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Report to Sen. William Proxmire, Chairman, Senate Committee on Appropriations: HUD-Independent Agencies Subcommittee; by Elmer B. Staats, Comptroller General.

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The Veterans Administration (VA) is planning four replacement hospitals as part of its construction program. The VA relied on historical patient workload data trends projected to 1985 from each of the existing facilities in making its estimates of future bed requirements. However, historical data on patient use of existing facilities are not considered a good indicator of future needs if lower cost alternatives to acute care are not readily available to VA in sufficient quantities. Without access to such alternatives as intermediate care and nursing home care, VA hospital patients would tend to remain longer than necessary in acute care beds, and historical data on patient use would be artificially inflated.

Findings/Conclusions: To suggest a way to overcome these problems, a new model was developed which analyzed past practices and determined what different degrees of care should have been provided. The model is designed to analyze computerized medical records of each patient discharged from the existing VA hospital and to determine how long, on an average, such a patient would have remained in an acute care bed section of a non-Federal community hospital. The model does not suggest that VA hospital beds are used for patients without medical problems but that their problems often do not require the resources associated with acute care beds for the full period of their medical treatment. The VA's method of projecting admissions and average length of stay should be changed because it does not adequately discern between acute and other types of care or show expected changes in the age mix of eligible veterans. Recommendations: The Congress should require that the VA justify all new and replacement hospitals, in terms of priority, on the basis of a clear and explicit set of objective

criteria before funding is approved. (RRS)

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REPORT BY THE

# Comptroller General

OF THE UNITED STATES

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## Inappropriate Number Of Acute Care Beds Planned By VA For New Hospitals

The Chairman, Senate Appropriations Subcommittee on HUD-Independent Agencies requested GAO to review the methodology used by the VA to determine the bed size of new and replacement hospitals.

As a part of its construction program, VA is planning four replacement hospitals. VA's planning approach will result in the wrong combination, or mix, between the number of acute care and less critical care hospital beds.

GAO developed a new hospital planning model calling for a different bed mix. The report discusses several other policy questions which the Congress should consider in approving new or replacement VA hospital construction.



HRD-78-102  
MAY 17, 1978



COMPTROLLER GENERAL OF THE UNITED STATES  
WASHINGTON, D.C. 20548

B-133044

The Honorable William Proxmire  
Chairman, Subcommittee on  
HUD-Independent Agencies  
Committee on Appropriations  
United States Senate

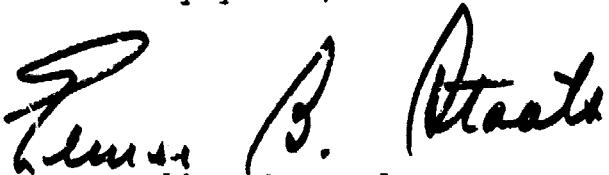
Dear Mr. Chairman:

In response to your January 4, 1977, request, this is our concluding report on the methodology used by the Veterans Administration to determine the bed size of new and replacement hospitals.

At your request, we did not obtain formal written comments from the Veterans Administration since its position has been stated in previous reports and in discussions with the Subcommittee staff. We did, however, discuss matters covered in the report with program officials in the Veterans Administration's Department of Medicine and Surgery and their comments have been incorporated where appropriate.

As agreed with your office we are sending copies to the Chairmen of the Senate and House Committees on Veterans Affairs, and the Subcommittee on HUD-Independent Agencies, House Committee on Appropriations; the Director of the Office of Management and Budget; and the Administrator of Veterans Affairs.

Sincerely yours,

  
Comptroller General  
of the United States

COMPTROLLER GENERAL'S REPORT  
TO THE SUBCOMMITTEE ON  
HUD-INDEPENDENT AGENCIES  
SENATE COMMITTEE ON APPROPRIATIONS

INAPPROPRIATE NUMBER OF  
ACUTE CARE BEDS PLANNED  
BY VA FOR NEW HOSPITALS

D I G E S T

As part of its construction program the Veterans Administration (VA) is planning replacement hospitals in Martinsburg, Portland, Seattle, and Baltimore. VA's planning approach will result in the construction of the wrong combination or mix of acute care and less critical care hospital beds and too few lower cost options, such as nursing home care, and outpatient facilities.

The basic problem is that the present care system is centered around the acute care hospital. Since the VA's planning model relies on past experience in determining what is needed, estimates as to hospital size tend to reflect the inefficient system of the past. Moreover, VA's planning model does not recognize in a precise way expected changes in the size and age mix of the veteran population.

To suggest a way to overcome these problems, GAO developed a new model which analyzed past practices and determined what different degrees of care should have been provided. An application of this model to projected veteran population data showed that a mix of medical facilities different from that proposed by VA is needed to permit the new replacement hospitals to have a range of health care options consistent with modern medical practice.

As a result of discussions held among VA, GAO, and members of the staff of both the Subcommittee on HUD-Independent Agencies of the Senate Appropriations Committee, and the Senate Committee on Veterans Affairs, it was agreed that VA would carefully assess the GAO model in developing estimates for hospital bed needs. It was further agreed that where the estimates

derived from the GAO model did not agree with the VA estimates, based on its own estimating techniques, VA would provide the Congress a detailed justification for the differences between its conclusions and those derived from the GAO model. It was also agreed that VA and GAO would meet to develop a mutually acceptable model and would continue to work toward that goal.

GAO believes that the Congress should require that VA justify all new and replacement hospitals, in terms of priority, on the basis of a clear and explicit set of objective criteria before funding is approved. GAO believes that the highest priority should be established in areas of the Nation where existing VA hospitals are least able to provide high quality medical care to the veteran population. VA indicated that a new system has been developed which will determine priorities for new hospital construction or replacement. GAO believes the new system is a major improvement.

#### KEY POLICY QUESTIONS NEED ATTENTION

GAO's model determines VA bed requirements based on an assumption that the eligibility conditions under which VA now provides care will not change. Other policy matters--such as the bed capacity that should be provided to permit continued treatment of veterans for nonservice-connected illnesses, the use of community or other Federal hospital beds, and the potential impact of national health insurance--need to be addressed by VA and the Congress when new or replacement hospital construction is being contemplated since they could have a significant impact on future bed needs.

At the request of the Chairman, Senate Appropriations Subcommittee on HUD-Independent Agencies, GAO did not get written comments from VA since its position has been stated in discussions with the Subcommittee staff. GAO did, however, discuss the report with program officials in VA's Department of Medicine and Surgery and their comments have been incorporated in the report where appropriate.

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ABBREVIATIONS

CBO	Congressional Budget Office
GAO	General Accounting Office
HSA	Health Systems Agency
NAS	National Academy of Sciences
PAS	Professional Activity Study
VA	Veterans Administration



## CHAPTER 1

### INTRODUCTION

In a letter dated January 4, 1977, the Chairman, Subcommittee on HUD-Independent Agencies, Senate Committee on Appropriations, requested that we make a comprehensive evaluation of the process the Veterans Administration (VA) uses to determine the bed size of new and replacement health care facilities.

The Chairman was concerned about construction costs associated with VA hospitals. He referred to a May 1976 announcement by the President to build eight VA hospitals--seven replacement and one new--at a cost in excess of \$800 million and was concerned that VA build hospitals of the appropriate size and mix of beds.

The proposed hospitals are listed below in VA's order of construction priority.

- Richmond, Virginia.
- Bay Pines, Florida.
- Martinsburg, West Virginia.
- Little Rock, Arkansas.
- Portland, Oregon.
- Seattle, Washington.
- Baltimore, Maryland.
- Camden, New Jersey (new).

This report discusses VA's proposed new hospitals in Martinsburg, Portland, Seattle, and Baltimore. Our report on three hospitals--Richmond, Bay Pines, and Little Rock--was issued in May 1977. 1/ A separate report was issued on the Camden hospital in February 1978. 2/

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1/Letter report to the Chairman, Subcommittee on HUD-Independent Agencies, Senate Committee on Appropriations (HRD-77-104, May 20, 1977).

2/"Constructing New VA Hospital in Camden, New Jersey, Unjustified," (HRD-78-51, Feb. 6, 1978).

As shown below, the four hospitals discussed in this report are estimated to cost almost \$400 million to construct and are to consist of 2,450 beds.

<u>Hospital</u>	<u>Estimated construction costs</u>	<u>Beds</u>	
		<u>Hospital</u>	<u>Other</u>
Martinsburg	\$ 74,600,000	357	a/320
Portland	150,130,000	738	b/120
Seattle	90,000,000	455	b/60
Baltimore	<u>80,800,000</u>	<u>c/400</u>	<u>(c)</u>
Total	<u>\$395,530,000</u>	<u>1,950</u>	<u>500</u>

a/Consists of a 120-bed nursing home care unit and a 200-bed domiciliary.

b/Nursing home care unit.

c/VA has proposed, but not requested funding, for 30 additional hospital beds and a 220-bed nursing home care unit.

#### SCOPE OF REVIEW

Our review included discussions with (1) officials of the VA Central Office in Washington, D.C.; (2) officials at the VA hospitals in Martinsburg, West Virginia; Portland, Oregon; Seattle, Washington; and Baltimore, Maryland; and (3) representatives of Health Systems Agencies (HSAs) in the localities of the proposed VA facilities. We reviewed pertinent records, reports, and other documents available at the VA Central Office and at each of the hospitals we visited.

Our source of statistical data on the use of VA hospitals was magnetic tapes maintained at VA's Data Processing Center, Austin, Texas. The tapes--the patient treatment file--contained information on all patients discharged from the hospitals reviewed for fiscal year 1976. The tapes were validated by selecting a random sample of patient data and checking it against medical records on file at the hospitals. Fiscal year 1976 and 1985 veteran population statistics were supplied by VA Central Office of the Controller. We did not verify the accuracy of this data.

Regarding community hospitals, the basic data for use in this study were supplied by the Commission on Professional and Hospital Activities, Ann Arbor, Michigan. In these data, the identities of individual hospitals were not revealed in any way. Any analyses, interpretations, or conclusions based on these data are ours, and the Commission disclaims responsibility for any such analyses, interpretations, or conclusions.

## CHAPTER 2

### ALTERNATIVES TO ACUTE CARE BEDS SHOULD BE CONSIDERED IN PLANNING

#### NEW HOSPITALS

Each of the four hospitals is to replace an already existing VA hospital. VA relied on historical patient workload data trends projected to 1985 from each of the existing facilities in making its estimates of future bed requirements. However, historical data on patient use of existing facilities is not considered a good indicator of future needs if lower cost alternatives to acute care, such as intermediate care and nursing home care, were not readily available to VA in sufficient quantities. Without access to such alternatives, VA hospital patients tend to remain longer than necessary in acute care beds, and historical data on patient use of acute care facilities would be artificially inflated.

Several independent research organizations have concluded that numerous patients currently occupying acute care beds in VA hospitals would more appropriately be placed in other treatment settings, such as intermediate care, <sup>1</sup>/nursing home care, or outpatient care, if such facilities were readily available. Other treatment settings are those in which patients require a lower level of medical attention. The extent to which these alternatives could replace acute care facilities needs to be considered in the planning of new VA hospitals.

The inappropriate use of acute care beds is shown in the average lengths of stay in general medical and surgical hospitals which are considerably longer than for community hospitals, even when adjustments are made for the patients' ages and diagnoses. Part of the reason for the current situation is that existing VA hospitals were originally designed primarily as acute care inpatient facilities with little or no attention given to lower level inpatient care requirements, or outpatient facilities. Over the years, due to the general increase in the average age of the veteran population and the shift of medical practice toward greater substitution of outpatient care, these lower levels of care

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<sup>1</sup>/VA defines intermediate care as a level of care below acute care, but above nursing home care in terms of medical requirements.

have been accommodated for the most part in the only facilities available to VA--existing acute care VA hospitals. The opportunity exists, however, in planning the size and bed mix of replacement hospitals to modify historical patterns of use and redistribute patients among acute care and lower level care requirements when projecting the requirements to future years. In this way, the planning approach can provide the most appropriate facilities and levels of care consistent with current medical practice.

#### LENGTH OF STAY IN VA ACUTE CARE BEDS IS LONGER THAN NECESSARY

Although VA has steadily reduced the average length of stay for treatment in both general medical and surgical and psychiatric hospitals over the past 10 to 15 years, it remains considerably longer than in non-Federal community hospitals. In fiscal year 1966, an average length of stay in VA's general medical and surgical teaching hospitals affiliated with medical schools was 30.5 days compared with 23.5 days in fiscal year 1974. 1/ However, the fiscal year 1974 average length of stay in non-Federal teaching hospitals was 11 days. This overall disparity in average length of stay cuts across most high-incidence diagnoses shown on page 5.

The overall average length of stay in VA hospitals probably should be longer than in most community hospitals since VA patients are, on the average, older and poorer than the patients in non-VA institutions. Thus, they are more likely to have chronic problems and less likely to have an appropriate place to go for convalescence and long-term care. These conditions often require a longer stay in the hospital. We believe, however, that in many cases the entire stay need not be in an acute care bed setting.

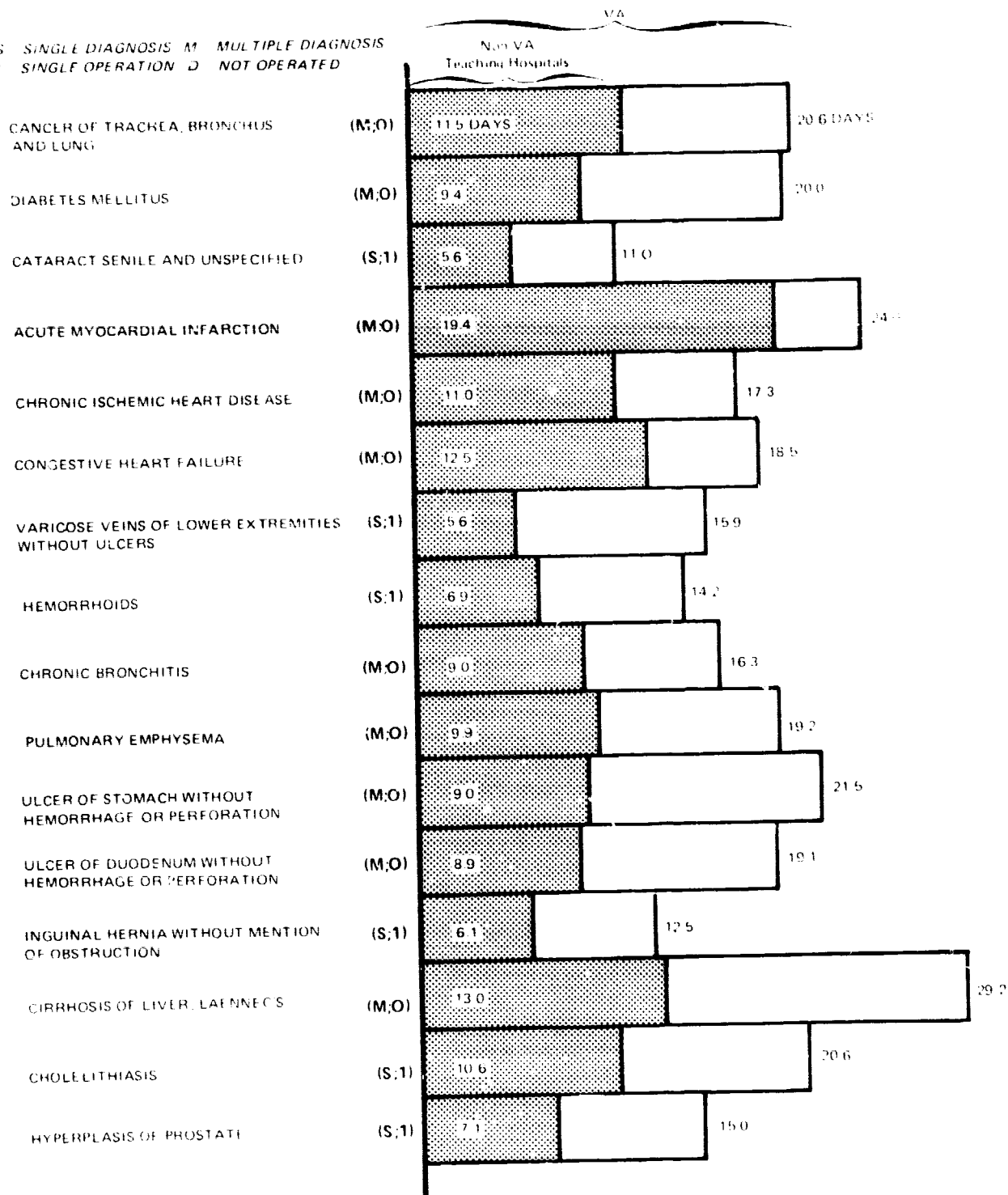
A study conducted by a consulting firm under contract to VA reported that programs can be developed to reduce the overall average length of stay in VA hospitals by 25 to 50 percent. 2/ From tests conducted in VA general medical and surgical hospitals, the consultant reported the following:

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1/These figures exclude 1-day dialysis admissions.

2/"Developing Programs for Achieving Appropriate Lengths of Stay," U.S. Veterans Administration; McKinsey and Company, Inc., VA Document No. 25, June 1975.

# COMPARATIVE AVERAGE LENGTHS OF STAY BY DIAGNOSIS FOR MALES AGE 50-64

S SINGLE DIAGNOSIS M MULTIPLE DIAGNOSIS  
 1 SINGLE OPERATION 0 NOT OPERATED



SOURCE: Special study by the Commission on Professional Hospital Activities

"In Hospital A, analysis showed that nearly 30 percent of inpatient days during FY [fiscal year] 1974 were avoidable. Of those avoidable days, one-third were caused by delays in physicians' management of their patients care, and another 20 percent were due to treatment on an inpatient basis where outpatient treatment would have been appropriate. In Hospital B, a similar review showed that over 50 percent of inpatient days during FY 1974 were avoidable. In this hospital just over one-third of avoidable days were related to inappropriate inpatient treatment, about one-quarter of avoidable inpatient days were due to outplacement delays, and about 20 percent were due to delays in physician management of patients' courses of treatment."

According to the consultant, implementing programs to correct the causes of unnecessarily lengthy patient stays could reduce average length of stay from 18 to about 13 days in Hospital A and from 29 to about 18 days in Hospital B. Similar opportunities to reduce average length of stay were identified in the other hospitals analyzed.

Our study 1/ also found that acute care average length of stay in VA hospitals could be significantly reduced. A random sample of 420 patient medical records were selected at 6 VA hospitals. The records were reviewed by the treating physicians who estimated that the length of hospital stay could have been reduced by:

- 832 days for 144 patients if diagnostic tests had been performed on an outpatient basis prior to hospital admission.
- 897 days for 79 patients if they could have been discharged earlier to nursing care bed facilities or outpatient treatment.
- 182 days for 47 patients if hospital admissions had been better coordinated with availability of surgical facilities.

On this basis, we estimated that about 146,000, or 15 percent, of the 1 million hospital days furnished at these six hospitals during fiscal year 1971 could have been avoided.

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1/"Better Use of Outpatient Services and Nursing Care Bed Facilities Could Improve Health Care Delivery to Veterans," B-167656 (Apr. 11, 1973).

The Congressional Budget Office (CBO) reviewed the average length of stay of VA patients as part of a study reported in April 1977. <sup>1/</sup> It found that when length of stay in VA hospitals is adjusted for age, diagnosis, and surgical procedure it is usually twice that of a community hospital. CBO's analysis of the factors causing long length of stay showed that:

"While some factors may be uncontrollable because of special characteristics of the VA patient population or because certain facilities are not convenient to patients' homes, it appears that further improvement in management and resource allocation in the VA system could significantly reduce the average length of stay, even if not by as much as experienced in the last decade. The VA itself, in a study showing the effect of selected factors on length of stay, concluded that certain stays in VA hospitals are excessive. The VA study indicated that the length of stay could have been reduced 24 percent by increasing the use of outpatient treatment before hospitalization and after surgery. Scheduling admissions according to the availability of the operating room would have reduced length of stay by another 7 percent."

CBO stated that if current trends prevail, by 1990, when the number of aged veterans is reaching its peak, VA will have 10,500 more beds for general medical and surgical purposes than needed to treat acutely ill patients. In regard to new hospital construction, CBO concluded that:

"An effort should be made to commit Federal funds to those sorts of capital investments that promise to bring the type and number of VA beds and expected need for them more into alignment. At the same time, greater investment in alternatives to acute-care beds--such as outpatient or long term care facilities--ought to be considered."

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<sup>1/</sup>"Projected Acute-Care Bed Needs of Veterans Administration Hospitals," CBO, April 1977.

## THE NATIONAL ACADEMY OF SCIENCES' (NAS's) FINDINGS

The fact that VA hospital patients tend to remain in acute care beds longer than necessary leads to a mix of acute and nonacute care patients on VA hospital wards. This observation was corroborated by NAS in its May 1977 report "Health Care for American Veterans."

NAS studied a 10-percent sample of VA general hospitals nationwide to determine the appropriateness of inpatient treatment. The study included the medical patients in 14 VA general hospitals and the surgical patients in 13 VA general hospitals. Criteria were developed by a panel of physicians on the kinds of services that would require acute hospitalization. These criteria were then applied to the services that patients had actually received during the week of the census.

The study team found that, on the average, about 48 percent of medical patients, and 63 percent of surgical patients occupying VA hospital acute care beds, actually required that level of care. The remainder of the patients required other care, such as intermediate care, convalescent care, nursing home care, or outpatient treatment.

NAS findings were similar to a study by VA of psychiatric patients conducted in connection with a 1973 VA census. In the VA study the following question was asked of the VA staff concerning each occupant of a psychiatric bed who had a primary psychiatric diagnosis: "If facilities were available, which one of the following would be preferable for this patient concerning his needs on the day of the census?" This was followed by a list of possible treatment settings. For 43 percent of the patients, the VA staff judged that a psychiatric hospital bed was not the preferred treatment setting. These patients were recommended for outpatient care, alcohol or drug treatment programs, intermediate care, nursing home care, domiciliary care, or other programs.

NAS also conducted a 1-day census of inpatients in 18 VA hospitals to determine appropriateness of placement of patients in psychiatric beds. Only 17 percent of patients in psychiatric beds in psychiatric hospitals and 38 percent of patients in psychiatric beds in general hospitals were judged by the nurses in charge of the wards to be appropriately placed. In the study, "appropriateness" was defined as requiring services uniquely available in hospitals, e.g., isolation or restraint, intensive observation, detoxification for drug or alcohol abuse, or drug-dosage regulation. Of the patients who were deemed not to need hospitalization, about



half were judged to be treatable as outpatients. The remainder were recommended for treatment in another type of setting. NAS concluded that:

"More than half the patients in VA psychiatric beds do not appear to require hospitalization. Many could be treated more appropriately as outpatients, but discharging them would be difficult. Most are unmarried, and many would require extensive social-support services that the VA (and most communities) do not provide."

In order to provide alternatives to inpatient psychiatric care, NAS recommended that:

"\* \* \* steps be taken for discharging such patients by placing special emphasis on developing and implementing alternatives to inpatient hospitalization including partial hospitalization, halfway houses, sheltered workshops, group homes, and cooperative apartments."

In summary, NAS found that many patients currently occupying VA medical, surgical, and psychiatric beds could be cared for in other beds or on an outpatient basis. These judgments considered only patient care needs, without regard to the availability of alternative facilities. The inappropriate use of acute care beds can be explained by the (1) shortage of nursing homes; (2) availability of acute care beds; (3) incentives to keep those beds filled; and (4) lack of suitable homes to which patients could be discharged so that they might receive outpatient, rather than inpatient care.

## CHAPTER 3

### VA CAN IMPROVE ITS METHODS OF ESTIMATING HOSPITAL SIZE

VA's approach to sizing replacement hospitals relies on historical patient workload data as the basis for estimating future bed requirements. However, a significant percentage of patients who have historically occupied acute care beds in VA hospitals would more appropriately be placed in a lower level of care, such as intermediate, nursing home, or outpatient care. The opportunity exists in planning the size and bed mix of new replacement hospitals to reassess patient requirements and provide the most appropriate facilities and levels of care consistent with current and cost effective medical practices.

VA's hospital sizing method makes no explicit attempt to estimate the extent to which patients who occupied acute care beds in the past could more appropriately be served in less costly settings. Using VA's approach, the inefficiencies which result from existing facility constraints and limitations are carried forward and influence VA's estimates of size and bed mix for replacement hospitals.

In contrast, the model which we developed for determining hospital size provides an estimate of acute care bed needs in VA hospitals by accumulating the actual patient workload by diagnosis and age group, then adjusting it to show data on an average length of stay in non-Federal hospitals. The model is designed to analyze the computerized medical records of each patient discharged from the existing VA hospital during a specified period, and determine how long, on an average, such a patient would have remained in an acute care bed section of a non-Federal community hospital. The number of days which would have been spent in a community hospital, and the number of days actually spent in the VA hospital, are both accumulated separately for all patients treated during the specified period. The difference, called nonacute care patient days, is then distributed among the appropriate lower level care requirements (intermediate care, <sup>1</sup>/<sub>nursing home care, rehabilitation, nonacute psychiatric care, and</sub>

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<sup>1</sup>/See footnote on page 3.

outpatient care). The result is a redistribution of the current VA patient load to other levels of care. The patient requirements are then projected into the future based on expected changes in the size and age profile of veterans in the hospital's area.

Our model does not suggest that VA hospital beds are being used for patients without medical problems, but only that their problems often do not require the resources associated with acute care beds for the full period of their medical treatment.

VA used one basic methodology in estimating the size requirements for each of the replacement hospitals. VA's projection of future bed needs relies upon the validity of projected 1985 admissions and lengths of stay as critical inputs to the bed sizing computation. We believe VA's method of projecting admissions and average length of stay should be changed because it does not adequately (1) discern between acute and other care in VA hospitals and (2) show expected changes in the age mix of eligible veterans.

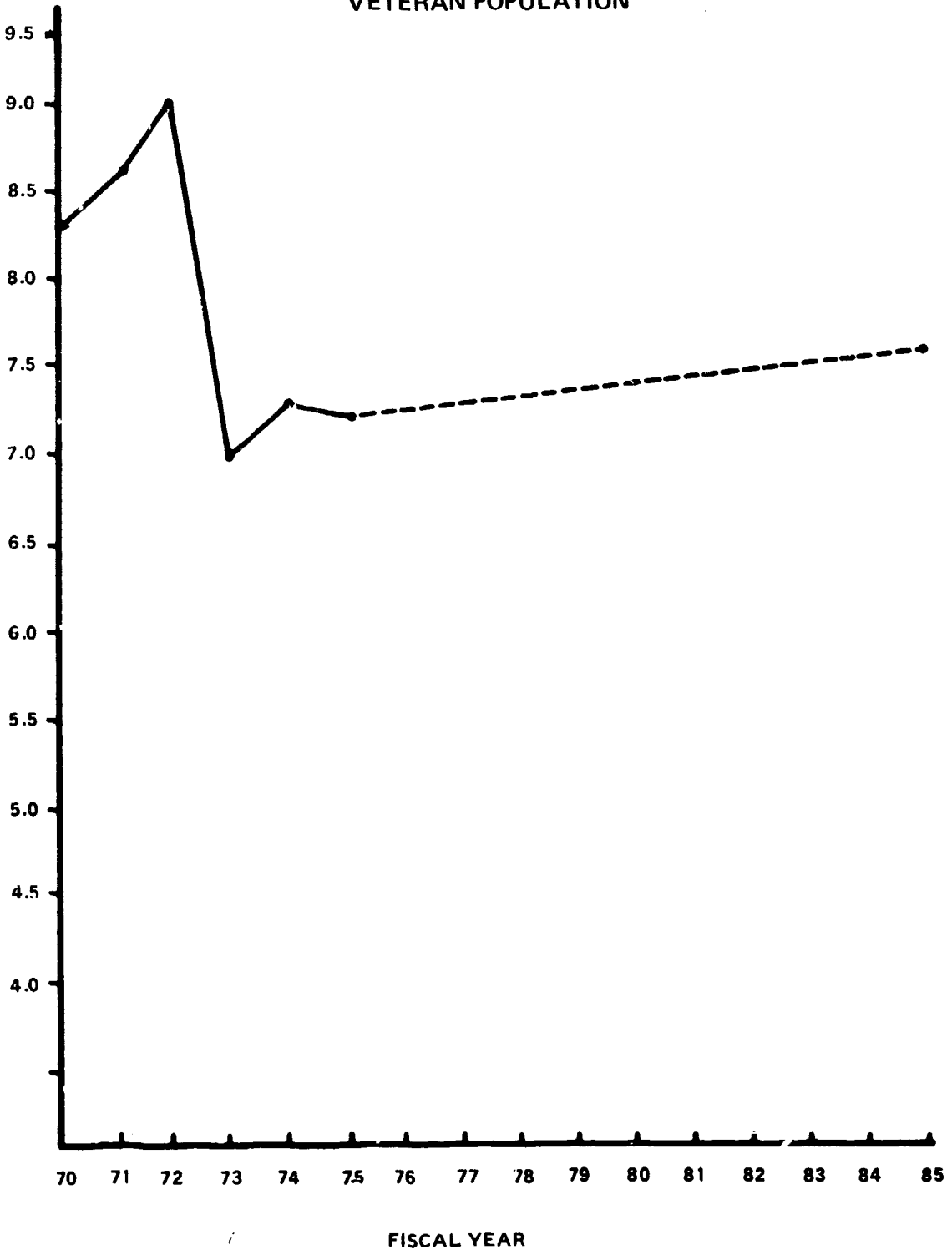
#### PROJECTION OF 1985 HOSPITAL ADMISSIONS

VA used a technique known as "graphical extrapolation" to forecast expected hospital admission rates in 1985 for each of the replacement hospitals. This technique involved plotting historical data points on a graph of admission rate over time, and then extending the trend line out to 1985 based on professional judgment after inspection of the historical data. We believe that a judgmental extension of a trend line over a 10-year period leaves considerable room for estimating error and may not accurately reflect the relationship between the increasing average age of the veteran population and its inpatient medical requirements.

The graph on the following page shows an example of the graphical extrapolation technique using VA's data. It illustrates VA's 1985 forecast of the admission rate for Seattle area medical patients to the Seattle VA Hospital.

VA'S 1985 ESTIMATED SEATTLE AREA  
MEDICAL ADMISSIONS PER 1000  
VETERAN POPULATION

ADMISSIONS PER  
1000 VETERAN  
POPULATION



Data points connected by solid lines represent admissions per thousand veterans to the Seattle VA Hospital during 1970 to 1975. The dotted line represents the trend assumed by VA in forecasting medical admissions per thousand veterans in 1985. VA converted the admission rate to total medical admissions based on 1985 veteran population estimates, and used this number in estimating total medical bed requirements for the replacement hospital.

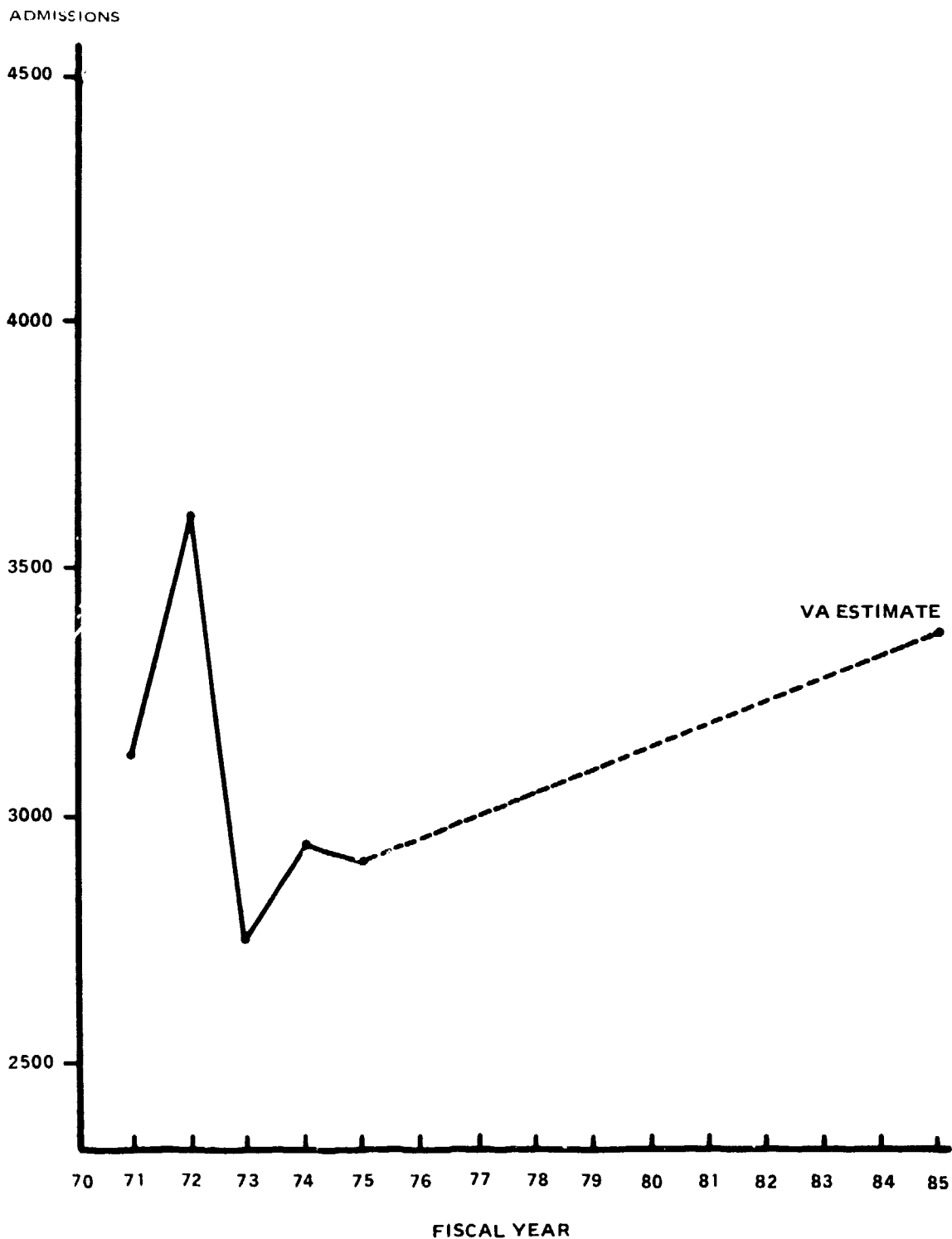
In order to estimate admissions of all potential VA hospital users to each Seattle VA Hospital bed section--internal medicine, surgery, and psychiatry--a total of 26 separate trend lines were drawn based on five data points each, and extended to 1985 based on professional judgment. VA then used the 26 estimates to calculate expected 1985 admissions to the Seattle VA Hospital. If, as we believe, each of the 26 projections is subject to estimating error, the overall forecast is thus compounded. The graph on the following page shows actual medical admissions to the Seattle VA Hospital in 1971 through 1975 and VA's projection of 1985 medical admissions.

#### EXPECTED CHANGES IN THE AGE DISTRIBUTION OF THE VETERAN POPULATION

VA's method of projecting future admissions relied upon past trends in overall admissions to the VA hospital. By considering only the overall admissions for all age groups combined, we believe VA's approach may not adequately account for the way the veteran population age mix is changing and the way these affect hospital requirements. VA could not use data on the age distribution of the veteran population, or statistics on expected changes in the age distribution, because at the time of VA's study, these data were not available. Although VA has now changed its planning method to incorporate these data on future changes in veteran age patterns, it has not used the new data to reevaluate the sizes for the replacement hospitals.

We believe, and VA agrees, that long-term changes in the number of admissions to VA hospitals occur primarily due to changes in the size and age distribution of veterans in the hospital's geographical area. If, for example, the number of veterans in the area increases, and the average age of the veteran population rises, admissions would tend to rise as well. While other factors, such as fluctuations in unemployment rates can have significant impact, such factors are generally of short duration and should not

# SEATTLE VA HOSPITAL 1985 ESTIMATED MEDICAL ADMISSIONS



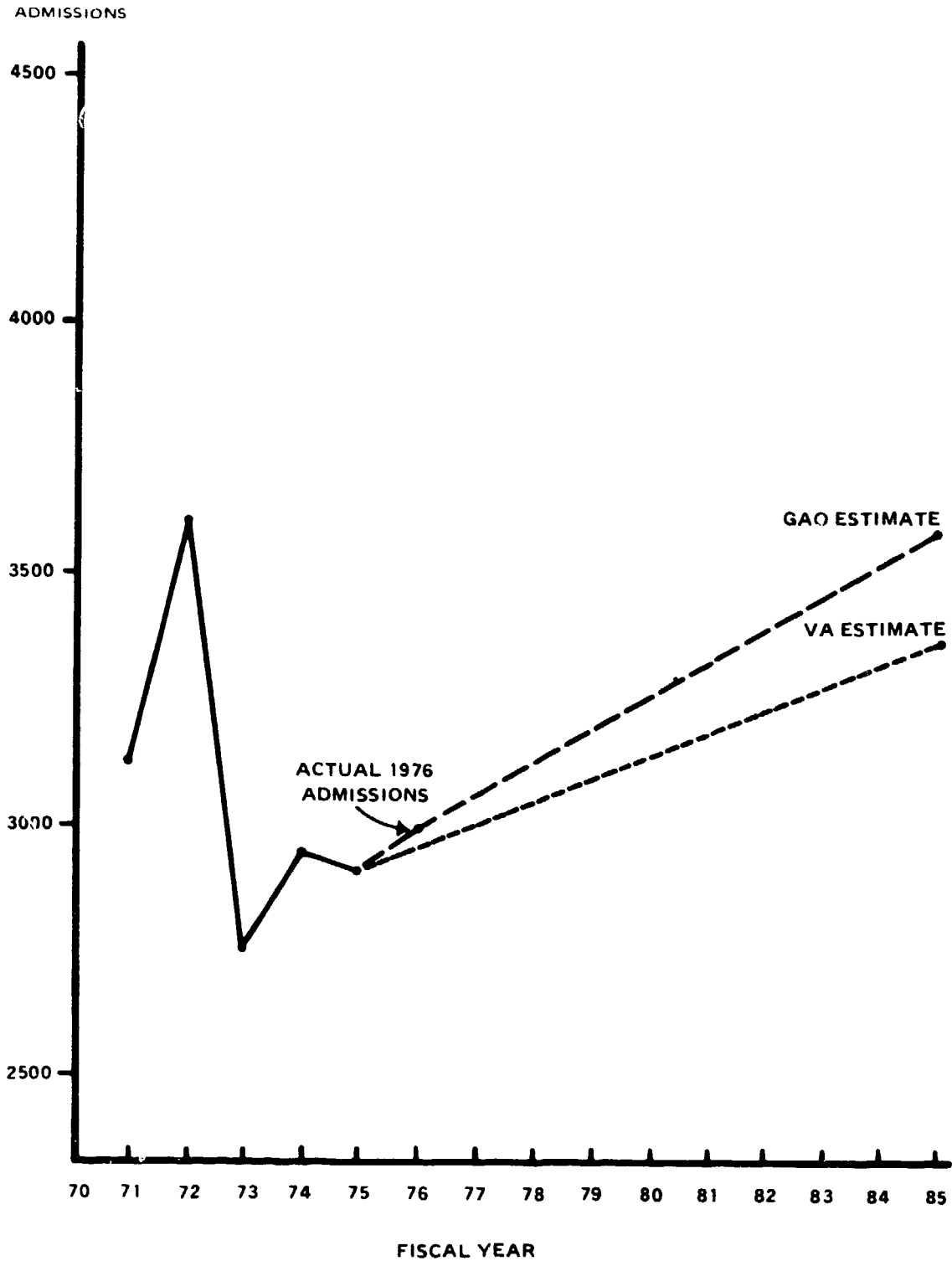
be considered in making long-range forecasts. Thus, an alternate approach to estimating 1985 admissions is to analyze the rate at which veterans in various age groups used the VA hospital in a recent representative year, then mathematically determine 1985 admissions based on expected changes in the size of each age group. As an example, the table below shows the size of each veteran population age group in fiscal year 1976 and the projected size in 1985 for the Seattle VA Hospital area.

<u>Age category</u>	<u>1976 veteran population</u>	<u>1985 veteran population</u>	<u>Per-centage change</u>
0 to 24	15,928	7,837	-51
25 to 44	173,400	146,010	-16
45 to 54	105,201	69,019	-34
55 to 64	82,531	94,922	+15
65 and up	<u>33,447</u>	<u>71,617</u>	+114
Total	<u>410,507</u>	<u>389,405</u>	-5

Although the veteran population in the Seattle area is expected to decrease by 5 percent, the number over 65 years of age is expected to more than double. Hospital admissions will be subject to two countervailing trends--a decrease in the number of veterans in the area, but an increase in their average age.

Our hospital size planning model, described in appendix I, bases projections of admissions on expected changes in veteran population size and age mix. When this approach is used, admission projections are often higher than VA's. The graph on the following page compares VA's forecast with ours for the Seattle VA Hospital.

COMPARISON OF GAO AND VA 1985 SEATTLE  
VA HOSPITAL ESTIMATED  
MEDICAL ADMISSIONS





We believe the alternative approach to projecting 1985 admissions better reflects the changing size and age mix of the veteran population, and avoids the error inherent in the graphical extrapolation method used by VA at the time it made its projections.

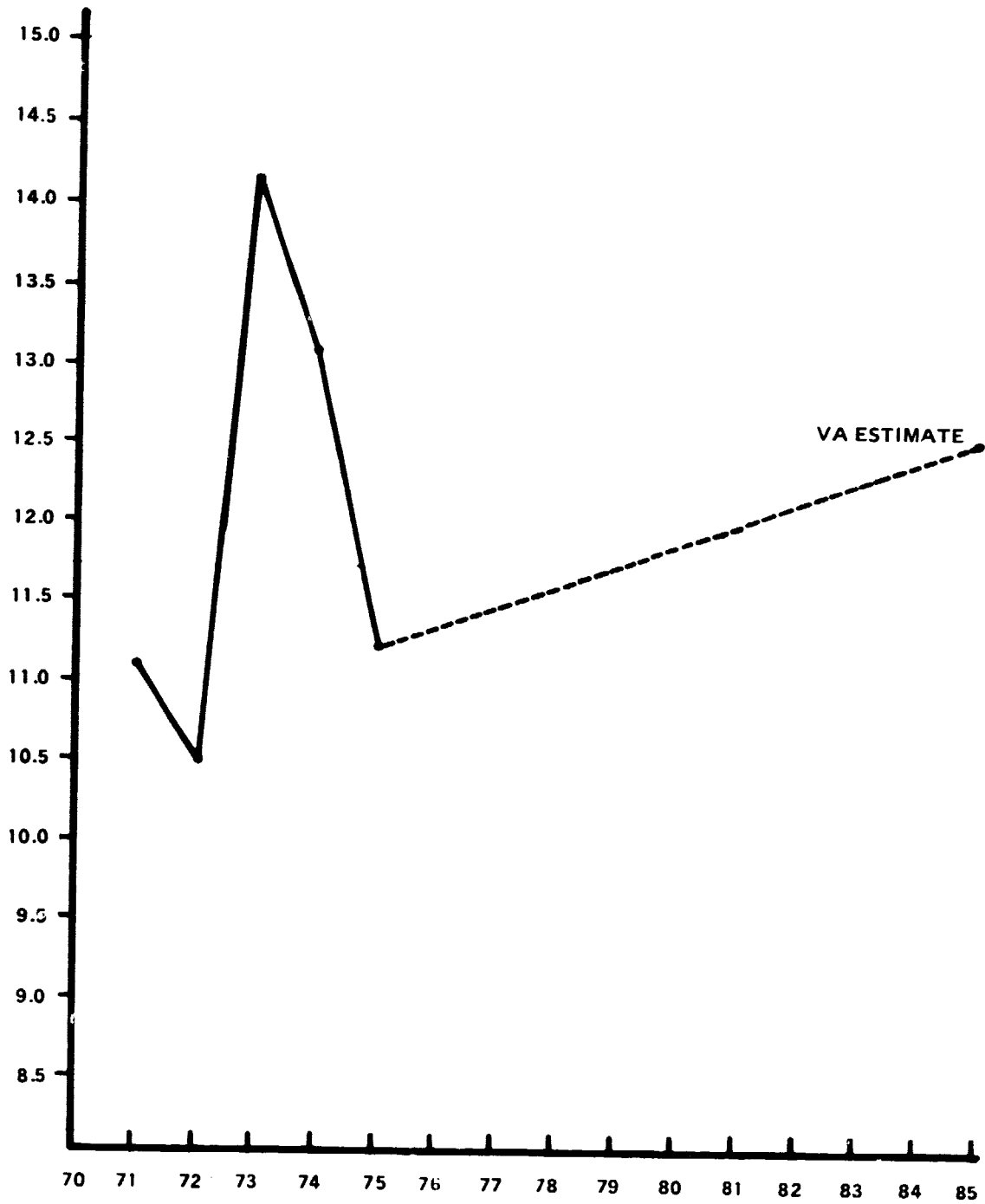
#### ESTIMATES OF 1985 AVERAGE LENGTH OF STAY

VA used graphical extrapolation of the trend in average length of stay at each VA hospital during 1971 to 1975 to predict 1985 average length of stay for each replacement hospital. Besides being subject to error as described in the previous section, we believe this approach does not adequately discern acute care patient requirements, and requirements for various types of other care.

The graph on the following page illustrates an example of the graphical extrapolation technique using VA's data. It shows VA's projection of 1985 average length of stay for internal medicine patients in the Seattle VA Hospital. VA extended the historical trend line to 1985 based on professional judgment after inspecting the data points for fiscal years 1971 to 1975. VA's projected 12.5 days average length of stay for internal medicine was used by VA in its computation of the required number of internal medicine beds in the Seattle replacement hospital.

# ESTIMATE OF 1985 AVERAGE LENGTH OF STAY FOR SEATTLE INTERNAL MEDICINE PATIENTS

AVERAGE LENGTH OF STAY (DAYS)



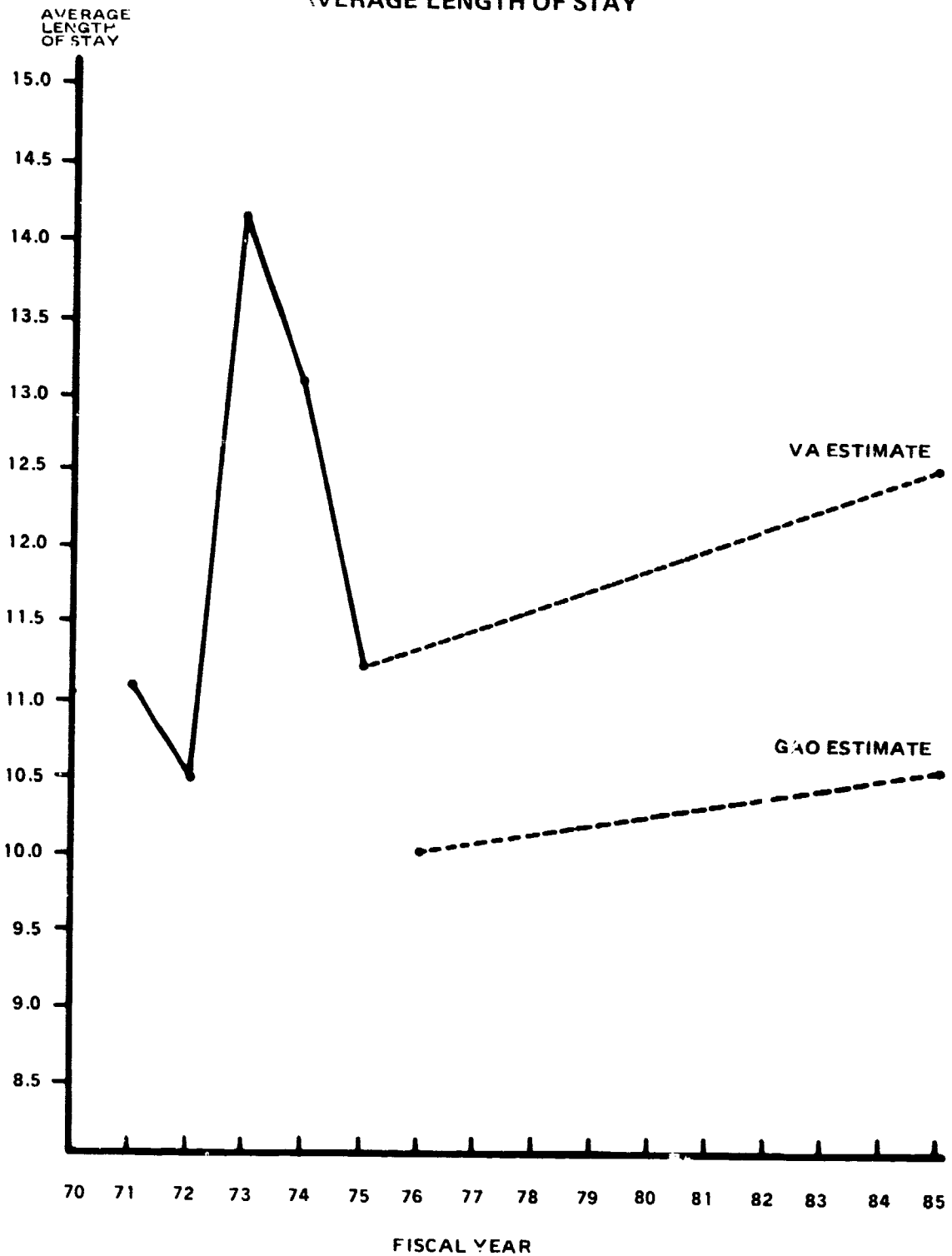
FISCAL YEAR

We believe VA's past trends in average length of stay are not an adequate basis for projecting future stays. Historically, VA stays have generally been much longer than those of similar patients in non-Federal community hospitals because they included a mixture of acute care and nonacute care patient stays. Furthermore, by considering only the aggregate length of stay for all age groups combined, VA's approach may not adequately account for the way the veteran population age mix is changing, its resulting effect on overall average length of stay, and hospital bed requirements. VA's model now includes age mix.

An alternative approach to estimating acute care average length of stay is to analyze the diagnosis and age of each patient in a VA hospital during a recent year, and determine how many days should have been spent in acute care, and how many days in other care if such facilities had been readily available. This analysis yields average length of stay estimates for acute and nonacute care broken down by age group. The average length of stay in 1985 can then be calculated so as to reflect the changing age profile of the veteran population in the area.

Our hospital size planning model uses this approach in estimating average length of stay. The graph on the following page shows our estimate of the appropriate 1976 acute care average length of stay (excluding intermediate care, nursing home care, etc.) for internal medicine patients in the Seattle VA Hospital, and our projection of the 1985 acute care average length of stay. VA's estimate is shown on the same graph for comparison.

COMPARISON OF GAO AND VA ESTIMATES OF  
SEATTLE AREA INTERNAL MEDICINE  
AVERAGE LENGTH OF STAY



## DETERMINATION OF NONACUTE CARE REQUIREMENTS

While VA's sizing method predicts changes in future acute care average length of stay, its methodology does not determine whether and to what extent these changes will affect the requirements in other care. VA's estimated requirements for intermediate care beds are usually based on the historical workload of intermediate care patients in the hospital being replaced. Since the existing Portland and Seattle VA Hospitals have not had bed sections designated as intermediate care in the past, VA has proposed that none are needed in the replacement hospitals.

Our model estimates requirements for other beds are based on analysis of appropriate and inappropriate patient days spent in acute care bed sections of the hospital during a recent period of time. The model then allocates the portion of care inappropriately provided by VA in acute care beds to the other levels--intermediate care, rehabilitation, long-term psychiatric care, nursing home care, and outpatient care.

Our findings for the Portland VA Hospital illustrate the difference between VA's and our estimating technique. Our model estimated a need for 578 acute care and 85 intermediate care beds while VA has proposed 698 acute care and no intermediate care beds.

Our model determines only those lower level care requirements which can be substituted for acute care in VA hospitals. This workload would be an addition to projected nursing home care and outpatient workloads derived from patients who would normally not be admitted to the hospital, but who would instead be directly placed in one of these lower levels of care.

## EFFECTS OF INADEQUATE BED MIX

One effect of an inadequate bed mix is increased construction costs. Recent data indicated that construction of VA nursing homes costs about \$45,000 per bed while VA acute care hospital beds cost about \$170,000 per bed. As a shift is made from construction of acute care beds to the extended care type, cost savings should accrue.

Another effect of an improper bed mix is the impact on efficiency of operations. Development of staffing standards, for example, is very difficult when the day-to-day workload on a hospital ward can fluctuate from all acute care to all

nonacute patients. By providing acute care beds only for the seriously ill patients, workloads in the various patient areas should remain more constant and allow for better planning and more efficient staffing patterns for both nurses and physicians.

Another effect, and perhaps the most important, is the impact that an improper bed mix has on the quality of patient care. A system which provides the appropriate level of care for each type of medical requirement would, in our opinion, represent an improvement in the efficiency, timeliness, and overall quality of VA health care delivery.

## CONCLUSIONS

With proper provision of facilities for nonacute care--such as intermediate care and nursing home care--in new construction programs, we believe VA can reduce its average acute care length of stay comparable to that which currently prevails in non-Federal community hospitals among similar patient groups. By substituting lower levels of care for acute care where appropriate, considerable economies in construction cost should be obtained.

We believe our model can be a useful tool in determining the right size and mix of facilities needed in future VA hospitals to provide an improved level of efficiency and quality of patient care.

## ACTION BY VA

In a May 20, 1977, report to the Chairman, Senate Appropriations Subcommittee on HUD-Independent Agencies, we recommended that VA adopt our planning methodology in estimating the size and mix of beds for replacement VA hospitals. The size estimates obtained from the model should be reported to the Congress in hospital construction proposals, and any beds requested in addition to those determined by the model should be justified separately by VA.

As a result of discussions in July 1977 held among VA, GAO, and members of the staff of both the Subcommittee on HUD-Independent Agencies, and the Senate Committee on Veterans Affairs, it was agreed that VA would carefully assess our model in developing estimates for hospital bed needs. It was further agreed that where the estimates derived from our model did not agree with the VA estimates based on its own estimating techniques, VA would report to the Congress a detailed justification for the differences between its and our conclusions. This agreement, which is to be used

in future hospital size estimates, was confirmed in July 1977 during floor debate between the Chairman of the Senate Veterans Affairs Committee, and the Senate Subcommittee on HUD-Independent Agencies. It was also agreed that we and VA would work together to develop a mutually acceptable model.

## CHAPTER 4

### VA PLANNING INAPPROPRIATE NUMBERS

#### OF ACUTE CARE BEDS

#### IN MOST REPLACEMENT HOSPITALS

Using our hospital sizing model, we estimated the number and mix of acute care beds, and other levels of care required for each of the proposed replacement hospitals. Our analysis indicates that the mix of beds proposed by VA is inappropriate-- VA is planning too many acute care beds and too few nonacute care beds in most replacement hospitals. Based on the recognized significantly higher cost of constructing acute care beds instead of extended care beds and nursing home beds, we believe the overall construction costs for the replacement hospitals could be reduced if the mix of hospital beds were determined on the basis of our analysis.

#### OVERALL BED SUMMARY

VA has proposed construction of a total of 2,500 beds (1,763 acute care and 737 other), in the four replacement hospitals, Baltimore, Martinsburg, Portland, and Seattle. Using our sizing model, we estimate a need for a total of 2,487 beds (1,591 acute care and 896 other). While the total bed estimates proposed by VA are nearly equal to our estimates, the mix of acute care and other types of beds is considerably different.

#### Acute care bed estimates

For one of the four replacement hospitals--Martinsburg-- we estimated acute care bed needs to be greater than those proposed by VA. For the remaining three hospitals, we estimated a need for fewer acute care beds than VA has proposed.

The table on the following page presents a comparison of VA's proposals and our estimates of the number of acute care beds required for each of the replacement hospitals.



Acute care bed needs

<u>Hospital</u>	<u>VA proposal</u>	<u>Our estimate</u>	<u>Percentage difference</u>
	(beds)	(beds)	
Portland	698	590	-15
Martinsburg	267	371	+39
Seattle	368	256	-30
Baltimore	<u>430</u>	<u>382</u>	-11
Total	<u>1,763</u>	<u>1,599</u>	-11

Although our estimate of acute care bed requirements in the four hospitals is about 11 percent lower than VA's, the estimates for individual hospitals range from 39 percent higher to 30 percent lower than VA has proposed.

Nonacute care bed estimates

The table below presents VA's and our estimates of nonacute care bed needs.

Nonacute care bed needs

<u>Hospital</u>	<u>VA proposal</u>	<u>Our estimate</u>	<u>Percentage difference</u>
	(beds)	(beds)	
Portland	160	291	+82
Martinsburg	<u>a/210</u>	<u>a/221</u>	+5
Seattle	147	163	+19
Baltimore	<u>220</u>	<u>221</u>	-
Total	<u>737</u>	<u>896</u>	+24

a/Domiciliary not included.

In addition to the bed needs shown in the table, provisions for outpatient care above normal requirements should be made to accommodate patients who would otherwise be treated on an inpatient basis. We estimated that in 1985, outpatient care could substitute for about 154,292 nonacute care patient days at the four hospitals. By handling these patients on an outpatient basis, construction and operating costs for approximately 497 nonacute care beds can be avoided in the four replacement hospitals.

## PORTLAND VA HOSPITAL

The Portland VA Hospital is located on a 28.5-acre site, 2 miles from downtown Portland. The earliest construction at the site was in 1928 with most recent construction in 1949. The facility has a total of 30 buildings which experience overcrowding and have seismic building code deficiencies. (See photograph on p. 28.)

The Vancouver VA Hospital is located 14 miles from the Portland VA Hospital. It was built in 1941 with an expected useful life of 5 to 10 years and has 75 buildings (see photograph on p. 29). The two hospitals serve a veteran population which was 405,585 in 1976 and is expected to decrease to 385,254 by 1985. Though the Portland and Vancouver hospitals currently operate independently, the proposed replacement hospital will consolidate the inpatient bed functions of both facilities.

VA has proposed to construct a new 738-bed hospital and a 120-bed nursing home care unit on the site of the existing Portland facility. After completion of construction, VA has recommended that the hospital in Vancouver be closed to inpatient care, but continue to provide outpatient care, and warehousing and laundry services to the new Portland facility.

The table on page 27 shows our estimate of the number and mix of VA hospital beds needed in the Portland area in 1985. While there is currently a total of 903 operating beds in the Portland and Vancouver VA Hospitals, we estimate a future need for 881 beds, 23 more than VA's proposal for 858 beds. However, the mix of beds is considerably different. We estimate a need for 590 acute care beds--108 beds less than VA's proposal--and 291 nonacute care beds--131 more than VA has proposed.

COMPARISON OF VA AND  
GAO SIZE ESTIMATES FOR PORTLAND VA HOSPITAL

Bed section	Current operating beds			VA's 1985 proposal	Our 1985 estimated bed needs (note a)
	Portland VA Hospital	Vancouver VA Hospital	Combined		
Acute care:					
Medical	216	203	419	312	272
Surgical	196	116	312	256	219
Neurological	32	-	32	40	15
Hemodialysis	-	-	-	12	12
	444	319	763	608	518
Psychiatric	30	57	87	90	72
Total	474	376	850	698	590
Nonacute care:					
Intermediate	-	-	-	-	85
Rehabilitation	53	-	53	40	48
Long-term	-	-	-	-	38
Psychiatric	-	-	-	120	b/120
Nursing home	-	-	-	160	291
Total	53	-	53	160	291
Total	527	376	903	858	881

a/ In addition to the number of beds shown, we estimated a need for outpatient visits to substitute for 57,868 bed days of inpatient care. These outpatient visits would be in addition to the normal ambulatory care workload.

b/ The VA proposal for nursing home care bed requirements is used.



PORTLAND VA HOSPITAL



VANCOUVER VA HOSPITAL

VA's proposal does not include any intermediate care or long-term psychiatric care beds, even though a need for these kinds of facilities appears to exist. At our request, the head nurse at the Vancouver VA Hospital conducted a 1-day census of patients in September 1977 to determine how many could be treated in intermediate care and nursing home care beds. The study showed that 26 percent of the patients who were in acute care beds could be at another level of care (14 percent in intermediate care, and 12 percent in nursing home beds). A study conducted for us by the nursing service at the Portland VA Hospital during July and August 1977 showed that about 9 percent of the patients in acute care beds could have been at some other level of care, such as intermediate or extended care.

VA officials in Portland and Vancouver cited several reasons why patients were being kept in acute care facilities longer than necessary. The reasons included:

- VA has only limited outpatient and extended care facilities, services, and funding which are needed if inpatients are to be released earlier from acute beds.
- VA's funding method has a tendency to keep patients in short-term beds rather than releasing them for other types of treatment since funds are based on the daily average census. This type of funding is a disincentive for moving patients out of acute care.

VA officials from both the Portland and Vancouver VA Hospitals have complained about a shortage of psychiatric care beds. However, a Portland VA official said that about one-third of the psychiatric patients receiving inpatient care should be in some type of long-term facility and that another third could be treated as outpatients if adequate facilities, staff, and programs were available. The chief of psychiatry at the Vancouver hospital said that about 25 percent of the current inpatient workload could be treated on an outpatient basis if other facilities, such as halfway houses, were available.

Although VA did not propose any intermediate or long-term psychiatric beds, we estimated a need for 85 intermediate beds and 38 long-term psychiatric beds in addition to a 120-bed nursing home care unit proposed by VA.

Our recommended bed mix, in comparison to VA's proposal, would shift VA resources away from short-term care in favor of extended care, nursing home care, and other alternatives. This mix of facilities calls into serious question the propriety of VA's decision to close the Vancouver VA Hospital to all inpatient care functions. The hospital director stated his belief that with expenditures over the next 5 years of between \$5 million and \$6 million, the facility could adequately provide patient care for the next 45 years. Both the Vancouver VA Hospital director and the director of the Southwest Washington Health Systems Agency suggested VA should build a 500-bed acute care hospital in Portland and convert the Vancouver VA Hospital to a 200-bed nursing home. Our estimate of 590 acute care beds and 291 nonacute care beds falls somewhat in line with their suggestions.

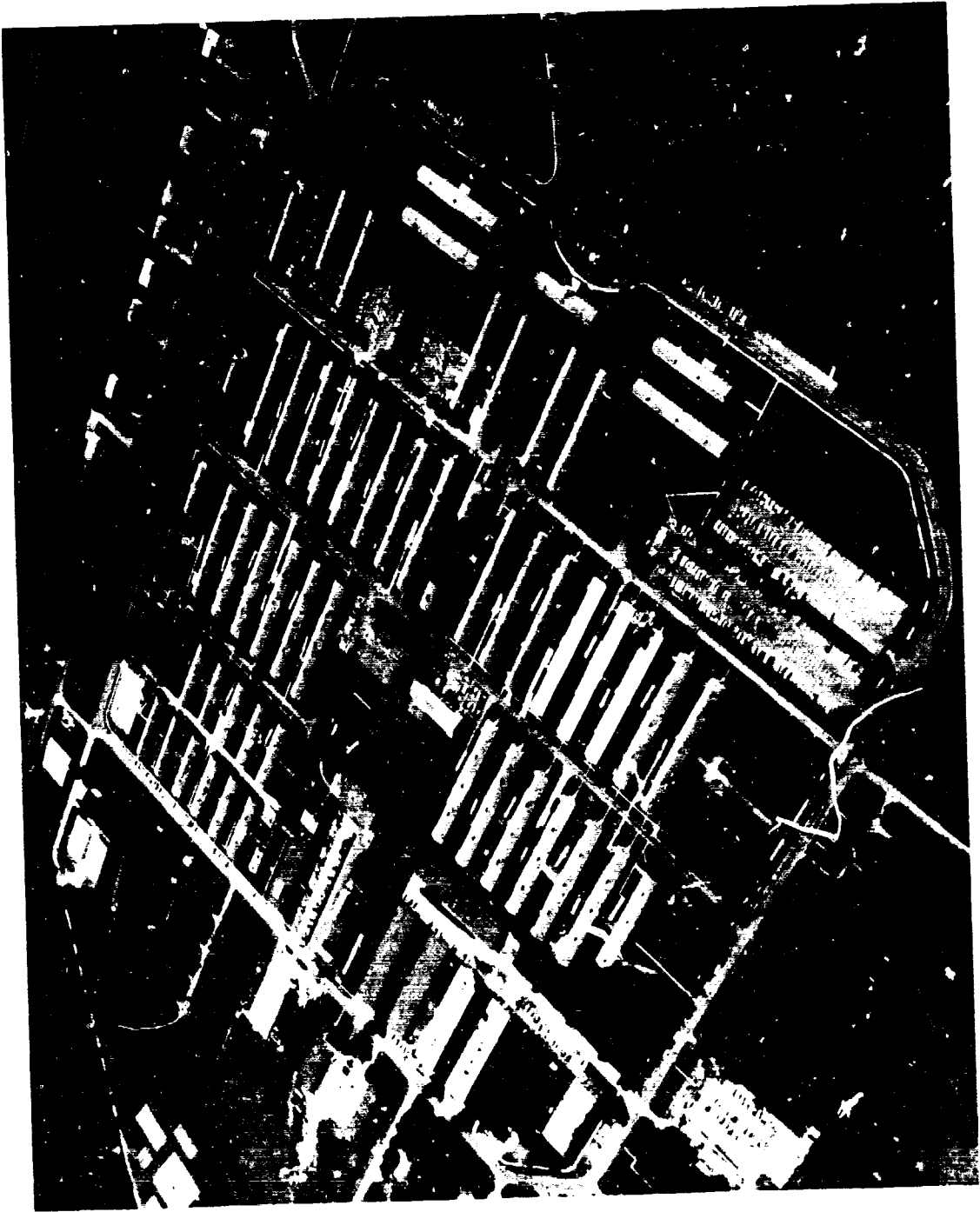
According to VA officials placement of a VA nursing home in Vancouver would not follow its policy of locating nursing homes next to a VA hospital. VA has opposed a nursing home in Vancouver and has proposed that it be built adjacent to the new Portland hospital because it contends that nursing home patients often need the services that only a hospital can provide.

#### MARTINSBURG VA HOSPITAL

The VA hospital in Martinsburg, West Virginia, consists of 90 buildings or units of buildings, constructed by the military in 1943. It is a cantonment hospital, originally designed for a life expectancy of 5 to 10 years. Described as having a campus layout, the hospital's corridors measure in excess of 7 miles. The facility houses 651 hospital beds and a 550-bed domiciliary. (See photograph on p. 32.) In 1976 the hospital served a veteran population of 108,706 which is expected to decline to 101,623 by 1985.

VA recommends the replacement of the facility, with a new 357-bed hospital on the existing site, including 267 acute care, 80 intermediate care, and 10 rehabilitation beds. With a new 120-bed nursing home care unit and renovation of 200 of the 550 domiciliary beds, VA's cost estimate of the entire project is \$74.6 million.

The table on page 33 shows both VA's proposal and our estimates of the number and mix of VA hospital beds needed in the Martinsburg area in 1985. The hospital currently operates 651 beds, all of which are designated acute care. Our model estimated a need for 371 acute care beds, or



MARTINSBURG VA HOSPITAL



104 more than proposed by VA. We also estimated a need for 221 nonacute beds, or 11 more than VA has proposed.

COMPARISON OF VA AND  
GAO SIZE ESTIMATES FOR MARTINSBURG VA HOSPITAL

<u>Bed section</u>	<u>Current operating beds (note a)</u>	<u>1985 Bed needs</u>	
		<u>Va. proposal (note a)</u>	<u>Our estimate (note b)</u>
Acute care:			
Medical	491	113	234
Surgical	138	74	63
Neurological	-	20	(c)
	629	207	297
Psychiatric	22	60	74
Total	651	267	371
Nonacute care:			
Intermediate	-	80	75
Rehabilitation	-	10	(c)
Long-term psychiatric	-	-	26
Nursing home	-	120	d/120
Total	-	210	221
Total	651	477	592

a/Martinsburg VA Hospital is currently operating 550 domiciliary care beds. VA's proposal is to replace 200 domiciliary beds and continue using the other 350 beds for a limited period of time. Our model does not estimate domiciliary care requirements.

b/In addition to the number of beds shown, we estimated a need for outpatient visits to substitute for 50,780 bed days of inpatient care. These outpatient visits would be in addition to the normal ambulatory care workload.

c/Included in Medical Bed Section.

d/The VA proposal for nursing home care bed requirements is used.

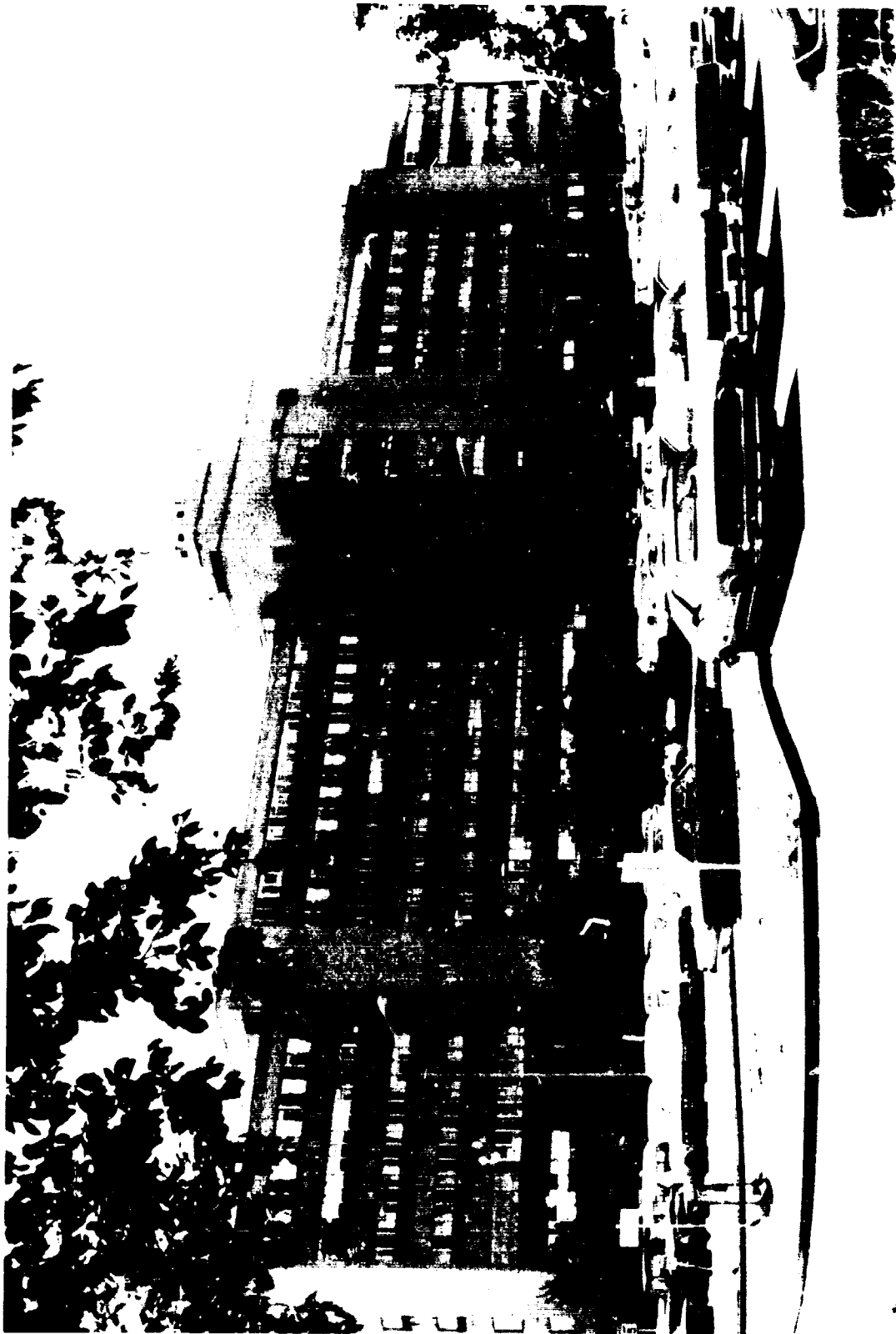
## SEATTLE VA HOSPITAL

The VA facility in Seattle, Washington, was constructed in 1951 as a general hospital. The hospital serves an area consisting of 14 Washington counties with a 1976 veteran population of 410,505. VA estimates the veteran population will decline to 389,404 by 1985.

Currently operating 300 beds, the Seattle hospital contains seismic and life safety code deficiencies, as well as space shortages. Restricted by an exceptionally narrow design, VA believes the hospital does not lend itself to expansion for inpatient care. (See photograph on p.35.)

VA is proposing a major addition to the hospital, consisting of 455 hospital beds and 60 nursing home care beds. Its plan provides for inpatient diagnostic and support services to be housed in the new facility, renovation of the existing hospital for ambulatory care and other nonbed functions, and construction of a new parking structure. VA's cost estimate for the proposal is \$90 million.

The table on page 36 shows our estimate of the number and mix of VA hospital beds needed in the Seattle area in 1985. While VA currently operates 300 beds in Seattle, our estimate shows a need for 112 fewer acute care beds and 16 more non-acute care beds than proposed by VA.



SEATTLE VA HOSPITAL

COMPARISON OF VA AND

GAO SIZE ESTIMATES FOR SEATTLE VA HOSPITAL

<u>Bed section</u>	<u>Current operating beds</u>	<u>1985 bed needs</u>	
		<u>VA proposal</u>	<u>Or est.imate (note a)</u>
Acute care:			
Medical	107	106	112
Surgical	98	140	83
Hemodialysis	-	12	b/12
Nuerological	<u>16</u>	<u>20</u>	<u>11</u>
	<u>221</u>	<u>290</u>	<u>218</u>
Psychiatric	<u>63</u>	<u>90</u>	<u>38</u>
Total	<u>284</u>	<u>368</u>	<u>256</u>
Nonacute care:			
Intermediate	-	-	22
Rehabilitation	16	30	19
Spinal cord injury	-	45	b/45
Long-term psychiatric	-	-	17
Nursing home	<u>-</u>	<u>60</u>	<u>b/60</u>
Total	<u>16</u>	<u>147</u>	<u>163</u>
Total	<u>300</u>	<u>515</u>	<u>419</u>

a/In addition to the number of beds shown, we estimated a need for outpatient visits to substitute for 16,575 bed days of inpatient care. These outpatient visits would be in addition to the normal ambulatory care workload.

b/The VA proposal for spinal cord injury, nursing home care bed, and hemodialysis is used.

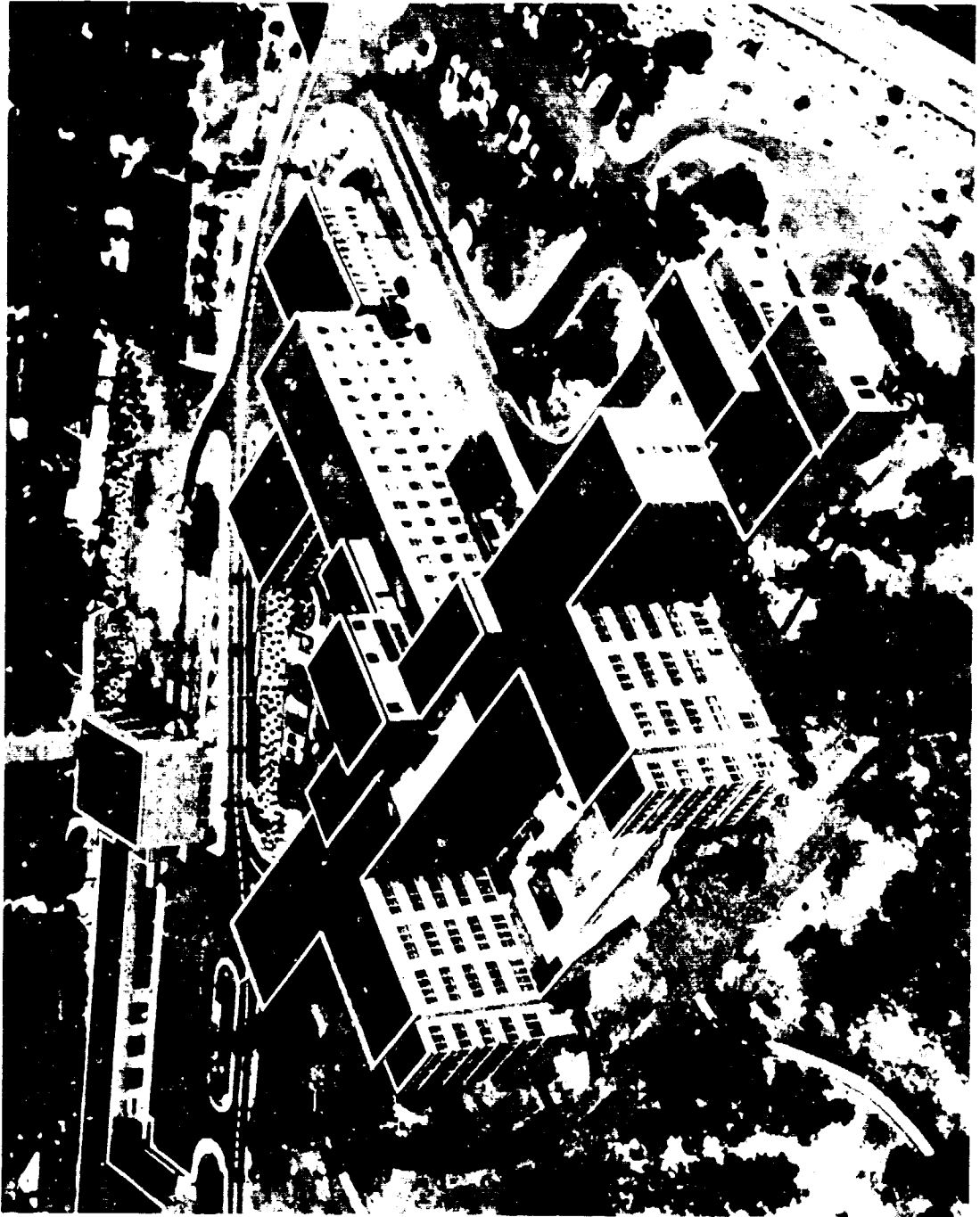
BALTIMORE VA HOSPITAL

The Baltimore VA facility is composed of three separate hospitals. Loch Raven VA Hospital, a 5-story structure opened in 1950, provides the bulk of the acute medical and surgical care, operating 291 beds. (See photograph on p.38.) Originally constructed as a tuberculosis institution, the hospital is currently experiencing space shortages.

According to VA, the hospital is better suited for extended care rather than for medical and surgical care. Fort Howard VA Hospital is located 15 miles from Loch Raven. It was constructed in 1942 and currently provides primarily extended care, and nursing home care. (See photograph on p.39.) The third Baltimore facility is the VA hospital at Perry Point (built in 1921 with construction as recent as 1947) which houses 1,044 beds, with a primary mission of long-term psychiatric care. (See photograph on p. 40.)

VA has proposed that a new 400-bed acute care hospital be constructed on land contiguous with the hospital of the University of Maryland in downtown Baltimore (approximately 5 miles from the Loch Raven hospital); that the Loch Raven hospital be converted to primarily an extended care facility; and that Fort Howard VA Hospital be closed. Funding for the Loch Raven project has not been requested.

The table on page 41 shows our estimate of the number and mix of VA hospital beds needed in the Baltimore area in 1985. Overall, we estimate a need for 593 beds--57 fewer than proposed by VA. The major difference is in acute care, with VA proposing 430 beds while we estimated 382 beds--48 fewer than proposed by VA.



LOCH RAVEN VA HOSPITAL



FORT HOWARD VA HOSPITAL

PERRY POINT VA HOSPITAL





COMPARISON OF VA AND

GAO SIZE ESTIMATES FOR BALTIMORE VA HOSPITAL

Bed section	Current operating beds			VA'S 1985 proposal			Our estimated 1985 bed needs (note a)		
	Howard	Loch Raven	Combined	Loch Raven	Balt.	Combined	Loch Raven	Balt.	Combined
Acute care:									
Medical	111	142	253	-	210	210	-	223	223
Surgical	-	109	109	-	120	120	-	90	95
Hemodialysis	-	-	-	-	10	10	-	10	b/10
	111	251	362	-	340	340	-	328	328
Psychiatric	17	40	57	30	60	90	-	54	54
Total	128	291	419	30	400	430	-	382	382
Nonacute care:									
Intermediate Rehabilitation	58	-	58	60	-	60	76	-	76
Long-term psychiatric Nursing home	47	-	47	80	-	80	44	-	44
Total	150	-	150	220	-	220	21	-	21
Total	278	291	569	250	400	650	80	-	b/80
							221	-	221
							221	372	593

(new)

(new)

a/In addition to the number of beds shown, we estimated a need for outpatient visits to substitute for 29,069 bed days of inpatient care. These outpatient visits would be in addition to the normal ambulatory workload.

b/The VA proposal for nursing home care and dialysis bed requirements is used.

A more detailed analysis of the differences between VA's proposal and our estimate reveals there is very little discrepancy. Of the 48 acute care bed difference, 36 are attributable to psychiatric beds, and 12 to medicine and surgery. We estimated, however, a need for 21 long-term psychiatric beds while VA has proposed none. This narrows the difference in total psychiatric beds to only 15, which are somewhat offset by additional outpatient visits predicted by our model.

VA's sizing methodology, and our model predicted almost the same requirements for short-term care medical and surgical beds in Baltimore because our projections of admissions and average length of stay were nearly equal to VA's. Loch Raven, Fort Howard, and Perry Point hospitals provide the area's veterans with several distinct levels of care: acute care, intermediate care, nursing home care, and long-term psychiatric care. Loch Raven, as shown in the following table, attained average lengths of stay in fiscal year 1976 comparable to those attained in acute care community hospitals. VA's projections of 1985 average length of stay are similar to projections made by our sizing model.

Comparison of 1976 Actual and Adjusted Lengths of Stay to Projected 1985 Lengths of Stay

<u>Bed section</u>	<u>Actual 1976 average length of stays</u>	<u>Adjusted 1976 average length stay (note a)</u>	<u>Projected 1985 average length of stay</u>	
			<u>VA</u>	<u>GAO</u>
Medical	12 days	11 days	10 days	13 days
Surgical	12 days	9 days	12 days	9 days

a/We adjusted VA stays for each patient to community averages based on primary diagnosis, age, surgery, and multiple diagnosis.

We believe Loch Raven's success in achieving these stays stems from its ability to discharge patients requiring care beyond the acute phase of their illness to an extended care facility like Fort Howard or Perry Point, much the same way community hospitals would treat similar patients.

## CHAPTER 5

### POLICY CONSIDERATIONS AND OTHER MATTERS

#### WHICH COULD AFFECT HOSPITAL SIZE

VA currently operates 172 medical, surgical, and psychiatric hospitals in the United States which were constructed between 1888 and 1977. In fiscal year 1976, VA hospitals discharged a total of 934,302 patients, 88 percent of whom were treated for nonservice-connected conditions. Two policy considerations which we believe need to be addressed concern (1) which VA hospitals should be replaced first and (2) in sizing these hospitals, should VA plan on serving the future needs of all segments of the beneficiary population--service connected and nonservice connected--or should some limitation be specified. Answers to these questions could have important implications for current and future VA hospital construction proposals.

#### PRIORITIES FOR NEW CONSTRUCTION

About 41 percent of VA hospital beds nationwide are in facilities constructed prior to 1947. About 10 percent were constructed in the 1920s or earlier and some date back to before the turn of the century. While VA indicated that the hospitals proposed for replacement were overcrowded and/or obsolete, it could provide no study showing they were the most overcrowded or most obsolete in the VA system. Two of the hospitals discussed in this report--Seattle and Baltimore--were opened in the early 1950s.

We believe the Congress should require that VA justify all new and replacement hospital construction proposals, in terms of priority, on the basis of a clear and explicit set of objective criteria before funding is approved. The criteria should be used by VA to evaluate and compare the current level of adequacy of existing VA hospitals in all parts of the Nation in meeting the medical needs of veterans. Highest priority for new VA hospital construction should be established in areas of the Nation where existing VA hospitals are least able to provide high-quality medical care to the veteran population.

VA has recently developed a process to determine priorities for new hospital construction or replacement based on comparisons between existing facilities and other criteria. However, this process is not to be applied to the seven hospitals in VA's current construction program. This system is

called the Space and Functional Deficiency Identification system. We believe the system is a major improvement over the previous way in which decisions were made to replace hospitals.

#### ELIGIBILITY STATUS OF VETERANS

Our model determines VA bed requirements assuming that the eligibility conditions under which VA now provides care will not change. Other matters--such as the bed capacity that should be provided to permit continued treatment of veterans for nonservice-connected illnesses, the use of community or other Federal hospital beds, and the potential impact of national health care insurance--need to be addressed since they could have a significant impact on future bed needs.

#### Construction of new facilities for treatment of nonservice-connected illnesses

Section 610(a) of title 38 of the U.S. Code authorizes hospital and nursing home care to veterans

- for a service-connected disability; •
- for a nonservice-connected disability if the veteran is unable to pay for such care;
- whose discharge or release from active military service was for a disability incurred or aggravated in line of duty;
- who receive, or are eligible for, disability compensation; and
- for a nonservice-connected disability if the veteran is 65 years of age or older.

The overriding obligation of VA has been to care for veterans with service-connected disabilities. However, most VA patients are veterans without service-connected conditions who presumably cannot afford needed hospital and related care elsewhere--veterans who are over 65, pensioners, or those who certify to their lack of financial means to buy needed care. As health care costs have escalated over the years, VA's role has increasingly become one of providing low-income veterans with hospital-based medical services. About half of VA's patients are eligible for VA care only because they certify that they cannot afford treatment elsewhere.

Service-connected veterans receive top priority in admission to VA hospitals, while those with nonservice-connected illnesses are admitted only on a space available basis. The report of the Senate Committee on Veterans Affairs on the Veterans' Omnibus Health Care Act of 1976 stated:

"The VA hospital system, since its establishment more than 50 years ago, has had as its primary mission the provision of first class medical care to service-connected veterans. Its secondary mission has been to provide care for non-service-connected veterans, but only to the extent that facilities are available so as to bring about a patient population size which would promote efficient utilization of resources."

A matter which we believe needs to be addressed is the question of whether new and replacement facilities should be sized to accommodate the entire current workload of nonservice-connected illnesses on a space available basis; it is unclear as to whether new VA hospitals should be sized to meet all, some, or none of this demand.

The percentage of VA hospital patients discharged during fiscal year 1976 who had been treated for service-connected conditions ranged from 3 to 14 percent among the 7 hospitals proposed for replacement. At one facility only 189 out of the total of 8,169--about 2 percent--patients discharged had been treated for a service-connected condition.

We analyzed the number of acute care beds, excluding hemodialysis beds, which would be required at each of the four replacement hospitals under the assumptions that (1) no restriction is imposed on beneficiary use, i.e., no change from current practices; (2) only patients with service-connected disabilities would be treated, but for any illness; and (3) only patients with service-connected disabilities would be treated for service-connected illnesses. The results, shown on the following page, indicate that treatment of patients with service-connected conditions requires relatively few acute care hospital beds.

VA Acute Care Bed Requirements  
Under Various Policy Assumptions

<u>Projected Acute Care</u> <u>Bed Requirement Assuming</u>	<u>Martins-</u> <u>burg</u>	<u>Portland</u>	<u>Seattle</u>	<u>Baltimore</u>
	------(acute care bed needs)-----			
Current practice (no restriction on beneficiary use)	371	578	244	372
Only service-connected patients treated (for either service-connected or non-service-connected illness)	62	130	58	48
Only service-connected patients treated for service-connected illnesses	14	39	15	11

Consideration of surplus community hospital beds

The United States today has over 931,000 non-Federal hospital beds, of which 20 percent are estimated to be surplus. Excess bed capacity has become a national concern in recent years. Since 1960, the total of non-Federal hospital beds for short term and other care in general hospitals has increased from 640,000 to 931,000--more than 45 percent. When related to the national population, the ratio of beds has increased from 3.6 beds per 1,000 population to 4.4 beds per 1,000. Excess bed capacity is one reason that hospital costs since 1950 have risen four times as fast as the consumer price index.

The National Health Planning and Resource Development Act of 1974, Public Law 93-641, provides a new approach to resolving the problems of access, cost, and quality of health care. The law created a network of more than 200 Health System Agencies which, among other things, are to plan for the health resources needed in their geographic areas of responsibility.

The HSAs, in projecting the bed supply and demand, count the total population in their geographical areas but do not include the Federal hospital beds in their area. The Federal agencies such as VA, in making their projections, count the population they serve but do not count community or other Federal agencies' hospital beds available. In effect, both the HSAs and the Federal agencies are counting the same population twice and are building hospital beds based on projections of these populations. HSA statistics indicate that considerable excess community hospital bed capacity exists in each of the eight areas where VA is planning new or replacement hospitals.

While the Government bears the cost (construction, equipment, staffing, etc.) of new VA hospital beds, it is also sharing in the increased costs resulting from excess community hospital beds. Many were constructed with Federal support and operating costs are paid for, in part, through Medicare, Medicaid, and other Federal health benefit programs.

We found that of the eight HSAs covering the areas of the proposed VA hospitals, only two, at the time of our fieldwork, had studied the justification for the new facilities-- Baltimore and Portland--and both had concluded the projects were unjustified in their present form. VA officials subsequently told us that the Baltimore HSA has approved the project. Of the six HSAs that did not study VA's proposals, four HSAs believe that under the current system, any analysis they provided, regardless of the findings, would have no effect on VA's construction planning. The other two HSA's did not study VA's proposals primarily because (1) they did not have sufficient information on the proposals and (2) VA's decision to replace the hospitals were made prior to establishment of HSAs.

#### Potential impact of national health insurance

The passage of some form of national health insurance legislation could greatly reduce the demand for VA hospital beds. For calendar years 1973-74, only 12.3 percent of all discharges for veterans from short-term stay hospitals (30 days or less) were from VA hospitals. About 88 percent were discharged from community hospitals. Many veterans now using VA hospitals would undoubtedly turn to private physicians and local community hospitals for their care if such care were available at low cost to them.

While about 82 percent of the veterans in the United States are currently covered by some form of health insurance, either public or private, most veterans who use VA hospitals are not. A VA survey of admissions to VA hospitals in 1975 showed that 65.7 percent of the veterans admitted had no health insurance coverage. Under the assumption that national health insurance would provide all veterans with coverage similar to that of veterans who currently are insured, the Congressional Budget Office estimated that VA hospital demand would drop by at least 20 percent after enactment of national health insurance. <sup>1/</sup> On the basis of a detailed evaluation of veteran's benefits and a range of potential national health insurance programs, the Health Policy Program staff of the University of California, San Francisco, similarly estimated that just over 20 percent of veterans seeking short-stay hospital care from VA may attempt to obtain care elsewhere after enactment of national health insurance. <sup>2/</sup> Depending on the extent of coverage provided under this insurance, however, VA's demand for medical services could decrease to a considerably greater extent.

VA's role in national health insurance has been the topic of discussion between VA and the Department of Health, Education, and Welfare. VA's Assistant Chief Medical Director for Policy and Planning Services serves as VA's representative to the Interagency Committee for Development of National Health Insurance Policy.

#### Future role of VA hospitals

We have not independently assessed the expected changes in demand for VA health care services under national health care, nor the most appropriate future role of VA as an integral part of the total U.S. health care delivery system. However, the answers to these and other policy questions have important implications for the proper sizing of new VA hospitals.

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<sup>1/</sup>"Projected Acute Care Bed Needs of Veterans Administration Hospitals," CBO, April 1977.

<sup>2/</sup>"The Role of the Veterans Administration Medical System in the American Health Care Enterprise," Health Policy Program of the University of California, San Francisco, March 10, 1974.



Studies aimed at a determination of VA's proper role have come to various conclusions. The National Academy of Sciences, after a detailed study of the VA health care system, recommended that: 1/

"\* \* \* VA policies and programs should be designed to permit the VA system ultimately to be phased into the general delivery of health services in communities across the country."

A consulting firm under contract to VA concluded in 1974 that after enactment of national health insurance VA should move to reduce or eliminate its hospital facilities in areas which are adequately served by community hospitals, and "\* \* \* redirect its resources toward services not sufficiently available in the community (e.g., chronic care)." 2/

In view of the potentially significant impact of a national health insurance program on the demand for care in VA hospitals, the Congress, when considering the authorization of new and replacement VA hospitals, will need to explore the appropriate role for VA to play in any national health care insurance program. In light of the large proportions of veterans being treated in VA hospitals for nonservice-connected illnesses, the existing surplus capacity of community hospital beds, and the uncertainty regarding VA's appropriate future role in the Nation's health care delivery system, we believe the Congress and VA should be very conservative in their evaluations of the size requirements for new short-term stay VA hospitals.

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1/"The Study of Health Care For American Veterans," NAS, May 1977.

2/"The Future Role of the Veterans Administration in Health Care," McKinsey & Company, July 28, 1974.

OUR MODEL FOR ESTIMATING  
BED NEEDS FOR VA HOSPITALS

This appendix describes the methodology we used in estimating the number and mix of acute care and other bed needs for VA hospitals. During an earlier review of the Department of Defense's planning for the San Diego Naval Hospital, 1/ we developed a computer-based model for determining the acute care bed needs in military hospitals. In July 1976 the Congress adopted a conference report on the military construction appropriations bill for fiscal year 1977, stating that acute care bed requirements for active duty members and their dependents throughout Defense should be calculated using our model. Defense is currently using the model to plan the size of its hospital facilities.

The version of the model which we used to analyze Defense hospitals has been modified and expanded to accommodate the unique characteristics of the VA hospital system. The current version provides detailed estimates of acute care bed requirements for each hospital department (medicine, surgery, psychiatry, etc.) rather than only one estimate of total acute care bed needs as provided earlier in our Defense model. It also determines bed requirements for lower levels of care, such as intermediate care, nursing home care, and outpatient treatment.

DETERMINATION OF ACUTE CARE LENGTH OF STAY

Our model provides an estimate of the number of days each patient should have spent in an acute care setting before being transferred to a lower care level, or discharged from the hospital. This estimate is based on a data bank of hospital patient statistics compiled by the Commission on Professional and Hospital Activities.

The Commission's Professional Activity Study (PAS) publishes average length of stay statistics by diagnostic

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1/"Policy Changes and More Realistic Planning Can Reduce Size of New San Diego Naval Hospital" (MWD-76-117, Apr. 7, 1976.)

category and age of patients discharged from PAS member hospitals. If we know a patient's age and diagnosis, whether the patient had multiple diagnoses (for example, more than one medical ailment) and whether the patient underwent surgery, then we can determine from the PAS statistics the average length of stay which all patients with the same set of characteristics experienced in PAS member hospitals. Our model assumes that the valid acute care length of stay for most VA hospital patients is equal to the average length of stay taken from the PAS data bank for similar patients (same age, diagnosis, multiple diagnoses, surgery). The additional time actually spent by patients in the VA hospital is assumed to be a lower level care requirement and distributed to intermediate care, nursing home care, and other levels of care as discussed later.

The PAS statistics are published for regions of the United States and for the Nation as a whole. In analyzing the bed needs for VA hospitals, we used PAS data for the Nation as a whole. PAS national statistics include data compiled from 13.2 million inpatients discharged during 1974 from 1,801 member hospitals having a total of 374,612 beds--40.2 percent of all U.S. short-term non-Federal hospitals. Member hospitals use the PAS data as a reference point in measuring their own efficiency in treating patients.

The PAS system has 349 primary diagnoses categorized. The average length of stay can be determined by knowing (1) the patient's age, (2) the primary diagnosis, (3) if the patient has a single or multiple diagnosis, and (4) if the patient underwent surgery. The value of the data is enhanced by "variance" figures which allow the user to statistically determine their degree of reliability. In general terms the lower the variance, the smaller the deviation of individual length of stay from the average. PAS also provides length of stay figures for various percentiles of the population. For example, the length of stay figure at the 95 percentile is exceeded by only 5 percent of the population.

The chart on the following page is an example of data for one diagnostic group. It illustrates, for example, that for patients with a single diagnosis of acute appendicitis without peritonitis (operated on) in the age brackets from 20-34:

178: Acute appendicitis without peritonitis (540.0)

TYPE OF PATIENT (1)	TOTAL PATIENTS (2)	AVG. STAY (3)	VARIANCE (4)	PERCENTILES						
				5th (5)	10th (6)	50th (7)	75th (8)	90th (9)	95th (10)	99th (11)
<b>1. SINGLE DX</b>										
A. <i>Not Operated</i>										
0-19 YRS	636	2.7	7	1	1	2	3	5	7	10
20-34	343	2.8	6	1	1	2	4	5	7	8
35-49	100	3.8	6	1	1	3	5	7	9	12
50-64	63	4.1	9	1	1	3	5	7	10	16
65+	31	5.3	10	<1	2	5	7	10	11	13
B. <i>Operated</i>										
0-19 YRS	37131	4.4	5	2	3	4	5	7	8	12
20-34	18910	4.7	6	2	3	4	5	7	8	12
35-49	5298	5.5	8	3	3	5	6	8	10	15
50-64	2498	6.4	12	3	3	6	8	10	13	19
65+	713	8.2	19	3	4	7	10	14	16	24
<b>2. MULTIPLE DX</b>										
A. <i>Not Operated</i>										
0-19 YRS	225	3.3	8	1	1	2	4	6	9	17
20-34	181	3.9	6	1	1	3	5	8	9	12
35-49	64	5.3	33	2	2	4	6	9	11	40
50-64	51	6.8	19	2	2	6	9	14	15	21
65+	45	8.3	31	2	3	7	10	16	22	24
B. <i>Operated</i>										
0-19 YRS	5746	6.4	18	3	3	5	7	11	14	22
20-34	4132	6.8	19	3	3	6	8	11	14	23
35-49	1619	8.4	28	3	4	7	10	15	19	28
50-64	1182	10.7	57	4	4	9	13	19	24	41
65+	712	13.2	74	4	5	11	16	23	29	46
<b>SUBTOTALS:</b>										
1. SINGLE DX										
A. <i>Not Operated</i>	1173	3.0	7	1	2	2	4	6	7	11
B. <i>Operated</i>	64550	4.7	6	2	3	4	5	7	8	13
2. MULTIPLE DX										
A. <i>Not Operated</i>	566	4.4	16	1	1	3	5	9	11	21
B. <i>Operated</i>	13391	7.5	29	3	3	6	9	13	17	28
1. SINGLE DX	65723	4.7	6	2	3	4	5	7	8	13
2. MULTIPLE DX	13957	7.4	29	3	3	6	9	13	17	28
A. NOT OPERATED	1739	3.4	10	1	1	3	4	7	9	16
B. OPERATED	77941	5.2	11	2	3	4	6	8	11	18
TOTAL 0-19 YRS	43738	4.6	7	2	3	4	5	7	9	14
20-34	23566	5.0	9	2	3	4	6	8	10	15
35-49	7081	6.1	14	3	3	5	7	10	13	20
50-64	3794	7.7	30	3	3	6	9	14	18	28
65+	1501	10.5	52	4	4	9	13	19	24	37
<b>GRAND TOTAL</b>	<b>79680</b>	<b>5.1</b>	<b>11</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>6</b>	<b>8</b>	<b>10</b>	<b>18</b>

Source: "Length of Stay in PAS Hospitals," Commission on Professional and Hospital Activities, 1974.

- The total number of patients reported on was 18,910.
- The average length of stay was 4.7 days.
- The variance value was 6.
- Five percent of the total patients had a length of stay of 8 days or longer.

The model uses 1974 PAS statistics as the basis for adjusting patient stays. Because of the declining trend in average length of stay in recent years, use of the 1974 PAS data base probably assigns more acute care bed days to each patient than will be required in the future, making the bed estimate a conservative one. Since PAS length of stay statistics do not include patients who died, we used the actual VA hospital length of stay for these patients without any adjustment.

Special consideration was given to patients who had stayed in the hospital for 100 days or longer. PAS average length of stay figures do not include these individuals, but PAS percentile distribution data does. We determined the community hospital length of stay for each patient who had stayed 100 days or longer by using PAS data corresponding to the 95th percentile.

#### DETERMINATION OF 1985 DISCHARGES

Our model determines future patient discharges by first considering the age mix of patients who were discharged from the VA hospital during 1976 and relating the discharges to the age mix of veterans in the population in the same year. Then, based on expected changes in the size of each age group of the veteran population between 1976 and 1985 (provided by VA's Office of the Controller), the model projects proportional changes in hospital discharges for each age group. Since the veteran age mix is shifting toward older veterans, and older veterans tend to use VA hospitals at higher rates than younger veterans, the model generally predicts significant increases in patient demand between 1976 and 1985.

#### DETERMINATION OF ACUTE CARE BED REQUIREMENTS

Basically our model determines acute care bed requirements by analyzing the medical record of each patient recently discharged from the hospital and adjusting each patient's actual length of stay in the VA hospital to make

it conform with comparable diagnoses in non-Federal community hospitals. The model then projects future discharges based on the changing age distribution of veterans in the population.

Adjustment of each VA hospital's acute care workload was accomplished through the use of a computer program designed to:

- Accumulate the actual patient days for each patient discharged from each VA hospital during fiscal year 1976.
- Extract from the data each patient's primary diagnosis and age, as well as whether the patient has a single or multiple diagnosis and whether the patient underwent surgery.
- Match each patient's characteristics with those of corresponding patients discharged from community hospitals during 1974, based on PAS information.
- Accumulate the corresponding PAS average length of stay for patients discharged from each VA hospital during fiscal year 1976.

Using the steps shown above, the model calculated the total number of acute care bed days required for each patient discharged from each VA hospital in fiscal year 1976 adjusted to be in conformance with non-Federal hospital stays for similar patients. The computer was also instructed to keep track of bed requirements by age category. We determined the number of acute care beds needed by calculating the average number of beds occupied on any given day and then adding a factor to allow for an 85-percent occupancy rate in medicine, surgery, and psychiatry. These occupancy rates are consistent with those used by VA, except for psychiatric, where VA used a 90-percent occupancy rate.

Using the procedure described above, our model determines the number of patient discharges and the valid acute care bed requirement in 1976 for each of five patient age groups. Each age group is expected to change significantly in size between 1976 and 1985, with a shift toward older patients. By determining the patient discharges and acute care bed requirements per 1,000 veterans in 1976, broken down by age category, our model can then project acute care

requirements to 1985 by considering the shifts expected to occur in the veteran age profile.

It is important to recognize that our model assumes that the average length of stay for each individual age group in 1976 will remain constant. Veterans in older age groups, however, tend to require longer average stays in hospitals than younger veterans. Therefore, due to the expected shift in patient mix toward older veterans, our model predicts a general rise in hospital average length of stay. A sample computer output is shown on the following page. It shows the acute care surgical bed determination for the Martinsburg VA Hospital and the projection of bed requirements to 1985.

#### DETERMINATION OF HOSPITAL REQUIREMENTS FOR LOWER LEVELS OF CARE

In addition to estimating acute care bed requirements as described previously, our model allocates the portion of care inappropriately provided by VA in acute care beds to the other lower levels--intermediate care, rehabilitation, nonacute psychiatric care, nursing home care, and outpatient care. The model does this by first computing the difference between valid acute care bed days (based on PAS statistics) and actual bed days spent by all patients in the VA hospital during 1976. This difference represents the number of days spent by all patients in the VA hospital during 1976 in a nonacute care status. The 1976 nonacute care patient days are projected to 1985 based on expected changes in the veteran age profile, as discussed earlier. The 1985 nonacute patient days are further broken down in to hospital departments of medicine, surgery, psychiatry, rehabilitation service, and intermediate care based on the bed section from which each patient was discharged. The allocations of nonacute patient days from each of these departments to the lower levels of care were based primarily on the findings of NAS. <sup>1/</sup>

<sup>1/</sup>"Health Care for American Veterans," Report to the Congress on Health Care Resources in Veterans' Administration, NAS, May 1977.

Martinsburg VA Hospital

1/

Acute Beds Using CPHA Days  
Surgery Beds Summary Report

Age category	Number of patients	Total adjusted bed days	1985 CPHA required beds	1976 Veteran population	1985 Veteran population	Ratio 1985/1976	1985 CPHA required beds	Average length of stay
0-24	28	142.50	0.45	3,693	1,990	0.54	0.25	5.09
25-44	208	1,555.20	5.01	43,033	36,087	0.84	4.21	7.48
45-54	346	3,315.90	10.68	32,381	18,773	0.58	6.19	9.58
55-64	400	4,352.40	14.02	21,987	28,490	1.30	18.23	10.88
65 + over	318	5,227.30	16.84	7,609	16,282	2.14	36.04	16.44
	<u>1,300</u>	<u>14,593.30</u>	<u>47.01</u>	<u>108,703</u>	<u>101,622</u>	<u>0.93</u>	<u>64.92</u>	<u>11.23</u>
Age errors	0	0.00	0.00	108,703	101,622	0.93	0.00	11.23
TOTAL	<u>1,300</u>	<u>14,593.30</u>	<u>47.01</u>	<u>108,703</u>	<u>101,622</u>	<u>0.93</u>	<u>0.00</u>	<u>11.23</u>

1/Commission on Professional and Hospital Activities.



Medical and surgical patients

As part of NAS's study, nurses on medical wards in 14 VA general hospitals were asked to judge the most appropriate facility to transfer each nonacute patient to if it were necessary to do so immediately. The nurses were to assume that an appropriate facility was available. The table below shows the average values of the nurses' estimates of the most appropriate level of care for nonacute patients occupying VA medical wards.

<u>Medical patients</u>	
<u>Appropriate level of care</u>	<u>Percentage of nonacute patients</u>
Intermediate care	14
Convalescent care	12
Nursing home care	24
Outpatient care	<u>50</u>
Total	<u>100</u>

The same study conducted on surgical wards of 13 VA general hospitals yielded the following.

<u>Surgical patients</u>	
<u>Appropriate level of care</u>	<u>Percentage of nonacute patients</u>
Intermediate care	12
Convalescent care	19
Nursing home care	19
Outpatient care	<u>50</u>
Total	<u>100</u>

Our model allocates nonacute patient days for medical and surgical patients to intermediate care, convalescent care, nursing home care, and outpatient care using the percentage distributions (in the tables above) which were judged by the nurses to be appropriate.

### Psychiatric patients

The NAS study team also conducted a census of inpatients in 18 hospitals to determine appropriateness of placement of patients in psychiatric beds. Only 38 percent of patients in psychiatric beds in general hospitals were judged by the nurses in charge of the wards to be appropriately placed. In this study, "appropriateness" was defined as requiring services uniquely available in hospitals (for example, isolation or restraint, intensive observation, detoxification for drug or alcohol abuse, or drug-dosage regulation). Of the patients who were deemed not to need hospitalization (for example, nonacute care patients), about half were judged to be treatable as outpatients. The remainder were recommended for treatment in another type of setting. The NAS committee recommended that VA take steps to develop and implement alternatives to inpatient hospitalization, including partial hospitalization, halfway houses, sheltered workshops, group homes, and cooperative apartments.

Our model allocates nonacute psychiatric patient days in accordance with the NAS findings. Fifty percent of the patient days were allocated to nonacute psychiatric care alternatives, and 50 percent, to outpatient care.

### Rehabilitation medicine

Patients are generally transferred to rehabilitation-medicine bed sections for therapy only after completion of their acute care treatment in other hospital bed sections.

Although all 172 VA hospitals in the Nation have rehabilitation-medicine service, only 40 have rehabilitation-medicine bed sections. In all hospitals most patients receiving rehabilitation services are in other bed sections, and the rehabilitation services they receive are an adjunct to their full-time care in medicine, surgery, or psychiatry.

VA's computerized patient treatment files indicate the bed sections from which hospital patients are discharged. However, no information is given regarding intrahospital transfers prior to discharge. For patients discharged from the rehabilitation-medicine bed section, our model allocates the acute care part of the patients' hospital stay (based on the PAS statistics, the patient's age, diagnosis, etc.) to the acute medical bed section, and the remainder of the stay to the rehabilitation-medicine bed section.

#### Intermediate care patients

Patients discharged from VA hospital intermediate care bed sections are handled by our model in a manner similar to rehabilitation-medicine patients. The model allocates the acute portion of the patient's stay (based on PAS statistics, the patient's age, diagnosis, etc.) to the acute medical bed section and the remainder to nonacute intermediate care.

#### Nursing home care and outpatient care

Our model estimates requirements for nursing home care and outpatient care based on analyses of appropriate and inappropriate patient days spent in acute care bed sections. In accordance with the NAS study findings, our model determines nursing home care and outpatient care requirements that can be substituted for acute care in VA hospitals. This workload would be an addition to projected workload derived from patients directly placed in these lower-level modalities of care, without prior admission to the hospital.

The total nursing home care bed requirements in VA hospitals is contingent on not only workload allocations from acute bed sections and direct admissions to VA nursing home units, but also on the availability of VA contract nursing beds in the community. VA is currently conducting a nationwide study to evaluate additional factors which may affect bed requirements for nursing home care.

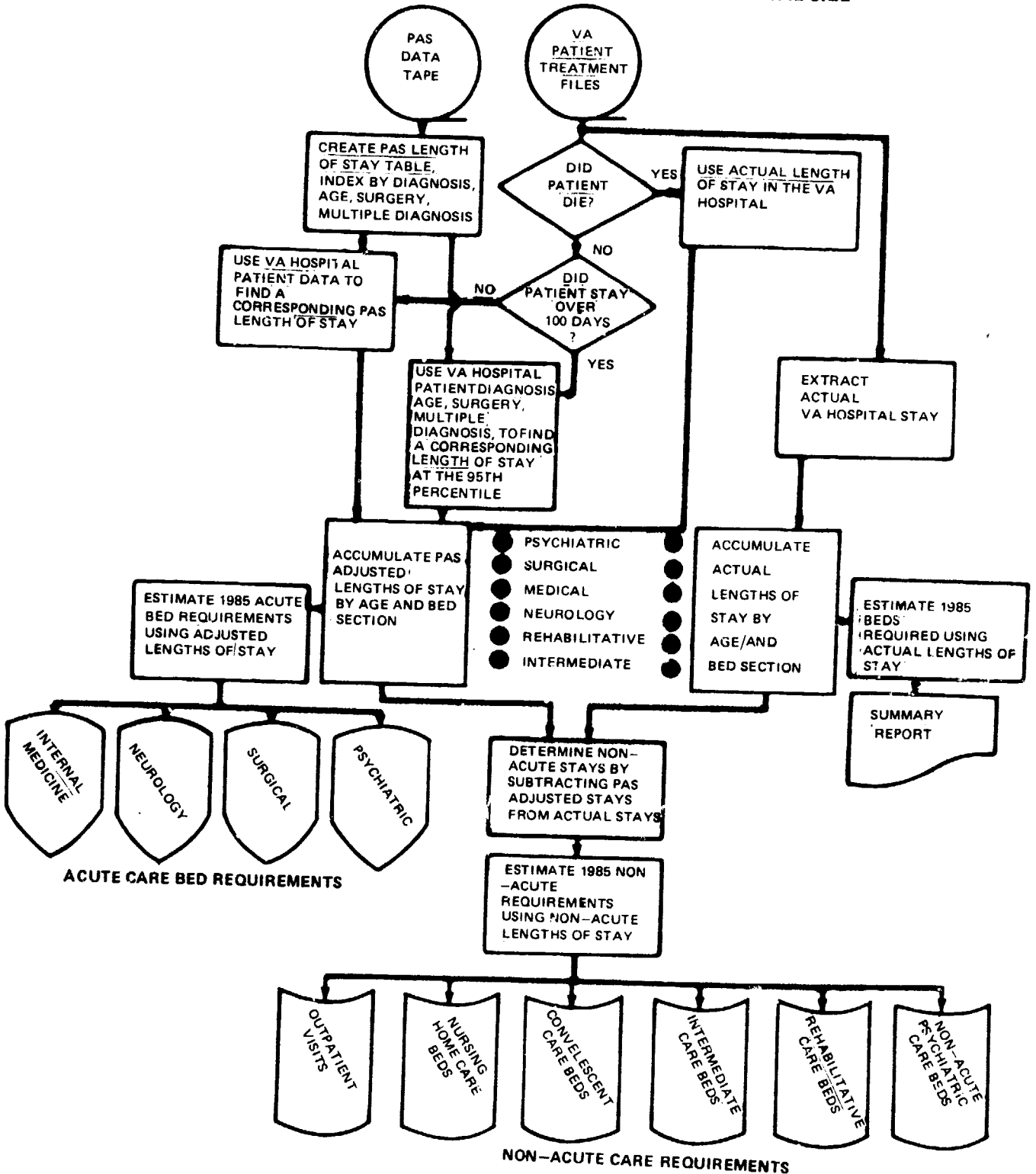
Because of the ongoing VA study and the ability of our model to estimate only a portion of the total required beds, we have adopted VA's bed projections as the total nursing home care bed requirements in each replacement hospital area.

Our model estimates outpatient care workloads by determining the number of bed days of inpatient care that would more appropriately be treated through outpatient care. This workload would be an addition to the normal ambulatory care workload.

#### COMPUTER ASPECTS OF OUR MODEL

The flowchart on the following page depicts the decision logic used by the computer in carrying out the steps of our model. The computer program is coded in COBOL and requires two primary data inputs in the form of magnetic tapes: the national Commission on Professional and Hospital Activities or PAS data tape, and the VA patient treatment file that we extracted for the hospital being analyzed. Both tapes are readily available. The program requires approximately \$30 of computer time to produce a complete analysis of each hospital.

SEQUENCE OF OPERATIONS IN DETERMINATION OF HOSPITAL SIZE



REQUIRED 1973, 1977, and 1985 MEDICAL  
AND SURGICAL BEDS IN PHILADELPHIA AREA VA  
HOSPITALS BASED ON TRENDS ASSUMED BY VA

<u>1973</u>						
Age group	Estimated 1973 discharges per 1,000	1973 veteran population	Estimated 1973 discharges	VA share based on 10%	1973 average length of stay	1973 required beds
15-44	84	295,208	24,797	2,480	14.5 days	116
45-64	170	342,105	58,158	5,816	21.1	396
65-up	343	44,802	15,367	1,537	23.6	117
Total						<u>629</u>

<u>1977</u>						
Age group	Estimated 1977 discharges per 1,000	1977 veteran population	Estimated 1977 discharges	VA share based on 10%	Estimated 1977 average length of stay	1977 required beds
15-44	87.13	267,650	23,320	2,332	11.82 days	89
45-64	186.45	352,374	65,700	6,570	19.82	420
65-up	381.24	54,955	20,951	2,095	22.98	155
Total						<u>664</u>

<u>1985</u>						
Age group	Estimated 1985 discharges per 1,000	1985 veteran population	Estimated 1985 discharges	VA share based on 10%	Estimated 1985 average length of stay	1985 required beds
15-44	92.8	221,251	20,532	2,053	11.5 days	76
45-64	225.0	302,568	68,078	6,808	14.3	314
65-up	483.2	102,477	49,517	4,952	18.5	295
Total						<u>685</u>