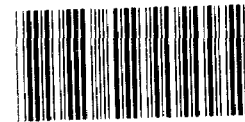


GAO

September 1987

MEDICAL ADP SYSTEMS

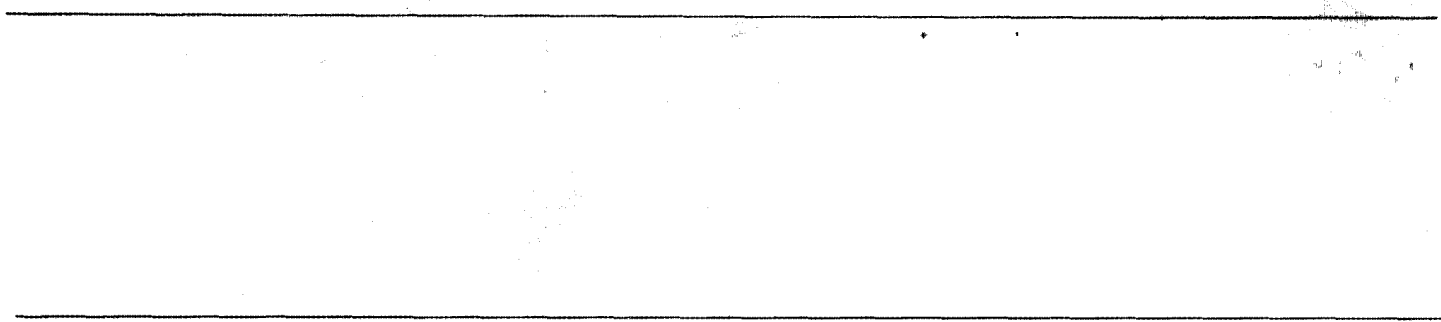
Status of Defense's Test of VA's System



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Information Management and
Technology Division

B-220732

September 21, 1987

The Honorable Sam Nunn
Chairman, Committee on
Armed Services
United States Senate

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

The Honorable G. V. (Sonny) Montgomery
Chairman, Committee on
Veterans' Affairs
House of Representatives

The Defense Authorization Acts for fiscal years 1986 and 1987 require the Department of Defense (DOD) to test and evaluate the Veterans Administration's (VA) Decentralized Hospital Computer Program system before procuring a medical information system from the private sector. Specifically, the Congress directed DOD to test all components being used by the VA and available at the beginning of a 3-month test period. The Congress also directed DOD to perform the test at two military medical facilities, with one facility significantly larger than the other, in order to evaluate the VA system's capabilities for handling the patient work load of a large DOD treatment facility.

As of July 1, 1987—the latest date by which DOD could start the 3-month test in order to meet the October 1, 1987, deadline established by the Congress—much of the available VA software was being tested at the two test sites, March Air Force Base Hospital and Fitzsimons Army Medical Center. However, neither facility was testing all the available software components and neither was testing the software in all ward and clinic areas where it could be appropriately used. In particular, at Fitzsimons—the larger of the two sites—most of the laboratory, radiology, and social work software features were not being tested; associated patient work load, which would generate data to contribute to the overall assessment of the VA system's capabilities for handling a large military facility, was not being processed from these areas.

In response to our findings, a senior program official acknowledged that there were a number of software components at both sites that were not

being appropriately tested on July 1, 1987, but stated that DOD anticipates testing all appropriate software components by October 1, 1987. The length of time software is tested is an important consideration in evaluating the VA system. Since DOD is still installing software as the test deadline nears, it is unclear whether the length of testing of the last software installed will provide DOD a sufficient basis to reasonably conclude whether the VA system can meet the needs of a large military medical facility.

Scope and Methodology

To obtain information on the status of this test, we interviewed DOD, Army, and Air Force officials; local site personnel conducting the tests at March and Fitzsimons; and contractor personnel responsible for developing and executing plans to evaluate these tests. We also reviewed planning and contracting documents and applicable laws. We conducted our work at the Tri-Service Medical Information System and Hospital Systems Program Office in Bethesda, Maryland; Fitzsimons Army Medical Center in Aurora, Colorado; March Air Force Base in Riverside, California; VA medical centers in Loma Linda, California, and Denver, Colorado; and VA Information Systems Center in Salt Lake City, Utah.

Because of limited time, we did not assess the validity of the explanations given by site officials for incomplete testing. However, our review of the adequacy of DOD's test of the VA system is continuing, and we will provide analysis of the results of DOD's test and evaluation in a subsequent report.

Our review was conducted in accordance with generally accepted government auditing standards. A detailed description of our objective, scope, and methodology is provided in appendix I.

Background

DOD is acquiring a computerized medical information system to automate a wide range of medical support services and hospital administrative processes in 167 hospitals and over 500 clinics, worldwide. This system, the Composite Health Care System, is currently in the midst of a competitive acquisition process, with four vendors performing demonstration tests. If the VA system is not chosen by DOD, one or two vendors will be selected to install systems worldwide. DOD estimates that such systems will cost about \$1 billion over an 8-year life cycle.

When the Composite Health Care System procurement was initiated in 1984, the Committee of Conference, approving appropriations for fiscal year 1985, directed DOD to consider VA's Decentralized Hospital Computer Program as an alternative to the Composite Health Care System. In late 1984, in response to this directive from the Committee of Conference, DOD initiated a formal test of VA's system at March Air Force Base Hospital to assess its feasibility and cost-effectiveness in a military medical facility. Later, the fiscal year 1986 Defense Authorization Act required DOD to test all available VA components (including equipment and software) and expand the test to include a facility significantly larger than March. Specifically, in the conference report accompanying the act, conferees stated that the larger site was needed to demonstrate the VA system's ability to handle a large military medical facility. The act also directed DOD to report on the results of such testing, and provide an assessment of the cost-effectiveness and feasibility of using the VA system as an alternative to the Composite Health Care System.

Subsequently, DOD selected Fitzsimons Army Medical Center as the larger facility. The 1987 Defense Authorization Act extended the deadline for test completion to no later than October 1, 1987. Appendix II provides additional detailed background information on the test.

Status of Test

We assessed the status of DOD's test as of July 1, 1987, from two perspectives: (1) how many of the available software modules¹ and their functions were being tested by the two sites and (2) how many of the modules' functions were being tested in the applicable wards and clinics.²

March was testing 10 of the 12 available software modules, and Fitzsimons was testing 6 of the 12. However, at March, the test project manager explained that two modules were not being tested—dental and engineering—because the first primarily generates VA-specific reports and accounting information and the second operates on a separate computer that is not integrated with the VA system's patient data base. Key clinical users at March explained that functions of some modules were not being tested because the functions were incompatible with March

¹A software module is a set of functions that supports a particular activity. For example, the Admission/Discharge/Transfer module is composed of a set of functions that allows automated registration and admission of patients and access to patient records throughout a hospital.

²We recognize that the system has been installed and is being used in other operational areas. However, we focused on the wards and clinics because they are the principal patient treatment areas in these medical facilities and include a large number of system users.

operations or provided data that were available from other sources. They stated that another reason for not testing all functions was that necessary software modifications had not been completed. At Fitzsimons, the test project manager explained that this facility was not testing the dental and engineering modules for the same reasons given at March. Key clinical users at Fitzsimons stated that reasons for not testing other modules included inadequate hardware, telecommunications problems, lack of critical staff, and differences in military hospital operations. Appendixes III and IV provide details on the number of modules and functions tested at March and Fitzsimons, along with site explanations for less than complete testing.

Neither site was fully testing the software capabilities in all applicable wards and clinics. Officials at both sites explained that certain software features were only partially tested in wards and clinics because features were incompatible with local hospital operations, features were not designed for use in wards or clinics, and start dates for clinic and ward tests were postponed as a result of delays in software modifications. Appendixes V and VI provide details on ward and clinic implementation at March and Fitzsimons, along with site explanations for less than complete testing.

On August 27, 1987, we discussed the results of our work with the Deputy Director, Defense Medical Systems Support Center—the office responsible for the acquisition of the Composite Health Care System. He generally agreed with our assessment that several important software components were not being tested on July 1, 1987. However, he pointed out that since that date, testing has begun on additional software, more was scheduled to be tested, and all appropriate software could be sufficiently tested by October 1, 1987. While he stated that adequate information would be available by October 1, 1987, to provide an assessment of the VA system, he acknowledged that an extension of the test deadline would enable DOD to more thoroughly test the VA system. He also acknowledged that more thorough testing would improve the overall quality of DOD's information on the VA system. He stated that if the VA system test is extended, legislative requirements for DOD's evaluation report must be deferred and additional funding must be provided.

Conclusions

The length of time software is tested is an important consideration in evaluating the VA system. We recognize that DOD has experienced difficulties in such areas as telecommunications, software modifications, and staffing in its efforts to test the VA software available on July 1, 1987,

and that it is continuing to install software. However, as the test deadline nears, it is unclear whether the length of testing of the last software to be installed will provide a sufficient basis for DOD to reasonably conclude whether the VA system can meet the needs of a large military medical facility.

Summary of Agency Comments and Our Evaluation

In commenting on a draft of this report, DOD agreed that we had correctly assessed the status of testing at both sites as of July 1, 1987. DOD pointed out, however, that testing is being performed under stringent time requirements and, in the case of Fitzsimons, in one of the largest installations using the VA system. DOD stated that, as of August 31, 1987, additional software had been placed into operation at Fitzsimons; by October 31, 1987, both sites will have implemented that portion of the software that was available on July 1, 1987, that DOD considers appropriate to test in a military facility. DOD noted, however, that it does not plan to implement either the engineering or the dental software modules because these modules support VA-specific requirements and are of no use in the military medical environment.

DOD also stated that it had always planned to continue operational support at both sites beyond the congressionally mandated October 1, 1987, test completion date. DOD pointed out that since its evaluation of the VA system was not to be conducted until mid- to late October 1987, it believed that sufficient data would exist at that time to conclusively address the question of whether the VA system could meet the needs of a large military medical facility. Nevertheless, DOD recognizes that an extension of the test could enhance the quantity and quality of data upon which a decision would be rendered. Consequently, DOD said that it would be amenable to an extension of the test completion deadline, contingent on (1) the legislative reporting requirement being deferred, (2) additional funding being provided to accommodate the installation of new software that may become available from VA in the future, and (3) the extension not adversely affecting DOD's planned test and evaluation of Composite Health Care System vendor systems.

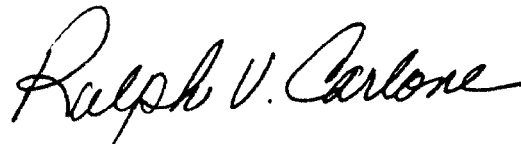
While we have not analyzed the applicability of all VA functions within the engineering and dental modules, we recognize that it is inappropriate for DOD to install software that is of no use in the military medical environment. With regard to the need for an extension of the test, we note that DOD will still be installing software during October 1987—the same month in which it had planned to conduct its evaluation of the test. As a result, it continues to be unclear whether the length of testing of the last

software to be installed will provide DOD with a sufficient basis to reasonably conclude whether the VA system can meet the needs of a large military medical facility. Therefore, we concur with DOD's statement that an extension of the test could enhance the quantity and quality of data upon which a decision would be rendered.

If the test were extended, we believe it would be appropriate for DOD to request deferral of its legislative reporting deadline. With regard to DOD's position on the need for additional funds, we cannot provide an assessment at this time. A detailed examination of all funding available to the Composite Health Care System program is needed to determine the amount of funding DOD would require if new software and requisite hardware are installed during an extension of the test. Finally, on the basis of discussions with DOD officials, we understand that Composite Health Care System test and evaluation activities are scheduled to be completed no sooner than June 1989. Since DOD is required to assess the VA system as an alternative to the Composite Health Care System, it would seem reasonable for DOD to coordinate the assessment of VA system test results with the evaluation of the Composite Health Care System. Under these circumstances, it appears that an extension of the VA system test should not adversely affect DOD's planned Composite Health Care System test and evaluation activities.

We are sending copies of the report to the Chairmen of the House and Senate Committees on Appropriations; Senate Committee on Veterans' Affairs; Director of Management and Budget; and will make copies available to others upon request.

Sincerely yours,



Ralph V. Carlone
Director

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Abbreviations

ADP	automatic data processing
DOD	Department of Defense
GAO	General Accounting Office
VA	Veterans Administration

Objective, Scope, and Methodology

Our report objective was to obtain information on the status of DOD's test of the Veterans Administration (VA) software at March Air Force Base Hospital and Fitzsimons Army Medical Center. This interim report provides data on the status of the test as of July 1, 1987, the latest date by which DOD could start the 3-month test in order to meet the October 1, 1987, deadline.

To assess the planned conduct of the test, we observed and analyzed project plans, methodologies, and operations. We conducted our review at the Tri-Service Medical Information System and Hospital Systems Program Office in Bethesda, Maryland; DOD consultant offices in Silver Spring, Maryland; Fitzsimons Army Medical Center in Aurora, Colorado; March Air Force Base in Riverside, California; VA medical centers in Loma Linda, California, and Denver, Colorado; and VA Information Systems Center in Salt Lake City, Utah.

To learn about the status of the test, we held discussions with DOD project managers and various Fitzsimons, March, and VA staff including site project managers, key clinical users, and data processing staff. We also observed planning, coordination, and status review meetings.

To assess the implementation of software modules and functions in the wards and clinics, we interviewed key clinical users, observed the system in operation in the wards and clinics, and independently verified that software functions were operationally available. We also reviewed applicable laws and other congressional directives, prior GAO reports, consultants' interim reports, and documents on project planning, system implementation, and system modification.

We limited the scope of our review in both facilities to ward and clinic operations. We recognize, however, that other operational units (for example, emergency rooms, reception and information areas, and pharmacy offices) have implemented and are using the VA software. We focused our efforts on wards and clinics because they are major patient care areas and include a large number of system users.

Many of the site explanations for less than complete testing were provided in early July 1987. Consequently, because of limited time, we did not assess the validity of these explanations. However, our review of the adequacy of DOD's testing of the VA system is continuing, and we will provide an analysis of the results of DOD's test and evaluation in a subsequent report as required by the National Defense Authorization Act for Fiscal Year 1986. Our audit work was performed from November 1985

through July 1987 and was conducted in accordance with generally accepted government auditing standards. Official comments on a draft of this report were obtained verbally from DOD and incorporated where appropriate.

Background Information on DOD's Test of the VA System

To automate a wide range of its medical support services and hospital administrative processes, the Department of Defense (DOD) is acquiring a computerized medical information system, known as the Composite Health Care System. According to DOD estimates, the system will cost between \$800 million and \$1.1 billion over its 8-year life cycle. The system is complex; it must support a health care network that is one of the world's largest. The military health care network serves about 9 million active duty personnel, retirees, and dependents at over 700 treatment centers worldwide. These treatment facilities are staffed by over 45,000 health care professionals.

Because the anticipated DOD system will be expensive and because the Veterans Administration (VA) had already begun developing the Decentralized Hospital Computer Program, the Congress wanted DOD to consider using the VA system to meet its needs. DOD has received congressional direction regarding the testing of the VA system on three separate occasions. Initially,¹ in October 1984, the Committee of Conference, approving appropriations for fiscal year 1985, directed DOD to test the VA system at March Air Force Base Hospital in Riverside, California. March was selected because, in June 1984, it had independently installed one of the VA system's software modules—scheduling—for its own use. By early 1985, March began testing the VA system. In September 1985, we reported² that DOD was testing only 2 of at least 5 available software modules and planned to test only 3 of the 12 additional modules planned for the VA system. The second congressional action,³ in late 1985, directed DOD to (1) expand the test at March to include all available VA software, (2) initiate the test in a military hospital significantly larger than March, (3) run the test at the two hospitals for 6 months beginning on March 1, 1986, and (4) report on the feasibility and cost-effectiveness of using the VA system in military hospitals. The same action also directed the VA to provide, on a reimbursable basis, personnel and equipment needed by DOD to carry out the test. DOD selected Fitzsimons Army Medical Center, in Aurora, Colorado, (a suburb of Denver) as its second test site. In a third action,⁴ concerned about the extent to which available VA software was being tested, the Congress extended the test deadline from September 1, 1986, to no later than October 1,

¹Conference Report, H.R. Rep. No. 98-1159 at 316 (1984).

²DOD Should Restructure the March Air Force Base Test of Veterans Administration-developed Software (GAO/IMTEC-85-14, September 11, 1985).

³National Defense Authorization Act for Fiscal Year 1986 (Public Law 99-145), November 8, 1985.

⁴National Defense Authorization Act for Fiscal Year 1987 (Public Law 99-661), November 14, 1986.

1987, and required DOD to test all VA components (equipment and software) available at the start of the 3-month period. Because of an October 1, 1987, test deadline—the latest date by which DOD must complete the test—testing had to commence on July 1, 1987.

DOD's Response to Congressional Direction

In response to these congressional directives, DOD secured VA's assistance in several activities. This assistance included the acquisition of equipment, modification of the VA software to meet military requirements, and initial training of DOD personnel. Hundreds of medical and automatic data processing staff have been trained to use and operate the system.

March and Fitzsimons differ in both age and physical size. The March hospital is a relatively modern facility contained in one five-story building. In contrast, Fitzsimons is an older, larger medical center spread throughout 282 buildings on a 625-acre site. Table II.1 shows the principal characteristics of each facility.

Table II.1: Characteristics of March Air Force Base Hospital and Fitzsimons Army Medical Center

Characteristics	March	Fitzsimons
Age of facility (in years)	22	69
Buildings linked to computer system	1	21
Number of computer system users	546	880
Number of personnel on site	641	4,077
Number of wards	6	21
Number of clinics	25	35
Authorized beds	108	506
Annual inpatient admissions	4,603	16,635
Annual outpatient clinic visits	207,227	571,741
Annual outpatient prescriptions	506,513	1,601,165
Annual laboratory procedures	826,846	4,378,364
Annual X-rays exposed	110,281	786,312

To fulfill congressional requirements to report on test results, DOD initiated development of a test plan and evaluation criteria. DOD also hired contractors to monitor the test and to assist in determining the system's cost-effectiveness and feasibility for use in military medical facilities. In response to the congressional directive that the separate military departments also evaluate results of the test, these military departments initiated the development of an independent evaluation plan.

What Is the VA System?

The VA system is composed of software modules that support many of the medical and administrative activities in a health care facility. The VA software modules form an integrated system, which allows users in various hospital areas such as admissions, pharmacy, and laboratory to access a common patient data base. The basic software functions allow hospital staff to establish and update patient treatment records; admit, transfer, and locate patients within the hospital; and schedule patient appointments in all the clinics. Once established, patient records can be viewed and updated by various health care providers to assist in patient treatment. For example, by interaction with the rest of the hospital system, radiology personnel can see what medications a patient is taking and obtain the results of laboratory tests that might influence the nature of the X-ray examination. Likewise, before dispensing a medicine, a pharmacist can review the patient's medication history to determine whether the prescribed drug could cause an allergic reaction. At the same time, the software module can be automatically researching the existence of any known adverse interactions between the prescribed drug and others. Table II.2 provides a detailed listing of the VA software available as of July 1, 1987, for testing at March and Fitzsimons.

Table II.2: VA Software Available for Testing at March Air Force Base Hospital and Fitzsimons Army Medical Center

Software module	Description	Functions
Admission/Discharge/Transfer	Registers patients and makes patient records available to VA system users throughout a hospital; has information about the location of inpatients; generates gain/loss reports, patient lists, and ward rosters.	Registration, admission, transfer, discharge, patient tracking, generation of gain/loss reports, creation of identification cards.
Scheduling	Schedules clinic appointments for inpatients and outpatients; tracks appointments for a given patient to eliminate duplication of appointments; generates patient record lists for the file room.	Appointment review, patient notification, appointment setting, patient record creation, establishment of clinic schedules, report printing.
Dietetics	Analyzes the nutritional value of planned menus, comparing them to recognized guidelines; generates labels and inventory lists; supports ward order entry for diets.	Nutritional assessment, energy/nutrient management, supplemental feeding, order entry, consult management, patient movements.
Mental Health	Contains over 80 computer-administered psychological tests and interviews, many with automated interpretation.	Clinical records, patient-administered instruments, vocational, general management.
Outpatient Pharmacy	Generates outpatient prescription labels; maintains patient medication profiles; provides drug inventory control for medical facilities.	Prescription label generation, patient medication profiles, statistical reports.
Inpatient Pharmacy	Supports three inpatient drug dispensing methods: unit dose, ward stock, and intravenous (I.V.) solutions; provides inventory control, inpatient medication profiles, and drug interaction data.	Order entry, patient medication profiles, statistical reports.

(continued)

**Appendix II
Background Information on DOD's Test of
the VA System**

Software module	Description	Functions
Laboratory	Prints laboratory test results; accumulates patient histories showing laboratory results; directly interfaces with automated laboratory instruments; produces laboratory management reports (including supply and equipment inventories); provides ad hoc reporting capabilities.	Numbering of specimens, tracking of blood drawings, laboratory test processing, results reporting, order entry, quality control.
Radiology	Registers patients for exams; automatically prints labels identifying X-ray files; tracks demographic data regarding exams; maintains patient profiles showing all exams and their status; provides for on-line transcription of radiologic reports.	Preregistration, registration, data collection, on-line reporting.
Nursing	Provides personnel management information (demographic and professional data of nursing staff); classifies patients by acuteness of illness; tracks continuing education attendance of nurses.	Administration, clinical, education, quality control.
Social Work	Opens and closes cases; tracks cases by social worker; identifies high-risk patients.	Case registration, community resources, contract nursing-home cost control.
Dental	Allows the input, capture, and summarization of detailed, VA-specific, dental work load accounting data.	Entry/tracking of dental procedures, generation of recurring reports specific to VA, special program management.
Engineering	Stand-alone module not integrated with VA system patient data base. Tracks medical facility engineering activities, such as building renovation.	Entry/tracking of work orders, equipment maintenance tracking, entry/tracking of construction jobs, space management, accident reporting, funds distribution and tracking, office automation.

VA Software Being Tested at March Air Force Base (As of July 1, 1987)

Software module ^a	Extent of functions	Site explanation ^b
Admission/Discharge/Transfer	7 of 7	
Scheduling	6 of 6	
Dietetics	6 of 6	
Mental Health	3 of 4	March is not testing the "Vocational" function because patients are generally military personnel and do not need job referrals.
Outpatient Pharmacy	3 of 3	
Inpatient Pharmacy:		
Unit Dose	2 of 3	The "Statistical Reports" function is not being tested because necessary software modifications had not been made by July 1, 1987.
I.V. Fluids	2 of 3	The "Statistical Reports" function is not being tested because necessary software modifications had not been made by July 1, 1987.
Ward Stock	2 of 3	The "Statistical Reports" function is not being tested because necessary software modifications had not been made by July 1, 1987.
Laboratory:		
Hematology	6 of 6	
Chemistry	6 of 6	
Microbiology	6 of 6	
Anatomical Pathology	0 of 6	Testing of the Anatomical Pathology submodule was delayed because necessary modifications had not been made by July 1, 1987. Testing is scheduled for the end of August 1987.
Radiology	4 of 4	
Nursing	2 of 4	Completion of the necessary modifications to the "Clinical Patient Classification" function was delayed until late July 1987 because March considered these modifications to have a lower priority than others. March established this lower priority because it plans to use the function primarily during wartime. The "Quality Assurance" function is not being tested because the function is a VA-specific function related to staffing, and most of the data it would provide can be obtained from the nursing module's "Administration" function.
Social Work	1 of 3	The "Case Registry" function is not being tested because March considers its social work operation to be too small to need automated caseload management. The "Contract Nursing Home Cost Control" function is not being tested because March does not contract with nursing homes.
Engineering	0 of 7	The Engineering module is not being tested because it is not health related and operates on a separate computer that does not interface with the system's patient data base.
Dental	0 of 3	The Dental module is not being tested because it is primarily a VA-specific work load tracking system.

^aSome software modules, such as Inpatient Pharmacy, have submodules; for example, Unit Dose is a submodule of Inpatient Pharmacy.

^bWe did not verify site explanations provided. In addition, the absence of a site explanation indicates that a complete test for that module or submodule has been initiated.

VA Software Being Tested at Fitzsimons Army Medical Center (As of July 1, 1987)

Software module ^a	Extent of functions	Site explanation ^b
Admission/Discharge/Transfer	6 of 7	The "Embosser interface" function—which enables automatic creation of identification cards—is not being tested because necessary software modifications have not been completed.
Scheduling	5 of 6	The "Patient Notification" function is not being tested because hospital procedures do not call for the clinics to notify patients of pending appointments or clinic cancellations.
Dietetics	4 of 6	The "Consult Management" function is not being tested because Fitzsimons has not yet evaluated the function's merits. The "Order Entry" function is not being tested because software problems have not been resolved.
Mental Health	0 of 4	The "Vocational" function is not being tested because patients are generally military personnel and do not need job referrals. Fitzsimons' test of the remainder of the Mental Health module was postponed until July 16 because of (1) a delay in obtaining the VA-DOD sharing agreement for use of copyrighted tests and (2) a misunderstanding between Fitzsimons and VA staff.
Outpatient Pharmacy	3 of 3	
Inpatient Pharmacy:		
Unit Dose	2 of 3	The "Statistical Reports" function is not being tested because necessary software modifications had not been made by July 1, 1987.
I.V. Fluids	2 of 3	The "Statistical Reports" function is not being tested because necessary software modifications had not been made by July 1, 1987.
Ward Stock	2 of 3	The "Statistical Reports" function is not being tested because necessary software modifications had not been made by July 1, 1987.
Laboratory:		
Hematology	6 of 6	
Chemistry	0 of 6	Fitzsimons decided not to test the Chemistry submodule until it can solve technical problems with its telecommunications system.
Microbiology	0 of 6	The Microbiology submodule is not being tested because of a temporary unavailability of critical staff and reported software problems.
Anatomical Pathology	0 of 6	The Anatomical Pathology submodule is not being tested because of the laboratory section's limited space, environmental problems, and pending relocation, which is targeted for early 1988.
Radiology	0 of 4	The "On-line Reporting" function is not being tested because an appropriate method of entering radiology reports into the system has not yet been determined. Fitzsimons' test of the remaining three functions was delayed until July 7, 1987, because of the July 4 holiday.
Nursing	0 of 4	The "Continuing Education" function is not being tested because staff determined that software problems needed resolution. The "Administration" function is not being tested because Fitzsimons determined that data retrieval is too slow. The "Clinical" function is not being tested because the VA system uses a classification methodology that is very different from the Army's. The "Quality Assurance" function is not being tested because DOD requires use of another system that fulfills similar data requirements.

(continued)

**Appendix IV
VA Software Being Tested at Fitzsimons Army
Medical Center (As of July 1, 1987)**

Software module^a	Extent of functions	Site explanation^b
Social Work	0 of 3	The Social Work module is not being tested because Fitzsimons prefers to wait until the new VA version is released, later in 1987.
Engineering	0 of 7	The Engineering module is not being tested because the package is not health related and operates on a separate computer that does not interface with the system's patient data base.
Dental	0 of 3	The Dental module is not being tested because the package is primarily a VA-specific work load tracking system.

^aSome software modules, such as Inpatient Pharmacy, have submodules; for example, Unit Dose is a submodule of Inpatient Pharmacy.

^bWe did not verify site explanations provided. In addition, the absence of a site explanation indicates that a complete test for that module or submodule has been initiated.

Ward and Clinic Implementation at March Air Force Base (As of July 1, 1987)

Software module ^a	Extent of wards	Extent of clinics	Site explanation ^b
Admission/Discharge/Transfer	6 of 6	24 of 25	The Admission/Discharge/Transfer module is not being tested in the physical therapy clinic because significant benefits would not result from automating the registration process.
Scheduling	0 of 6	24 of 25	The Scheduling module is not being tested in the wards because the wards do not schedule patient appointments; appointments are scheduled by the central appointment office or directly by clinics. The Scheduling module is not being tested in the physical therapy clinic because the clinic decided that it would be more effective to continue using the current manual system.
Dietetics	6 of 6	1 of 25	March is testing the Dietetics module only in the one clinic that can appropriately use it—the Nutrition clinic.
Mental Health	2 of 6	1 of 25	March is testing the Mental Health module only in the two wards and the one clinic that can appropriately use it—the Psychiatric ward, the Alcohol Rehabilitation ward and the Mental Health clinic.
Outpatient Pharmacy	6 of 6	25 of 25	
Inpatient Pharmacy:			
Unit Dose	2 of 6	0 of 25	March is testing the Unit Dose submodule only in the two wards that use the unit dose dispensing method—the Medical ward and the Surgical ward. The unit dose submodule is not being tested in the clinics because the submodule is not designed for clinic use.
I.V. Fluids	4 of 6	0 of 25	The Intravenous (I.V.) Fluids submodule is being tested in only the four wards that dispense intravenous fluid medications—the Surgical, Medical, Obstetrics, and Special Care wards. March is not testing the submodule in the clinics because the submodule is not designed for clinic use.
Ward Stock	0 of 6	2 of 25	The Ward Stock submodule is not being tested in the wards because there was insufficient time to install it; drug lists need to be developed, and this development is labor intensive. The Ward Stock submodule will be made available to the 25 other clinics by mid-August 1987.
Laboratory:			
Hematology	6 of 6	25 of 25	
Chemistry	6 of 6	25 of 25	
Microbiology	6 of 6	25 of 25	
Anatomical Pathology	0 of 6	0 of 25	The Anatomical Pathology submodule is not being tested because software modifications have not been completed.
Radiology	6 of 6	25 of 25	
Nursing	6 of 6	0 of 25	The "Administration" function is not being tested in the clinics because the clinics do not have the type of nursing personnel that the function is designed to benefit, and other clinic personnel have no need for the information provided by the function.
	6 of 6	11 of 25	March is testing the "Continuing Education" function in only the 11 clinics that have nursing services staff who are required to accumulate continuing education units.
	0 of 6	0 of 25	The "Clinical" function is not being tested in the wards because March did not have time to install the function. Testing is scheduled for September 1987 to allow time for software modifications. The function is not being tested in the clinics because it is not designed for clinic use.

(continued)

**Appendix V
Ward and Clinic Implementation at March Air
Force Base (As of July 1, 1987)**

Software module^a	Extent of wards	Extent of clinics	Site explanation^b
	0 of 6	0 of 25	The "Quality Assurance" function is not being tested in the wards or clinics because March considers it a VA-specific function related to staffing. March believes the data it would provide can be obtained from the Nursing module's "Administration" function.
Social Work	0 of 6	0 of 25	The Social Work module is not being tested because March believes the module was not appropriate for ward and clinic use.
Engineering	0 of 6	0 of 25	The Engineering module is not being tested because it is not health-related and operates on a separate computer that does not interface with the system's patient data base.
Dental	0 of 6	0 of 25	The Dental module is not being tested because the module is a VA-specific work load tracking system.

^aSome software modules, such as Inpatient Pharmacy, have submodules; for example, Unit Dose is a submodule of Inpatient Pharmacy.

^bWe did not verify site explanations provided. In addition, the absence of a site explanation indicates that a complete test for that module or submodule has been initiated.

Ward and Clinic Implementation at Fitzsimons Army Medical Center (As of July 1, 1987)

Software module ^a	Extent of wards	Extent of clinics	Site explanation ^b
Admission/Discharge/Transfer	21 of 21	34 of 35	The Admission/Discharge/Transfer module is not being tested in the Urology clinic because the clinic is being relocated.
Scheduling	1 of 21	34 of 35	Fitzsimons is testing the Scheduling module in only the Labor and Delivery ward because this ward sees outpatients on an emergency basis during the hours the Obstetrical clinic is closed. The ward enters data about these visits into the system for work load reporting purposes. Wards do not schedule patient appointments; all appointments are scheduled by the central appointment office or directly by clinics. The Scheduling module is not being tested in the Urology clinic because the clinic is being relocated.
Dietetics	0 of 21	0 of 35	While the Dietetics "Supplemental Feeding" and "Patient Movement" functions are being tested in the wards, the "Diet Order Entry" function is not being tested because software problems have not been resolved. The Dietetics module is not being tested in the Nutrition clinic (the only clinic in which use would be applicable) because the Nutrition clinic operates group classes for weight reduction; Fitzsimons staff believe the benefits of the module are targeted toward individual counseling.
Mental Health	0 of 21	0 of 35	Fitzsimons delayed testing the Mental Health module in the Psychology Services Office until July 16 because of a delay in obtaining the VA-DOD sharing agreement for use of copyrighted tests and a misunderstanding between Fitzsimons and VA staff. The Mental Health module is not being tested in the Psychiatric ward (the only ward in which use would be applicable) because Fitzsimons officials determined that the use of the module in the Psychology Services Office (located in the next building) would suffice.
Outpatient Pharmacy	0 of 21	0 of 35	The Outpatient Pharmacy module is not being tested in the wards or clinics because the module was designed for operation only in hospital pharmacies.
Inpatient Pharmacy:			
Unit Dose	20 of 21	0 of 35	The Unit Dose submodule is not being tested in the Psychiatric ward because that ward does not use the unit dose dispensing method. The submodule is not being tested in the clinics because it is not designed for clinic use.
I.V. Fluids	20 of 21	0 of 35	The Intravenous (I.V.) Fluids submodule is not being tested in the Psychiatric ward because that ward does not dispense intravenous fluid medications. The Intravenous Fluids submodule is not being tested in the clinics because the package was not designed for clinic use.
Ward Stock	0 of 21	0 of 35	The Ward Stock submodule is not being tested in the wards because pharmacy managers and nursing/ward staff have not agreed on how extensive the stock levels should be. The Ward Stock submodule is not being tested in the clinics because the clinics stock few medications.

(continued)

**Appendix VI
Ward and Clinic Implementation at
Fitzsimons Army Medical Center
(As of July 1, 1987)**

Software module^a	Extent of wards	Extent of clinics	Site explanation^b
Laboratory:			
Hematology	2 of 21	0 of 35	Fitzsimons is testing the Hematology submodule in only two wards until problems in data loss are resolved. The Hematology submodule is not being tested in the clinics because the computer does not have enough "port" interfaces to connect to terminals in the physicians' offices.
Chemistry	0 of 21	0 of 35	The Chemistry submodule is not being tested because Fitzsimons officials believe that the supporting telecommunications system is unreliable.
Microbiology	0 of 21	0 of 35	The Microbiology submodule is not being tested because of a temporary lack of critical staff and reported software problems.
Anatomical Pathology	0 of 21	0 of 35	The Anatomical Pathology submodule is not being tested because of the laboratory section's limited space, environmental problems, and pending relocation (targeted for early 1988).
Radiology	0 of 21	0 of 35	The Radiology module is not being tested in the wards because an appropriate method of entering radiology reports into the system has not yet been determined. The Radiology module is not being tested in the clinics because Fitzsimons does not have enough "port" interfaces to connect to terminals in the physicians' offices.
Nursing	0 of 21	0 of 35	The "Continuing Education" function is not being tested because staff determined that software problems needed resolution. The "Administration" function is not being tested because Fitzsimons determined that data retrieval is too slow. The "Clinical" function is not being tested because the VA system uses a classification methodology that is very different from the Army's. The "Quality Assurance" function is not being tested because DOD requires use of another system that fulfills similar data requirements.
Social Work	0 of 21	0 of 35	The Social Work module is not being tested because Fitzsimons prefers to wait until the new VA version is released, later in 1987.
Engineering	0 of 21	0 of 35	The Engineering module is not being tested because it is not health related and it operates on a separate computer that does not interface with the system's patient data base.
Dental	0 of 21	0 of 35	The Dental module is not being tested because the package is primarily a VA-specific work load tracking system.

^aSome software modules, such as Inpatient Pharmacy, have submodules; for example, Unit Dose is a submodule of Inpatient Pharmacy.

^bWe did not verify site explanations provided. In addition, the absence of a site explanation indicates that a complete test for that module or submodule has been initiated.

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