administrative personnel.

Another factor that does not appear to have been
considered in the Optimization Study and the AMA models
is the difference in case mix between family practice
and general practice physicians. The AMA groups these
two types of physicians together when providing
productivity data, and the productivity data of the
Medical Corps Optimization Study indicates that both
types of physicians work the same amount of time each
week and see the same number of patients. Due to the
three years of residency training family practitioners
have in areas such as pediatrics, obstetrics and
surgery, a family practitioner can and does handle a
higher case mix than a general practitioner or a field
surgeon. Consequently, productivity (number of
patients seen per week) of family practitioners should
be lower than that of field surgeons. The fewer the
number of patients a physician can see per week, the
greater the number of physicians needed. However,
because of the wide range of care a family practitioner
can deliver, the need for other specialists, like
obstetrician/gynecologists, is reduced (see
obstetrician/gynecology discussion above).

Also increasing the need in this specialty is the demand for service and department chiefs with a family practice background. In addition to a family practitioner being chief of the family practice department or service, family practitioners are often used in other medical leadership roles such as Chief, Department of Primary Care and Community Medicine. These personnel have a myriad of administrative responsibilities which greatly reduce the amount of time they can devote to patient care.

A new factor that will soon impact on family practitioner productivity in the Army is the institution of Gateway to Care. The requirement for family practice physicians to oversee the care patients obtain from other specialists will reduce the amount of time spent in direct patient care.

Obviously, making a projection of the number of family practice physicians that will be needed at Fort Polk following realignment is not easy. However, due to the apparent overestimation of physician availability by many models, the need for family practitioners in leadership roles, and the new demands

that will be placed on this specialty under Gateway to
Care, they need for family practitioners will be placed
at 18.

General Surgery

The range of need for these specialists varies
among the models from two to four. If surgical demand
alone was examined, two general surgeons may be
sufficient to meet the needs of the 1994 Fort Polk
catchment area population. However, general surgeons
at Bayne-Jones have acted as surrogate specialists in
areas other than general surgery. For example, much of
the work that would typically be referred to a
gastroenterologist by our general internists (e.g.,
scopes of various kinds) is performed by our general
surgeons. Another fact that must be considered in
determining general surgery staffing is the regularity
with which they are called into the emergency
room after hours. Running a general surgery service
with only two general surgeons who are each on call
fifty percent of the time would be very stressful on
the assigned surgeons and could affect quality of care.
Consequently, a need for three general surgeons will be
established.

Orthopedic Surgery

The estimate from JHMET is very high and may not have considered the availability of podiatrists and orthopedic physician assistants. The need for two orthopedic surgeons is fairly consistent across the other models.

Flight Surgery

Two models estimate that Fort Polk will have a need for one to two flight surgeons following realignment while the JHMET model projects a need for four. Due to the limited number of personnel who will be on flight status at Fort Polk following realignment, one full time flight surgeon should be adequate. However, a second trained flight surgeon must be available for when the full time flight surgeon is not available. Training one of the 18 family practice physicians as a flight surgeon should fill this need.

Emergency Medicine

The minimum emergency medicine requirement for staffing an emergency room 24 hours a day, 7 days a week with overlap during peak periods is five emergency medicine physicians. The models provide projections ranging from four to six physicians. Due to the availability of other practitioners at Bayne-Jones who

could work in the emergency room when an emergency

medicine physician cannot work a shift, a staffing of

five emergency medicine physicians should be adequate.

Field Surgery

Our need for field surgeons is mostly in our Troop

Medical Clinics (TMCs). Given the past volume at the

TMCs and the estimates of the models which based need

on projected 1994 volumes, nine field surgeons are

needed. However, this need will be diminished if

physician assistants are available to practice at the

TMCs. This issue will be addressed later.

Dermatology

This is the one specialty for which the need of a

full time equivalent was not projected by the Medical

Corps Optimization Study but for which past demand

indicates the need for a full time practitioner. Past

demand and the James and Williams model indicate a need

for nearly two dermatologists. Despite the

productivity of the current dermatologist at Fort Polk,

which is far above national productivity averages,

Bayne-Jones usually has a back log of several hundred

patients and often does not put patients on the waiting

list because it is so long.

The need for dermatology services at Bayne-Jones
is driven by the location of the Fort Polk and the
activity of units on post. The climate at Fort Polk is
hot and humid for several months each year, a condition
that increases the incident rate of fungal infections.
When soldiers go to the field in hot and humid
conditions where they are unable to shower daily, the
incident rate for numerous other dematological
conditions also increase. Finally, being in the South,
the incidence rate of skin cancer is higher than in
other parts of the country. Because of these factors
and the past workload in this specialty, a need for two
dermatologists will be established.

Revised Projected Needs

The above adjustments to projected physician needs
are summarized in Table 5. The needs for each
beneficiary group were adjusted by multiplying the
physician need for each beneficiary group shown in
Table 3 by the corresponding change in total physician
need. For example, if the total number of physicians
needed in a specialty in Table 3 is four and the
revised need is five, than the number of providers

needed to meet the demands of each beneficiary group
was increased by 25%. Additional adjustments were made
to the family practice and internal medicine figures.

Total family practice need cannot be proportioned
among the three beneficiary groups based on group
populations because of the availability of field
surgeons for active duty needs. To determine the
number of family practitioners needed to accommodate
the needs of the active duty population in 1994, the
number of 1990 family practice visits by soldiers was
reduced by the same proportion that active duty troops
will be reduced at Fort Polk. The resulting number of
projected visits in 1994 is 3,661, an amount that would
require no more than 1 family practitioner. The
remaining 4.84 family practitioner full time
equivalents were divided among the other two
populations, dependents of active duty soldiers and
"others," in proportion to the number of providers they
were estimated to need in Table 3. Thus, 3.48 of the
providers originally assigned to active duty need were
assigned to family member need and 1.36 of the original
active duty need was assigned to the need of "others."

Internal medicine visits were also adjusted
similarly to account for the disparity in visit rates

between active duty beneficiaries, their families, and

"others." In 1990, 65% of the visits to the internal

medicine clinic at Bayne-Jones were by this last group

of beneficiaries who only comprised 15% of the total

beneficiary population. Thus, dividing the total need

for internists by population proportions is not an

appropriate methodology for this specialty. To

estimate active duty need in 1994, the same methodology

used to project 1994 active duty visits to the family

practice clinic was used here. This resulted in a

projected volume of 1,880 visits, a volume well within

the capability of one internist (the average civilian

internists has over 3,200 office visits per year). The

number of visits by active duty family members to

internists in 1994 was also projected by using direct

care and CHAMPUS data. The projected number of

internal medicine visits in 1994 by this population is

expected to be 3,610, an annual volume close to what

the average internists can see. The remaining full

time equivalents from the active duty and active duty

family members (.63 and .42, respectively) were added

to the number of physicians projected to be needed by

the "others" population in 1994.

Table 5
Adjusted Physician Needs by Specialty

| | Beneficiary Needs | | | |
Specialty	Active Duty	Family Member	Others	Total
Operational Medicine	2.00			2.00
Preventive Medicine[1]	1.00			1.00
Ob/Gyn	.51	2.20	2.28	5.00
Urology	.33	.48	.19	1.00
Anesthesia	.65	.97	.38	2.00
Pediatrics		4.38	.60	5.00
Ophthalmology	.65	.97	.38	2.00
Otolaryngology	.32	.48	.19	1.00
Psychiatry	1.30	1.93	.76	4.00
Child Psychiatry		.90	.10	1.00
Neurology	.32	.49	.19	1.00
Internal Medicine[2]	1.00	1.00	3.00	5.00
Family Practice[3]	1.00	12.19	4.79	18.00
General Surgery	.98	1.45	.57	3.00
Orthopedics	.65	.97	.39	2.00
Flight Surgery	1.00			1.00
Diagnostic Radiology	.77	1.15	.45	2.38
Pathology	.58	.87	.34	1.79
Emergency Medicine	1.62	2.41	.97	5.00
Field Surgery	9.00			9.00
Dermatology	.66	1.00	.40	2.06

[1]Does not include civilian employee care
[2]Needs/beneficiary group adjusted with 1990 visit data
[3]Active need adjusted for presence of field surgeons

Further Adjustments

Active Duty Need

The list of specialists needed to support only the active duty population at Fort Polk is presented below. Whole numbers were obtained by rounding up the provider need in Table 5 if the need was $\geq$ .5.

Table 6
Physician Needs for Active Duty Population

Specialty	Active Duty
Operational Medicine	1
Preventive Medicine	1
Obstetrics/Gynecology	1
Anesthesia	1
Ophthalmology	1
Psychiatry	1
Internal Medicine	1
Family Practice	1
General Surgery	1
Orthopedics	1
Flight Surgery	1
Diagnostic Radiology	1
Pathology	1
Emergency Medicine	2
Field Surgery	9
Dermatology	1
Total	25

Ability to Coordinate Care

The number of physicians necessary to coordinate the care of all beneficiaries in the Fort Polk catchment area is the sum of family practitioners (18) and field surgeons (9) in Table 5 (27 physicians).

Availability of Civilian Providers

Table 7 presents a list of specialities available in the catchment area, the physician to population ratio for each specialty (population excludes beneficiary population), and the nationwide physician to population ratio for the specialty.

Table 7
Specialties in the Fort Polk Catchment Area

		Specialty to Population Ratio	
Specialty	Number	Catchment Area	United States[1]
Gen./Family Practice	33	1: 3,953	1: 3,771
Pediatrics	6	1: 21,082	1: 7,101
Internal Medicine	5	1: 25,299	1: 2,959
Obstetrics/Gynecology	3	1: 42,165	1: 7,892
General Surgery	4	1: 31,624	1: 7,049
Orthopedic Surgery	1	1:126,496	1:14,100
Anesthesiology	1	1:126,496	1:10,567
Ophthalmology	1	1:126,496	1:16,473
Urology	1	1:126,496	1:26,654
Radiology	3	1: 42,165	1:32,309
Pathology	1	1:126,496	1:20,490
Total	59		

[1]Source: Robach, Randolph & Seidman (1990)

As can be seen in Table 7, not one of the specialties in the catchment area has a physician to population ratio that is better than its national physician to population ratio. Thus, no excess availability of any specialty exist in the catchment area.

Costs

The average total cost associated with several of the specialties in Table 5 are presented in Table 8. Specialties are rank ordered by total expense in

Table 8. Total expense includes gross salary plus
annual inpatient charges associated with each
speciality. CHAMPUS data was not available for
pediatric admissions, so data from the Universal
Healthcare Almanac (Silver & Cherner, 1991) and the
National Center for Health Statistics (U.S. Department
of Health and Human Services [DHHS], 1991) was used for
this specialty. This latter source was also used to
obtain psychiatric admission data.

Table 8

Average Cost Associated with Selected Specialties

Specialty	Gross Income[1] (000)	Government Cost Per Disposition[2] (000)	Disp. Per Year	Total Annual Cost (000)
Psychiatry	#169	#15.280	120	#2,003
Orthopedics	381	3.954	282	1,496
Pediatrics	158	4.993	188	1,096
Ob/Gyn	278	1.920	282	819
Urology	363	1.636	235	737
General Surgery	288	1.844	235	691
Otolaryngology	293	1.727	141	837
Internal Medicine	203	3.663	141	817
Neurology[3]	229	5.014	94	472
Anesthesia	307			307
Radiology	305			305
Ophthalmology	285			285
Pathology	251			251
Dermatology[3]	237			237
Emergency Medicine	207			207

[1]1990 salary data from Roback, Randolph & Seidman (1990)
[2]Cost from FY90 CHAMPUS Summaries
[3]Estimate

Final Adjusted Physician Need

Table 9 summarizes the specialists needed to care

for each of the three segments of the beneficiary

population. Specialties are rank ordered by cost with
the exception of operational medicine, family practice
and specialties which support other specialties.

Two operational medicine physicians are needed to
fill the positions of commander and deputy
commander for clinical services. Because they are
required to operate the medical activity, they are
listed initially in Table 9. Next, a sufficient number
of primary care physicians need to be on staff to
coordinate the care of beneficiaries enrolled in
Gateway to Care. Consequently, they are listed as the
next priority in Table 9. Finally, some specialties
have to be added when other specialties are added.

The addition of radiologists, pathologists and
anesthesiologists was done on the basis of their need
in relation to the other specialists which demand their
services. Because radiologists and pathologists
support all specialties and two of each are required to
meet the needs of the total beneficiary population, a
second radiologist and a second pathologist were
determined necessary when half of the other physicians
required to meet the needs of the total population
had been added to the staff. For anesthesiology, a
second anesthesiologist was determined needed after the

first one-half of the total number of surgeons
necessary to meet the needs of the total beneficiary
population had been added to the list.

Hospital staffing should be accomplished by moving
down columns. For example, after all active duty needs
have been met, one would move to the top of column two
and fill staff positions by moving down the column,
thus adding 12 family practitioners and three
psychiatrists. If after reaching the bottom of column
two the hospital could still add physicians to its
staff, one would move to the top of column three and
add five more family practitioners.

Table 9

Adjusted Physician Needs by Specialty and Cost

Beneficiary Needs

Specialty	Active Duty	Family Member	Others	Total
Operational Medicine	2	0	0	2
Family Practice	1[1]	12	5	18
Psychiatry	1	3[2]	1	5
Orthopedics	1	1[3]	< .5	2
Pediatrics	0	4	1	5
Obstetrics/Gynecology	1	2[4]	2	5
Urology	< .5	1	< .5	1
General Surgery	1	1	1	3
Otolaryngology	< .5	1	< .5	1
Internal Medicine	1	1	3	5
Neurology	< .5	1	< .5	1
Anesthesia	1	1	< .5	2
Diagnostic Radiology	1	1	< .5	2
Ophthalmology	1	1	< .5	2
Pathology	1	1	< .5	2
Dermatology	1	1	< .5	2
Emergency Medicine	2	2	1	5
Flight Surgery	1	0	0	1
Field Surgery	9	0	0	9
Preventive Medicine	1	0	0	1
Total	26	34	14	74

[1]Need adjusted for presence of field surgeons
[2]One is a child psychiatrist
[3]Add a second pathologist and a second radiologist
[4]Add second anesthesiologist

DISCUSSION

Projected Population Changes

The population of active duty family members in the catchment area following realignment was obtained by subtracting the number of family members leaving Fort Polk from the current family member population and adding the number of family members associated with units being assigned to Fort Polk. The population figures for dependents at Fort Polk and the dependents associated with incoming MTO&E and TDA units were all obtained from the Defense Eligibility Enrollment System (DEERS). One potential drawback in using the DEERS system as a basis for determining populations is the number of eligible beneficiaries who are not enrolled in DEERS. Although enrollment in DEERS is necessary to obtain medical treatment at a military facility or through the Civilian Health and Medical Program of the Uniformed Services (CHAMPUS), some beneficiaries do not enroll in DEERS. This shortcoming was determined not to be of importance in this study because the objective of this study is to determine the physician staffing level necessary to meet the needs of beneficiaries who

seek treatment from military medical facilities or
through CHAMPUS. Thus, nonenrolled members are not an
issue.

Projected Demand

The specialty mix of physicians needed to meet the
medical needs of the 1994 Fort Polk catchment area
population as determined by the physicians to
population ratios developed in the Medical Corps
Optimization Study was validated using projections
of 1994 demand based on 1990 demand. One
disadvantage of this technique is the lack of
differentiation between medical need and medical
demand. Beneficiaries may not need a service but may
be currently demanding it and receiving it. One can
argue that we should not provide services beyond those
needed. However, through CHAMPUS, the Army eventually
pays for much of the demanded services it cannot
provide but others do provide.

Another argument against the use of historical
visit data to project future demand is that unmet
demand is not accounted for. One could argue that
unmet demand at the MTF should show up in CHAMPUS
visits, but many beneficiaries will go without care
rather than obtain care through CHAMPUS. The reason

for them going without care are many. Some
beneficiaries cannot afford the deductibles and cost
shares associated with CHAMPUS, some people do not know
how to use CHAMPUS and others do not seek civilian care
because it is not readily available in rural locations
like the Fort Polk catchment area.

Another reason that unmet demand may not show up
in CHAMPUS visits, even though care was obtained in the
civilian community, is the failure of beneficiaries to
submit claims to CHAMPUS. If a beneficiary has only
made one or two visits to a civilian provider during a
fiscal year, the beneficiary will most likely not have
met the annual deductible. Thus, filing a claim with
CHAMPUS would not be of any financial benefit.

The disadvantages to using past visit data
discussed above have a cancelling effect on one
another. While using demand data to project need may
overestimate true medical need, the unmet demand not
accounted for in visit data will help offset this
overestimation. One advantage to using past visit data
to project future staffing needs is that future
staffing levels will not encourage increased demand
due to availability. Furthermore, by including the
CHAMPUS data in the projections, past demand, whether

or not it was medically necessary, that turned into a
financial liability, will have been accounted for.
Hopefully, a managed care environment will be able to
reduce unnecessary demand.

Availability of Civilian Providers

This study focused on civilian providers available
in the catchment area. Although the catchment area is
very rural with no large cities, two large cities are
located on the outside edges of the catchment area.
Alexandria, Louisiana, a city of approximately 55,000
people, is located 50 miles east of Fort Polk. Lake
Charles, Louisiana, a city of approximately 90,000
residents, is located 65 miles south of Fort Polk.
Although both cities have many physicians, the
physician to population ratio for most specialties in
both of these cities is below the national average.
An excess physician capacity (as defined in this study)
of greater than 10% and for which more than one full
time equivalent is needed to serve the entire
beneficiary population in the catchment area exist in
only three specialties: orthopedic surgery, diagnostic
radiology and otolaryngology. The excess capacity in
these specialties should be considered when deciding
which specialties should be available at Bayne-Jones

Army Community Hospital and the number of physicians
that should be assigned in these three specialities.

Cost Per Provider

From Table 8, we see that psychiatry is the most
expensive specialty to do without. Past experience
supports the data in Table 8. Fiscal year 1990 CHAMPUS
inpatient and outpatient data reveals that psychiatric
services were by far the largest expense to Bayne-Jones
Army Community Hospital, accounting for nearly 50% of
all CHAMPUS expenditures. Because of the expense
associated with psychiatrists, the first staffing
priority for meeting the needs of the active duty
family member population should be psychiatrists. As
indicated in Table 5, three psychiatrists (two adult
and one child) should be added to the staff of one
required to meet the needs of active duty soldiers.

Several specialties cannot be added on a
cost basis. Pathology, radiology and anesthesiology
must be added when justified by other physician
staffing. Another specialty that cannot be looked at
from strictly a cost viewpoint or a population level is
emergency medicine. If a hospital decides to run a 24
hour emergency room, a minimum of five emergency
medicine physicians are needed to staff the emergency

room. Depending on the volume of patients seen in the
emergency room, the type of patients and the backup
coverage available when an emergency medicine physician
cannot work a shift, more emergency medicine physicians
may be necessary.

Reducing Physician Need

The specialists listed in Table 9 are all
physicians. In many areas, the need for physician
providers can be reduced by introducing physicians
assistants and nurae practitioners into the direct
health care system. If these alternate providers are
used efficiently, seeing patients for which they are
well trained to handle, their visit productivity can
equal or exceed that of a physician provider. However,
such scheduling efficiency leaves the physician
provider with a high acuity level and the requirement
to review the charts of these other providers, lowering
the volume of patients the physician can see. For this
reason, the Medical Corps Optimization Study considered
the net effect of adding a physician assistant to be a
reduction of one half of a physician full time
equivalent.

The need for some of the specialties listed in
Table 9 will be reduced by physician assistants and

nurse practitioners already assigned to Fort Polk.
Some of these areas at Bayne-Jones which have recently
had such providers include anesthesia (four nurse
practitioners), pediatrics (one nurse practitioner),
orthopedics (one physician assistant), preventive
medicine (one physician assistant) and internal
medicine (one nurse practitioner). In addition to these
assets, the 199th Separate Infantry Brigade
(Motorized), which is scheduled to move to Fort Polk,
has one physician and six physician assistants assigned
to it. If all these personnel move to Fort Polk with
the 199th, the need for field surgeons would be reduced
by four. However, the number of medical personnel that
will move with any unit relocating to Fort Polk is not
highly predictable at this time.

Study Limitations

One limitation to this study is the lack of
consideration of physicians in the MEDical FIller
System (MEDFIS)/PROfessional Filler System (PROFIS) and
zero-based need physicians (our go to war needs)
assigned to Fort Polk. Some PROFIS/MEDFIS and
zero-based need physicians in specialties for which
Fort Polk does not have use for full time equivalent
could be assigned to Bayne-Jones. Currently, such a

situation does not exist at Fort Polk. However, if
such specialists were assigned to Fort Polk, they would
be used in their specialty as much as possible. The
remainder of their time could be used to fulfill some
of the needs that other unassigned specialists would
meet. A example of such a situation that existed until
recently was the assignment of a colon and rectal
surgeon to Fort Polk. In addition to performing colon
and rectal surgery, he performed general surgery
procedures, many scope procedures that a
gastroenterologist would normally perform (Fort Polk is
not assigned a gastroenterologist) and was the Chief,
Department of Surgery.

Another limitation to this methodology is the
prioritizing of care by beneficiary category. Not only
does this make the retiree population less than happy
with their access to the military treatment facility,
but it also limits the patient mix for the physician
staff. The Army strongly desires that its physicians
be well rounded, having regular exposure to the full
range of patients appropriate for a specialty. This
patient mix is necessary for board certification in
many specialities and enables the Army to use its
physicians in a variety of locations. Given a limited

staff, the above methodology would most likely limit the practice of Bayne-Jones physicians to active duty soldiers and their families.

A third limitation to the approach taken in this study is the acceptability of cost as a criteria for ranking specialists. Beneficiary expectations of what specialties should be available may be different than the specialties that would be available if cost is used as the criteria for adding specialists to the staff. For example, beneficiaries may desire and/or expect to have a dermatologist on staff, as opposed to a neurologist, because more beneficiaries may have a need for the services of a dermatologist than a neurologist.

Finally, the changing mission of Fort Polk was not considered in this study. With the realignment of Fort Polk will come a training mission that will involve at least one rotation per month of approximately 3,000 trainees. Some units coming to Fort Polk for training will come with organic medical assets who will provide primary care. However, if a training unit does not have organic medical support, Bayne-Jones may be tasked to provide a primary care

physician. In addition to this use of hospital
manpower, hospital resources will be used whenever
secondary or tertiary care is required.

CONCLUSION

This study quantifies the need for physician
specialties necessary to support the beneficiary
population of the Fort Polk catchment area following
the realignment of Fort Polk. Specialty need is
subdivided among population groups, allowing the
commander to determine how many physicians in each
specialty are necessary to meet the needs of the active
duty population, the active duty family member
population, and the population of others entitled to
medical care in military treatment facilities. In
addition to providing physician need by specialty, this
study also identifies which physician specialists
should be added to the staff to minimize CHAMPUS
expenditures.

Given the need of the beneficiary population and
the staffing of the hospital, Bayne-Jones Army
Community hospital will be able to determine the
specialty areas in which it does not have an adequate
staff. Knowing where its shortages are, the hospital
will then be able to identify those specialities for

which it should make business arrangements in the civilian sector to minimize its CHAMPUS expenditures. Such information should enhance the effectiveness of managed care at Bayne-Jones.

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