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Ms. Lois G. Prow
Department of Veterans Affairs

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Northern Arizona VA Health Care System
500 Highway 89 North
Prescott, AZ 86313

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US ARMY MEDICAL DEPARTMENT CENTER AND SCHOOL
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Veterans Health Administration (VHA), like all health care organizations, is under increasing pressure to provide greater access to quality health care and, at the same time, improve efficiency and maintain or decrease the cost of providing care. Northern Arizona VA Health Care System (NAVAHCS), as one player in this nationwide system, identified the need to evaluate options for meeting acute care needs at its main facility.

The purpose of this study was to determine the appropriateness of retaining acute inpatient beds at NAVAHCS. Assuming the findings indicated the retention of beds was appropriate, an additional purpose was to determine the number of acute inpatient beds needed. Access to care was assessed, costs of care were compared, and quality of care was measured. Formulas and ratios for projecting bed-need were identified and incorporated into the recommendation for continuing with acute inpatient beds.

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The Appropriateness of Inpatient Beds
at Northern Arizona VA Health Care System

Lois G. Prow
Department of Veterans Affairs
Prescott, Arizona

Graduate Management Project
U.S. Army-Baylor University
Graduate Program in Health Care Administration

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Abstract

Veterans Health Administration (VHA), like all health care organizations, is under increasing pressure to provide greater access to quality health care and, at the same time, improve efficiency and maintain or decrease the cost of providing care. Northern Arizona VA Health Care System (NAVAHCS), as one player in this nationwide system, identified the need to evaluate options for meeting acute care needs at its main facility in Prescott, Arizona.

The purpose of this study was to determine the appropriateness of retaining acute inpatient beds at NAVAHCS. Assuming the findings indicated the retention of inpatient beds was still appropriate, an additional purpose included determining the number of acute inpatient beds needed by NAVAHCS. The impact of considering a change in beds and services required an assessment of the availability of alternative resources and services, a comparison of the costs of providing care under the different options, and an evaluation of the quality of care provided.

The assessment was based on real-time data collected on all patients admitted to acute inpatient beds at NAVAHCS during the first quarter of fiscal year 2000. Appropriateness of admission and level of care were based on InterQual™ criteria. The need for access to inpatient beds at other facilities was based on

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input from the patients' medical providers. Costs of care were compared using bed day of care (BDOC) costs taken from the cost distribution reports for VHA facilities and facility-specific Medicare reimbursement rates for private-sector facilities. Quality of care and patient satisfaction with care at NAVAHCS were evaluated using Joint Commission on Accreditation of Health Care Organizations (JCAHO) survey scores and results of VHA performance measures.

Analysis of the data indicated that NAVAHCS' inpatient bed need could not be met by other VHA or private sector facilities. It was also found to be more costly for the Department of Veterans Affairs (DVA) to pay for needed inpatient care at other VHA and private sector facilities than to pay for the care as provided at NAVAHCS. Quality of care and level of patient satisfaction with care at NAVAHCS both received high ratings.

The study included a literature review that identified trends in acute hospital bed utilization and planning for changes in health care systems. Ratios for projecting the need for beds were identified and incorporated into the recommendation for continuing with acute inpatient beds.

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Chapter 1

Introduction

The Veterans Health Administration (VHA), as the nation's largest integrated health care organization, faces many challenges. Like all health care organizations today, VHA is under increasing pressure to provide greater access to quality health care and, at the same time, to improve efficiency and to maintain or decrease its costs of providing care. All this is to be accomplished in an environment of rapidly increasing costs and zero-growth or slow-growth budgeting.

Northern Arizona VA Health Care System (NAVAHCS), as one player in the Department of Veterans Affairs' (DVA) nationwide healthcare program, continues to assess and evaluate the appropriateness of services it provides. Its goals are to provide high quality care at a cost that allows NAVAHCS to meet its stakeholders' needs. One issue currently under consideration is whether it is appropriate to retain acute inpatient beds at its main facility. NAVAHCS approaches an issue such as this through its strategic planning process.

Strategic planning, at NAVAHCS, is an ongoing process to establish and chart the direction the facility takes in its planning efforts. The impact of changing inpatient beds and services requires the availability of alternative resources and services, an assessment of the quality of care that can be achieved, and the costs of making such changes.

Conditions Which Prompted the Study

The Strategic Planning Board of NAVAHCS utilizes a systematic planning process to establish strategic (long-range) targets and goals. This process includes input from all service/support lines and stakeholders and is integrated with the larger network of Veterans Integrated Service Network (VISN) 18 and the overall VHA planning processes. It was through this process of strategic planning that the executive leadership of NAVAHCS identified the ongoing need to assess and evaluate the impact and appropriateness of retaining inpatient acute medical beds at its main campus in Prescott.

In June 1999, NAVAHCS launched four strategic planning teams to address areas of consideration for future direction. These teams addressed alternative revenue generation, resource utilization, outreach/networking, and inpatient care. It was through this process that a recommendation was made to close the inpatient acute medical beds at the Prescott facility. The recommendations and final report of each of these teams were forwarded to a consensus conference for further evaluation.

Participants at the consensus conference, which was held in September 1999, included members of NAVAHCS' Medical Executive Board and Senior Management Board, key staff of the Executive Leadership Office, representatives of the American Federation of Government Employees Local 2401, and other stakeholders. These participants evaluated each team's recommendations and final report in break-out and plenary sessions. The inpatient care team's recommendation addressing the closure of inpatient beds

did not pass this consensus process. It was, however, identified as the number one issue needing further review.

National headquarters of VHA has hinted at criteria to be used for the identification of facilities targeted for closure, integration, or at least some sort of mission re-alignment. Although not officially released, these criteria were rumored to identify facilities having extremely low workload volumes and which are located near larger VHA facilities. One version of the criteria includes hospitals with an average daily census of fewer than 25, hospitals with fewer than 15,000 unique patients (i.e., individual patients as opposed to numbers of visits), and hospitals located within 125 miles of another VHA medical facility (Veterans Health Administration, 1998a). Since NAVAHCS fits these criteria, the Strategic Planning Board identified inpatient beds as an area for in-depth assessment and planning.

Background of VHA

The Department of Veterans Affairs (DVA) is divided into three major operational elements. These include the Veterans Health Administration (VHA), the Veterans Benefits Administration, and the National Cemetery Administration.

The VHA, currently under the leadership of the Acting Under Secretary for Health, exists to meet four Congressionally-defined missions:

- delivery of health care services to the nation's veterans;
- education of health care professionals;

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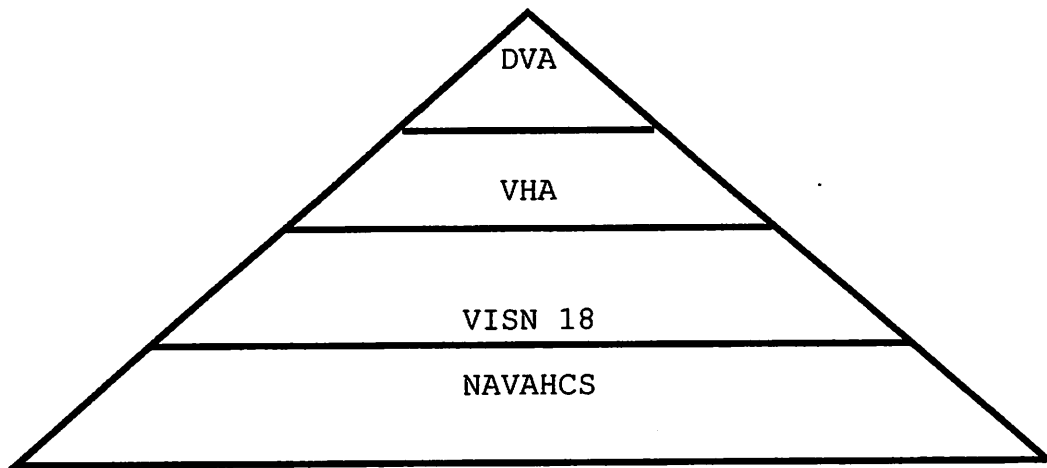
- health-related research and development; and
- contingency medical support to the Department of Defense during periods of national emergency (Klemm, Lewin, and AA Study Team, 1996).

The first mission, to deliver health care services to veterans, is the most significant in terms of resources needed. It accounts for approximately 93%, or \$14 billion, of all funds expended across the four mission areas (Klemm et al., 1996).

At the beginning of fiscal year 1996, VHA implemented a major reorganization. Some of the authority held by headquarters or the 170 individual medical facilities was shifted to 22 networks within VHA's health care organization. The intent of shifting authority to networks of facilities was to create a more efficient and responsive health care organization, i.e., one that could better provide effective health care for veterans within each area. These networks, called Veterans Integrated Service Networks and referred to as "VISNs", are each under the leadership of a Network Director.

NAVAHCS is organizationally aligned within VISN 18. Figure 1 displays the organization's alignment within DVA.

Figure 1. Organizational Alignment of NAVAHCS within DVA.

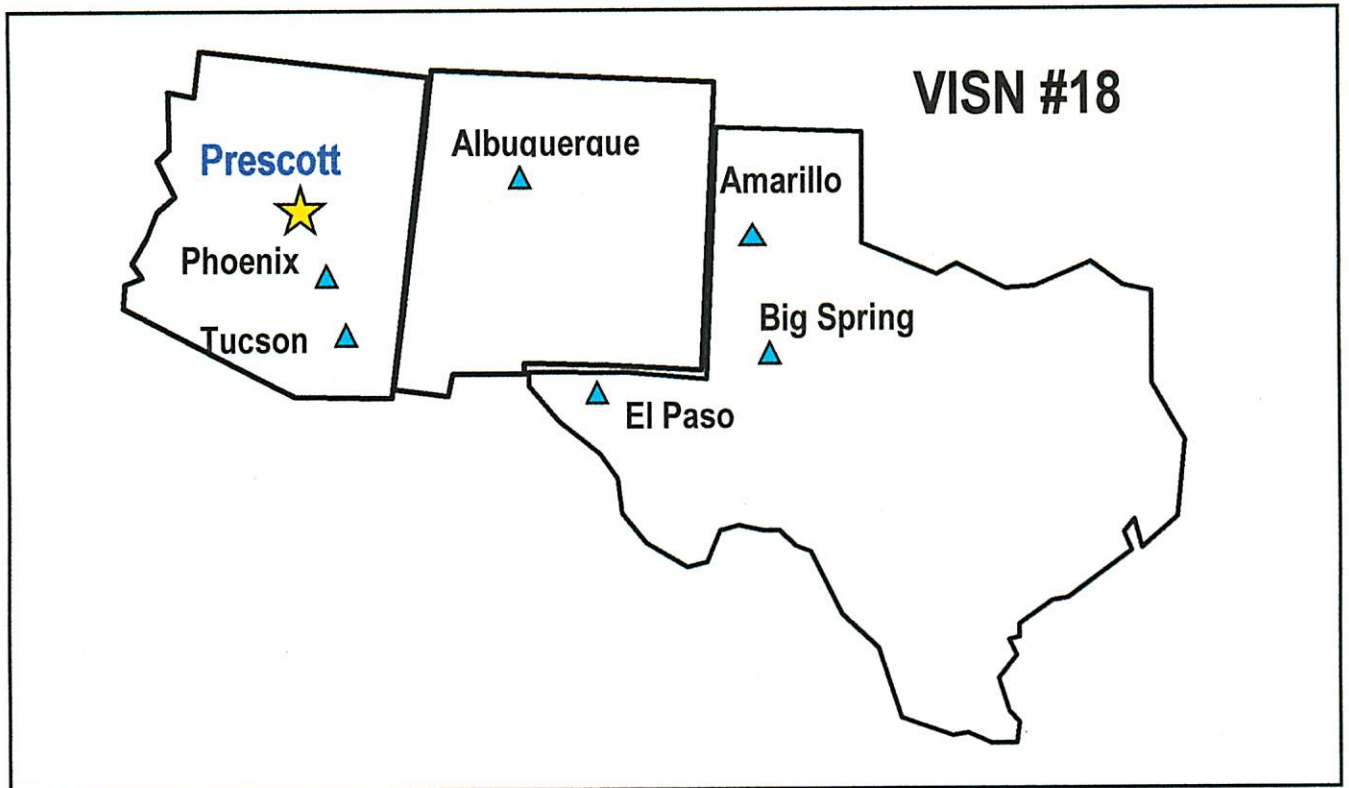


(NAVAHCS, 1999a).

Background of NAVAHCS

NAVAHCS is one of seven medical centers in VISN 18 (see Figure 2) which was established to improve veterans' access to healthcare services, and to promote timeliness, coordination, and cost efficiencies within the VHA facilities in Arizona, New Mexico, and western Texas (NAVAHCS, 1999b).

Figure 2. VISN 18 Facilities.



Northern Arizona VA Health Care System, known until recently as Prescott VA Medical Center, serves military veterans of northern Arizona. NAVAHCS is designated, by DVA, as a level 1 health care facility. This means it provides a continuum of primary medical, long-term, and rehabilitative care; inpatient care; triage of medical and psychiatric crises; preventive care; patient education; ancillary testing; assessment of age-related illnesses; and referrals for subspecialty services

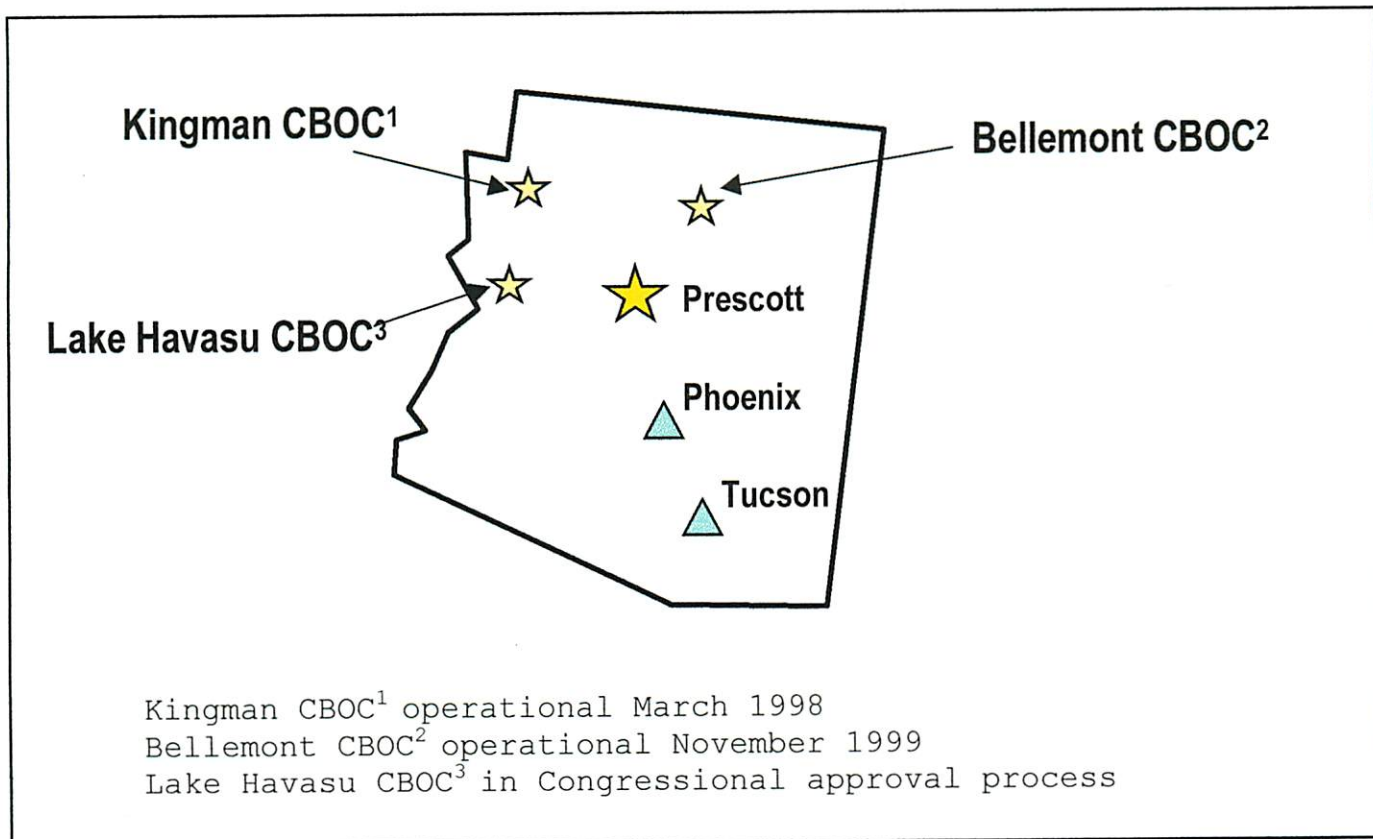
NAVAHCS' operating bed levels include 25 acute inpatient hospital beds, 90 long-term care beds, and 120 domiciliary beds. Acute medical care consists of primary and secondary inpatient medical care and ambulatory care, including medicine, minor ambulatory surgery, mental hygiene, and selected

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specialized outpatient clinics. Rehabilitative care consists of inpatient and outpatient rehabilitation medicine, an outpatient substance abuse treatment program, and a vocational rehabilitation/job-training program. Long-term care consists of the Extended Care Rehabilitation Center, a Geriatric Evaluation and Management Program, and domiciliary care which provides rehabilitative care and long-term health maintenance services. The facility also provides hospice and respite programs, an assisted living program, and dementia care.

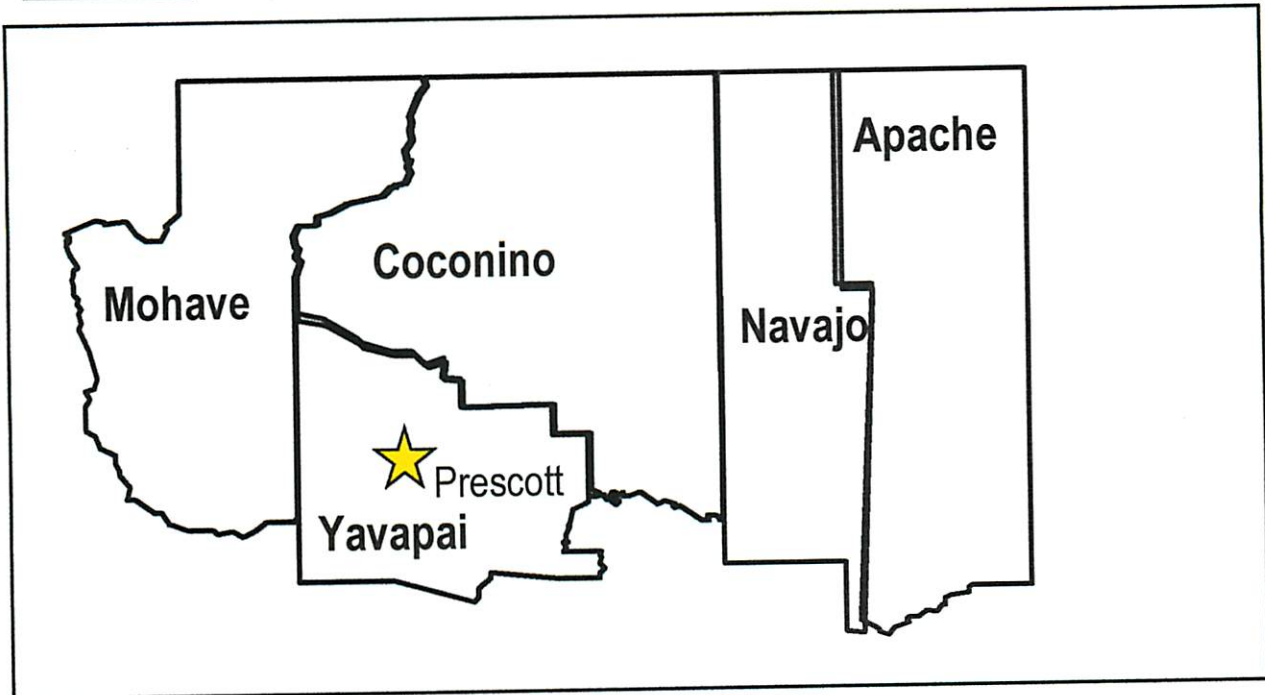
Non-emergent, complex medical care and diagnostic procedures, most specialty care, and all inpatient surgical care are referred to other facilities. Ideally, patients needing such care stay within the VHA system and are usually referred to one of the other two Arizona VHA inpatient facilities located in Phoenix and Tucson (see Figure 3). Emergent cases are referred to the closest private sector health care facility.

Figure 3. Location of VHA Facilities in Arizona.



NAVAHCS' service area is quite unique. It encompasses five counties (all designated as medically under-served), exceeds 60,000 square miles, and extends far beyond the Prescott facility (see Figure 4). It has instituted two community-based outpatient clinics (CBOCs) located in the outlying areas of Kingman and Bellemont. Plans are underway to establish another clinic at Lake Havasu City, along the Colorado River. In addition, NAVAHCS is currently implementing teleradiology and telemedicine, which will assist with access and continuity of care. It is not uncommon for veterans to travel distances of up to 250 miles to receive care as there is limited public transportation in the service area (NAVAHCS, 1999a).

Figure 4. Arizona Counties in NAVAHCS' Service Area.



NAVAHCS also hosts a mobile health clinic, one of six within VHA. This mobile clinic provides ambulatory and screening services to underutilized areas not served by the main Prescott facility or its community based clinics. The State of Arizona has the third largest resident Native American population in the country, and this allows the facility to reach those groups of veterans in their remote and geographically dispersed areas (NAVAHCS, 1999a).

NAVAHCS' main facility is located in the mountains of north-central Arizona in a tri-city community of approximately 75,000 people. It is situated on a 150-acre site within the original Fort Whipple Military Reserve on State Highway 89. The geographic area, not highly industrialized, is known for its clean air, sunshine, and relatively mild climate. Currently, the

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population density of northern Arizona is low with only about seven persons per square mile. However, like other areas of the sunbelt, this area is experiencing rapid population growth (NAVAHCS, 1999a).

Growth of the veteran population for the service area is projected to increase until the year 2010. This trend differs from that of Maricopa county, Prescott's neighboring county to the south. That area's veteran population has already peaked and is predicted to decline by the year 2010 (NAVAHCS, 1999a).

The number of individual, or unique, veterans treated by NAVAHCS continues to increase. In fiscal year 1998, NAVAHCS treated 10,522 veterans for 90,620 visits. In fiscal year 1999, those numbers increased to 11,498 veterans with total visits numbering 100,878. The facility expects to see more than 13,000 veterans in fiscal year 2000. NAVAHCS has an overall goal of treating 15,000 veterans in any one year.

This increase in numbers of veterans is particularly significant as VHA is operating within a straight-line budget through fiscal year 2002. NAVAHCS' budget for fiscal year 1999 was approximately \$39 million. The fiscal year 2000 budget is just over \$40 million, as Congress appropriated some additional funds to the DVA budget for fiscal year 2000.

NAVAHCS has an unusual physical layout for a health care facility. It consists of 56 station-owned buildings, one leased building in Kingman, Arizona, and one building acquired through a sharing agreement with the Department of the Army and which is located in Bellemont, Arizona. The station-owned buildings, with

an average age of more than 60 years, are located on what has recently been designated as an historic district on the National Registry of Historic Places (NAVAHCS, 1999a).

NAVAHCS employs over 600 permanent and temporary employees. Because of its relatively small size and rural locale, NAVAHCS encounters difficulty in recruiting and retaining qualified and competent professional employees, particularly physicians.

Strategic planning

NAVAHCS has a strong foundation for its strategic planning process which supports short and long-range planning. The facility's planning process is essential for ensuring a full range of services to the veterans served and that services are provided in the most cost-effective, efficient, and appropriate setting possible (NAVAHCS, 1999c). To drive its planning processes, the facility has identified strategic targets.

Its most important strategic target, as written in the facility's FY99 - FY03 strategic plan, is to enhance access to an integration of health care services in an effective and cost-efficient manner (NAVAHCS, 1999c). It is this target that drives NAVAHCS' continual re-evaluation of the appropriateness of the services it provides. Along with this, it is the philosophy of NAVAHCS to create an environment that supports continuous improvement and innovation in patient care. This takes into consideration, also, the complexities presented by the current health care environment, including the budget constraints of VHA (NAVAHCS, 1999d).

One definition of strategic planning/management is the process of aligning the organization with its external environment (Ginn and Young, 1992). For NAVAHCS, this external environment includes the local health care community of Prescott, other Arizona VHA facilities, VISN 18 resources, and the rest of the VHA and DVA environment.

According to one publication by VHA, any change should be accompanied by the question: "Given our resources, what is in the best interest of the veteran we serve?" (VHA, 1996, p. 2). The executive leadership at NAVAHCS consistently takes this approach in guiding the facility's strategic planning endeavors.

Statement of the Problem

NAVAHCS must determine whether it is appropriate to continue with acute inpatient beds at its Prescott facility. The recent recommendation to close all acute inpatient beds, along with rumors regarding criteria for identification of facilities targeted for closure, integration, or mission re-alignment, demanded an in-depth study of the ramifications of changing the delivery of care for NAVAHCS' patients.

The findings of this study were data driven. Whatever the outcome, the goal was to ensure the veterans of northern Arizona have appropriate access to a continuum of efficient, high quality health care at the most reasonable cost to VHA.

Literature Review

The changing boundaries of the American hospital

Today's health care industry is one of the largest in the world. In the United States, it is second only to the real estate industry. The resources devoted to health care in this country have more than tripled since the 1950s (Gapenski, 1996). In 1996, the health care industry consumed about 14% of the nation's gross national product and that is expected to increase to nearly 15% by the year 2002 (National, 2000).

Many reasons have been cited for these escalating health care expenditures in the United States. These include the expensive technology used to diagnose and treat disease; the government funding of health care services through Medicare and Medicaid; the third party payment systems that have removed much of the economic responsibility from consumers; the aging of the population; the high cost of educating physicians; the costs of new facilities and equipment; and even society's view of the value of life. According to Gapenski, it seems Americans believe good health is worth any price. He supports this with his statement, "(I)t has been said that Americans are the only people on earth who believe that death is optional" (Gapenski, 1996, p. 10).

In the United States, the hospital has historically been considered the central institution of the healthcare industry. Therefore, it should come as no surprise that the hospital has been the primary target for cost-cutting efforts. These efforts have focused on decreasing hospital admissions, patient days,

and occupancy rates. Since the early 1980s, hospitals have been confronted with prospective payment systems, increased competition, and other incentives to control spending. Emphasis has been directed toward outpatient care, home health services, and subacute care in place of traditional hospital services (Robinson, 1994).

Epidemiological patterns have also impacted the changing role of hospitals. These patterns have shown a shift from acute conditions requiring hospitalization to chronic conditions more effectively treated in outpatient settings, subacute facilities, and even patients' homes (Robinson, 1994).

The same technological factors that have been cited as responsible for increased health care costs have impacted the hospital's role in health care. Advanced radiological technologies, outpatient cardiac catheterizations, and ever-improving pharmaceuticals are just a few examples of new technologies that have played a role in eliminating the need for expensive overnight hospital stays (Robinson, 1994).

These reductions in the need for hospitalization have not caused a commensurate decrease in the hospital's importance within the health care industry. Hospitals have rapidly expanded into the outpatient, subacute, and home health care arenas. Outpatient facilities are utilized for diagnosing patients prior to hospital admissions. Subacute care and long-term care facilities shelter patients after acute episodes. And, home health care services allow patients to stay in their homes instead of receiving care only in the traditional inpatient

hospital settings (Robinson, 1994).

This declining trend in the use of hospital beds is not necessarily new. In 1987, Higgins and Meyers indicated that increased competition and cost-containment efforts were already causing a decline in the demand for hospital bed utilization (Higgins & Meyers, 1987). This was evidenced by steadily declining occupancy rates, excess bed capacity, and a sicker patient mix as less-ill patients were directed to outpatient services. Cost-based payment was being phased out and managers were suddenly forced to seek efficiency in all areas, including clinical services (Higgins & Meyers, 1987).

Gourley and Moore also indicated the course of hospital use had been changing since the 1970s. They quoted Hillestad and Berry as saying that the previous decade had "produced a type of social Darwinism for hospitals in which only the fittest survive" (Gourley & Moore, 1988, p. 332). And, remaining "fit" required hospitals to contain costs and increase competition for services.

In a more recent study, Manton, Woodberry, Vertrees, and Stallard showed that the prospective payment system also had a direct effect on the use of hospital services. Their study compared the use of Medicare services by the elderly and chronically disabled before and after the introduction of prospective payment. The intent of prospective payment was to control costs and improve efficiency by paying a fixed amount for treating cases in specific diagnosis-related groups. Since hospital profits were increased with shorter stays, hospitals

started to discharge patients to skilled nursing facilities or home health agencies for post-acute care. And, it seems this occurred with relatively few adverse effects (Manton, Woodbury, Vertrees, and Stallard, 1993). Now, shorter stays and fewer admissions have become the norm.

Another more recent study, reported in 1999, indicated that to change the way acute care hospitals are used, alternatives to hospital care must first be established, be made known, and be available. Only then will a shift in the use of health care resources occur. This conclusion is based on a 1994 study in Canada where a high percentage of admissions and days of care were found to be inappropriate (DeCoster, Peterson, Carruerem, and Kabian, 1999). The study involved a retrospective chart review of a sample of 150 randomly-selected adult medical patients in 26 hospitals. Trained abstractors used InterQual™, a standardized set of object-based non-diagnostic criteria, to assess each patient's condition at admission and for each day of hospital stay. Overall, 49.5% of medical patients were acute at the time of admission, 1.6% required no health care services, and 48.9% could have received care through alternative methods or facilities. Only 33.4% of the subsequent days of stay were appropriate (DeCoster et al., 1999).

Findings in one international study also indicated widespread use of acute care hospitals by patients who did not require that level of care. Hence, there is room for hospitals and health care systems to become more efficient. Studies show that 7% to 43% of adult admissions and 20% to 48% of subsequent

acute hospital stays were judged not to need the level of services requiring an acute care hospital setting (DeCoster et al., 1999).

Almost all patients admitted to the hospital in that 1999 study needed some kind of health care services. More than 95% of the patients required health care, but many did not need an acute setting. Long term care and home care were the most frequently assessed alternatives to the acute care hospital days. The proportion of days that could have been provided by home care increased from the urban hospital to the small rural hospital. This would seem to be a predictable finding as home care is often more difficult to arrange in small and rural communities (DeCoster et al., 1999).

It is obvious that demands for efficiency, along with the demand for quality, now drive health care competition (Higgins & Meyers, 1987). With this in mind, it can be assumed that the delivery system of the 21st Century might remain centered around the hospital, although in a vertically integrated system where acute beds play only a modest role (Robinson, 1994).

Planning for changes in the health care system

With the constant changes in the hospital's role in the health care industry, continual assessment and planning need to occur to assure the needs of the served patient population are being met. The number of people actually requiring hospitalization in a given population is rarely known (Rohrer, 1996). So, on what are forecasts projected?

Several methods have been identified in the literature for forecasting the health care needs of a population. One of these involved the survey of morbidity patterns in the population served. This included information about the types of illnesses from which the population suffers. One risk of this method is that focusing on morbidity could lead planners to emphasize treatment at the expense of prevention. However, used carefully, this approach is considered to be sound (Rohrer, 1996).

Rohrer identified a "menu of approaches" to follow in using this method. These include assessment of:

- demographic and socioeconomic characteristics including age, sex, and race as associated with morbidity rates;
- vital statistics such as population size, birth rates, and death rates by cause;
- reportable diseases such as sexually-transmitted and infectious diseases, and the registries in some states of cancers, birth defects, Alzheimer's disease, and traumas;
- hospital discharges, as morbidity patterns may be inferred from discharge diagnoses;
- community perceptions about health status, healthy behaviors, accessibility, efficiency, and quality of health services; and
- physician office billing systems that may show the health problems addressed by the population served (Rohrer, 1996).

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Another method for planning services is to examine the patient's proximity to various services. For example, according to one Department of Defense TRICARE contract, the availability of primary care should include delivery sites located so as to ensure that beneficiary travel time does not exceed 30 minutes from home and beneficiary travel time to specialty treatment services should normally not exceed 60 minutes (Tricare, 1999).

Another of these forecasting methods utilizes the historic use rates of inpatient hospital admissions and services as experienced by the subject population (Rohrer, 1996). Since hospital expenditures constitute the largest line item on the national bill of health expenditures and data on hospital use are more readily available than information on other types of personal health services use, this should be a feasible planning mechanism.

Rohrer identified one formula for computing the number of beds for a small rural, non-federal, short-stay hospital: $\text{Beds Needed} = [(\text{Discharges} \times \text{ALOS}) / 365] / \text{Occupancy}$. (ALOS = average length of stay.) A normative occupancy rate for the facility should be used, however an occupancy rate of at least 0.60 should be achievable for a small rural hospital (Rohrer, 1996). (It should be noted that VHA set a standard occupancy rate of 0.85 as one of its performance measures in 1997 (VHA, 1997)).

Other planners assume the number of needed beds can be based on total population served. However, the ratios for planning beds per 1,000 population continue to change. Some planners

assume two community hospital beds are needed per 1,000 population (Rohrer, 1996). This ratio of 2:1,000 does not include beds for mental health services, substance abuse treatment, and other specialized services which could be based on local priorities. In the 1950s and 1960s, government facility planners assumed four hospital beds per 1,000 population would be needed in planning hospital facilities. And now, on a national basis, U.S. hospital capacity is at 3.6 beds per 1,000 population. And, managed care has rapidly caused that to change even more. In California, hospital demand had already fallen to 1.06 beds per 1,000 in 1997 (Coile, 1998).

Chi Systems of Ann Arbor, Michigan, a national health care strategy and facilities-planning firm, developed a model for projecting demand under managed care. This model indicates that a population of 200,000 could effectively be served by fewer than 220 beds, or about one bed per 1,000 population, including beds for obstetrical and surgical services (Coile, 1998).

Hospital planners would find it difficult to estimate future requirements without a general knowledge of the prevalence of situations usually requiring hospital care. So, to meet this need, forecasting methods are generally employed by planners. These may include demand models or historical models or the use of norms. Of these, the best predictors of future use rates in a particular area are the recent past use rates, adjusted for demographic changes, for that area. The main disadvantage of using these historical utilization rates is that they tend to reinforce the status quo. These methods work on the

assumption that the medical practice had been reasonably appropriate and needs to continue. As a result, if an area has always had 150 discharges per 1,000 population, it will continue with that rate as long as physicians are given license to continue their same practice patterns and hospital administrators have sufficient resources to continue providing the same level of services (Rohrer, 1996).

An alternative approach involved normative use rates to forecast need for care. Need for care may, in fact, be very different from demand for care. Demand includes the amount of services the population will consume at a given price and this may not mirror the actual need for services. Normative use rates based on need and adjusted for differences in population characteristics are a valid and workable approach to health planning (Rohrer, 1996).

Hospital planners must determine which hospital characteristics cause legitimate differences in performance. Hospital performance may differ depending on type of ownership (investor-owned, not-for-profit, government), affiliation (system or non-system), location (urban or rural), service mix, teaching status, type of medical staff organization (salaried, closed-panel, open-panel), and volume of surgical activity (Rohrer, 1996).

The hospital planner could use averages as norms rather than benchmark with the extremes of the most efficient hospitals. This strategy incrementally moves the hospital system toward greater efficiency without calling for major changes and

sudden discontinuation of services (Rohrer, 1996).

Alternatives for surplus inpatient beds

All regions of the United States are expected to experience a decline in acute hospital utilization rates; however, this will occur in varying levels. While the Northeast will experience the greatest drop in utilization, the West will have the lowest drop and may be the only region to see even a slight increase (5%) in average hospital days. This is related to the fact that the West's utilization rates and length of stay figures are already heavily affected by managed care. Also, even as the population gets older, led by the aging baby boom and the rising number of the oldest age groups, the population center in the U.S. continues to shift to the south and west (Coile, 1998).

These trends in decreased hospital utilization create possibilities for recycling, retrofitting, and closing empty acute hospital beds. Alternatives to hospital utilization include continuum-of-care substitutions such as:

- step-down or rehabilitation units,
- sub-acute care,
- skilled care,
- hospice care,
- remodeling multi-bed rooms to single-patient rooms,
- recycling inpatient space for ambulatory care, and
- retrofitting space for non-patient uses (Coile, 1998).

Consolidation of facilities and services is also a consideration in dealing with excess hospital beds and changing

health care service demands. As outlined in Millennium Management, prime targets for hospital consolidations include:

- academic medical centers;
- acute general hospitals closer than 3 miles apart;
- emergency rooms as not all hospitals need to provide maximum-level emergency services;
- campuses smaller than 30 acres, as this limits flexibility in redeveloping acute inpatient facilities for ambulatory and post-acute care;
- facilities built before 1975, as these frequently have performance limitations that make it difficult to accommodate modern infrastructure;
- units with 3- to 4-bed patient rooms, as multi-bed units are less flexible for patient assignment and infectious disease prevention;
- hospitals with greater than 33% of beds out of service;
- programs below national minimums, as these may not cover overhead costs and quality of care and competency issues may arise;
- inpatient surgical services that are more than 50% ambulatory; and
- units with fewer than 25 beds, as these may have limited flexibility for accommodating the high-acuity patients expected to be seen in acute care settings (Coile, 1998).

Traditional acute care hospitals have much to gain by entering the long term care market. Not only is the actual operation of a long term care service potentially profitable,

but the overall benefits can help the hospital meet both its mission and its financial goals (Giardini, Fottler, Shewchuk, and Hill, 1990). Many hospitals have already targeted subacute care in an effort to provide a less costly level of care, to become more price-competitive, and to better manage the Medicare-aged and managed care populations (Gill, 1994). As reported in Millennium Management, eventually about half of all closed hospitals return to health care uses such as long-term care, home health care, and ambulatory services (Coile, 1998).

The demand for long term care services is expected to increase as a result of several demographic changes. These include the growing number of elderly, the increased incidence of morbidity, a reduction in the number of caregivers for this aging population, and the increasing share of American health care resources used by this population (Giardini et al., 1990). According to information released by the American Health Care Association, nearly 9 million elderly were expected to need long term care services by the year 2000. That number is estimated to increase to 10 to 14 million by 2020 and to 14 to 24 million by 2060 (American Health Care Association, 1997).

Hospital organizations must project utilization of hospital-based subacute care units as well as the impact such units would have on the occupancy of acute care beds. Successful implementation of a subacute care unit will customarily decrease the patient days and average daily census of the acute care patient population (Gill, 1994).

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If hospital administrators are leery of closing excess acute care beds or of converting them to subacute and other long-term care beds, they may choose to convert them to swing beds or transitional beds. Managers may prefer doing this over closing beds as it may prove difficult to change converted beds back to needed bed designations in the event the demand for levels of care change according to population and case mix changes. This allows for more flexibility to use the beds as needed.

Hospitals and long term care facilities generally have opposite incentives regarding excess subacute capacity. Hospitals need to have subacute care beds available on precisely the day when the patient can be discharged from the acute care setting. Therefore, hospital administrators may choose to provide some subacute care services in the hospital setting. Long term care facilities, on the other hand, are profitable only when they maintain full capacity. They also have more difficulty making beds available on demand. In principle, this difference in interest can be handled by agreements for the nursing home/long term care facility to maintain full bed capacity and to discharge a resident whenever the hospital needs one of the beds. Such arrangements, however, are very difficult to effect (Robinson, 1994).

According to Giardini et al., the health care organization should be viewed as a reciprocal system through which patients feed from one component to another as their physical or mental conditions change. Hospital managers should view patients as

progressing through a continuum of care as the patient makes a recovery from illness or injury (Giardini et al., 1990).

Strategies for rural hospitals

More than one-third of United States hospitals may be classified as rural. These organizations serve that 20 percent of the nation's population that lives in small-town markets with low population densities. Most of these rural facilities are small, with fewer than 50 beds, and frequently with as few as 25 beds (Coile, 1998).

Rural facilities must pay particular attention to cost-control and cost-reduction efforts as these are the most important management strategies to differentiate the successful from the unsuccessful rural hospitals. These are critical factors in improving return on investment, and successful hospitals have lower costs per discharge after adjusting for case-mix differences (Cleverly, 1992).

Since health care in rural areas usually involves longer distances for travel, the number of acceptable hospital alternatives may be linked to patients' or physicians' willingness to travel. The maximum distance that patients are willing to travel hasn't been empirically established, possibly because of the complexity of linking data sets that provide complete information. Some models measuring patient choice have confirmed the importance of distance in the ultimate decision of where patients seek care (Goody, 1993).

Inpatient Beds

Diversification into ambulatory and post-acute services can be beneficial for rural facilities. According to the American Hospital Association's 1995 survey of rural facilities, half of all rural hospitals now operate home health agencies, one-third have nursing homes, and almost all have outpatient clinics. It is expected these trends will continue. Realistically, the rural hospital of the future in many communities may be an urgent care center with skilled nursing beds (Coile, 1998).

Direction for VHA

Veterans Health Administration has not been spared these same trends in decreasing inpatient utilization and development of alternative treatment options. VHA health care providers are expected to place patients in the most appropriate settings. Since VHA has traditionally been a hospital-based system, this has stimulated the incentive for creation of appropriate alternatives to hospital admissions. Many VHA hospitals have followed the private sector in creating alternative care settings.

VHA's expansion into long-term care is a consideration for further diversification. This includes expanding skilled and intermediate nursing home programs, rehabilitation services, home health care, and hospice programs. VHA has always offered some programs not as readily seen in the private health care sector such as domiciliary care and respite programs. Domiciliary care is intended to assist the patient while respite care is generally intended to assist the caregiver in continuing

to provide care for the patient in his home or other familiar setting.

Several creative approaches have been taken by different VHA facilities. For example, Jonathan M. Wainwright Memorial VA Medical Center in Walla Walla, Washington, integrates three levels of care in one area. Their multi-care unit is set up to treat beneficiaries who require critical care, acute care, or nursing home care. Staffing is determined on resident/patient classifications and other patient workload using multi-skilled staff (VA, Walla Walla, 1999). Carl T. Hayden VA Medical Center (CTHVAMC) in Phoenix, Arizona, utilizes a type of swing-bed scenario and bases its medical ward bed-level designation on the intensity-of-services needs of the patients. Patients on the inpatient medical wards can be designated acute medical, telemetry, or alternate level of care (VA, Phoenix, 1999).

Purpose of the Study

The purpose of this study was to determine the appropriateness of continuing with acute inpatient medical beds at the Prescott facility of NAVAHCs. Assuming the findings indicated retention of inpatient beds was appropriate, an additional purpose was to determine the number of acute inpatient beds needed by NAVAHCs.

Chapter 2

Methods and Procedures

Data were collected on every patient admitted to an acute inpatient medical bed at the Prescott facility of NAVAHCS during first quarter of fiscal year 2000. The inpatient acute medical beds at NAVAHCS include intensive care unit beds (ICU), telemetry beds, and acute medicine ward beds.

In order to obtain real-time data regarding the ability of other facilities to accept patients who would require admission at another facility, NAVAHCS obtained the cooperation of other VHA and private sector facilities upon whom it would rely for inpatient services. These included Yavapai Regional Medical Center (hereafter referred to as Yavapai Hospital or YRMC) in Prescott, Carl T. Hayden VAMC (hereafter referred to as Phoenix VA or CTHVAMC) in Phoenix, and the Southern Arizona VA Health Care System (hereafter referred to as Tucson VA or SAVAHCS) in Tucson. A point of contact was identified at each of these facilities.

This study used an assessment of the availability of needed services, a comparison of the costs of providing care in existing inpatient beds with the costs of providing care in available alternative beds, and an application of bed planning ratios identified in the literature review.

In order to assure reliability of data, all appropriateness of admission, based on InterQual™ criteria, was determined by the utilization management coordinator. To assure continuity of data collection, all contacts with the other facilities were

made by one individual with only one back-up person.

The status of every patient admitted to a NAVAHCS acute inpatient bed was reviewed daily with either the admitting provider or the primary care provider to determine how the patient's medical needs could have been met if NAVAHCS did not have acute inpatient beds. An appropriate disposition/scenario was determined for each patient based upon his current medical status. If the determination was that the patient would have required admission at another facility, the respective facility was contacted to determine that facility's capacity to accept the patient. Capacity in the context of this study refers to a vacant bed at an appropriate level of care with adequate staffing resources to provide care for the patient. It was assumed that for every day a patient remained in a NAVAHCS bed, that patient would require the same bed days of care if he were at another facility. For this study, the NAVAHCS inpatients who would have required a bed at another facility were referred to as "phantom patients".

Multiple data pieces were collected on each patient admitted to an acute inpatient bed at NAVAHCS between October 1, 1999, and December 31, 1999. These included:

- day, date, and time of admission,
- admission diagnosis,
- unit to which patient was admitted,
- whether InterQual™ criteria for acute admission were met,
- level of InterQual™ criteria met upon admission (ICU, telemetry, acute medicine),

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- reason for admission if InterQual™ criteria were not met,
- length of stay in an acute inpatient bed,
- InterQual™ criteria for continued stay,
- discharge disposition,
- facility to which the patient would have required transfer if NAVAHCS did not have inpatient beds (Yavapai Hospital, Phoenix VA, Tucson VA, Other),
- the level of care required at that facility (ICU, telemetry, acute medicine),
- type of patient transportation required to the needed facility,
- expected cost of that transportation, and
- expected cost of the hospitalization.

The costs associated with the provision of care at NAVAHCS were compared with the costs of purchasing the same care at Yavapai Hospital, Phoenix VA, Tucson VA, and other facilities. Costs per bed day of care for VHA facilities were derived from the end of fiscal year 1999 cost distribution reports. Total costs include direct costs of personal services and all other indirect costs (Total Cost = Direct Personal Services Costs + All Other Indirect Costs). Direct personal services costs were obtained from the 1110.00 cost distribution report account for general medicine and the 1117.00 cost distribution report account for ICU. All other indirect costs were obtained from the 1100.00 cost accounts for medical hospital beds, sub-accounts 1100.14 through 1100.50. These included costs allocated for continuing education, administration, environmental management,

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and engineering services in the acute inpatient service areas.

It should be noted that NAVAHCS has six beds in the ICU. All six carry a dual designation of ICU/telemetry. The cost distribution report, however, includes telemetry costs in the general medicine account (1110.00).

The costs associated with the provision of care at Yavapai Hospital and other private facilities were estimated by submitting each of the respective phantom patient's International Classification of Diseases - 9th Revision Clinical Modification (ICD-9CM) codes, related to that episode of care, into a software pricing program. This estimated Medicare reimbursement rates specific to those facilities which reflects the amount of money NAVAHCS would expect to reimburse those facilities for the phantom patient's care. These figures do not reflect the cost to those facilities to provide that care nor the amount those facilities would have actually billed NAVAHCS for providing the care. This Medicare reimbursement amount does not include physicians' fees.

The physicians' fees were estimated by submitting, to the pricing software, the most frequently used provider visit Current Procedural Terminology (CPT) codes for each of the phantom patients, assuming a minimum of one provider visit per day and one EKG interpretation per patient. Radiology costs were estimated by submitting the CPT codes for actual radiology procedures for the phantom patients.

NAVAHCS would have incurred transportation costs for the transport of the phantom patients to the respective facilities.

Inpatient Beds

These costs included vehicle costs and the travel coordinator's salary costs. Vehicle costs included the General Services Administration rentals and additional maintenance costs on six vans. These included three regular vans, one wheelchair van, one stretcher van, and one special stretcher van equipped with an inverter for use of electrical emergency equipment. The travel coordinator costs included salary costs associated with one full time employee travel coordinator (and associated back-up) prorated for the time allocated to the phantom patients during the first quarter of fiscal year 2000.

Chapter 3

Results

NAVAHCS had 348 admissions to acute inpatient beds during first quarter of fiscal year 2000. Of these, 102 were admissions to ICU, 22 to telemetry, and 224 to acute medicine. Over 51% (179 of 348) of the admissions were related to circulatory and respiratory system diagnoses. On average, only slightly more than 50% of the admissions met the InterQual™ criteria for the level of care to which they were admitted (Table 1). However, 64.6% met InterQual™ criteria for at least the level of acute care.

Table 1. Admission Location and Percent Meeting Criteria

	# of Admissions	% of Total Admissions	% Meeting InterQual™ criteria for level of care at Admission	% Meeting InterQual™ criteria for at least Acute Medicine
ICU	102	29.3%	54.9%	(96) 94.1%
TELE	22	6.3%	54.5%	(18) 81.8%
ACUTE	224	64.4%	49.5%	(111) 49.5%
Total	348	100%	51.4%	(225) 64.6%

Inpatient Beds

Access to Care

Of the 348 admissions, 290 would have required admission at another facility if NAVAHCS did not have inpatient beds.

Eighty-two patients would have needed inpatient care at Yavapai Hospital in Prescott, 197 at Phoenix VA, 8 at Tucson VA, and 3 at other facilities (Kingman and Flagstaff, Arizona) (Table 2).

Table 2. Inpatient Bed Requirements

Facility	# of Patients Requiring Beds
YRMC -- Prescott	82
CTHVAMC -- Phoenix	197
SAVAHCS -- Tucson	8
Kingman Regional Medical Center	2
Flagstaff Regional Medical Center	1
TOTAL	290

Of the 82 patients requiring care at Yavapai Hospital, 66 required ICU beds and 16 required acute beds. Since the Yavapai Hospital contact was unable to provide actual bed availability/capacity data from 10/1/99 through 10/21/99, data for that facility's ability to meet NAVAHCS' inpatient bed-need was based on their ability to accept 25 of the 59 (42.4%) veterans requiring care at Yavapai Hospital from 10/22/99 through 12/31/99.

Of the 197 patients requiring care at Phoenix VA, 6 required

Inpatient Beds

ICU and 191 required acute beds. Phoenix VA could have accepted 164 (6 ICU, 158 acute) of these patients, thereby meeting NAVAHCS' need for inpatient beds 83.2% of the time.

Of the 8 patients requiring care at Tucson VA, one required ICU and 7 required acute care. Tucson VA could have accepted 7 (1 ICU, 6 acute) of these patients, thereby meeting NAVAHCS' patient bed-need 87.5% of the time.

The 3 patients requiring care at other facilities (Kingman and Flagstaff) were each in need of an acute bed. The ability of these facilities to meet NAVAHCS' need was not assessed.

Table 3 illustrates the 287 patients who would have required care from Yavapai Hospital, Phoenix VA, and Tucson VA (excluding the three patients at other facilities) during the first quarter of fiscal year 2000. It also includes the number of patients that could have been accommodated and the percentage of bed-need that could have been met by each facility respectively. The three patients who would have required beds at Kingman and Flagstaff were not included in the table as the ability of these facilities to meet bed-need was not assessed.

Inpatient Beds

Table 3. Ability to Meet NAVAHCS' Inpatient Bed-Need for Admission

	# Beds Required			# Beds Available			% of Bed-Need Met		
	ICU	Acute	Total	ICU	Acute	Total	ICU	Acute	Total
YRMC1*	66	16	82						
YRMC2**	47	12	59	15	10	25	31.9%	83.3%	42.4%
CTHVAMC	6	191	197	6	158	164	100%	82.7%	83.2%
SAVAHCS	1	7	8	1	6	7	100%	85.7%	87.5%

* Total number of beds required at YRMC from 10/1/99 - 12/31/99

** Total number of beds required at YRMC from 10/22/99-12/31/99

The 290 patients who would have required inpatient beds at other facilities would have needed a total of 1,944 bed days of care. Table 4 illustrates the ICU and acute medicine/telemetry bed days of care required for these 290 patients.

Table 4. Bed Days of Care (BDOC) Required

Facility	# Patients	Required BDOC		
		ICU	ACUTE / TELE	Total
YRMC	82	141	205	346
CTHVAMC	197	108	1377	1485
SAVAHCS	8	2	69	71
Other	3	0	42	42
TOTAL	290	251	1693	1944

Inpatient Beds

Cost of Care

The costs associated with the provision of care at the three VHA facilities were based on costs per bed day of care taken from the end of fiscal year 1999 cost distribution report. See Table 5. Costs for the private sector facilities were based on their facility-specific Medicare reimbursement rates. Provider costs and procedure costs for private-sector facilities were based on CPT codes.

Table 5. VHA Bed Day of Care (BDOC) Cost Comparison

Facility	ICU BDOC	Acute Medicine / Telemetry BDOC
NAVAHCS	\$1654.92	\$631.39
CTHVAMC	\$1671.56	\$1047.40
SAVAHCS	\$2022.12	\$1159.43

The costs for the inpatient care to be provided at the different facilities are displayed in Table 6. The total cost for the care to be provided in the existing acute inpatient beds at NAVAHCS equaled \$1,484,328. The cost for the same care at the different facilities, including transportation, equaled \$2,224,412 (see Appendices B, C, and D for further breakdown of data).

Table 6. Costs for Care at Various Facilities

# BDOC	CTHVAMC	SAVAHCS	YRMC	KRMC/FRMC	Total	NAVAHCS
1485	\$1,622,798					\$1,048,155
71		\$84,045				\$46,876
346			\$339,080			\$362,779
42				\$18,452		\$26,518
Total					\$2,064,376	\$1,484,328
Trans*					+ \$160,036	\$0
Total					\$2,224,412	\$1,484,328

Trans* = transportation costs NAVAHCS would have paid

Quality of Care

NAVAHCS received scores in the nineties for all areas surveyed during the last JCAHO accreditation survey conducted in June of 1999. These scores are displayed in Table 7.

Table 7. NAVAHCS' June 1999 JCAHO Survey Scores

Area of Survey	Score
Hospital	94
Domiciliary	96
Long Term Care	99
Home Care	94

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In fiscal year 1999, NAVAHCS met eight of its eleven national performance measures at the exceptional or fully successful level (Table 8). NAVAHCS was the only facility in VISN 18, and one of only 15 VHA facilities nationwide, to meet the Customer Service Satisfaction measure. This particular performance measure on customer service satisfaction was developed by a non-DVA organization and is used to compare VHA patient satisfaction rates with the private sector.

Table 8. NAVAHCS' 1999 Performance Measures Scores

Performance Measure	NAVAHCS score
Ambulatory Procedures	Fully Successful
Home and Community Based Services	Fully Successful
Follow-up After Hospitalization for Mental Illness	Exceptional
Chronic Disease Care Index	Fully Successful
Prevention Index	Not Met
Palliative Care Index	Exceptional
VHA-Wide Clinical Practice Guidelines	Not Met
Customer Service Satisfaction	Fully Successful
Total Peer-Reviewed Research Funding	Not Met
Continuing Education for VHA Employees	Exceptional
Patient Safety	Exceptional

Chapter 4

Discussion

The top five major diagnostic categories for which patients were admitted accounted for 76.7% of all admissions (Appendix E). The top two categories, circulatory and respiratory disorders, accounted for slightly more than 50% of all admissions. As previously noted, these are areas that are expected to see a continual rise in numbers of admissions.

An average of 64.6% of the admissions met criteria for at least the level of acute care. This indicates these patients were of a level of severity of illness that would be expected to be treated in an acute inpatient setting and required services that would be expected to be delivered in an acute inpatient setting.

Those patients who were admitted without meeting acute care criteria (35.4%) still had medical needs that required care. These patients usually needed some intervention, continuation of care, or treatment planning that could not be done on an outpatient basis. In some instances these cases involved social reasons; e.g., there was no family to provide care, or the patient required some type of medical or nursing monitoring that could not expeditiously be arranged in another setting. In many of these cases, the patient would have been appropriate for admission to an alternative or lower level of care.

Access to Care

Access to acute inpatient services was not available at other VHA or private sector facilities for all NAVAHCS patients who required inpatient care. Yavapai Hospital could have met NAVAHCS' need less than 43% of the time (based on 59 patients). These were patients identified by the medical staff as needing a bed at the local community hospital as they were too unstable and inappropriate to be transported more than 100 miles to the nearest VHA facility. Phoenix VA was able to meet NAVAHCS' demand for inpatient beds at its facility 83.5% of the time (based on 197 patients). And Tucson VA could only meet 87.3% of the bed-need identified for that facility (based on 8 patients).

Cost of Care

Cost data indicated VHA would incur greater costs for inpatient care at other VHA and private sector facilities than if it continued to provide inpatient care at NAVAHCS. The costs per bed day of care, at all acute inpatient levels, at NAVAHCS were less than at either of the other two VHA facilities in Arizona. In addition, NAVAHCS would incur costs to transport patients to the appropriate facilities for care. Based on the scenario of paying all inpatient care and transportation costs for the 290 patients, the additional costs to VHA to provide inpatient care for NAVAHCS patients at other facilities, rather than NAVAHCS, was \$740,083. Assuming the same rate of utilization for one full year, it would cost VHA approximately 2.96 million dollars more to provide acute inpatient care at

other facilities, assuming access were available.

Quality of Care

Quality of care and level of patient satisfaction with care provided at NAVAHCS were both high. All areas surveyed by JCAHO in June of 1999 received high scores and were accredited. As discussed previously, NAVAHCS was the only facility in VISN 18, and one of only 15 facilities nationwide, that met the customer service satisfaction standard.

Bed projection formulas and ratios

According to findings in the literature, bed projection formulas and ratios have changed from approximately 4 beds per 1,000 covered population to 1 - 1.06 beds per 1,000 covered population. Applying this formula, NAVAHCS needs 12 - 12.72 acute inpatient beds based on approximately 12,000 patients last fiscal year. Assuming a projected increase to 13,000 veterans this fiscal year, NAVAHCS should need from 13 to 13.78 acute inpatient beds by the end of the year.

Another formula for determining numbers of needed hospital beds utilizes the facility's current usage averages while maintaining a specific occupancy rate. That formula is: (Beds needed = [(Discharges X ALOS)/365/ Occupancy]). Based on an occupancy rate of 60%, as suggested in the literature, and using NAVAHCS' fiscal year 1999 data of 1285 discharges, average length of stay of 6.7 days, and actually utilizing 31 inpatient beds, the number of beds needed comes to 39 beds: (1285 X

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$6.7)/365 / .60 = 39$ beds. (Note: Although NAVAHCS reports 25 acute inpatient medical beds, 31 beds were actually utilized for inpatient care during the time of this study.)

Using the same formula and an occupancy rate of 85%, as directed by VHA through its performance measurement system, the number of needed beds comes to 28 beds. However, NAVAHCS achieved a cumulative occupancy rate of 97.7% for fiscal year 1999. This means that NAVAHCS was more efficient at utilizing its inpatient beds than the suggested rate of 60% or even the 85% as recommended by VHA. So, applying the same formula but using the actual cumulative occupancy rate of 97.7% brings the projected number of beds needed at NAVAHCS to 24: $(1285 \times 6.7)/365 / .977 = 24$ beds.

The above formula works on the assumption that the admission practices of the medical staff have been reasonably appropriate and need to continue at the same rate. Slightly more than 64% of all admissions to NAVAHCS' acute inpatient beds, during the three-month time period of the study, actually met admission criteria. This would mean that continuing the same admission practices, NAVAHCS would actually require 20 acute inpatient beds (64.6% of 31 current beds).

One final forecasting formula, also based on normative usage patterns, is based on average demand vs. average need. Looking at actual bed demand, on any one day of the study, NAVAHCS had a range of 15 - 31 patients occupying acute inpatient beds, an average of 23.38 patients per day with the median and mode both being 24 patients per day. Of those, looking at bed-need, there

Inpatient Beds

was a range of 3 - 17 patients per day who actually met criteria to be in an acute inpatient bed. This came to an average of 9.91 acute inpatients per day with the median and mode both being 10 per day (8 acute medicine and 2 ICU/telemetry) who actually required the level of acute care (see Appendix F for complete daily bed demand/need).

Applying these different bed projection ratios and comparing average normative use rates, NAVAHCS needs between 10 and 24 acute inpatient beds.

Chapter 5

Conclusions

Analysis of the data indicates it is appropriate that NAVAHCS continue with acute inpatient beds. The data indicated that other VHA and private sector facilities could not meet NAVAHCS' acute inpatient bed-need. Even if they could, it would be more costly to VHA to pay for the needed inpatient care at other VHA and private sector facilities than to pay for the care as provided in NAVAHCS' acute inpatient beds. In addition, the quality of care and level of patient satisfaction with care at NAVAHCS have both received high ratings.

Applying current bed projection formulas and ratios found in the literature, NAVAHCS should maintain between 10 and 24 acute inpatient beds. The intent of this study was not to determine the most efficient size of an acute inpatient bed unit, however, a combination of acute and subacute beds would be appropriate. This would allow the flexibility of maintaining availability of acute medicine beds while allowing access to subacute beds when needed.

The results of this study provided top management at NAVAHCS with objective, measurable data to use in determining the appropriateness of continuing with acute inpatient beds at its Prescott facility. The data could also be used to compare costs of care utilizing alternative options in the event access to inpatient care becomes available outside NAVAHCS.

Although the collection of data for this study was very time intensive, the study is now a valuable tool that could be

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replicated by other facilities as the demands for health care, and access to inpatient health care, continue to shift. For example, if a facility were to see a significant shift in the numbers of patients seeking care through its system, the demands for inpatient care could shift in direct proportion to the number of patients treated. Or, as another example, if the local health care market changed, the facility might want to do a study on the changing need for inpatient beds, the availability of access, and the costs of care to determine the most appropriate way to provide inpatient care.

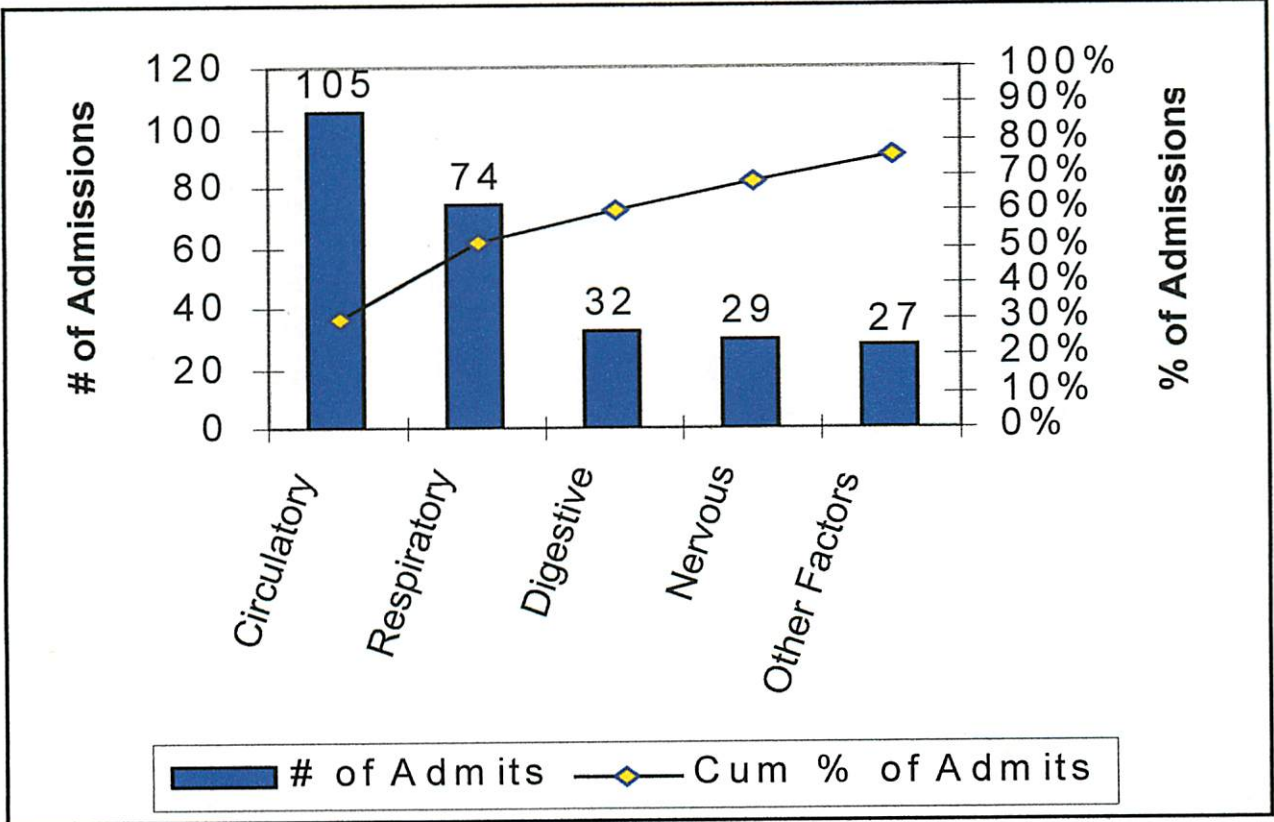
Appendix A

List of Acronyms and Definitions

ALOS	Average Length of Stay
BDOC	Bed day of care
CBOC	Community Based Outpatient Clinic
CPT	Current Procedural Terminology
CTHVAMC	Carl T. Hayden VA Medical Center
DVA	Department of Veterans Affairs
FRMC	Flagstaff Regional Medical Center
ICD-9 CM	International Classification of Diseases - 9 th Revision Clinical Modification
ICU	Intensive Care Unit
KRMC	Kingman Regional Medical Center
NAVAHCS	Northern Arizona VA Health Care System
Phoenix VA	Carl T. Hayden VA Medical Center
SAVAHCS	Southern Arizona VA Health Care System
TELE	Telemetry
Tucson VA	Southern Arizona VA Health Care System
VHA	Veterans Health Administration
VISN	Veteran Integrated Service Network
Yavapai Hospital	Yavapai Regional Medical Center
YRMC	Yavapai Regional Medical Center

Appendix B

Top 5 Major Diagnostic Categories for Admissions



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Appendix C

Bed Day of Care Costs for VHA Facilities

NAVAHCS	ICU	Acute Med / Tele	Total
BDOC	251	1693	1944
Cost per BDOC	\$1654.92	\$631.39	-----
Cost for Inpatient Care	\$415,384.92	\$1,068,943.20	\$1,484,328.12

CTHVAMC	ICU	Acute Med/Tele	Total
BDOC	108	1377	1485
Cost per BDOC	\$1671.56	\$1047.40	-----
Cost for Inpatient Care	\$180,528.48	\$1,442,269.98	\$1,622,798.46

SAVAHCS	ICU	Acute Med/Tele	Total
BDOC	2	69	71
Cost per BDOC	\$2022.12	\$1159.43	-----
Cost for Inpatient Care	\$4,044.24	\$80,000.67	\$84,044.91

Appendix D

Costs at Private Facilities Compared with NAVAHCS

YRMC - for 82 patients for 346 BDOC

	YRMC	NAVAHCS
ICU/Acute Medicine Cost	\$304,091.97	\$362,778.67
Physician Costs	\$34,065.98	Inclusive
EKG Interpretation	\$922.50	Inclusive
Total	\$339,080.45	\$362,778.67

In addition to these costs, NAVAHCS would have to include transportation costs.

Kingman and Flagstaff Regional Medical Centers - includes 3 patients for 42 days

	KRMC/FRMC	NAVAHCS
ICU/Acute Medicine Cost	\$15,206.34	\$26,518.34
Physician Costs	\$3,211.97	Inclusive
EKG Interpretation	\$33.69	Inclusive
Total	\$18,452.00	\$26,518.34

In addition to these costs, NAVAHCS would have to include transportation costs.

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Appendix E

Transportation Costs for "Phantom Patients"

Mode of Transportation	# of Patients	Transport Cost	Associated Salary Cost	Total Cost
Ambulance	169	\$129,139.53	\$7,387.13	\$136,526.66
Other	83	\$19,870.96	\$3,638.44	\$23,509.40
Total	252*	\$149,010.49	\$11,025.57	\$160,036.06

Only 252 of the 290 patients who would have required beds at the other VHA and private sector facilities would have actually required ambulance or other VA-funded transportation.

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Appendix F

Total Number of Patients by Day

(based on patient census at 2400 hours)

	October 1999		November 1999		December 1999	
	# Patients	Avg/Day	# Patients	Avg/Day	# Patients	Avg/Day
ICU	79	2.55	100	3.23	79	2.55
Tele	27	0.87	24	0.77	47	1.52
Acute	559	18.03	588	18.97	648	20.90
Total # Patients	665	21.45	712	22.97	774	24.97
# Patients Meeting InterQual™ Criteria for Which Bed Level						
ICU	30	0.97	38	1.23	25	0.81
Tele	15	0.48	28	0.90	43	1.39
Acute	208	6.71	210	6.77	315	10.16
Total Meeting Criteria	253	8.16	276	9.20	383	12.35

# of Patients/Day occupying beds (based on census at 2400 hours)	ACUTE	ICU/TELE	ALL BEDS (Acute + ICU + Tele)
Mean	19.51	3.87	23.38
Median	20	4	24
Mode	20	5	24
Range	12 - 25	1 - 6	15 - 31
# Patients/Day meeting criteria (based on census at 2400 hours)	ACUTE criteria	ICU/TELE criteria	At least ACUTE criteria
Mean	7.97	1.95	9.91
Median	8	2	10
Mode	7	2	10
Range	2 - 16	0 - 6	3 - 17

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