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FEDERAL HEALTH CARE

Increased Information System Sharing Could Improve Service, Reduce Costs

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

Dear Mr. Chairman:

In December 1992, you asked us to obtain information comparing the automated health information systems now in use at the Departments of Defense (DOD) and Veterans Affairs (VA), and the Indian Health Service (IHS), a component of the Public Health Service, Department of Health and Human Services. As agreed with your office, our objectives were to determine the functions common to all three systems; the extent of sharing—information, software, and computer systems—among the three agencies; and facilitators and barriers to sharing.

On April 23, 1993, we briefed your office on our results. This report documents our briefing and includes some additional information on specific examples of benefits and barriers to sharing. Appendix I presents the slides used at that briefing and appendix II contains information on our scope and methodology.

Results in Brief

Sharing among VA's Decentralized Hospital Computer Program (DHCP), DOD's Composite Health Care System (CHCS), and IHS' Resource and Patient Management System (RPMS) offers many potential benefits, including improved service to patients, reduced costs, and better use of health care facilities. However, despite these benefits, such sharing is limited. Health-related information that is shared between the agencies is paper-based; electronic exchange of information does not exist, and intra-agency exchange is limited. Some software sharing does occur between VA and IHS for selected functions, and a few VA/DOD sites share computer systems.

There are three factors that facilitate sharing: the agencies perform a common function—delivering medical care; they have a general desire to improve health care services within constrained resources; and their health information systems have a similar technical structure.

However, before additional sharing can be achieved, a number of barriers must be overcome, with organizational barriers the most challenging. Each agency has its own regulations, authorizing legislation, management information requirements, and clinical support operations that will need to be addressed. To facilitate additional sharing, consensus will be needed to standardize some of the agency-specific, health care related functions and their implementation.

Background

Federal health care is provided by VA, DOD, and IHS—each with its own health care mission. VA's focus is on acute and long-term health care for veterans; DOD focuses on acute and primary care for military personnel and dependents; and IHS' focus is on community-oriented, public health for Native Americans and Alaska Natives.

Correspondingly, each of the agencies has its own automated medical information system. VA's DHCP and IHS' RPMS are fully operational, and are being continually enhanced to improve their capabilities. DHCP is operational at 171 VA medical centers and 520 other health care facilities, while RPMS is operational at 229 sites. DOD has nearly completed CHCS testing at 14 sites, and plans to begin deployment of the outpatient portion of the system to 104 additional sites in 1993.

Functions and Features Common to All Systems

DHCP was used as the basis of all three systems. Its origin can be traced back to a group of VA medical personnel called the "Underground Railroad." By the late 1970s, this group had developed health care software modules based on the Massachusetts General Hospital Utility Multi-Programming System (MUMPS). In 1982 VA formally established DHCP, based on the MUMPS modules. IHS adopted portions of DHCP in 1985 as a basis for RPMS. In 1988 DOD awarded a contract for CHCS development to Science Applications International Corporation (SAIC), which used DHCP as a foundation for CHCS.

All three systems support some of the same health care functions (e.g., pharmacy, laboratory, radiology, and patient scheduling). However, other functions, such as case registry and emergency room support, are not available in all of the systems. In addition, the currently scheduled deployment of CHCS will provide support for only outpatient and ancillary functional capabilities, whereas DHCP and RPMS already support both inpatient and outpatient functions. Technically, all three systems are based on 1970s software technology and lack modern user interfaces. As a result,

they are more difficult to learn and use than systems that rely on current technology. In addition, performance and security issues related to the MUMPS environment require active management to prevent performance problems and security breaches during system operation.

Each system has its own strength—DHCP covers a larger number of separate functions than the other systems, CHCS covers selected functions (such as pharmacy) in more depth, and RPMS is farthest along toward developing an electronic medical record accessible from multiple locations.

Despite Benefits, Sharing Among Agencies Is Limited

Agency sharing of information, software, and computer systems offers benefits both to the government and to federal patients. For the government, sharing could support more efficient and effective use of federal health care computer systems and reduce administrative and software development costs. For example, DOD has developed an archiving capability for CHCS that facilitates patient-based data retrieval. VA would like a similar capability for DHCP. By taking advantage of the archiving work already done by DOD, VA could save software development costs. Similarly, federal patients could benefit from sharing through improved quality of care and reduced administrative "hassle." For example, coordinated eligibility among agencies could improve service to patients who are eligible for care and/or disability benefits in more than one agency.

However, despite these potential benefits, sharing of information, software, and computer systems is limited. Information sharing is paper-based; electronic information sharing between agencies does not exist and occurs only to a limited extent within each agency. For example, CHCS allows locally connected facilities to view centralized patient files; IHS is testing its Multi-Facility Integration program, which allows patient data to be exchanged from one facility's records to another, for RPMS; and VA can share demographic and some prescription data between medical centers nationwide. However, the VA exchange requires that (1) a medical center request data from another center, (2) communications modules be installed by both the data sender and receiver, and (3) staff intervene to process the data at the receiving site.

Software sharing occurs between VA and IHS. The agencies share in the design and development of selected modules and each uses software developed by the other agency. For example, IHS is using DHCP radiology

and surgery modules with minor modifications for IHS-specific requirements, while VA is pilot testing IHS' Patient Care Component software, part of RPMS, at the VA Medical Center in Tucson, Arizona. Also, VA and IHS are jointly developing an outpatient pharmacy module to be used by both systems. DOD does not share software with either VA or IHS.

Computer systems sharing occurs between VA and DOD at a few locations where either DHCP or CHCS is used as the host system for both agencies. For example, at the New Mexico Regional Federal Medical Center campus in Albuquerque, the VA Medical Center and the Kirtland Air Force Base Hospital use DHCP software to serve both VA and Air Force patients. IHS does not share computer systems with either VA or DOD.

Facilitators and Barriers to Additional Sharing

Opportunities for additional sharing are facilitated by several factors. First, VA, DOD, and IHS provide the same service—medical care—to their patients and share an overall desire to improve health care services within the current environment of constrained resources. In addition, all three systems have a similar technical structure—the MUMPS language and systems software, which includes Fileman database management software.

Despite these facilitating factors, the agencies face barriers to further sharing, which are primarily organizational. Varying management information requirements, limited resources, resistance to change, and differing clinical-support operations all create barriers. For example, DOD uses management reports that contain data not relevant to VA, such as data on the flying status and military occupational specialty of Air Force patients. Since it does not include these data in its database, DHCP must be modified to produce DOD management reports at sites where the agencies use DHCP as the shared computer system. Also, VA and DOD do not share hardware procurements, although there are no laws that preclude them from doing so. Shared procurements could result in more standardized hardware at computer system sharing sites. According to a VA official, agency policy and practices could be contributing to this barrier.

Technical barriers to sharing also exist. Despite similar origins, the systems' software architectures differ. For example, each system's data dictionary and file structure uses a different patient identifier. DHCP uses a patient's social security number, CHCS uses the military sponsor's social security number and a family member prefix to identify the patient's relationship to the sponsor, and RPMS uses a facility-specific health record

number as a patient identifier. Other technical barriers include the agencies' limited telecommunications capabilities and the varying degrees of system integration and software configuration management. Finally, portions of CHCS are proprietary; sharing of CHCS software will require contractual actions.

Observations

Although increased agency sharing offers numerous potential benefits, accelerating the pace of such sharing will be an onerous task. In particular, organizational and cultural barriers are daunting obstacles. Nevertheless, we believe that progress can be made if priority is placed on standardizing management and clinical support policies and practices across all three agencies.

Once this priority is made, agencies will be in a better position to reach consensus on several key areas. First, consensus is needed on standardization of data to support electronic sharing of information. Additional study will be needed first, however, to identify specific information to be shared, determine the associated costs and benefits, and develop an implementation plan. Another area requiring consensus is standardization of system interfaces to support expanded software sharing. Finally, agreement is needed on the degree to which the three systems should be merged.

We conducted our review from January 1993 to May 1993, in accordance with generally accepted government auditing standards.

We discussed a draft of this report with VA, DOD, and IHS officials responsible for these health information systems. These officials generally agreed with the facts as presented and their comments have been included where appropriate.

We are sending copies of this report to interested congressional committees; the Secretary of Health and Human Services; the Secretary of Defense; the Secretary of Veterans Affairs; and the Director, Office of Management and Budget. We will also make copies available to others upon request. Please contact me at (202) 512-6408 if you have any questions concerning this report. Other major contributors are listed in appendix III.

Sincerely yours,

Frank W. Reilly
Director, Human Resources
  Information Systems

Contents

Abbreviations

CHCS	Composite Health Care System
DOD	Department of Defense
DHCP	Decentralized Hospital Computer Program
GAO	General Accounting Office
IMTEC	Information Management and Technology Division
IHS	Indian Health Service
MUMPS	Massachusetts General Hospital Utility Multi-Programming System
RPMS	Resource and Patient Management System
SAIC	Science Applications International Corporation
VA	Department of Veterans Affairs

Briefing Charts: Sharing Among Federal Health Information Systems

GAO Information Management and
Technology Division

VA, DOD, and IHS Health
Information Systems Sharing

- Benefits and Barriers

GAO Objectives

- For Department of Veterans Affairs (VA), Department of Defense (DOD), and Indian Health Service (IHS) health information systems

- Profile each system: compare missions, functionality, design, and implementation approaches

GAO   Objectives (cont'd)

- Identify types of sharing and potential benefits

- Report on current sharing initiatives, facilitators of sharing, and existing barriers

- Identify areas where consensus could lead to increased sharing

GAO   Scope and Methodology

- Reviewed agency documents

- Interviewed knowledgeable personnel in each agency

- Observed the operation of all three systems

- Identified facilitators and barriers (based largely on agency input)

GAO   Results in Brief

- Types of sharing possible
  - Information--inter-agency
    and intra-agency
  - Software--development and
    use
  - Computer systems
- Benefits of sharing
  - Improved service
  - Reduced costs
  - Better use of health care
    facilities

GAO Overview - DHCP

- Medical focus on acute and long-term care
- Operational at 171 medical centers and 520 other health care facilities
- Performs inpatient, outpatient, and facilities management functions
- Versions controlled centrally; medical centers can develop additional software beyond standard applications

GAO   Overview - CHCS

- Medical focus on acute and primary care for military personnel and dependents
- Piloted at 14 hospital test sites; deployment of outpatient portion to 104 additional sites beginning in 1993
- Performs inpatient and outpatient functions
- Versions controlled centrally; no additional software can be developed by individual sites

GAO Results in Brief (cont'd)

- Sharing among the three agencies is limited
- Agencies' common desire to provide quality medical care facilitates sharing
- Organizational issues provide the greatest barriers to sharing
- Consensus can be obtained if priority is placed on uniformity of administrative and clinical support practices
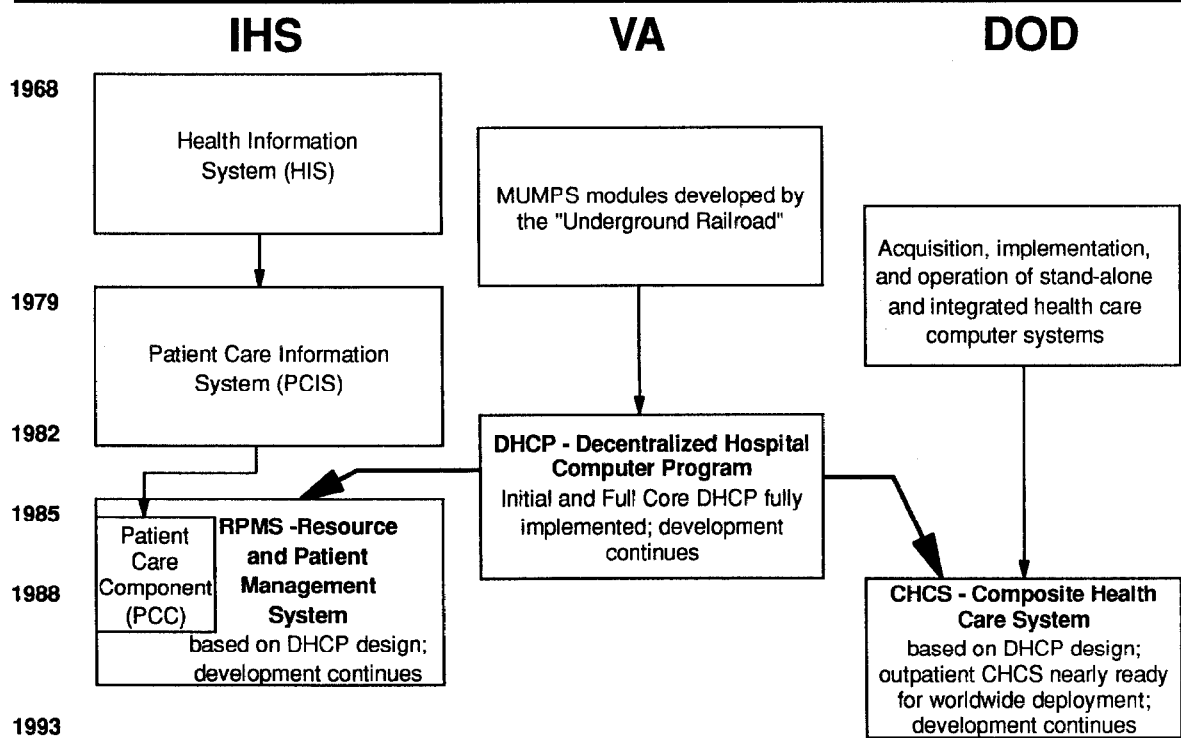
GAO   Major Federal Health
       Information Systems

- VA--Decentralized Hospital
  Computer Program (DHCP)

- DOD--Composite Health Care
  System (CHCS)

- IHS--Resource and Patient
  Management System (RPMS)
  - includes Patient Care
  Component (PCC)

GAO   Overview - RPMS

- Medical focus on community-oriented public health, with maximum tribal involvement
- Operational at 229 sites
- Uses IHS-developed functions together with selected DHCP functions
- PCC module provides a range of health data electronically
- Versions controlled centrally; sites can develop additional software

GAO Federal Health Information Systems - Development History

	IHS	VA	DOD
1968	Health Information System (HIS)		
		MUMPS modules developed by the "Underground Railroad"	
			Acquisition, implementation, and operation of stand-alone and integrated health care computer systems
1979	Patient Care Information System (PCIS)		
1982		**DHCP - Decentralized Hospital Computer Program** Initial and Full Core DHCP fully implemented; development continues	
1985	Patient Care Component (PCC)		
1988	**RPMS -Resource and Patient Management System** based on DHCP design; development continues		**CHCS - Composite Health Care System** based on DHCP design; outpatient CHCS nearly ready for worldwide deployment; development continues
1993			

GAO Federal Health Information
Systems - Summary

- System strengths:
  - DHCP--breadth of functions
  - CHCS--depth of functions in selected areas
  - RPMS--farthest along toward system wide medical record
- All 3 systems rely on 1970s software technology
  - Lack modern user interface
  - Performance and security issues require active management

GAO   Types of Sharing

- **Information** -
  clinical/administrative
  - Intra-agency
  - Inter-agency,
    private providers

- **Software**
  - Design knowledge
  - Development
  - Use

- **Computer Systems**
  - Inter-agency use
  - Procurement

GAO   Information Sharing Today

- Inter-agency sharing is paper-based; health care related data are not shared electronically
- Intra-agency sharing is done by IHS and DOD between local facilities
- VA sites send selected DHCP data to other sites by electronic mail; staff receiving the data prepare it for local DHCP processing

GAO Software Sharing Today

- Occurs between VA and IHS
  - VA and IHS co-develop selected DHCP and RPMS modules
  - VA incorporates IHS software needs into standard DHCP releases
  - IHS incorporates current releases of selected DHCP modules into RPMS
  - VA is pilot testing IHS' PCC at one VA Medical Center

GAO   Computer Systems Sharing
Today

- Occurs between VA and DOD
  at a few locations
  - Example: New Mexico
    Regional Federal Medical
    Center at Kirtland Air Force
    Base
    - DOD and VA use DHCP as
      host system
    - Outpatient pharmacy
      functions not shared due to
      differences in VA and DOD
      operations

GAO Computer Systems Sharing
      Today (cont'd)

- Five other VA/DOD sites planned; either DHCP or CHCS will be used as the host system

- Software modifications for sharing sites are handled on a site-by-site basis

GAO Sharing Among the Three Agencies is Limited

Agencies	Type of Sharing		
	Information	Software	Computer Systems
VA / DOD			✓
VA / IHS		✓	
IHS / DOD			

✓ - Sharing initiatives

GAO   Benefits of Sharing

- Improved service to the federal patient
  - Improved quality of care
  - Reduced administrative "hassle"
  - Coordinated eligibility
- Reduced costs
  - Administrative
  - Software development
- Provides foundation for more efficient and effective use of facilities

GAO   Benefits of Sharing (cont'd)

- **Reduced software development costs--example: archiving**
  - VA desires patient-based archive retrieval to enhance current module-specific capabilities
  - CHCS' archived data retrieval can be patient-based
  - VA could potentially benefit from sharing with DOD

GAO   Facilitators of Sharing

- Same function--medical care-- is performed by all three systems

- Overall desire to improve health care services within constrained resources

- Systems have similar technical origin (MUMPS language, Fileman)

GAO   Barriers to Sharing

- Barriers to sharing are primarily organizational
    - Differing agency missions
    - Legal/regulatory restrictions
    - Varying management information requirements
    - Agency-specific clinical support operations
    - Resistance to change
    - Limited resources
    - Accounting for shared costs

GAO   Barriers to Sharing (cont'd)

- Some technical barriers exist
  - Software components differ despite similar origin
  - Data dictionaries and file structures not identical
  - Limited telecommunications capability
  - Varying degrees of system integration
  - Portions of CHCS proprietary; sharing would require contractual actions

GAO Organizational Barriers to Sharing

- Resistance to change--example: computer procurements
  - Laws do not prevent shared agency contracts
  - Common contracts would facilitate sharing--example: standardizing hardware
  - No shared procurements at VA/DOD computer system sharing sites

GAO   Organizational Barriers to
Sharing (cont'd)

- Varying management
  information requirements
  --example: VA and DOD
    - DOD uses a management
      report that requires data not
      applicable to VA--example:
        - Flying status
        - Military occupational
          specialty
    - DHCP modifications required
      to generate DOD data at
      sharing sites

GAO   Organizational Barriers to
       Sharing (cont'd)

- Agency-specific clinical
  support operations--example:
  outpatient pharmacy at
  VA/DOD sharing site

  - VA uses pharmacists to
    process prescriptions--
    DHCP lacks drug interaction
    checks

GAO   Organizational Barriers to
       Sharing (cont'd)

- DOD uses technicians to
  process prescriptions--CHCS
  performs drug interaction
  checks

- DOD could not use DHCP at
  sharing site due to lack of
  drug interaction checks
  needed for technician
  prescription processing

GAO Technical Barriers

- Data dictionaries and file structures not identical--example: patient identifier
  - VA uses patient Social Security Number (SSN)
  - DOD uses sponsor SSN and a family member prefix
  - IHS uses facility specific health record number which can include demographic data and SSN if available

GAO   Areas Requiring Consensus

- **Standardization of data for electronic sharing of information**

  - **Additional study needed to identify specific information to be shared, determine associated costs and benefits, and develop an implementation plan**

GAO   Areas Requiring Consensus
       (cont'd)

- Standardization of interfaces
  for expanded software sharing

- Degree of convergence of the
  three systems

Objectives, Scope, and Methodology

The House Committee on Veterans Affairs requested that we obtain information on sharing among VA's, DOD's, and IHS' automated health information systems. In particular, we were asked to focus on determining the extent to which information is shared and identifying facilitators and barriers to systems sharing and health functions common to all three agencies' systems.

To achieve these objectives, we interviewed officials responsible for the development and management of each agency's system, as well as those responsible for addressing systems sharing issues. In addition, we reviewed documents pertaining to each of the systems and to sharing issues encountered to date. Finally, we observed each of the systems in operation and visited sites where sharing initiatives are taking place.

Our work was conducted at VA offices in Washington, D.C.; the DOD CHCS Program Office in Falls Church, Virginia; and the IHS Headquarters in Rockville, Maryland. In addition, we visited the New Mexico Regional Federal Medical Center and the IHS Western Headquarters, both in Albuquerque, New Mexico. Also, we visited the IHS Research and Development Center, the IHS San Xavier Clinic, and the VA Medical Center, all in Tucson, Arizona.

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