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**GAO**

Briefing Report to the Chairman,  
Committee on Armed Services, House of  
Representatives

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January 1988

# MEDICAL ADP SYSTEMS

## Composite Health Care System Operational Test and Evaluation Costs



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

Information Management and  
Technology Division

B-220732

January 28, 1988

The Honorable Les Aspin  
Chairman, Committee on Armed Services  
House of Representatives

Dear Mr. Chairman:

This report responds to requests from your office beginning on July 16, 1987, pertaining to the cost of operational test and evaluation (OT&E) of the Department of Defense's Composite Health Care System (CHCS)--a state-of-the-art medical information system Defense is acquiring for use in all military hospitals, medical centers, and clinics worldwide. The specific concerns raised in the requests were whether Defense had sufficient funds in its fiscal years 1988 and 1989 program budget to conduct tests that will meet OT&E objectives and whether test objectives could be fulfilled either at a lower cost or more effectively than currently planned.<sup>1</sup>

On October 5, 1987, we briefed your office on the results of our work and agreed to document the briefing in a report that excluded procurement-sensitive information. After discussions with committee staff over prospective budget cuts, Defense program management provided us with additional information on events occurring after our October 5 briefing and bearing on the results of our analysis. As requested, we have analyzed the effect of these events on our initial findings and have incorporated information and analysis of the current status of the program's budget into the attached briefing materials (see appendix).

#### INITIAL FINDINGS

On the basis of its own cost projections and testing criteria, Defense had sufficient funds and had planned to conduct what it considered to be acceptable tests. In addition, Defense had the options of either reducing the cost of testing or conducting more comprehensive tests. Whether Defense chose one of these options or conducted testing as planned, it could have reduced the program budget by several million dollars in fiscal years 1988 and 1989 combined.

The level of testing planned by program management--which we refer to as baseline to avoid disclosure of procurement-sensitive information--would satisfy most of Defense's OT&E site-selection criteria and meet test objectives. We found that the baseline level of testing exceeds by two the number of sites considered minimally acceptable to Defense's Operational

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<sup>1</sup>Information linking OT&E costs with a specific test site or group of sites is procurement-sensitive.

Test and Evaluation Directorate<sup>2</sup> and, on the basis of Defense's projections, costs about \$9.8 million more than the minimal acceptable level.

Our analysis showed that Defense could better satisfy its site-selection criteria and more completely fulfill its test objectives by modifying its plans to include additional small-size sites and increase testing overseas. This more comprehensive testing approach could be achieved by excluding one of the current baseline sites and including three others, increasing the total number of sites by two. This alternative, according to Defense's OT&E site-cost projections, would cost about \$4.5 million more than the baseline level of testing.

Funds for the more comprehensive testing could have been obtained by eliminating two questionable budget-allocation items amounting to \$13.2 million--\$6.7 million in fiscal year 1988 and \$6.5 million in 1989. That is, our analysis of the justifications supporting program management's allocation of budgeted funds raised questions about the propriety of allocating funds to (1) software development centers, which appears premature at this stage in the acquisition process, and (2) continuation of the Automated Quality of Care Evaluation Support System (AQCESS),<sup>3</sup> which--though an appropriate Defense medical systems budget item--should not be funded under the CHCS budget, but out of funds for operating systems.

In an October 20, 1987, meeting, senior program management officials agreed with our analysis. In response to our concerns, funds for software development centers were deleted from the program's revised budget allocation plan; however, we noted that all funds for the continuation of AQCESS were still included among program management's revised estimate of program support costs.

#### IMPACT OF SUBSEQUENT EVENTS

On October 20, 1987, senior program management officials provided information on two recent events affecting the results of our previous analysis:

- Higher-than-anticipated costs may be incurred to terminate one of the four CHCS development contractors.
- Less program funds will be available as a consequence of automatic Gramm-Rudman-Hollings budget reductions.

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<sup>2</sup>This Directorate is an internal Defense Department organization independent of specific programs and responsible for overseeing the adequacy of operational tests and evaluations department-wide.

<sup>3</sup>A non-integrated quality assurance system installed in all Defense medical treatment facilities on an interim basis until the Composite Health Care System is deployed.

Regarding the first item, on October 5, 1987, Defense's termination contracting officer informed the CHCS contracting officer that final settlement expenses could run from \$7.6 to \$11.8 million--well above the \$2 or \$3 million they had anticipated. The second item stems from Defense's Budget and Finance Director's October 7, 1987, memorandum, which led program management to expect a budget reduction of \$9.6 million for fiscal year 1988. The total impact of these two events is estimated at \$17.2 million in fiscal year 1988--\$4 million over the \$13.2 million of combined fiscal years 1988 and 1989 budget allocation items we previously found to be questionable.

With respect to the options of either reducing testing costs or conducting more comprehensive tests, program management now believes the events discussed above prevent Defense from conducting testing at the more comprehensive level we found would have been possible. Nonetheless, program management hopes to conduct OT&E at the baseline level previously planned, but recognizes that because of the projected shortage of operation and maintenance funds in fiscal year 1989, it may have to cut back to the minimally acceptable level identified by Defense's Operational Test and Evaluation Directorate.

This assessment seems reasonable. If these events transpire as expected, Defense no longer has the option to conduct more comprehensive tests or reduce its testing budget. However, if these events do not transpire as expected, or if the CHCS budget is otherwise insulated from their effect, the alternatives identified in our initial findings would still be available.<sup>4</sup>

#### OBJECTIVES AND METHODOLOGY

To determine whether Defense has sufficient funds to conduct tests that will meet OT&E objectives, we evaluated the justification supporting program management's allocation of budgeted CHCS funds to OT&E and other program activities. To determine whether OT&E objectives could be met either at a lower cost or more effectively within the current budget, we evaluated planned testing and various alternative scenarios against the OT&E site-selection criteria developed by program management and the Operational Test and Evaluation Directorate. In addition, we confirmed the reasonableness of Defense's criteria for selecting OT&E sites by tracing each criterion back to the objectives of underlying law and directives. Having found a clear link, we accepted Defense's site-selection criteria as reasonable and evaluated how the criteria were applied by program management and the Directorate in the formulation of testing levels each organization considered acceptable. Lastly, we estimated the cost of each testing scenario on the basis of program management's projected cost of testing at individual OT&E sites.

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<sup>4</sup>Subsequent to the completion of our work, the Fiscal Year 1988 Defense Authorization Act was passed authorizing the appropriation of funds to carry out the operational test and evaluation phase. However, the precise amount of funds that will be available for this purpose after congressional and/or Defense budget reduction actions was not known at that time.

We conducted our review at the offices of the Defense Medical Systems Support Center and the Tri-Service Medical Information Systems program office--collectively referred to as program management--during the 3-month period ending October 20, 1987. As requested by your office, we did not obtain official Department of Defense comments on a draft of this report. However, we worked closely with Defense to develop the information, confirm our analytical methods, and avoid disclosure of procurement-sensitive information. Our evaluation was conducted in accordance with generally accepted government auditing standards.

We are sending copies of this report to the Chairmen of the House and Senate Committees on Appropriations; Senate Committee on Armed Services; the Director, Office of Management and Budget; and the Secretary of Defense. Copies will also be made available to other interested parties upon request.

Sincerely yours,



Ralph V. Carlone  
Director

**COSTS ASSOCIATED WITH OPERATIONAL  
TESTING AND EVALUATION OF  
THE DEPARTMENT OF DEFENSE'S  
COMPOSITE HEALTH CARE SYSTEM**





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### ABBREVIATIONS

|         |   |
|---------|---|
| AQCESS  | Automated Quality of Care Evaluation Support System             |
| CHCS    | Composite Health Care System                                    |
| CONUS   | Continental United States                                       |
| HIS     | Hospital Information System                                     |
| OCONUS  | Outside Continental United States                               |
| O&M     | operations and maintenance                                      |
| OT      | operational test  |
| OT&E    | operational test and evaluation                                 |
| RCM     | Representative Class of Military Medical Treatment Facility     |
| TPO     | Tri-Service Medical Information System Program Office           |
| USAF    | United States Air Force   |
| VA-DHCP | Veterans Administration-Decentralized Hospital Computer Program |



## **(1) WHAT IS OT&E AND HOW ARE TEST SITES CHOSEN?**

- Purposes of operational testing (OT) versus OT&E
- Characteristics of OT&E sites
- Characteristics of OT sites and sites at which Defense is testing the Veterans Administration Decentralized Hospital Computer Program system (VA-DHCP)
- Defense criteria for selecting OT&E sites

PURPOSES OF OPERATIONAL TESTING AND  
OPERATIONAL TEST AND EVALUATION

Operational Testing<sup>a</sup>

To compare functional capabilities of competing systems and costs

- Conducted in a realistic environment in military hospitals
- Conducted in medium-to-large medical treatment facilities
- Test of 9-12 months in duration

Operational Test and Evaluation<sup>b</sup>

To field-test under realistic conditions

To determine system's effectiveness and suitability--whether it can be operated and maintained by typical military users

To provide information for major decisions regarding production start-up

Other Program Objectives<sup>c</sup>

To validate that benefits can be achieved

<sup>a</sup>Required by Defense's 1987 Authorization Act; applies only to CHCS.

<sup>b</sup>Required by Defense's 1984 Authorization Act; applies to all major systems acquisitions, including CHCS--which is projected to cost over \$1 billion and is considered a major systems acquisition.

<sup>c</sup>Specified by Defense Medical Systems Support Center (program management).



**CHARACTERISTICS OF  
COMPOSITE HEALTH CARE SYSTEM  
OPERATIONAL TEST AND EVALUATION SITES**

| Test Site<br>(Location) | Service<br>Branch | RCM | Operating<br>Beds | Percent<br>Occupied | Annual<br>Inpatient<br>Admissions | Annual<br>Clinic<br>Visits | Average<br>Daily<br>Patient<br>Loads |
|-------------------------|-------------------|-----|-------------------|---------------------|-----------------------------------|----------------------------|--------------------------------------|
| <b>GROUP A</b>          |                   |     |                   |                     |                                   |                            |                                      |
| Eisenhower (Georgia)    | Army              | 1   | 407               | 83                  | 15,029                            | 574,263                    | 347                                  |
| Jacksonville (Florida)  | Navy              | 2   | 178               | 80                  | 11,694                            | 307,000                    | 142                                  |
| Nuernberg (Germany)     | Army              | 2   | 117               | 98                  | 8,906                             | 209,279                    | 115                                  |
| Eglin (Florida)         | USAF              | 2   | 160               | 79                  | 8,037                             | 390,654                    | 126                                  |
| Walter Reed (Wash., DC) | Army              | 0   | 865               | 83                  | 23,221                            | 841,837                    | 722                                  |
| Weisbaden (Germany)     | USAF              | 2   | 255               | 74                  | 8,572                             | 248,784                    | 188                                  |
| Maxwell (Alabama)       | USAF              | 3   | 60                | 78                  | 3,874                             | 233,467                    | 47                                   |
| <b>GROUP B</b>          |                   |     |                   |                     |                                   |                            |                                      |
| Keesler (Mississippi)   | USAF              | 1   | 325               | 85                  | 11,605                            | 448,367                    | 275                                  |
| Blanchfield (Kentucky)  | Army              | 2   | 188               | 75                  | 10,294                            | 419,088                    | 141                                  |
| Tripler (Hawaii)        | Army              | 1   | 526               | 80                  | 23,144                            | 589,594                    | 426                                  |
| Bremerton (Washington)  | Navy              | 3   | 98                | 76                  | 6,442                             | 197,869                    | 74                                   |
| San Diego (California)  | Navy              | 0   | 566               | 80                  | 32,350                            | 723,355                    | 453                                  |
| Guam (Far East)         | Navy              | 3   | 61                | 75                  | 4,425                             | 86,554                     | 46                                   |
| Yokosuka (Japan)        | Navy              | 3   | 69                | 75                  | 4,077                             | 101,364                    | 52                                   |

SOURCE: Department of Defense Health Facilities Planning Review (FY 1985 - Health Facilities Inventory)

### Characteristics of Candidate Operational Test and Evaluation Sites

Program management has identified and ranked 14 candidate OT&E sites, divided into two groups of 7. The two contractors participating in OT&E will deploy and operate their systems at an equal number of sites. One contractor will be assigned sites from Group A, the other from Group B. Defense will make the choice of sites on the basis of its site-selection criteria, together with its analysis of negotiated contractor costs, and funds available in the program budget. On the basis of current funding levels, each contractor will be assigned fewer than 7 sites.

The ranking of candidate sites within each group was influenced by outside factors as well as program management's OT&E criteria. For example, the Navy's Jacksonville hospital and the Air Force hospital at Eglin are ranked above others in Group A because--according to program management--they offer the added benefit of eliminating the ineffective "off-the-shelf" hospital information systems currently installed at each site. Program management contends that conducting OT&E at these sites will save Defense the cost of maintaining these systems--estimated at over \$1 million annually. According to program management, the Army's Nuernberg hospital, also in Group A, is ranked above the Air Force hospital at Weisbaden because of an Army directive preventing installation in Europe of any information system that has not undergone operational test and evaluation at an Army facility in Europe. In Group B, the Army's Tripler hospital in Hawaii is ranked above other Pacific hospitals because program management believes the hospital's (1) role as the major communications and medical evacuation facility in the Pacific, (2) tri-service medical support mission, (3) large clinic work load, and (4) stable political climate, all outweigh advantages to be gained by testing at the smaller hospitals on Guam and at Yokosuka, Japan. Additional factors affecting program management's hospital rankings within each group include the progress of architectural and engineering studies and site preparation and whether the candidate site currently had a computer room that affects the scope of studies and the extent of site preparation.

**CHARACTERISTICS OF  
COMPOSITE HEALTH CARE SYSTEM  
OPERATIONAL TEST AND VA-DHCP TEST SITES**

| Test Site<br>(Location)                     | Service<br>Branch | RCM | Operating<br>Beds | Percent<br>Occupied | Annual<br>Inpatient<br>Admissions | Annual<br>Clinic<br>Visits | Average<br>Daily<br>Patient<br>Loads |
|---|-------------------|-----|-------------------|---------------------|-----------------------------------|----------------------------|--------------------------------------|
| <u>OPERATIONAL TEST</u>                     |                   |     |                   |                     |                                   |                            |                                      |
| Ft. Knox (Kentucky)                         | Army              | 2   | 173               | 84                  | 11,755                            | 431,651                    | 147                                  |
| Camp Le Jeune (North<br>Carolina)           | Navy              | 2   | 170               | 82                  | 10,095                            | 348,184                    | 136                                  |
| Charleston <sup>a</sup><br>(South Carolina) | Navy              | 2   | 184               | 80                  | 12,884                            | 324,771                    | 147                                  |
| Sheppard (Texas)                            | USAF              | 2   | 145               | 81                  | 4,635                             | 266,093                    | 117                                  |
| <u>VA-DHCP TEST</u>                         |                   |     |                   |                     |                                   |                            |                                      |
| Fitzsimons (Colorado)                       | Army              | 1   | 456               | 81                  | 15,827                            | 664,601                    | 370                                  |
| March (California)                          | USAF              | 2   | 115               | 72                  | 4,601                             | 241,937                    | 83                                   |

<sup>a</sup>In September 1987, Technicon Data Systems, the contractor whose system was partially installed at the Charleston Naval Hospital site, withdrew from the CHCS competition. As a result, this location will be excluded from further testing consideration.

SOURCE: Department of Defense Health Facilities Planning Review (FY 1985 - Health Facilities Inventory)



### Characteristics of Current Operational Test and VA-DHCP Test Sites

Portions of the systems being developed by an individual Composite Health Care System contractor have been installed at four military hospitals. These are called operational test sites. All of the hospitals are of medium size and have work loads similar to the medium size OT&E candidate hospitals. One of the alternatives considered in our evaluation would substitute the operational test sites of the two contractors participating in OT&E instead of selecting medium-sized hospitals from the list of candidate OT&E sites. For this reason, we have included reference data on each of the current operational test sites.

The Veterans Administration's Decentralized Hospital Computer Program is also being tested at two military hospitals. Both have size and work load statistics comparable to candidate OT&E hospitals. Though not a factor in the OT&E site-selection process, we have included reference data on these sites because the National Defense Authorization Act for fiscal year 1986 (Public Law 99-145) requires Defense to ultimately compare OT&E results against VA-DHCP test results to determine whether it is feasible and cost-effective to utilize the VA system in military hospitals in lieu of the Composite Health Care System.

DEFENSE CRITERIA FOR SELECTING OPERATIONAL  
TEST AND EVALUATION SITES

Program Management's Criteria

- |                     |   |
|---------------------|---|
| Size of hospital    | -- Test small, medium, and large facilities |
| Geographic location | -- Test CONUS and OCONUS sites              |
| Branch of service   | -- Test each military department in CONUS   |

Operational Test and Evaluation  
Directorate Criteria<sup>a</sup>

- |                                   |   |
|-----------------------------------|---|
| Outpatient work load              | -- Test ability of systems configurations to handle transaction volume and storage requirements |
| Deployment risk reduction         | -- Test ability of contractors to implement and manage in a compressed time frame               |
| Realistic OCONUS sites            | -- Test full spectrum of problems unique to foreign country implementation                      |
| Scope and extent of prior testing | -- Consider adequacy of prior testing as a factor in structuring OT&E                           |

<sup>a</sup>The Directorate's criteria are in addition to program management's criteria.

### Defense Criteria For Selecting Operational Test and Evaluation Sites

The selection of OT&E hospitals is based on two sets of criteria. Both sets have been developed with related objectives in mind. Program management's criteria, which serve as the basis for identifying and ranking candidate sites, includes demographic variables such as hospital size, location, work load, and military service representation. The Operational Test and Evaluation Directorate's criteria are designed to ensure thorough testing (1) at facilities representative of the environments into which the system will be deployed and (2) of contractors' ability to deploy their systems effectively. In effect, the Directorate's criteria supplement and refine those established by program management and provide a basis for department-level reviews of the program's OT&E plans.

Program management's focus is on obtaining the best mix of test locations-- considering demographic statistics, cost, and other factors. The Directorate's emphasis is on obtaining the best test with less regard to cost and other factors. For example, program management, on the basis of the factors considered in establishing the ranking in each group, favors conducting OT&E at the Army's Walter Reed Hospital in Washington, D.C., and at the Navy's San Diego Hospital over testing at the Air Force hospital in Weisbaden, West Germany, and the Navy's hospital on Guam. Under the Directorate's criteria, however, the Weisbaden and Guam hospitals are better OT&E sites than Walter Reed and San Diego because they are troop-support facilities of a size representative of the majority of hospitals into which the system will be deployed and will test contractors' ability to deal with systems installation and maintenance complexities unique to overseas environments. Walter Reed and San Diego, on the other hand, are extremely large facilities that emphasize teaching and research, lack significant troop-support missions, and are representative of a category of military hospitals containing but a few facilities of such large size.



## **(2) HOW MUCH WOULD ORIGINALLY PROPOSED OT&E COST?**

- Original OT&E would cost \$120 million for:
  - FY 1988 and FY 1989
  - 14 sites (7 per vendor)
  - Current OT sites of two winning vendors



**(3) HOW MUCH DOES DEFENSE HAVE TO SPEND FOR THE CHCS AND HOW DOES IT PLAN TO SPEND IT?**

- The program budget request for the Composite Health Care System for fiscal years 1988 and 1989
- Program management's budget allocation plan for fiscal years 1988 and 1989

PROGRAM BUDGET REQUEST  
COMPOSITE HEALTH CARE SYSTEM  
FISCAL YEARS 1988 AND 1989  
(\$ MILLIONS)

| <u>YEAR</u> | <u>PROCUREMENT<br/>FUNDS</u> | <u>OPERATION AND<br/>MAINTENANCE<br/>FUNDS</u> | <u>TOTAL<br/>FUNDS<br/>BUDGETED</u> |
|-------------|------------------------------|--|-------------------------------------|
| 1988        | \$50.6                       | \$41.3   | \$91.9                              |
| 1989        | 31.2                         | 57.2   | 88.4                                |





| <b>PROGRAM MANAGEMENT'S<br/>BUDGET ALLOCATION PLAN FOR<br/>FISCAL YEARS 1988 AND 1989 (\$ MILLIONS)<sup>a</sup></b> |                      |                      |
|---|----------------------|----------------------|
| <b><u>PROCUREMENT ITEMS:</u></b>  | <b><u>1988</u></b>   | <b><u>1989</u></b>   |
| Deploy OT&E Sites   |                      |                      |
| Software Development Centers  |                      |                      |
| Continuity of Operations Sites  |                      |                      |
| Post OT&E Deployment (July - September 1989)  |                      |                      |
| <b>Total Procurement Items</b>  | <b><u>\$50.4</u></b> | <b><u>\$32.2</u></b> |
| Amount Included in the Program's Budget   | <b>\$50.6</b>        | <b>\$31.2</b>        |
| Difference  | <b>\$ 0.2</b>        | <b>-\$1.0</b>        |
| <br><b><u>OPERATIONS AND MAINTENANCE ITEMS:</u></b>   |                      |                      |
| Government Project Costs  | <b>\$ 3.9</b>        | <b>\$ 5.5</b>        |
| Stage I Contract Costs  | <b>\$ 21.6</b>       | <b>\$ 4.4</b>        |
| -- 4 Contractors and OT Sites through March 1988  |                      |                      |
| -- 4 OT Sites March through September 1988  |                      |                      |
| -- 2 OT Sites of Losing Contractor  |                      |                      |
| Stage II Contract Costs   | <b>\$ 6.5</b>        | <b>\$37.6</b>        |
| -- 2 Stage I OT Sites of Winning Contractors  |                      |                      |
| -- Project Management/Software Development  |                      |                      |
| -- Deployment and Operation of OT&E Sites   |                      |                      |
| Program Support Costs   | <b>\$11.1</b>        | <b>\$10.6</b>        |
| -- Payback of FY 1989 reprogramming   |                      |                      |
| -- Continue AQCESS  |                      |                      |
| -- Sustain VA-DHCP test   |                      |                      |
| -- Other TPO support  |                      |                      |
| <b>Total Operations and Maintenance Items</b>   | <b><u>\$43.1</u></b> | <b><u>\$58.1</u></b> |
| Amount Included in the Program's Budget   | <b>\$41.3</b>        | <b>\$57.2</b>        |
| Difference  | <b>- \$ 1.8</b>      | <b>- \$ 0.9</b>      |
| <br><sup>a</sup> Individual item costs are not shown because they are procurement-sensitive.                        |                      |                      |

### Program Management's Budget Allocation Plan For Fiscal Years 1988 and 1989

The Composite Health Care System budget covers several activities in addition to OT&E. Program management has determined that the budget allocation for OT&E and certain other activities is procurement-sensitive because it could give contractors an indication of how to price these items. For this reason, none of the procurement items show separate budget-allocation amounts. Under the operations and maintenance items, Stage I and II contract costs and program support costs have been aggregated because they are also matters of future contract negotiations.

On the basis of our analysis of the justifications for the items included in program management's budget allocation, we found two charges to the Composite Health Care System budget that appear to be unjustified. First, charges pertaining to software development centers appear questionable. We believe that building two such centers, one for each OT&E contractor, appears premature at this point in the acquisition because it is possible that one or both contractors could fail OT&E. In the event of such a failure, the investment in a software development center would be lost. In addition, program management has not undertaken the necessary analysis demonstrating that construction of software development centers is cost-beneficial compared with other options, such as leased centers or timesharing. Second, charges to continue the AQCESS system, which the Composite Health Care System will replace, appear unjustified because it is a separate, unrelated program for which management has not used Composite Health Care System funds to pay for its operation in prior years. In light of the congressional life-cycle cost cap placed on the Composite Health Care System acquisition, charges for the operation of a separate, unrelated program appear inappropriate.

Total charges for these two items equal \$13.2 million--\$6.7 million from the fiscal year 1988 budget and \$6.5 million from 1989. Eliminating these items from program management's allocation of the budget makes several million dollars available for OT&E. The availability of additional funds allows for consideration of a greater number of options than might otherwise be possible. Furthermore, in most instances, less than half of the additional funds would be needed to pursue an alternative to program management's planned testing.

We also found that \$30.4 million in 1989 funds, intended for deployment of the system(s) after testing is completed, may not be needed until fiscal year 1990 due to the likelihood of testing continuing beyond June 1989. If not expended in fiscal year 1989, these funds will remain in the budget for two additional years.



**(4) WHAT ALTERNATIVES ARE AVAILABLE WITHIN  
DEFENSE'S PLAN AND HOW DO THEY DIFFER FROM  
BUDGETED TESTING?**

- Summary of alternatives and cost differences
- Summary of differences among alternatives

Summary of Cost Differences Among Operational  
Test and Evaluation Alternatives<sup>a</sup>

| <u>Alternative</u>         | <u>Total<br/>Number<br/>of Sites</u> | <u>Incremental Costs (\$ Millions)</u> |                         |              |
|----------------------------|--------------------------------------|--|-------------------------|--------------|
|                            |                                      | <u>1988<br/>Procurement</u>            | <u>1989<br/>O&amp;M</u> | <u>Total</u> |
| I. Baseline <sup>b</sup>   | c                                    | c                                      | c                       | c            |
| II. Least Cost             | Same                                 | -9.4                                   | -2.7                    | -12.1        |
| III. Minimum Level         | 2 Less                               | -6.8                                   | -3.0                    | -9.8         |
| IV. Max OCONUS             | 2 More                               | + 3.3                                  | + 1.2                   | + 4.5        |
| V. Max CONUS               | 2 More                               | + 3.9                                  | + 1.3                   | + 5.2        |
| VI. All RCM                | Same                                 | + 9.1                                  | + 1.4                   | + 10.5       |
| VII. All RCM With OT Sites | Same                                 | + 0.6                                  | -2.2                    | -1.6         |

<sup>a</sup>Alternatives I and III are proposed by program management and Defense's Operational Test and Evaluation Directorate, respectively. We identified alternatives IV and V on the basis of our understanding of Defense's test objectives and test site selection criteria. Alternatives II, VI, and VII were developed in anticipation of possible questions related to the least cost and all RCM testing concepts. All alternatives are affordable within Defense's current budget except for alternative VI, which will require an additional few million dollars in fiscal year 1988 procurement funds.

<sup>b</sup>The baseline used in our analysis is the level of testing included in program management's budget allocation plan.

<sup>c</sup>The number of test sites and the cost of the budget baseline alternative are procurement-sensitive and cannot be disclosed publicly. In this table, those costs are used as baseline costs against which the costs of other alternatives are compared to derive the incremental costs.

### Cost Differences Among OT&E Alternatives

Alternatives I and III are proposed by program management and Defense's Operational Test and Evaluation Directorate, respectively. We identified alternatives IV and V on the basis of our understanding of Defense's test objectives and test site selection criteria. Alternatives II, VI, and VII were developed in anticipation of possible questions related to the least cost and all RCM testing concepts.

To avoid disclosure of Defense's projected OT&E costs, which are procurement-sensitive, we cannot disclose the actual cost of any alternative. However, the cost differences among alternatives are reportable and can be determined by using the cost of the level of testing budgeted by program management as a baseline and comparing the cost of other alternatives against it. The summary on the facing page shows the results of our comparisons for each alternative. The nature of each alternative is discussed below.

Alternative I: Baseline. Preferred by program management and included in the budget allocation plan. It represents their minimum acceptable level of OT&E. It includes a mix of small, medium, and large hospitals, one or more from each service branch. Two sites are overseas.

Alternative II: Least Cost. Includes the same number and size of test hospitals as the baseline alternative, but consists solely of the least costly sites for each size hospital. Includes sites from each service branch. Two sites are overseas.

Alternative III: Minimum Level. Represents the absolute minimal combination of OT&E sites acceptable to the Operational Test and Evaluation Directorate. Includes one or more hospitals from each service branch. Does not include a small hospital. Two sites are overseas.

Alternative IV: Max OCONUS. Emphasizes overseas locations. Includes a mix of small, medium, and large hospitals, one or more from each service branch. Five sites are overseas.

Alternative V: Max CONUS. Emphasizes Continental United States locations. Includes a mix of small, medium, and large hospitals, one or more from each service branch and different sizes of hospitals. Three sites are overseas.

Alternative VI: All RCM. Includes hospitals in each size category from small to very large, and one or more from each service branch. Two sites are overseas.

Alternative VII: All RCM With OT. Includes hospitals in each size category, from small to very large, and one or more from each service branch. One site is located overseas. Includes two of the current operational test sites as the OT&E sites for medium-size hospitals.

## SUMMARY OF RELATIVE DIFFERENCES AMONG OT&amp;E ALTERNATIVES

|  | Alternatives                                     |  |   |   |   |                                     |   |
|--|--|--|---|---|---|-------------------------------------|---|
|  | I BASELINE<br>X SITES<br>(2 OCONUS) <sup>a</sup> | II LEAST COST<br>X SITES<br>(2 OCONUS) | III MINIMUM<br>LEVEL<br>X 2 SITES<br>(2 OCONUS) | IV MAX<br>OCONUS<br>X + 2 SITES<br>(5 OCONUS) | V MAX<br>CONUS<br>X + 2 SITES<br>(3 OCONUS) | VI ALL RCM<br>X SITES<br>(2 OCONUS) | VII ALL RCM<br>WITH OT<br>X SITES<br>(1 OCONUS) |
| <b>COST DIFFERENCE (\$ MILLIONS):</b>  | b  | -12.1                                  | -9.8  | +4.5  | +5.2  | +10.5                               | -1.6  |
| <b>FACTORS CONSIDERED</b>  |  |  |   |   |   |                                     |   |
| (A) Sites with architectural and engineering studies completed or in-process | N/A  | Less                                   | Less  | Same  | Same  | Less                                | Less  |
| (B) Sites with site preparation in process                                   | N/A  | Less                                   | Same  | Same  | Same  | Less                                | Less  |
| (C) Sites previously evaluated by all CHCS competitors                       | N/A  | Same                                   | Same  | Same  | Same  | Less                                | Less  |
| (D) Sites without an existing computer room                                  | None   | Some                                   | None  | Some  | Few   | Some                                | Few   |
| (E) OCONUS sites critical to program management                              | Yes  | No                                     | Yes   | Yes   | Yes   | No                                  | No  |
| (F) OCONUS testing adequate to Test and Evaluation Directorate               | No   | No                                     | No  | Yes   | Yes   | No                                  | No  |
| (G) Ineffective HIS sites replaced   | N/A  | Less                                   | Less  | Less  | Same  | None                                | None  |
| (H) Test site selection criteria satisfied                                   | Most   | Some                                   | Some  | All   | All   | Some                                | Some  |
| (I) Risk versus baseline alternative   | N/A  | More                                   | More  | Less  | Less  | More                                | More  |
| (J) Potential to delay schedule  | None   | Low                                    | None  | Low   | Low   | Moderate                            | Moderate  |
| Alternative acceptable to program management?                                | Yes  | No                                     | Yes   | Yes   | Yes   | No                                  | No  |
| Alternative acceptable to Test and Evaluation Directorate?                   | Yes  | No                                     | Yes   | Yes   | Yes   | No                                  | No  |

<sup>a</sup>The number and mix of sites included in program management's budgeted alternative is procurement-sensitive and cannot be disclosed publicly. We used the symbol "X" to represent this number and included information on the number of OCONUS sites which by itself is not procurement sensitive. The total number of sites in alternatives II through VII are reported in terms of "X" to allow for some comparisons. For example, the number of sites in alternative III, which contains two fewer sites than the budgeted alternative, is reported as "X-2."

<sup>b</sup>Procurement-sensitive data



### Relative Differences Among OT&E Alternatives

Program management's alternative (baseline) and six other options are evaluated against factors (A) through (J) considered relevant by either program management or Defense's Operational Test and Evaluation Directorate or both. The relevance of each factor is discussed below:

- (A) Completion of architectural and engineering studies, a prerequisite to site preparation. Of the 14 candidate OT&E sites, 7 have architectural and engineering studies either completed (3) or in process (4).
- (B) Completion of site preparation, a prerequisite to system hardware installation. Of the 14 candidate OT&E sites, 2 have site preparation in process.
- (C) Contractor knowledge of site resulting in reduced systems installation time. Of the 14 candidate OT&E sites, 4 have been evaluated by competing Composite Health Care System contractors.
- (D) Existing computer facilities require less extensive architectural and engineering studies and site-preparation activities. Of the 14 candidate OT&E sites, 6 have no computer rooms.
- (E) Includes OCONUS sites critical to program management. Of the five OCONUS sites, two are critical to program management--Nuernberg in Germany and Tripler in Hawaii.
- (F) Includes OCONUS sites that are representative of the full spectrum of problems unique to a foreign country.
- (G) Replaces ineffective HIS sites. According to program management, two HIS sites--Jacksonville and Eglin, both in Florida--are ineffective.
- (H) Satisfies test site selection criteria--program management's as well as the Operational Test and Evaluation Directorate's.
- (I) Relative risk involved. On the basis of the Operational Test and Evaluation Directorate's criteria, this factor shows the extent to which each alternative increases or reduces deployment risks relative to the risk associated with the baseline alternative.
- (J) Potential to delay schedule. Differences in the number of sites or site characteristics can result in delays that are a negative factor to program management.

The chart includes program management's and the Operational Test and Evaluation Directorate's assessment of the acceptability of each alternative. Three of the six alternatives to program management's planned level of testing were acceptable to both organizations.



**(5) WHAT IS THE IMPACT OF SUBSEQUENT  
EVENTS ON THE CHCS BUDGET ?**

- Program management's October 20, 1987 budget allocation plan

| <u>PROGRAM MANAGEMENT'S OCTOBER 20, 1987<br/>BUDGET ALLOCATION PLAN FOR<br/>FISCAL YEARS 1988 AND 1989 (\$ MILLIONS)<sup>a</sup></u>   |             |             |
|--|-------------|-------------|
| <u>PROCUREMENT ITEMS:</u>  | <u>1988</u> | <u>1989</u> |
| Amount included in the program's budget  | \$50.6      | \$31.2      |
| -- minus expected Gramm-Rudman-Hollings cuts   | 5.3         | b           |
| Procurement funds available  | 45.3        | 31.2        |
| -- minus additional VA test site hardware  | 1.7         | 1.2         |
| Funds available for OT&E   | 43.6        | 30.0        |
| <u>OPERATIONS AND MAINTENANCE ITEMS:</u>   |             |             |
| Amount included in the program's budget  | 41.3        | 57.2        |
| -- minus expected Gramm-Rudman-Hollings cuts   | 4.3         | b           |
| -- minus estimated contractor termination costs  | 7.6         | 0.0         |
| -- minus VA test site operations and maintenance   | 2.0         | 2.9         |
| -- minus Stage I contract costs  | 13.9        | 4.7         |
| -- 3 Contractors' and OT Sites through March 1988  |             |             |
| -- 2 OT sites, March through September 1988  |             |             |
| -- minus programs support costs  | 9.2         | 8.9         |
| -- payback of FY 1989 reprogramming  |             |             |
| -- Continuation of AQCESS  |             |             |
| -- Other TPO support   |             |             |
| -- minus Stage II contract costs   | 8.3         | 24.3        |
| -- 2 Stage I OT states of winning contractors  |             |             |
| -- Project management/software development   |             |             |
| Funds available for OT&E <sup>c</sup>  | -7.9        | 16.4        |
| <p><sup>a</sup>Individual item costs are not shown because they are procurement-sensitive.</p> <p><sup>b</sup>Fiscal year 1989 budget reductions--though expected--have not been determined by Defense's Controller.</p> <p><sup>c</sup>No operations and maintenance expenses will be incurred at OT&amp;E sites during fiscal year 1988.</p> |             |             |

Program Management's October 20, 1987  
Budget Allocation Plan For  
Fiscal Years 1988 and 1989

Senior program management officials provided information illustrating the budgetary impact of two events occurring subsequent to completion of our audit work. The first event involves the cost of terminating the system development contract of one of the four contractors participating in the Composite Health Care System competition. According to program management, these costs could run between \$7.6 and \$11.4 million--well above the \$2 or \$3 million they had anticipated. The second event involves the Budget and Finance Director's requirement for program managers to plan for automatic Gramm-Rudman-Hollings budget reductions that would occur by operation of law. This event would cut an estimated \$9.6 million from the program budget in fiscal year 1988. Though program management expects similar budget reductions in fiscal year 1989, none are shown in the revised budget allocation plan because the Budget and Finance Director's guidance only covers the current fiscal year.

In revising its budget allocation plan, program management appropriately deleted a portion of funds allocated to continuation of system development (Stage I) contracts since one of the previous four contractors was no longer eligible for continuation. In addition, program management deleted funding for software development centers, a budget item that our analysis showed to be questionable at this point in the acquisition. However, funds for continuation of the AQCESS program in fiscal year 1989--the item we believe should not be funded under the Composite Health Care System budget, but out of funds for operating systems--are still shown in the revised budget allocation plan, and without clear justification. Less significantly, the estimate of funds allocated to continuing Defense's test of the Veterans Administration's Medical ADP System was developed without a comprehensive analysis of hardware, software modification, test evaluation, or user personnel needs. Program officials acknowledge that their cost estimate for some of these areas could be high.

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