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MEDICARE TRANSACTION SYSTEM

Success Depends Upon Correcting Critical Managerial and Technical Weaknesses

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Subcommittee on Human Resources
Committee on Government Reform and Oversight
House of Representatives

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Committee on Government Reform and Oversight
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This report responds to your request that GAO evaluate the Health Care Financing Administration's (HCFA) acquisition of its Medicare Transaction System (MTS). Specifically, we addressed the extent to which HCFA is (1) effectively managing its interim Medicare processing environment, (2) using required practices to manage MTS as an investment, and (3) applying sound system development processes to reduce risk. The report makes several recommendations that could help HCFA effectively meet its Medicare information technology needs and decrease the risk of costly technological decisions and wasted federal expenditures that are often associated with large federal information technology projects.

We are sending copies of this report to the Secretary of Health and Human Services, Administrator of the Health Care Financing Administration, Director of the Office of Management and Budget, and appropriate congressional committees. We will also make copies available to others upon request.

Please call me at (202) 512-6253 if you or your staff have any questions concerning this report. You can also reach me by e-mail at *willemssenj.aimd@gao.gov*. Major contributors to this report are listed in appendix III.

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Executive Summary

Purpose

Medicare, the nation's largest health insurer, expects to process over 1 billion claims and pay $288 billion in benefits per year by 2000. The Health Care Financing Administration (HCFA) is responsible for administering this program under the Department of Health and Human Services (HHS). Nine separate automated information systems have been used to process Medicare claims. HCFA plans to spend about $1 billion to replace these systems with a single, unified system—the Medicare Transaction System (MTS). HCFA estimates that MTS will begin replacing the existing systems in 1998, providing improved service, reduced operating expenses, better contractor oversight, and more protection of program funds from waste, fraud, and abuse, while also accommodating managed care and alternative payment methodologies.

At the request of the Subcommittees on Human Resources, and Government Management, Information, and Technology of the House Committee on Government Reform and Oversight, GAO reviewed the extent to which HCFA is (1) effectively managing its interim claims-processing, including planning for and correcting year 2000-related computer problems, (2) using required practices to manage MTS as an investment, and (3) applying sound systems-development practices to reduce risk.

Background

HCFA manages the Medicare program through about 70 contractors who process claims and pay benefits at about 45 sites nationwide. It considers MTS an important part of its plans to improve the Medicare claims process. By replacing Medicare's multiple, contractor-operated claims-processing systems with a single system, HCFA believes it will obtain significant benefits. For example, HCFA explained that when changes in legislative or administrative policies require changes in Medicare payments or coverage, each of the existing claims-processing systems must be individually modified—an expensive, time-consuming process. Under MTS, only one system would need to be modified.

HCFA has made major changes to the development and implementation plans for MTS since it was begun. In previous reviews, GAO identified the need to reduce MTS acquisition risks through an incremental deployment approach.[1] HCFA now plans such an approach. In an effort to improve its MTS initiative, reduce risk, and achieve some savings before MTS is

[1]Medicare: New Claims Processing System Benefits and Acquisition Risks (GAO/HEHS/AIMD-94-79, Jan. 25, 1994) and Medicare Transaction System: Strengthened Management and Sound Development Approach Critical to Success (GAO/T-AIMD-96-12, Nov. 16, 1995).

implemented, HCFA is simultaneously undertaking several interim actions while continuing its development of MTS.

HCFA's interim efforts consist of selecting a single part A and single part B system from the nine existing systems and consolidating the data processing workload, thereby reducing the number of processing sites from 45 to about 20. (Medicare part A covers institutional care, while part B covers physician, supplier, and other outpatient services.) HCFA plans to move the data processing workload from the interim consolidated processing sites to two planned MTS claims-processing sites by mid-1998. By then, HCFA also plans to have its contractors revise their systems to accommodate year-2000 processing.[2]

On April 4, 1997, HCFA announced that, as a result of a recent management review, it was redirecting its MTS contractor to focus solely on the managed care module—the first of six planned software releases—while it examines alternative ways to achieve its MTS goals. HCFA concluded that its vision of MTS as the best information technology to take Medicare into the 21st century had not changed.

Results in Brief

HCFA recognizes that the multiple Medicare claims-processing systems are difficult to administer, and is looking to MTS to achieve substantial administrative savings, increase claims control, and improve customer service. To its credit, HCFA is using a phased development approach to reduce risks and is beginning to apply investment practices in its management of the MTS project. However, the benefits of modernizing Medicare claims processing at an estimated cost of $1 billion will not be realized unless HCFA overcomes serious management and technical weaknesses in three major areas that place the modernization at great risk.

First, HCFA needs to greatly improve its management of the essential interim Medicare processing environment and the changes necessary for operating beyond 2000. To successfully process the claims workload, consolidate existing processing sites, address year 2000-related systems problems, and convert from nine systems to two, careful planning is necessary. However, such planning has not yet been completed. For example, although HCFA has already begun to convert its existing systems

[2]Due to the use of the two-digit format for dates in many computer systems, the year 2000 (represented "00") will be indistinguishable from the year 1900 (also represented "00"). As a result, unless modifications are made, system or application programs that use dates to perform calculations, comparisons, or sorting may generate incorrect results when working with dates after 1999 as a result of reading "00" as "1900."

and consolidate its sites, it has not developed plans to guide these activities. Such plans should include a schedule and estimate of resources required for the transition, details defining systems-contractor responsibilities, and an approach for addressing potential year-2000 problems.

The risks associated with concurrently converting major systems while at the same time managing ongoing development of MTS is magnified by the fact that changing from the existing claims processing environment to MTS is a larger, more complex systems-conversion challenge than anything HCFA has previously faced. Further, HCFA is relying on its Medicare systems contractors to assess, plan, and implement essential changes for the year-2000 issue, but is not closely monitoring these critical activities or receiving certifications or assurances from contractors that the problems will be corrected.

A schedule and estimate of needed resources for each major stage of the transition to the interim processing environment would ensure the availability of needed resources and help HCFA better manage and coordinate transition activities. HCFA agreed that a transition schedule and resource estimates would be helpful; a contractor is to assist HCFA in preparing and integrating them into the overall MTS development schedule, to be completed by late this spring.

Second, MTS is not being adequately managed as an investment. HCFA has not followed practices that are essential if management is to make informed technology investment decisions, including preparing a valid cost-benefit analysis, considering viable alternatives, and fully evaluating how the proposed technology benefits will contribute to improvements in mission performance. HCFA estimates that many programmatic savings will result from automated edits that identify abusive billing practices and deny related claims. However, HCFA stated that because the exact nature of MTS' edits had not been identified, the resulting savings could be significantly different from the estimated savings. Also, since 1992 when the first analysis was completed, the total cost of this project has increased from $151 million to about $1 billion.[3] The $1 billion includes estimated costs to transition to the MTS environment and acquire operating sites.

Finally, HCFA has not applied all the sound systems-development practices necessary to reduce risk and assist management in controlling development of system requirements and software. Along with not

[3]All dollar amounts presented in this report are expressed as undiscounted current dollars.

developing plans critical to the project's success, the agency has not adequately overseen its contractor's software development strategy, adequately managed the project's schedule, or implemented a program to effectively address risk. More specifically, deficiencies in several critical systems-development processes provide early warning of weaknesses in the management capability of HCFA itself and of its contractors. Plans are inadequate or completed too late, the schedule is incomplete and contains overlap in development phases, HCFA's risk-management process is inadequate, and its oversight has not prevented an unsound software-development strategy. These factors all increase the risk that MTS cannot be developed into the management information tool that HCFA needs.

Principal Findings

Ineffective Management of Interim Processing Environment

Generally accepted program management practices call for preparing detailed plans for system transitions and modifications, which for HCFA should include (1) schedule and resource estimates, (2) defined responsibilities of the selected Medicare part A and part B systems contractors, (3) test plans, and (4) performance measures. These plans are particularly important for HCFA because the interim transition is a larger systems-conversion effort than any previously undertaken by HCFA and is being performed concurrently with HCFA's management of MTS development.

HCFA has recently taken some actions and plans others. It hired a consultant to help it prepare a schedule and resource estimates for the transition, and awarded a contract defining responsibilities for the selected part B system on April 8, 1997. The part A systems contractor's statement of responsibilities is to be completed by the end of May of this year.

According to HCFA officials, their contractors routinely test and implement systems changes, and they plan to rely on their contractors to successfully test and implement the changes occurring during the transition. However, the transition differs from routine changes. The contractors may not have a particularly high incentive to properly make these conversions, since HCFA plans to eliminate these contractors when MTS is fully implemented. Also, these conversions involve significantly more data and will require

more system capacity than routine modifications. Further, HCFA officials said they do not believe it would be cost-beneficial to use the agency's limited resources to develop performance measures for interim systems that will be replaced by MTS. GAO believes these measures are needed to ensure that this complex and important interim phase is properly implemented and delivers the benefits expected.

HCFA has also not taken enough initial actions to ensure that it can avoid the systems-related service disruptions that may occur as the year 2000 approaches. For example, it has not developed an assessment of the potential severity of the impact of the century change or completed a plan for addressing it. Further, HCFA has not required systems contractors to submit year-2000 plans for approval. It lacks any specific legal agreements with its contractors addressing year-2000 problems, including how, when, or even if such problems will be corrected. The potential risks associated with not being ready for 2000 are serious, since virtually all Medicare transactions depend, to some degree, on dates to determine benefits eligibility—dates of birth, medical procedure, other insurance coverage, and so forth. Unless corrected, if a computer system were to read "00" as 1900 instead of 2000, someone born in 1925 would be seen as negative 25 years old—not even born yet—rather than the actual age of 75.

HCFA is now surveying its contractors about this issue. The agency has also asked the contractors to provide estimates showing when their systems will be year-2000 compliant. However, HCFA has no plans to independently validate the contractors' strategies and test plans. HCFA likewise has no plans to approve contractors' approaches for addressing interface and data exchange issues.

MTS Not Being Adequately Managed as an Investment

Federal legislation and Office of Management and Budget (OMB) directives require agencies to manage major information technology acquisitions as investments. Critical elements of technology investment decision-making are processes and data that ensure that (1) the right project proposals are funded on the basis of management evaluations of costs, risks, and expected benefits to mission performance and (2) once funded, projects are controlled by examining costs, the development schedule, and actual versus expected results.

These goals are accomplished through preparing valid cost-benefit analyses, considering viable alternatives, having senior management consistently make key decisions on major projects, and ensuring that the

projects support the agency's mission and goals. Because HCFA has not implemented these critical elements, it has no assurance that its MTS development will reduce risks to the greatest extent possible, and achieve a maximum return on its MTS investment.

Since 1992 HCFA has prepared numerous documents showing MTS' estimated costs and benefits. However, all of these documents are flawed in that not all costs were identified, projected savings were overstated or not adequately supported, and alternative solutions were not considered. As a result, reliable cost or benefit estimates for MTS are not yet available. In such an information vacuum, it is impossible to manage a complex technology project such as MTS as an investment because no basis exists on which to predict likely short- or long-term results, and compare them against resources spent. Furthermore, recent data show that an early key HCFA assumption was invalid. HCFA's 1993 analysis assumed that, without MTS, costs per claim for part A and part B would continually increase from 1993 through 2002. However, actual contractor cost reports show that costs per claim for part A and part B decreased for fiscal years 1994 through 1996, from $1.41 to $1.27, and from $0.89 to $0.88, respectively.

Beyond monetary uncertainties, decision-making without alternatives analysis adds risk. The decision to consolidate a daily claims-processing workload of about 2.6 million claims at two new sites yet to be acquired was made without considering other alternatives, such as using existing processing centers.

Related to a sound cost-benefit analysis is the level of management oversight. While HCFA is making positive changes, such as designating a chief information officer and establishing an investment review board, consistent senior-level involvement and investment-based decision-making are still lacking. HCFA's executive decision-making group—the MTS management board—has not made many of the critical MTS investment decisions, and HCFA has not adequately linked MTS to its agency goals or mission; likewise, it has not established performance measures to evaluate how well MTS supports the goals or programs of the agency.

Lack of Sound Systems-Development Practices

Sound systems-development practices are not being followed for MTS. HCFA lacks critical project development plans, including plans for requirements management, software development, and systems integration. Without these plans, it is difficult for HCFA to appropriately manage and monitor the MTS contract and apply sound systems-development practices. HCFA's

contractor oversight likewise departs from critical software development best practices, including an assessment of the software capability level of the MTS development contractor, use of specific software measures to assess the quality of software development, and use of sound software-estimation assumptions to make reasonable project cost and time estimates. Not embracing such practices threatens MTS' quality, timeliness, and cost.

For example, HCFA's lack of a requirements-management plan contributed to several redirections that resulted in schedule delays. The approach toward defining requirements has been changed, not all requirements are yet defined, many that have been defined have not been formally agreed to, and their volatility can affect cost and development. For example, during a recent 5-month period, the requirements for one software release dropped from 1,639 to 1,499, while the requirements for another release increased from 631 to 868.

In addition, the MTS development schedule contains serious flaws. Resource needs have not been included, a critical path (i.e., the sequence of dependent tasks that, if delayed, will delay the entire project) has not been identified, and project development phases—designed to be sequential—are often concurrent. As a result, HCFA cannot rely on the MTS program schedule for management decision-making.

Finally, weaknesses in HCFA's MTS risk management process have not been addressed. HCFA has no quantitative analysis of the cost, schedule, or systems performance impact of identified risks to MTS development; overall responsibility for MTS risk management has not been assigned. At the same time, several long-standing critical risks remain, and serve as a warning that effective risk management practices have not been institutionalized or uniformly practiced.

Recommendations

In order to help HCFA effectively manage its interim Medicare processing environment, GAO recommends that the Secretary of Health and Human Services direct that the Administrator of the Health Care Financing Administration take the following steps:

- Prepare a plan that provides details of the transition to the single Medicare part A and part B systems, and defines how systems will be converted to address potential year-2000 problems. (See chapter 2.)

- Prepare plans for conducting thorough testing before converting part A and part B systems. (See chapter 2.)
- Establish a means of assessing performance in the crucial early stages of the transition, and apply any lessons learned to planning for MTS. (See chapter 2.)
- Help ensure the reliable operation of its systems through the year 2000 by identifying responsibilities for managing and monitoring year-2000 actions, preparing an assessment of the severity and timing of potential year-2000 impact, developing contingency plans for critical systems in the event of failure, and regularly reporting to HHS on its progress. (See chapter 2.)

In addition, in order to help HCFA develop and implement MTS, and minimize unnecessary spending in the process, GAO recommends the Secretary of Health and Human Services withhold funding for the MTS operating site contracts until HCFA cost-justifies them. (See chapter 3.) GAO also recommends that the Secretary of Health and Human Services direct that the Administrator of the Health Care Financing Administration do the following:

- Justify the continuation of MTS by producing a valid cost-benefit and alternatives analysis that includes goals for reaching programmatic savings and links estimated savings to specific improvements in Medicare claims processing, and take appropriate action based on the results of the analysis. (See chapter 3.)
- Establish an investment management approach for MTS by explicitly linking the roles and responsibilities of the CIO and the Investment Review Board to relevant legislative mandates and requirements, which include (1) designing and implementing a process for maximizing the value and assessing and managing the risks of information technology acquisitions, and integrating that process with the budget, financial, and program management decisions of the agency, (2) providing the means for senior management to obtain timely information regarding the progress of an investment, including a system of milestones for measuring progress, in terms of cost, capability of the system to meet specified requirements, timeliness, and quality, and (3) ensuring that performance measures are applied to measure how well information technology projects support the goals and missions of the agency. (See chapter 3.)
- Complete and implement those plans that are critical to effective systems development, including a requirements management plan, software development plan, configuration management plan, and systems integration plan. (See chapter 4.)

- Require an independent evaluation of the MTS contractor's software development capability prior to beginning the software development phase. To ensure that the contractor's MTS development team has the capability required for reasonable assurance of success, it should achieve a rating of at least level 2. (See chapter 4.)
- Complete a new, integrated MTS program schedule that includes a critical path for the entire initiative, including the interim, and resources and costs for each task; it should also minimize overlap in the phases of the systems-development process. (See chapter 4.)
- Mitigate critical risks by designating an accountable official for risk management and ensuring that this individual implements a process that will (1) identify and quantify all significant risks, (2) establish time frames for assessing risk status and specifying target dates for risk mitigation, (3) develop metrics that will compare progress in assessing the effectiveness of risk mitigation efforts, (4) provide a mechanism for alerting management early of risks that are becoming imminent, (5) provide resource estimates of staff, schedule needs, and funding to address identified risks, (6) ensure that the MTS risk management database incorporates all identified risks, and (7) document interdependencies among risks. (See chapter 4.)

Additional GAO recommendations to improve the transition, management, development, and implementation of MTS are in chapters 2, 3, and 4.

Agency Comments and Our Evaluation

We requested written comments from the Secretary of the Department of Health and Human Services and the Director of the Office of Management and Budget. HHS' Assistant Secretary for Management and Budget agreed with GAO's recommendations for effectively managing Medicare's interim claims-processing environment, using required practices to manage MTS as an investment, and applying sound systems-development practices. HHS said that both the Department and HCFA are committed to complying with these recommendations. Further, HHS said that steps have already been initiated to implement several of GAO's recommendations, including (1) preparing detailed plans for the transition to the single Medicare part A and part B systems, (2) requesting implementation plans from its contractors on their progress in making their systems millennium-compliant, and (3) reassessing the cost, benefits, and alternative development strategies to MTS. HCFA concluded that GAO has been of significant assistance in offering suggestions for improved management.

In comments on a draft of this report, OMB's Deputy Director for Management agreed with GAO's recommendations for improved management of MTS and concurred that HCFA must take steps to more adequately plan for the consolidation to the standardized part A and part B system. It also concurred that HCFA needs to better manage MTS as an investment, and apply sound systems-development practices to reduce risk and assist management in controlling the development of systems requirements and software.

GAO believes that by effectively implementing its recommendations HCFA will improve the management of its modernization effort and increase its assurance that the approach taken will be cost-effective, risk-averse, and support the agency's mission and goals.

These comments are discussed in chapters 2, 3, and 4 and are reprinted in appendixes I and II.

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Abbreviations

AIMD	Accounting and Information Management Division
CCA	Clinger-Cohen Act
CIO	chief information officer
CMM	capability maturity model
FASA	Federal Acquisition and Streamlining Act
GAO	General Accounting Office
HCFA	Health Care Financing Administration
HHS	Department of Health and Human Services
IRM	information resources management
IV&V	independent verification and validation
MTS	Medicare Transaction System
OMB	Office of Management and Budget
PRA	Paperwork Reduction Act of 1995
SA-CMM	Software Acquisition Capability Maturity Model
SAF	systems assessment framework
SEI	Software Engineering Institute
SLIM	software life-cycle management

Introduction

Medicare is the nation's largest health insurer, serving about 38 million Americans by providing federal health insurance to individuals 65 or older and to many of the nation's disabled. It now provides over $200 billion in health care benefits annually. Medicare's day-to-day operations are run by the Health Care Financing Administration (HCFA) under the Department of Health and Human Services (HHS). HCFA uses about 70 intermediary and carrier claims processing contractors to administer the Medicare program. Intermediaries are the contractors that handle part A claims submitted by hospitals, skilled nursing facilities, hospices, home health agencies, and rehabilitation agencies. Carrier contractors handle part B claims submitted by physicians, laboratories, equipment suppliers, outpatient providers, and other practitioners. In December 1996, contractors were using three different systems to process part A claims and six different systems to process part B claims.

Medicare is expected to process over 1 billion claims and pay $288 billion in benefits per year by 2000. With more claims creating a rapidly expanding workload, HCFA is planning to replace its current claims-processing systems in order to be able to handle the expected increase in numbers of claims and provide better service to its customers.

The Medicare Transaction System

In January 1994, as part of its plans to improve the efficiency and effectiveness of Medicare program operations, HCFA awarded a contract to a software developer to design, develop, and implement a new government-owned, automated claims-processing information system, the Medicare Transaction System (MTS).[1] HCFA intends to replace the claims processing functions being performed by the nine different systems with a single, unified MTS having improved capabilities to help achieve significant advances in Medicare management and operations.

The specific goals of MTS are to improve service to beneficiaries and providers; reduce administrative expenses; allow better oversight of Medicare contractors' operations; better protect program funds from waste, fraud, and abuse; and accommodate managed care and alternative payment methodologies.

[1]MTS is used throughout the report to refer to the software development project as well as other initiatives, such as interim-phase activities, MTS claims processing sites, and telecommunications.

HCFA Revised Its MTS Transition and Implementation Plans

HCFA initially expected contractors to begin processing claims using MTS in late 1996 and to implement MTS at all Medicare contractor locations by December 1998. However, because of difficulty in defining system requirements and a revised system development approach to minimize risk, HCFA now expects to have its first MTS software module—managed care—implemented by June 1998, and complete implementing the remaining modules in 2000 and beyond. It also plans to award contracts for an MTS data operations and analysis center and two MTS claims processing sites in late 1997, and move the claims processing workload to these two processing centers from the existing claims processing locations as the MTS modules become available.

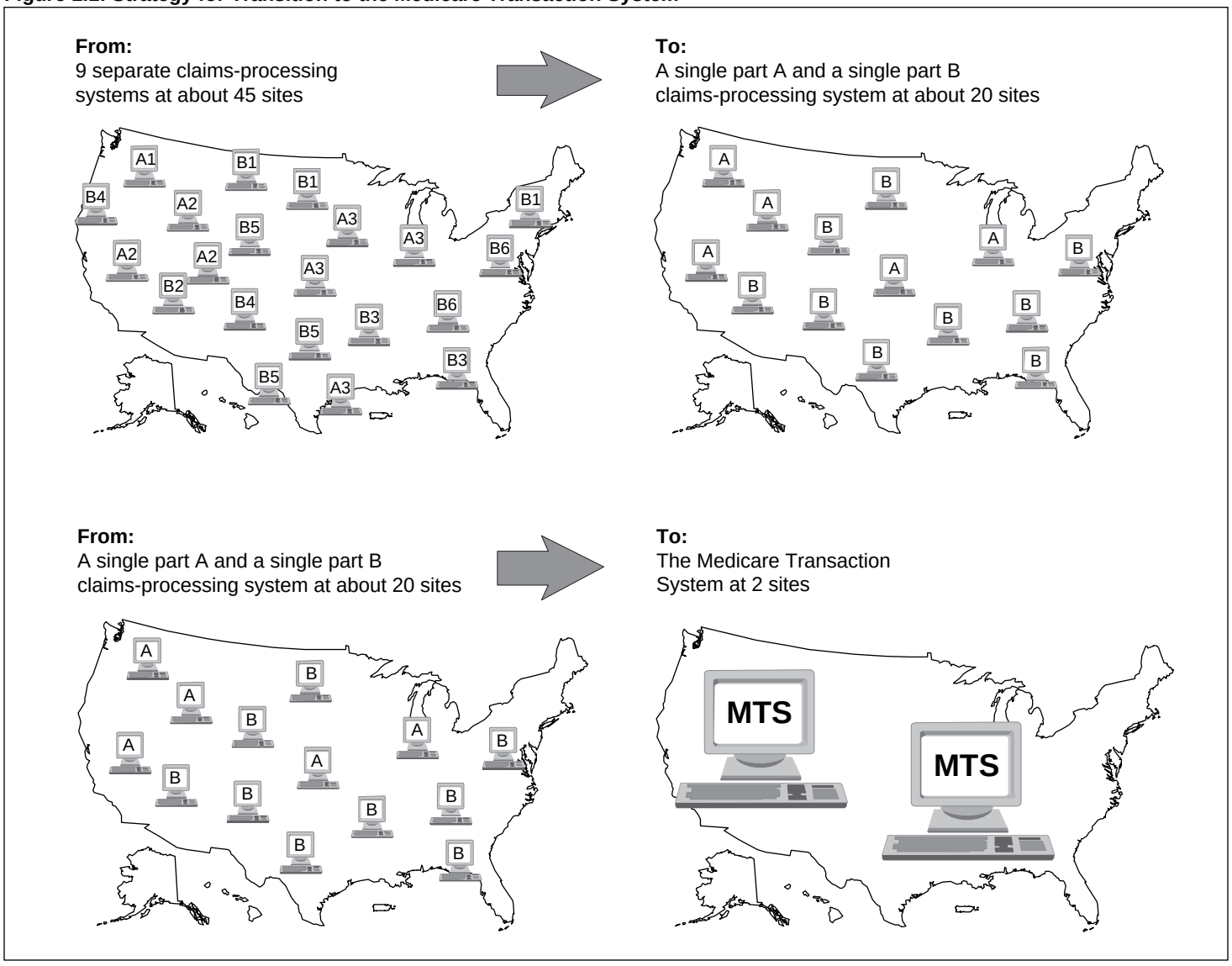
The original MTS project schedule was developed on the basis of a grand design approach, in which the complete system would be implemented at one time. HCFA changed its implementation plan to a phased approach after our January 1994 report, in which we discussed the reduced financial, schedule, and technical risks associated with phased implementation strategies.[2] HCFA's new approach includes deploying MTS in increments and making necessary changes to its existing systems to allow claims processing past 2000.

Specifically, HCFA plans to move from its current claims processing environment to a fully implemented MTS in two phases—first, to an interim Medicare processing environment and then to a full MTS environment. For the interim phase, HCFA (1) will require its contractors to convert three part A and six part B systems to a single part A and single part B system,[3] (2) is transferring claims processing from about 45 contractor sites to about 20 sites nationwide, and (3) has funded its contractors to modify any existing software that will still be in use to ensure reliable operations through the change of century. (See figure 1.1.) For the final phase, HCFA will transfer the existing part A and part B systems from the few remaining processing sites to the two planned MTS processing centers. Then, applicable software in these systems will be replaced by MTS modules as they become available, until these systems are completely replaced by MTS.

[2]Medicare: New Claims Processing System Benefits and Acquisition Risks (GAO/HEHS/AIMD-94-79, Jan. 25, 1994) and Medicare Transaction System: Strengthened Management and Sound Development Approach Critical to Success (GAO/T-AIMD-96-12, Nov. 16, 1995).

[3]One each of the existing part A and part B systems will become the single systems used to process all part A and part B claims.

Figure 1.1: Strategy for Transition to the Medicare Transaction System



HCFA has begun its interim-phase activities. It selected the Florida Shared System as the single part A system, converted one of the two remaining part A systems to the Florida system, and has initiated action to have the other system's contractors begin converting to the Florida system. Second, it has asked system user groups to present proposals for consolidating the part A processing sites. HCFA awarded a contract on April 8, 1997, for the

single part B system. Also, it has provided limited funding for several system contractors to begin making millennium-related software changes.

HCFA's final-phase activities include, in addition to the 1994 MTS development contract, issuing a request for proposals for two MTS claims processing sites and one data operations and analysis center. The contract for these sites, originally scheduled to be awarded in March 1997, is now planned for late 1997. The first MTS software module is scheduled to be installed at those sites in May 1998.

On April 4, 1997, HCFA announced that, as a result of a recent management review, it was redirecting its MTS contractor to focus solely on the managed care module while it examines alternative ways to achieve its MTS goals.[4] HCFA concluded that its vision of MTS as the best information technology to take Medicare into the 21st century had not changed.

Objectives, Scope, and Methodology

Our objectives were to determine the extent to which HCFA is (1) effectively managing its interim Medicare processing environment, including planning for and correcting year 2000-related computer problems, (2) using required practices to manage MTS as an investment, and (3) applying sound systems development processes to reduce risks.

To review HCFA's management of its interim environment, we analyzed documents supporting decisions to select part A and part B systems and to consolidate existing processing sites. We also interviewed HCFA officials responsible for ensuring that claims are properly processed during this period. Further, we discussed HCFA's interim transition decisions with applicable claims system contractors.

We assessed HCFA's activities to address the millennium change by (1) assessing millennium-related project plans and directives, (2) reviewing related budget and funding documents, and (3) discussing these activities with officials responsible for HCFA's millennium conversion and with HCFA's system contractors. In addressing HCFA's efforts in preparing for the millennium, we drew heavily on government and private-industry testimony and guidance.

To assess HCFA's management of MTS as an investment we applied the following criteria:

[4]Managed Care is the first of six planned releases. The remaining five releases, in order of planned implementation are the common working file and the beneficiary insurance file, consolidated financial server, carrier claims processing, intermediary claims processing, and encounter data processing.

- The Clinger-Cohen Act of 1996 (P.L. 104-106, Division E; Feb. 10, 1996) (Effective Aug. 8, 1996).
- The Paperwork Reduction Act of 1995, as amended (P.L. 104-13; May 22, 1995).
- The Federal Property and Administrative Services Act of 1949, § 313(b), as amended by the Federal Acquisition And Streamlining Act of 1994 (FASA), P.L. 103-355; October 13, 1994.
- The Government Performance and Results Act of 1993 (P.L. 103-62; Aug. 3, 1993).
- Office of Management and Budget Circular A-11, Part 3, "Planning, Budgeting, and Acquisition of Fixed Assets," July 1996; Circular A-130 Revised, "Management of Federal Information Resources" (Feb. 8, 1996); Bulletin 95-03, "Planning and Budgeting for the Acquisition of Fixed Assets" (June 27, 1995) (now superseded by OMB Circular A-11); Evaluating Information Technology Investments, A Practical Guide (Version 1.0, November 1995); and executive memorandum M-97-02, Funding Information Systems Investments (Oct. 25, 1996).

(See appendix II for key segments of these investment management laws, regulations, and guidance.)

In assessing HCFA's management of MTS as an investment, we analyzed HCFA documentation related to planning and managing information technology and interviewed members of HCFA's MTS management committees. We also obtained and analyzed HCFA's MTS cost models and discussed them with HCFA officials in assessing how well HCFA had identified and justified alternatives.

To assess HCFA's use of effective systems development processes, we compared them with HCFA's systems development life cycle procedures, our Systems Assessment Framework (SAF), criteria contained in Carnegie-Mellon University's Software Engineering Institute's (SEI) Software Capability Maturity Model and Software Acquisition Capability Maturity Model, and other generally accepted systems development practices.[5] We also analyzed HCFA's software and systems development management documents including HCFA's draft MTS Requirements Management Plan, risk management reports, systems development methodology, and MTS Change Management Manual.

[5]Systems Assessment Framework: A Guide for Reviewing Information Management and Technology Issues in the Federal Government, version 1.0, (GAO, August 1996).

To determine how HCFA is overseeing MTS development, we reviewed applicable technical plans and MTS software cost and schedule estimation model results, and compared them to generally accepted practices. To assess whether HCFA is managing the MTS schedule, we obtained and analyzed HCFA's monthly MTS program schedules to determine whether they were realistic and contained all necessary schedule elements. To determine whether HCFA is appropriately identifying and managing risks associated with the MTS development, we reviewed HCFA and MTS contractors' risk abatement activities reported in the risk management reports. We also obtained copies of monthly risk reports developed by HCFA and MTS contractors and assessed how these risks were being mitigated. Finally, we interviewed HCFA officials responsible for MTS development, as well as HCFA's contractors for system development and for independent verification and validation. Further, we analyzed a commissioned study on program controls, interviewed the contractor that performed the study, and obtained HCFA's response to the recommendations.[6]

We performed our work at HCFA headquarters in Baltimore, Maryland, and its Kansas City, Missouri, regional office; the MTS software development contractor's offices in Tampa, Florida, and Baltimore, Maryland; the Independent Verification and Validation (IV&V) contractor's office in Baltimore Maryland; and several part A and part B system contractors' offices.

We performed our work from October 1996 through April 1997, in accordance with generally accepted government auditing standards. HHS and OMB provided written comments on a draft of this report. Their comments are presented and evaluated in chapters 2, 3, and 4, and are included in appendixes I and II.

[6]HCFA MTSI Program Management Final Assessment Report, (Robbins-Gioia, July 11, 1996).

Interim Medicare Processing Environment Needs To Be More Effectively Managed

HCFA is not effectively managing its interim Medicare claims processing environment, increasing the risks of transition delays, excessive costs, and not achieving the goals of the transition. The transition from the current claims processing environment to MTS represents a major challenge in that it is a larger systems-conversion effort than any previously undertaken by HCFA, and is being performed concurrently with HCFA's management of MTS development. Although such a major undertaking requires careful planning and management, HCFA has not followed generally accepted program management practices, which call for detailed plans for systems' transitions and modifications. Also, it has not ensured that it will avoid the potential systems-related problems that accompany the year-2000 change.

Schedule and Resource Estimates Are Important

A schedule and estimate of needed resources for each major stage of the transition to the MTS processing environment would help HCFA manage and coordinate its transition activities and ensure that required resources are available at each stage. Specifically, this would include overseeing planning, testing, and implementing the conversion of the nine part A and part B systems to two, managing the site preparation and migration from 45 processing centers to about 20, shifting the workloads of local contractors who decide not to renew their contracts for processing Medicare claims, and converting systems to address potential year-2000 problems. The need for such a transition plan is highlighted in our August 1996 guide for reviewing information management and technology issues.[1]

HCFA agreed that a transition schedule and resource estimates would be useful. As part of a consulting contract to help HCFA develop a complete MTS initiatives program schedule, the consultant is to assist HCFA in preparing a schedule and resource estimates for HCFA's transition and then integrating them into the overall MTS program development schedule work. These are due to be completed by late spring 1997.

HCFA Plans To Define and Control Part A System Responsibilities

HCFA selected its single part A system contractor on May 23, 1996, and as of March 17, 1997, had paid the contractor about $870,000 to convert one of the two remaining part A systems to the selected system. However, HCFA has no legally binding document to define the responsibilities of the selected part A systems contractor for the conversion. Instead, the work is being performed under a 1991 agreement that the contractor will maintain the part A system. This agreement does not define the contractor's

[1]Systems Assessment Framework (GAO, August 1996).

responsibilities for consolidating and maintaining a single part A system, supporting the movement of claims processing from current sites to MTS operating sites, and developing agreements with users which outlines customer expectations warranties and guarantees.

Generally accepted practices for managing and overseeing such work include (1) preparing a statement to document the requirements of relevant systems contractors and (2) establishing a change control mechanism to manage and control changes to these requirements. HCFA awarded a contract defining responsibilities for the selected part B system on April 8, 1997. According to HCFA officials, they plan to (1) prepare a statement of responsibilities for the part A system work by the end of May 1997, and (2) use this statement as a basis for a legally binding agreement with the part A system contractor. According to the MTS project manager, a board to manage changes to part A began work on April 3, 1997. HCFA also intends to establish a similar control board for the part B system.

Test Strategy Lacking

As addressed in our guide for reviewing information management and technology issues, a sound test strategy should include testing, such as the selected part A and part B systems, to ensure that they meet certain specified requirements.[2] To date, HCFA's involvement in the ongoing part A conversion has been limited primarily to informal discussions with contractors and users.

The testing should measure whether the systems (1) perform required claims processing and other functions, (2) have the capacity for processing the total part A and part B workload, (3) can process claims using data converted from the old systems, and (4) will operate in the year 2000 and beyond. A test strategy would ensure that sufficient testing is conducted and the results evaluated so that converted systems will be able to reliably process the increased workload; this is vital to ensuring that Medicare claims will be processed in an uninterrupted fashion.

To date HCFA has not taken any of the following steps, each necessary for a sound testing approach:

- defining its role in planning or overseeing the testing,
- assigning responsibility for overseeing and approving the part A and part B conversion or approving the contractors' acceptance testing and results,

[2]Systems Assessment Framework (GAO, August 1996).

- developing criteria for evaluating the contractors' test plans to ensure that the systems can adequately handle the combined increased workload and that the systems will operate properly in the year 2000 and beyond,
- identifying how it will provide resources to manage the testing,
- providing for an independent validation and verification of whether test results meet requirements, and
- determining how it will ensure that problems uncovered in testing are corrected promptly.

According to HCFA officials, their contractors routinely test and implement systems changes in response to legislative mandates, without a HCFA test plan or strategy. Consequently, they said, they plan to rely largely on their contractors to successfully implement transition-related changes. They further stated that they expect system users (local Medicare contractors) to ensure that the testing is adequate.

The transition to the MTS system differs in several key ways, however, from routine changes in response to legislation. First, the selected part A and part B contractors may not have a particularly high incentive to properly make these conversions, since HCFA plans to eliminate these contractors when MTS is fully implemented. Second, converting a system owned by someone else may be more difficult than making changes to an existing system, and the selected contractors have no choice over which systems will be converted to their system—all part A systems will be converted to the selected part A system, and all part B systems will be converted to the selected part B system. Third, these conversions involve significantly more data and will require more system capacity than routine modifications. Finally, as we reported in 1992 and 1994, two of HCFA's previous system conversions did encounter problems.[3] Specifically, when HCFA shifted an outgoing contractor's claims processing workload to another contractor's system, serious disruptions in getting claims processed and payments made to physicians ensued, as did increases in erroneous payments and decreases in payment safeguards, possibly resulting in overpayments.

At the conclusion of our review, the MTS project manager told us that HCFA is exploring the feasibility of procuring an IV&V contractor for the transitions to the single part A and part B systems.

[3]Medicare: Shared Systems Policy Inadequately Planned and Implemented (GAO/IMTEC-92-41, Mar. 18, 1992) and Medicare: Shared System Conversion Led to Disruptions in Processing Maryland Claims (GAO/HEHS-94-66, May 23, 1994).

HCFA Doubts Benefits of Performance Measures; None Scheduled To Be Used

Measuring the results of the implementation of the interim Medicare systems is required by legislation and can be useful to HCFA in understanding and tracking how these systems have altered Medicare processing. The Clinger-Cohen Act requires agency heads to implement a process for managing the risks of information technology acquisitions, which includes a method of identifying quantifiable measurements for determining the net benefits and risks of the investment. Further the agency head is to ensure that performance measurements are prescribed for the information technology used by the agency and that they measure how well the information technology supports the agency's programs. The process is to provide the means for senior management to obtain timely information regarding the progress of the investment. The Paperwork Reduction Act also requires agencies to use effective methods for measuring the progress of technology in meeting their goals, and OMB guidance emphasizes the need for such performance measures.

However, HCFA's plan for evaluating the performance of its transition systems are inadequate. Its transition plan does not contain elements that would allow the agency to determine (1) whether Medicare systems will continue to provide reliable processing and adequate service throughout the transition period, (2) whether expected administrative savings are being achieved, and (3) how MTS plans might be refined on the basis of results of the transition systems, such as determining the design and configuration of MTS. HCFA officials said they do not believe it would be cost-beneficial to use the agency's limited resources to develop performance measures for interim systems that will be replaced by MTS. We believe performance measures are needed to ensure that this complex and important interim phase is properly implemented. Appendix II cites legislation that mandates the implementation and use of such performance measures.

Management Oversight Not Established To Address Potential Year-2000 Problems

As we approach the year 2000, information systems worldwide could malfunction or produce incorrect information simply because they have not been designed to handle dates beyond 1999; Medicare claims processing systems are no different. Failure to adjust the systems for the year 2000 could result in payment delays and in losses due to bypassed automated controls that flag claims that should be paid by the beneficiaries' other insurers. The danger is that, if not corrected, systems could well read the computer-coded "00" as 1900, not 2000. All date-dependent calculations would therefore be affected, having an obvious impact on age and beneficiary status.

The timing of HCFA's transition strategy will make addressing the year-2000 issue even more of a major challenge. For example, the single part B system will face converting five other systems to the selected system, while concurrently modifying the selected system to make it year-2000 compliant. Because HCFA now estimates it will not complete the transition to the single part B system until shortly before 2000, it has provided initial funding to make four of the six part B systems year-2000 compliant—the selected single part B system and three of the remaining five systems. The Medicare part A systems contractor has started to modify its software to make it year-2000 compliant, and estimates that it will complete testing this software and be ready to implement it by July 1997.

Because HCFA's Medicare contractors routinely make system modifications in response to legislation, HCFA is relying on them to make year-2000 changes. However, the scope of the work required for contractors to make year-2000 changes is significantly broader than other systems changes contractors have had to make in the past. Specifically, it requires review of all software programs and systems interfaces, and all systems components that can be affected by date problems; this includes hardware, operating systems, communications applications, and databases. Yet, again, HCFA is not adequately overseeing this process and further is not requiring contractors to certify that they will correct the year-2000 problem.

Adequately addressing the potential year-2000 systems problems for the Medicare program requires management attention and a wide range of managerial activities. As detailed in our February 1997 year-2000 assessment guide,[4] among the most important of these activities are (1) developing an overall year-2000 plan, (2) identifying responsibilities for managing and monitoring year-2000 actions, (3) preparing an assessment of the severity and timing of potential year-2000 impact, (4) conducting an inventory of the systems on which Medicare claims processing depends, (5) prioritizing and scheduling work to convert, replace, or eliminate these systems, (6) developing validation strategies and test plans for systems, (7) addressing interface and data exchange issues, and (8) developing contingency plans for critical systems in the event of failure.

According to HCFA officials, the agency has prepared an overall year-2000 plan for its internal systems, intends to include Medicare claims processing systems in this plan at a future date, and is collecting information from systems contractors on both their progress and their planned year-2000 activities. To date, however, HCFA has not required

[4]Year 2000 Computing Crisis: An Assessment Guide (GAO, February 1997).

systems contractors to submit year-2000 plans for approval. Further, it does not have contracts or other specific legal agreements with any contractors, other than the selected contractor for the single part B system, which state how or when the year-2000 problem will be corrected or whether contractors will certify that they will correct the problem.

HCFA has also not identified critical areas of responsibility for year-2000 activities. Although HCFA's regional offices have a role in overseeing contractor efforts, their specific year-2000 responsibilities have not been defined, nor has guidance been prepared on how to monitor or evaluate contractor performance. While HCFA has been assessing the impact of the year-2000 on its internal systems, it has not completed a similar review of Medicare contractors' claims processing systems. Further, HCFA has not required its contractors to prepare an assessment of the severity of potential year-2000 problems.

On March 26, 1997, HCFA asked its Medicare contractors to provide an inventory of the Medicare applications affected by the year-2000 change and their schedules for converting, replacing, or eliminating these systems. However, HCFA had no plans to independently validate the contractors' strategies and test plans. In addition, while HCFA has asked the contractors to identify their system interfaces, it had no plans for approving the contractors' approaches for addressing interface and data exchange issues.

HCFA had also not developed contingency plans in the event that year-2000 systems fail. HCFA officials are again relying on the contractors to identify and complete the necessary work in time to avoid problems. Yet, the part A and part B contractors not only have not developed contingency plans, they said they do not intend to do so because they believe this is HCFA's responsibility.

On April 22, 1997, at the conclusion of our review, HCFA provided us with information regarding a technical workgroup, which is to identify and resolve any year-2000 technical issues. However, this workgroup, which was established on January 10, 1997, had not yet discussed or resolved any technical issues.

Conclusions

HCFA faces a challenging array of tasks as it operates in an interim Medicare claims processing environment over the next few years. It expects this interim phase to better ensure a successful transition to MTS

and ensure reliable claims processing during this period. However, HCFA has not prepared the necessary plans to help it manage this interim period, help ensure that these goals will be met, or evaluate the performance of its interim claims processing environment. Further, unless timely, effective systems changes are implemented as the year-2000 approaches, HCFA may be unable to process claims accurately and within required time frames.

Recommendations

To better ensure the success of claims processing during the interim before MTS implementation, we recommend that the Secretary of Health and Human Services direct that the Administrator, Health Care Financing Administration, manage and be accountable for the following actions.

- Preparing a detailed transition plan, which includes sections that (1) provide a schedule and estimate of resources needed for each major stage of the transition to the interim processing environment (2) define how software changes to the part A and part B systems will be controlled and managed, (3) identify how HCFA will ensure reliable processing while reducing the number of processing centers and shifting the workloads of local Medicare contractors who decide not to renew their Medicare claims processing contracts, and (4) define how systems will be converted to address potential year-2000 problems.
- Obtaining a legally binding agreement with the part A contractor, which identifies all responsibilities for conversion and maintenance of the part A system, before providing any additional funds for this effort.
- Preparing plans for conducting thorough testing before converting part A and part B systems. These plans should, at a minimum, (1) define HCFA's role in planning or overseeing the testing, (2) assign responsibility for overseeing and approving the part A and part B conversion or approving the contractors' acceptance testing and results, (3) develop criteria for evaluating the contractors' test plans to ensure that the systems can adequately handle the combined increased workload and that the systems will operate properly in the year 2000 and beyond, (4) identify how it will provide resources to manage the testing, (5) provide for an independent validation and verification of whether test results meet requirements, and (6) determine how it will ensure that problems uncovered in testing are corrected promptly.
- Establishing a means of assessing performance in the crucial early stages of the transition, and applying any lessons learned to planning for MTS. The performance measures should include elements that allow HCFA to determine (1) whether Medicare systems will continue to provide reliable processing and adequate service throughout the transition period,

(2) whether expected administrative savings are being achieved, and (3) how the design and configuration of MTS might be refined on the basis of results of the interim systems performance.

- Helping ensure the reliable operation of its systems through the year-2000 by identifying responsibilities for managing and monitoring year-2000 actions, preparing an assessment of the severity and timing of potential year-2000 impact, and developing contingency plans for critical systems in the event of failure. Further, HCFA should require its contractors to submit for review and approval (1) plans for identifying and correcting potential problems, including a certification that their changes will correct the problem, (2) validation strategies and test plans for systems, and (3) plans for addressing interface and data exchange issues. Finally, HCFA should regularly report to HHS on its progress in addressing the year 2000 issue, including the amount of funds spent on this effort.

Agency Comments and Our Evaluation

HHS agreed with our recommendations to more effectively manage the interim Medicare processing environment. HHS stated that it

- has prepared a part A transition plan and plans to complete the part B transition plan in early summer 1997;
- agrees with our recommendation to conduct thorough testing before converting the part A and part B systems;
- has established performance metrics to monitor the software development contract and, as a result, was able to initiate corrective action when the work was not progressing satisfactorily; and
- has requested implementation plans from its contractors on their progress in bringing their systems into millennium compliance, and is in the process of analyzing these plans.

HHS said that both the Department and HCFA are committed to implementing our recommendations. It also commented that many of our recommendations will assist them in better managing the transformation from antiquated, redundant information and processing systems to the planned modernized system.

We believe that the actions HHS has outlined to manage the interim Medicare processing environment are positive and expect that, if effectively implemented, they will help the Department and HCFA achieve a successful transition to MTS. In addition, just as software development performance measures are critical to the software development process, performance measures are also critical to the success of the transition.

Further, while requesting year-2000 implementation plans from HCFA contractors can also help by improving the overall understanding of the status of the year-2000 effort, to ensure success, these contractors must have their responsibilities specifically defined and their actions reviewed and approved by HCFA.

OMB concurred with our recommendations encouraging HCFA to take steps to more adequately plan for the transition to standardized part A and part B systems, and said it is continuing to work with HCFA on this transition. OMB also said it will look into our recommendations concerning the year-2000 contractor systems' conversion issue, and take appropriate action.

MTS Is Not Being Managed as an Investment

HCFA has begun to respond to legislative and OMB requirements for managing information technology projects as investments; however, it has not applied effective investment practices in managing MTS. Such practices include: preparing valid cost-benefit analyses, considering viable alternatives and assessing risks, and having senior management involved in the critical decision-making process. Without these, HCFA has no assurance that its planned system will be cost-effective, risk-averse, and support the agency's mission and goals.

HCFA Has Not Performed an Investment Analysis for Current MTS Plan

As early as 1992, when HCFA began planning for MTS, OMB Circular A-11 required that planned information technology acquisitions be based on a cost-benefit analysis. Similarly, since 1992, OMB Circular A-94 has required that decisions to initiate government projects be based on an analysis of expected life-cycle costs and benefits (justified on economic grounds using net present value calculations), and that alternative means of achieving program objectives be considered.[1]

Over the years, agencies have experienced numerous failures in acquiring information technology. Billions of dollars have been wasted on systems that did not work as planned or cost significantly more than expected. Both the Congress and OMB have recognized this problem and have recently established requirements that more specifically require agencies to manage their major acquisitions using sound information technology investment practices. For example, the Clinger-Cohen Act requires agencies to focus more on the results achieved through their investments and to use more rigor and structure in their processes for selecting and managing their information technology projects. The act also provides OMB with additional authority to ensure that the act's provisions are carried out. In an October 1996 policy memorandum, OMB specified that major investments in information technology should demonstrate a projected return on the investment that is "clearly equal to or better than alternative uses of available public resources." (See appendix II for details.)

Since HCFA began its MTS project in 1992, the estimated cost to develop MTS software and move to the new system has increased from about $151 million to about $1 billion.[2] The $1 billion includes estimated costs to

[1]Present value dollars represent the current worth of an amount or series of amounts payable or receivable (cost-benefits) in the future, determined by discounting the future amount or amounts at a predetermined rate of interest.

[2]All dollar amounts presented in this report are expressed as undiscounted current dollars unless otherwise noted. They are not adjusted for inflation and are not present values.

transition to the MTS environment and acquire operating sites. In spite of these significant estimated project cost increases, as discussed below, HCFA's cost analyses have not (1) identified the specific MTS applications that justify its estimates of $2.1 billion in reduced program costs over 10 years (stated as a present value), (2) adequately documented the assumptions used to estimate total administrative savings of almost $1.5 billion, or (3) addressed available alternative solutions to MTS, which could provide much of the estimated program and administrative savings within a shorter time and at substantially lower costs. When asked about the lack of a cost-benefit analysis, HCFA responded that the benefits of MTS were obvious.

Reduced Program Costs Not Linked to Specific MTS Processing Improvements

HCFA's initial MTS cost-benefit analysis, developed by an outside contractor in April 1992, and updated in December 1993, compared the MTS alternative with the status quo claims processing environment at that time of 80 contractors, 62 processing sites, and 22 claims processing systems.[3] Since that time, from February 1995 through November 1996, HCFA has developed, in-house, a series of cost models, which update the cost and savings estimates of the previous contractor-developed analyses. In September 1996, HCFA's Office of the Actuary provided a report of its estimate of program savings from MTS, and these estimates were incorporated into HCFA's November 1996 cost model.

HCFA's Office of the Actuary estimated that MTS would provide annual programmatic savings of $570 million by fiscal year 2005, resulting in 10-year life cycle (fiscal years 1997 through 2006) programmatic savings of about $2.1 billion (stated as a present value). It estimated that program cost savings would result from (1) increasing the use of automated edits to identify abusive billing practices and deny related claims, (2) improving and standardizing "medical necessity" review edits, which would result in an increase in the number of inappropriate claims identified and denied, and (3) developing a centralized beneficiary insurance file, which would increase the amount of savings under the Medicare Secondary Payment program.[4] However, the Office of the Actuary qualified its savings estimate, stating that too many details of MTS implementation were not

[3]HCFA's 1993 alternative analysis only compares MTS versus continuing its current operations. It did not assess viable alternative solutions to MTS.

[4]Medical necessity review edits involve identifying claims for inappropriate or excessive medical services. Abusive billing involves such practices as billing for the same procedure twice although only provided once or billing for an assistant surgeon when one was not warranted. Medicare secondary payment savings result from identifying instances in which beneficiaries have other health insurance that should be the primary payer, rather than Medicare.

available, especially the exact nature of the edits that will be built into the software and any requirement for Medicare contractors to implement those edits. It concluded that because of this lack of information about the MTS development, the actual savings associated with MTS could prove to be significantly different from its estimate.

As of April 14, 1997, HCFA had not identified the exact nature of the edits that will be built into MTS. Further, HCFA's MTS development strategy is not based on maximizing potential savings early. The MTS releases that include new, but as yet undefined edit routines are not planned for implementation until 1999. Finally, for several years both we and the HHS Office of the Inspector General have reported that HCFA could save hundreds of millions of dollars annually in program costs by immediately implementing commercially available automated edits to detect and prevent fraud, waste, and abuse.[5] In May 1995 we reported that HCFA could save billions of dollars by using commercially available software containing edits to detect and correct billing abuses. HCFA is currently evaluating this type of software.

We also reported in January 1996 that some contractors were using several different medical review edits which, if implemented nationally, could save up to $150 million annually by denying claims that were not medically necessary.[6] These edits can be implemented on existing systems without spending hundreds of millions of dollars to develop MTS and install two MTS claims-processing sites. HCFA has not developed a strategy or schedule to implement these edits and is continuing to allow local contractors to decide whether to use them.

Estimated Administrative Savings Not Adequately Supported

HCFA's November 1996 MTS cost analysis estimates that the system will provide net administrative savings of $697 million. This $697 million estimate is based on two key assumptions. First, during MTS' 10-year estimated life, expenditures for software improvements will be substantially less than would have been required for the existing part A and part B systems. HCFA projected that $788 million of its total $1.5 billion administrative savings estimate would result from these reduced expenditures. However, according to actual and estimated system improvements trend data presented in HCFA's budgets for fiscal years 1995

[5]Commercial Technology Could Save Billions Lost to Billing Abuse (GAO/AIMD-95-135, May 5, 1995) and Antifraud Technology Offers Significant Opportunity to Reduce Health Care Fraud (GAO/AIMD-95-77, Aug. 11, 1995).

[6]Millions Can Be Saved by Screening Claims for Overused Services (GAO/HEHS-96-49, Jan. 30, 1996).

through 1998, if MTS were not implemented, HCFA would need only $83.6 million to implement improvements to existing systems during these 10 years. In addition, HCFA did not include in-house costs to develop MTS in its administrative savings analysis, which it estimates will be about $49 million during fiscal years 1997 through 2000.

Second, HCFA's current administrative savings estimate assumes that total costs to process Medicare claims will continue to increase unless MTS is developed. Further, HCFA's 1993 analysis, which was the last analysis to show how much it cost to process individual claims, assumed that, without MTS, costs per claim for part A and part B would continually increase from 1993 through 2002. However, actual contractor cost reports show that costs per claim for part A and part B actually decreased for fiscal years 1994 through 1996, from $1.41 to $1.27 and from $0.89 to $0.88 respectively. (See tables 3.1 and 3.2.)

Table 3.1: Part A Costs Per Claim for Fiscal Years 1994-1996

	Part A costs per claim		
Fiscal years	**HCFA estimate[a]**	**Actual costs[b]**	**Difference**
1994	$1.62	$1.41	$0.21
1995	1.66	1.33	0.33
1996	1.70	1.27	0.43

[a]HCFA's 1993 MTS Alternative Analysis.

[b]Medicare contractors' fiscal years 1994-1996 expenditure reports.

Table 3.2: Part B Costs Per Claim for Fiscal Years 1994-1996

	Part B costs per claim		
Fiscal years	**HCFA estimate[a]**	**Actual costs[b]**	**Difference**
1994	$1.06	$0.89	$0.17
1995	1.06	0.94	0.12
1996	1.07	0.88	0.19

[a]HCFA's 1993 MTS Alternative Analysis.

[b]Medicare contractors' fiscal years 1994-1996 expenditure reports.

In addition, HCFA's 1993 savings estimates were based on an existing claims processing environment that included 62 separate contractor processing sites using 22 different software systems. HCFA assumed that it would replace the 22 different systems with MTS and make substantial reductions in the number of processing sites by developing MTS-based sites. However,

some of these savings may have already occurred without MTS as part of HCFA's interim consolidation effort. As we mentioned earlier, HCFA has reduced the number of existing systems from 22 to 9, and is further reducing them to only a standard part A and part B system prior to implementing MTS. HCFA has also consolidated its 62 processing sites to about 45 and plans further consolidations to about 20 sites.

HCFA Has Not Evaluated Alternative Solutions

OMB requires agencies to prepare cost-benefit analyses that consider alternative means of achieving program objectives. For example, when evaluating a decision to acquire a capital asset, OMB requires that the analysis should consider alternatives such as upgrading, renovating, sharing or converting existing government property, leasing, or contracting for services. Although HCFA has prepared several estimates of MTS costs and benefits, none has included assessments of alternative solutions to MTS. For example, HCFA has not assessed and compared the costs and benefits of implementing readily available, commercial medical review edits and abusive billing software routines to its plans for similar MTS features. Likewise, HCFA has not assessed whether the actual and planned reductions in existing systems and claims processing sites have achieved or will substantially achieve most of the projected administrative savings estimated for MTS.

Operating Site Decision Made Without Analyzing Alternatives or Risks

As part of MTS initiatives, HCFA decided to consolidate its daily claims-processing workload of about 2.6 million claims at two claims processing sites using MTS software. It also plans to acquire a data operations and analysis center. However, these decisions were made with inadequate decision criteria or analysis for comparing alternatives. Further, technical risk analyses to support the planned facilities are incomplete.

In April 1996 HCFA issued a request for proposals for the three MTS operating sites. The criteria for determining the number of processing sites were limited to data storage and disaster recovery requirement considerations. More explicit criteria were not used to evaluate and prioritize alternatives such as HCFA's interim-phase Medicare processing sites or other processing centers such as the Department of Veterans' Affairs data center in Austin, Texas.

Thorough risk assessments have not been conducted to ensure that the planned MTS processing sites will perform as required and meet system

goals. Three major steps commonly used in such assessments have not been completed. First, a realistic workload analysis, using high volumes of data as input and output to realistically simulate the Medicare system, has not been conducted. Second, a formal capacity analysis has not been conducted to determine if the commercial middleware[7] already selected on the basis of a market survey can handle the high frequency transmission of input and output data required by MTS. Finally, a security risk analysis is essential. In the MTS case, it is being prepared out of sequence, after the security engineering analysis, and is not planned for completion until the summer of 1997. The risk in this approach is that when the security risk analysis is complete, any major security-related risks identified during this analysis will need to be addressed in the security engineering analysis. Thus, the security engineering analysis may have to be modified at added cost to correspond to the security risk analysis.

HCFA Responding to Legislative Requirements but Still Lacks Required MTS Investment Strategy

In response to explicit Clinger-Cohen Act requirements and OMB guidance, HCFA has begun action to follow practices essential for making informed information technology investment decisions. However, it does not yet have consistent senior management involvement or investment-based decision-making on MTS issues, and has not explicitly demonstrated how MTS will help the agency meet its mission, goals, and objectives.

HCFA Taking Action but MTS Management Decisions Not Yet Investment-Based

The Clinger-Cohen Act requires agencies to designate a chief information officer (CIO) to develop, maintain, and facilitate the implementation of a sound and integrated information technology architecture.[8] Further, this act, and the Federal Acquisition Streamlining Act, require agencies to provide a means for senior management to obtain timely information regarding the progress of an investment in an information system. In addition, OMB guidance on investment management practices encourages senior management to (1) be involved in making decisions in a disciplined and structured management forum, (2) monitor the progress of ongoing information technology projects against projected cost, schedule, performance, and benefits, (3) document all management decisions and

[7]The term middleware is used to describe software that resides between an application program and an operating system and network, enabling diverse systems to communicate in a common client-server environment.

[8]The Paperwork Reduction Act, as amended by the Clinger-Cohen Act, specifically requires agencies, such as HHS, to designate a CIO. Further, the conferees of this legislation also anticipated that major subcomponents or bureaus, such as HCFA, would also appoint CIOs responsible for ensuring that the management and acquisition of information technology is implemented consistent with the law.

supporting data to avoid replication of effort in analysis, and (4) evaluate how common problems and their solutions apply to other information technology projects.[9]

In response to the Clinger-Cohen Act, HHS designated a CIO. The CIO told us that HHS intends to be more involved in overseeing HCFA's management of this project than in it has been in prior years.

Similarly, HCFA has begun to respond by appointing a CIO and establishing an investment review board. As envisioned by HCFA, the board will provide an integrated process for strategic information technology planning, budget development, and performance-based management and evaluation of major information technology/system investments. HCFA also has recently announced an agencywide reorganization that recognizes the significant role that the CIO will have in agency management and planning. The reorganization is planned for completion by July 1, 1997.

Although HCFA is progressing in its overall investment management approach, it still lacks an MTS investment management strategy. For example, HCFA established its most senior MTS decision-making body, its MTS Initiatives Management Board, on December 14, 1994. The Board comprises several senior program and information managers, and reports directly to the HCFA Administrator. It is responsible for reviewing the progress of MTS and keeping decisions on schedule, as well as reviewing MTS planning to ensure that all future needs are met and its strategic vision maintained. Members told us that the Board (1) acts as the front line MTS decisionmaker, (2) provides leadership for and facilitates MTS project decisions, and (3) provides overall strategies and planning for MTS. The Board meetings have recently been expanded to include joint sessions with a core group of technical advisers. The decision-making and project management responsibilities that existed with the original Board remain unchanged with the combined group.

The Board has not, however, been systematically involved with MTS. For example, between 1995 when it was established and January 1997, the Board was responsible for only one of 34 major MTS project decisions, that being the decision to locate one print-mail facility at each MTS claims processing site. Other critical decisions, such as the selection of the single part A claims processing system or the implementation of a new MTS

[9]Evaluating Information Technology Investments: A Practical Guide, Office of Management and Budget, November 1995.

transition strategy, were made by individual managers or executives, or lower-level MTS groups.

MTS Strategic Plan Developed, but Not Adequately Linked to Agency Mission, Goals

When organizations manage information systems projects as investments, they view projects as efforts to improve mission performance, not simply as actions to implement information technology. Since its passage in 1980, the Paperwork Reduction Act has required agencies to ensure that information technology is acquired and used in a manner that improves service delivery and program management, and increases productivity. In its 1995 revision, the act explicitly required agencies to (1) ensure that information resources management operations and decisions are integrated with organizational planning, budget, financial management, human resources management, and program decisions, and (2) establish goals for improving information resources management's contribution to program productivity, efficiency, and effectiveness, and methods for measuring progress toward achieving those goals. More recent legislation supports this requirement and mandates that performance measures be established to gauge how well information technology supports agency programs.

In response to these requirements, in February 1994, HCFA developed an agency strategic plan, which includes its overall agency mission, goals to support that mission, and objectives to achieve those goals. Annually, the agency also develops 5-year Information Resources Management (IRM) plans that document its IRM goals, accomplishments, and major information technology initiatives. HCFA's September 1996 IRM plan (1) provides a mechanism for incorporating its IRM planning process with its budget process and its strategic plan, (2) graphically links the agency's information technology initiatives and each of the strategic goals, and (3) lists each of its strategic goals, along with accomplishments that HCFA believes have moved it along toward achieving each of those goals.

Although HCFA's IRM plan provides a mechanism for integrating its IRM planning process with its agencywide strategic planning, as mandated by the Paperwork Reduction Act of 1995, it does not adequately apply this integrated approach in its information technology planning. MTS and other information technology projects are still ranked on the basis of budget priorities determined by a HCFA budget review group rather than on how well the systems will help fulfill HCFA's mission and meet its program needs. Using this budget approach, without cost-benefit analyses and ranked key investment technology projects as required by legislation and

OMB, HCFA has no assurance that it is funding the most important information technology projects that are necessary to meet its mission and goals.

Further, while MTS is HCFA's major information technology project, it is not highlighted in HCFA's IRM plan. This plan includes a series of graphics linking numerous information technology initiatives, including MTS, with the seven strategic goals that they support. The plan also lists each of the agency's strategic goals, along with accomplishments that HCFA believes has moved it closer to achieving those goals. However, MTS has been linked to only one of the seven strategic goals, which is to "create excellence in the design and administration of HCFA's programs." According to the plan, other important goals, such as "be a leader in health care information resources management" or "provide leadership in the continuing evolution of the health care system" are not being addressed by MTS. Further, the plan shows that MTS supports only 1 of the 30 strategies that HCFA has developed to achieve its goal of creating excellence in HCFA's programs. According to HCFA officials, they are revising their strategic plan and are arraying their projects in support of all strategic goals rather than tying them to individual goals.

Conclusions

HCFA's MTS initiative has been under development for over 3 years, however, it still has not been adequately cost-justified, as required by legislation and OMB directives. Consequently, by moving forward with the MTS development contract and planning to award contracts for MTS operating sites without preparing required analyses, HCFA continues to put at risk the opportunity for the most cost-effective and beneficial Medicare claims processing environment possible. Further, HCFA is limiting its MTS investment management approach with its lack of consistent oversight from its senior decision-making body, as required by statutes and OMB directives. Until HCFA officials implement an investment management approach and produce adequate analyses to justify the cost of MTS and its related initiatives, HCFA has no assurance that the project will be cost-effective, delivered within estimated time frames, or result in a more efficient or effective Medicare claims processing environment.

Recommendations

We recommend that the Secretary of Health and Human Services better ensure the success of MTS by

- withholding funding for the MTS operating site contracts until an approach has been selected on the basis of an alternatives analysis; alternatives are ranked on the basis of cost, benefit, performance, risk, and technical factors, and are justified with valid cost-benefit analyses; and supported with a thorough risk assessment, which includes a realistic workload analysis, formal capacity analysis, and a sound security risk analysis;
- requiring the Administrator of the Health Care Financing Administration to justify the continuation of MTS by producing a valid cost-benefit and alternatives analysis that includes goals for reaching programmatic savings and links estimated savings to specific improvements in Medicare claims processing, and take appropriate action based on the results of the analysis; and
- requiring the Administrator of the Health Care Financing Administration to establish an investment management approach for MTS by explicitly linking the roles and responsibilities of the CIO and the Investment Review Board to relevant legislative mandates and requirements, which include (1) designing and implementing a process for maximizing the value and assessing and managing the risks of information technology acquisitions, and integrating that process with the budget, financial and program management decisions of the agency, (2) utilizing specific quantitative and qualitative criteria for comparing and prioritizing alternative information systems investment projects, (3) providing the means for senior management to obtain timely information regarding the progress of an investment, including a system of milestones for measuring progress, in terms of cost, capability of the system to meet specified requirements, timeliness, and quality, and (4) ensuring that performance measures are applied to measure how well the information technology supports the goals and missions of the agency.

Completing these actions by the end of 1997 is essential so that the Congress, in monitoring HCFA's progress, has assurance that HCFA is pursuing a course that will efficiently fulfill its goals and missions.

We recommend that the Secretary of Health and Human Services assist HCFA in its modernization effort by providing oversight in accordance with provisions in the Clinger-Cohen, Paperwork Reduction, and Federal Acquisition and Streamlining Acts. This should include requiring the Department's Chief Information Officer to (1) review the MTS project at predetermined project milestones to measure its progress in terms of cost, capability of meeting specified requirements, timeliness and quality, and (2) identify suitable actions to be taken, including termination, if the

project falls significantly behind schedule, over budget, or is not in compliance with performance or capability requirements.

We also recommend that the Director of the Office of Management and Budget utilize the enforcement authority provided by section 5113 (b)(5) of the Clinger-Cohen Act to ensure that the Health Care Finance Administration complies with the act's provisions, including the requirement to justify major information technology projects such as MTS with sound cost-benefit and alternatives analyses.

Agency Comments and Our Evaluation

HHS stated that improvement is needed in its MTS investment management activities, and essentially concurred with our recommendations. HHS also stated that both the Department and HCFA agree that no funds will be obligated for the MTS operating site procurements until a reassessment of the project has been completed and a revised development strategy is established. Further, HCFA stated that (1) it will continue to analyze the cost and savings of MTS development strategies and evaluate alternatives and (2) it concurs with our recommendation to link the roles and responsibilities of the CIO and Investment Review Board. However, HCFA commented that the following clarifications of our analyses were warranted. First, it said that we failed to recognize the positive efforts it has made in managing MTS, such as preparing multiple investment models, hiring consultants, and broadening the agency's MTS management team. Second, HCFA said that because the scope of the costs included in its 1992 estimate differ from those included in the 1996 estimate, it is misleading to state that MTS costs have increased from $151 million to about $1 billion. Moreover, HCFA noted that, while the amount of the estimated MTS investment has increased, administrative savings have been significant in every analysis performed. Third, HCFA stated that while available commercial software has value, it does not provide the sophistication necessary to detect and prevent a significant amount of abusive billing. HCFA also said that it uses several types of commercial software to detect inappropriate billing; and is using the Los Alamos National Laboratory to identify prepayment techniques for detecting inappropriate billing.

Throughout the report, we have recognized the positive efforts that HCFA has made in managing MTS. For example, we noted that HCFA had prepared a series of cost models, hired consultants such as its IV&V contractor, and responded to legislation and OMB regulations. Yet, although HCFA has prepared a series of cost models, none of these models included all costs or evaluations of available alternatives. Thus, a complete cost-benefit

analysis that includes an assessment of viable alternatives has not been performed.

Further, our statement that estimated MTS costs have increased from $151 million to about $1 billion is accurate. Whether the scope of the project has changed is immaterial to the fact this project has incurred a substantial cost increase, which we described to emphasize that HHS and HCFA need to manage this project as an investment. One concern we have always had is that HCFA has not finalized the requirements for MTS. Until these requirements are finalized, no reliable cost estimate can be prepared. Further, although all of HCFA's MTS cost analyses included estimates of substantial administrative savings, these estimates were based on an invalid assumption—that Medicare claims processing costs would continue to increase anyway. Actual cost data have shown this to be incorrect. In addition, the cost-benefit analyses do not consider other alternatives for administrative savings, such as those offered by consolidating existing processing sites. Accordingly, we believe that HCFA needs to reassess the estimated administrative savings MTS will provide.

Finally, although commercially available software may not provide the sophistication HCFA desires for MTS, we believe it has potential for HCFA's claims-processing systems. HCFA does not expect MTS to be fully implemented for years. This commercial software for detecting fraud and abusive billing, along with the consolidation of the existing claims processing software and claims processing sites, offers opportunities for substantial program and administrative cost savings in the interim.

OMB agreed with our recommendations for HCFA to manage MTS as an investment, and for OMB to ensure that HCFA justifies its major information technology projects such as MTS with sound cost-benefit and alternatives analyses. OMB said it will request that HCFA develop benefit, risk, return on investment, and alternatives design analyses that correspond to the changes in the MTS software design and that will address methodological concerns raised in our report. Such analyses should greatly assist management in making sound investment management decisions.

Significant Systems-Development Practices Not Being Followed, Increasing MTS Risk

HCFA has never before managed a systems development project the size and complexity of MTS. Recognizing its lack of systems development and risk management experience, HCFA has relied on contractors to (1) provide the hardware, telecommunications, and software required to process Medicare claims, (2) review and make recommendations on the efficiency and effectiveness of the MTS program, including risk management, (3) assist in developing an integrated program schedule and identifying the related critical path and risks associated with it, and (4) assist in identifying the scope and components of MTS integration, and the risks associated with this integration.

HCFA's ability to adequately monitor and oversee the work of its contractors, however, remains a question, given its own inexperience. Deficiencies in several critical systems-development practices provide early signs of weakness in HCFA's system acquisition management capability and its contractors' software development practices. Plans essential to MTS' success are either inadequate, incomplete, or are being completed too late in the development cycle; the project schedule is incomplete and contains risky overlap in development phases; HCFA's risk-management process is inadequate; and its oversight has not prevented a risky software-development strategy.

Requirements Management Plan Completed Too Late in Systems Development Process

A requirements management plan describes the process that will be used to define, validate, rank, and control systems requirements.[1] This plan is critical because requirements are the key element of any system design. Because requirements provide the foundation for designing, developing, testing, and implementing the system software, it is essential that they be defined and implemented early in the systems development life cycle. In addition, requirements must be clearly defined to avoid ambiguity, overlap, and duplication, and should completely and logically describe all features and functions needed in the planned system. Using an appropriate requirements management plan to define and manage requirements significantly reduces the risk that requirements defects will cause technical problems such as unacceptable system response times and inadequate software interfaces. It also reduces the likelihood of needing to

[1]Requirements management plans are addressed in the Capability Maturity Model (CMM) Software Version 1.1 Software Engineering Institute (Pittsburgh, Pennsylvania: February 1993); Software Acquisition Capability Maturity Model (SA-CMM) Version 1.01, Software Engineering Institute (Pittsburgh, Pennsylvania: December 1996); and Guidelines for Successful Acquisition and Management of Software-Intensive Systems (Air Force Guidelines), Department of the Air Force, Software Technology Support Center, Volume 1, (February 1995).

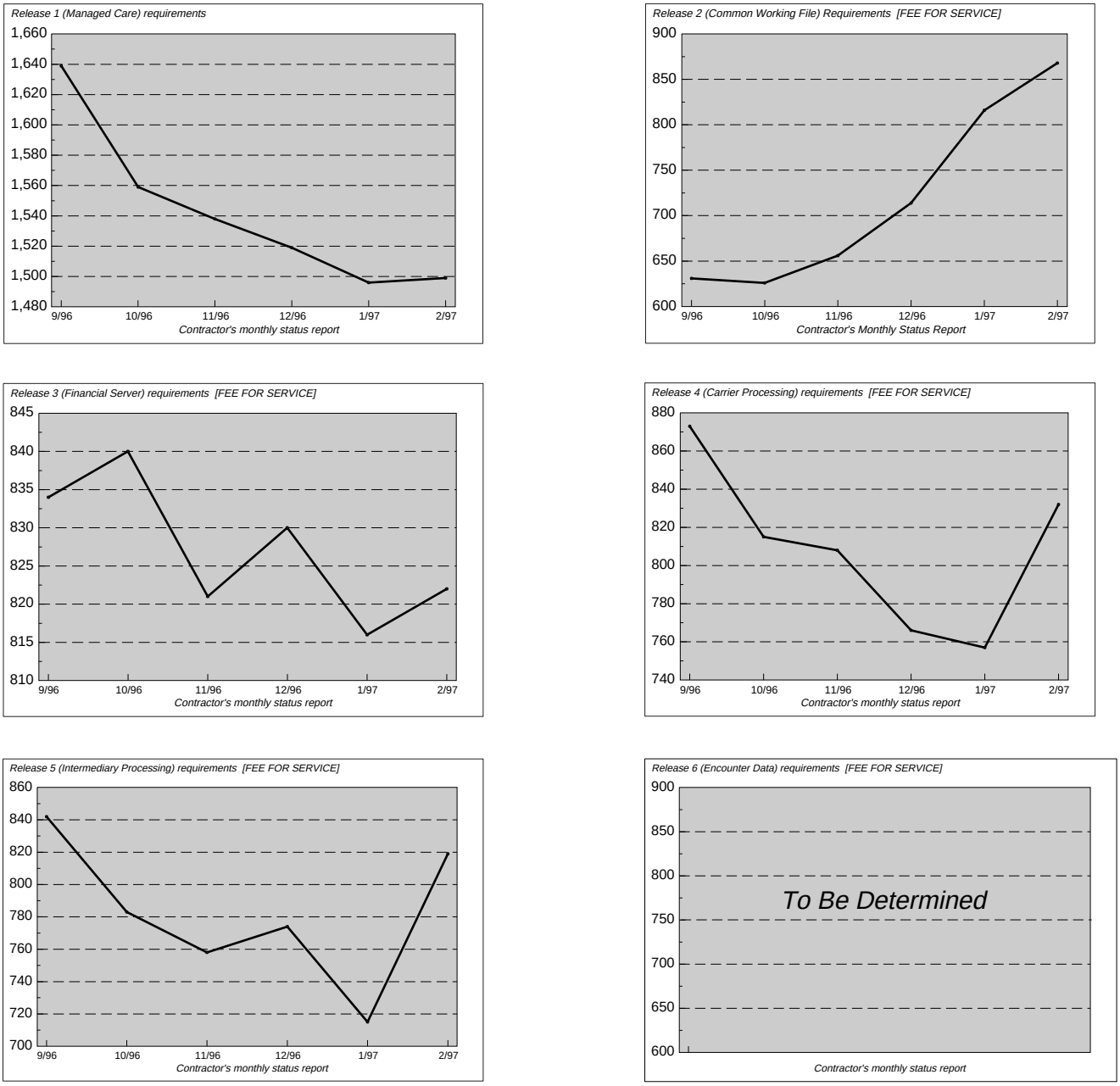
make time-consuming requirements changes later in the development when they are more costly and risky to implement.

Although HCFA officials stated that they are following an interim requirements management process, they have not yet made final or implemented an official requirements management plan. Instead, they have been relying on a draft MTS Business Requirements Writer's Guide for developing and managing MTS business requirements. The requirements management process discussed in the guide does not describe how requirements are to be assessed to determine their impact on the overall project.

HCFA's lack of a requirements management plan contributed to several redirections that caused schedule delays. First, HCFA has twice redirected the requirements definition approach and, 3 years into the MTS contract, requirements have yet to be completely defined or approved. Second, although requirements for the managed care module—the first MTS release—were expected to be completed and documented in a systems requirements document by November 1996, they have not yet been officially approved by HCFA, nor have they been baselined.[2] Despite the lack of approved requirements, the MTS contractor has progressed into the development phase for the managed care module. Further, as shown in figure 4.1, the system requirements have been volatile. During a recent 5-month period, the requirements for one software release dropped from 1,639 to 1,499, while the requirements for another release increased from 631 to 868. Such volatility will affect cost, schedule, defects, and overall quality of the software.

[2]A baseline is a specification or product that has been formally reviewed and agreed upon, and thereafter serves as the basis for further development. It should then only be changed through formal change-control procedures.

Figure 4.1: Volatility of MTS Requirements



NOTE: Scale above [600-900] for purposes of illustration only; numbers of requirements for this release are not yet available.

HCFA's IV&V contractor has recommended that HCFA develop and implement a requirements management plan, and has warned that without such a plan, a high probability exists that a system will be delivered that does not meet customer needs. In early January 1997, HCFA officials said that they expect to complete a requirements management plan by January 31, 1997. As of April 1997, no plan had yet been completed.

Software Development Plan Is Inadequate

The software development plan is a key document that reflects the contractor's overall approach to developing software and serves as a benchmark for monitoring how well the contractor adheres to approved procedures and activities.[3]

HCFA does not have an adequate integrated software development plan. It did not require such a software development plan in its January 1994 MTS contract, and did not specifically request one during its contract renegotiation in May 1996. HCFA officials explained that as part of the negotiation process, they provided the MTS contractor with a template containing the essential requirements of a software development plan. They also stated that while the negotiations document met HCFA's overall requirements, several elements of a software development plan are contained in various contract deliverables. According to HCFA officials, the need for a software development plan for MTS has been fulfilled. The IV&V contractor, who, in May 1995, indicated that the lack of a software development plan was an area of significant risk, stated that the negotiation document received from the MTS development contractor incorporates most of the requirements for such a plan. The IV&V contractor added that the negotiation document, along with other internal MTS contractor practices, are sufficient to satisfy the software development plan requirement.

While the MTS negotiation document contains the technical approach for developing MTS, it lacks critical components of a software development plan, such as a description of the software development library standards and metrics. A software development library is critical to the software development effort because it provides two fundamental capabilities: (1) storage of computer software in machine readable form for computer operation and (2) storage of computer software documentation in human-readable form. Software development metrics are measures used to indicate progress or achievement. Without these elements, the orderly

[3]Software development plans are addressed in the (1) Software Engineering Institute's Capability Maturity Model, Software and its Software Acquisition Capability Maturity Model, and (2) Air Force's Guidelines for Successful Acquisition and Management of Software-Intensive Systems.

development and subsequent support of software cannot be supported, and the quality of software cannot be measured respectively.

According to HCFA officials, other parts of the MTS software development plan are contained in numerous documents. However, this makes it difficult for effective use by the MTS contractor and for HCFA to oversee and manage the software development process. For example, HCFA provided nine pages of references to various documents that it considered contained components of a software development plan. Such document dispersal precludes effectively managing software development. Sound software development practices require the entire plan to be reviewed and approved by all user groups, including those responsible for documentation, testing, training, installation, and quality assurance. Further, at each phase of review the plan is to be updated. These practices are important to obtaining user agreement on procedures and to holding individuals accountable for the delivered software products. Not having these documents integrated and formally agreed to by all parties responsible for software development increases the risk that they will not be adequately reviewed.

Configuration Management Plan Not Yet Implemented

A configuration management plan describes how changes to software and the total system including key documents will be managed and controlled throughout the software development process.[4] This process facilitates communication among development team members regarding the status of software engineering efforts, and ensures that proposed changes to software or other system components, and related documents, are reviewed by a configuration control board to determine whether the changes should be approved. While system development contractors are responsible for developing configuration management plans, agencies acquiring information systems—such as HCFA—also need such a plan to control all activities associated with the software development initiative. The configuration management plan should be completed and used for system development.

HCFA has not yet implemented a configuration management plan for MTS. It relied on the MTS development contractor's configuration management plan to manage changes to MTS development, but this plan is limited to software related products. Configuration management for other MTS components, including those that will be part of the planned data

[4]Configuration management plans are addressed in the (1) Software Engineering Institute's Capability Maturity Model, Software and its Software Acquisition Capability Maturity Model and (2) Air Force's Guidelines for Successful Acquisition and Management of Software-Intensive Systems.

operations and analysis center and processing sites, has not yet been addressed. In response to this weakness, HCFA' s change management development team developed a plan in February 1997 which documented the configuration management process for the entire MTS initiative. According to HCFA, it will use this process to manage and control changes across all MTS products. However, the plan has not yet been implemented.

Without such a process, changes to items such as software requirements, and key documents can not be effectively managed or controlled. For example, MTS' managed care requirements are being defined without a change management process. As a result, HCFA may not know whether all managed care requirements that the contractor is using to develop the first module adequately represent and fulfill Medicare's functions and MTS' goals. Also, without a configuration management process, HCFA will be unable to effectively communicate hardware changes to the planned operating sites that affect other members of the MTS development community.

HCFA's configuration management plan outlines a process for documenting and reporting all requests for changes to MTS configuration items and provides change management support for related MTS documentation. HCFA intends to integrate the plan with the MTS design contractor's configuration management plan.

Systems Integration Plan Not Yet Developed

A systems integration plan is developed and used to ensure that the hardware, software, and telecommunications standards are adhered to so that components of the system will interface seamlessly with each other and with users.[5] A well-defined systems integration plan identifies related interfaces between hardware and software, and includes procedures for managing and controlling these interfaces. These procedures should include provisions for identifying the functional and physical characteristics between the applicable software or hardware units and ensuring that they are compatible. Control over the interface structure helps management make cost-effective, functional allocations among systems and can provide needed safeguards during systems integration testing.

In 1995, the IV&V contractor cited that HCFA lacked a systems integration plan. However, HCFA has not yet developed a systems integration plan to

[5]Systems integration plans are addressed in the Systems Engineering Management Guide, Defense Systems Management College, January 1990.

help ensure that all required interfaces will be developed and implemented. Without a systems integration plan, HCFA cannot ensure that all of the legacy systems and MTS software and hardware components will interface with each other as they should. In September 1996, HCFA tasked a consultant with (1) defining the scope of the MTS systems integration effort and identifying its key systems integration activities and tasks, (2) identifying who will perform key systems integration activities, and (3) developing an overall plan and schedule for systems integration activities. On April 1, 1997, HCFA received a copy of the consultant's report. HCFA plans to use this report as a basis for developing a detailed system integration plan for MTS. On April 22, 1997, at the conclusion of our review, HCFA had not established a date for the final plan.

HCFA Oversight of MTS Contractor's System Development Is Risky

Leading software-related organizations enhance their software development capabilities by applying modern software development standards and assessing their software engineering processes. Many such organizations improve their software development programs by using a capability maturity model to assess their capability to produce high-quality software.[6] These organizations also define and use software measures, or metrics, to assess the quality of software development, and prepare software development cost and schedule estimates, as part of the initial planning process.

Software Capability Maturity Is Key to Success

The MTS development contractor estimates that about 2 million lines of software code will need to be designed and developed for MTS. Even though the software was the crucial component of MTS, HCFA did not require prospective contractors to provide the results of independent assessments of their software capability maturity, as recommended by the Software Engineering Institute and other organizations, including the Department of Defense.[7] Such assessments help agencies ensure that the selected contractor has the key software development processes in place to reduce risks.

[6]The Software Engineering Institute has developed two models to assist organizations in assessing the maturity of their software development processes. These models are the Capability Maturity Model for Software, and the Software Acquisition Capability Maturity Model. The Institute provides leadership in advancing the state of the practice of software engineering to improve the quality of systems that depend on software.

[7]Guidelines for Successful Acquisition and Management of Software- Intensive Systems: Weapon Systems Command and Control Systems Management Information Systems, Department of the Air Force, February 1995.

According to the MTS development contractor, although its MTS software development team had not yet been evaluated using the software capability maturity model, its corporate goal is to have the entire corporation attain a maturity level three in 3 years.[8] This is but a goal; as yet a plan to achieve it has not been developed. Further, the contractor had not established a software improvement process.

In addition, the systems development methodology being used was developed specifically for MTS and, as a result, the contractor's MTS team has no experience with this methodology. Further, it is still incomplete. For example, a complete systems development methodology consists of a series of steps and tasks that are used by developers to provide a structured approach for systems development from systems planning and design through implementation and support. The MTS contractor's methodology only addressed the design, development, and testing and validation phases. It does not address other key phases, which consist of the analysis and implementation phases.

An inadequate software development methodology greatly increases development risk because this methodology is used to control the key software development phases, such as planning, design, development, testing, and implementation. In addition, the contractor is not addressing all phases in the proper sequence. For example, it has already moved into the development phase for the Managed Care module before HCFA has approved these requirements.

MTS Contractor Not Using Complete Software Development Metrics

Software development metrics are numerical measures used to predict a dimension of software quality throughout the project. Early detection and avoidance of problems and control of software development projects are possible through the collection, validation, and analysis of metrics. Useful metrics include numbers of defects found at various stages of development, costs to repair defects, and the extent of test coverage. Metrics such as the number and frequency of errors associated with a specific software module are used to analyze software quality. Such analysis can identify questionable or unacceptable situations.

Despite the importance of software metrics, the MTS contractor has only included metrics that measure how much of the planned activity has been completed at each measurement point and metrics that help refine future

[8]Level 3 is the "defined" level on a scale ranging from one to five, with five being the highest rating. Level 3 means that the software process for both management and engineering activities is documented, standardized, and integrated into an organization-wide software process.

cost and schedule estimates. While these are essential for assessing the contractor's overall performance, they are incomplete because they do not contain critical measures to determine the quality of the software being developed, such as the number of defects identified and corrected per software module.

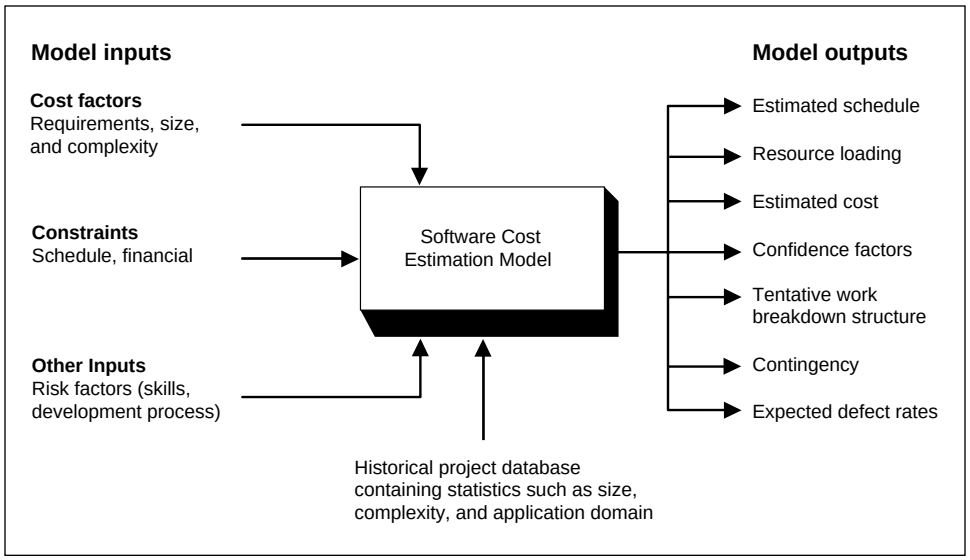
Questionable Assumptions Used to Develop Software Cost and Schedule Estimates

Software estimating tools, used along with sound assumptions about a planned project, help developers make reasonable projections about how much a planned project will cost and how long it will take to develop. The MTS software developer applied the widely used software life-cycle management (SLIM) model for the MTS estimate.

Since HCFA began MTS in 1994, it has worked with the software developer in making many software development cost and schedule projections. HCFA's original MTS contract called for the software to be developed by late 1996 for about $18 million and was supposed to have been completed by October 1996. Now, following contract renegotiations, the software development will cost over $90 million including award fees, and will not be completely implemented until after 2000. During the renegotiations, HCFA directed the MTS contractor to estimate the cost and schedule for developing the software.

The processes that should be used for estimating software cost are illustrated in figure 2. Planning and cost estimating should be one of the first set of activities the project team responsible for producing software performs. Sound planning helps ensure that resources will be used effectively to support corporate strategic objectives. Good software estimating provides the basis for cost trade-offs and resource allocation decisions. Together, planning and software estimates set the stage for project controls and for managing progress.

Figure 4.2: Software Cost Estimating Process



The MTS software developer, with direction from HCFA, applied to the SLIM model a series of assumptions and constraints on such factors as the desired completion date and staff resources and skills to calculate outputs, including cost, development schedule, and degree of risk. Based on this model, the MTS project will require over 1.7 million lines of code.

However, several assumptions used as input for the SLIM model do not realistically portray the MTS software development environment. For instance, one assumption used in the model rated the team as "very experienced" with the software infrastructure. This was based on plans to use specific, contractor-owned, proprietary software. Since these estimates were made, however, the software developer has decided to use a commercial off-the-shelf product. The "very experienced" indicator has not been adjusted to reflect that the software development team had never before used this commercial product. In another assumption, the software developer characterized the volume of data to be processed as "average" when, in fact, MTS will be required to process enormous amounts of data. Furthermore, requirements have been described as being "defined." Yet, HCFA has not approved the software requirements specifications or documentation for any of the software releases. In addition, the specifications and requirements for the infrastructure needed to support the six releases have likewise not yet been approved.

These types of assumptions cause the SLIM model to inflate a key estimation variable—the productivity index—above the rating it would have received if more accurate assumptions had been used. This results in unrealistic software cost and schedule estimates. According to the SLIM vendor, for every point the productivity index drops or rises, a project will take 10 percent more or less time, and cost 30 percent more or less to develop than other typical, large-scale development projects.

According to the software developer, the estimated number of lines of code will be reviewed during the design phase on the basis of further knowledge about software component size and complexity, better estimates of anticipated code reuse, and commercial off-the-shelf software use; this in turn will result in cost and schedule revisions.

MTS Schedule Incomplete, Dangerously Compressed

Generally accepted systems development practices require project managers to continually monitor a project's schedule to ensure that its activities are completed as planned. In addition, OMB requires that agencies establish appropriate controls to help ensure that information technology acquisitions remain on schedule. Further, to avoid technical problems, federal systems acquisition guidance calls for agencies to minimize overlap of systems development phases—analysis, design, software development, testing, conversions, and deployment.[9] In other words, to minimize the risk of major system development rework, all activities that need to be completed in one phase should be completed before the next system development phase begins.

HCFA has integrated its program schedule with that of its development contractor, and has added broadly defined transition tasks. However, it has not yet identified (1) how the schedule's tasks interrelate or (2) a critical path showing the sequence of tasks that is longer than any other. Such critical paths are used to determine the overall project completion date. Also, HCFA has not developed resource estimates for each task, without which realistic projections about the time to complete each task or the entire project cannot be made. Further, detailed plans for several major MTS initiatives are still not included in the current program schedule, such as the transition, year-2000 effort, and the release of the final software module. Finally, key critical tasks are inappropriately scheduled. For example, according to the program schedule, the first MTS software

[9]Guidelines for Successful Acquisition and Management of Software Intensive Systems, Department of the Air Force, Software Technology Support Center, February 1995.

release will be installed at the planned MTS processing centers before the new processing centers are scheduled for implementation.

HCFA has hired a contractor to assist in developing these missing program schedule elements. By mid-summer 1997, HCFA plans to have (1) project-level resource requirements for each of the approximately 30 projects that constitute the MTS initiative and (2) a program-level critical path.

Finally, MTS project phases still overlap considerably for both the overall MTS project as well as the development phases within each MTS module release. As we reported in 1994, if a contractor advances too far into a succeeding systems development phase before sufficient progress has been made in previous phases, the risk of technical problems is significantly increased.[10] HCFA's current program schedule shows concurrency in all overall project phases and, between September 1997 and September 1998, HCFA plans to perform all five systems development phases at one time. (See figure 4.3.) In addition, each one of the five scheduled MTS software releases contains project phases that overlap. Figure 4.4 shows the overlapping phases scheduled for the first release—Managed Care.

[10]GAO/HEHS/AIMD-94-79, Jan. 25, 1994.

Figure 4.3: Medicare Transaction System Program Schedule Revisions

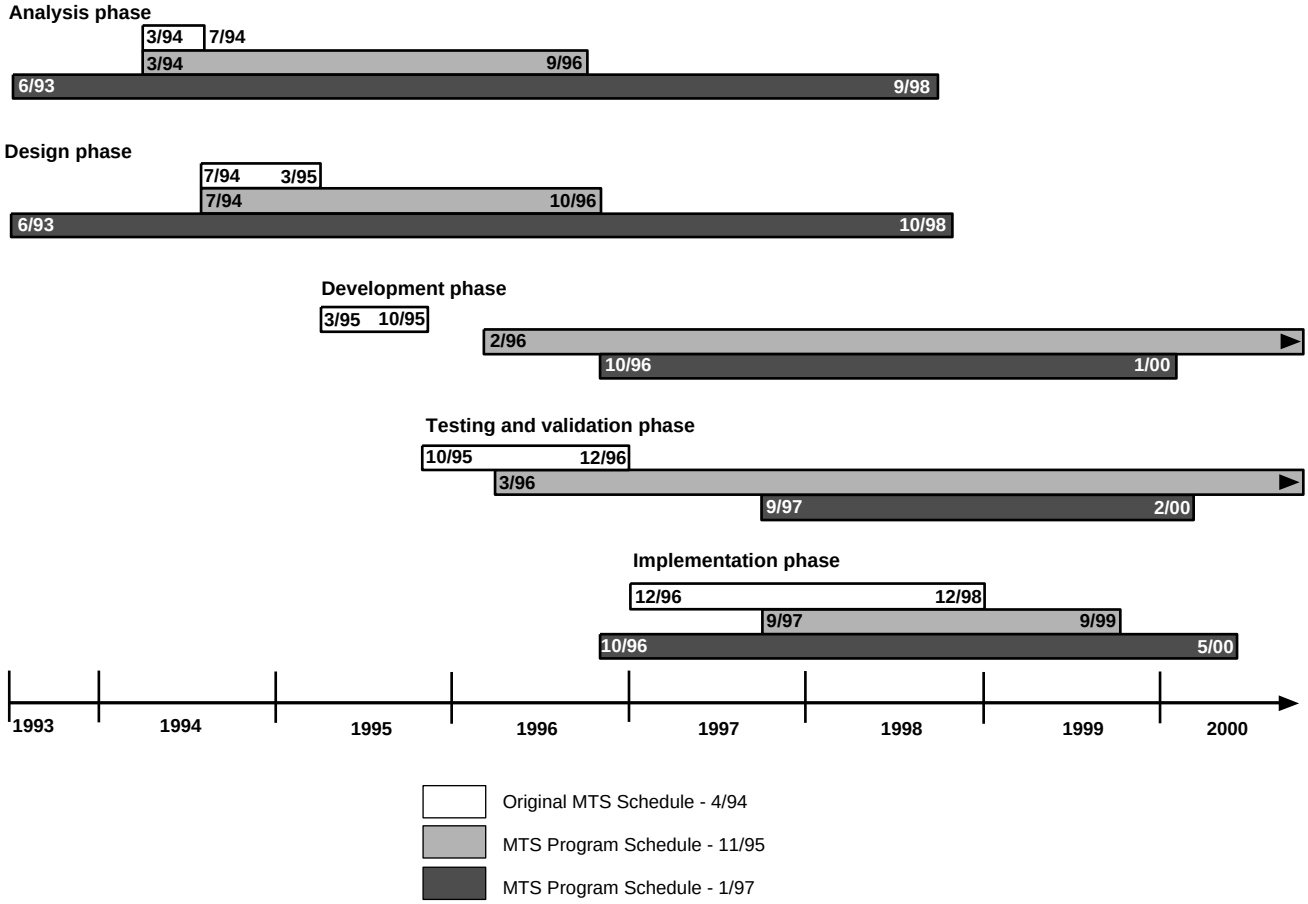
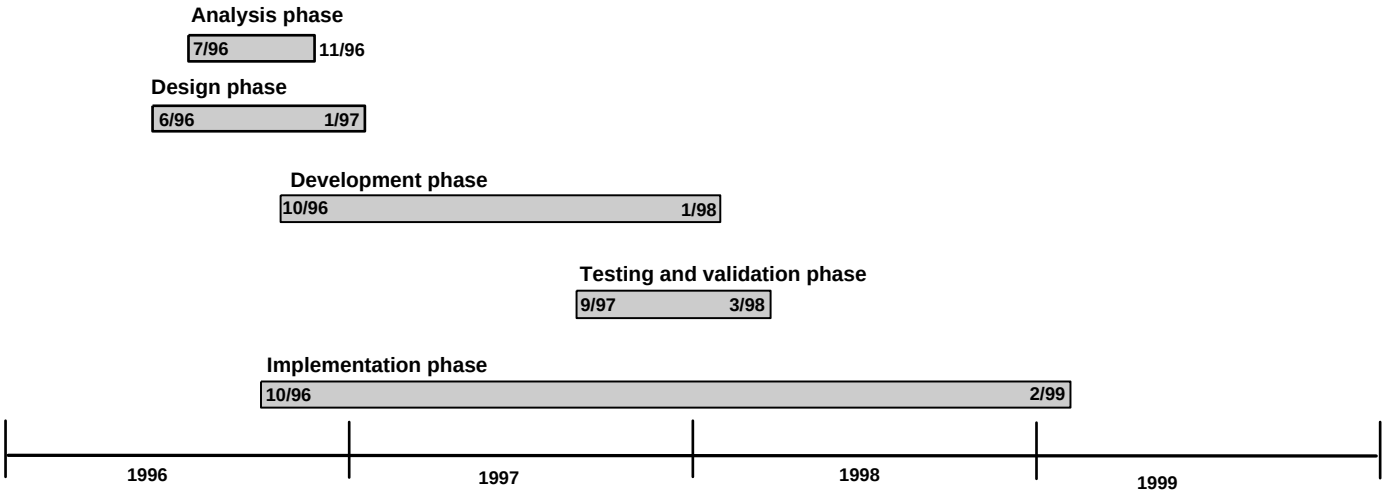


Figure 4.4: Medicare Transaction System Program Schedule for Managed Care—Release 1



HCFA's IV&V contractor has also expressed concern about the MTS schedule. In HCFA's February 1997 risk tracking report, the contractor stated that the software development schedule was risky because it "did not allow any slack time to accommodate slippage or partial performance." The contractor explained that the schedule has never contained sufficient time to completely perform tasks leading to key deliverables such as the systems requirements document and systems external specifications.[11] The IV&V contractor said that because the MTS development contractor was 1 month late in delivering these two products, additional resources would have to be taken from other tasks to complete this work. The IV&V contractor concluded that "This, in turn, will have a direct negative impact on the tasks being performed with reduced resources."

[11]A systems requirements document specifies the requirements that are to be included in a planned software system. System external specifications describe interfaces to the planned system, and include descriptions of subsystem and related software programs.

Weaknesses in MTS Risk Management Require Attention Before Proceeding With Development

Federal statutes and OMB directives require effective risk management as an essential part of successful information technology system development. OMB Memorandum 97-02 directed agencies to reduce risks in major information systems investments by establishing clear measures and accountability for project progress. The Paperwork Reduction Act of 1995 and the Clinger-Cohen Act of 1996 require agencies to manage risks associated with information technology investments. Further, an investment guide signed jointly by us and OMB recommends the use of key investment control techniques, including risk assessments, to expose potential technical and managerial weaknesses that could impair project success.[12]

In addition to these criteria, guidance developed by federal agencies, including the Department of Defense, suggests other key elements that should be part of an effective risk management program. These include quantitatively estimating risk impact, developing success criteria and measures when the risk can be considered mitigated, assigning a full-time risk management officer, and contracting for IV&V services.

Measuring HCFA and MTS against these criteria reveals a disappointing picture. First, HCFA's risk mitigation plans contain no established time frame for assessing risk status and do not specify target dates for risk mitigation. Second, metrics have not been developed to provide HCFA with the means for comparing progress in assessing the effectiveness of risk mitigation efforts. Third, the risk management process has no mechanism for providing management with early warnings of risks becoming imminent. Fourth, resource estimates of staff, schedule needs, and funding to address risks have not been identified. Fifth, the MTS risk management database does not incorporate all identified risks. Finally, documents do not identify interdependencies among risks.

Overall responsibility for risk management has not been formally assigned. The chapter on risk management in HCFA's program management plan assigns broad responsibility for risk management to the MTS Initiatives Management Group, Office Leads, and Project Owners.[13] The MTS project manager serves as the de facto risk management official. The recent assignment of a team responsible for risk management oversight under

[12]Evaluating Information Technology Investments, OMB Office of Information and Regulatory Affairs, Information Policy and Technology Branch, November 1995.

[13]The MTS Management Group is a core advisory group that shares definition, development and implementation responsibilities for MTS. The MTS Office Leads is composed of representatives of HCFA bureaus, who meet regularly to discuss MTS integration, coordination, program monitoring, and communications issues. The Project Owners are responsible for discrete MTS project segments.

this official provides support for risk management activities; however, current risk management policies and procedures remain unchanged.

In February 1997, HCFA formed a team responsible for risk oversight and management; this team reports to the MTS project manager. The team's responsibilities include incorporating all identified risks into the MTS risk database; helping to identify additional risks; updating the risk management section of the program management plan; and helping to monitor, and mitigate reported risks to the point where they are removed from the risk management report.

Long-standing unmitigated risks indicate that effective risk management practices have not been institutionalized and uniformly applied. Table 4.1 describes critical risks for which the cost, schedule, and performance impact has not yet been adequately quantified.

Table 4.1: Critical Unmitigated MTS Risks

Risk	Date/by whom identified	Description	Impact
Lack of a software development plan[a]	May 1995 by IV&V contractor	A software development plan describing the methodology and approach to developing and testing MTS software has not been created.	HCFA will be unable to assess MTS software development. It will be difficult for HCFA to move to a new MTS software development contractor effectively and cost-efficiently.
Lack of a requirements management plan	November 1994 by IV&V contractor	A requirements management plan is needed to control new and changing requirements.	Difficulty in tracing requirements to MTS or Medicare functions. Managing changing requirements may result in a system that does not meet HCFA's needs.
Lack of a system integration plan	June 1995 by IV&V contractor	A well-defined process is needed to describe how the various systems supporting MTS will be integrated.	HCFA cannot ensure that systems are interfacing appropriately and producing the correct results.

(continued)

Risk	Date/by whom identified	Description	Impact
Lack of a configuration management plan	May 1995 by IV&V contractor	HCFA has not developed a configuration management plan to manage and control changes to MTS products such as requirements, software, and other contract deliverables.	HCFA cannot ensure that the integrity of MTS products is maintained and that only approved changes are being made to MTS throughout the system development life cycle.
Compressed MTS development schedule	June - December 1996 by IV&V and MTS software development contractors	The MTS software development schedule does not provide time for any delays.	Any delay in a task on the critical path will result in a delay in the overall schedule. Therefore, the expected MTS completion date will not be met, and additional funds to complete the project may be required.
Lack of Medicare subject-matter experts	October 1996 by MTS software development contractor	The MTS software development contractor lacks sufficient Medicare business analysts, necessary to analyze and define MTS requirements for releases 2 through 5.	Insufficient Medicare expertise can delay defining requirements, and result in needing to rework requirements.
Incorrect metrics	October 1996 by MTS software development contractor	Software and financial metrics either understate or overstate MTS software quality and performance.	Incorrect metrics may lead to negative MTS cost, schedule, and performance trends and unacceptable software.

[a]Although this risk item was taken off the risk report by the IV&V contractor in November 1996, we believe that it should still be classified as a risk because it has not been mitigated.

Conclusions

HCFA has attempted to address systems requirements, schedule, and risk management issues that we have been reporting since 1994, yet many critical problems remain inadequately addressed. Critical management plans have not been adequately developed, the contractor is using a risky software development strategy, the MTS schedule is incomplete and

dangerously compressed, HCFA is not using sound risk management procedures, and its IV&V contractor is not ensuring that potential critical risks are routinely assessed. Unless HCFA solves these problems before proceeding further with MTS development or implementation, it risks extensive development rework, substantial cost increases, and a system that will not fully meet HCFA's needs.

Recommendations

To better ensure the success of MTS, we recommend that the Secretary of Health and Human Services require the Administrator, Health Care Financing Administration, to direct and remain accountable for the following actions before proceeding further with MTS development.

- Complete a requirements management plan to assist in identifying, approving, managing, and controlling the requirements development process.
- Support the development of MTS software with an integrated software development plan, which includes a description of such critical elements as software development library standards and metrics. All critical elements should be in a single document to facilitate the review, approval, and use by involved individuals.
- Implement a configuration management process that includes change controls for requirements as well as all other related MTS issues such as hardware changes to the planned operation sites.
- Complete a comprehensive systems integration plan to ensure that all MTS-related interfaces are identified, developed, managed, and controlled.
- Require an independent evaluation of the MTS contractor's software development capability prior to beginning the software development phase. To ensure that the contractor's MTS development team has the capability required for reasonable assurance of success, it should achieve a rating of at least level 2.
- Improve software development oversight by requiring the MTS developer to include measures of the quality of software in the software development metrics.
- Direct the MTS developer to rerun the SLIM model using appropriate assumptions and constraints, and use the results in reassessing the cost and time required to develop MTS.
- Complete a new, integrated MTS program schedule that includes a critical path for the entire initiative, including the interim Medicare processing environment, and resources and costs for each task. The schedule should also minimize overlap in the phases of the system development process.

- Mitigate critical risks by designating an accountable official for risk management and ensuring that this individual implements a process, which will (1) identify all significant risks, (2) quantify the impact of identified risks, (3) establish time frames for assessing risk status and specifying target dates for risk mitigation, (4) develop metrics that will compare progress in assessing the effectiveness of risk mitigation efforts, (5) provide a mechanism for alerting management early of risks that are becoming imminent, (6) provide resource estimates of staff, schedule needs, and funding to address identified risks, (7) ensure that the MTS risk management database incorporates all identified risks, and (8) document interdependencies among risks. Further, this accountable official should (1) ensure that mitigation plans are developed to address identified risks, (2) hold individuals in authority accountable for prompt completion and implementation of risk mitigation plans, and (3) periodically evaluate the adequacy of HCFA's progress in mitigating risks and identify new risks.
- Require the IV&V contractor to assist HCFA in mitigating risks by quantifying the impacts of identified risks on program cost and schedule. HCFA should also reflect these in its program status reports.

To help HCFA improve its ability to use effective systems development practices and improve its software acquisition capability, we recommend that the Secretary of Health and Human Services direct the Administrator, Health Care Financing Administration, to (1) obtain an independent assessment of its software acquisition capabilities using the Software Engineering Institute's software acquisition capability maturity model, and implement improvements to correct any identified weaknesses, and (2) report its findings to both HHS and OMB.

Agency Comments and Our Evaluation

HHS agreed with our recommendations in this chapter. It specifically concurred with our recommendations regarding the need for plans critical to effective systems development, a complete and integrated program schedule, and a designated official accountable for risk management. While HHS agreed that the SEI certification of software development contractors at a level 2 has value, and plans to use this rating as one of its selection criteria for future software development contractors, it said that requiring the current software developer to achieve this rating would have little if any value, and that using the level-2 rating as a minimum qualification would limit the range of potential competitors.

We believe that such a rating is critical to HCFA's assurance that its software developers have the capability to successfully complete contract

requirements. Further, we believe that limiting the choice of contractors to those who have achieved a level-2 rating is not only appropriate, but necessary to the successful development of MTS.

OMB agreed with our recommendations for HCFA to apply sound systems-development practices to reduce risks and assist management in controlling MTS. It also commented that it would request an evaluation of the benefits of performing an independent assessment of HCFA's software acquisition capability and, if the benefits are confirmed, would incorporate the results of this evaluation in its overall discussions with HCFA regarding the next steps for MTS.

Based on the complexity of this project and the difficulties HCFA has had in managing it, we are certain that HCFA will benefit from an independent assessment of its software acquisition capabilities using SEI's software acquisition capability maturity model.

Comments From the Department of Health and Human Services

DEPARTMENT OF HEALTH & HUMAN SERVICES

Office of the Secretary

Washington, D.C. 20201

MAY 7 1997

Mr. Gene L. Dodaro
Assistant Comptroller General
Accounting and Information Management Division
United States General Accounting Office
Washington, D.C. 20548

Dear Mr. Dodaro:

Thank you for the opportunity to comment on your draft report entitled "Medicare Transaction System Success Depends Upon Correcting Critical Managerial and Technical Weaknesses" which raises concerns about a mission-critical information systems development project at the Health Care Financing Administration.

GAO is correct in identifying the MTS initiative as the most significant infrastructure change ever undertaken by HCFA. Although we are steadfast in our belief that HCFA must institute the changes in information technology represented in the MTS initiative, we will be the first to admit the task is more complex than originally contemplated. However, the reality is that current methods of processing transactions and information are simply not adequate to serve the Nation's beneficiaries and providers, nor are they capable of providing the Nation's health care policy makers the timely and relevant information necessary for informed decisions on critical public policy issues.

We learned a great deal in the past 3 years about ways to improve the management of complicated technology projects. GAO has been of significant assistance in offering suggestions for improved management.

The Department of Health and Human Services and the Health Care Financing Administration concur with your recommendations and we will work together to assure the future success of our effort to modernize the processing of Medicare claims and payments.

Your continued support of the need for significant modernization of HCFA's information processing systems is appreciated.

Sincerely,

LaDonna Bentley

- for - John J. Callahan
Assistant Secretary for
Management and Budget

Enclosure

Comments of the Department of Health and Human Services (DHHS) on the General Accounting Office (GAO) Draft Report, "Medicare Transaction System (MTS): Success Depends Upon Correcting Critical Managerial and Technical Weaknesses"

GAO recommends that the Secretary withhold funding for the MTS operating site contracts until HCFA cost justifies them.

We concur. Both Department and HCFA management staff agree that no funds will be obligated for operating site contracts until a reassessment of the project has been completed and a revised development strategy has been established.

GAO recommends that the Secretary provide oversight in accordance with provisions of the Clinger-Cohen, Paperwork Reduction, and Federal Acquisition and Streamlining Acts.

We concur. Departmental staff will continue to exercise its appropriate statutory oversight and work closely with project management staff at HCFA.

GAO recommends that the Secretary direct the HCFA Administrator to adopt a wide range of other GAO recommendations based upon best practices.

We concur. Both the Department and HCFA are committed to complying with the GAO recommendations, and have worked closely together to prepare the following comments indicating how we will implement the recommendations.

Although the report questions some of the Health Care Financing Administration's (HCFA's) methods in the planning and development of the MTS initiative, we appreciate GAO's support of the need for significant change in HCFA's information technology strategy as embodied in MTS. Many of your recommendations will assist us in better managing HCFA's transformation from an antiquated and redundant set of information and processing systems to a highly integrated processing system capable of protecting the trust funds and providing timely and relevant information to system users and other interested parties.

We provided a great deal of information in response to GAO's concerns about the management of MTS. GAO is selective in the use of information provided by HCFA. We, however, will limit our comments to GAO recommendations we believe require clarification of fact or intent. Our comments appear at the end of the individual chapters containing the specific report recommendations.

GAO is correct in identifying the MTS initiative as the most significant infrastructure change ever undertaken by HCFA. Although we are steadfast in our belief that HCFA must institute

the changes in information technology represented in the MTS initiative, we will be the first to admit the task is more complex than originally contemplated. However, the reality is that current methods of processing transactions and information are simply not adequate to serve the Nation's beneficiaries and providers, nor are they capable of providing the Nation's health care policy makers the timely and relevant information necessary for informed decisions on critical public policy issues.

We learned a great deal in the past 3 years about ways to improve the management of complicated technology projects. GAO has been of significant assistance in offering suggestions for improved management.

HCFA's management recognizes the need to learn from past experiences and build processes that better ensure early disclosure of marginal performance. The recent decisions to issue a stop-work order to the software developer and reassess the MTS development strategy are examples of aggressive project management and our willingness to intercede. No project of the complexity of MTS can be accomplished without difficulties and setbacks. HCFA is acutely aware of both the visibility of projects such as MTS and the responsibility inherent in the investment of public funds. It is the acceptance of that public responsibility that drives the project. A return on investment (ROI) analysis is expected to show that unless HCFA's systems are modernized, the public will continue to pay more than necessary for the administration of Medicare, and program payments will continue to exceed what is necessary and reasonable.

Chapter 2 - Interim Medicare Processing Environment Needs to be More Effectively Managed

HCFA concurs with GAO's recommendations regarding management of the interim Medicare processing environment.

HCFA further concurs with the recommendation concerning details of the transition to the single Medicare part A and part B systems. A part A transition plan has been developed. The part B transition plan will be completed in early Summer 1997. The selection of the part B standard system was just made in April 1997 and a transition plan was contingent on that selection.

HCFA also concurs with the recommendation for conducting thorough testing before converting part A and part B systems.

HCFA concurs with GAO's recommendation to establish a means of assessing performance in the crucial early stages of transition. In fact, HCFA established performance metrics last October to monitor the renegotiated software development contract with GTE. Because of these performance metrics, HCFA determined that GTE's work on MTS was not satisfactory and this resulted in the current stop-work order.

HCFA concurs with the recommendation that we help ensure the reliable operation of systems through the year 2000 by identifying responsibilities for managing and monitoring year-2000 actions, preparing an assessment of severity and timing of potential year-2000 impact, and develop contingency plans for critical systems in the event of failure.

HCFA requested implementation plans from its contractors on their progress in bringing their systems into millennium compliance. The essential data will be collected by the regions and reported to Central Office. We are now receiving initial reports and are in the process of analyzing them. We will require contractor reports on their progress no less frequently than quarterly depending upon contractor performance.

Chapter 3 - MTS is Not Being Managed as an Investment

HCFA agrees that improvement is needed in its investment management activities. However, we believe GAO's characterization of our actions fails to recognize the positive efforts made by the agency. Over the last 4 years HCFA produced six separate investment models for MTS costs and savings, engaged several expert consultants to assist in better managing the investment, and broadened its management team for MTS to include senior staff from throughout the agency. HCFA's most recent analysis projects a return on investment of 4.8-to-1 and a net present value of $2.4 billion over the period of 1997 through 2006. Medicare program savings, which were included in this ROI analysis, were not assumed in the fiscal year (FY)1998 President's budget and may change with the new implementation strategy.

HCFA is currently reassessing the MTS development strategy (hardware and software) and, as recommended by GAO, no funds will be obligated for MTS operating site procurements until that reassessment is completed and a development strategy has been accepted by HHS officials.

GAO recommends that HCFA justify the continuation of MTS by producing a valid cost/benefit and alternatives analysis that includes goals for reaching programmatic savings and links estimated savings to specific improvements in Medicare claims processing, and take appropriate action based on the results of the analysis.

Over the past 4 years HCFA produced a series of six investment models for MTS costs and savings. Each investment model was based on the best knowledge available at the time regarding the design and configuration of MTS. Accordingly, early models were theoretical and based on broad assumptions. Later models had the benefit of more mature design and configuration of MTS and were able to more precisely estimate costs and savings. Although assumptions changed with the developing outline of the MTS design, the underlying methodology remained consistent. The

methodology always created two scenarios for comparison: the cost of the Medicare administrative environment with MTS, and the cost of the Medicare administrative environment without MTS. Each model's result continues to confirm substantial administrative savings following the implementation of MTS.

We will continue to analyze the cost and savings of MTS development strategies and will include calculations of ROI. Our current reassessment of MTS development strategies will include an economic analysis of alternative development strategies. An important aspect of our analysis is determining the optimum balance of risk and savings as we stage the segments of MTS implementation. We expect this work to take several months and will be done on an incremental basis (i.e., each step of the development process will be subjected to cost benefit analysis and ultimately be aggregated when all steps are completed).

In HCFA's most recent cost model calculations (Cost Model V), a ROI calculation was performed, consistent with OMB guidance (A-94). The ROI analysis found a return on investment of 4.8-to-1. This consisted of administrative savings worth 1.5-to-1 plus program savings worth 3.3-to-1. It is important to note, however, that Cost Model V incorporated assumptions that are no longer current. It preceded both the reassessment now underway and the preparation of the FY 1998 President's budget request.

HCFA concurs with the recommendation that we establish an investment management approach for MTS by explicitly linking the roles and responsibilities of the Chief Information Officer and the Investment Review Board.

While agreeing with these recommendations, some clarification of the GAO analysis is warranted. It is misleading to state that MTS costs have increased from about $151 million to about $1 billion, because the scope of costs included in the 1992 estimate differs from those included in the 1996 estimate.

The original estimates were made without the benefit of a system architecture, system design, development strategy or transition plan. As the project developed and the design, implementation, and transition process became more mature, cost and savings calculations were significantly more accurate. In addition, as our implementation strategy developed we opted for strategies that decreased risk and in some cases increased cost. It is important to note although the amount of investment required to accomplish the project has increased, administrative savings have been significant in every analysis performed. HCFA's most recent analysis projects savings in excess of $200 million annually following implementation of MTS.

The conclusion that HCFA continues to forego savings from commercial software was the subject of a separate GAO report prepared in 1995. This report asserts "billions" could be saved if HCFA would adopt commercial software designed to prevent

fraudulent and abusive billing. We are piloting such software in a Midwest state. The commercial software under discussion is essentially a system that prevents the billing under numerous codes for services that should be bundled and billed together. HCFA believes such software has value but is far from the sophisticated software tools that are necessary to detect and prevent a significant portion of abusive and fraudulent billings. HCFA makes use of several types of commercial software for the detection of inappropriate billings. It is currently engaged in a research and development effort with the Los Alamos National Laboratory for the development of prepayment techniques to detect inappropriate billings prior to payment.

Chapter 4 - Significant System-Development Practices Not Being Followed, Increasing MTS Risk

HCFA accepts GAO's recommendations from Chapter 4.

HCFA concurs with the recommendation that we complete and implement those plans that are critical to effective systems development.

GAO recommends an independent evaluation of the MTS contractor's software development capability prior to beginning the software development phase. HCFA will use level 2 certification as one of its criteria for the selection of software vendors.

GTE was directed to stop work beyond release 1. Release 1 is already well into the software development stage. Therefore, such an evaluation would have marginal value. In any subsequent procurement for software development we will use the Software Engineering Institute (SEI) ratings as one of our selection criteria. We are concerned that to use the SEI criteria as a minimum qualification would limit the range of potential competitors. SEI certification is not a requirement for vendors on General Services Administration or other government-wide contracts.

HCFA concurs with the recommendation for completion of a new, integrated program schedule.

HCFA concurs with the recommendation that we mitigate critical tasks by designating an accountable official for risk management.

Comments From the Office of Management and Budget

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

DEPUTY DIRECTOR
FOR MANAGEMENT

Mr. Gene L. Dodaro
Assistant Comptroller General
U.S. General Accounting Office
Washington, D.C. 20548

MAY 6 1997

Dear Mr. Dodaro:

This responds to your letter of April 23, 1997 requesting comments on the draft GAO report entitled Medicare Transaction System: Success Depends Upon Correcting Critical Managerial and Technical Weaknesses (GAO/AIMD-97-78). I appreciate your request for our comments on this report.

The report provides GAO's review of the Medicare Transaction System (MTS), including issues concerning the transition to a standardized Part A and Part B system and software conversions necessary for Year 2000 compliance. The report contains two specific recommendations for OMB. The first recommendation requests that OMB use the enforcement authority provided by § 5113 (b)(5) of the Clinger-Cohen Act ("the Act") to ensure that the Health Care Financing Administration (HCFA) complies with the Act's provisions, including the requirement that agencies justify information technology projects with a positive return on investment (ROI), and provide sound benefit, risk, and alternatives analyses. The second recommendation would have HCFA provide to OMB the results of an independent assessment of its software acquisition capability.

We agree that HCFA has faced many challenges and problems in developing MTS. As your report notes, HCFA has made major changes to its development and implementation plans for MTS over the past few months. We concur with your recommendation that HCFA's management of the project from this point forward must intensify its efforts to address these challenges and take steps to more adequately plan for the consolidation to a standardized Part A and Part B system, to manage MTS as an investment, and to apply sound systems development practices to reduce risk and assist management in controlling the development of systems requirements and the MTS software. We will look into your recommendations concerning the Year 2000 contractor systems' conversion issue and take appropriate action as necessary.

OMB is using the tools of the Clinger-Cohen Act to oversee MTS and other HHS investments in information technology. For example, through the annual budget cycle, OMB has reviewed the planning, development, and implementation of MTS. During the FY 1998 budget process, we payed particular attention to the definition of requirements, the excessive concurrency in software development, alternative processing center arrangements, and reviewed HCFA's implementation plans for the transition to one Part A and one Part B system. As a result

of that review we made recommendations to HCFA to assist in improving its management of the MTS program. As you are aware, HCFA is in the process of evaluating alternative design and implementation strategies for MTS.

We believe the goals of the MTS program -- to improve service to Medicare beneficiaries and providers; to reduce administrative expenses; to achieve better oversight of Medicare contractor operations; to reduce payment of fraudulent claims; and to accommodate managed care and alternative payment methods -- are the right goals for HCFA to pursue. Further, we believe that HCFA has taken action to reduce the risk associated with the area of requirements definition and concurrent development by scaling back the contract to focus on the development of Release 1 (where the requirements are well-defined). We are continuing to work with HCFA on the transition to a standardized Part A and Part B system and on the benefits, risks, and ROI of various alternative approaches to MTS. We will continue to pursue appropriate actions through the budget process.

Accordingly we have no objection to the first recommendation concerning OMB and will request that HCFA develop benefit, risk, ROI, and alternatives design analyses that will correspond to the changes in the MTS software design and that will address methodological concerns raised in your report. As to the second recommendation, we will request the Information Technology Resources Board and HCFA's Independent Validation and Verification contractor to evaluate the benefit of performing an independent assessment of HCFA's software acquisition capability. If the benefits are confirmed, we will incorporate the results of such an assessment into our overall discussions with HCFA as to the next steps regarding MTS.

The development and implementation of the MTS effort will continue to receive substantial attention from OMB and we will follow HCFA's progress in implementing your recommendations closely.

Sincerely,

John A. Koskinen
Deputy Director for Management

Key Provisions of Laws, Regulations, and Best Practices Relating to Information Technology Investments

The citations presented in this appendix include key laws, regulations, and guidance pertaining to information technology investment issues. They are organized on the basis of the major sections of this report.

Information Technology Project Transitions and Year 2000

Information Technology Transition Environment

The Clinger-Cohen Act of 1996 (CCA), (formerly named the Information Technology Management Reform Act of 1996), P.L. 104-106, Division E; February 10, 1996, effective August 8, 1996, 40 USC 1423(3): Agency heads shall "ensure that performance measurements are prescribed for information technology used by, or to be acquired for the executive agency, and that the performance measurements measure how well the information technology supports programs of the executive agency."

CCA, 40 USC 1425(c)(2): The agency CIO shall "monitor the performance of information technology programs of the agency, evaluate the performance of those programs on the basis of the applicable performance measurements, and advise the head of the agency regarding whether to continue, modify, or terminate a program or project."

The Federal Property and Administrative Services Act of 1949, § 313(b), as added by the Federal Acquisition And Streamlining Act of 1994 (FASA), P.L. 103-355; October 13, 1994, 41 USC 263(b): "The head of each executive agency shall approve or define the cost, performance, and schedule goals for major acquisition programs of the agency."

The Paperwork Reduction Act of 1995 (PRA) as amended (P.L. 104-13; May 22, 1995), 44 USC 3506(b)(3)(C): Requires agencies "to develop and maintain an ongoing process . . . to establish goals for improving information resources management's contribution to program productivity, efficiency, and effectiveness; methods for measuring progress toward those goals, and clear roles and responsibilities for achieving those goals."

Office of Management and Budget (OMB) Circular No. A-130, "Management of Federal Information Resources," February 8, 1996, 8b(3)(f): "Agencies shall establish information systems management oversight mechanisms . . . that ensure that major information systems proceed in a timely fashion towards agreed-upon milestones in an information system life cycle, meet user requirements, and deliver intended benefits to the agency and affected publics through coordinated decision making about the information, human, financial, and other supporting resources."

OMB Memorandum M-97-02, Funding Information Systems Investments, October 25, 1996: Investments in major information systems proposed for funding in the President's budget should "be implemented in phased, successive chunks as narrow in scope and brief in duration as practicable, each of which solves a specific part of an overall mission problem and delivers a measurable net benefit independent of future chunks."

OMB, Evaluating Information Technology Investments: A Practical Guide, version 1.0, Office of Information and Regulatory Affairs, Information Policy and Technology Branch, November 1995: "Senior managers need to compare the preliminary results being achieved by a project against its projected costs, benefits, and risks, and to identify actual or potential managerial, organizational, or technical problems."

General Accounting Office (GAO), Systems Assessment Framework: A Guide for Reviewing Information Management and Technology Issues in the Federal Government (SAF), version 1.0, August 1996: During the design, development, and deployment of systems, agencies are to prepare products and documents, including (1) a completed work plan with human resources, scheduling, and funding for each step, (2) a transition plan, including conversion from the legacy environment to the replacement system, and (3) performance measures that link to the users' operations. Further, agency management responsibilities include (1) review and approval of the system test and conversion plans, (2) formal verification and validation of the developed system, (3) review and approval of the transition plan, including procedures for site surveys, conversion preparation, and contingencies, and (4) agreement that acceptance test results meet management's criteria.

Information Technology Measures to Address Year 2000

GAO, Year 2000 Computing Crisis: An Assessment Guide, Exposure Draft, February, 1997: This guide presents a structured approach and a checklist to aid federal agencies in planning, managing, and evaluating their year

2000 programs. The most important year-2000 activities are (1) developing an overall year-2000 plan, (2) identifying responsibilities for managing and monitoring the year-2000 efforts, (3) preparing an assessment of the severity and timing of potential year-2000 impact, (4) conducting an inventory of the systems on which Medicare claims processing depend, (5) prioritizing and scheduling activities to convert, replace, or eliminate these systems, (6) developing validation strategies and test plans for systems, (7) addressing interface and data exchange issues, and (8) developing contingency plans for critical systems in the event of failure.

Managing Information Technology Projects as Investments

Required Investment Analyses

CCA, 40 USC 1427: The agency head shall identify major information technology acquisition programs that have significantly deviated from the cost, performance, or schedule goals established for the program in the IRM plan required by the PRA.

FASA, 41 USC 263(a): "It is the policy of Congress that the head of each executive agency should achieve, on average, 90 percent of the cost and schedule goals established for major and nonmajor acquisition programs of the agency without reducing the performance or capabilities of the items being acquired."

FASA, 41 USC 263(c): The agency head shall "(1) determine whether there is a continuing need for programs that are significantly behind schedule, over budget, or not in compliance with performance or capability requirements; and (2) identify suitable actions to be taken, including termination, with respect to such programs."

OMB Bulletin No. 95-03, Planning and Budgeting for the Acquisition of Fixed Assets, June 27, 1995 (superseded): "The planning for fixed asset acquisitions should be based on a systematic analysis of expected benefits and costs. The fundamental method of formal economic analysis is benefit-cost analysis."

OMB Circular No. A-11, "Preparation and Submission of Budget Estimates," Part 3 Planning, Budgeting and Acquisition of Fixed Assets (July 1996); Appendix 300A(b): "The planning for fixed asset acquisitions should be based on a systematic analysis of expected benefits and costs. The fundamental method of formal economic analysis is benefit-cost analysis."

OMB Circular No. A-94, "Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs," October 29, 1992; (5)(c)(3): Benefit-cost analyses should "consider alternative means of achieving program objectives by examining different program scales, different methods of provision, and different degrees of government involvement. For example, in evaluating a decision to acquire a capital asset, the analysis should generally consider: (i) doing nothing; (ii) direct purchase; (iii) upgrading, renovating, sharing, or converting existing government property; or (iv) leasing or contracting for services."

OMB Circular No. A-130, 8b(1)(c): Agencies shall "conduct benefit-cost analyses to support ongoing management oversight processes that maximize return on investment and minimize financial and operational risk for investments in major information systems on an agency-wide basis."

OMB Memorandum M-97-02: "Investments in major information systems proposed for funding in the President's budget should . . . demonstrate a projected return on the investment that is clearly equal to or better than alternative uses of available public resources."

Required Alternatives and Risk Analyses

CCA, 40 USC 1422: Agency heads are to "design and implement in the executive agency a process for maximizing the value and assessing and managing the risks of the information technology acquisitions of the executive agency." The process is to (among other things) provide for the selection of information technology investments using minimum criteria on whether to undertake an investment (including quantitatively expressed projected net, risk-adjusted return on investment, and specific quantitative and qualitative criteria for comparing and ranking alternative information systems investment projects) and to provide a means for senior management to obtain timely information regarding progress (at established milestones) in terms of cost, capability of the system to meet specified requirements, timeliness, and quality.

OMB Bulletin No. 95-03, Attachment A (superseded): "Alternative fixed assets, information system designs, and other solutions to meet a mission need should always be explored. Analyses of fixed asset acquisitions should include a comprehensive set of options. If it is decided to acquire the services of fixed assets, the decision whether to purchase or lease may be analyzed by comparing the present value of expected life-cycle costs over the period during which the services of the asset will be needed."

OMB Circular No. A-94; (5)(b): "A program is cost-effective if, on the basis of life cycle cost analysis of competing alternatives, it is determined to have the lowest costs expressed in present value terms for a given amount of benefits." (5)(c)(3) "Analyses should also consider alternative means of achieving program objectives by examining different program scales, different methods of provision, and different degrees of Government involvement. For example, in evaluating a decision to acquire a capital asset, the analysis should generally consider: (i) doing nothing; (ii) direct purchasing; (iii) upgrading, renovating, sharing, or converting existing Government property; or (iv) leasing or contracting for services."

Required Investment Management Strategies

CCA, 40 USC 1422(b)(2): The information technology investment process of executive agencies is to "be integrated with the processes for making budget, financial, and program management decisions within the executive agency."

CCA, 40 USC 1423(3): "The head of an executive agency shall . . . ensure that performance measurements are prescribed for information technology used by or to be acquired for the executive agency and that the performance measurements measure how well the information technology supports programs of the executive agency."

PRA, 44 USC 3506(b)(2): Each agency is to develop and maintain a strategic IRM plan on how IRM activities help accomplish agency missions.

PRA, 44 USC 3506(b)(3)(A): Requires agencies to "ensure that information resources management operations and decisions are integrated with organizational planning, budget, financial management, human resources management and program decisions" 44 USC 3506(b)(3)(C), and to "establish goals for improving information resources management's contribution to program productivity, efficiency, and effectiveness, methods for measuring progress towards those goals, and clear roles and responsibilities for achieving those goals."

OMB Circular No. A-130, 8b(2): "Agencies shall establish and maintain strategic information resources management planning processes" that include "[s]trategic IRM planning that addresses how the management of information resources promotes the fulfillment of an agency's mission."

OMB's Practical Guide: Agency processes should include a disciplined and structured management forum for making information technology investment decisions, with the authority to approve, cancel, or delay projects, mitigate risks, and validate expected returns. Also, the agency should establish an executive management team that makes funding decisions based upon comparisons and trade-offs among competing project proposals, especially for those projects expected to have agencywide impact. All management decisions should be documented along with data supporting the required changes. Common problems and their solutions, which are applicable to one information technology project, should be evaluated as to how they apply to other information technology projects under management's purview.

Generally Accepted Systems Development Best Practices

Critical Systems Development Plans: Requirements Management

Department of the Air Force, Guidelines for Successful Acquisition and Management of Software-Intensive Systems (Air Force Guidelines) Volume 1, Version 1.1, February 1995: Requirements must constantly be managed because they significantly affect total system development costs and schedule. Management of requirements must stress a commitment to an iterative process that utilizes structured requirements methods and appropriate tracking and analysis tools. In addition, traceability from original, identified needs to their derived requirements, designs, and implementation must be assured.

Software Engineering Institute, Capability Maturity Model Software (CMM),Version 1.1, February 1993: Requirements management includes (1) managing and documenting the system requirements and their allocation throughout the project's life, (2) providing adequate resources and funding for managing the allocated requirements, and (3) ensuring that members of the software engineering group and other

software-related groups are trained to perform their requirements management activities.

Software Engineering Institute, Software Acquisition Capability Maturity Model (SA-CMM), Version 1.01, December 1996: Requirements management ensures that software requirements are unambiguous, traceable, testable, documented, and controlled. A plan describing requirements management should be developed prior to contractual actions and should cover: (1) objectives of the project team's requirements development and management activities, (2) activities to be performed, including requirements identification, (3) identification of the groups, and intergroup coordination, associated with requirements development and management activities, (4) the extent of end-user involvement in the acquisition, (5) procedures for requirements development, including planning, identification, analysis, and verification, (6) procedures for requirements management, including baseline establishment, change control, and status reporting, and (7) procedures for impact analysis of changes to requirements or introduction of new requirements, including performance, cost, and schedule. The plan should also describe a mechanism for tracing requirements during software development to ensure that requirements have been included in the implemented work products and services.

Critical Systems Development Plans: Software Development

Air Force Guidelines: The software development plan is the key software document reflecting the contractor's overall software development approach. It includes resources, organization, schedules, risk identification and management, data rights, metrics, quality assurance, control of nondeliverable computer resources and identification of commercial off-the-shelf systems, reuse, and government-furnished software that the contractor intends to use.

CMM: The software development plan provides the basis for performing and managing the software project's activities and addresses the commitments to the software project's customer according to the resources, constraints, and capabilities of the software project. The software development plan includes (1) the software project's purpose, scope, goals, and objectives, (2) selection of a software life cycle, (3) identification of the selected procedures, methods, and standards for developing and/or maintaining the software, (4) identification of software work products to be developed, (5) size estimates of the software work products and changes to the software work products, (6) estimates of the software project's effort and

costs, (7) estimated use of critical computer resources, (8) the software project's schedules, including identification of milestones and reviews, (9) identification and assessment of the project's software risks, and (10) the project's software engineering facilities and support tools.

SA-CMM: The project team should track the contractor's development of the software engineering environment required to support the software.

Critical Systems Development Plans: Configuration Management

Air Force Guidelines: Requests for proposals should require offerers to provide a configuration management plan that addresses change control throughout the development process, the offerer's configuration management organization, the tools to be used, configuration management personnel experience, and a description of the offerer's configuration management training program. The government should also have a configuration management plan to control changes to functional and performance requirements. This plan is needed when the software and its documentation are released to the government.

CMM: The purpose of software configuration management is to establish and maintain the integrity of the products of the software project throughout the project's software life cycle. This practice includes the development of a configuration management plan in the early stages of overall project planning, which is used as the basis for performing configuration management activities, including establishing a configuration management library system as a repository for the software baselines, and identifying the software products to be placed under configuration management.

SA-CMM: The customer's project team should develop and implement the plans for moving and supporting the acquired software products. One goal for moving software from the contractor to the customer is maintaining configuration management throughout the transition. Software acquisition planning documents such as a configuration management plan should be developed prior to contractual actions.

Critical Systems Development Plans: Systems Integration

Defense Systems Management College: Systems Engineering Management Guide, January 1990: A primary role of systems engineering is to ensure that the many diverse elements constituting a system are compatible and ready when needed. This avoids the situation in which hardware or software, when integrated into the system, fails to function as intended as

part of the system. Integration ensures that all pieces of the system will work together to realize system goals.

Contractor's Software Development Strategy and Capability

Air Force Guidelines: Prior to or during source selection, contracting agencies should evaluate offerers' software development capabilities. This can start with an overall assessment, such as SEI's software capability evaluation, which focuses on the details of tools, metrics, personnel facilities, and management control. Contracting agencies should require that offerers selected for best and final offers submit to a capability evaluation with the goal of achieving a level-3 rating.

Air Force Guidelines: A prudent contractor will implement a measurement process that includes collecting and receiving actual data and analyzing that data. For measurement to be effective, a metrics usage plan should be developed to determine what data should be collected and analyzed. Contractors should be required to submit this plan to the government, since it describes to what extent and at what frequency offerors will provide metrics to the government and how they will be used internally to manage the proposed program.

CMM: In order for software development organizations to achieve lasting results from process improvement efforts, it is necessary to design an evolutionary path that increases an organization's software process maturity in stages. The capability maturity model for software provides software organizations with guidance on how to gain control of their processes for developing and maintaining software and how to evolve toward a culture of software engineering and management excellence. The CMM guide was designed to assist software organizations in selecting process improvement strategies by determining current process maturity and identifying the issues most critical to software quality and process improvement.

Measurements are made and used to determine the functionality and quality of software products. Examples of these measurements include the numbers, types, and severity of defects identified in the software products tracked cumulatively and by stage. Other measurements are made and used to determine the status of software product engineering activities such as the cost to implement and test software changes. As part of software project tracking and oversight, the size of the software products is tracked, actual size of code is compared with estimates documented in

the software development plan, and the overall projected size of the software is refined, monitored, and adjusted regularly.

SAF: Agencies should ensure that they design, develop, test and deploy their automated systems in accordance with conventional management and technical practices. This activity includes evaluating the agency's software engineering processes for critical attributes such as configuration management, software subcontract management, and software quality assurance. Also, agencies are responsible for preparing estimated project cost schedules using commercially available software packages, such as the constructive cost model or the software life cycle management (SLIM) model, or customized in-house techniques.

Project Schedule Development and Management

CCA, 40 USC 1427: The agency head shall identify in the agency's IRM plan (required by PRA) "any major information technology acquisition program, or phase or increment of such a program, that has significantly deviated from the cost, performance, or schedule goals established for the program."

SA-CMM: A project management plan is required to manage the critical dependencies and critical paths of the project's overall software acquisition schedule. The project's overall acquisition schedule typically specifies that milestones, tasks, commitments, critical dependencies, staffing, costs, and reviews are allocated in the schedule consistent with the project's defined software acquisition process. In addition, critical dependencies and paths defined and reflected in the schedule should be tracked on a regular basis.

Project Risk Management Processes

CCA, 40 USC 1422: Requires executive agency heads to design and implement a process to assess and manage the risks of the information technology acquisitions.

PRA, 44 USC 3506(h)(5): Requires agencies to assume responsibility for assessing and managing the risks of major information systems initiatives through a process that is (1) integrated with budget, financial, and program management decisions, and (2) used to select, control, and evaluate the results of major information systems initiatives.

OMB Memorandum 97-02: Directs federal agencies to reduce risks associated with information technology investments "by establishing clear measures and accountability for project progress."

Air Force Guidelines: Provides detailed guidance on the development, components, and operation of an effective risk management process.

SA-CMM: Recommends that organizations identify risks as early as possible, adjust the acquisition strategy to manage those risks, and develop and implement a risk management process as an integral part of the organization's software acquisition process.

Improving Mission Performance Through Strategic Information Management and Technology, GAO/AIMD-94-115: Recommends that agencies include a disciplined risk management process based on explicit criteria, to assess risk as a component of managing information systems projects as investments.

OMB's Practical Guide: Recommends that senior managers compare the preliminary results of information technology projects against projected costs, benefits, and risks, and identify actual or potential managerial, organizational, or technical problems.

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