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GAO

Report to the Administrator of Veterans
Affairs

April 1986

VA HEALTH CARE

Too Many Operating Rooms Being Planned and Built



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**Human Resources Division
B-207930**

April 29, 1986

The Honorable Thomas K. Turnage
Administrator of Veterans Affairs

Dear Mr. Turnage:

In March 1981, we reported that continued use of the Veterans Administration's (VA's) criterion for determining the number of operating rooms in new or replacement hospitals— 1 operating room for every 28 surgical beds—would result in the planning and construction of too many operating rooms (Better Guidelines Could Reduce VA's Planned Construction of Costly Operating Rooms, HRD-81-54, Mar. 3, 1981).

We recommended that VA use a model (such as the operating room planning model we developed) that focuses on the unique surgical workload characteristics of each medical center. VA generally agreed that developing and implementing a planning methodology based on surgical workload would enhance its ability to plan, but had several concerns about our model. In May 1983, VA began developing its own model at the VA medical center in Ann Arbor, Michigan. Completion is expected by the end of April 1986. The model must then be reviewed and approved by the VA central office before it is used in the planning process.

We made this review to examine how VA has been determining its operating room requirements since our earlier report was issued and, in view of the absence of any revised VA criteria since 1981, whether the number of operating rooms planned or under construction is consistent with that derived using our model. In VA's central office, we reviewed construction project data files and interviewed officials in the Department of Medicine and Surgery and the Office of Construction. At the Ann Arbor Medical Center, we discussed VA's new operating room planning model with the officials responsible for developing it. We also met with health planning officials in the Department of Defense and private industry to determine if the model recommended in our 1981 report was still valid. Our review was conducted between March 1985 and January 1986 in accordance with generally accepted government auditing standards.

We found that VA is using the same criterion it used in 1981 to determine its operating room needs. For 24 construction projects planned since

October 1982,¹ 29 unnecessary operating rooms costing about \$5.8 million are being built. We believe that VA could avoid construction costs on some of these projects by reducing the number of operating rooms being designed and might, in some cases, save money by eliminating unnecessary operating rooms from projects under construction.

We have two concerns with the model being developed by VA. First, it permits VA planners to use independently established utilization rates for each planned facility. An agency-wide preestablished rate would promote more efficient management of operating room resources and staff. An 80-percent utilization rate, which we recommended in 1981, is used by health planners in the Department of Defense and private industry. Second, the model would allow VA planners to independently and perhaps inconsistently develop workload projections to reflect possible changes in several planning factors, such as Medicare policies or a facility's mission. We believe that when such changes occur, VA's central office should (1) give planners guidance on how to make workload adjustments and (2) monitor the planners' calculations of projected workloads.

We provided a draft of this report to officials of VA's Department of Medicine and Surgery and Office of Construction. Their comments, addressed in detail beginning on page 11, questioned our model's use of (1) historical data on the number of surgical procedures and (2) an 80-percent utilization rate for operating rooms. Regarding the use of historical data, our model can function with either historical or projected data. For this report, we used the former because VA's central office could not provide the latter. Regarding the 80-percent utilization rate, we believe the rate is reasonable, based on our review of current literature and discussions with officials of the Defense Department and private industry. Moreover, using this preset rate in the model will establish a benchmark against which VA managers can measure medical centers' performance.

We recommend that you direct the Chief Medical Director to:

1. Instruct Ann Arbor project officials to develop a final model that will use a preestablished 80-percent utilization rate for determining the number of operating rooms.

¹A date 18 months after we issued our report, a period we assumed was sufficient for VA to have implemented our model.

2. Give planners guidance on how to adjust workload projections to reflect changes in the model's planning factors and monitor VA planners' calculations of projected workload to ensure that adjustments are consistent with the guidance.

3. Stop using VA's current operating room planning criterion and use our methodology to determine the required numbers of new or replacement operating rooms until the Ann Arbor model is implemented.

4. Reassess all existing construction projects to eliminate, where cost effective, excessive operating rooms.

As you know, 31 U.S.C. 720 requires you to report your actions on our recommendations to the Senate Committee on Governmental Affairs and the House Committee on Government Operations within 60 days of the date of this report and to the House and Senate Committees on Appropriations with your first request for appropriations made more than 60 days after the date of this report.

We are sending copies of this report to the Director, Office of Management and Budget, and the Chairmen and Ranking Minority Members of the above committees and the House and Senate Committees on Veterans' Affairs. Copies will also be made available to other interested parties who request them.

Sincerely yours,



Richard L. Fogel
Director

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Abbreviations

DOD	Department of Defense
GAO	General Accounting Office
VA	Veterans Administration

VA Continues to Plan and Build Too Many Operating Rooms

In March 1981, we reported¹ that continued use of the Veterans Administration's (VA's) criterion for determining the number of operating rooms in new or replacement hospitals would result in VA's constructing too many operating rooms. VA assumed that 1 operating room would support 28 surgical beds and that all patients admitted to such beds would have surgery. The VA criterion failed to consider that some patients in surgical beds do not undergo surgery and that the time needed to perform a surgical procedure varied according to the type of surgery and the surgeon's experience.

We developed a model for determining the number of operating rooms in a surgical suite using actual workload data, thereby taking into account each facility's unique combination of surgical procedures and surgeon experience. Our model is intended to produce the number of rooms needed in construction projects so that a hospital can more efficiently use its resources.

Our model incorporated two workload measures—the number of surgical procedures performed and the average operating times—that recognize the unique characteristics of individual VA medical centers. In addition, it used a standard room preparation and cleanup time of 30 minutes and an expected utilization rate of 80 percent, based on an operating room availability of 8 hours per day. Our model is expressed by the following formula:

$$\text{Number of operating rooms} = \frac{\text{Number of procedures per day} \times \left[\frac{\text{Average hours per operation} + \text{Room preparation and cleanup time}}{\text{Expected utilization rate}} \right]}{8 \text{ hours}}$$

The model can be adjusted to make it applicable to any period of time—from one day, as shown above, to one year, as discussed on pages 11-12.

Although VA agreed that developing and implementing such a methodology based on the number of surgical procedures would enhance its planning ability, it did not think our model was comprehensive and flexible enough to implement in each of its health care facilities. In May 1983, VA began a project to develop its own operating room planning model.

¹Better Guidelines Could Reduce VA's Planned Construction of Costly Operating Rooms, HRD-81-54, Mar. 3, 1981.

Objectives, Scope, and Methodology

Our objectives were to (1) determine how VA has been arriving at the number of operating rooms needed in replacement surgical suites since our March 1981 report was issued and (2) apply our surgical workload model to a universe of VA construction projects to identify any differences between VA's stated operating room needs and the requirements for operating rooms identified using our model.

At VA's central office we interviewed officials from the Department of Medicine and Surgery and Office of Construction to determine the criterion VA has been using to arrive at the number of operating rooms in its construction projects. We also examined construction project data files used to support VA's operating room needs.

At the Ann Arbor VA Medical Center, we discussed VA's operating room planning model project with responsible officials. We also reviewed and analyzed project documents to evaluate the project's proposed methodology and results.

To determine whether the model recommended in our 1981 report was still reasonable, we reviewed current literature and discussed operating room practices and procedures with VA central office, Ann Arbor Medical Center, and Department of Defense (DOD) officials and with various private industry health care organizations, such as the American Hospital Association and Humana, Inc.

If VA had accepted our 1981 recommendation to use our operating room planning model, we believe it could have begun applying the model within 18 months, by October 1, 1982. According to information provided by VA in July 1985, there have been 47 projects involving operating rooms in various stages of construction since our 1981 report was issued. Because changes to construction projects become more difficult and expensive to make as the projects move through the process, we limited our analysis to projects on which final design work had not begun as of October 1, 1982.² We also eliminated projects involving new operating room construction because historical surgical workload data

²VA construction projects go through three stages: planning, design, and construction. The projects can be changed or modified at any point in these stages. Moreover, when VA decides whether to approve a specific change or modification in an approved project, it compares the benefit of the change (such as better quality care or cost avoidance) to the cost of the change (which could include higher design costs, higher construction costs, or delays). We selected a point in the process where we believe changes, such as eliminating one or more operating rooms, could be made without incurring substantial redesign costs. Based on discussions with VA's Office of Construction, we chose projects on which final design work had not begun.

were not available. As a result, our analysis focused on 24 replacement operating room projects.

We provided a draft of this report to officials of the Department of Medicine and Surgery and the Office of Construction. Their comments are discussed beginning on page 11. Our work was conducted between March 1985 and January 1986 in accordance with generally accepted government auditing standards.

VA's New Operating Room Planning Model

After we issued our 1981 report, VA began to develop its own workload-based operating room planning model. The Ann Arbor VA Medical Center, which was selected to develop the model, began work in May 1983. Formal VA central office funding for the project was received in May 1984. The project director expected it to be completed by the end of April 1986 and ready for review and approval by the central office.

The model being developed by the Ann Arbor center will consist of two components—one to forecast workloads and one to determine the number of operating rooms needed to serve the forecasted workloads. The forecasting component will use a facility's historical workload to predict its future workload. It will allow planners to adjust workload projections for such factors as

- increased reliance on outpatient surgery;
- changes in VA policies, such as limiting care to veterans with service-connected disabilities or imposing a means test to determine a veteran's eligibility;
- changes in Medicare policies, which may cause certain veterans to seek care from VA for the first time; or
- changes in a facility's mission, such as opening a cardiac surgery program.

The second component will use facility-specific data—such as the extent to which the facility expects to use the operating rooms during an 8-hour day, the type of surgery scheduling system used, and the length of the operating day—to determine the number of operating rooms needed.

Although the Ann Arbor model is still being developed, we have two concerns. First, the model does not use a fixed utilization rate but relies on other data (such as the type of surgery scheduling system used) to produce facility-specific utilization rates, which according to the project

director, could range from 65 to 80 percent. Our model, on the other hand, uses a preestablished utilization rate of 80 percent, which we believe balances the need for scheduling flexibility with the need for efficient management.

Second, the Ann Arbor model would allow planners to adjust projected workloads based on several planning factors, but VA has not provided specific guidance on how these adjustments should be made. For example, if Medicare's required copayment were increased, some veterans may turn to VA for their medical and surgical needs rather than incur the increased costs. On the other hand, if the Congress accepts the President's fiscal year 1987 budget, which calls for reduced health care funding for VA, veterans may have less access to VA care. Without guidance on how to incorporate changes in such factors into the planning process, VA planners may inconsistently estimate their effects on surgical demand. We believe the use of projected data for any model should be reviewed at a high level (preferably in VA's central office) to ensure that projections are consistent, realistic, and in line with current, planned, or contemplated policy changes.

VA Is Building or Planning to Build Too Many Operating Rooms

We applied our model for determining VA operating room requirements to 24 construction projects, using actual surgical workload data from the medical centers involved and the average operating times by surgical procedure developed at 10 medical centers for our 1981 report. The Director of the Department of Medicine and Surgery's Surgical Service reviewed the averages and agreed they could still be used. We found that VA is building or plans to build 29 unnecessary operating rooms as part of these 24 projects. VA determined that 122 operating rooms were necessary, but our model showed a requirement for 93. (See table I.1.)

**Appendix I
VA Continues to Plan and Build Too Many
Operating Rooms**

Table I.1: Number of VA Operating Rooms Exceeding Those Required by the GAO Model

VA medical center	Number of operating rooms		
	Per VA project	Required by GAO model ^{a,b}	More (less) than GAO model
Projects in final design or construction stage:			
Alexandria, LA	3	3	0
Amarillo, TX	2	2	0
Big Spring, TX	2	2	0
Biloxi, MS	4	2	2
Cheyenne, WY	2	2	0
Clarksburg, WV	3	2	1
Cleveland, OH	7	6	1
Fargo, ND	3	3	0
Fayetteville, NC	3	2	1
Houston, TX	9	8	1
New York, NY	10	6	4
Philadelphia, PA	7	6	1
Togus, ME	3	2	1
Total	58	46	12
Projects in planning or preliminary design stage:			
Allen Park, MI	5	4	1
Asheville, NC	5	5	0
Atlanta, GA	8	4	4
Dallas, TX	11	6	5
Huntington, WV	3	4	(1)
Memphis, TN	7	7	0
Montgomery, AL	3	2	1
Nashville, TN	7	4	3
Oklahoma City, OK	6	5	1
Salem, VA	4 ^c	3	1
Wilmington, DE	5	3	2
Total	64	47	17
Total	122	93	29

^aIn accordance with VA's approved space criteria, figures with fractions of 0.30 or less are rounded to the next lowest whole number, and those with fractions of 0.31 or more, to the next highest.

^bFigures less than 2 were raised to 2 to comply with VA's minimum requirements for a surgical suite.

^cIncludes one general operating room modified for specific types of procedures.

Applying VA's estimated cost of \$200,000 per operating room, we believe VA could have avoided about \$5.8 million by applying our model to

determine the operating room requirements for the 24 projects. Some of the projects are probably too far along in the construction process to warrant reducing the number of operating rooms because the expense of redesign and construction would exceed the savings. We estimate, however, that VA could still save about \$3.4 million by eliminating 17 unnecessary operating rooms that were part of construction projects in the planning and preliminary design stages as of March 1986.

VA central office officials told us that the number of operating rooms included in the 24 projects we reviewed was generally determined by applying the criterion of 1 operating room for every 28 surgical beds. This is the same basic criterion that VA was using when our 1981 report recommended changing to the workload-based model. Deviations from the criterion, which resulted in additional operating rooms, were made on four projects.³ The additions were justified based on historical workload data, inclusion of operating rooms for ambulatory care, and inclusion of a general operating room dedicated to specific types of procedures.

VA's Comments and Our Response

We discussed our model and the data obtained to use in it with VA officials and provided them with a draft of this report. They questioned (1) some of the data we used, (2) our use of historical data in the model, and (3) our use of a preset 80-percent utilization rate.

Explanation of Our Data

In reviewing the data used in applying our model, VA officials asked for more specifics, including any adjustments made to the data.

To determine the number of operating rooms needed for the 24 projects, we applied our model as it was applied in our 1981 report, with one data adjustment—instead of using procedures per day, we used procedures per year. We considered the number of operating days per year to be 251, calculated as follows: 52 weeks per year x 5 workdays per week = 260 days minus 9 federal holidays.⁴ We obtained the procedures-per-year data from VA's Annual Report of Surgical Procedures for fiscal years 1983 and 1984 or, when these data were not available, from VA's patient treatment files. We adjusted some of the data because several

³For the deviations to these four projects, we considered those rooms as unneeded if they exceeded what our model determined. These deviations resulted in four more operating rooms than our model showed were necessary.

⁴Currently there are 10 federal holidays, but when the workload was performed, there were 9.

medical centers included nonsurgical procedures, such as diagnostic cytoscopies in yearly totals. Top officials from the Surgical Service in the Department of Medicine and Surgery agreed with our use of the data, and that Service's Deputy Director concurred with our adjustments.

Because procedure times were not available for the 24 hospitals we reviewed, we used data developed in our 1981 report for average times per operation: 99 minutes at VA medical centers affiliated with medical schools and 32 minutes at nonaffiliated medical centers. The Director of the Surgical Service reviewed these averages, and how they were developed, and agreed that they reflect current operating times and could be used.

In addition, we used the 30 minutes for room preparation and cleanup as developed in the 1981 report and converted the 8 hours per day to an annual figure to correspond with procedures per year.

No allowances were made for deviations from VA's practice of scheduling its elective surgery during the main day shift hours. We do not believe such allowances should be made unless a facility has demonstrated over an extended period a practice of performing enough of its surgery outside of those hours to warrant such an allowance.

Use of Historical Data

We used historical workload data for (1) numbers of surgical procedures performed and (2) average operating hours per procedure. VA officials said that using historical data to determine procedure times for each medical center is not appropriate because they will not reflect the center's mission. Among other concerns, the officials also said that projections based on past performance may lock the facility into an operating room configuration limited by past experience.

VA officials were primarily concerned about our use of historical data to determine procedure times and to determine the numbers of surgical procedures performed. In both cases, our model is flexible and can be used with historical or projected data. Estimated future surgical demand adjusted for demographic projections, for example, can be used in our model, as can practically any data base of verified procedure times.

The officials also commented that our model did not use projected data or adjust the data it did use based on expected changes to the veteran

patient population due to such factors as demographic shifts or Medicare policy restrictions. For this report, we used historical workload data for each facility we analyzed to determine the required number of operating rooms because data on projected workloads were not readily available from VA.

Further, the officials commented that we had not adjusted workloads to account for any demand for surgery that the center could not meet because of understaffing or lack of beds. While this is true (we used actual workloads), these are the kinds of adjustments that we believe the central office should monitor to ensure they are properly documented, consistently calculated, and in line with VA policy.

Use of an 80-Percent Utilization Rate

VA officials agreed that selecting a goal of 80-percent utilization is valid, but added that by stipulating that future construction be based on this rate, our model requires that a minimum utilization of 80 percent be attainable in all future VA facilities. The officials were not sure that all facilities will be able to accomplish this goal.

We believe an 80-percent utilization standard balances the need for scheduling flexibility with the need for efficient management. Using an operating room 6.4 hours per day during an 8-hour workday allows for other activities, such as operating room staff administrative duties, required breaks, and operating room unavailability caused by equipment failure.

We recognize that there is no universally accepted utilization standard for operating rooms. However, our literature review and discussions with private industry and DOD representatives lead us to believe that an 80-percent utilization level is a reasonable goal for VA operating rooms. One study cited in our 1981 report emphasized that operating room management must aggressively control the surgical workload that can be controlled—specifically, elective surgery—to achieve higher utilization. The study pointed out that low utilization levels—which we found in our 1981 study of 10 VA hospitals—are caused by two factors: poor facility planning (i.e., too many operating rooms) and poor surgery scheduling.

We also found support for the 80-percent rate from other health care representatives. DOD, for example, uses an 80-percent utilization rate in planning new or replacement operating rooms. Also, Humana, Inc., a for-profit hospital system, using a workload model similar to ours, plans for

100-percent utilization during a 7-hour day, which equates to an 87.5-percent rate during an 8-hour day.

Further, since our 80-percent utilization rate promotes planning standardization for all VA facilities, we believe it can be used to set a goal or benchmark against which VA managers can measure the facilities' performance.

Conclusions

We believe that the operating room planning model being developed by the Ann Arbor VA Medical Center, if it uses a preset 80-percent utilization rate, will promote the efficient use of operating rooms.

We also believe that VA management should set a reasonable utilization rate as a goal and require medical centers to use that rate when planning how many operating rooms they need. Managers should also use the rate as a benchmark to measure the surgical services' performance in scheduling operations.

The Ann Arbor model could allow for operating room requirements to be based on utilization rates lower than 80 percent. Based on our evaluation of methodologies used by DOD and Humana, we believe that an 80-percent rate for an 8-hour day, 5 days a week, is reasonable. We recognize that certain surgical workload factors—such as emergency patient surgery, in-hospital transfers, short-notice cancellations, and postponements—are beyond the control of operating room management. However, we believe that the 20-percent variance between the maximum attainable operating room utilization (100 percent in an 8-hour day) and the optimal utilization rate (80 percent) adequately allows for uncontrollable factors. We also believe that in planning numbers of operating rooms, VA should not be setting utilization rates lower than those used in DOD and the private sector.

The Ann Arbor model will allow VA planners to adjust workload projections based on several planning factors that are subject to change. Because these adjustments could affect the number of operating rooms determined to be needed, we believe VA's central office should (1) provide guidance to planners on how to adjust workload projections and (2) monitor how planners calculate projected workload for input into the model.

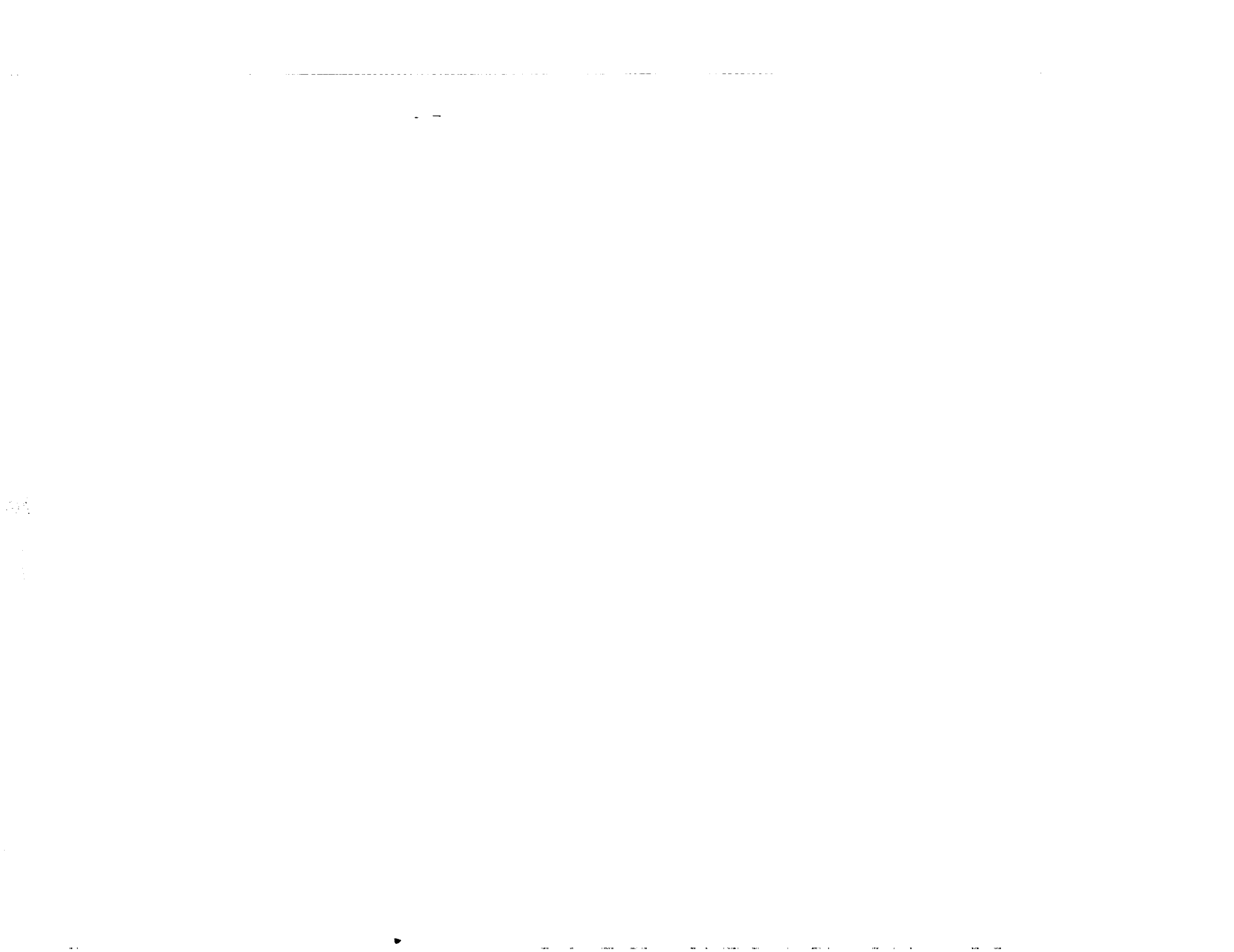
Had VA used our model, it may have planned to build fewer operating rooms. VA could still avoid construction costs on some of its planned

projects by reducing the number of operating rooms being designed and might be able to save money by eliminating unnecessary operating rooms from some projects already under construction.

Recommendations

We recommend that the Administrator of Veterans Affairs direct the Chief Medical Director to:

1. Instruct Ann Arbor project officials to develop a final model that will use a preestablished 80-percent utilization rate for determining the number of operating rooms.
2. Give planners guidance on how to adjust workload projections to reflect changes in the model's planning factors and monitor VA planners' calculations of projected workload to ensure that adjustments are consistent within the guidance.
3. Stop using VA's current operating room planning criterion and use our methodology to determine the required numbers of new or replacement operating rooms until the Ann Arbor model is implemented.
4. Reassess all existing construction projects to eliminate, where cost effective, unnecessary operating rooms.



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