



DEPARTMENT OF VETERANS AFFAIRS
OFFICE OF INSPECTOR GENERAL

Office of Audits and Evaluations

DEPARTMENT OF VETERANS AFFAIRS

The Electronic Health
Record Modernization
Program Did Not Fully Meet
the Standards for a
High-Quality, Reliable
Schedule

AUDIT

REPORT #21-02889-134

APRIL 25, 2022



MISSION

The mission of the Office of Inspector General is to serve veterans and the public by conducting meaningful independent oversight of the Department of Veterans Affairs.

In addition to general privacy laws that govern release of medical information, disclosure of certain veteran health or other private information may be prohibited by various federal statutes including, but not limited to, 38 U.S.C. §§ 5701, 5705, and 7332, absent an exemption or other specified circumstances. As mandated by law, the OIG adheres to privacy and confidentiality laws and regulations protecting veteran health or other private information in this report.

FOR MORE
VA OIG REPORTS
CLICK HERE



**Report suspected wrongdoing in VA programs and operations
to the VA OIG Hotline:**

www.va.gov/oig/hotline

1-800-488-8244



Executive Summary

As part of its ongoing modernization efforts, VA is replacing its aging electronic health record system with a new system intended to be interoperable with the one used by the Department of Defense to provide healthcare providers with a continuous and comprehensive medical history for veterans. VA previously reported that this effort, known as the Electronic Health Record Modernization (EHRM) program, will cost about \$16 billion—but, as of December 2021, VA is reevaluating its cost.¹ It is expected to take about 10 years to implement the new system across VA facilities nationwide. As of October 2021, completion was projected for fiscal year (FY) 2028.²

To implement the program successfully within this time frame, it is imperative that VA develop a reliable integrated master schedule (IMS). Government Accountability Office (GAO) guidance, which the EHRM program office adopted in its internal plans, states that a high-quality, reliable schedule should be comprehensive, credible, well-constructed, and controlled.³ The IMS is designed to cover the entire required scope of work needed to successfully complete the program from start to finish, including both government and contractor work. It is intended to provide VA personnel with a road map to completion, track progress, help identify potential problems and track their resolutions, and promote accountability for assigned tasks. For these reasons, it is critical that VA maintains an IMS that meets high-quality standards and is realistic and achievable.

Because poor schedule management practices increase the risk of missing important milestones and cost overruns—and undercut the important function of the IMS to roll out a system that supports the provision of quality health care to veterans—the Office of Inspector General (OIG) conducted this audit as part of its continuing oversight of this costly and complex modernization program. This audit examined whether VA and its contractors developed and managed a high-quality, reliable EHRM program schedule. First, the team evaluated whether the IMS met “scheduling standards.” Second, the OIG assessed whether the Office of Electronic Health Record Modernization (OEHRM) took the steps needed for compliance with regulations

¹ Two previous OIG reports identified that program costs are expected to exceed the reported \$16 billion amount. See VA OIG, *Deficiencies in Reporting Reliable Physical Infrastructure Cost Estimates for the Electronic Health Record Modernization Program*, Report No. 20-03178-116, May 25, 2021; and *Unreliable Information Technology Cost Estimates for the Electronic Health Record Modernization Program*, Report No. 20-03185-151, July 7, 2021.

² Hearing Update on VA’s Electronic Health Record Modernization Implementation Before the Subcommittee on Military Construction, Veterans Affairs, and Related Agencies, House Committee on Appropriations, 117th Cong., (October 21, 2021) (statement of Donald Remy, VA Deputy Secretary).

³ GAO, *Schedule Assessment Guide*, GAO-16-89G, December 2015. Throughout this report, the audit team refers to GAO’s scheduling guidance as “scheduling standards.” This terminology is consistent with the GAO guide, which was developed to determine the extent that programs meet industry scheduling standards. The guidance was also adopted by OEHRM in its EHRM Schedule Management Plan, dated April 27, 2021.

requiring that IMS submissions (schedule updates) be accepted before payment.⁴ Cerner Corporation, the system developer and integrator, is contractually required to submit the IMS with revisions monthly. These submissions, known as IMS deliverables, identify any updates made to the IMS since the previous submission.

The OIG's Findings

The OIG identified reliability weaknesses with the program's IMS. Additionally, the OIG found that VA did not comply with the Federal Acquisition Regulation (FAR) when it paid its contractor for IMS deliverables before accepting them (that is, reviewing for compliance with contract requirements). The following sections describe the determinations that formed the foundation for the OIG's two findings.

VA Did Not Have a High-Quality, Reliable IMS

As of June 30, 2021, the OIG found that neither the overall IMS nor the five underlying individual project schedules the audit team reviewed fully met standards adopted by OEHRM for a high-quality, reliable schedule.⁵ The following highlights significant findings related to the four key characteristics set out in the scheduling standards:

- **Comprehensive.** The IMS should reflect the entire scope of program work in some level of detail to plan how the system deployment will be executed. However, the OIG determined that the IMS did not capture all work for the program's duration, including missing activities for the Veterans Health Administration (VHA) and Office of Information and Technology (OIT). Although the OIG recognizes that not all details are available for a decade-long project, planning packages and other approaches can be used to help account for all work.
- **Credible.** A credible IMS should include a complete schedule risk analysis. This analysis predicts the level of confidence VA can have in meeting a program's completion date based on the schedule. However, OEHRM did not conduct a schedule risk analysis for the IMS.
- **Well-constructed.** A well-constructed IMS should have a valid "critical path." As described by GAO, this path determines the earliest date the program can be completed

⁴ OEHRM was the entity responsible for EHRM program efforts during the scope of this audit. In December 2021, a new office was created called the EHRM Integration Office. The change in organizational structure does not affect the relevance of the OIG-identified weaknesses or the applicability of recommendations made in this report.

⁵ As of June 30, 2021, the IMS consisted of 38 active project schedules. The audit team conducted its testing in two ways. First, the team assessed the IMS overall. Second, because the IMS consists of a collection of project schedules, the team conducted detailed testing of five statistically selected project schedules against scheduling standards.

and helps managers examine the effects of activity slippages.⁶ However, there was no overall IMS critical path for the program.

- **Controlled.** A controlled schedule should include a baseline. The baseline schedule is the basis for managing the program and is used to conduct trend analyses over time to assess program performance. However, OEHRM’s program baseline only covered events through April 2020. While OEHRM has in some instances developed “notional” (conceptual) baseline dates within project schedules, they are limited to near-term work and do not provide a comprehensive view of the program’s full timeline.⁷ This is needed to have a complete understanding of the plan and of what constitutes successful program completion.

These issues, and others identified by the audit team, occurred largely because OEHRM:

- **Did not adequately coordinate with various offices.** According to leaders in VHA and OIT, officials in OEHRM did not collaborate with them when developing the schedules. As a result, the OIG found that the schedules the audit team reviewed did not include all work to be performed by these entities.
- **Did not conduct a schedule risk analysis because it lacked procedures.** An OEHRM scheduling team member stated that they could not conduct a schedule risk analysis because the program does not have a complete baseline schedule. The team member was unaware if there was a formal plan to conduct this analysis and OEHRM lacked procedures for doing so. Without conducting this important analysis, OEHRM lacks reasonable assurance the program’s IMS is credible. The audit team found other evidence (discussed later in this report) that the schedule was not credible, including weaknesses with the sequencing of activities and inconsistencies between dates for schedule activities and management documents.
- **Focused on near-term deployment of the system at the initial operating sites.** OEHRM only requires development of site-specific schedules after task orders for those sites are awarded. Continuing this approach, VA would not have a high-quality, reliable IMS until it starts deploying the system to the last sites, which are planned to go live in FY 2028.⁸
- **Did not enforce its own scheduling standards or have tools in place to assess compliance.** OEHRM did not take necessary measures to ensure its own scheduling

⁶ GAO, *Schedule Assessment Guide*, “Best Practice 6,” pp. 75–80.

⁷ According to OEHRM leaders, notional baseline dates are unofficial dates that project managers agree to but were not part of the official program baseline review completed at the beginning of the program.

⁸ According to OEHRM’s former program control director, the day a site turns on the new electronic health record system for personnel to use is referred to as the “go-live” date.

standards were followed. First, OEHRM's schedule management plan stresses compliance with GAO scheduling standards, but the task orders awarded to Cerner do not refer to or require the IMS to align with them.⁹ Additionally, OEHRM's schedule management plan requires staff to use specific software to assess whether EHRM project schedules comply with GAO standards. However, a schedule analyzer tool was not available from March 2020 to June 2021 to assess the schedule's compliance with these standards. OEHRM has been using the tool since June 2021.

- **Lacked consistent guidance on roles, resulting in confusion over the assignment of IMS development and documenting how work was broken down.** Internal planning and contract documents inconsistently assigned responsibilities for developing and maintaining the program's work breakdown structure (WBS) and the IMS. The WBS defines in detail all work needed to complete the program, and when properly planned, the schedule should be consistent with the WBS. Guidance documents inconsistently assigned these responsibilities to VA or one of its contractors—Booz Allen Hamilton, Inc., or Cerner Corporation.¹⁰ This led to some confusion on roles and responsibilities. Cerner accepted responsibility for the WBS and, in July 2020, worked with VA to create the program's WBS. Although parties now understand that Cerner is responsible for developing the IMS, VA should ensure contract requirements are consistent with internal guidance. Expectations must be clear for all future development of the WBS and IMS.
- **Did not clearly define IMS contract requirements.** Cerner was contractually required to develop and maintain an IMS for the EHRM program under task orders issued by VA; however, the task orders did not clearly establish a timeline for when a complete IMS would be developed. Without a clear timeline, OEHRM required Cerner to develop site-specific project schedules once task orders were awarded. Following this process, Cerner would only develop the IMS as task orders are awarded over time, meaning that future work not yet on a task order would be unaccounted for in the IMS. VA has a responsibility to ensure there is a complete IMS that meets scheduling standards.

VA has plans to improve the quality and reliability of its IMS. After completing a 12-week strategic review in June 2021, VA committed to conduct an enterprise-wide assessment. This assessment, or a similar effort, would identify gaps at all VA medical centers and would allow VA to develop a reliable schedule by using the information learned to better define the scope of work needed. It would also help to address some of the concerns identified by the OIG.

⁹ VA, EHRM Schedule Management Plan, April 27, 2021. This plan describes how the IMS will be developed and maintained throughout the life of the program.

¹⁰ Booz Allen Hamilton staff supported OEHRM. Their work included gathering input from VA administrations or offices to develop schedules for VA activities.

VA needs a high-quality, reliable IMS to strengthen the credibility of the program's timeline. Without one, OEHRM cannot demonstrate how slippages will affect the overall timeline, nor can OEHRM assure stakeholders that the reported timeline is realistic and achievable. Any schedule delays that extend the program beyond 10 years is also likely to result in billions of dollars in cost overruns.¹¹

Weaknesses in the IMS may also significantly undermine VA's other modernization efforts. VA is developing an enterprise-level IMS, which is intended to capture all of VA's three major modernization initiatives—VA's electronic health record, supply chain, and financial systems.¹² This enterprise IMS will show the interdependencies among the initiatives, a necessary tool for VA leaders to successfully deploy them concurrently. As the EHRM program is the largest of the three modernization efforts, schedule delays could also potentially affect VA's other two initiatives.

VA Paid for IMS Monthly Updates (IMS Deliverables) before Confirming Their Compliance with Contract Requirements

Cerner is responsible for developing its own activity schedules. Cerner is further responsible for integrating all the schedules into an overall IMS and providing this IMS as a deliverable monthly. Cerner provided VA with the EHRM program's IMS under two task orders.¹³ The OIG reviewed all IMS-related invoices paid through August 30, 2021, and found that for one of the two task orders, OEHRM did not take the necessary steps to allow "acceptance" of multiple IMS deliverables (that is, review their compliance with contract requirements) until after the related invoices were paid—even though these deliverables were critical to monitoring program progress.¹⁴ In one instance, VA paid the invoice about 10 months before accepting the deliverable. This is a violation of the FAR, which requires acceptance before payment.¹⁵

This improper practice occurred in part because the IMS deliverables were not separately priced in the task order and VA did not provide staff guidance on how to review and accept such deliverables.¹⁶ This lack of guidance contributed to misinterpretations of the FAR requirements and when deliverables not separately priced needed to be reviewed and accepted. For example,

¹¹ As detailed in table 3 of the report, the average cost per year of a schedule delay is potentially about \$1.95 billion.

¹² In 2016, VA established the Financial Management Business Transformation program to modernize the Department's financial and acquisition management systems. In 2019, VA established the Defense Medical Logistics Standard Support system to modernize legacy supply chain systems.

¹³ Task order number 36C10B18N0001, May 17, 2018; task order number 36C10B20N0028EHRM, August 21, 2020. In this report, the OEHRM practice of paying invoices before accepting deliverables was specific to task order number 36C10B20N0028EHRM.

¹⁴ For more information on the acceptance process, see figure A.1 in appendix A.

¹⁵ FAR Part 32.905(c).

¹⁶ A "not separately priced" deliverable means the unit price for that item is included in the unit price of another related line item.

OEHRM's team leader responsible for overseeing deliverables believed OEHRM did not need to accept the IMS before payment because the monthly IMS deliverables that contained updates were not separately priced and, therefore, the related invoices should be paid like a monthly service fee. However, this does not comply with the FAR, which requires *all* invoice payments to be supported by a report showing acceptance for the supplies or services and does not exclude deliverables that are not separately priced. The OIG maintains that to fully support an invoice payment for a contract line item and comply with the FAR, the government must review and accept *all* deliverables associated with that line item before paying the contractor, regardless of how the deliverable is priced.

VA invoices paid without sufficient acceptance documentation are considered technically improper payments *if* the payments are otherwise deemed proper except for this lack of documentation.¹⁷ OEHRM cannot ensure deliverables or corrected resubmissions meet quality standards if payments are made before acceptance is documented. The audit team identified instances in which OEHRM returned IMS deliverables to the contractor for correction. According to an OEHRM official, in one instance it took VA more than 100 days to receive a corrected deliverable. VA should comply with the FAR when reviewing the IMS deliverables, given the critical importance of the IMS to the success of the EHRM program.

What the OIG Recommended

The OIG made six recommendations for the EHRM program management office executive director to

1. comply with internal guidance and ensure the development of an IMS that complies with standards adopted from GAO for scheduling,
2. take action to improve stakeholder coordination in the development of the program schedules to ensure activities from all relevant VA entities are included,
3. develop procedures for when and how staff should perform an initial schedule risk analysis and conduct periodic updates as needed,
4. ensure consistency between contract language and program office plans or other guidance identifying the entity or individuals responsible for developing and maintaining the program's WBS and IMS,

¹⁷ Office of Management and Budget Circular A-123, Appendix C, *Requirements for Payment Integrity Improvement*, June 26, 2018, rev. March 5, 2021. A technically improper payment is a payment made to an otherwise qualified recipient for the right amount, but the payment failed to meet all regulatory and/or statutory requirements. The team did not have sufficient evidence to fully evaluate whether IMS deliverables complied with contract requirements to determine if payments made to Cerner were otherwise proper.

5. evaluate the contract requirements for schedule management and modify as needed to ensure clear roles and expectations for further development and maintenance of the IMS, and
6. comply with the FAR and issue guidance to accept deliverables not separately priced before invoice payment.¹⁸

VA Management Comments and OIG Response

The EHRM Integration Office program executive director concurred with the six recommendations and provided responsive actions plans. The program executive director provided target completion dates to implement recommendations from May 2022 through December 2022. The OIG will continue to monitor implementation of the planned actions. The recommendations will be considered open until VA has provided sufficient evidence to demonstrate the cited corrective actions have been implemented.

The EHRM Integration Office program executive director also provided one general comment acknowledging the OIG-identified deficiencies. She noted that this audit was conducted during the COVID-19 pandemic and VA’s own strategic review of the EHRM program. The program executive director stated these factors had “significant impacts” on the program’s schedule and many of the OIG’s findings are related to these schedule impacts. These events may have particularly affected go-live activities at facilities. The OIG appreciates the program executive director’s stated commitment to meeting GAO standards going forward and implementing the report recommendations. Of note, the audit team did consider the potential effects of VA’s internal strategic review on the five project schedules examined and acknowledged when there was a possible connection with an identified deficiency. Appendix C contains the full text of VA’s comments.



LARRY M. REINKEMEYER
Assistant Inspector General
for Audits and Evaluations

¹⁸ The program management office previously fell under VA’s OEHRM. In December 2021, the organizational structure was realigned with the EHRM program management office reporting to the program executive director of EHRM integration.

Contents

Executive Summary	i
Abbreviations	ix
Introduction.....	1
Results and Recommendations	11
Finding 1: VA Did Not Have a High-Quality, Reliable IMS for the EHRM Program.....	11
Recommendations 1–5	32
Finding 2: VA Paid for IMS Monthly Updates (IMS Deliverables) before Acceptance.....	35
Recommendation 6	39
Appendix A: Background	40
Appendix B: Scope and Methodology	43
Appendix C: VA Management Comments	48
OIG Contact and Staff Acknowledgments	53
Report Distribution	54

Abbreviations

CMO	Chief Medical Office
EHRM	Electronic Health Record Modernization
FAR	Federal Acquisition Regulation
FY	fiscal year
GAO	Government Accountability Office
IMS	integrated master schedule
OEHRM	Office of Electronic Health Record Modernization
OIG	Office of Inspector General
OIT	Office of Information and Technology
VBA	Veterans Benefits Administration
VHA	Veterans Health Administration
WBS	work breakdown structure



Introduction

VA is several years into its Electronic Health Record Modernization (EHRM) program to replace its aging record system. The new system is intended to provide veterans and their healthcare providers with a comprehensive medical history that includes their care while in military service. Including care received during military service will be possible due to the new system's interoperability with the Department of Defense system. Although VA initially reported the EHRM program would cost about \$16 billion, as of December 2021, VA is reassessing the program's total estimated costs.¹⁹ VA estimated a project timeline of 10 years to implement the new system across VA facilities nationwide, with completion projected for fiscal year (FY) 2028.²⁰

A reliable integrated master schedule (IMS) that meets federal quality standards is imperative to achieve successful implementation within this time frame. The IMS helps managers gauge progress, identify potential problems and track their resolution, and promote accountability for assigned tasks. Government Accountability Office (GAO) guidance, which the EHRM program office adopted in its internal plans, states that a high-quality, reliable schedule should be comprehensive, credible, well-constructed, and controlled. Throughout this report, the audit team refers to GAO's guidance as "scheduling standards."²¹

The Office of Inspector General (OIG) examined whether VA and its contractors developed and managed a high-quality, reliable EHRM program schedule. First, the team evaluated whether the IMS met scheduling standards. Second, the OIG assessed whether the Office of Electronic Health Record Modernization (OEHRM) took the steps needed for compliance with regulations requiring that IMS submissions be "accepted" (that is, reviewed for compliance with contract requirements) before payment. These submissions, known as IMS deliverables, are provided monthly.

¹⁹ Two previous OIG reports identified that program costs are expected to exceed the reported \$16 billion amount. See VA OIG, *Deficiencies in Reporting Reliable Physical Infrastructure Cost Estimates for the Electronic Health Record Modernization Program*, Report No. 20-03178-116, May 25, 2021; and *Unreliable Information Technology Cost Estimates for the Electronic Health Record Modernization Program*, Report No. 20-03185-151, July 7, 2021.

²⁰ Hearing Update on VA's Electronic Health Record Modernization Implementation before the Subcommittee on Military Construction, Veterans Affairs, and Related Agencies, US House Committee on Appropriations, 117th Cong. (October 21, 2021) (statement of Donald Remy, VA Deputy Secretary).

²¹ GAO, *Schedule Assessment Guide*, GAO-16-89G, December 2015. The scheduling standards terminology is consistent with the GAO guide that was developed to determine the extent that programs meet industry scheduling standards. This guidance was also adopted by OEHRM in its EHRM Schedule Management Plan, dated April 27, 2021, which states the program schedule shall adhere to and follow the GAO guide.

Why the OIG Did This Audit

According to VA, successful completion of the EHRM program will improve VA's delivery of health care to veterans by providing clinicians seamless access to comprehensive medical records. Any delays in the rollout of the new system would undermine VA's goals to improve efficiency, quality of care, the veteran experience, and—most importantly—patient safety.

VA is more than three years into its modernization effort and has already experienced several delays in deploying the new system. In part, these delays were caused by the global COVID-19 pandemic, but deficiencies identified through system testing also caused VA to delay system deployment at its first site. According to VA's initial deployment schedule, the new system should have been deployed at 28 VA medical centers by December 2021. Instead, as of February 2022, the Mann-Grandstaff VA medical center in Spokane, Washington, remained the only site to use the electronic health record system, with limited capabilities.²² For more on the program delays, see appendix A.

In consideration of the challenges faced at the Mann-Grandstaff VA Medical Center, VA initiated an internal 12-week strategic review of the program in March 2021. The review was an in-depth assessment of the program, with a focus on identifying areas for improvement at Mann-Grandstaff and future deployment sites. In July 2021, lessons learned from the strategic review were released pertaining to VA's management of the program schedule, including identified deficiencies.²³ For example, the strategic review found the IMS did not capture all work.

The OIG audit team also identified significant schedule weaknesses that are discussed in detail in this report. The report also expands on the strategic review results by highlighting additional areas of concern and proposing recommendations for VA to improve the reliability of the IMS.

The OIG conducted this audit because poor schedule management practices increase the risk that the program could lack proper monitoring and miss important milestones. Failure to successfully implement the system on schedule could also cost VA about \$1.95 billion for each additional year it takes to fully deploy the system beyond the projected end date.²⁴ A high-quality, reliable IMS is critical to assure stakeholders that the timeline is realistic and achievable. The OIG conducted this audit as part of its continuing oversight of this costly and complex modernization

²² "Capabilities" are the features of the electronic health record system that are available to system users. On October 24, 2020, the system went live at the Mann-Grandstaff VA Medical Center with 231 of 292 capabilities. Among the missing capabilities were those related to cardiology and radiology imaging. In August 2020, VA also released the new appointment scheduling tool at the VA Central Ohio Healthcare System. This scheduling system is only one part of the overall electronic health record system for VA patients.

²³ VA, Electronic Health Record Comprehensive Lessons Learned, July 2021.

²⁴ The average annual cost of EHRM program contracts together with the need to continue operating VA's existing system is about \$1.95 billion. For more information about the potential cost implications of not meeting the timeline, see table 3 in this report.

program and recognizes that the IMS is critical for VA to successfully meet its deployment timeline and budget for implementing a system that will improve patient safety and the quality of care provided.

Importance of the IMS

The IMS serves as an essential element of program management by allowing leaders to understand and evaluate the planned time needed to successfully complete a program. Using an IMS, leaders can decide the order in which work needs to be completed, determine the flexibility in the schedule, and allocate contingency plans to mitigate risk as needed. The IMS for the EHRM program is also important to the development of a VA enterprise-level IMS that shows the interdependencies among VA's three major modernization initiatives—VA's electronic health record, supply chain, and financial systems.

Before discussing the four standards for a high-quality and reliable IMS, it is important to provide the background on some of its elements. An IMS should (1) start with a baseline schedule, (2) reflect all work needed to complete the program, (3) identify the critical path, and (4) incorporate the results of completed schedule risk analyses.²⁵

Baseline Schedule

A baseline schedule represents the original plan or target for the program and includes forecasts for activity start and finish dates.²⁶ Typically, the baseline schedule should be in place within six months of the contract award, although specific timing could vary based on program-specific factors, such as the size and risk of the effort. The level of detail in the baseline will also vary depending on program factors. Once formally approved and archived, the baseline will represent the agency's commitments for meeting milestones. The baseline schedule is different from the IMS in that it serves as the original plan and is only updated if major program changes occur, whereas the IMS represents the current schedule that is continuously updated to reflect actual work to date.²⁷ In program management, the IMS will be continually compared to the baseline schedule to measure and monitor whether the program is on track with the plan. However, as later discussed in this report, the baseline schedule for the EHRM program only covered events through April 2020.

²⁵ GAO, *Schedule Assessment Guide*.

²⁶ GAO, *Schedule Assessment Guide*.

²⁷ A major program change can include updates to the program scope or formal replanning.

All Work Included

The IMS should include the entire required scope of work needed to successfully execute the program from start to finish, including both government and contractor work.²⁸ Ideally, the IMS would be a single unified schedule that includes both summary and detailed activities. However, it may also be a set of several different schedules linked to one another. The links between schedules are made by specific activity and demonstrate how different activities are related to each other. For example, as shown in figure 1, the activity in the schedule named Cerner Mann-Grandstaff needs to be completed before the activity in the schedule named EHRM Enterprise can begin. Within the scheduling software used by VA, a user can click on the activity dependency and be taken directly to the related line in a different schedule.

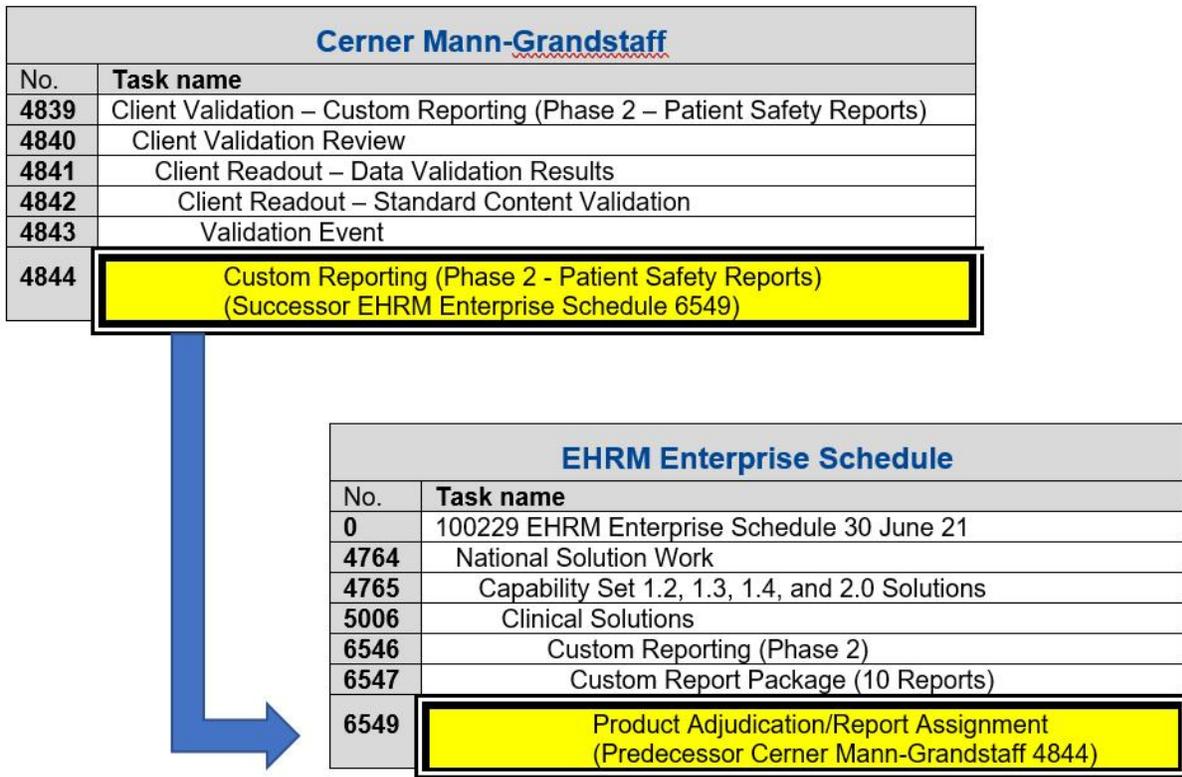


Figure 1. Illustration showing how two schedules are linked together through dependencies. Related activities are referred to as predecessors and successors. A predecessor activity must start or finish before its successor.

Source: OIG analysis of the schedule’s named EHRM Enterprise and Cerner Mann-Grandstaff, as of June 30, 2021.

²⁸ GAO, *Schedule Assessment Guide*.

As of June 30, 2021, the IMS for the EHRM program consisted of 66 individual project schedules, of which 38 were considered active.²⁹ At the summary level, the IMS should give a high-level, strategic view of major activities and milestones needed to complete the program. At the most detailed level, the schedule should contain the individual activities needed for program execution to clearly reflect the program’s work breakdown structure (WBS).³⁰

Table 1 shows the hierarchical structure of the WBS. In this table, level 1 lays out a high-level summary, growing increasingly specific, with more detailed work at level 4. Each activity in the IMS should be traceable to an “element” within the WBS. For example, schedule activities associated with the WBS element named “ambulatory” would capture the work needed to design, develop, and configure the electronic health record system to deliver the full range of needed ambulatory system capabilities.

Table 1. Excerpt of WBS

Outline Level	Number	Task
1	2	Electronic Health Record Solution Configuration
2	2.1	Financial (Revenue Cycle) Solutions
2	2.2	Clinical Solutions
3	2.2.1	Ambulatory*
4	2.2.1.1	Ambulatory Referral Management †

Source: EHRM program WBS, July 2021.

* The new system will be composed of solution sets supporting the various areas of patient care. Ambulatory is the name for one of the new system’s solution sets.

† Ambulatory referral management is a system capability that will help VA users to submit and monitor patient referrals and manage the referral process.

The WBS is essential because it defines in detail all activities necessary to accomplish program goals, including work performed by both the government and contractors, and provides an organizational structure for activities.³¹ The WBS and IMS should work in tandem: the WBS defines and documents the requirements to develop the program, while the IMS outlines specifically how the program will deliver the elements in the WBS. When properly planned, the schedule should be consistent with the WBS. Therefore, individuals responsible for developing the schedule should use the WBS to populate the program’s IMS. Because the WBS is meant to be comprehensive, every activity in the schedule should be traceable to a WBS element. Doing so ensures that the IMS includes the total scope of work.

²⁹ Schedules are considered active if included activities are in progress.

³⁰ The GAO Schedule Assessment Guide states that a WBS “deconstructs a program’s end product into successively greater levels of detail until the work is divided to a level suitable for management control.” See finding 1 for a discussion of WBS responsibilities.

³¹ GAO, *Schedule Assessment Guide*.

At program onset, the IMS should cover the scope of the program with as much detail for each activity as is known at the time. Although significant detail for all activities may not be known then, the schedule should at least include summary activities spanning the entire scope of the project. For example, at the beginning of the program, VA may not have known the detailed work needed to upgrade network infrastructure in every one of its medical centers, but it did know the total number of VA medical centers (sites) where the system would be implemented. VA also knew certain activities, such as user training, would need to occur at every site prior to system implementation. These are examples of known activities that should be included in the IMS for every site where the system will deploy—not just for sites expected to deploy earlier in the timeline. The level of detail needed to complete each activity should be regularly updated as it becomes known.

Activities that are known but not yet well-defined may be captured in the schedule through “planning packages.” This industry practice identifies and summarizes future work that should become more detailed and defined over time as requirements are identified.³² For example, general site work that is not planned to occur until year eight or nine of the program may be captured in the schedule through these packages. Regardless of the IMS development approach taken, there should be a complete picture of the program from start to finish.

By definition, and in accordance with government standards and the EHRM schedule management plan, an IMS should include both government and contractor activities needed to complete a program.³³ In addition to OEHRM, the Veterans Health Administration (VHA), Office of Information Technology (OIT), and Veterans Benefits Administration (VBA) need to perform work to successfully deploy the new electronic health record system. For example, VHA is responsible for ensuring its clinical and administrative personnel can get needed information, medical devices are compatible with the new system, and physical upgrades and modifications are completed in facility spaces. OIT has the responsibility for aligning projects and plans to support information technology infrastructure upgrades needed to transition to the new system. VBA should make certain that the new electronic health record system will be interoperable with the benefits management system and that VBA representatives can get needed data from the new system.³⁴ Work from all VA entities should be included to have a comprehensive IMS.

Critical Path

As articulated by GAO, the critical path is a continuous sequence of scheduled activities that must be met to complete a project. It determines the earliest date the program can be completed

³² GAO, *Schedule Assessment Guide*.

³³ VA, EHRM Schedule Management Plan, April 27, 2021. This plan describes how the IMS will be developed and maintained throughout the life of the program.

³⁴ The benefits management system is dependent on electronic health record data to analyze veterans’ claims of disability for compensation benefits.

and helps managers examine the effects of any activity slippage.³⁵ Delays of any one activity on the critical path can affect the finish date of a program. When an IMS is constructed from multiple project schedules, as is the case with the EHRM program, two levels of critical paths need to be managed: the overall program critical path and the individual project critical paths. For example, if a project activity on the IMS's critical path is delayed by a week, the overall program finish date will be delayed by a week, unless the delay is mitigated. Monitoring the critical path is an important tool that leaders use to identify the activities that may require more focus or additional resources. Scheduling software, such as Microsoft Project, automatically calculates the critical path based on the amount of "float" in schedule activities. Float is the amount of time an activity can be delayed or extended before affecting the program's finish date. An activity with zero float is identified as a critical path activity because it has an inflexible timeline, meaning any delay to the activity will cause an equal delay to the project's or program's finish date. Overall, monitoring critical path activities is vital to keeping the program's progress on course.

Schedule Risk Analysis

One of the most important reasons for conducting a schedule risk analysis is to determine the likelihood that VA can meet its program completion date. The schedule risk analysis identifies uncertainty and key risks and how they could affect a schedule's activity duration.³⁶ Using statistical techniques, the analysis will calculate the program's duration using best case, worst case, and most likely scenarios.³⁷ Given the complexity and scale of the EHRM program, conducting this analysis is vital to understanding if the schedule has sufficient flexibility to mitigate delays, or if there is more risk to the schedule than is acceptable.

EHRM Schedule Development Responsibilities

Cerner Corporation and Booz Allen Hamilton, Inc. are contractors working with VA to develop project schedules for activities. Cerner, the system developer and integrator, creates schedules for its own assigned activities, such as site assessments, training, and other actions needed to prepare for system rollout. Booz Allen Hamilton staff support OEHRM and gather input from VA administrations or offices to compose schedules for VA's activities.

Cerner is also contractually required to develop the IMS to depict "the implementation and deployment of the EHRM solution," which shall include creating a schedule "that depicts this

³⁵ GAO, *Schedule Assessment Guide*, "Best Practice 6," pp. 75–80.

³⁶ Duration is the time between an activity's start and finish, showing the estimated time to complete an activity.

³⁷ GAO, *Schedule Assessment Guide*.

information as a cohesive whole.”³⁸ Scheduling standards are clear that a comprehensive IMS “includes the entire required scope of effort, including the effort necessary from all government, contractor, and other key parties for a program’s successful execution from start to finish.” Both an OEHRM leader and a Cerner leader acknowledged Cerner’s responsibility to ensure the IMS captures VA work. For example, a Cerner employee stated that Cerner’s responsibilities for the IMS include “work on all Cerner activities, but [they] also capture VA dependencies, meaning anything Cerner depends on VA for.”

However, according to OEHRM, Cerner-assigned activity project schedules are developed in two phases. The first phase begins when VA awards Cerner a task order to conduct site assessments.³⁹ Once awarded, Cerner builds the first phase of the schedule covering activities needed to conduct its assessment. The second phase begins when VA awards Cerner the task order to deploy the system at the site. Once Cerner receives requirements for site deployment, it has 20 days to build and submit the second phase of the schedule covering activities needed to deploy the new electronic health record system at that site. Upon receipt and approval of the Cerner site schedules, VA and Booz Allen Hamilton staff then work to develop schedules for VA activities needed to support deployment. By following this process, however, Cerner would only develop the IMS as task orders are awarded, leaving unaccounted in the IMS all future work under the contract that has not yet been captured on task orders. This is discussed further in finding 1 of this report. See figure 2 for a list of responsibilities.

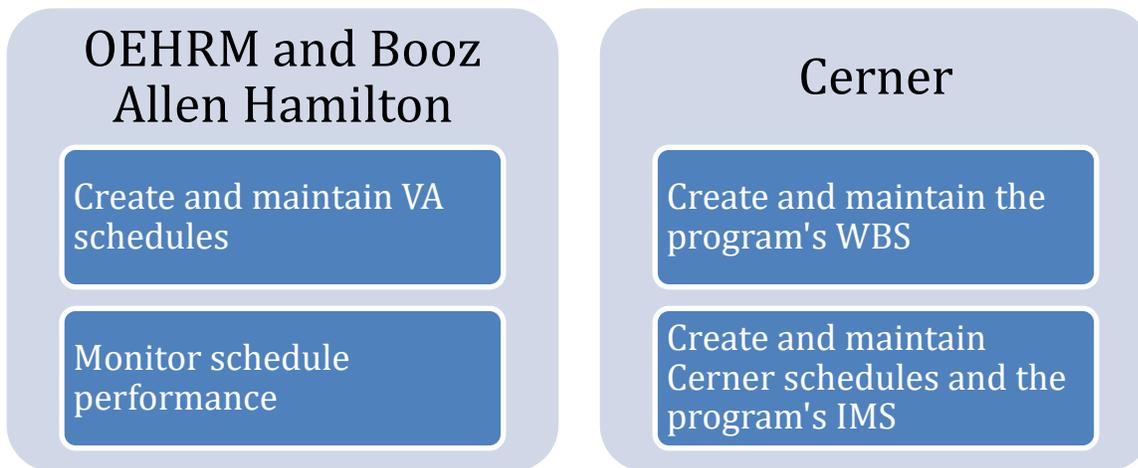


Figure 2. Responsibilities of VA’s OEHRM and contractors Booz Allen Hamilton and Cerner.
Source: VA, EHRM Schedule Management Plan, April 27, 2021.

³⁸ The IMS is contractually required under task order numbers 36C10B18N0001, May 17, 2018, and 36C10B20N0028EHRM, August 21, 2020. The EHRM solution, also referred to as the EHRM system, will be deployed enterprise wide.

³⁹ The site assessments identify gaps between the existing condition of the facilities and what is required by the new electronic health record system.

EHRM IMS Management Responsibilities

While Cerner continually develops the IMS, VA’s OEHRM was primarily responsible for ensuring compliance with standards. Before December 2021, OEHRM had three component offices, referred to as “pillars.” Figure 3 shows OEHRM’s pre-2022 organizational chart with its three pillars. Within the program management office pillar, there is a schedule management team, staffed primarily by Booz Allen Hamilton employees.

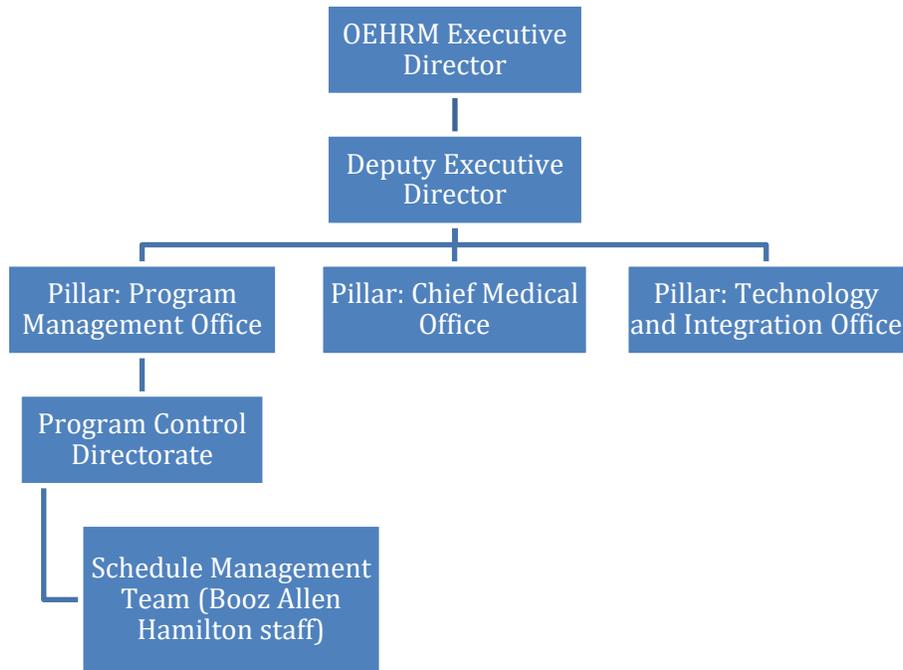


Figure 3. *OIG analysis of OEHRM organization chart as of October 2021. Not all pillar suboffices are shown. In December 2021, VA announced changes to the program’s organizational structure with the EHRM’s Program Management Office reporting to the program executive director of a new office for EHRM integration. Those changes are reflected in figure 4.*

The new EHRM Integration Office established in December 2021 resulted in OEHRM being disbanded as the centralized office for managing the EHRM program.⁴⁰ VA also revised some of the pillars. For example, Program Management Office personnel report to the program executive director of the newly formed EHRM Integration Office. Throughout this report, the OIG refers to OEHRM instead of the new integration office because it was the entity responsible for EHRM program efforts during the audit review period. The change in organizational structure does not affect the relevance of the OIG-identified weaknesses or the applicability of recommendations made in this report. Figure 4 shows the EHRM Integration Office structure.

⁴⁰ VA, Electronic Health Record Comprehensive Lessons Learned Progress Update, November 2021, and released December 1, 2021.

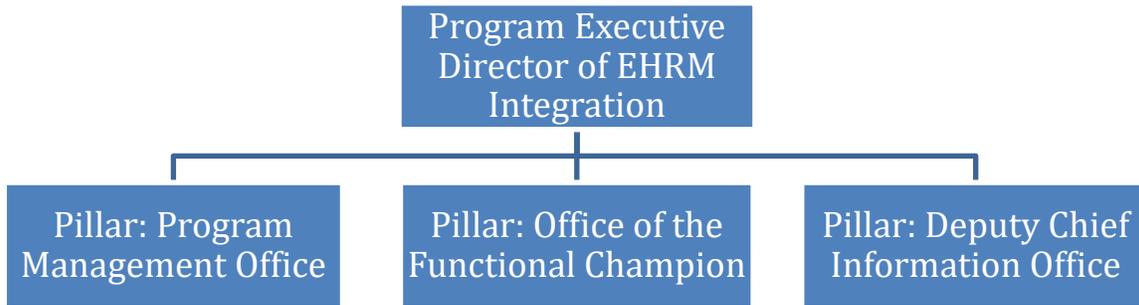


Figure 4. OIG analysis of Electronic Health Record Comprehensive Lessons Learned Progress Update, dated November 2021, and released December 1, 2021.

IMS Deliverables Acceptance Process

To meet program management needs, Cerner is contractually required to submit a monthly IMS deliverable that includes any updates made to the IMS since the previous submission.⁴¹ To comply with the Federal Acquisition Regulation (FAR), VA must review and accept each submitted deliverable before payment. This process is an important control designed to help ensure Cerner delivers required products and services that meet program needs. The FAR states that all invoice payments must be supported by documentation that includes the date of government acceptance for the supplies or services.⁴² Therefore, after OEHRM officials perform a review, they issue a memorandum to document acceptance of the deliverable. The deliverable review and acceptance process is detailed in finding 2 of this report (see also appendix A).

⁴¹ For example, any changes to start or finish dates would be captured in this deliverable.

⁴² FAR 32.905(c).

Results and Recommendations

Finding 1: VA Did Not Have a High-Quality, Reliable IMS for the EHRM Program

As stated earlier, OEHRM adopted GAO guidance in its internal policies that states a high-quality, reliable schedule should be (1) comprehensive, (2) credible, (3) well-constructed, and (4) controlled.⁴³ The audit team found that neither the EHRM program’s overall IMS nor the five underlying individual project schedules the team reviewed fully met these four characteristics. Most notably, the team found the IMS to be incomplete because it did not capture all work needed for the program’s planned 10-year development and deployment.

These issues occurred in part because OEHRM did not adequately coordinate with other department stakeholders to ensure all relevant VA components’ work was included in the schedules. Additionally, no analysis was conducted on the credibility of and risk to the project timeline because of the lack of schedule risk analysis procedures. Additional causes are outlined in the determinations listed below.

A high-quality, reliable IMS provides the EHRM program office with a comprehensive road map of the entire development and deployment effort to help ensure it can be achieved in the established timeline. If it is unreliable, program leaders cannot determine how slippages will affect the completion date, and consequently VA leaders cannot assure stakeholders that it can realistically achieve its stated timeline. Ultimately, weaknesses in the schedule could lead to delays that affect veterans’ care and leave VA vulnerable to billions of dollars in potential cost overruns.⁴⁴

This finding is based on the following determinations:

- Schedules did not fully meet high-quality standards characterized as comprehensive (due in part to inadequate coordination across VA), credible (attributable to some extent to the lack of schedule risk analysis procedures), well-constructed, and controlled.
- The focus was on near-term deployment of the system at initial operating sites instead of a comprehensive integrated schedule covering the entire planned decade-long program.
- Scheduling standards from its own plan were not enforced and schedule analyzer tools were not available to assess compliance.
- Guidance was inconsistent on the assigned responsibility for the WBS and IMS.

⁴³ GAO, *Schedule Assessment Guide*; VA, EHRM Schedule Management Plan.

⁴⁴ The average annual cost of the Cerner and Booz Allen Hamilton contracts together with the need to continue operating VA’s existing system is about \$1.95 billion. See table 3 of this report.

- Contract requirements and expectations for development of the IMS were unclear.
- Weaknesses reduced the reliability of the program timeline and could lead to schedule delays and cost overruns that affect veterans' quality of care.

What the OIG Did

EHRM schedules are maintained in a web-based version of Microsoft Project, called Project Web App, with updates made in real time. On June 30, 2021, the audit team extracted all EHRM project schedules from Project Web App. The extracted schedules included both VA and Cerner activities. The audit team conducted its testing in two ways: First, the team assessed the IMS overall, as appropriate. However, the audit team was limited in performing every test of the IMS because some tests are designed to be used only on a single file. Second, the team conducted detailed testing of five statistically selected project schedules of the 38 that were active. As needed, the team accessed the real-time schedules from August 24, 2021, through January 18, 2022.

The team evaluated the schedules and supporting documents in accordance with government standards adopted by OEHRM. The team used commercially available software to analyze the schedules, such as determining whether schedules had a logical sequence of activities.⁴⁵ The team gathered evidence from the department and interviewed staff from various VA entities, including OEHRM, the Office of Enterprise Integration, and OIT, among others. The team also interviewed Department of Defense personnel and VA contractor staff from Cerner and Booz Allen Hamilton. For more on the scope and methodology, see appendix B.

OEHRM's Schedules Did Not Fully Meet the Four Characteristics in Quality Standards

To provide context for the team's analysis, this section first explains GAO's guidance on the four characteristics and corresponding 10 best practices associated with a high-quality, reliable schedule. GAO's guidance generally aligns with industry best practices for scheduling.⁴⁶ According to OEHRM's own schedule management plan, success will be measured by compliance with GAO and industry scheduling best practices; therefore, OEHRM has adopted

⁴⁵ Schedule Analyzer forProject is a commercially available software, sold by forProject Technology, Inc.

⁴⁶ Project Management Institute, *Practice Standard for Scheduling*, 2nd ed., 2011, and 3rd ed., 2019. In general, the best practices in the GAO *Schedule Assessment Guide* align with industry standards. One difference was the requirement to assign resources to activities in the schedule. In the industry *Practice Standard for Scheduling*, the practice to assign resources is "conditionally" required based on the requirements of the project. Still, the standards describe resource planning as a best practice. In contrast, the GAO guide includes the best practice to assign resources to all activities without conditions. For purposes of this audit, the team followed the GAO best practice for assigning resources.

these practices in its internal plans.⁴⁷ The audit team refers to these characteristics and best practices collectively as “scheduling standards.” Table 2 provides the four characteristics, as defined by GAO, as well as the corresponding best practices.

Table 2. Characteristics and Best Practices of a High-Quality, Reliable Schedule

Characteristic	Best Practice	Description
Comprehensive	<ul style="list-style-type: none"> • Capturing all activities • Assigning resources to all activities • Establishing the durations of all activities 	A comprehensive schedule will reflect having all the activities included in the project’s WBS. All the resources that are required to accomplish the project will need to be assigned. Finally, the schedule will need to notate the durations of each of the tasks that should be completed with defined dates.
Credible	<ul style="list-style-type: none"> • Verifying that the schedule can be traced horizontally and vertically⁴⁸ • Conducting a schedule risk analysis 	A credible schedule will have all tasks aggregated, including differing levels of supporting activities and subroutines. A risk analysis will need to be completed to identify and prioritize risks to ascertain a level of confidence in the ability to meet the proposed completion date.
Well-constructed	<ul style="list-style-type: none"> • Sequencing all activities • Confirming that the critical path is valid⁴⁹ • Ensuring reasonable total float⁵⁰ 	A well-constructed schedule should be sequenced logically with the appropriate predecessors and successors for each activity. The critical path will need to be calculated because this will be the factor that determines the earliest date of completion. Lastly, total float needs to be known, as it will allow the project manager to know the amount of schedule flexibility.
Controlled	<ul style="list-style-type: none"> • Updating the schedule using actual progress and logic • Maintaining a baseline schedule⁵¹ 	A controlled schedule will require regular updates that are based on logic and realistic forecasting. Baselining the schedule is needed to identify any variances and, if necessary, a management control process. ⁵²

Source: GAO Schedule Assessment Guide, GAO-16-89G, December 2015.

⁴⁷ VA, EHRM Schedule Management Plan, April 27, 2021.

⁴⁸ A horizontally traceable schedule reflects the order of events needed to achieve program success. A vertically traceable schedule includes lower-level activities that are clearly consistent with higher-level activities.

⁴⁹ As previously described, per the GAO *Schedule Assessment Guide*, the critical path is a continuous sequence of scheduled activities that must be met to complete a project and determines the earliest date the program can be completed.

⁵⁰ GAO’s *Schedule Assessment Guide* states that total float is “the amount of time an activity can be delayed or extended before the delay affects the program’s finish date.”

⁵¹ GAO’s *Schedule Assessment Guide* states that a baseline schedule “represents the original configuration of the program plan and signifies the consensus of all stakeholders regarding the required sequence of events, resource assignments, and acceptable dates for key deliverables.”

⁵² A change control process governs when and how technical and programmatic changes are applied to the baseline.

Schedules should adhere to these four characteristics to be high-quality and reliable. The audit team's detailed analysis by characteristic is presented in the following sections. Each section also contains a description explaining the importance of the respective characteristic and the issues identified at the IMS and individual project schedule levels.

IMS and Individual Schedules Were Not Comprehensive

A comprehensive schedule (1) captures all activities, (2) assigns resources, and (3) establishes durations for each activity.⁵³ These activities should include both VA and contractor work needed to successfully deploy the system as defined in the program's WBS. The audit team found that project schedules established activity durations.⁵⁴ However, neither the IMS nor any of the five individual project schedules the team tested were comprehensive because they did not capture all work that needs to be performed for successful system deployment or fully assign resources to work captured in the schedules.

The IMS Was Not Comprehensive

The IMS is composed of individual project schedules that should collectively yield a comprehensive schedule. According to GAO, an ideal IMS takes the form of a single schedule file that includes all activities, but it may also be a set of separate schedules linked together.⁵⁵ The OIG determined that the aggregated project schedules were not comprehensive because they did not (1) cover activities for the entire 10-year system deployment; (2) capture all significant activities; and (3) trace to the program's WBS. All three of these issues can lead to an IMS that is missing key activities.

IMS Did Not Cover Activities for the Full Program Timeline

The OIG acknowledges that it is unreasonable to expect the IMS to include *all* activities for the entire decade-long program in the same level of detail because near-term work is typically better defined than the work performed at the end of the program. However, as mentioned earlier, the schedule should at least include summary activities spanning the entire scope of the project, which can be captured through planning packages (or a similar mechanism) to account for how the system deployment will be executed for all VA medical centers. Because initial plans and timelines may change as lessons are learned during deployment, efficiencies may be gained as

⁵³ GAO, *Schedule Assessment Guide*.

⁵⁴ The team's review of durations was limited to determining if durations were established. The team did not evaluate whether established durations were reasonable. Since no issues were identified at the individual project schedule level, the team did not expand its testing of activity durations across the IMS.

⁵⁵ In Microsoft Project, a task can be linked to external tasks in another project schedule, indicating cross-dependency.

the program progresses. However, ensuring the IMS is comprehensive and reflects all known work will allow leaders to better estimate program completion.

OEHRM reported that it expects the program to be complete in FY 2028; however, as of June 30, 2021, the IMS only showed work to be completed at VA medical centers through March 2023 and only included activities for 12 of 170 VA medical centers. OEHRM has provided Congress with high-level graphics illustrating the phased system deployment for the program's 10-year planned timeline.⁵⁶ While these graphics may provide a high-level overview, the estimated dates in the August 2020 congressional brief, for example, are not supported by the IMS.

OEHRM Did Not Adequately Coordinate with VHA, OIT, and VBA Offices, and Consequently, the IMS Was Missing Significant Activities

According to VHA and OIT leaders, they were not consulted or involved in developing the schedules. The audit team confirmed that, as of June 30, 2021, individual program schedules were missing important activities for these entities that need to be completed to successfully implement the system at VA facilities, which led to an incomplete IMS. VBA leaders stated that they were consulted during development of the IMS, but OEHRM did not then provide VBA with the IMS. This lack of follow-up did not allow VBA the opportunity to validate that all needed work was captured. Because there are many schedules that make up the IMS, if any of them are missing activities, the IMS cannot be comprehensive. Notably, VA's own strategic review also identified that the IMS did not capture all work, particularly for activities funded outside of OEHRM, such as by VHA or OIT.

The following examples detail the importance of many of the missing activities by office:

- **VHA.** Although the OIG audit team identified some VHA activities in the schedules maintained by Cerner, some VHA activities needed for physical infrastructure and facility security upgrades, as well as project management, were missing.⁵⁷ These VHA activities were identified in the program's WBS and need to be completed for VA to deploy the new system. When properly planned, the schedule should be consistent with the WBS.
- **OIT.** The audit team analyzed the "wave D" OIT project schedule in effect as of June 30, 2021, which the team identified was missing most OIT activities.⁵⁸ For example,

⁵⁶ Office of Electronic Health Record Modernization Update, August 2020.

⁵⁷ Physical infrastructure includes power, network cabling, cooling, and other upgrades needed to meet system requirements. Project management activities include developing an overall site deployment plan.

⁵⁸ The new system is being released in cycles referred to by VA as "waves" and organized alphabetically. As of August 2020, the "wave D" deployment cycle included medical facilities in Seattle, Washington, and Portland, Oregon, among others.

the June 2021 iteration of the schedule had less than 150 activities and indicated the project was over 50 percent complete; however, by November 2021, the same schedule had more than 700 activities. The Booz Allen Hamilton scheduler responsible for OIT project schedules stated that activities were not in the June 2021 schedule due to a misunderstanding of the new deployment timeline and activities that should have been included in the wave D schedule. The scheduler confirmed these additional activities should have been included but were not.

- **VBA.** The audit team identified four WBS elements specific to VBA and confirmed that activities related to three of these elements were included in the schedules.⁵⁹ However, it was unclear if all activities related to the Veterans Benefits Management System were included in the schedule. This is because there were two WBS elements related to the system. While the audit team identified some activities in the schedule, those activities were traced to only one of these two WBS elements. According to an OEHRM official, activities for the second element were not captured in any of the schedules because the WBS element was meant to function as a placeholder. Any work related to this WBS element, however, should have been captured in the appropriate schedule with the specific activities refined when more information became known.

The EHRM program schedule did not capture all important activities because OEHRM did not collaborate with those entities when developing the schedules. OEHRM and OIT both have internal plans emphasizing intra-agency coordination and various collaboration efforts across directorates and pillars.⁶⁰ However, OIT's director for the Office of Technical Integration and VHA's acting deputy for the Office of the Functional Champion stated that the offices were not involved in developing the schedules and, until this audit was initiated, OIT was not even aware those schedules existed. A VBA senior advisor for the EHRM program stated that the office was consulted during development of the IMS; however, according to VBA's portfolio integration manager, despite requests to OEHRM, VBA had not been granted access to the schedules. OEHRM should improve intra-agency coordination and involve these stakeholders in the decision-making process to ensure the schedules are comprehensive and contain the work they perform.

IMS Was Not Traceable to the WBS

The WBS details the activities needed to complete the program; therefore, every activity within a schedule should be traceable to a WBS element. The team found that as of June 30, 2021, there was no identifier or field to link schedule activities to a WBS element. Without this

⁵⁹ As previously discussed, the WBS was developed by OEHRM and Cerner.

⁶⁰ EHRM Schedule Management Plan, April 27, 2021; Technology and Integration Office (TIO) Director of Operations Directorate Plan, March 9, 2020.

identification, the team could not verify whether the schedules comprehensively contained all activities as defined in the program’s WBS. To address this issue—and partially in response to this audit—OEHRM added a field to its schedules in July 2021 identifying WBS elements. However, the audit team found this field was still only traceable for higher-level WBS elements (see table 1 on page 5 for a depiction of the WBS’s hierarchy).⁶¹ Without traceability from the IMS to the WBS at all levels, there is increased risk that schedules will not contain all activities and therefore will not be comprehensive.

Individual EHRM Project Schedules Were Not Comprehensive

The audit team also identified that the individual EHRM project schedules were not comprehensive. Specifically, project schedules (1) continued to face traceability issues with the WBS despite OEHRM’s improvement efforts and (2) did not fully identify labor resources needed for activities. According to the scheduling standards, a comprehensive schedule gives a full picture of the activities and identifies necessary resources. Without these components, project managers cannot truly have complete visibility of the project’s progress.

Individual EHRM Project Schedules Were Not Traceable to the WBS

In August 2021, the audit team assessed the five selected individual schedules to determine if the field update OEHRM made in July 2021 to allow schedule activity tracing to the WBS was effective.

The team identified errors at the project schedule level:

- One schedule had activities that could not be traced to the program’s WBS.
- Four schedules had activities that were linked to incorrect WBS elements. For instance, “ambulatory” work was linked to an unrelated schedule activity for financial revenue cycle solutions. This occurred partly because OEHRM and Cerner scheduling staff were using two inconsistent versions of the WBS.
- Two schedules had activities that were not aligned to the appropriate WBS level. Both the WBS and project schedules are structured in hierarchical relationships, or levels. According to OEHRM’s schedule management team lead, the levels should be consistent between the WBS and the schedule to enable traceability. However, the team found that some activity levels in the schedules did not align with WBS levels. For example, a level three activity in the schedule was incorrectly linked to a WBS level two element. Without proper alignment from the schedules to the WBS, there is risk that the schedules may not reflect all WBS elements as it should.

⁶¹ The EHRM program WBS has nine levels. The top three levels were developed by VA and Cerner. Lower-level, detailed activities should roll up into the higher, summary-level activities.

The deficiencies identified above demonstrate that further improvements are still needed. If WBS elements cannot be traced to the schedule, managers cannot be sure that the schedule actually contains all the required activities in the WBS—meaning the schedule could not be considered comprehensive. Missing WBS elements will hinder coordination efforts among program partners, limit managers’ visibility over the program’s progress, and increase the likelihood of delays.

Individual Project Schedules Did Not Fully Identify Labor Resources Needed for Activities

The team found that none of the schedules fully identified labor resources needed to complete activities.⁶² VA schedules were developed by Booz Allen Hamilton staff to capture work that is needed by VA offices such as OIT, while Cerner schedules captured site deployment work. Although one VA schedule and three Cerner schedules identified project teams for some lower-level tasks, this practice was applied inconsistently. Additionally, one VA schedule did not identify any labor resources at all.

In addition to standards stating the schedule should identify labor resources, Cerner’s first task order also contractually required Cerner to fully identify labor resources needed to complete activities. According to OEHRM officials, however, their office did not enforce this requirement because the awarded task orders were all under a firm-fixed-price contract, and with this contract type, the contractor assumes all risk. As such, one VA official added, managing resource needs is the contractor’s responsibility, and the requirement was removed from the follow-on task order. The official stated that because Cerner did not identify labor resources, VA similarly did not require Booz Allen Hamilton to identify labor resources in the VA schedules. However, this decision is contrary to scheduling standards. The OIG acknowledges VA’s position with regard to Cerner not identifying Cerner resources under a fixed price contract, but that does not address VA’s obligation under GAO standards to prepare a comprehensive IMS and identify VA labor resources to reasonably estimate how long activities will take to complete. Identifying these labor resources ensures the time expected to complete activities is realistic and provides assurance that the overall schedule is reliable.

Labor resource assignments could be to a project team or group, rather than an individual, and still meet the intent of the standard. To ensure resources are available, project managers need to know what resources are required to carry out an activity. Without this information, critical activities could be understaffed and result in program delays, or noncritical activities could be overstaffed and lead to inefficiency. To adhere to GAO scheduling standards, VA labor resources should be identified.

⁶² The audit team focused their review of resources on labor resources (the actual number of personnel) needed to perform the work in the schedule.

IMS and Individual Schedules Were Not Credible

A credible schedule is characterized by three standards.⁶³ First, it should be “horizontally traceable,” which means activities are listed in the order in which they should be carried out in both the IMS and individual project schedules. Second, it should be “vertically traceable,” which means detailed activities align with their overall or summary activities. Third, it should include a complete schedule risk analysis that identifies uncertainty and key risks and how they could affect a schedule’s activity duration. An organization should perform this analysis to determine the level of confidence in meeting a program’s completion date.

Ultimately, a credible schedule will help managers ensure all activities are logically sequenced and properly linked to related schedules and management documents. This becomes increasingly important—and difficult—with a large program like EHRM that has many individual project schedules. Credible schedules help to ensure staff are working toward the same schedule expectations and program leaders are identifying key risk factors that could affect the program’s timeline.

IMS Was Not Credible

The audit team found that because the schedule did not capture all work for the estimated duration of the program, the schedule did not have a complete and rational order of events from program start to finish. Therefore, the IMS was not horizontally traceable. OEHRM’s prior executive director and acting program control director told the team that the schedule was designed to provide the most significant detail for sites expected to deploy earlier in the timeline rather than comprehensively cover all 10 years. By this design, the schedule could not be traced horizontally until later in the program. (For more on this issue, see “OEHRM Focused on Initial Operating Sites” on page 26.) In addition, there was no summary-level schedule, such as a schedule including all key milestones to complete the program. As a result, the audit team could not assess whether detailed schedules were consistent with summary-level schedules. Based on the way the IMS was structured, the team could not evaluate vertical traceability at the program level.

The audit team also found that OEHRM did not conduct a schedule risk analysis for the IMS. OEHRM’s schedule management plan stresses the importance of conducting a schedule risk analysis in developing an executable program schedule. Its completion is critical to help determine how much contingency is needed and which risks or activities are most likely to delay the program.⁶⁴ Performing this analysis is complex because it often requires the use of statistical

⁶³ GAO, *Schedule Assessment Guide*.

⁶⁴ Contingency is a margin or reserve of extra time. It is included to account for known and quantified risks and uncertainty in the schedule.

techniques or simulations. Despite the importance of this complex analysis, OEHRM did not have procedures in place on when and how to conduct it. A member of OEHRM's scheduling team confirmed that there was no formal plan to complete a schedule risk analysis. The scheduling team member further added that because the program does not have a complete baseline schedule, they could not conduct a schedule risk analysis. The audit team acknowledges that the schedule risk analysis is typically performed while developing the baseline schedule to ensure the baseline schedule appropriately captures contingency needed to account for identified risks.

If unable to conduct a schedule risk analysis at the overall program level, the program office should consider alternatives, such as conducting analyses by individual project schedule. For example, Department of Defense leaders overseeing the deployment of its new electronic health record system stated a schedule risk analysis is conducted for each of its wave deployment schedules. This analysis is critical to leaders and stakeholders and would strengthen the credibility of VA's deployment schedule.

Individual Project Schedules Were Also Not Credible

The schedules were not credible because they did not fully meet GAO scheduling standards set out in its assessment guide that were adopted by OEHRM. First, the team found that activities were only partially horizontally traceable. The audit team changed activity durations to test how the schedule would react and identified that the schedule responded and adjusted as it should. However, the team also found two of the five schedules reviewed were missing links to activities that must be started or finished to allow another activity to begin.⁶⁵ Failing to identify the links between activities can cause inconsistent dates between schedules, which can lead to involved entities having different expectations.

Second, the audit team found that while all five schedules were traceable internally, they were not consistent with external documents.⁶⁶ An essential check of vertical traceability is determining whether a schedule is externally traceable, meaning that activity dates in schedules match those in management documents. Without this traceability, OEHRM and other stakeholders will not have the information—such as key milestones and project end dates—needed to manage progress.⁶⁷ For example, the audit team found that one schedule had key milestones that could not be traced to an internal dashboard that OEHRM developed to brief managers on the program schedule. As mentioned previously, without consistency between schedules and documents, managers could have teams working toward different expectations,

⁶⁵ GAO refers to this as missing predecessor and/or successor relationships.

⁶⁶ Because of a feature within Microsoft Project, activities at the lower level were rolled up into activities at the summary level, which means they were internally traceable.

⁶⁷ Each project schedule should include the project finish date, at a minimum, as a key milestone.

which could negatively affect the schedule's integrity.⁶⁸ Additionally, two of the other four schedules tested did not identify key milestones. Without key milestones, such as project end dates, the schedules could not be traced to OEHRM's internal dashboard. Cerner explained that key milestones are only captured in site-specific schedules. Therefore, one schedule that was not site-specific did not identify key milestones. Although not site-specific, the schedule still captures important activities and milestones, such as work needed to connect other VA systems with the new electronic health record. These activities, if delayed, can have an impact on site deployment. While the second schedule was site-specific, Cerner explained the schedule did not have key milestones because it was developed before they added this milestone field. Consequently, OEHRM will have a more difficult time tracking progress to date and cannot effectively brief managers.

IMS and Individual Schedules Were Not Well Constructed

A well-constructed schedule should meet the following three standards:

- *Be logically sequenced.* This means activities are listed in the order they need to be carried out. Sequencing activities logically can help managers analyze how changes made to the schedule affect the program.⁶⁹
- *Have a valid critical path.* A valid critical path is the longest sequence of scheduled activities that must be met to complete a project. When an IMS is constructed from multiple project schedules, such as the EHRM program's IMS, two levels of critical paths need to be managed: the overall program critical path and the individual projects' critical paths. The critical path determines the earliest date the program can be completed and helps managers examine the effects of any activity slippage.
- *Ensure reasonable float.* Float is the amount of time an activity can be delayed or extended before affecting the program's finish date and helps managers measure flexibility in the schedule. For example, an activity with "negative float" indicates the amount of time that needs to be recovered so as not to delay the project finish date.

Having a schedule that meets these standards will allow managers to credibly determine the overall project timeline and keep the program's progress on course.

IMS Was Not Well Constructed because It Lacked a Critical Path

The IMS was not well constructed because it did not include an overall program-level critical path, which is necessary for managers to identify activities that will detrimentally affect the key

⁶⁸ Various stakeholders within VA use the dashboard to review schedule information in a simplified manner. The dashboard is reportedly updated daily.

⁶⁹ Logical sequencing of activities is directly connected to horizontal traceability, discussed previously.

program milestones if they are delayed. Most importantly, without a program-level critical path, management cannot easily determine whether the system can be fully deployed in the 10-year timeline. Considering just a one-year delay in deploying EHRM could potentially cost about \$1.95 billion, keeping the project on course is essential.⁷⁰

Individual Project Schedules Were Not Well-Constructed in Several Ways

If a schedule is not well-constructed, managers cannot be sure the timeline for the project is feasible or monitor its progress to avoid delays. The audit team found the project schedules were not well-constructed because activities in the schedules were not logically sequenced, did not contain a valid critical path, and contained activities that were behind schedule (negative float). First, the team's review found that four of the five project schedules were not logically sequenced. Of the four, two schedules were missing links to activities, as previously discussed (see "Individual Project Schedules Were Also Not Credible").

Second, four of the five project schedules did not contain a valid critical path. The team identified issues with the critical path. For example, four schedules did not have a continuous sequence of activities. In general, the critical path should have no gaps or unaccounted time. For example, figure 5 shows that one activity was scheduled to end on February 17, 2021, but the next activity would not begin until March 2.

⁷⁰ As stated earlier, the average annual cost of the Cerner and Booz Allen Hamilton contracts together with the need to continue operating VA's existing system is about \$1.95 billion. For more information, see table 3 of this report.



Legend:
■ Depicts gaps in time between activities

Figure 5. Schedule showing gaps between activities.
 Source: OIG, derived from the Chief Medical Office (CMO) Columbus schedule as of June 30, 2021.

Finally, three schedules also contained activities that were behind schedule. For example, one critical activity to conduct a maintenance workshop at the Boise VA Medical Center was behind schedule by 165 days. Cerner schedulers told the audit team that activities appear to be behind schedule due to a synchronization issue in Project Web App, and they plan to monitor and update the schedules until the issue is resolved.

IMS and Individual Schedules Were Not Controlled

A controlled schedule is characterized by two standards. First, it should be regularly updated using actual progress and logic to realistically forecast dates for ongoing or future program activities. This includes archiving outdated schedule versions as updates occur. Second, it must be continuously monitored and compared against the original plan for the program, the baseline schedule. As explained earlier, the baseline schedule serves as the basis for managing the

program scope, the time frame for accomplishing it, and the required resources. The baseline schedule is also used to conduct a trend analysis, which is necessary to assess how the program is performing. Changes to the baseline schedule should be managed through a change control process, where these changes—such as adjusting the time frame (re-baselining)—are reviewed and approved. Ultimately, a controlled schedule is up-to-date and allows managers a means to accurately assess and gauge progress. This is essential in ensuring that projects stay on track and are measured reliably.

The IMS Was Not Controlled

Although VA committed to a deployment schedule that ends in FY 2028, the OIG found that the program baseline schedule only covered events through April 2020—the planned date that the electronic health record system was set to deploy at VA’s last initial operating capability site.⁷¹ This is distinct from the IMS which, as previously discussed in this finding, also does not cover the entire 10-year deployment timeline. The program baseline should be set promptly after a program begins and adjusted as needed. However, according to OEHRM’s schedule team lead, OEHRM did not formally adjust the timeline when the EHRM program experienced delays. While OEHRM’s schedule team lead explained that “notional” (conceptual) baselines were developed for each project schedule, they are limited to near-term work and do not provide a full view of the program’s entire timeline.⁷² To be considered controlled, the program needs a complete baseline. This is particularly important since without it, management cannot measure performance against the baseline, which is needed to readily identify and mitigate delays. By not including all work covering the full deployment schedule in the baseline schedule, VA could have an incomplete understanding of the plan and of what constitutes successful completion of the program.

Individual EHRM Project Schedules Were Not Controlled

Additionally, four of the five individual project schedules reviewed were not fully controlled because OEHRM did not demonstrate that it updated the schedules using information in progress records. This information could include original and remaining duration of activities, forecasted and actual start and finish dates, and float. The team also found OEHRM had different monitoring practices for Cerner and VA schedules, did not maintain a proper baseline, did not use trend analyses, and did not have a formal process to coordinate and approve changes.

⁷¹ Initial operating capability sites are the first sites to deploy the new electronic health record system. The initial three sites were originally projected to go live in March and April 2020. The formal program baseline schedule extends through this time frame. This is distinct from the IMS, which covers activities through March 2023.

⁷² According to OEHRM leaders, notional baseline dates are unofficial dates that project managers agree to but were not part of the official program baseline review completed at the beginning of the program.

The audit team also found that schedule management practices varied between Cerner and VA schedules. All changes made to schedules should be documented, along with their likely effect on future activities. However, while Cerner is required to document changes made by submitting biweekly schedule reports, the schedule team lead reported being unaware of any requirement for schedulers to submit similar reports to document changes for VA schedules. In fact, neither of the two VA schedules had documentation describing the changes made. Instead of a formal process to document changes, one scheduler stated a combination of emails and phone calls were used.⁷³ Additionally, VA schedules were not assigned version numbers and were not archived. Instead, the schedules were updated and maintained in real time. By doing this, OEHRM lost the ability to track changes made over time that could inform decision making.

In addition, three of the five schedules reviewed contained activities that showed planned start and finish dates in the past; these activities had not been updated to reflect revised planned dates or the dates the activities actually started and finished. This was because activities were paused and schedules were not updated, pending the outcome of VA's strategic review.⁷⁴ The OIG recognizes that the strategic review affected specific activities in the schedule and understands that activities may not have been updated during this period. However, if unfinished work still displays inaccurate dates, the schedule no longer represents a realistic plan for completing the project. Now that the strategic review is complete, VA and its contractor staff should work to update the schedule accordingly.

As with the IMS, the OIG audit team also determined that OEHRM did not effectively maintain a baseline schedule for the individual project schedules. A baseline schedule should be set promptly, as it is necessary to measure progress and maintain the schedule's integrity going forward. As previously discussed in this finding, baseline dates in individual project schedules were only conceptual. However, one of the schedules had no conceptual baseline set, even though activities started in February 2019. For another schedule, 29 percent of activities were missing conceptual baseline start and finish dates; therefore, OEHRM could not identify whether these activities were proceeding as intended.

The OEHRM program control director stated that a trend analysis of the program's schedule had not been performed, which is required for a controlled schedule.⁷⁵ This analysis differs from a schedule risk analysis. As previously noted, a schedule risk analysis identifies uncertainties and key risks and how they affect a schedule. In contrast, in a trend analysis, the schedule data are collected and plotted over time to indicate whether a program is susceptible to future problems and, if needed, allows for action to be taken. For example, analysis of float over time is a key

⁷³ A scheduler is the person responsible for creating, editing, and updating the schedule based on input and direction from task owners and/or other relevant individuals.

⁷⁴ The 12-week strategic review from March through June 2021 consisted of an in-depth assessment of the program, including identifying lessons learned pertaining to VA's management of the program schedule.

⁷⁵ GAO, *Schedule Assessment Guide*.

measure for monitoring the health of the program. Using available buffer or slack time early in the program could warn managers that more serious delays may occur in the future. Without completing a trend analysis, managers lack valuable information about how a program is performing.

A controlled schedule also should follow a change control process to ensure baseline and current schedules are accurate and reliable, and to minimize the risk of unapproved schedule changes. According to OEHRM's change control management plan, a change control board is responsible for approving high-impact schedule changes.⁷⁶ This is particularly important because if changes are not appropriately tracked and approved, VA may not be aware of changes that affect key milestones. However, the team identified that OEHRM does not have a formal process to coordinate and approve changes, which OEHRM first identified as a program risk around April 2020. While OEHRM has a plan detailing a formalized change control process for governing and communicating EHRM program baseline changes, the plan was not implemented as intended. According to OEHRM's change control management team lead, as of October 2021, a charter had not been signed that would establish an official change control board as described in its plan. The team lead described an informal change process that occurred instead. OEHRM's schedule management team lead further stated, though, that a change control process only applied to Cerner and OEHRM did not require VA to adhere to such a process. Without a consistent change control process for both contractor and VA-related schedules, changes may not be appropriately approved or monitored.

OEHRM Focused on Initial Operating Sites

The IMS did not fully meet the characteristics of a high-quality, reliable schedule in part because OEHRM focused on the near-term goal of deploying the program at the initial operating sites. OEHRM officials provided two main reasons why the schedule was not initially intended to capture all 10 years: First, both OEHRM's prior executive director and prior program control director stated that the office's focus was to complete system deployment at its first sites. Per the prior executive director, the intent was to work on developing more details for the schedule after initial operating capability deployment. While the OIG acknowledges the need to consider near-term work, OEHRM cannot wait until its near-term activities are complete before beginning a schedule for its long-term work. This is particularly true as the order of sites has changed as of December 2021, and also as of that date, OEHRM had yet to decide what specific sites make up the initial operating capability period and when this period should be completed. If OEHRM decides to move a site up for deployment that was originally scheduled for later, then necessary schedule information might not be available.

⁷⁶ A high-impact schedule change is expected to cause a greater than 20-day impact to one or more program critical path tasks.

Second, OEHRM's former program control director explained that OEHRM could not have an IMS covering all 10 years until all site assessments have been completed. Because these assessments identify issues that need to be addressed at facilities, the resulting work should be captured in the IMS. However, as previously discussed in this finding, activities that are known but not yet well defined can be captured in the schedule through planning packages to summarize future work until detailed requirements are identified. After completing the strategic review, VA committed to conduct an enterprise-wide assessment. This would identify gaps at all VA medical centers and allow VA to develop a reliable schedule without having to conduct each individual site assessment first. Additionally, an enterprise-wide assessment or a similar effort can be valuable, as it would allow VA to use the information learned to better define the scope of work needed to continue deploying the new system and would help to address some of the concerns identified by the OIG in this finding.

OEHRM Did Not Enforce Its Own Scheduling Standards or Have Schedule Analyzer Tools Available to Assess Compliance

Weaknesses in the IMS and project schedules were also caused in part because OEHRM did not enforce its own scheduling standards. Scheduling standards are detailed in the EHRM schedule management plan, which OEHRM drafted in March 2018 but only finalized in April 2021. Although the plan was not finalized for about three years, OEHRM stated staff should have followed the draft version. Both versions of the plan stress compliance with scheduling standards. However, Cerner's task orders do not refer to these scheduling standards or require the IMS to align with them.⁷⁷ The former contracting officer for the EHRM contract stated that OEHRM wrote the IMS contract requirements.

Additionally, both the draft and final EHRM schedule management plan required OEHRM's schedule team to assess whether EHRM project schedules comply with GAO standards using Defense Contract Management Agency-compliant schedule analyzer software. The analysis results are meant to assist VA and Cerner schedule developers with meeting relevant standards. However, according to OEHRM, the process of transitioning from one schedule analyzer software to another left the schedule team without a tool from March 2020 to June 2021.⁷⁸ For the five schedules reviewed, the OIG audit team confirmed that a schedule analyzer tool had not been used prior to June 2021, but that OEHRM has been running an analyzer tool on project

⁷⁷ VA awarded Cerner two program management task orders under its contract award for the EHRM program. The first was awarded in May 2018, and the second in August 2020. GAO, *Schedule Assessment Guide*, GAO-16-89G, December 2015.

⁷⁸ In June 2021, OEHRM started using Schedule Analyzer forProject, a commercially available software, sold by forProject Technology, Inc. It performs a schedule analysis following the Defense Contract Management Agency 14-point schedule assessment.

schedules since that date. If the schedule team had used the software when schedules were first developed, OEHRM could have identified deficiencies earlier.

Guidance Was Inconsistent on the Assigned Responsibility for the WBS and IMS

The IMS and project schedules also did not fully meet the characteristics of a high-quality, reliable schedule because internal planning and contract documents did not consistently assign responsibilities for developing and maintaining the program’s WBS and IMS. First, OEHRM did not clearly establish responsibilities for developing and maintaining the WBS. As discussed earlier in this report, the WBS is an essential part of the program because it defines in detail all activities necessary to accomplish program goals. However, figure 6 shows that, over time, OEHRM has assigned responsibility for the WBS inconsistently in various documents.

Document & Timeline	Responsible Party to Create and Maintain WBS
2017 Booz Allen Hamilton contract	Booz Allen Hamilton
March 2018 Draft EHRM schedule management plan	OEHRM
May 2018 Cerner program management contract	No mention of responsibility
August 2020 Cerner follow-on program management contract	No mention of responsibility
April 2021 Final EHRM schedule management plan	Cerner

Figure 6. Designation of WBS responsibilities by document in a timeline format.
 Source: *OIG analysis of awarded contracts and OEHRM’s draft and final schedule management plan.*

This led to some confusion concerning roles and responsibilities. While Booz Allen Hamilton was contractually responsible for the WBS, a senior scheduler for OEHRM told the audit team that Booz Allen Hamilton was never directed by OEHRM to develop it. Conversely, even though Cerner was not contractually responsible for the WBS, Cerner schedulers told the audit team they had informally accepted the responsibility of developing it, and in July 2020, they collaborated with VA to create the program’s WBS—more than two years after the EHRM program began. In its final EHRM schedule management plan, OEHRM designated Cerner as the responsible party for the WBS. While responsibility for the WBS appears to be resolved, this resolution should be formalized in Cerner’s contract to ensure clarity and accountability moving forward.

Likewise, OEHRM had not clearly established responsibilities for developing and maintaining the IMS. While various contracts and guidance assigned this responsibility, it has been inconsistent. Figure 7 illustrates how responsibility for developing and maintaining the IMS has changed by document.

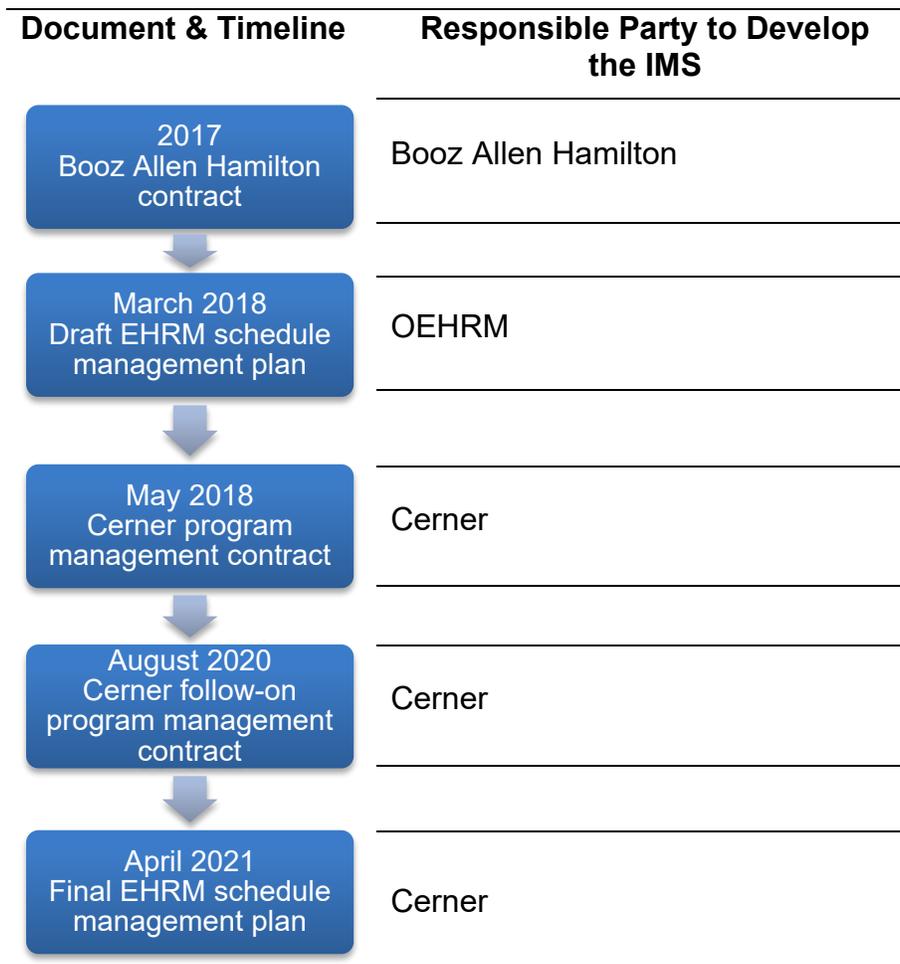


Figure 7. Designation of IMS responsibilities by document in a timeline format.
 Source: OIG analysis of awarded contracts and OEHRM’s draft and final schedule management plan.

The conflicting direction led to confusion concerning who was responsible for the IMS. Parties appeared to understand their responsibilities at the close of the audit: Cerner is responsible for developing the IMS and Cerner schedules, while Booz Allen Hamilton is responsible for developing VA schedules. To ensure clarity moving forward, OEHRM should ensure that contract requirements are consistent with its internal guidance and clearly communicate expectations for developing and maintaining the IMS.

Contract Requirements and Expectations for Development of the IMS Were Unclear

OEHRM, in its role as the oversight body for the program, was responsible for ensuring the new electronic health record system would be implemented within the scheduled time frame, as well as for the development and maintenance of the IMS used to track the program’s progress. Although Cerner was contractually required to develop and maintain an IMS for the EHRM program under two task orders issued by VA, the task orders did not clearly establish a timeline for when a complete IMS would be developed.⁷⁹

Under the first task order, which ended in September 2020, the contractor was required to deliver an IMS that depicts the “implementation and deployment of the EHRM solution.” The subsequent task order, which was still in effect as of February 2022, included the same requirement. OEHRM also required Cerner to develop site-specific project schedules. Consistent with the contract, these schedules would be developed once task orders were awarded or modified. According to both OEHRM and Cerner staff, this was the process that was followed for schedule development.⁸⁰ As a result, as of June 2021, Cerner had only developed schedules for 12 of 170 VA medical facilities where the system was expected to deploy next. Continuing this approach, VA would only have a comprehensive IMS that captures all site activities once it starts deploying to the last sites—currently planned to go live in FY 2028.⁸¹

Despite the understanding between OEHRM and Cerner to develop schedules over time, VA still had a responsibility to ensure that a complete IMS exists for the program. Yet, the OIG found there was not a complete IMS because of the inadequate schedule development process, and because contract requirements did not clearly specify the time frame for when the complete IMS should be delivered. Furthermore, the IMS that did exist as of June 30, 2021, did not meet the standards of a high-quality, reliable schedule. Regardless of who develops the IMS—VA or a

⁷⁹ Task order number 36C10B18N0001, May 17, 2018; task order number 36C10B20N0028EHRM, August 21, 2020.

⁸⁰ Both task orders state that schedules should be in place “within 20 business days of receiving baseline requirements (e.g., as new requirements are identified within 20 business days of award of a new TO [task order] or TO modification).”

⁸¹ According to OEHRM’s former program control director, the day a site turns on the new electronic health record system for personnel to use is referred to as the “go-live” date.

contractor—the program office should ensure that one is developed, that it meets scheduling standards, and that it captures the complete program timeline. Without a complete IMS that meets these standards, VA lacks assurance that the 10-year timeline is realistic and achievable.

Weaknesses Reduced the Reliability of the Program Timeline and Could Lead to Schedule Delays and Cost Overruns That Affect Veterans’ Quality of Care

VA has faced numerous schedule delays. To help leaders foresee, monitor, and respond to these and other potential delays, VA needs a high-quality and reliable IMS that meets scheduling standards for being comprehensive, credible, well-constructed, and controlled.

Any delays in the schedule could result in significant challenges for VA and additional costs to taxpayers. Table 3 shows the average cost per year for VA’s EHRM-related contracts and the continued cost to operate its existing electronic health record system—Veterans Health Information Systems and Technology Architecture—should the schedule experience delays.

Table 3. Potential Cost Implications of Schedule Overrun

Cost Element	Average Cost Per Year
Cerner contract	\$1 billion
Booz Allen Hamilton contract	\$150 million
Continued operation of existing electronic health record	\$800 million
Total	\$1.95 billion

Source: Cerner EHRM program contract; Booz Allen Hamilton EHRM program management office support contract; GAO, Electronic Health Records: VA Needs to Identify and Report Existing System Costs, GAO-19-679T, July 2019.

Weaknesses in the IMS may also significantly undermine VA’s other modernization efforts. Until a reliable IMS for the EHRM program is developed, VA cannot develop an enterprise-level IMS that would capture VA’s three major initiatives: systems for VA electronic health records, supply chains, and financial management.⁸² This enterprise schedule would show the interdependencies among the initiatives, key milestones, and critical paths. Once complete, the enterprise schedule would provide greater transparency to VA and other stakeholders. VA’s Office of Enterprise Integration is responsible for developing the enterprise IMS, but office leaders have stated they cannot successfully meet their mission until it receives a complete IMS from each of VA’s major modernization initiatives, which will be used to populate the enterprise

⁸² In 2016, VA established the Financial Management Business Transformation program to modernize the department’s financial and acquisition management systems. In 2019, VA established the Defense Medical Logistics Standard Support system to modernize legacy supply chain systems.

IMS. As EHRM is the largest modernization effort in VA, schedule slippages could potentially affect not only development of an enterprise IMS but also delay deployment of VA's other important modernization initiatives. The enterprise IMS is a necessary tool for VA leaders to successfully deploy these initiatives concurrently and will address lessons learned from VA's strategic review of the EHRM program.

Finding 1 Conclusion

The success of a program depends on having a high-quality and reliable IMS. The EHRM program IMS is incomplete because the aggregated project schedules do not cover the duration of the planned program timeline, nor does the IMS capture all work required to complete the program. Additionally, because the IMS does not adequately trace activities to the WBS, managers cannot be sure that the schedule actually contains all the required WBS activities. VA should adhere to the GAO standards adopted by OEHRM to strengthen the credibility of the program's timeline. Without improvements to the IMS, VA cannot assess the impact of early delays or reliably gauge progress—creating uncertainty about whether the overall timeline is achievable. Schedule slippages resulting from poor schedule management practices could not only delay program success but ultimately hinder VA's goal to improve the delivery of health care to veterans. Other systems that rely on electronic health records, including those needed to process benefits, also may be affected. An extension of the timeline beyond its projected completion date is also likely to result in billions of dollars in cost overruns.

VA has plans to improve the quality and reliability of its IMS. After completing a strategic review, VA committed to conducting an enterprise-wide assessment. This would allow VA to develop a comprehensive schedule for the program's full deployment timeline as well as develop a complete baseline schedule, critical path, and schedule risk analysis for the program.

Recommendations 1–5

The OIG made the following recommendations to the executive director of the Electronic Health Record Modernization Program Management Office:

1. Comply with internal guidance and ensure the development of an integrated master schedule for the Electronic Health Record Modernization program that complies with standards adopted from GAO for scheduling.
2. Take action to improve stakeholder coordination in the development of the program schedules to ensure activities from all relevant VA entities are included.
3. Develop procedures for when and how staff should perform an initial schedule risk analysis for the program and conduct periodic updates as needed.

4. Ensure consistency between contract language and program office plans or other guidance identifying the entity or individuals responsible for developing and maintaining the program's work breakdown structure and integrated master schedule.
5. Evaluate the contract requirements for schedule management and modify as needed to ensure clear roles and expectations for further development and maintenance of the program's integrated master schedule.

VA Management Comments

The EHRM Integration Office program executive director concurred with the recommendations and provided action plans for each. She also provided the following statements:

For recommendation 1, the IMS will comply with scheduling standards adopted from GAO, and the program office has already made progress in implementing best practices. Additionally, the EHRM Integration Office will use established assessment metrics and the schedule analyzer tool to evaluate schedule quality monthly, with each schedule needing to earn a minimum score of 75 percent to pass internal review. The target completion date is December 2022.

For recommendation 2, VA recently established an integration council that meets monthly to coordinate stakeholder involvement, including schedule development. In addition, the EHRM Integration Office is in the process of hiring a governance lead to help resolve the stakeholder coordination issues identified in this report. The target completion date is August 2022.

For recommendation 3, the program office will develop a plan for conducting schedule risk analyses, including timelines to resolve OIG recommendations and procedures to ensure the program schedule's critical path remains viable. The office also will conduct monthly checks to identify and assess any critical path deviations and develop mitigation plans to stay on schedule. The target completion date is December 2022.

For recommendation 4, the office will review the EHRM contract performance work statement, applicable task orders, and the schedule management plan to ensure language identifying the individuals responsible for developing and maintaining the WBS and IMS is consistent across all sources. The office will use change control processes to correct any identified discrepancies in contract or program management plan language. Additionally, consistent language will be incorporated into any new or renegotiated task orders moving forward. The target completion date is November 2022.

For recommendation 5, staff will review the contract requirements for schedule management to ensure there are clear roles and expectations for developing and maintaining the IMS. As above, the office will also correct any discrepancies identified and incorporate consistent language into any new or renegotiated task orders going forward. The target completion date is December 2022.

The EHRM Integration Office program executive director also provided one general comment that acknowledged the deficiencies outlined in this report and the intent to comply with all recommendations, but also noted that this audit was conducted during the COVID-19 pandemic and VA's own strategic review of the program. The program executive director stated these factors had "significant impacts" on the program's schedule, and many of the OIG's findings are related to these schedule impacts. Appendix C contains the full text of VA's comments.

OIG Response

The EHRM Integration Office program executive director provided responsive action plans with target completion dates for each of the five recommendations. The OIG will monitor implementation of the planned actions and will consider the recommendations open until VA has provided sufficient evidence to demonstrate the cited corrective actions have been implemented.

Regarding the general comment made that the COVID-19 pandemic and VA's strategic review made a significant impact on the program's schedule, the OIG acknowledges these events may have particularly affected go-live activities at facilities. The OIG appreciates the program executive director's commitment to advance future compliance with the GAO standards. Of note, the audit team also did consider the potential effects of VA's strategic review on the five project schedules examined. In this report, when deficiencies could have been attributed to the strategic review, the audit team acknowledged the connection.

Finding 2: VA Paid for IMS Monthly Updates (IMS Deliverables) before Acceptance

The OIG found that for one of the two task orders with IMS deliverable requirements, those deliverables were not accepted (reviewed for compliance with contract requirements) until after the invoice was paid. In one instance, VA paid the invoice about 10 months before accepting the deliverable. This is a violation of the FAR, which requires acceptance before payment.⁸³ This improper practice occurred, in part, because the deliverables were not separately priced in this task order and VA did not have guidance on how to review and accept deliverables that were not separately priced.⁸⁴ While not separately pricing deliverables is an allowed practice, VA needs guidance to ensure the acceptance process for these deliverables complies with the FAR.

If VA's payments to Cerner were otherwise proper, then these payments would be considered technically improper because they did not comply with the FAR.⁸⁵ Although the audit team cannot quantify the amount paid to Cerner for IMS deliverables because they were not separately priced, as of August 30, 2021, VA had paid Cerner approximately \$16.7 million for program management services, which includes the monthly IMS deliverables. OEHRM cannot ensure deliverables or corrected resubmissions meet quality standards if payments are made before deliverables are accepted. According to an OEHRM official, in one instance it took VA more than 100 days to get a corrected deliverable. Given the importance of the IMS to the success of the EHRM program, it is essential that VA ensures deliverables are reviewed and accepted prior to approving invoices for payment, as required by the FAR.

The following determinations are discussed in finding 2:

- VA paid invoices before accepting IMS deliverables in violation of federal regulations.
- VA did not guide staff on how to treat deliverables not separately priced.
- Acceptance practices could have resulted in technically improper payments.

What the OIG Did

To assess OEHRM's acceptance of contractor deliverables for updating the IMS and related paid invoices, the audit team reviewed all invoices VA paid through August 30, 2021, billed on the

⁸³ FAR Part 32.905(c).

⁸⁴ A "not separately priced" deliverable means the unit price for that item is included in the unit price of another related line item.

⁸⁵ Office of Management and Budget Circular A-123, Appendix C, *Requirements for Payment Integrity Improvement*, June 26, 2018, rev. March 5, 2021. A technically improper payment is a payment made to an otherwise qualified recipient for the right amount, but the payment failed to meet all regulatory and/or statutory requirements. The team did not have sufficient evidence to fully evaluate whether IMS deliverables complied with contract requirements to determine if payments made to Cerner were otherwise proper.

two previously mentioned task order awards to Cerner.⁸⁶ Additionally, the team reviewed applicable regulations and policies and relevant deliverable review and acceptance documentation. The team gathered evidence from VA’s electronic contract management system, invoice payment processing system, as well as internal OEHRM documents. The team also conducted interviews with a VA contracting officer and OEHRM staff. For more on the scope and methodology, see appendix B.

VA Paid Invoices before Accepting IMS Deliverables Not Separately Priced in Violation of Federal Regulations

As stated previously, the FAR requires deliverables to be accepted before payment. Specifically, the FAR states that all invoice payments must be supported by a receiving report or other documentation that includes, at a minimum, the date of government acceptance for the supplies or services.⁸⁷ The team reviewed invoices associated with the two task orders with IMS deliverables during the review period. The audit team did not identify issues with VA’s payment of invoices and acceptance documentation for the first task order. However, for all 10 invoices for the second task order, OEHRM did not accept the IMS deliverables until after VA paid the related invoice.⁸⁸

Unlike the first task order, which priced the IMS deliverables separately, IMS deliverables for the second task order were rolled up into an overall line item, “EHRM Program Management.” See table 4 for an excerpt of this task order pricing.

Table 4. Excerpt of Pricing in Task Order

Line Item	Description	Unit	Unit Price
0002	EHRM Program Management	Monthly	\$1,671,185.56
0002A	Deliverable: A. Integrated Master Schedule (IMS)	Each	Not Separately Priced
0002B	Deliverable: A. Biweekly Schedule Reports	Each	Not Separately Priced
0002C	Deliverable: A. Updated Resource Management Plan	Each	Not Separately Priced

Source: OIG analysis of task order number 36C10B20N0028EHRM, August 21, 2020. Not all deliverables required under line item 0002 are shown.

⁸⁶ Task order number 36C10B18N0001, May 17, 2018; task order number 36C10B20N0028EHRM, August 21, 2020.

⁸⁷ FAR Part 32.905(c).

⁸⁸ FAR Part 46.501 states that acceptance constitutes acknowledgement that the supplies or services conform with applicable contract quality and quantity requirements.

VA Did Not Guide Staff on How to Treat Deliverables Not Separately Priced

The FAR acceptance requirements hold true regardless of how the deliverables are priced. While it is an acceptable practice to not separately price deliverables, neither the FAR, VA acquisition regulation, nor internal VA policies include explicit instructions for reviewing and accepting these types of deliverables.

This lack of guidance contributed to differing interpretations of the FAR and whether deliverables not separately priced needed to be reviewed and accepted before payment. For example, OEHRM's quality and performance management team lead responsible for overseeing deliverables believed the IMS did not need to be accepted before payment because the IMS is not separately priced in the task order, and therefore, the IMS deliverable invoices should be paid like a monthly service fee. Consistent with this, a contracting officer's representative responsible for approving Cerner invoices for payment stated that the former contracting officer instructed staff to pay the invoices automatically.⁸⁹ By contrast, OEHRM's prior executive director stated that the current practice of paying for deliverables not separately priced before acceptance was inappropriate, and that staff needed to be informed of the way to handle these invoices properly. The current contracting officer for the Cerner contract took a similar position, stating that at least some of the payment should have been withheld until OEHRM accepted all deliverables associated with each invoice. The FAR states that *all* invoice payments must be supported by government acceptance for the supplies or services, and it does not exclude from this requirement deliverables that are not separately priced. The OIG maintains that to fully support an invoice payment for a contract line item and comply with the FAR, the government must review and accept all deliverables associated with that line item before paying Cerner, regardless of how the deliverable is priced.

To prevent these issues in the future and to comply with the FAR, VA should take steps to ensure that deliverables not separately priced are accepted before invoice payment. For example, in April 2020, the Department of Defense prescribed the use of a clause for solicitations and contracts with items not separately priced. This clause states that the government must accept an item not separately priced before the contractor can invoice the government.⁹⁰ A similar contract requirement, memo notification, or other guidance clarifying the requirement to accept deliverables not separately priced would help ensure the program office accepts these items before payment in accordance with FAR requirements.

⁸⁹ The representative stated that contracting officer's representatives did not perform deliverables reviews. The OIG is separately examining in a related project the responsibilities of the contracting officer's representative for deliverable review and acceptance under the EHRM contract.

⁹⁰ Defense Federal Acquisition Regulation Supplement 252.204-7002, *Payment for Contract Line or Subline Items Not Separately Priced*, April 2020.

According to the new contracting officer, VA is asking Cerner to separately price deliverables going forward, which would make accepting the deliverable before payment clearer. While this may resolve concerns for future task orders, for existing task orders with deliverables not separately priced, VA must ensure that staff review and accept mission-critical deliverables like the monthly IMS updates before payment.

Acceptance Practices Could Have Resulted in Technically Improper Payments

Because VA paid invoices without sufficient acceptance documentation, if payments are determined to have been otherwise proper, then these payments could be considered technically improper. According to the Office of Management and Budget, a payment is technically improper when made to a qualified recipient for the right amount, but “the payment failed to meet all regulatory and/or statutory requirements.”⁹¹ Accordingly, paying Cerner without accepting the deliverable beforehand, as required by the FAR, potentially constitutes a technically improper payment. These regulations are important controls to avoid federal spending on products that are found to be inadequate or do not meet specifications.

As previously stated, the audit team cannot quantify how much of the over \$16 million paid to Cerner for its program management services, as of August 30, 2021, could be improper payments for IMS deliverables because they were not separately priced (see line item 0002 in table 4).⁹² To prevent future improper payments, VA should review and accept IMS deliverables before paying Cerner.

OEHRM cannot ensure deliverables or corrected resubmissions meet quality standards if payments are made before acceptance is documented. The audit team found that OEHRM returned several IMS deliverables to Cerner to correct issues between November 2020 and February 2021. For example, OEHRM returned one monthly deliverable for correction because it identified inaccurate and inconsistent information between individual deployment sites for training future system users. However, the audit team identified that OEHRM also did not require the deliverables to be corrected before payment. Additionally, OEHRM’s quality and performance management team lead stated there was no timeliness requirement for Cerner to correct and resubmit the deliverables. The team lead added that, in one instance, it took VA more than 100 days to get a corrected deliverable. Given the critical importance of the IMS updates to the program’s success, VA should review deliverables before making payment to help ensure the contractor submits deliverables that meet program needs.

⁹¹ Office of Management and Budget Circular A-123, Appendix C, *Requirements for Payment Integrity Improvement*, June 26, 2018, rev. March 5, 2021.

⁹² Cerner provided VA with 10 invoices, each for about \$1.67 million.

Finding 2 Conclusion

The team identified invoices that VA paid to the contractor before accepting the related IMS deliverables—several of which were returned to Cerner for correction because OEHRM considered them unacceptable. Considering the size and costs of the EHRM program, VA must improve its oversight of the schedule to ensure IMS deliverables comply with the FAR and meet contract requirements and expectations. The IMS is the focal point of program management and is critical to monitoring program progress. It helps to guide VA’s program activities and ultimately contributes to smooth system deployment and program success. Therefore, the correct payment amounts should be made to the contractor only after confirming IMS deliverables meet contract quality and reliability standards, so these scheduling products can be used to inform leaders and guide their decision-making.

Recommendation 6

The OIG made the following recommendation to the executive director of the Electronic Health Record Modernization Program Management Office:

6. Comply with the Federal Acquisition Regulation and issue guidance to accept deliverables not separately priced before invoice payment.

VA Management Comments

The EHRM Integration Office program executive director concurred with recommendation 6 and responded that the office would implement a procedure to clarify how and when to pay an invoice that contains a not separately priced deliverable. No payment will be issued until all associated deliverables have been accepted as required by the FAR. Additionally, the contracting officer for EHRM communicated the FAR requirement to Cerner and recommended that the contractor begin pricing all deliverables. The target completion date is May 2022. Appendix C contains the full text of VA’s comments.

OIG Response

The EHRM Integration Office program executive director provided a responsive action plan to the recommendation. The OIG will monitor implementation of the planned action and will consider the recommendation open until VA has provided sufficient evidence to demonstrate the cited corrective actions have been implemented.

Appendix A: Background

VA has long recognized the need to modernize its electronic health record system (Veterans Health Information Systems and Technology Architecture). If successful, VA’s new system will connect to the Department of Defense’s electronic health record system and create a lifetime health record for military service members. This would ultimately improve and inform the delivery of quality health care to veterans. Once implemented, healthcare providers could access more comprehensive medical histories for the more than 9 million veterans enrolled in the VA healthcare program.⁹³

Program Schedule Delays

In August 2019, VA’s planned deployment of the new system included three initial operating sites, originally expected to go live beginning in March 2020, followed by 47 additional deployment cycles, referred to as waves, with nationwide system deployment planned for completion in FY 2028. VA is now more than three years into the 10-year effort, and the program has experienced several delays. Table A.1 provides a timeline of the program delays.

Table A.1. Timeline of Program Delays

Date	Description
December 2019	OEHRM announced it would push back the go-live date at two of the three initial operating sites from April 2020 to November 2020. ⁹⁴ The Mann-Grandstaff VA Medical Center remained on schedule for system deployment in March 2020.
February 2020	OEHRM announced it would also delay the go-live date at the Mann-Grandstaff VA Medical Center to July 2020 and attributed this to the results of system testing.
April 2020	VA temporarily paused deployment of the new system due to the COVID-19 pandemic.
August 2020	OEHRM released an adjusted deployment schedule. The revised schedule showed the system would be deployed at the updated first three sites in FY 2021, about 12 months after originally planned.
October 2020	OEHRM deployed the new system at the Mann-Grandstaff VA Medical Center.
March 2021	VA announced it would pause system deployments to conduct a 12-week strategic review of the EHRM program.
September 2021	OEHRM released an adjusted deployment schedule through FY 2023.

Source: *OIG analysis.*

⁹³ “About VHA,” VHA, accessed August 20, 2021, <https://www.va.gov/health/aboutVHA.asp>.

⁹⁴ The first three sites that were supposed to begin using the new electronic health record were the Mann-Grandstaff VA Medical Center in Spokane, the Seattle VA Medical Center, and the American Lake VA Medical Center in Tacoma, Washington.

As of December 2021, the Mann-Grandstaff facility was the only site operating the new system, despite the initial August 2019 schedule projecting that 28 VA medical centers would be using the system by that time. Despite the early program delays, as recently as October 2021, VA’s deputy secretary remained committed to the program’s 10-year timeline with nationwide deployment still planned for completion in FY 2028. In December 2021, VA released a revised deployment schedule through FY 2024 showing the next sites to deploy the new system. Table A.2 shows the planned dates for deploying the new electronic health record system through FY 2022.

Table A.2. Next Sites Planned Deployment Schedule

VA Site	Location	Go-Live Date
VA Central Ohio Healthcare System	Columbus, OH	March 5, 2022*
Jonathan M. Wainwright Memorial VA Medical Center	Walla Walla, WA	March 26, 2022 †
VA Roseburg Health Care System	Roseburg, OR	June 11, 2022
VA Southern Oregon Healthcare System	White City, OR	June 11, 2022
VA Boise Healthcare System	Boise, ID	June 25, 2022
VA Alaska Healthcare System	Anchorage, AK	July 16, 2022
VA Puget Sound Health Care System	Seattle, WA	August 27, 2022

Source: *Electronic Health Record Comprehensive Lessons Learned Progress Update*, dated November 2021, and released December 1, 2021.

*As of January 2022 will be delayed due to the COVID-19 pandemic.

† On March 26, 2022, VA deployed the new electronic health record system in Walla Walla, Washington.

EHRM Program Schedules in Project Web App

The program’s schedule management plan defines how the IMS will be developed and maintained throughout the life of the program.⁹⁵ According to the plan and OEHRM officials, the IMS is the collection of all EHRM schedules located in Project Web App. Access to Project Web App is restricted. Users must request and receive approval for a license to view or edit content in Project Web App. To prevent unauthorized edits, most users are granted read-only access to view the schedules. Primarily, access to edit content is limited to VA and Cerner schedulers. Within Project Web App, VA schedules shall be updated weekly, while Cerner schedules are updated twice a month, according to an OEHRM leader.

⁹⁵ EHRM Schedule Management Plan, dated April 27, 2021.

Deliverable Review and Acceptance Process

OEHRM’s deliverable review and acceptance process at the time of the audit included multiple levels of review involving subject matter experts and OEHRM leaders. Figure A.1 provides an overview of the deliverable review and acceptance process, as well as the process for notifying Cerner of OEHRM’s decision to either accept or reject the deliverable. If a deliverable was rejected, Cerner had to make corrections and resubmit the deliverable for approval.

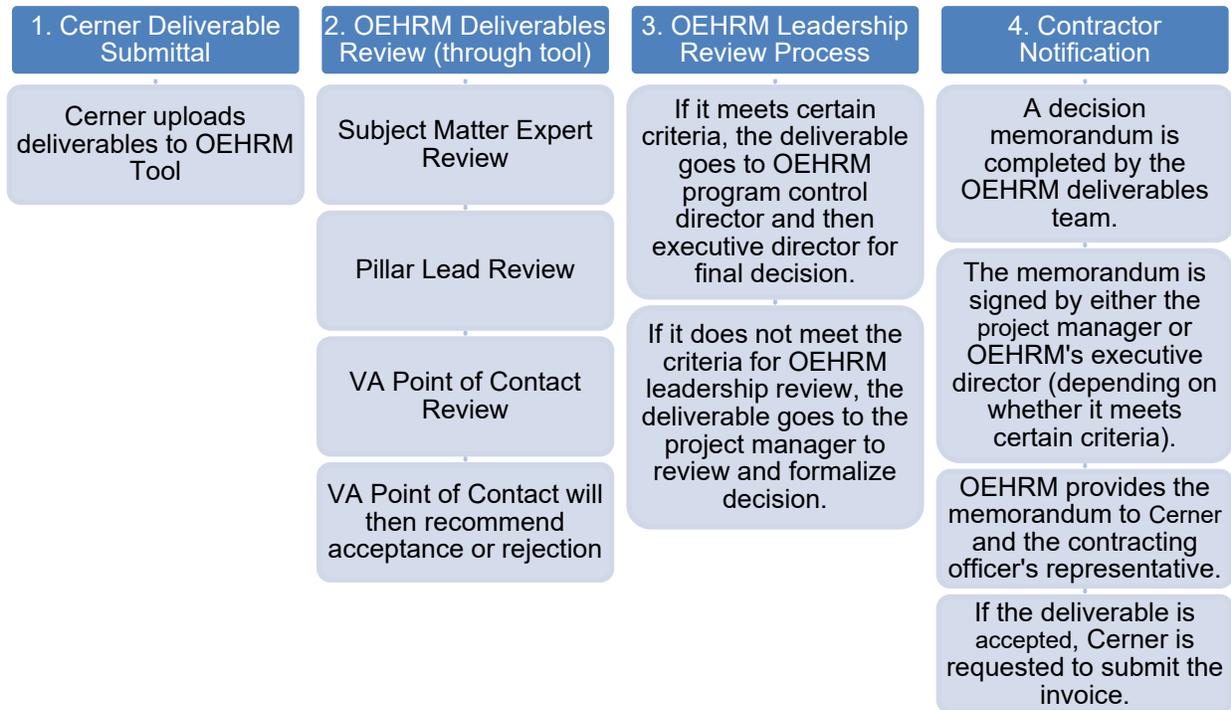


Figure A.1. OEHRM process to review, accept, and notify Cerner on deliverables, as of September 2021.

Source: OIG analysis of OEHRM process flowcharts and deliverable approval narrative provided September 2021.

Until March 2021, OEHRM’s prior executive director was required to approve all deliverables. In March 2021, the guidance was changed to reflect that only deliverables meeting specific criteria needed higher-level review. According to the guidance, only deliverables meeting the following criteria required executive director approval:

- Deliverables authorizing continuation of a deployment
- Deliverables resulting from site assessments
- All deliverables priced greater than or equal to \$500,000

For all other deliverables, approval can be granted by the project manager.

Appendix B: Scope and Methodology

Scope

The audit team conducted its work from July 2021 through March 2022. The audit scope encompassed all efforts to develop and manage the EHRM program’s IMS from May 17, 2018, the date of EHRM contract award, through June 30, 2021. EHRM project schedules were maintained in a web-based version of Microsoft Project, called Project Web App, with updates made in real time.⁹⁶ The audit team’s testing was based on EHRM project schedules extracted from Project Web App on June 30, 2021. To facilitate the team’s work, the real-time project schedules were accessed from August 24, 2021, through January 18, 2022. The team also reviewed invoices VA paid through August 30, 2021, for IMS deliverables and associated acceptance documentation.

Statistical Sampling

To accomplish the objective, the audit team reviewed a statistical sample of EHRM schedules. The team used statistical sampling to assess the reliability of the project schedules in accordance with government and industry scheduling standards.

On June 30, 2021, the audit team extracted 66 EHRM project schedule files located in Project Web App. The team reduced the population to 19 project files by excluding from the population inactive schedules, schedules marked “draft,” and contractor schedules less than 50 percent complete.⁹⁷ The team excluded these schedules from the sample universe because they were either archived, not finalized, or the schedule’s progress was not far enough along for the team to draw conclusions. The audit team selected a sample of five schedules from the population. The population was categorized in four strata, as seen in table B.1.

Table B.1. Strata

Strata	Description	Population Size	Sample Size
1	High-risk schedule	1	1
2	Contractor-activity schedules	11	2
3	VA OIT-activity schedules	4	1
4	VA (other than OIT) activity schedules	3	1
	TOTAL	19	5

Source: VA OIG statistician’s stratified population. Data were obtained from Project Web App as of June 30, 2021.

⁹⁶ Project is a management software application developed and sold by Microsoft.

⁹⁷ According to OEHRM officials, inactive schedules are archived so they are no longer in use.

The first stratum included a high-risk schedule identified as one of the most mature schedules for the program. The other three strata were divided by activity type. The OIG statistician selected the sample of schedules in strata 2 through 4 using simple random statistical sampling, with each schedule having an equal chance of selection. Because of the small sample size, the team did not project the results for the population. However, as previously mentioned, the team performed some testing on the collection of project schedules to arrive at specific conclusions on the IMS as a cohesive unit.

Methodology

The audit team reviewed applicable laws, regulations, policies, and GAO and industry scheduling practices. The team gathered evidence from VA's electronic contract management system, invoice payment processing system, as well as information obtained from various VA offices, including internal OEHRM documents. The team interviewed VA officials from OEHRM, the Office of Enterprise Integration, VHA, OIT, VBA, and the Technology Acquisition Center. Additionally, the team interviewed Department of Defense personnel and relevant VA contractor staff from Booz Allen Hamilton and Cerner. The team conducted a site visit to Washington, DC, in August 2021. All staff interviews not conducted as part of the site visit were performed virtually.

The audit team coordinated with the Office of the Counselor to the Inspector General for legal guidance and an OIG statistician to develop the methodology for testing EHRM schedules. To assess compliance with scheduling standards adopted by OEHRM, the audit team conducted its testing in two ways. First, the team assessed the IMS overall as appropriate. However, the audit team was limited in performing every test of the IMS because some tests are designed to be used only on a single file, whereas this audit included multiple files. Second, because the IMS is a collection of project schedules, the team conducted detailed testing of the following five statistically selected project schedules against scheduling standards:

- EHRM Enterprise Schedule
- Cerner Mann-Grandstaff CS1 and CS1_1 Only
- EHRM Wave C Boise Cerner
- CMO Columbus
- OIT Infrastructure—Wave D—Portland-Amer Lake-Seattle

For four of the five project schedules, the audit team used a tool, Schedule Analyzer for Project, which is a commercially available software that performs schedule analysis using the Defense Contract Management Agency's 14-point schedule assessment metrics. The software runs within Microsoft Project and was used to alert the team to potential errors in the schedules. The team could not use the tool for some of their analyses because the schedules did not contain data in

required fields. Specifically, the tool could not be used when baseline date fields were empty. The team identified that baseline start and finish dates were not established for some of the CMO Columbus schedule and all the OIT Infrastructure Wave D schedule.⁹⁸ Alternatively, the audit team manually conducted tests to evaluate these schedules against scheduling standards.

To assess VA's review and acceptance of contractor IMS deliverables and related paid invoices, the audit team also evaluated all invoices associated with IMS deliverables that VA paid under task orders 36C10B18N0001 and 36C10B20N0028 from May 17, 2018, through August 30, 2021. VA awarded these two task orders to Cerner for EHRM program management services and required the contractor to deliver a monthly IMS. Additionally, the team reviewed OEHRM deliverable acceptance memorandums for Cerner IMS deliverables dated August 12, 2018, through September 7, 2021.

Internal Controls

The audit team assessed the internal controls of OEHRM significant to the audit objective. This included an assessment of the five internal control components to include control environment, risk assessment, control activities, information and communication, and monitoring.⁹⁹ In addition, the team reviewed the principles of internal controls as associated with the objective. The team identified the following two components and two principles as significant to the objective.¹⁰⁰ The team identified internal control weaknesses during this audit and proposed recommendations to address the following control deficiencies:

- Component: Control Environment
 - Principle 3: Management should establish an organizational structure, assign responsibility, and delegate authority to achieve the entity's objectives.
- Component: Risk Assessment
 - Principle 7: Management should identify, analyze, and respond to risks related to achieving the defined objectives.

Fraud Assessment

The audit team assessed the risk that fraud and noncompliance with provisions of laws, regulations, contracts, and grant agreements, significant within the context of the audit

⁹⁸ The CMO Columbus schedule was composed of nine different sites. Of those sites, five had baseline dates set, while four did not. The audit team used the tool for the five schedules with baseline dates.

⁹⁹ GAO, *Standards for Internal Control in the Federal Government*, GAO-14-704G, September 2014.

¹⁰⁰ Because the audit was limited to the internal control components and underlying principles identified, it may not have disclosed all internal control deficiencies that existed at the time of this audit.

objectives, could occur during this audit. The team exercised due diligence in staying alert to any fraud indicators by

- searching OIG hotline complaints or allegations relevant to the audit objective;
- soliciting the OIG’s Office of Investigations for indicators; and
- interviewing VA personnel and management from OEHRM, Office of Enterprise Integration, and VBA, as well as relevant Cerner staff to determine whether they knew of fraudulent activity or weaknesses that would affect the scope of this audit.

The OIG did not identify any instances of fraud or potential fraud during this audit.

Data Reliability

The audit team assessed the reliability of computer-processed WBS maintained in WBS Pro and schedule data created and maintained in Microsoft Project. The team also assessed the reliability of using a commercially available software to conduct analyses of the schedules. Finally, the team assessed the reliability of invoice data retrieved from VA’s financial management system.

To assess the reliability of the WBS developed collaboratively by VA and Cerner, the team validated data against contract documents and interviewed appropriate personnel. The audit team considers this data sufficiently reliable to support the findings and conclusions in this report.

To assess the reliability of schedule data, the audit team confirmed with OEHRM leaders that all EHRM program schedules are located in Project Web App. The team was granted access to and retrieved the schedules directly from Project Web App. The audit team confirmed with OEHRM’s schedule team lead that the downloaded files were unaltered and intact. The team also interviewed the OEHRM and contractor staff responsible for developing and maintaining the schedules and performed some basic reasonableness checks of the data. The team concluded the data to be sufficiently reliable for purposes of the audit. The team’s determination was made based on guidance from GAO for assessing the reliability of computer-processed data in accordance with generally accepted government audit standards.¹⁰¹ Notably, these standards are different from GAO guidance on the reliability of a schedule.¹⁰² As discussed in finding 1 of this report, the audit team’s detailed testing performed during fieldwork found that the EHRM project schedules were unreliable. For example, some or all the schedules

- did not trace to the program WBS,
- did not capture activities for work performed by VHA and OIT, and

¹⁰¹ GAO, *Assessing Data Reliability*, GAO-20-283G, December 2019.

¹⁰² GAO, *Schedule Assessment Guide*.

- did not include baseline start and finish dates for important program activities.

The team made recommendations within this report to improve the reliability of the EHRM schedules.

The team also assessed the reliability of using the Schedule Analyzer forProject tool. The commercially available software sold by forProject Technology is an add-in tool for Microsoft Project. The tool provides an easy-to-read dashboard that allowed the team to quickly identify potential schedule issues. The tool does not process or import data from an information system nor does the tool include any sensitive data. To determine the reliability of the analysis results, the team independently validated errors identified by the software. The team did not identify any material discrepancies. Importantly, OEHRM officials confirmed this tool is also used by the schedule team to assess and monitor schedule compliance.

Finally, to assess the reliability of invoice data obtained from VA's financial management system, the audit team reviewed an annual financial statement audit report for FYs 2019 and 2020 performed and prepared by an independent public accounting firm. The financial statement audit identified functionality issues that could affect the timeliness and accuracy of transactions, specifically that other VA systems are not fully integrated with the financial management system.¹⁰³ The audit team ensured this did not adversely influence the completeness of the audit universe by comparing the universe of invoices pulled from the financial management system in September 2021 for the period of May 17, 2018, through August 30, 2021, to another universe of invoices that was pulled from VA's invoice payment processing system for the same period. There were no material discrepancies between the two data sets. The audit team also compared invoice information from the financial management system for all invoices, including payee name, vendor ID, and invoice number, to the invoices submitted by contractors. The team considers this data sufficiently reliable to support the findings and conclusions.

Government Standards

The OIG conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that the OIG plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for the findings and conclusions based on audit objectives. The OIG believes the evidence obtained provides a reasonable basis for the findings and conclusions based on the audit objectives.

¹⁰³ VA OIG, *Audit of VA's Financial Statements for Fiscal Years 2020 and 2019*, Report No. 20-01408-19, November 24, 2020.

Appendix C: VA Management Comments

Department of Veterans Affairs Memorandum

Date: April 8, 2022

From: Program Executive Director, Electronic Health Record Modernization Integration Office (00EHRM)

Subj: Response to Draft Report “The Electronic Health Record Modernization Program Schedule Does Not Meet Quality Standards” (Project Number 21-02889-AE-0132)

To: Assistant Inspector General for Audits and Evaluations, Office of Inspector General (52)

1. Thank you for the opportunity to review the Department of Veterans Affairs Office of Inspector General (OIG) draft report “The Electronic Health Record Modernization Program Schedule Does Not Meet Quality Standards.” The report contains two findings and six recommendations for the Electronic Health Record Modernization Integration Office (EHRM IO).

2. I concur with the findings and recommendations in this report. I have included as attachments to this memorandum one general comment on the report and an action plan to address the recommendations.

(Original signed by)

Terry A. Adirim, M.D.

Attachments

Department of Veterans Affairs

General Comment

VA OIG Draft Report: “Electronic Health Record Modernization Program Schedule Does Not Meet Quality Standards” (Project Number 21-02889-AE-0132)

The Department of Veterans Affairs (VA) Electronic Health Record Modernization Integration Office (EHRM IO) acknowledges the integrated master schedule (IMS) deficiencies identified during the Office of the Inspector General’s (OIG) recent investigation and will comply with all recommendations made in the draft report. However, EHRM IO notes that this engagement was conducted during the COVID-19 pandemic and VA’s strategic review of the EHRM program, both of which had significant impacts on the program’s schedule. Many of OIG’s findings are related to these schedule impacts. As published in the Comprehensive Lessons Learned Progress Update in November 2021, the Deputy Secretary approved updates to the EHRM schedule through the beginning of Fiscal Year 2024. Moving forward, EHRM IO is committed to maintaining the quality and reliability of the program’s IMS and ensuring that it meets all required scheduling standards as outlined in the OIG draft report.

Department of Veterans Affairs

Response to the VA OIG Draft Report

The Electronic Health Record Modernization Program Schedule Does Not Meet Quality Standards

Project 21-02889-AE-0132

Recommendation 1

Comply with internal guidance and ensure the development of an integrated master schedule for the Electronic Health Record Modernization program that complies with standards adopted from GAO for scheduling.

VA Response: Concur.

The Department of Veterans Affairs (VA) Electronic Health Record Modernization Integration Office (EHRM IO) will ensure that its integrated master schedule (IMS) complies with standards adopted from the Government Accountability Office (GAO) for scheduling, to include the following 10 best practices listed in the GAO 16-89 Schedule Assessment Guide:

1. Capturing all activities
2. Sequencing all activities
3. Assigning resources to all activities
4. Establishing the durations of all activities
5. Verifying that the schedule can be traced horizontally and vertically
6. Confirming that the critical path is valid
7. Ensuring reasonable total float
8. Conducting a schedule risk analysis
9. Updating the schedule using actual progress and logic
10. Maintaining a baseline schedule

EHRM IO has already made progress in implementing these best practices. The program will use the Defense Contract Management Agency's (DCMA) 14-Point Schedule Assessment metric in conjunction with a DCMA Report Card to determine a quantitative measure of basic schedule compliance. EHRM IO also uses the DCMA Schedule Analyzer tool to assess schedule quality against metrics such as the DCMA 14-Point Schedule Assessment. The program collects DCMA Schedule Analyzer scores for all schedules, which must earn a minimum score of 75% to pass internal review. If a schedule scores lower than 75%, it is returned to the schedule owner for further adjustment. EHRM IO will collect scores monthly for each schedule for adjustment as necessary.

Target Date for Completion: December 2022

Recommendation 2

Take action to improve stakeholder coordination in the development of the program schedules to ensure activities from all relevant VA entities are included.

VA Response: Concur.

As a part of the recent restructuring of the EHRM program, VA established the EHRM Integration Council to coordinate VA stakeholder involvement in the EHRM effort. The Council meetings convened in February 2022 and meets monthly (the last meeting has held on March 23, 2022), and serves as a forum for VA stakeholders to receive updates on the EHRM program and discuss and address topics that may impact different parts of the VA enterprise, including development and update of program schedules.

In addition, EHRM IO is in the process of hiring a governance lead who will assist in resolving the stakeholder coordination issues identified in this report.

Target Date for Completion: August 2022

Recommendation 3

Develop procedures for when and how staff should perform an initial schedule risk analysis for the program and conduct periodic updates as needed.

VA Response: Concur.

EHRM IO will develop a Schedule Risk Analysis Plan that will include timelines to resolve recommendations made by OIG and procedures to ensure that the EHRM program schedule's critical path remains viable. In addition to ongoing identification and mitigation processes for program risks and issues, EHRM IO will conduct monthly checks to identify and assess any critical path deviations and develop mitigation plans to ensure the program stays on schedule.

Target Date for Completion: December 2022

Recommendation 4

Ensure consistency between contract language and program office plans or other guidance identifying the entity or individuals responsible for developing and maintaining the program's work breakdown structure and integrated master schedule.

VA Response: Concur.

EHRM IO will review the VA EHRM Indefinite Delivery/Indefinite Quantity contract performance work statement, applicable EHRM task orders and the EHRM Schedule Management Plan to ensure language identifying individuals responsible for developing and maintaining the work breakdown structure and IMS is consistent across all sources and will utilize the change control process as necessary to correct any discrepancies in contract language or program management plan language. Additionally, consistent language will be incorporated into any new or renegotiated task orders moving forward.

Target Date for Completion: November 2022

Recommendation 5

Evaluate the contract requirements for schedule management and modify as needed to ensure clear roles and expectations for further development and maintenance of the program's integrated master schedule.

VA Response: Concur.

EHRM IO will review the contract requirements for schedule management to ensure roles and expectations regarding further development and maintenance of the EHRM IMS are clear. The program will utilize the change control process as necessary to correct any discrepancies in contract language. Additionally, consistent language will be incorporated into any new or renegotiated task orders moving forward.

Target Date for Completion: December 2022

Recommendation 6

Comply with the Federal Acquisition Regulation and issue guidance to accept deliverables not separately priced before invoice payment.

VA Response: Concur.

EHRM IO will implement a procedure to clarify how and when to pay an invoice that contains a Not Separately Priced (NSP) deliverable. Moving forward, EHRM IO will not issue payment for a parent line item until all associated NSP deliverables have been accepted by VA.

On 3/8/2022 the Technology Acquisition Center Contracting Officer for EHRM communicated the above change regarding the disposition of NSP deliverables to Cerner and recommended that Cerner begin pricing all of its deliverables. In addition, the Contracting Officer has added the following information to all Requests for Task Execution Plans sent to Cerner: "When pricing a line item as Not Separately Priced (NSP), the contractor should be aware of the requirements of FAR 32.905(c) whereby payment to the contractor under a parent line item cannot be made by the Government until all NSP sub-line items have been accepted. Consequently, the contractor should take this into consideration when pricing a sub-line item as NSP."

Target Date for Completion: May 2022

For accessibility, the original format of this appendix has been modified to comply with Section 508 of the Rehabilitation Act of 1973, as amended.

OIG Contact and Staff Acknowledgments

Contact	For more information about this report, please contact the Office of Inspector General at (202) 461-4720.
----------------	---

Audit Team	Jessica Blake, Director Kristi Corthell Francis Hoang Joy Jordan Ryan Mols Cecilia Shim Chris Sizemore
-------------------	--

Other Contributors	Melissa Bentley Kendal Ferguson Clifford Stoddard
---------------------------	---

Report Distribution

VA Distribution

Office of the Secretary
Veterans Benefits Administration
Veterans Health Administration
National Cemetery Administration
Assistant Secretaries
Office of General Counsel
Office of Acquisition, Logistics, and Construction
Board of Veterans' Appeals
Program Executive Director, EHRM Integration Office

Non-VA Distribution

House Committee on Veterans' Affairs
House Appropriations Subcommittee on Military Construction, Veterans Affairs,
and Related Agencies
House Committee on Oversight and Reform
Senate Committee on Veterans' Affairs
Senate Appropriations Subcommittee on Military Construction, Veterans Affairs,
and Related Agencies
Senate Committee on Homeland Security and Governmental Affairs
National Veterans Service Organizations
Government Accountability Office
Office of Management and Budget

OIG reports are available at www.va.gov/oig.