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Electron Microscopy in Veterans Administration Hospitals: Planning, Distribution, and Control Need Improvement. HRD-78-75; B-133044. July 19, 1978. 25 pp. + 3 appendices (6 pp.).

Report to Max Cleland, Administrator, Veterans Administration; by Gregory J. Ahart, Director, Human Resources Div.

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The electron microscope (EM) is a device which produces highly magnified images used in clinical diagnostic applications to examine the microstructure of thin sections of biological tissue. Individual EM's in Veterans Administration (VA) hospitals have cost up to \$82,000, and a complete EM unit, including remodeled facilities, purchase and installation, darkroom, and photographic equipment and supplies may cost from \$150,000 to \$200,000. EM activities were reviewed at 15 VA hospitals in 8 of the 28 VA medical districts.

Findings/Conclusions: The VA central office has permitted the establishment of EM units in locations without adequately determining their need. The VA has not followed its stated policy that specialized medical services, including electron microscopy, be planned and provided on a regionalized basis to avoid duplicating or overlapping these costly medical programs. Some of the VA's EM units are underused; from July 1974 to December 1976, 15 of 42 diagnostic EM units examined less than 250 specimens annually (the current use standard). Plans to install EM units have not been formally coordinated at the national, department, or medical district level. The current practice of assigning separate EM's to the Pathology Service and the Medical Research Service, both within VA's Department of Medicine and Surgery, impedes the most effective use of these instruments. Recommendations: The Administrator of Veterans Affairs should: direct the Chief Medical Director to make a systemwide study to determine the feasibility of establishing joint Pathology and Medical Research Services utilization standards for both diagnostic and research electron microscopes; insure continuing compliance with VA regulations to terminate electron microscope programs when the programs cannot be justified on the basis of available workload; require that the VA's electron microscope inventory be updated to accurately reflect all electron microscopes within the VA system; direct that VA medical districts be given more responsibility for the planning, distribution, and utilization of EM's; and require

formal sharing agreements to make the best use of the medical district's resources. (BRS)

7046

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REPORT BY THE U.S.

# General Accounting Office

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## Electron Microscopy In Veterans Administration Hospitals: Planning, Distribution, And Control Need Improvement

Some Veterans Administration electron microscopes are underused and some unnecessarily duplicate nearby Veterans Administration or community facilities. To improve management of the electron microscopy program, the Administrator of Veterans Affairs should:

- Require maximum use of both diagnostic and research electron microscopes.
- Actively involve all medical districts in the planning and distribution of electron microscopes as well as in coordinating the program at the national and medical district levels.



HRD-78-75  
JULY 19, 1978



**UNITED STATES GENERAL ACCOUNTING OFFICE**

**WASHINGTON, D.C. 20548**

**HUMAN RESOURCES  
DIVISION**

**B-133044**

**The Honorable Max Cleland  
Administrator of Veterans Affairs**

**Dear Mr. Cleland:**

This report makes recommendations to you concerning improved management of the Veterans Administration's electron microscopy program. In commenting on our draft report, you did not fully concur with all of our recommendations but described a number of corrective actions to be taken.

By separate letters we are sending copies of this report to the Chairmen of the Subcommittees on HUD-Independent Agencies of the House and Senate Committees on Appropriations. In view of VA's plans to establish additional specialized medical resources, we are recommending that the Subcommittees consider requiring VA to (1) provide them with the goals and objectives of VA's specialized medical services programs and (2) specify the resources, including electron microscopes, necessary to implement comprehensive and effective programs for veterans needing specialized medical services.

As you know, section 236 of the Legislative Reorganization Act of 1970 requires the head of a Federal agency to submit a written statement on actions taken on our recommendations to the House Committee on Government Operations and the Senate Committee on Governmental Affairs not later than 60 days after the date of the report and to the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 60 days after the date of the report.

B-133044

We are also sending copies of this report to the Chairmen, House and Senate Committees on Veterans' Affairs, and to the Director, Office of Management and Budget.

Sincerely yours,



Gregory J. Ahart  
Director

GENERAL ACCOUNTING OFFICE  
REPORT TO THE ADMINISTRATOR  
OF VETERANS AFFAIRS

ELECTRON MICROSCOPY  
IN VETERANS ADMINISTRATION  
HOSPITALS: PLANNING,  
DISTRIBUTION, AND CONTROL  
NEED IMPROVEMENT

D I G E S T

The electron microscope is a device which produces highly magnified images, sometimes up to 500,000 times the size of a specimen. This equipment is used to see objects too small to be distinguished by a conventional light microscope. (See p. 1.)

GAO found that some of the electron microscopes in Veterans Administration (VA) hospitals are underused. For the period July 1974 to December 1976, 15 of 42 units used for diagnostic purposes did not examine 250 specimens annually--the current use standard set by VA. (See p. 12.)

VA currently has no standard of use for electron microscopes dedicated to research, and there are significant disparities in their use among VA hospitals. GAO found that usage can range from 1/2 hour a week to 30 hours a week. VA should undertake a systemwide study to determine the feasibility of having the Pathology Service and Medical Research Service jointly establish use standards for both diagnostic and research electron microscopes. (See p. 13.)

Aside from the fact that underused electron microscopes is a waste of a valuable resource, underutilization could also have an adverse impact upon diagnoses and the quality of patient care. Often electron microscopy examinations of human tissue specimens improve, correct, or change an initial diagnosis.

VA should not acquire additional electron microscopes until all existing units are optimally used. Also, sharing arrangements with other VA and community hospitals should be appropriately explored in all cases. (See p. 14.)

## PLANNING AND CONTROL

VA central office has permitted at least 15 VA hospitals to establish and maintain electron microscope units which have not had a sufficient workload to justify their operation. (See p. 12.)

Some hospitals plan their electron microscope programs with little overall guidance or control from VA central office. Also, VA central office has incomplete inventories of the actual number of units in VA hospitals. The lack of overall planning, coordination, and control by VA central office could lead to more unnecessary duplication of this costly specialized medical resource. (See p. 20.)

## RECOMMENDATIONS TO THE ADMINISTRATOR OF VETERANS AFFAIRS

GAO recommends that the Administrator:

- Direct the Chief Medical Director to make a systemwide study to determine the feasibility of establishing joint Pathology and Medical Research Services utilization standards for both diagnostic and research electron microscopes. (See p. 13.)
- Insure continuing compliance with VA regulations to terminate electron microscope programs when the programs cannot be justified on the basis of available workload. (See p. 11.)
- Require that VA's electron microscope inventory be updated to accurately reflect all electron microscopes within the VA health care system, whether they are being funded by VA central office, locally, or otherwise. (See pp. 9 and 10.)
- Direct that VA medical districts be given more responsibility for the planning, distribution, and utilization of both diagnostic and research electron microscopes, and require formal sharing

agreements when this would make the best use of the medical district's resources. (See p. 20.)

VA did not fully concur with all of GAO's recommendations but described a number of corrective actions it planned to take which should improve the electron microscopy program.



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### ABBREVIATIONS

EM	electron microscope
GAO	General Accounting Office
VA	Veterans Administration

## CHAPTER 1

### INTRODUCTION

The Veterans Administration (VA), through its Department of Medicine and Surgery, administers the Nation's largest health care delivery system--172 hospitals, 219 outpatient clinics, 89 nursing homes, and 18 domiciliarys. Routine medical services are provided at all VA hospitals, but some hospitals offer specialized medical services, such as cardiac catheterization, open heart surgery, supervoltage therapy, and electron microscopy--each requiring specialized personnel, equipment, and facilities.

### THE ELECTRON MICROSCOPE

The electron microscope (EM) is a device which produces highly magnified images by using electrons for illumination. Some EMs can magnify up to 500,000 times the size of a specimen. Conventional light microscopes, by comparison, magnify to about 1,000 times the size of a specimen. EMs are used to see objects too small to be distinguished by a light microscope.

There are now several types of EMs; the most typical are the scanning EM (see p. 3) and the conventional "transmission" EM (see p. 4). Each type is adapted to particular applications on particular kinds of materials. Scanning EMs examine surface structure and surface composition and complement the transmission EM. EMs are often used in clinical diagnostic applications to examine the complex microstructure of thin sections of biological tissue.

EM images can be recorded on photographic plates to make "electron micrographs," which provide permanent records that can be further enlarged and/or studied (see pp. 5 and 6). The procedure of examining patient specimens with an EM unit is known as "electron microscopy."

Individual EMs in VA hospitals have cost up to \$82,000, depending upon the manufacturer and the type of EM obtained. A complete EM unit in VA, including remodeled facilities (if remodeling is required), purchase and installation of the EM instrument, a darkroom, and photographic equipment and supplies may cost from \$150,000 to \$200,000. The average annual recurring direct costs for a fully staffed EM unit in VA was about \$63,770 during fiscal year 1976.

Electron microscopy examinations are performed by specially trained individuals who prepare tissue specimens for EM examination, perform the darkroom procedures involved in developing the electron micrographs, and perform daily maintenance and minor repairs of the EM. In most situations the specialized nature of the work requires a physician with an appropriate background who can devote full attention to this work.

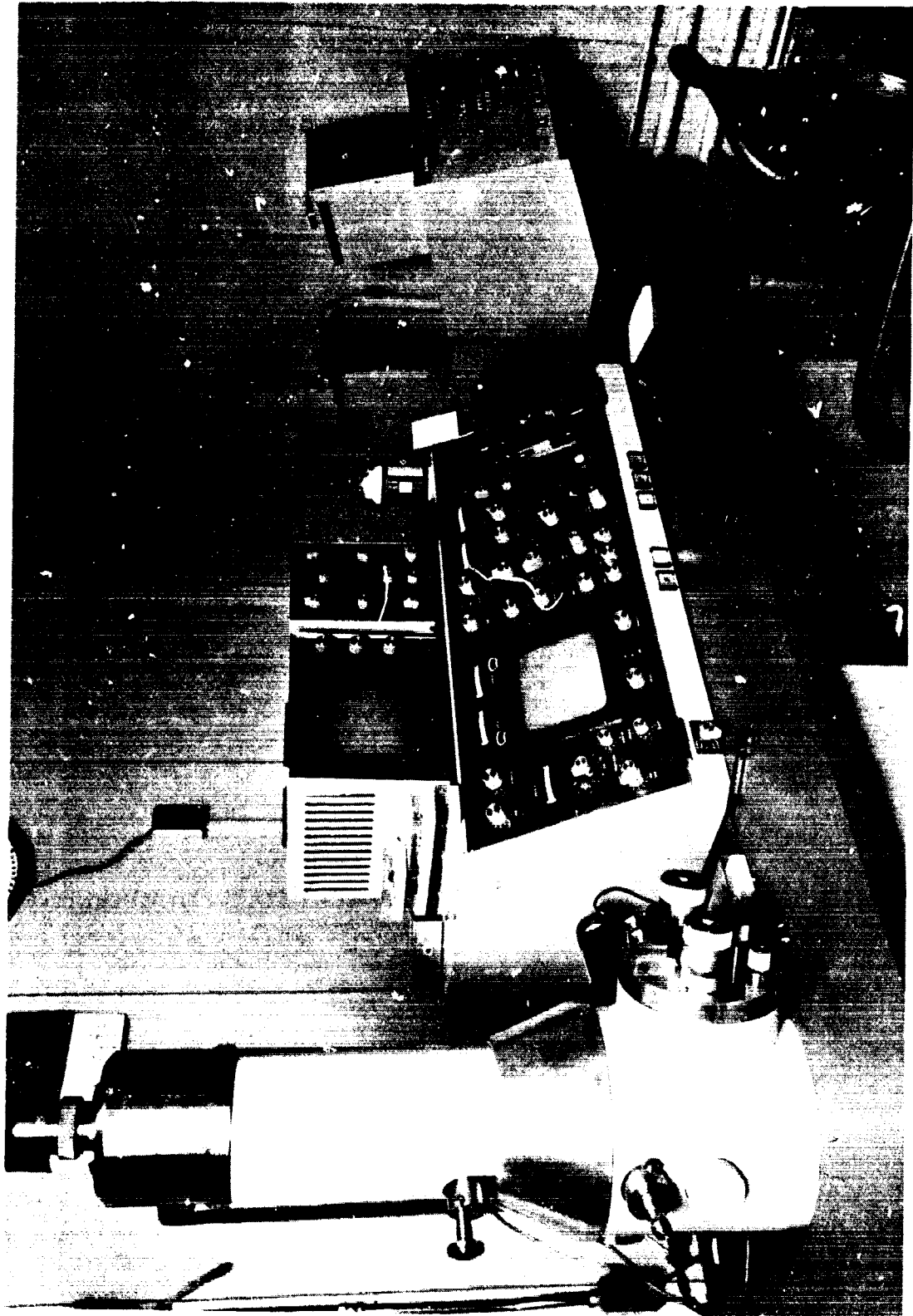
In 1966 VA began to install high resolution transmission EMs for service pathology in selected VA hospital laboratory services. At the time of our review, there were at least 42 such EM installations. The program, according to the Director of Pathology Service at VA central office, is designed to meet the growing need for specialized study in diagnostic pathology and also for the training of staff pathologists, clinicians, residents, and technical personnel in the uses and applications of EMs.

VA has about 54 other EMs that are used primarily in research. Research EMs are concentrated in 39 VA hospitals; two hospitals have as many as three research EMs (i.e., the San Francisco, California, and the Washington, D.C., VA hospitals) in addition to one diagnostic EM each. The average operating cost for research EMs, excluding individual user costs, as reported to VA central office in fiscal year 1976 was about \$18,400.

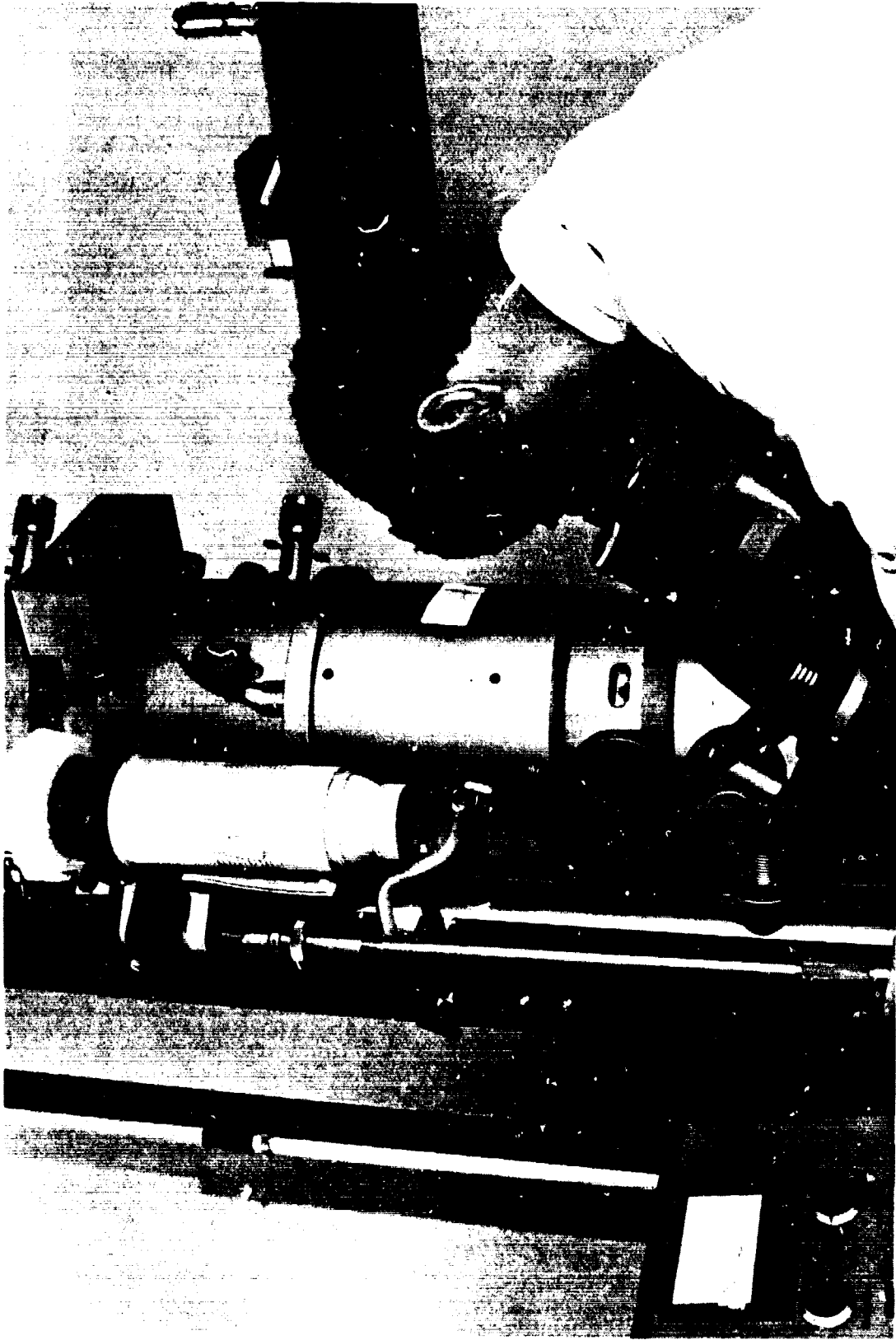
#### RELATED WORK

Because of the increasing health care costs, the Congress wants VA medical facilities to be used effectively and efficiently. One way for VA to accomplish this goal is to participate in sharing specialized medical resources through affiliations with community medical complexes. VA is authorized to share specialized medical resources with community hospitals by Public Law 89-785, enacted by the Congress on November 7, 1966, and now codified under 38 U.S.C. 5053. Under this authority, VA hospitals can share specialized medical resources which, because of cost, limited availability, or unusual nature, are either unique in the medical community or are maximally used only through mutual sharing arrangements. The law was intended to avoid duplication of costly and highly specialized medical resources and to provide improved care to patients through more effective use of scarce medical specialists.

Legislation enacted during the 1960s permitted the medical community to have the latest advances in the diagnosis and



**A TYPICAL SCANNING ELECTRON MICROSCOPE**  
SOURCE: VA CENTRAL OFFICE (COURTESY OF ARMED FORCES INSTITUTE OF PATHOLOGY)



**A TYPICAL TRANSMISSION ELECTRON MICROSCOPE IN USE BY PATHOLOGIST ELECTRON MICROSCOPIST**

SOURCE: VA CENTRAL OFFICE (COURTESY OF WASHINGTON VA HOSPITAL)



SCANNING ELECTRON MICROGRAPH OF PORTION OF A KIDNEY. SCANNING ELECTRON MICROSCOPY DEPICTS THIS PORTION IN A THREE DIMENSIONAL MANNER.

SOURCE: PATHOLOGY DEPARTMENT, BOSTON VETERANS ADMINISTRATION HOSPITAL



TRANSMISSION ELECTRON MICROGRAPH OF PORTION OF A KIDNEY. THIS VIEW OF THE SAME KIDNEY AS NOTED ON PAGE 4, IS MAGNIFIED 13,500 TIMES. TRANSMISSION ELECTRON MICROSCOPY SUPPLIES DETAIL AND REVEALS STRUCTURES NOT VISIBLE IN SCANNING ELECTRON MICROSCOPY.

SOURCE: PATHOLOGY DEPARTMENT, BOSTON VETERANS ADMINISTRATION HOSPITAL

treatment of patients with certain diseases (i.e., heart disease, cancer, stroke, and related diseases) through the establishment and operation of regional medical programs. In the mid-1960s VA established the policy that specialized medical services should be planned and provided on a regional or multiregional basis so that these services would not be duplicated. The objectives of VA's regionalization policy were to avoid or eliminate duplication of costly and underused medical programs and to foster expanded sharing within VA medical districts.

In prior reports to the Congress, we noted that the expansion of certain specialized medical programs had not been adequately controlled. For example, in a 1974 report 1/ we concluded that VA had established two specialized medical services--supervoltage therapy and kidney transplantation--without adequately determining patient need and the availability of similar resources in the community, and that as a result, existing services at some VA hospitals were duplicated and underused. VA officials agreed that available community resources had not been adequately considered. In a 1977 report 2/ we concluded that many VA cardiac catheterization laboratories were underused and that VA had not followed its policy that specialized medical services be planned and provided on a regionalized basis to avoid duplicating or overlapping these costly medical programs. As a result of our 1977 study, VA said it was taking actions which included raising the minimum utilization standards and obtaining better data for planning any additional cardiac catheterization laboratories.

In a 1973 report to the Administrator of Veterans Affairs, 3/ we pointed out that VA's utilization rate for diagnostic EM units was very low, and we questioned VA's plans to acquire 29 new diagnostic units (in addition to 40 existing

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1/"Better Planning and Management Needed by the Veterans Administration to Improve Use of Specialized Medical Services" (B-133044, June 19, 1974).

2/"Many Cardiac Catheterization Laboratories Underused in Veterans Administration Hospitals: Better Planning and Control Needed" (HRD-76-168, Feb. 28, 1977).

3/"Need for Improvement in Certain Hospital Laboratory Service Activities" (B-133044, Nov. 13, 1973).



units) during fiscal years 1974-77. The estimated one-time capital outlay for these new EM units was \$2.7 million, exclusive of annual operating costs (estimated to be about \$1.7 million). We recommended that VA

- determine the present equipment requirements on the basis of the program objectives for diagnostic and training applications and
- consider deactivating EM units at those locations where an EM cannot be justified on the basis of available workload, and fulfill EM needs by referring specimens to other EM units.

In commenting on the draft of the report in August 1973, VA stated that after reevaluating its EM needs, its projected 29 additional EM units would be reduced by 13 to 16 units. This meant that the \$2.7 million cost for the additional EM units would be substantially reduced.

In VA's fiscal year 1975 budget request, however, VA asked for \$2.4 million for 5 new EM units and for upgrading 19 existing units. However, during the House and Senate conference, this \$2.4 million was deleted from VA's budget request. VA did not request funds for additional EM units during fiscal years 1976 or 1977, but did request in its fiscal year 1978 budget \$448,000 for 2 EMs to be located in VA hospitals at Madison, Wisconsin, and Loma Linda, California. VA's latest 5-year plan calls for acquiring 11 additional EMs between fiscal years 1978 and 1982.

This report reexamines VA's electron microscope program and illustrates the continuing need for improved management of VA's policy for planning and controlling the expansion of its specialized medical services.

#### SCOPE OF REVIEW

We made our review at 15 VA hospitals located in Florida, Illinois, Indiana, Kentucky, New York, Ohio, and Wisconsin (see app. I). We also interviewed officials at VA central office; the Washington, D.C., VA hospital; various community hospitals; and VA-affiliated medical schools and hospitals. We examined legislation and VA regulations, policies, and procedures relating to specialized medical services.

## CHAPTER 2

### MANAGEMENT OF VA ELECTRON MICROSCOPE

#### PROGRAM NEEDS IMPROVEMENT

We reviewed EM activities at 15 VA hospitals located in 8 of the 28 VA medical districts, and found problems in both the distribution and utilization of diagnostic and research EMs. VA has not followed its policy to avoid duplication by providing specialized medical services on a regional or district basis; EMs have been installed, and others have been planned, which duplicate facilities in nearby VA hospitals and/or community hospitals.

#### INCOMPLETE DATA AT VA CENTRAL OFFICE ON THE DISTRIBUTION OF EMs

At the time of our review, VA central office records indicated that 43 EMs were assigned to the Pathology Service for diagnostic applications, and 54 EMs were assigned to the Medical Research Service for research purposes. However, our study disclosed that VA central office's inventory of EMs does not reflect all of the EMs that exist in some VA hospitals or the locations and actual use being made of all EMs. For example, we found that the Brooklyn, New York, VA hospital has three EMs not included in VA central office records. VA central office officials said that they had not recognized the Brooklyn EM program because the hospital's EMs were funded locally and not through VA central office-controlled funds for specialized medical services. One of the EMs at the Brooklyn VA hospital is used for diagnostic applications; the other two are used by the hospital's research laboratory.

VA central office records also showed only six EMs for the four VA hospitals in Medical District 17 (the Chicago area). However, we found that the medical district actually had nine EMs as follows:

<u>VA hospital</u>	<u>EMs as shown on VA central office records</u>		<u>Actual EMs</u>	
	<u>Diag- nostic</u>	<u>Research</u>	<u>Diag- nostic</u>	<u>Research</u>
Hines	1	2	1	3
Lakeside	0	0	1	3
West Side	1	2	1	0
North Chicago	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	<u>2</u>	<u>4</u>	<u>3</u>	<u>6</u>

Also, the Madison, Wisconsin, VA hospital in Medical District 16 had two EMs, both assigned to research; VA central office records showed only one. We learned that one EM at the Madison VA hospital was acquired in 1974 for diagnostic use. When funds to staff the EM unit did not materialize, the EM was transferred to the hospital's research department, with the understanding that it would be returned to the laboratory service if and when funds became available. Hospital officials expect funds for staffing to be made available in fiscal year 1978, whereupon the EM will be reassigned to the laboratory service for diagnostic applications.

We believe that all EMs within VA should be accounted for in central office records and reports, regardless of how the EMs may have been or are being funded. This would enable VA central office to better monitor the use of its EMs and avoid possible overlapping of this specialized medical service.

#### USE OF EMs

VA has made progress in its use of diagnostic EMs based on the utilization standard of examining 250 specimens a year. The percentage of diagnostic EMs meeting or exceeding the standard increased from 36 percent in fiscal year 1975 to 64 percent for fiscal year 1977. However, problems still exist in the utilization of VA's diagnostic and research EMs.

## Use standards for EMs

In the early years of VA's EM program, definitive measures for evaluating diagnostic EM use by the medical community in general had not been developed. However, in fiscal year 1972, a VA Electron Microscopy Ad Hoc Committee indicated that an experienced and organized crew of two technicians and one professional could examine as many as 5 specimens a day, or 1,200 specimens a year. In our 1973 report to VA, we stated that based on this criteria, the optimum capability for 24 EM units operating as of December 1971, when fully staffed under the VA guidelines, was about 19,600 specimens annually. However, in 1971 these locations reported that only 1,808 diagnostic specimens had been examined (about 9 percent optimum) and, if research is included, 3,852 specimens had been examined (about 20 percent optimum).

Since our 1973 report, VA changed the utilization measurement criteria and stated that 5 specimens a day, or 1,200 specimens a year, was unrealistic. The EM Ad Hoc Committee stated:

"The conclusion has been reached that the average diagnostic workload for a fully operational EM unit with standard resources that include 1.0 FTE [full-time equivalent] pathologist-electron microscopist and 2.0 FTE electron microscopy technicians should be about 250 specimens per year."

During our most recent review, we noted that VA's standard did not specify whether the 250 specimens annually, with an allowable variance downward of 10 percent (225 specimens), meant those "accessioned" (i.e., prepared for examination) or those actually examined. Pathology Service officials at VA central office said the standard was based on the number of specimens accessioned. This, they said, was established to indicate the potential need for actual EM examinations. These officials also stated that experience indicated that the productivity standard should be adjusted to 250 specimens examined annually for established, fully staffed EM units. This adjusted standard became effective October 1, 1977. Also, the 10-percent allowable variance from the established standard has been eliminated.

VA regulations require a semiannual report on each diagnostic EM unit. Semiannual reports are evaluated by the VA central office Pathology Service and include specific comments on the strengths and weaknesses of each program. Each program's ability to meet the use standard usually determines whether the program is rated as satisfactory or unsatisfactory. When noted unsatisfactory, the condition must be improved within the next 12 months. If the condition is not corrected, the EM program will usually be terminated.

VA has no productivity standard for measuring the use of research EMs.

### Diagnostic EMs

Based on VA central office semiannual reports for the 6-month period which ended December 31, 1976, 19 of VA's reported 42 operating diagnostic EM units (45 percent) examined specimens at a rate of less than 250 specimens a year. As shown in the following table, 15 EM units did not examine 250 specimens annually from July 1974 through December 1976, and 12 of the 15 EM units examined less than 225 specimens annually (250 specimens minus a 10-percent variance).

VA Diagnostic EM Units  
Which Have Consistently Examined Less Than 250  
Specimens Annually From July 1974 Through December 1976

<u>VA hospitals with</u> <u>diagnostic EM</u> <u>units (note a)</u>	<u>Fiscal year EM units</u> <u>became fully</u> <u>operational (note b)</u>	<u>Examined</u> <u>less than</u> <u>225 specimens</u>
Allen Park, Michigan	1971	X
Birmingham, Alabama	1969	X
Bronx, New York	1970	X
Charleston, South Carolina	1974	X
Chicago (West Side), Illinois	1970	X
Cleveland, Ohio	1968	X
Gainesville, Florida	1973	X
Lexington, Kentucky	1974	X
Long Beach, California	1971	X
Los Angeles (Wadsworth), California	1967	X
Northport, New York	1974	X
Philadelphia, Pennsylvania	1966	
Pittsburgh, Pennsylvania	1973	
San Francisco, California	1969	
West Haven, Connecticut	1968	X

a/One diagnostic EM at each VA hospital.

b/Fully operational EM unit includes one full-time pathologist and two full-time electron microscopy technicians.

These EM units should be monitored closely under the current productivity standard (minimum of 250 specimens examined with no variance allowed) to determine if they are being underused. Aside from the fact that underused EMS are a waste of a valuable resource, underuse could also have an adverse impact on diagnoses and the quality of patient care. Often electron microscopy examinations of human tissue specimens improve, correct, or change an initial diagnosis.

VA should not acquire any additional EM units until all current diagnostic EM units meet or exceed the current use standard. If the EM units cannot meet the standard, they should be deactivated and/or transferred to locations where they will be optimally used.

### Research EMS

More than half of all VA electron microscopes are assigned to research. VA regulations do not provide utilization/productivity standards with which to measure the use of a research EM unit. There is but one reporting requirement by VA central office--a report of (1) the total number of research papers published, (2) the annual operating cost of the research EM unit, and (3) the distribution of applicable cost to each research investigator using the research EM unit.

Because VA has not established a utilization/productivity standard for its research EMS, it has no basis for evaluating whether these instruments are being used in the most efficient and economical manner.

In the absence of an established use standard, we assessed the use of research EMS on the basis of the number of hours per week the EMS were actually being operated in support of ongoing research projects at the VA hospitals we visited.

We found a significant disparity among research activity with EMS at the Hines and Lakeside VA hospitals. Although both hospitals had three research EM units in 1976, Lakeside used its EMS three times as often, as shown on the following page.

Hines' estimated weekly usage  
of its research EMs

EM #1 (Transmission) 16 hours  
EM #2 (Transmission) 8 hours  
EM #3 (Scanning) 1/2 hour

Total Usage 24-1/2 hours

Lakeside's estimated weekly  
usage of its research EMs

EM #1 (Transmission) 30 hours  
EM #2 (Transmission) 15-20 hours  
EM #3 (Transmission) 30 hours

75-80 hours

At the Miami, Florida, VA hospital, which has two research EMs, we found the average weekly usage to be:

EM #1 (Transmission)	8 hours
EM #2 (Transmission)	<u>24 hours</u>
Total	<u>32 hours</u>

Our review at the Tampa and Gainesville, Florida, VA hospitals, which together had three research EM units, indicated an average usage of about 24 hours a week.

On the basis of our review, it appears that more efficient use could be made of VA's research EMs by reducing the number of units at the above hospitals, properly scheduling the remaining units' availability to researchers, and sharing their use for both research and diagnostic purposes.

To maximize the use of all EMs within VA, we believe VA's Medical Research Service and Pathology Service should undertake a joint study to determine the feasibility of establishing a joint utilization/productivity standard for both research and diagnostic EMs.

DUPLICATION OF EM FACILITIES--  
REGIONALIZATION NOT PROGRESSING

VA's policy on laboratory service regionalization, as encouraged by Public Law 89-785, is to attain the maximum use of scarce and/or costly medical resources, including electron microscopes. Responsibility for planning and implementing this regionalization policy has been delegated to the 28 VA medical districts. Under this policy, each medical district is required to establish a laboratory committee comprised of the laboratory service

chiefs at all VA hospitals and clinics within the medical district. This committee is responsible for assessing the status of laboratory service regionalization in its medical district and making recommendations as indicated to district management.

Our review disclosed that regionalization with respect to electron microscopy has not been discussed or addressed at all by some medical districts' laboratory committees. We observed several instances where it seemed that EM services could be regionalized or that EMs at nearby university or community hospitals could be used, through sharing or contractual arrangements, until the workload is great enough to warrant a VA-equipped and-staffed EM unit. Some examples follow.

### Cincinnati, Ohio

VA's latest 5-year plan includes the purchase of an EM to be located at either the Cincinnati or Indianapolis VA hospital for fiscal year 1982. The University of Cincinnati College of Medicine, located one-half mile from the Cincinnati VA hospital, has 12 EMs. Four of the EMs are in the Medical School's Pathology Department. The Chairman of the school's Pathology Department said that his microscopes are used for only 35 to 40 percent of a 16-hour day and that the Cincinnati VA hospital could use the school's EMs even if the VA hospital's workload increased substantially.

Although a formal sharing agreement has not been negotiated, the Cincinnati VA hospital does use the school's EMs. The hospital has a pathologist skilled in electron microscopy and a technician who prepares specimens for examination. The pathologist said the school's EMs can do the same work as an EM the VA hospital wants to buy, and the school allows him to use the EMs, at his convenience, for a fee of \$20 an hour.

The Cincinnati VA hospital's workload in electron microscopy for 1976 was 26 specimens. Records for previous years were incomplete, but the hospital's Chief of Laboratory Services said the 1976 workload was typical. In 1976 VA paid the university \$1,940 for the use of its EMs; in 1975, \$1,960.

The Director of the Cincinnati VA hospital said he believes the basic reasons for acquiring an EM are to attract a highly qualified pathologist and improve the



hospital's overall patient care. He also said that using another institution's facilities is undesirable, because not having an EM unit in the hospital discourages the use of EM services. The Director said that although the EM service is available now at the university, there is no guarantee that it will be available in the future.

The hospital Director and his Chief of Laboratory Services believe they can increase their specimen examinations to 250 annually if an EM is purchased. These officials explained that EMs are not used to their maximum capacity because the pathologist and technician devote only part of their time to electron microscopy. We were informed, however, that no studies were available to show that a significant increase in electron microscopy is needed. A medical official at the Cincinnati VA hospital said that the hospital's workload does not justify owning such equipment.

Not only is the Cincinnati VA hospital's workload insufficient to justify an EM unit, but the purchase of an EM would duplicate underused EMs at the University of Cincinnati College of Medicine. Accordingly, we believe VA should cancel any plans to install an EM at the Cincinnati VA hospital and direct that hospital to enter into a formal sharing agreement with the University of Cincinnati to satisfy the hospital's long term electron microscopy needs.

### Chicago, Illinois

None of the four VA hospitals in the greater Chicago area, which comprise VA Medical District 17, have entered into formal sharing agreements for using non-VA electron microscopes.

As noted in the following sections, the affiliated medical schools and other nearby facilities have at least 34 EMs, many of which are not optimally used. The VA hospitals in Medical District 17 may have missed opportunities to avoid duplicating costly and highly specialized medical equipment which already exists in the surrounding medical community.

### Hines VA hospital/Loyola University

The Hines VA hospital has one diagnostic EM and three research EMs. At the time of our review, four departments at the adjacent Loyola University, with which

Hines is affiliated, had a total of seven EMs. The Pathology Department's three EMs were used primarily for diagnosis; all others were used for research. Loyola University's estimate for the use of its EMs is shown below:

<u>University department</u>	<u>Type of electron microscope</u>	<u>Daily hours</u>	<u>Weekly hours</u>
Pathology	Transmission	12	-
	Transmission	4	-
	Scanner (note a)	-	-
Anatomy	Transmission	4	-
	Transmission	4	-
Microbiology	Transmission	-	10-15
Dentistry	Transmission	-	24

a/Scanner EM is used for teaching and research. No estimated usage was provided.

Loyola University officials in each department except Pathology said that sharing EM services with the Hines VA hospital was definitely possible. An official in the Pathology Department indicated that sharing EM services with Hines, although possible, would be difficult.

#### Lakeside VA hospital/Northwestern University

The Lakeside VA hospital also had one diagnostic EM and three research EMs. During our review at Northwestern University we identified 6 departments with a total of 11 EMs. Three EMs, in the university hospital's Pathology Department, were used primarily for diagnostic examinations. The university medical school's Pathology and Dermatology Departments and dental school also did some diagnostic work using their EMs, but most of their examinations, and all of the examinations of the Anatomy and Biochemistry Departments, were for research. Estimated use of these electron microscopes is shown on the following page.

<u>University department</u>	<u>Type of electron microscope</u>	<u>Daily hours</u>	<u>Weekly hours</u>
Pathology	Transmission	8	-
(university hospital)	Transmission	4	-
	Scanner	4	-
Pathology (medical school)	Transmission	-	30
	Transmission	-	30
Anatomy	Transmission	-	60
	Transmission	-	60
	Transmission	-	60
Biochemistry	Transmission	-	20
Dermatology	Transmission	2	-
Dental School	Scanner	-	30

Only the Anatomy Department indicated that sharing EMs with the Lakeside VA hospital would not be possible.

West Side VA hospital/University of Illinois and West Side Medical Center

The West Side VA hospital has one EM which is used primarily for diagnostic work. We identified three organizations within the affiliated University of Illinois which had a total of nine EMs. The major workload of each was research, but some diagnostic work was also performed. The Pathology Department of the university hospital did their diagnostic work at the Research Resources Center. The estimated use of the EMs follows.

<u>University organization</u>	<u>Type of electron microscope</u>	<u>Daily hours</u>
Research Resources Center	Transmission	6-7
	Transmission	6-7
	Transmission	6-7
	Transmission	6-7
	Transmission	6-7
Eye and Ear Infirmary	Transmission	12
	Transmission (note a)	-
College of Dentistry	Transmission	6
	Scanner (note b)	-

a/An old EM which is not working and may be irreparable.

b/EM not operating due to recent move.

Other organizations in the Medical Center, not associated with the University of Illinois, also have EMS. Although we did not contact these organizations to ascertain their EM usage, we identified at least the following numbers of available EMS:

<u>Organization</u>	<u>No. of EMs</u>
St. Luke's Hospital	3
Cook County Hospital	1
Illinois State Pediatric Institute	1
University of Health Sciences/The Chicago Medical School	<u>2</u>
Total	<u>7</u> —

#### North Chicago VA hospital

The North Chicago VA hospital does not have an EM, and the hospital is not included in VA's latest 5-year plan to receive an EM. In the past, both Hines and Lakeside VA hospitals have provided EM services when needed. We learned that the Naval Dental Research Institute, in the same immediate area as the North Chicago VA hospital, has an EM. The EM unit's supervisor said time was available on the EM for sharing with the North Chicago hospital.

#### Madison, Wisconsin

The Madison, Wisconsin, VA hospital has an EM which will become operational in the laboratory during fiscal year 1978. The University of Wisconsin Medical School, affiliated with the Madison VA hospital, has at least eight EMS. Three instruments in the school's Pathology Department were used primarily for diagnostic work and were heavily scheduled. However, five other EM units, used primarily for research, had time available.

Our review indicated that there is EM time available elsewhere in the medical school which could help support the Madison VA hospital's EM research efforts. Also, the supervisor of the medical school's Pathology Department said his department's EMS could do a limited amount of the Madison VA hospital's current diagnostic workload despite the EMS' current heavy schedule.

In fiscal year 1978, when the Madison VA hospital's diagnostic EM unit becomes operational, diagnostic

specimens are expected to increase. The specimens will come from both Madison and Wood, Wisconsin, VA hospitals. During the first 3 years of operation the diagnostic EM workload is expected to be 200 to 250 specimens a year. However, the Madison VA hospital, when it applied to VA central office for establishing its own diagnostic EM unit, projected a potential yearly total of 615 diagnostic and research specimens. Based on our review of EM utilization in VA, we believe the Madison VA hospital's projected EM workload may be overly optimistic.

### New York

VA Medical District 2, consisting of six VA hospitals in the State of New York, has four EM units. The Albany VA hospital has three; the Buffalo VA hospital has one. The other four VA hospitals in Batavia, Bath, Canandaigua, and Syracuse, New York, have none. In addition to EMS located in the two VA hospitals, there are another 63 EMS in the medical community within the district's geographical area: 22 in Buffalo, 24 in Rochester, 3 in Syracuse, and 14 in Albany. According to VA and non-VA pathologists, most of these EMS are used for research purposes. However, some of the researchers are pathologists and can do diagnostic work, and could therefore help meet VA's diagnostic needs.

### EM UNITS ESTABLISHED WITHOUT ADEQUATE PLANNING

VA central office has permitted the establishment and continued operation of some EM units which have not had sufficient workloads to justify their existence in certain VA hospitals. Some EM units were originally purchased with VA research funds when electron microscopy was a new and developing procedure, and when no utilization standards existed either in VA or in the medical community. Other EM units were purchased for diagnostic applications in VA pathology laboratories before the present EM program was developed. Hospitals requested EM units because they believed the service was needed to complement patient care and attract highly qualified pathologists for their hospitals.

Plans for EM units have not been formally coordinated at the national, VA departmental, or VA medical district levels. Pathology Service officials at VA central office

said that all planned locations for additional EMS are tentative and subject to change each fiscal year until funds have been appropriated. For example, a proposed plan to purchase an EM unit for the San Antonio, Texas, VA hospital in fiscal year 1978 was changed to locate the EM unit at the Loma Linda, California, VA hospital. Assignment of EM units, according to VA central office officials, is based not on a hospital's formal application for an EM but on the desire of the VA hospital to have one. In our view, specific information, such as workload data and the identification and availability of nearby facilities already providing the service, should be considered by VA central office to foster regional planning and to avoid duplicating and overlapping facilities.

We believe EM units are still being planned and established without adequate VA central office review and control to determine the need for the service. For example, Pathology Service plans at VA central office, as of October 29, 1976, called for an EM unit at the Cincinnati, Ohio, VA hospital for fiscal year 1979 or later. The Pathology Service's 5-year plan, dated March 21, 1977, calls for an EM unit at either the Cincinnati, Ohio, or Indianapolis, Indiana, VA hospital for fiscal year 1982. In our review, we determined that the need for an EM unit at the Cincinnati VA hospital was not justified because the hospital had an EM workload of only 26 specimens during 1976 (see p. 15). Indianapolis VA hospital officials said they did not want to be considered for an EM unit because EM work is sent to the affiliated Indiana University Medical School which has nine EMS.

## CHAPTER 3

### CONCLUSIONS AND RECOMMENDATIONS

#### CONCLUSIONS

Some of VA's EM units are underused. From July 1974 to December 1976, 15 of 42 reported diagnostic EM units examined less than 250 specimens annually--the current use standard set by VA.

VA central office has permitted the establishment of EM units in locations without adequately determining their need. VA has not followed its policy that specialized medical services, including electron microscopy, be planned and provided on a regionalized basis to avoid duplicating or overlapping these costly medical programs.

Individual VA hospital planning to install EM units has not been formally coordinated at the national, VA department, or VA medical district levels. In some cases, such as at the Brooklyn VA hospital, independent planning of EM programs has proceeded with a lack of overall guidance from or control by VA central office.

We believe that the current practice of assigning separate EMs to the Pathology Service and the Medical Research Service, both within VA's Department of Medicine and Surgery, impedes the most effective use of these expensive instruments. We believe, also, that VA should consider involving its medical districts in overseeing medical research programs so that EM use and distribution can be more effective and efficient.

#### RECOMMENDATIONS TO THE ADMINISTRATOR OF VETERANS AFFAIRS

To improve the distribution and use of EMs within the VA health care system, we recommend that the Administrator:

- Direct the Chief Medical Director to make a systemwide study to determine the feasibility of establishing joint Pathology Service and Medical Research Service utilization standards for both diagnostic and research EMs.
- Insure continuing compliance with VA regulations to terminate EM programs when the programs cannot be justified on the basis of available workload.

--Require that VA's EM inventory be updated to accurately reflect all EMs within the VA health care system, whether they are being funded by VA central office, locally, or otherwise.

--Direct that VA medical districts be given more responsibility for the planning, distribution, and utilization of both diagnostic and research EMs, and require formal sharing agreements when this would make the best use of the medical districts' resources.

### VA COMMENTS AND OUR EVALUATION

In commenting on our draft report (see app. II), VA did not fully concur with all of our recommendations but indicated a number of corrective actions it would take. VA's comments and our evaluation are summarized below.

#### Establishing utilization standards

VA concurred with our recommendation to study the feasibility of establishing joint Pathology Service and Medical Research Service utilization standards.

#### Underutilization of EMs

VA said that it has a monitoring procedure in effect which evaluates the quality and productivity of each EM unit for diagnostic purposes.

We agree that VA has such a monitoring procedure in effect, and during our study we noted the progress that has been made in the EM program as a result of this monitoring procedure. As stated on page 10, the percentage of diagnostic EMs meeting or exceeding the standard of examining 250 specimens a year increased from 36 percent in fiscal year 1975 to 64 percent for fiscal year 1977. VA stated that 14 of the 15 units we considered to be underused met the productivity standard in effect at that time (250 accessions per year). We concur that the EM units met the accession standard. However, in light of the past performance of the EMs we cited and the new productivity standard of examining 250 specimens a year (which was clarified and implemented by VA on October 1, 1977), we believe the EMs we cited should be closely monitored in the future.



VA said that the same standards appropriate for diagnostic EMs should not be applicable to EMs used for research and that factors other than the number of specimens examined must be considered. VA said it is aware that the existing workload criteria does not adequately take into account the needs of research.

We are aware that there may be some difficulties in establishing productivity standards for the combined use of diagnostic and research EMs, so we recommended that VA undertake a study to determine the feasibility of establishing such joint utilization standards. VA lacks a means for effectively monitoring its 54 EMs used for research. We believe that the utilization of all EMs should be monitored whether they are used for diagnostic or research purposes.

#### Update EM inventory

VA agreed with our recommendation to update its EM inventory. We believe this will strengthen control over these specialized medical resources.

#### Responsibility for EM program

VA agreed with our recommendation that more responsibilities could be assigned to the VA medical districts, but stated that certain responsibilities must be retained by VA central office. These include (1) the development of productivity/utilization guidelines, (2) the determination of total requirements agencywide, (3) the setting of priorities among medical districts, (4) the final decision on obtaining new EMs, and (5) the review of all EM activities to provide a continuing assessment of the total agencywide picture.

We agree with VA, but we continue to believe that VA central office could and should involve, to a greater degree, the medical districts in its decisions for control, planning, and distribution of electron microscopes.

VA said the final decision to assign an EM unit has always been based on a number of factors, the interest of the hospital included. VA said that revised application procedures were issued in fiscal year 1977 which included the requirement for planned use as a regional resource within the medical district, and the endorsement of the Medical District Executive Council before submission of a

request to VA central office. We understand that this procedure will be applicable to EMs used for research as well as to EMs used for diagnostic purposes, in which case we agree with VA's action and believe it will result in a more efficient and effective EM program.

VA HOSPITALS AND ELECTRON MICROSCOPYPROGRAMS REVIEWEDHospitals visited

## Medical District 2:

Albany, New York

## Medical District 3:

Brooklyn, New York (note a)

New York, New York

Bronx, New York

## Medical District 11:

Lexington, Kentucky

## Medical District 12:

Gainesville, Florida

Miami, Florida

Tampa, Florida

## Medical District 13:

Cincinnati, Ohio (note a)

Cleveland, Ohio

## Medical District 15 (note a):

Indianapolis, Indiana (note a)

## Medical District 16:

Madison, Wisconsin

## Medical District 17:

Chicago (Hines), Illinois

Chicago (Lakeside), Illinois

Chicago (West Side), Illinois

North Chicago, Illinois

a/Has no EM units listed in VA central office inventories.



VETERANS ADMINISTRATION  
OFFICE OF THE ADMINISTRATOR OF VETERANS AFFAIRS  
WASHINGTON, D.C. 20420

1 APRIL 6 1978

Mr. Gregory J. Ahart  
Director, Human Resources Division  
U. S. General Accounting Office  
441 G Street, N.W.  
Washington, DC 20548

Dear Mr. Ahart:

We have reviewed the February 22, 1978 draft report, "Electron Microscopes are Still Underused in Many Veterans Administration Hospitals: Planning, Distribution, and Control Need Improvement," and will comment on the recommendations as they appear in the report.

The Administrator of Veterans Affairs should:

--Direct the Chief Medical Director to undertake a system-wide study to determine the feasibility of establishing joint Pathology and Medical Research Service utilization standards for both diagnostic and research electron microscopes.

We concur in this recommendation. A study to determine the feasibility of joint utilization standards for both diagnostic and research electron microscopes (EM's) will be undertaken.

--Insure continuing compliance with VA regulations to terminate electron microscope programs when the programs cannot be justified on the basis of available workloads.

We have a monitoring procedure in effect which evaluates, on a semi-annual basis, the quality and productivity of each EM unit used for diagnostic purposes. After a probationary period, programs not meeting standards will be terminated.

We wish to point out that in Fiscal Year (FY) 1977, 14 of the 15 units considered by GAO to be underutilized met the productivity standard in effect at that time (250 accessions per year). The unit at the Birmingham hospital did not meet the criteria and the program there is being monitored closely.

While a productivity standard based on the number of specimens examined may be appropriate for diagnostic EM's, we do not feel that the same standards should apply to EM's used for research. In research, factors other than number of specimens examined must be considered. These

Mr. Gregory J. Ahart  
Director, Human Resources Division

factors include the transiency of the material to be examined, the unpredictability of the moment when the specimens are available, and the need for special resolution. We feel the critical factor to be considered when establishing productivity standards for research EM's is the hours that the instrument is meaningfully "tied up" by a project, even if it is not in actual use but on standby awaiting a critical and transient specimen. We also feel that any productivity assessment must take into account the variable demand nature of research for resources as projects go through successive phases. Hence, standards should be set for an extended period of time. We are aware that existing workload criteria do not adequately take into account the needs of research.

--Require that VA's electron microscope inventory be updated to accurately reflect all electron microscopes within the VA health care system, whether they are being funded by VA central office, locally, or otherwise.

We concur in this recommendation and will update our EM inventory.

--Direct that VA medical districts be given responsibility for the planning, distribution, and utilization of both diagnostic and research electron microscopes, and require formal sharing agreements when this would make the best use of the medical districts' resources.

One of the objectives of the medical district concept is to identify and eliminate unnecessary duplication of services through district planning and community sharing agreements. We agree that more responsibilities can be assigned to the medical districts. However, certain responsibilities must be retained in central office. These include (1) the development of productivity/utilization guidelines, (2) the determination of total requirements Agency-wide, (3) the setting of priorities among medical districts, (4) the final decision on obtaining new EM's, and (5) the review of all EM activities to provide a continuing assessment of the total Agency-wide picture.

Under the heading "Electron Microscope Units Established Without Adequate Planning," the report states that assignment of EM units is not based on a hospital's formal application, but rather by

Mr. Gregory J. Ahart  
Director, Human Resources Division

the desire of the hospital to have one. The final decision to assign an EM unit has always been based on a number of factors, the interest of the hospital included. By FY 72, a formal application procedure was in effect and information pertaining to other EM's in the immediate medical community was required. Revised application procedures were issued in FY 77. These include the requirement for planned usage as a regional resource within the medical district, and the endorsement of the Medical District Executive Council before submission of a request to VA Central Office.

We appreciate the opportunity to comment on this report.

Sincerely,

  
Max Cleland - in the absence of  
MAX CLELAND  
Administrator

PRINCIPAL VA OFFICIALS  
RESPONSIBLE FOR ADMINISTERING  
ACTIVITIES DISCUSSED IN THIS REPORT

	<u>Tenure of office</u>	
	<u>From</u>	<u>To</u>
<b>ADMINISTRATOR OF VETERANS AFFAIRS:</b>		
J. M. Cleland	Mar. 1977	Present
H. D. Grubb (acting)	Feb. 1977	Mar. 1977
R. L. Roudebush	Oct. 1974	Feb. 1977
R. L. Roudebush (acting)	Sept. 1974	Oct. 1974
D. E. Johnson	June 1969	Sept. 1974
<b>DEPUTY ADMINISTRATOR:</b>		
R. H. Wilson	Mar. 1977	Present
Vacant	Jan. 1977	Mar. 1977
O. W. Vaughn	Nov. 1974	Jan. 1977
Vacant	Oct. 1974	Nov. 1974
R. L. Roudebush	Jan. 1974	Oct. 1974
F. B. Rhodes	May 1969	Jan. 1974
<b>CHIEF MEDICAL DIRECTOR:</b>		
J. D. Chase, M.D.	Apr. 1974	Present
M. J. Musser, M.D.	Jan. 1970	Apr. 1974
H. M. Engle, M.D.	Jan. 1966	Jan. 1970

(40130)