

July 1988

# MEDICAL ADP SYSTEMS

## Analysis of Technical Aspects of DOD's Composite Health Care System

043674



United States  
General Accounting Office  
Washington, D.C. 20548

Information Management and  
Technology Division

B-220732

July 11, 1988

The Honorable Frank C. Carlucci  
The Secretary of Defense

Dear Mr. Secretary:

As provided for in the Department of Defense Authorization Act for 1986, we are evaluating the acquisition of the Composite Health Care System (CHCS). As you know, CHCS is a state-of-the-art medical information system the Department of Defense (DOD) is acquiring for use in approximately 167 military hospitals and nearly 600 clinics worldwide at an estimated program cost of between \$800 million and \$1.1 billion.

This report discusses issues identified during our review of two key aspects of the acquisition—system-level specifications and medical facility work load. System-level specifications comprise the operational framework a system needs—such as response times and reliability—to effectively perform its functions. Medical facility work load is a critical factor vendors used in determining the type and amount of hardware needed at each site. Both of these elements will have a substantial impact on the overall size, cost, and operational capabilities of CHCS when the system is deployed worldwide.

From documentation and discussions with contractors and officials, we saw no reason to question most of the approximately 650 system-level specifications. We did, however, identify four specifications in the request for proposals that require additional analysis by DOD to ensure they are reasonable and cost-effective. These four specifications relate to (1) costing all computer operators as contractor-provided, although the government intends to use its own personnel under certain circumstances; (2) 2-hour maintenance response times, (3) 30-day on-line data retention for inpatients, and (4) 2-year on-line data retention for outpatients. These specifications are important because they have an impact on the system's cost in various areas—disk drives, maintenance, and system operations.<sup>1</sup> Additional analysis of and, if necessary, subsequent modifications to these specifications could reduce CHCS life cycle costs.

We also noted that from 1984 to 1986, the number of outpatient visits declined by 5 to 14 percent in all three services' medical facilities. At

<sup>1</sup>This report does not contain specific costs related to these elements, which constitute proprietary information. The unauthorized disclosure of such information is prohibited by 18 U.S.C. 1905

---

individual facilities, outpatient work load has varied widely—increasing as much as 85 percent and decreasing as much as 48 percent. Outpatient visits are an important element in the work load model vendors used to develop their cost and technical proposals. While this decline does not affect the validity of the work load model in estimating overall system cost, unanticipated variations at individual military medical facilities could result in excessive or inadequate computer resources.

In commenting on a draft of this report, DOD agreed that the four system-level specifications needed further analysis and stated that it would evaluate these specifications during the current operational test and evaluation phase of the acquisition. While DOD questioned whether our finding relating to the decline in outpatient work load was statistically significant, it stated that additional data on outpatient work load would be gathered during the current phase.

---

## Objectives, Scope, and Methodology

Our objectives were to evaluate the system-level specifications and medical facility work load data for this procurement. Our approach to evaluating the system-level specifications was to examine each of DOD's approximately 650 specifications to identify those that were questionable. We held discussions with officials from DOD's Tri-Service Medical Information Systems Program Office (the office responsible for managing the acquisition) and the four competing vendors, and reviewed documentation on the specifications. We also analyzed DOD's work load model to determine whether it provided for the full range of data processing requirements and whether it could support an accurate evaluation of vendor cost proposals. Finally, we examined whether significant changes in outpatient work load had occurred at medical treatment facilities from 1984 to 1986 (the latest year for which data was available). More details on our objectives, scope and methodology are in appendix I.

Our work was performed from August to December 1987. DOD's comments on a draft of this report are included as appendix II. Our review was conducted in accordance with generally accepted government auditing standards.

---

## Background

CHCS is an essential part of DOD's Tri-Service Medical Information Systems Program. CHCS will provide a common system for use at military

---

hospitals and clinics, replacing earlier systems deployed to meet individual hospital department needs at selected locations. It provides an integrated system that will support both departmental information processing needs and serve as a hospitalwide data communications system. We previously reported that integrated hospital information systems have been generally accepted in the larger hospitals in the nation.<sup>2</sup>

The Tri-Service Medical Information Systems Program Office is using Office of Management and Budget (OMB) Circular A-109, Major Systems Acquisitions, as the basis for its procurement strategy. Following this concept, one way to improve the acquisition of major information systems is to use detailed functional requirements and allow vendors to propose systems that meet these requirements.<sup>3</sup> By allowing vendors to develop proposals with the maximum latitude in systems design, user needs may be met at reasonable cost. Under DOD's strategy, several vendors were selected to develop prototypes at government expense for testing and evaluation prior to final selection, contract award, and full-scale implementation.

In February 1988, DOD completed its evaluation of proposals and prototypes from three vendors competing for contracts to proceed to the next phase of the CHCS acquisition—operational test and evaluation. The February evaluation resulted in DOD's selection of one vendor who will install their system in a number of medical facilities for an extensive evaluation of how the system will operate in this environment. During this operational test and evaluation phase, DOD plans to (1) determine the system's effectiveness and suitability, (2) gather information for making production and implementation decisions, and (3) conduct a detailed analysis of CHCS costs and benefits. The Defense Authorization Act for 1987, as amended, requires DOD to perform its analysis of benefits and costs prior to making its deployment decision.

---

<sup>2</sup>ADP Systems: Examination of Non-Federal Hospital Information Systems (GAO/IMTEC-87-21, June 30, 1987).

<sup>3</sup>The CHCS request for proposals delineates more than 1,800 functional requirements—the features and capabilities that the program office has determined during many years of study as essential to meeting the ADP needs of DOD's medical facilities. The functional requirements have been grouped into seven modules that represent broad hospital functions, such as patient administration, radiology, and nursing.

---

## Four System-Level Specifications Need Additional Analysis

The CHCS request for proposals included system-level specifications that define the limits within which the functional requirements must be met. For example, reliability, availability, and maintainability are system-level specifications. Army analysts played the largest role in initially defining the system-level specifications in 1984. The specifications were then refined on the basis of comments from the Surgeons General and industry.

Reasonably defined system-level specifications are important because overly stringent specifications could increase acquisition and/or life cycle costs. Understated system-level specifications could lead to implementing systems that prove inadequate and require costly corrective measures. OMB Circular A-109 requires agencies acquiring a major system to ensure that it demonstrates a level of performance and reliability that justifies the allocation of resources for its acquisition.

We reviewed documentation and held discussions with contractors and program office officials concerning the system-level requirements. In doing so, we identified 4 of the approximately 650 specifications that we believe require additional analysis by the program office to ensure the cost-effectiveness of this procurement. The four specifications are (1) costing all computer operators as contractor-provided, although the government intends to use its own personnel under certain circumstances; (2) 2-hour maintenance response times; (3) 30-day on-line data retention for inpatients; and (4) 2-year on-line data retention for outpatients. Additional analysis of and, if necessary, subsequent modifications to these specifications could reduce CHCS life cycle costs.

---

## Cost for Contractor Versus Government Support Personnel

In the CHCS request for proposals, the program office required vendors to submit cost proposals using contractor-supplied personnel for computer operator duties. The request for proposals also required vendors to describe the number of computer operators and their duties. Program office officials stated that the government intends to substitute government personnel for contractor personnel when government personnel are available and can perform the duties on a collateral basis.

Where computers are located at all or many facilities, as opposed to a few regional centers to meet CHCS requirements, smaller systems can be employed. These smaller systems offer an opportunity for savings if they do not require full-time computer operators, and thus permit government personnel to perform these duties on a collateral basis. Since

---

vendors were required to submit cost proposals using contractor-supplied personnel only, potential savings from using government personnel on a collateral basis versus using around-the-clock contractor personnel have not been determined. The operational test and evaluation phase offers an opportunity to estimate these savings by providing a period during which data can be collected and analyzed on the circumstances and conditions where substituting government employees is advantageous.

---

### Maintenance Response Time

CHCS specifications call for a maintenance response time of 2 hours in the continental United States, Northern Europe, and Japan and 10 hours elsewhere. One vendor stated that these specifications are demanding and considerable savings could accrue if longer response times were allowed. For example, this vendor pointed out that the 2-hour maintenance response time can only be satisfied if maintenance personnel are positioned within 2 hours by car of every mainland facility. Changing the requirement to 4 hours, according to the vendor, would, in many cases, allow the use of air travel, thus substantially reducing the size of the maintenance organization required. A customer service representative of a large computer firm told us that it charges 50 percent more for a 2-hour response time than for a 4-hour response time. The program office stated that the 2-hour response time reflects industry standards, prior experience, and user needs for a functioning CHCS. The program office was unable, however, to provide specific support for its maintenance response time specifications.

---

### On-Line Data Retention Requirements

The request for proposals requires vendors to (1) retain inpatient records on-line for 30 days after the patient has been released and (2) retain outpatient records for service members and dependents on-line for 2 years after the last activity. The program office cited Air Force regulations (168-4, Chapters 7 and 12), as justification for these provisions. However, we found these regulations do not apply to requirements for on-line data retention, but rather concern storage and handling procedures for non-automated records. While the reasonableness of these specifications can only be determined through an analysis of costs and benefits, it would appear that significant savings would accrue if these on-line data retention times were reduced. For example, if the requirements were reduced by 50 percent, under the terms of the winning proposal about \$11 million in acquisition costs could be saved.

---

Further, we believe the 2-year retention requirement, in particular, needs to be analyzed. For example, as currently stated, DOD would retain a service member's and dependents' medical records on-line (as opposed to being archived where additional time is required to make them accessible) for 2 years after the service member is discharged.

---

### Work Load Model Is Adequate but Declining Work Load Needs to Be Monitored

To determine whether appropriate computer processing capabilities were being procured, we evaluated the work load model used by vendors to develop their technical and cost proposals. While we found that the work load model provides sufficient range and definition of processing needs for categories of military treatment facilities, recent changes in outpatient work load at many facilities may necessitate changes in the CHCS procurement. Unanticipated decreases and increases in outpatient work load at facilities may result in excessive or inadequate processing capabilities, respectively. Program office officials stated that they were not aware of the wide fluctuation in work load at the facilities, and agreed there was a need to monitor work load more closely.

---

### Work Load Model Adequately Represents Medical Facilities

The program office classified military hospitals and clinics into 17 representative categories of military treatment facilities.<sup>4</sup> DOD provided vendors with profiles of the facility chosen to represent each category. Each profile consisted of blueprints, a terminal device placement plan containing the number and location of video terminals and printers, and work load measures such as the number of operating beds, admissions, laboratory tests, prescriptions filled, and outpatient visits. The vendors used these profiles to develop both the technical and cost sections of their proposals. On the basis of DOD's guidance, vendors assumed, for bidding purposes, that every hospital in a category was the same. Vendors proposed fixed prices for all equipment and services required under the request for proposals. The quantities of equipment and services required for each category were summed to develop a bid for the entire CHCS. Thus, using a representative hospital for a category of hospitals, rather than conducting profiles and developing proposals for each individual facility, simplified the bidding and evaluation process.

Before the installation of a system, the winning vendor will conduct a site survey at each facility, including the collection of current work load

---

<sup>4</sup>DOD expanded these categories to better cover the full range of facilities based on our recommendation in *ADP Systems: Concerns About the Acquisition Plan for DOD's Composite Health Care System* (GAO/IMTEC-86-12, Mar. 31, 1986).

---

data. The vendor will then identify all of the system components and activities needed to install the system. Using the fixed prices established in the contract, the total charge for the facility will be established. We believe this approach to the work load model is acceptable if there is sufficient range and definition to the categories. That is, if the work load model covers hospitals and clinics from the largest to the smallest and provides sufficiently defined categories in terms of work load, then it can support an accurate evaluation of vendor cost proposals. On the basis of our analysis, we believe there are both sufficient range and definition to the categories of military treatment facilities in the work load model.

According to program office officials, the best available indicators of work load for military treatment facilities are the number of operating beds<sup>5</sup> and outpatient visits. For system sizing purposes, the number of operating beds provides the best indicator of the maximum work load for inpatients. Outpatient visits are the best single indicator of outpatient work load for both hospitals and clinics.

Figure 1 on page 8 shows the number of operating beds for each of the representative hospital categories and figure 2 shows the number of outpatient visits for representative hospital and clinic categories used in constructing the work load model.

While there are 167 military hospitals and nearly 600 clinics worldwide, most medical treatment is delivered at military hospitals. On the basis of the most recently available complete data (1984 and 1985), 107 hospitals in categories 2 and 3 maintained 58 percent of operating beds and provided 45 percent of outpatient visits. Military hospitals provided 70 percent of outpatient visits, while the more numerous clinics provided only 30 percent of outpatient visits.

As shown in figure 1, DOD's work load model now covers larger hospital facilities with category "0," represented by the largest military hospital with 1,000 operating beds. The model also covers annual outpatient visits for facilities ranging from 749,000 at the largest facility to 9,300 at the smallest (see figure 2). Because vendors for this procurement proposed computer hardware that provides the ability to modularly increase capabilities by adding additional quantities, they can handle

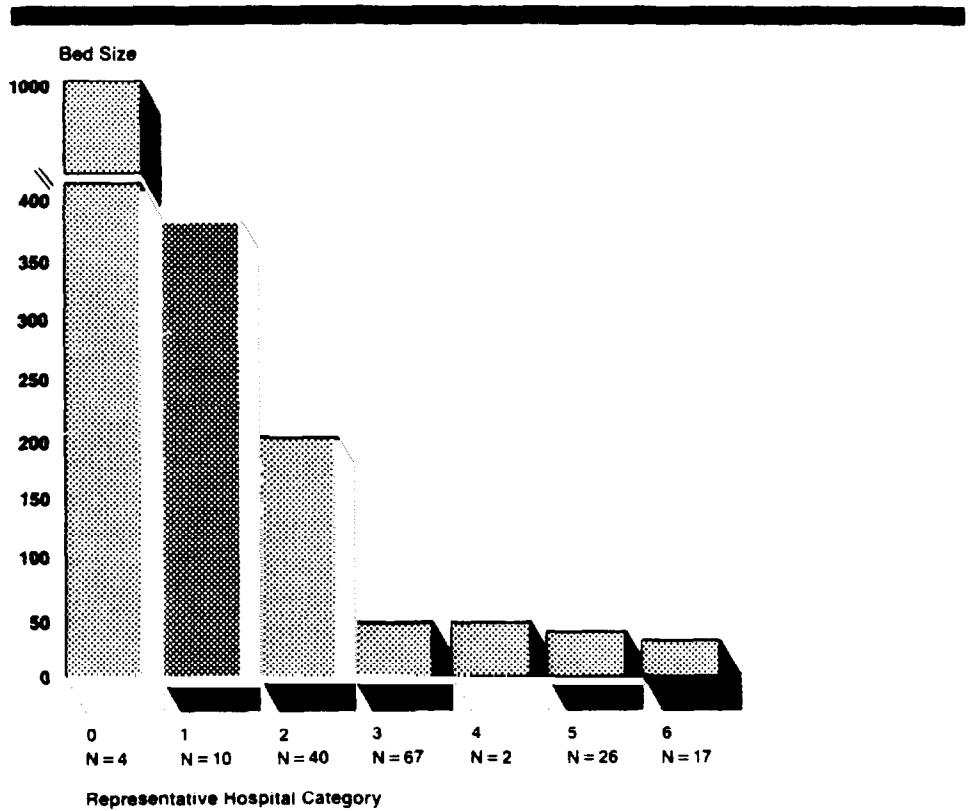
---

<sup>5</sup>Operating beds are those occupied or available for immediate occupancy. Military hospitals also have expandable beds that can be made operational in the event of mobilization or other emergency.



facilities whose work load varies from that of each category's representative site.

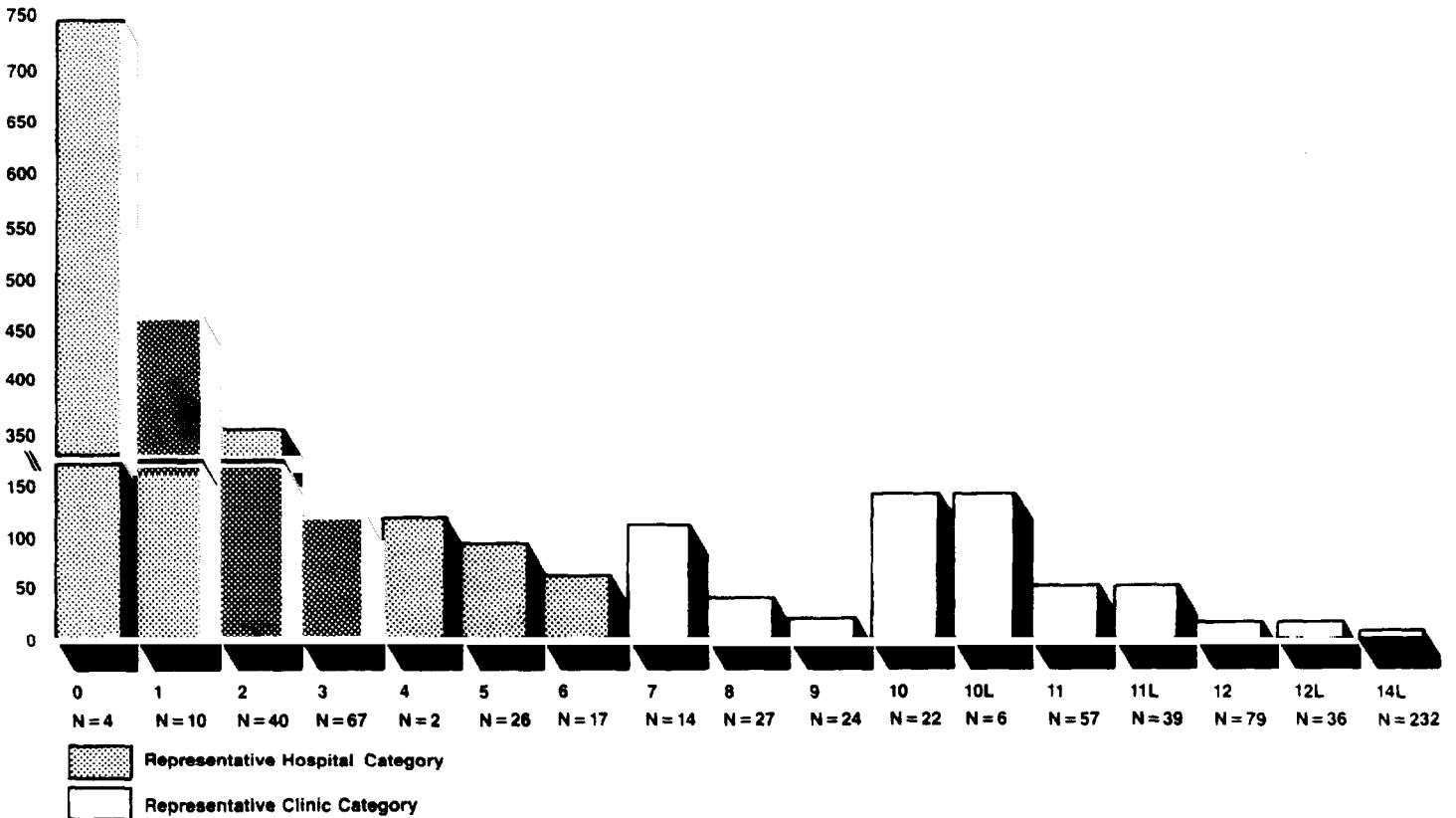
**Figure 1: Operating Bed Size of Representative Hospitals**



Note: N is the number of facilities represented in each category.

Note: Some categories appear duplicative, but represent facilities with similar work loads located outside the continental United States that require additional services.

**Figure 2: Outpatient Visits of Representative Hospitals and Clinics**  
 Outpatient Visits (000's)



Note: N is the number of facilities represented in each category.

Note: Some categories appear duplicative, but represent facilities with similar work loads located outside the continental United States that require additional services.

**Outpatient Work Load Has Declined Since 1984**

We reviewed available outpatient work load data from years 1984 through 1986 to determine if the number of outpatient visits at Army, Navy, and Air Force medical facilities had changed. We found that there has been a significant decline in outpatient work load at Navy and Air Force facilities since 1984 and at Army facilities since 1985 (1984 data were unavailable for the Army facilities). Table 1 shows that the decline varies significantly between the services, with the Navy showing the largest overall decrease of 14 percent. In addition, changes in outpatient

visits vary from facility to facility within each of the three services. For example, while the Navy shows an overall decline of 14 percent, the data for individual naval facilities varied extensively—increasing as much as 24.5 percent and declining as much as 48.4 percent. The number of outpatient visits for all three services dropped by more than 3.6 million for those facilities for which 1986 data were available.

**Table 1: Variations in Outpatient Work Load—1984-1986**

<b>Service</b>	<b>Largest Percentage Increase</b>	<b>Largest Percentage Decrease</b>	<b>Overall Percentage Decrease</b>
Air Force	+85.8	-32.0	-05.2
Army <sup>a</sup>	+06.2	-33.0	-10.1
Navy	+24.5	-48.4	-14.0

<sup>a</sup>The change in Army work load is from 1985 to 1986. Data for 1984 were not available.

Fluctuations in outpatient visits at DOD medical facilities are significant, and may have an impact on the CHCS acquisition. While vendors will conduct site surveys of medical facilities before CHCS hardware is installed, these surveys alone may not be sufficient because unanticipated decreases or increases in outpatient work load after installation may result in excessive or inadequate processing capabilities, respectively. Program office officials stated that they were unaware of the wide fluctuations in work load at individual facilities. They agreed that it would be necessary to more closely monitor work load trends in all three services prior to and after hardware is installed at individual medical facilities, in addition to conducting site surveys immediately prior to installation. These measures will help ensure that work load changes are anticipated and planned for.

## Conclusions

As DOD enters the operational test and evaluation phase of CHCS, the opportunity exists to identify possibilities for reducing costs while maintaining needed system capabilities. While we saw no reason to question the majority of the system-level specifications, we do not believe those for operator support, maintenance response times, and on-line data retention have been adequately analyzed or justified. During the operational test and evaluation phase of the acquisition, DOD has the opportunity to fully analyze the impact of these specifications on system costs and benefits. After this analysis, DOD may be able to revise these specifications to enhance the cost-effectiveness of the CHCS procurement.

---

In our opinion, DOD's work load model, used by vendors to develop their cost and technical proposals, is valid because it now includes providing automated support for the largest to the smallest hospitals and clinics. The use of DOD's work load model was a cost-effective alternative to requiring vendors to develop cost and technical proposals to meet the needs of every individual facility. However, outpatient visits—a key aspect of the work load at medical treatment facilities—have declined in the aggregate over the last several years. On an individual facility basis, outpatient visits have fluctuated widely—both increasing and decreasing. After installation at a facility, there could be significant shortfalls in capability if work load increases, or excess capacity if work load decreases. Therefore, it is critical for DOD to assess the impact of possible work load changes on the CHCS acquisition during the operational test and evaluation phase.

---

## Recommendations

To ensure that CHCS meets the needs of the military medical community in a cost-effective manner, we recommend that the Secretary of Defense direct the program office, during the operational test and evaluation phase, to

- determine potential savings from using government personnel instead of contractor-supplied computer operators by acquiring and analyzing data on the circumstances where this substitution should occur;
- evaluate and determine, during the cost/benefit analysis, the appropriate parameters for maintenance response times and on-line data retention; and
- monitor and analyze the work load at military medical facilities to ensure that, to the extent possible, changes in work load are anticipated and planned for. After completing these analyses, the program office should modify the procurement accordingly.

---

## Summary of Agency Comments

In commenting on a draft of this report, DOD agreed that the specifications for contractor-supplied computer operators, maintenance response times, and on-line data retention for inpatient and outpatient data need further analysis. DOD stated that during the operational test and evaluation phase it would (1) refine its requirements for contractor-supplied operators and adjust cost projections, and (2) address both the maintenance response times and the on-line data retention requirements to determine the most efficient and cost-effective parameters.

---

DOD did question whether the decrease in outpatient work load that we reported is statistically significant. While the services were only able to provide us with current work load data for 363 out of 702 facilities, or 52 percent, these facilities accounted for about 80 percent of military outpatient visits. We did not attempt to determine whether the decline in outpatient work load was statistically significant. As noted in our report, the work load at individual facilities has varied widely. We are concerned that wide fluctuations in work load at individual facilities can cause difficulties because unanticipated decreases or increases in work load after installation of CHCS could result in excessive or inadequate processing capabilities, respectively. In commenting on the draft report, DOD stated that the contractor is required to collect work load data at military medical facilities prior to installing CHCS and that this data will be used to size the equipment configuration for the facility. (See appendix II for the entire text of DOD's comments.)

---

This report contains recommendations to you on page 11. The head of a federal agency is required by 31 U.S.C. 720 to submit a written statement on actions taken on recommendations to the Senate Committee on Governmental Affairs and the House Committee on Government Operations 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.

We are sending copies of this report to the Chairmen of the House and Senate Committees on Appropriations and Armed Services; the Director, Office of Management and Budget; and other interested parties, and will make copies available to others upon request.

Sincerely yours,



Ralph V. Carlone  
Director

---

---

# Objectives, Scope, and Methodology

The Department of Defense Authorization Act for 1986 directs us to evaluate the acquisition of CHCS. Previously, we reported on (1) the process used in validating the functional requirements,<sup>1</sup> (2) the CHCS development contracts,<sup>2</sup> (3) CHCS operational test and evaluation costs,<sup>3</sup> and (4) DOD's evaluation of competing vendors' proposed medical information systems and the selection of one to proceed to the next phase of the acquisition—operational test and evaluation.<sup>4</sup> During this review, we evaluated the system-level specifications and work load model being used in this procurement.

To evaluate the system-level specifications contained in the CHCS request for proposals, we examined each of DOD's approximately 650 specifications to identify those that appeared questionable and for their potential impact on system acquisition costs. In addition, we met with cognizant representatives of each of the four competing CHCS vendors to obtain their assistance in identifying those system-level specifications having a significant impact on their expected costs. In analyzing the system-level specifications, we recognized that while a specification, when considered in isolation, may appear to have an impact on costs, its impact may be minimal when considered with other specifications. We also recognized that the cost impact of a system-level specification can vary significantly between vendor proposals. Each vendor developed its own system design, selected hardware and communication networks, and developed software to meet the functional requirements and system-level specifications under the OMB Circular A-109 process. Our discussions with the CHCS vendors revealed that individual system-level specifications often had disparate cost impacts on their proposals.

From these efforts, we developed a list of system-level specifications that may be contributing significantly to procurement costs and that did not appear to be adequately justified in program office documentation. We requested the Tri-Service Medical Information Systems Program Office to provide further justifications for these specifications and

---

<sup>1</sup>ADP Systems: Concerns About the Acquisition Plan for DOD's Composite Health Care System (GAO/IMTEC-86-12, Mar. 31, 1986).

<sup>2</sup>ADP Systems: Concerns About DOD's Composite Health Care System Development Contracts (GAO/IMTEC-87-25, June 8, 1987).

<sup>3</sup>Medical ADP Systems: Composite Health Care System Operational Test and Evaluation Costs (GAO/IMTEC-88-18BR, Jan. 28, 1988).

<sup>4</sup>Medical ADP Systems: Composite Health Care System Acquisition—Fair, Reasonable, Supported (GAO/IMTEC-88-26, Mar. 4, 1988).

examined their responses to determine whether there was, in our opinion, adequate justification for the specifications. We saw no reason to question a system-level specification if it did not have a significant impact on costs, or, if it did, that it provided compensating benefits. We did not, however, conduct a cost/benefit analysis of the specifications.

We analyzed DOD's work load model, used by vendors to develop their cost and technical proposals, to determine whether it provided for the full range of sites—the largest to the smallest hospitals and clinics. In addition, we assessed whether the work load model has sufficiently defined categories to support an accurate evaluation of vendor cost proposals.

We also examined whether there had been significant changes in work loads at military treatment facilities. To evaluate changes in medical work load, we obtained work load data from the Medical Expense Performance and Reporting System from each of the services for 1984 through 1986. (The Army could provide us only with data for 1985 and 1986.) We did not evaluate the accuracy of data generated from DOD's automated Medical Expense Performance and Reporting System. This data covered 239 Army facilities, 40 Navy facilities, and 84 Air Force facilities. We used the data to compute the percentage change in outpatient visits from 1984 (1985 for the Army) to 1986 (the most current available data) for each facility. Finally, we interviewed program office officials to assess how work load changes may affect the procurement.

We conducted our audit work from August to December 1987. It was conducted at the Tri-Service Medical Information System Program Office in Falls Church, Virginia; and at the offices of vendors bidding on the procurement. Our work was conducted in accordance with generally accepted government auditing standards.



# Agency Comments



HEALTH AFFAIRS

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE

WASHINGTON, D. C. 20301-1200

17 JUN 1988

Mr. Ralph V. Carlone  
Director, Information Management and  
Technology Division  
U.S. General Accounting Office  
441 G Street, N.W.  
Washington, D.C. 20548

Dear Mr. Carlone:

This is the Department of Defense (DoD) response to the General Accounting Office (GAO) Draft Report, "MEDICAL ADP SYSTEMS: Technical Aspects of DoD's Composite Health Care System," dated May 6, 1988 (GAO Code 510220), OSD Case 7630.

The DoD concurs with the report and will implement the recommendations during the CHCS operational test and evaluation. The projected completion date for the operational test and evaluation is Fall 1989.

Detailed DoD comments on each finding and recommendation are enclosed. The DoD appreciates the opportunity to comment on the draft report.

Sincerely,

A handwritten signature in cursive script, appearing to read "David Newhall".

David Newhall, III  
Principal Deputy Assistant Secretary

Enclosure

GAO DRAFT REPORT - DATED MAY 6, 1988  
(GAO CODE 510220) OSD CASE 7630

"MEDICAL ADP SYSTEMS: ANALYSIS OF TECHNICAL  
ASPECTS OF DOD'S COMPOSITE HEALTH CARE SYSTEM"

DEPARTMENT OF DEFENSE COMMENTS

\* \* \* \* \*

FINDINGS

- **FINDING A: Cost For Contractor Versus Government Support Personnel.** The GAO reviewed the system-level specifications developed for the Composite Health Care System (CHCS) acquisition and concluded that four of the approximately 650 specifications require additional analysis to ensure they are reasonable and cost-effective. First, the GAO found that vendors were required to submit cost proposals based on using contractor-supplied personnel. The GAO reported, however, that according to program office officials, the Government intends to substitute Government personnel for contractor personnel when they are available and can perform the duties on a collateral basis. According to the GAO, where computers are located at all or many facilities, rather than a few regional centers, smaller systems can be used. The GAO pointed out that these smaller systems offer an opportunity for savings if they do not require full time computer operators, thus permitting Government personnel to perform these duties on a collateral basis. The GAO noted, however, that since vendors were required to submit cost proposals, using only contractor supplied personnel, the potential savings from using Government personnel have not been determined. The GAO observed that the operational test and evaluation phase offers an opportunity to estimate these savings by providing a period during which data can be collected and analyzed to identify when substituting Government employees is advantageous. (p. 2, pp. 6-9/GAO Draft Report)

See pp. 1, 4-5.

**DoD Response:** Concur. The request for proposals required each vendor to include contractor-supplied computer operators in their cost proposals to eliminate any bias which would favor a cost proposal that relied heavily upon the use of Government supplied personnel. Forcing the competing vendors to cost all services as if they were to be contractor supplied allowed the cost proposals to be evaluated fairly, even though different technical solutions were being proposed. The CHCS contract is purposely structured so that contractor-supplied operators are optional for each site where the CHCS is to be deployed. For those facilities with a mature data processing operation, the Government would be in a position to provide the CHCS computer operators on a collateral basis. For

those facilities that do not currently have a data processing facility, however, using the contractor-supplied operators during the installation and implementation of the CHCS is a practical alternative that avoids the "hire lag" and training lead time problems of a new operation. The DoD will further refine its requirements and adjust cost projections as part of the CHCS operational test and evaluation.

- **FINDING B: Maintenance Response Time.** The GAO found that a second CHCS specification requires further analysis in the maintenance response time. According to the GAO, the CHCS specifications call for a maintenance response time of two hours in the continental U.S., Northern Europe and Japan, and 10 hours elsewhere. The GAO pointed out, however, that one vendor stated these specifications are demanding, and that the two hour requirement can only be satisfied by positioning maintenance personnel within a two hour car ride of every mainland facility. According to the GAO, this vendor said that changing the requirement to four hours would allow the use of air travel in many cases, thus substantially reducing the size of the required maintenance organization and providing an opportunity for considerable savings. The GAO also pointed out that a large computer firm it contacted charges 50 percent more for a two hour versus a four hour response time. The GAO reported that according to the CHCS program office, the two hour response time reflects industry standards, prior experience and user needs. The GAO noted, however, that the program office was unable to provide specific support for the maintenance response time specifications. The GAO concluded that additional analysis of the maintenance response time specification is needed to ensure the most cost effective approach. (p. 2, p. 7, pp. 9-10/GA Draft Report)

**DoD Response:** Concur. The maintenance response time of two hours is appropriate where the CHCS technical solution consists of a few regional data centers that serve many medical treatment facilities. Since the winning contractor system uses a decentralized concept of operation, the DoD will evaluate whether the maintenance response time standard could be relaxed without serious detriment to hospital operations.

- **FINDING C: On-Line Data Retention Requirements.** The GAO identified two other CHCS specifications that it concluded require additional analysis: (1) the 30-day on-line data retention for inpatients and (2) the two year on-line data retention for outpatients. The GAO reported that the CHCS program office cited Air Force regulations as justification for these provisions. The GAO found, however, that these regulations concern storage and handling procedures for non-automated records, not on-line data retention requirements. According to the GAO, the reasonableness of these specifications can only be determined through an

See pp. 1, 4, 5.

See pp. 1, 4, 5-6.

analysis of costs and benefits. The GAO concluded that significant savings might accrue if the on-line data retention times were reduced. As an example, the GAO estimated that, based on the winning proposal, \$11 million in acquisition costs could be saved by reducing the requirements by 50 percent. With regard to the two year retention requirement for outpatients, the GAO pointed out that this would mean the DoD would retain the medical records of a Service member and his dependents for two years after discharge, rather than being archived. The GAO concluded that the basis for this two year requirement needs to be further analyzed by the DoD. (p. 2, p. 7, pp. 10-11/GAO Draft Report)

**DoD Response:** Concur. The on-line retention requirements allow a health care provider to see the recent treatment history for each outpatient treated by the servicing medical treatment facility, and thus contribute to an improvement in the quality of care received by the patient. This capability would not be facilitated with an archived treatment record. The cost of on-line, high volume data storage equipment is continually decreasing. Each technological improvement in mass storage capability, coupled with the competitive pricing among competing vendors, is expected to reduce the cost of on-line data storage equipment for the deployment phase of the CHCS acquisition to the point where no appreciable saving would accrue by reducing the CHCS on-line data retention requirements. The on-line data retention requirements will be evaluated further during the CHCS operational test and evaluation.

- **FINDING D: The CHCS Work Load Model.** To determine whether appropriate computer processing capabilities are being procured, the GAO evaluated the work load model used by vendors to develop their technical and cost proposals. Based on its assessment, the GAO concluded that the work load model provided sufficient range and definition of processing needs for categories of military treatment facilities. With regard to system sizing, the GAO reported that, according to program officials, the best available indicator for inpatients is the number of operating beds, while outpatient visits is the best outpatient indicator for both hospitals and clinics. The GAO reviewed outpatient work load data from 1984 through 1986, and found that there has been a significant decline in outpatient work load at Navy and Air Force facilities since 1984, and at Army facilities since 1985. According to the GAO, the decline varies significantly between the Services, and changes in outpatient visits varies from facility to facility within each of the Services. The GAO pointed out that the fluctuations in outpatient visits are significant and could impact the CHCS acquisition, since unanticipated decreases or increases in outpatient work load after the

See pp. 1-2, 6-10.

CHCS hardware is installed could result in excessive or inadequate processing capabilities. The GAO reported that CHCS program office officials were unaware of the wide work load fluctuations at individual facilities, and agreed that it would be necessary to more closely monitor work load trends before and after the hardware is installed. The GAO concluded that it is critical for the DoD to assess the impact of possible work load changes in the CHCS acquisition during the operational test and evaluation phase. (p. 3, pp. 11-18/GAO Draft Report)

**DoD Response:** Partially concur. The GAO report did not state whether the observed workload increases or decreases were statistically significant. That is, an 85 percent increase in outpatient workload for a facility which normally handles 24,000 outpatient visits per year would have a much greater impact upon the CHCS equipment configuration than a facility that normally handles 2,000 outpatient visits. Other information, available to the DoD, raises a question as to whether the Army and the Air Force have actually experienced a decline in outpatient workload. The DoD does agree, however, that the results of the workload model should be verified with actual workload data before determining the equipment configuration that would run the CHCS at each deployment site. The CHCS contractor has been tasked to include current workload data collection as part of his CHCS pre-installation site survey.

#### RECOMMENDATIONS

- **RECOMMENDATION 1:** The GAO recommended that the Secretary of Defense direct the program office, during the operational test and evaluation phase, to determine potential savings from using Government personnel instead of contractor-supplied computer operators, by acquiring and analyzing data on the circumstances where this substitution should occur. (p. 18/GAO Draft Report)

See p. 11.

**DoD Response:** Concur. The DoD will further refine its requirements for contractor-supplied computer operators and adjust cost projections as part of its operational test and evaluation of the CHCS. The projected completion date for the operational test and evaluation is Fall 1989.

- **RECOMMENDATION 2:** The GAO recommended that the Secretary of Defense direct the program office, during the operational test and evaluation phase, to evaluate and determine, during the cost/benefit analysis, the appropriate parameters for maintenance response times and on-line data retention. (p. 19/GAO Draft Report)

See p. 11.

**DoD Response:** Concur. During the CHCS operational test and evaluation, the DoD will address both the maintenance response times and the on-line data retention requirements to determine the most efficient, yet cost effective parameters. The projected completion date for the operational test and evaluation is Fall 1989.

- **RECOMMENDATION 3:** The GAO recommended that the Secretary of Defense direct the program office, during the operational test and evaluation phase, to monitor and analyze the workload at military medical facilities to ensure that, to the extent possible, changes in work load are anticipated and planned for. The GAO further recommended that after completing these analyses, the program office should modify the procurement accordingly. (p. 19/GAO Draft Report)

**DoD Response:** Concur. Prior to installing the CHCS at a medical treatment facility, the contractor is required to conduct a site survey to include current work load data collection. The results of this survey would be used to size the equipment configuration that would best support the facility. Since this task is already required, a modification to the procurement is not necessary.

See p. 11.



---

Requests for copies of GAO reports should be sent to:

U.S. General Accounting Office  
Post Office Box 6015  
Gaithersburg, Maryland 20877

Telephone 202-275-6241

The first five copies of each report are free. Additional copies are \$2.00 each.

There is a 25% discount on orders for 100 or more copies mailed to a single address.

Orders must be prepaid by cash or by check or money order made out to the Superintendent of Documents.



United States  
General Accounting  
Washington, D.C. 20548

First-Class Mail  
Postage & Fees Paid  
GAO  
Permit No. G100

Official Business  
Penalty for Private Use \$300

4-10-80