FEDERAL ELECTRONIC HEALTH RECORD MODERNIZATION

FEHRM

2021 Annual Report

JANUARY 1, 2021 - DECEMBER 31, 2021

William J. Tinston
Director
Federal Electronic Health Record Modernization (FEHRM) Office

The estimated cost of this report or study for the Department of Defense is approximately $0 in Fiscal Years 2022 - 2023. This includes $0 in expenses and $0 in DOD labor.

Table of Contents

Figures

Introduction

As required by the National Defense Authorization Act for Fiscal Year 2020 (NDAA FY2020), this report provides an update on many aspects of the current state of health care interoperability between the Department of Defense (DOD) and Department of Veterans Affairs (VA). This report also outlines the activities of the Federal Electronic Health Record Modernization (FEHRM) office during calendar year 2021 (CY2021) in its delivery of the common capabilities that enable DOD and VA to deploy the single, common federal electronic health record (EHR).

The DOD, VA, Department of Homeland Security's U.S. Coast Guard (USCG) and other federal agencies continue to partner to deploy the federal EHR that enhances patient care and provider effectiveness, wherever care is provided. This partnership's interoperability effort advanced significantly following the establishment of the FEHRM and with the Departments' insightful decision to embrace a single commercial EHR solution. Today, the Departments are implementing a federal EHR that puts patients at the center.

This effort is vital; DOD and VA's separate, legacy EHR systems are outdated and unable to create the seamless care experience offered by the federal EHR. The new federal EHR implemented today is truly longitudinal; from the time individuals join the military through their care as a Veteran, their care will be documented in one, complete patient health record that they and their providers can access. With the Departments using the same federal EHR, they have access to the same patient data. As such, interoperability between the Departments is less relevant. The FEHRM, DOD, VA and USCG are moving beyond the interoperability of data and into the interoperability of processes.

The FEHRM is a key driver of this federal health care interoperability effort. In addition to its DOD, VA, USCG and other federal agency partners, the FEHRM collaborates with the Department of Health and Human Services, Office of the National Coordinator for Health Information Technology (ONC) and other government and industry leaders. This collaboration improves the continuity of care among and between public- and private-sector providers, better shapes the future of health information technology and information exchange and enhances the beneficiary experience.

The FEHRM unifies efforts across the federal EHR ecosystem and delivers common capabilities such as managing the Federal Enclave; managing the joint health information exchange (HIE); leading deployment activities at joint sharing sites; overseeing EHR configuration and content changes; providing software updates and solutions; tracking joint risks, issues and opportunities and lessons learned; maintaining an integrated master schedule; and advancing interoperability.

The FEHRM determines ways to converge EHR workflows and configurations to streamline the patient and provider experience. While DOD, VA and USCG have unique needs, the FEHRM converges their clinical and business capabilities where appropriate. The FEHRM

works via proven collaborative processes to facilitate technical and functional joint decision-making between the Departments at the lowest possible levels. The goal is to ensure providers have a common user experience defined by evidence-based best practices and patients have a consistent care experience regardless of where they get care.

Additionally, the FEHRM, DOD, VA and USCG continuously collect feedback and lessons learned from those deploying and using the federal EHR. This feedback informs best practices for deploying the federal EHR as well as enhancements to the federal EHR and interoperability. Some enhancements integrated into the federal EHR since initial deployment include Immunization Forecaster and Immunization Gateway, HealtheRegistries, Telehealth Capabilities and completion of Phase 1 of the Individual Longitudinal Exposure Record, which puts the exposure record into the Joint Longitudinal View (JLV). Other enhancements include the Opioid Registry, Burn Unit PowerForm, joint HIE and direct messaging.

The federal EHR continues to evolve as experiences with the federal EHR drive lessons learned, best practices and enhancements. In particular, the FEHRM, DOD, VA and Captain James A. Lovell Federal Health Care Center (FHCC) stakeholders are leading the deployment of the EHR at FHCC. This deployment will lead the way for how two health care systems can work together to make the best care decisions without technology being a barrier. The FEHRM will converge configurations, integrate processes and harmonize workflows between DOD and VA as part of deploying the federal EHR at FHCC. This work will evolve the federal EHR baseline to better serve providers and patients at both Departments and enhance interoperability.

Additionally, the amount of participating private sector partners DOD, VA and USCG share data with via the joint HIE is rapidly expanding. The FEHRM anticipates sharing data soon with more than 90 percent of private sector hospitals. With a vision for federal organizations to share a single, common EHR and meaningfully exchange and use data with community providers, patients will benefit from a continuity of care that spans across health care systems.

The collective EHR effort continues to improve and expand. As of December 2021, there are more than 65,000 DOD, VA and U.S. Coast Guard (USCG) federal EHR users (physicians, nurses, etc.) at 47 DOD Commands, two VA Medical Centers and 109 USCG sites. There is recognition that the federal EHR saves providers time and enables more standard workflows to support enhanced clinical decision-making and patient safety.

FEHRM Activities Toward Implementing A Single, Common Federal EHR

The FEHRM Role in the Federal EHR Space

The FEHRM delivers common capabilities in support of the shared mission of the DOD, VA, USCG and other partners to deploy a single, common federal EHR. These common capabilities refer to the common solutions, tools and activities DOD, VA and USCG identify as needed for them to effectively deploy the federal EHR. In the EHR space, the FEHRM leads common capabilities, while the DOD, VA and USCG lead EHR deployments.

The common capabilities the FEHRM delivers include:

- Managing the Federal Enclave, which is a shared environment to contain the federal EHR and supporting systems.
- Managing the joint HIE, a data-sharing capability.
- Overseeing configuration and content changes to the EHR that are agreed on by the Departments through a joint decision-making process facilitated by the FEHRM.
- Providing software upgrades and solutions to optimize EHR performance.
- Tracking joint risks, issues and opportunities as well as lessons learned regarding EHR implementation to inform continuous improvement.
- Maintaining an integrated master schedule to help coordinate EHR activities.
- Developing and updating deployment maps to show real-time status of deployments.
- Advancing interoperability, which is the meaningful use and exchange of data, to improve the continuity of care among and between public- and private-sector providers.
- Leading analysis and integration of deployment activities at joint sharing sites, sites where resources are shared between DOD and VA.

Value-added Activities Supporting EHR Modernization

Throughout the reporting period, the FEHRM delivered value-added capabilities integral to federal EHR modernization. The FEHRM supported multiple notable events that advanced the single, common federal EHR, including:

- Deployment of Joint EHR Software Capability Block 4.0, an upgrade that provided a range of technical updates to the federal EHR.
- Deployment of Joint EHR Software Capability Block 5.0, an upgrade that provided more than 600 enhancements for referral management, pharmacy, registration and documentation.
- DOD's go-live of Wave SAN DIEGO in March 2021.
- DOD's go-live of Wave CARSON+ in April 2021.
- DOD's go-live of Wave TRIPLER in September 2021.

- USCG's Wave Pacific EHR deployments.
- USCG's Wave ATLANTIC deployment, successfully completing the USCG's shoreside EHR deployment activities.
- Collaboration with the DOD to successfully deploy CommonWell manual enrollment to enable EHR users to manually enroll and link patients in August 2021; VA initiated a pilot of this new functionality.
- USCG's Wave ATLANTIC deployment, successfully completing the USCG's shoreside EHR deployment activities.
- Management of the Enterprise Operations Center to prepare federal EHR system owners and partners for go-live activities by providing insights into IT production events.
- Establishment of an electronic Joint Sustainment and Adoption Board (e-JSaAB) process for urgent and emergent issue resolution during off-hours to simulate real-world scenarios. This allows JSaAB co-chairs to be alerted about urgent items via email and text for emergent issue resolution during off-hours so they can be adjudicated and approved without a formal meeting. This effort included collecting lessons learned and improved processes for EHR deployment.
- Initiation of a new interface between the Joint Longitudinal Viewer and the Individual Longitudinal Exposure Record in March 2021, enabling the exchange of exposure data as part of the EHR.
- Development of Deployment Map Dashboards to show DOD, VA and USCG deployment data in real time.
- Creation of an onboarding process for new agencies to join the common EHR enterprise; hosted a meeting with National Oceanic Atmospheric Administration to discuss their requirements for EHR capabilities.
- Building a path forward for joint sharing sites by categorizing sites by level of integration and impact of the new EHR deployment to their operations; completing Discovery Assessment engagements with 14 prioritized sites to better understand the nature of sharing and the cross-Department touchpoints; and developing a Playbook for Asynchronous Deployment to guide joint sharing sites and the PMOs ahead of, and through asynchronous EHR deployments.
- Conducted an end-to-end assessment at FHCC to gather current state clinical and business process workflows.
- Completed the ballot reconciliation for the Health Level Seven® International (HL7) Dental Data Exchange project. The new ballots will be published as a new standard, establishing the technical foundation to start sharing computable dental data with private sector dental providers.
- Established a Federal Health IT Systems Work Group to advance federal agency health IT collaboration.
- Established Federal Interagency Terminology charter.

Implementing the Interoperability Modernization Strategy

The NDAA FY2020 directed the creation of a "comprehensive interoperability strategy with respect to electronic health records jointly developed by the Secretary of Defense and Secretary of Veterans Affairs." Pursuant to this direction, the FEHRM convened an Advisory Group of senior stakeholders to guide the effort, an Integrated Product Team (IPT) of key thought-leaders to operationalize the guidance and focused work groups of subject matter experts to refine details. The product was the DOD-VA Interoperability Modernization Strategy, a collection of 17 interoperability modernization objectives aligned under the four goals of the Federal Health IT Strategic Plan for 2020-2025.

The four goals of the DOD-VA Interoperability Modernization Strategy, which are derived from the Federal Health IT Strategic Plan for 2020-2025, are described below.

GOAL 1	**Promote Health & Wellness**
GOAL 2	**Enhance the Delivery & Experience of Care**
GOAL 3	**Build a Secure, Data-Driven Ecosystem to Accelerate Research & Innovation**
GOAL 4	**Connect Health Care & Health Data**

The FEHRM drafted and revised the Strategy document, and then delivered it to Congress in October 2020. Following the delivery of the Strategy, the team turned their attention to Phase 2 of the effort: identifying projects, programs and initiatives within DOD and VA that support the Strategy's objectives. The resulting list of 27 initiatives became the starting point for Phase 3: identification of key performance measures to mark progress toward the Strategy's objectives.

During CY2021, the initiatives were reviewed individually by the IPT's five subsidiary work groups of subject matter experts in the domains of clinical practice, benefits, population health, data standards and technical interoperability. Existing performance measures from each initiative were surfaced and new performance measures were outlined.

In total, 170 performance measures were identified. These performance measures were subjected to an additional round of scrutiny and prioritization, focusing on each measure's support of the Strategy's objectives and congressional priorities. After the review, a set of 37 performance measures were elevated and drafted into the DOD-VA Interoperability Modernization Strategy Performance Measurement Plan (PMP).

Interoperability Progress and Accomplishments

The FEHRM continues to pursue the highest level of interoperability for the delivery of health care. The FEHRM's partnerships with DOD, VA, USCG and the private sector advanced interoperability significantly. Under the FEHRM's leadership and guidance, the Departments and the private sector made significant progress in EHR interoperability. The following are examples of interoperability advancements during CY2021.

Joint Health Information Exchange

DOD and VA deployed the joint HIE in April 2020, and significantly enhanced the ability of VA, DOD and USCG staff to bi-directionally exchange Service member, Veteran and other beneficiary health care data securely with participating private sector providers for purposes of treatment. Throughout CY2021, the FEHRM continued to support enhancements, including updates to unattended searches (that rely on electronic matches) that will increase patient matches by revising the minimum traits required to match a patient when a Social Security number is not available. The FEHRM also continued to support efforts that enabled the Social Security Administration to receive documents from the federal EHR.

During the reporting period, the FEHRM also began its work with the Consolidated Clinical Data Architecture (C-CDA) standard. This effort is important to the work of the FEHRM because a large percentage of care for both DOD and VA beneficiaries comes from community providers. Further, the joint HIE went live with Diameter Health, which enables inbound and outbound C-CDA documents to be pushed from DOD/VA joint HIE to the VA Clinical Data Quality Tool for scoring of clinical quality and completeness, and subsequent sharing of reports between Departments.

To bring C-CDA into the future, the team published a clean version of the C-CDA companion guide in October 2021 and began a design cycle with HL7 for publication. HL7 creates a set of national and international standards that are released as implementation guides used to provide guidance for sharing data between various health care providers.

Today, the joint HIE connects to more than 65% of U.S. health care providers and facilities, delivers nearly 5 million documents to private sector partners and retrieves 40 million documents from private sector partners every month. Future efforts include completing Social Security Administration integration, continuing expansion with community partners and external networks (CareQuality), coordinating a private sector consent management

portal and migrating toward Fast Healthcare Interoperability Resources (FHIR) based exchange.

Joint Sharing Sites (JSS) Implementation Support

In CY2021, the FEHRM engaged in numerous planning, analysis and execution activities to support the unique health informatics, programmatic and technical needs at DOD/VA joint sharing sites ahead of DOD and VA EHR deployments. Due to shared personnel, space and/or services, DOD/VA joint sharing sites encounter distinct challenges with respect to both Departments' asynchronous EHR modernization efforts. The FEHRM collaborated with its interagency partners: DOD Healthcare Management System Modernization (DHMSM), VA Electronic Health Record Modernization Integration Office (EHRM-IO), Defense Health Agency Health Informatics (DHA HI) and Veterans Health Administration Office of Health Informatics (VHA OHI) to better understand clinical information sharing across joint sharing sites. The health informatics-led partnership, known as the Joint Workflow Assessment Working Group, executed a comprehensive four-month long discovery assessment effort completed in May 2021 to assess 13 tightly-integrated joint sharing sites for potential risks and issues. The joint DHA HI, VHA OHI and FEHRM team developed mitigation strategies, provided awareness and insight to EHRM PMOs and actively worked concerns to resolution.

The FEHRM partnered with DHMSM and EHRM-IO PMOs to resolve end-user provisioning for VA users impacted by DOD EHR deployment at Tripler Army Medical Center (TAMC).

To maintain clinical operations and mitigate patient safety risks, the FEHRM also developed interim-state enterprise joint process maps for the VA inpatient behavioral health unit embedded at TAMC.

The FEHRM, alongside its DHA HI and VHA OHI partners, evaluated the nature of sharing at DOD Wave HOOD and Wave BRAGG joint sharing sites to identify potential risks due to asynchronous deployment as well as determine the need for interim-state joint process maps for clinical processes to support ongoing operations after DOD go-live. Additionally, the FEHRM continues to provide pre-deployment support to DOD Wave BAMC and Wave LACKLAND joint sharing sites through the DOD go-live schedule in Q2 FY2022.

The FEHRM convened DHMSM and EHRM-IO stakeholders to evaluate patient care location (PCL) decision-making processes and their impact to EHR deployment at joint sharing sites as part of the FEHRM Risks, Issues, Opportunities (RIO) process. Department stakeholders and the vendors continue to evaluate courses of action to execute in CY2022.

The FEHRM started a Direct Messaging Clinical Proof of Concept initiative with the embedded VA staff at the David Grant Medical Center to assess the feasibility of leveraging Direct Messaging to manage interagency referrals across the VA legacy system and DOD MHS GENESIS during asynchronous deployment at the joint sharing sites.

Captain James A. Lovell Federal Health Care Center (FHCC) Federal EHR Implementation

The FEHRM leads the FHCC Federal EHR Implementation Project, in collaboration with DHMSM PMO and EHRM-IO. The project is following a four-phase approach for the development and deployment of the federal EHR at FHCC. In CY2021, the FEHRM led the project team through the completion of the first phase, Phase 0: Planning.

The first of the two major milestones within the Planning Phase was completion of the Initial Strategy and Plan in Q1 CY2021, which was developed through a multi-session event to establish the operating cadence for coordinating input between the requisite DOD and VA stakeholders to plan and execute a single FHCC implementation. The second major milestone in the Planning Phase was execution of the Executive Planning Session in Q3 CY2021. This in-person meeting at FHCC with leadership and key stakeholders provided an overview of the implementation strategy and phased planning approach to deliver a single federal EHR system at FHCC. Following these accomplishments, the FEHRM-led multi-agency team initiated Phase 1: Assessment and Design Concept.

In Q3 CY2021, the FEHRM directed the completion of the Preliminary Design Questionnaire (PDQ). This questionnaire contains an extensive set of questions and requests for information about the technical and clinical framework and processes, and operational layers and requirements, especially targeted to areas that will inform the federal EHR enterprise baseline.

Following completion of the PDQ, the FEHRM collaborated with DHMSM, EHRM-IO, DHA HI, VHA OHI and the vendor to conduct the FHCC End-to-End (E2E) Assessment in Q4 CY2021. These engagements assessed current state clinical, business, technical, functional/configuration and training processes. The E2E Assessment was held onsite over a period of five weeks and included more than 175 sessions with FHCC SMEs. The outputs include 84 joint current state process models, 46 completed functional configuration questionnaires and technical current state documentation that all serve as inputs to the Enterprise Requirements Adjudication (ERA) process.

Finally, in Q4 CY2021, in conjunction with the EHRM PMOs, the FEHRM developed and initiated the ERA process, a thorough, high-impact decision-making process focused on DOD and VA requirements and deployment approaches, where discrepancies exist. The ERA process aims to deconflict the build between DOD and VA, leverages existing governance boards and is driving towards convergence. Aspects of the ERA process will inform the FHCC Federal EHR Implementation Plan.

Individual Longitudinal Exposure Record

The Individual Longitudinal Exposure Record (ILER) is an IT system that aggregates information from numerous occupational health, exposure and deployment systems to produce a consolidated list of environmental and occupational exposures sustained by individual Service Members. One novel feature of ILER is its ability to correlate an environmental exposure event to an individual Service member based on the Service member's geographic proximity to the exposure event. This is a breakthrough capability that has the potential to construct an "exposure history" for each Service member in an accurate, objective and automated manner.

ILER's principal product is the Individual Exposure Summary (IES): a list of occupational and environmental exposures that the Service member may have sustained during their military service. ILER also has functionality for researchers and epidemiologists that allows the grouping of Service members who sustained similar exposures—so their health records can be monitored for trends that can inform updates to clinical practice guidelines and improve future evaluation and management. ILER can also be used by benefit claims examiners as a source of evidence to support a Veteran's claim for benefits.

The FEHRM maintains five lines of effort that aim to advance the implementation and adoption of ILER for clinical, public health, research and benefits communities:

1. **Functional Requirements for Use of Exposure Information in the Electronic Health Record** – The FEHRM convened a Clinical Functional Workgroup of DOD and VA clinicians to articulate how ILER-derived exposure information should be presented in the common federal EHR. Approximately 15 user stories were identified and are currently being detailed.

2. **National Standards for Exchange of Exposure Information** – As awareness of occupational and environmental exposures grows, so too will the need to exchange exposure information electronically between institutions. Two of the FEHRM's experts in standards and terminologies initiated a review of existing national standards to identify data structure and terminology standards that may support exchange of exposure information.

3. **Performance Measures for ILER Implementation** – As part of the DOD-VA Interoperability Modernization Strategy, members of the IPT identified ILER as a key interoperability initiative. Candidate performance measures were identified during Phase 3 of the DOD-VA Interoperability Modernization Strategy effort.

4. **Deliver Personal Exposure Record to Clinicians and Veterans** – NDAA FY2021 directed the Secretary of Veterans Affairs to provide Veterans with access to their ILER information through a website. The FEHRM contributed to delivering ILER's key product, the IES, to clinicians via the Joint Longitudinal Viewer (JLV). Plans are being

developed to deliver the exposure information directly to Veterans through the DOD and VA patient portals.

5. **Data Interface Between ILER and the Common Federal EHR** – Incorporating ILER-derived exposure data into clinical workflows requires the exchange of data between ILER and the common federal EHR. In 2021, the FEHRM initiated planning to convene data interface experts to support the interoperation of ILER and the common federal EHR.

Interoperability Standards

A successful interoperability ecosystem enables information sharing across the organization's boundaries to advance the effective delivery of health care for individuals and communities. Sophisticated and advanced policies, standards and technologies must come together for interoperability to realize effective health care delivery. The FEHRM analyzes standards and fosters the development of and establishes guidelines for the use of data standards that support seamless integration of health data between the federal EHR and legacy and community partner systems. In furtherance of its goals, the FEHRM collaborates with HL7 federal and industry partners and standards development organizations (SDOs) to advance national health data interoperability. As part of its NDAA FY2020 mandate, the FEHRM focuses on FHIR, which is a modern HL7 standard that leverages freely available internet technologies to securely exchange health information. Simultaneously, the FEHRM seeks to improve the interoperability of HL7 Clinical Document Architecture (CDA), which is a widely used XML-based document standard that defines the structure of certain medical records such as discharge summaries and progress notes. Below are the FEHRM interoperability standards initiatives and activities that are anchored to the FEHRM's mission.

- **Strategy Development:** During CY2021, the FEHRM developed the FEHRM Interoperability Standards Initiatives Strategy and Plan (2021) based on guiding principles derived from the NDAA FY2020, which directs the FEHRM to actively engage with national and international health standards setting organizations and advance interoperability across the federal and private sectors.

- **Promoting Standards Implementation:** The FEHRM began collaborative efforts with FHCC stakeholders by reviewing the FHCC Concept of Operations (CONOPS), Memorandum of Understanding (MOU) and Comments Matrix for privacy-related standards. The FEHRM updated the FHCC CONOPS document to reflect interoperability standards as a guiding principle and modified the breach language proposed by DOD to ensure alignment between DOD and VA breach response.

  In CY2021, ONC launched a new initiative called United States Core Data for Interoperability Plus (USCDI+) to provide a cutting-edge opportunity for federal

agencies such as DOD and VA to add specific data classes and elements that will operate as extensions to the existing United States Core Data for Interoperability (USCDI). The FEHRM held meetings with VA to discuss a collaborative opportunity to identify and analyze additional specific health data domains/classes and elements needed for USCDI+, with a focus on Veterans' health and wellness. The FEHRM and VA agreed to continue the effort and identify next steps to meet the USCDI+ requirements and accomplish the goal for VA.

- **Dental Data Exchange:** In CY2021, the FEHRM continued its efforts to advance data standards in the realm of cross-organizational patient data sharing. The FEHRM was instrumental in the development of both the *HL7 CDA R2 Implementation Guide: Dental Data Exchange, Release 1, STU 1 – US Realm* and the *HL7® FHIR Implementation Guide: Dental Data Exchange, Release 1 – US Realm,* which were formally published by HL7 and designed to facilitate care coordination and create best practices for the electronic exchange of patient data between dental and medical professionals. In ongoing efforts to develop and release the exchange of discrete dental observations among dental providers, the FEHRM collaborated with representatives from DOD, VA, American Dental Association (ADA) and the HL7 community to develop standards for Dental Data Exchange based on HL7's CDA and FHIR.

- **HL7 Da Vinci Project:** The HL7 Da Vinci Project (as known as Payer-Provider Health Information Exchange) brings together payers, providers and health care technology vendors, along with HL7, with a common goal of accelerating the adoption of HL7 FHIR as the standard to support and integrate value-based care data exchange across communities. Value based health care reimburses providers based on outcomes instead of the volume of services they provide.

- **Post-Acute Care Interoperability (PACIO):** Transitions between health care settings, including ambulatory care, acute care, long-term post-acute care, home and community-based services are often fragmented, leading to poor health outcomes, increased burden and increased costs. PACIO is a framework for the development of FHIR technical implementation guides and reference implementations that facilitate health data exchange through standards-based use case-driven application programming interfaces (APIs). The FEHRM contributed to PACIO in 2021 by monitoring and reporting on the standards used to share data on advance directives, including the data elements that will be a part of the advance directives template, and monitors and reports on the potential impact of decisions such as those related to the advanced directives template and data elements on the federal EHR.

- **CodeX:** CodeX promotes the use of FHIR in exchange of genomic and oncology data in EHRs. In the oncology space, CodeX integrates and tests the minimal Common Oncology Data Elements (mCode) FHIR Implementation Guide—an open standard

language for cancer data—within use cases that test new workflows supporting better cancer care and research. During CY2021, the FEHRM monitored and reported to stakeholders on the potential impact of decisions related to the exchange of oncology information and consideration of its use by the federal EHR to improve the care provided to Service members and Veterans. The FEHRM monitored developments in mapping mCode FHIR elements to the Observational Medical Outcomes Partnership (OMOP) Common Data Model (CDM) and how mCode application in public health registries can provide benefits to Service members and Veterans through eventual access from within the federal EHR.

- **Interoperability Standards Framework v9:** In CY2021, the FEHRM developed a draft of its Interoperability Standards Framework (ISF) v9, incorporating feedback from interoperability standards SMEs from across VA, DOD, USCG and ONC. Previously known as the Health Information Interoperability Technical Package (I2TP), the ISF serves as the formal reference of standards to be used for interfaces connecting to the federal EHR. This reference is used by both acquisition programs when developing requirements for planned integrations with the federal EHR, as well as by integration design teams, to validate their approach aligns with standardized integration methods the federal EHR supports.

- **Standards Adoption Assessment:** The FEHRM conducts Standards Adoption Assessment (SAA) activities to review the standards being used across interfaces with the federal EHR. Specifically, these assessments determine which versions of which interoperable health care data standards are in use within each interface and determines if those standards align with the FEHRM guidance for interface standards as published in the Healthcare Information Interoperability Technical Package (I2TP) v8. The SAA attempts to identify opportunities for improved standardization across similar interfaces and promote interoperability across the federal and private sectors by verifying adoption of recommended interoperability health care data standards in alignment with the FEHRM Charter.

  Recognizing more than 240 systems are connected to the federal EHR, in CY2021, the FEHRM analyzed 115 Interface Control Documents (ICDs) from those systems, containing details for 293 logical interfaces.

  In summary, the analysis completed shows nearly all the logical interfaces adhere to the standards defined by the I2TP v8; however, just over a majority adopted the recommended version of the standard defined for the logical interface.

Interoperability Engagements

- **Key Contributions/External Engagements (Federal and Industry):** The FEHRM engaged with multiple federal agencies and industries regarding health analytics and standards, data interoperability, and social determinants of health in predicting the wellness and health of a community. These events promoted the FEHRM's mission and priorities by enhancing interoperability and standards.

  In February 2021, the FEHRM submitted a poster abstract to the American Medical Informatics Association (AMIA) for the 2021 Clinical Informatics Conference (CIC) to discuss community determinants of health, with a focus on using U.S. state county-level data to infer the health and wellness of civilian communities and their National Guard and Reserve units.

- **Institute of Electrical and Electronics Engineers (IEEE) Engagements:** With an active portfolio of nearly 1,300 standards and projects under development, IEEE is a leading developer of industry standards in a broad range of technologies that drive the functionality, capabilities and interoperability of a wide range of products and services, transforming how people live, work and communicate. The FEHRM assists the Departments in standardizing data exchanges between medical/mobile-health devices and health information systems (e.g., EHR) by contributing to the development of conceptual frameworks and standards. The FEHRM also shared standards information with the Departments for P1752 mHealth, P2933 Clinical Internet of Things (IoT) Data and Device Interoperability with Trust, Identity, Privacy, Protection, Safety, Security (TIPPSS) and Life Science Technical Community Transforming the Telehealth Paradigm (LSTC).

  Notable activities included:
  - Developing a collaborative relationship with IEEE regarding engagement in Transforming the Telehealth Paradigm: Sustainable Connectivity, Accessibility, Privacy, and Security for All.
  - Collaborating with Life Science Technical Community (LSTC) members to narrow the scope in relation to telehealth technologies and services that can be provided feasibly in emergency situations, analyzing Section 508 compliance for emergency telehealth related communications and performing meta-analysis of academic research and publications to promote transparency and equity for clinical devices and telehealth services in situations such as hurricane seasons and pandemics (e.g., COVID-19).
  - Engaging in IEEE P1752 Main Work Group meetings to discuss specific use cases from the Metabolic Subgroup with a focus on blood glucose monitoring and security requirements for Bluetooth.
  - Engaging with P2933 (Clinical Internet of Things) Work Group and providing comments on the Protection, Safety and Security chapter of the proposed

standard with respect to the beneficial safety-related aspects of employing standards and reviewing the v3 draft of the Privacy Chapter of Clinical IoT Standard.

- **Office of the National Coordinator for Health Information Technology (ONC) Engagements:** During CY2021, the FEHRM continued collaboration with ONC stakeholders to further the progress of interoperability standards and the quality of health information exchange required by the Departments. In this effort, the FEHRM participated in numerous ONC engagements, including meetings, webinars and public comment periods to inform their work supporting the 21st Century Cures Act. The FEHRM continued representation with the Federal Health IT Advisory Committee (HITAC); the Federal Health IT Coordinating Council (FHIT CC); and USCDI and USCDI+ Workgroups. FEHRM engagements with ONC resulted in progress toward developing and issuing industry-wide specifications for representing and formatting patient addresses based on USPS standard and establishing, harmonizing and advancing the use of interoperable datasets.
  - Submitted more than 140 comments from DOD, VA and the FEHRM on the USCDI draft v2 to ONC.
  - Continued participation as a federal member of the ONC's monthly Project US@ initiative to develop and issue a unified, cross-standards development organization, health care industry-wide specification for representing and formatting patient address based on USPS standards.
  - Participated in the regular HITAC and ONC HITAC Annual Report Workgroup meetings. The FEHRM presented an update of the Interoperability Modernization Strategy at the November 2021 HITAC.
  - Participated in five Trusted Exchange Framework and Common Agreement (TEFCA) Federal Workgroup meetings that enhanced coordination between representatives from multiple federal entities engaged in health IT policies, programs, and oversight.
  - Coordinated final review by both DOD and VA of the final draft, pre-publication version of the 2022 Interoperability Standards Advisory (ISA) Reference Edition.
  - Hosted the first joint FEHRM-ONC-Center for Medicare and Medicaid Services (CMS) meeting on October 7, 2021, where leadership shared current and planned activities and opportunities to enhance overall federal interoperability and engagements and explore collaboration opportunities. Subsequent meeting on December 6, 2021, resulted in the FEHRM co-leading the collaboration on USCDI+, a service to federal partners who have a need to establish, harmonize and advance the use of interoperable datasets that extend beyond the core data in the USCDI to meet agency-specific program requirements.

- **Additional CY2021 FEHRM engagements with key federal stakeholders included the following:**
  - Hosted a quarterly FEHRM Town Hall for more than 100 participants on October 18, 2021, to inform the community on initiatives such as the VA Office of Research and Development Enabling Technologies for Rapid Learning Health systems (ENTHRALL) and the ONC the Public Health Informatics Technology (PHIT) Workforce Development Program. Additionally, the CMS provided a community update on Patient Access final rule (CMS-9115-F)(85 FR 25510).
  - Hosted the 11th FEHRM Industry Roundtable with a theme of "Protecting the Patient – The Role of Cybersecurity" on November 18, 2021, for nearly 200 participants, representing 77 industries and 20 federal agencies. Leaders from DOD, VA and USCG; ONC; and CMS discussed EHR modernization efforts and highlighted current and upcoming interoperability initiatives. Further, this engagement facilitated a panel discussion on the impact of Presidential Order 14028 – Improving the Nation's Cybersecurity, and Zero Trust Architecture on the federal EHR and patients.
  - Continued participation in the CMS-sponsored Post-Acute Care Interoperability (PACIO) Workgroup and PACIO Project Advance Directive Use Case Subgroup established in CY2021 to create FHIR implementation guidance for advance directives information interoperability.
  - Participated in HL7 Gravity Community Collaboration Project and Gravity FHIR Implementation Guide Technical (Patient Care) Workgroup Meetings to review and analyze inclusion of social determinants of health in standards and revision to the ICD-10. The FEHRM evaluated and voted on multiple domains, goals and interventions, which led to a formal Gravity Project ICD-10-CM submission representing needed terms from the project's consensus, evidence-based analysis of social isolation, psychological stress, intimate partner violence, Veteran status and elder abuse. The FHIR Implementation Guide Work Group focused on development and finalization of the Implementation Guide, workflows and preparations for the January 2022 HL7 Connectathon.

Metrics and Analysis (M&A)

The FEHRM monitors, analyzes and reports progress toward interoperability and health data sharing across the Departments and private sector as well as the execution of the Departments interoperability modernization strategic goals and objectives.

- **M&A Roadmap:** FEHRM leadership signed the M&A Roadmap on December 22, 2020. In December 2021 the FEHRM released version 4.0. The M&A Roadmap prioritizes the measure identification, analysis and reporting activities for FY2022, articulates supporting methodologies and defines associated deliverables.

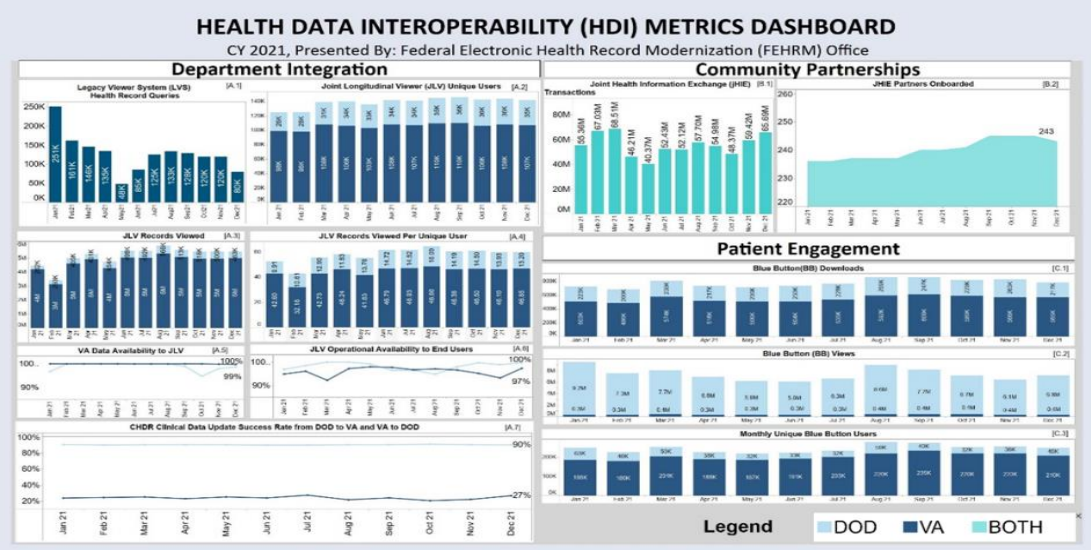
- **M&A Integrated Product Team (IPT):** Chartered on September 3, 2020, the FEHRM established the M&A IPT to advance and harmonize interoperability modernization measurement and reporting among the Departments and other federal partners. In CY2021, the M&A IPT combined efforts with the Interoperability Modernization IPT to develop a performance measurement plan (PMP) to identify measures to monitor and report on progress towards interoperability modernization efforts in support of the IM Strategy. Going forward, the M&A IPT's focus includes the development of measure specifications to support FEHRM priorities (e.g., Individual Longitudinal Exposure Record, FHCC EHR deployment and EHR modernization) and other measures proposed in the IM Strategy PMP.

- **HDI Measurement Framework:** First established by the M&A IPT in 2019, the FEHRM continues to examine the HDI Measurement Framework and revise its four interoperability Dimensions: 1) community partnerships, 2) department integration, 3) patient engagement and 4) standards and measurement categories to better reflect the evolution of monitoring and reporting for the FEHRM. The HDI Measurement Framework provides a structure for harmonized reporting of progress towards interoperability modernization across Departments and with community partners. The FEHRM continues to collect data and provide trended analysis and summary results from the quarterly HDI Metrics Dashboard as input to the Interoperability Progress Quarterly Report to Congress, the quarterly presentation brief to the Executive Committee (EXCOM) and the FEHRM Annual Report to Congress. As deployment of the federal EHR is expanded, the FEHRM will continue to actively collaborate with stakeholders from the Departments and other federal partners to identify new metrics for reporting as data availability evolves.

- **HDI Metrics Dashboard:** During the reporting period, the FEHRM routinely evaluated HDI metrics to track progress toward modernization and enhancement of interoperability. Within the HDI Metrics Dashboard, each metric is displayed in its own graph (Figure 1**Error! Reference source not found.Error! Reference source not found.**). These graphs are grouped together based on their interoperability dimension (per the HDI Measurement Framework). The HDI Metrics Appendix is a more

comprehensive document and includes each individual metric visualization as well as a thorough description of each metric and analysis of its change.

Figure 1: Baseline Health Data Interoperability Metrics



FEHRM Interoperability Goals for CY2022 and Beyond

Looking ahead, the FEHRM will continue to operationalize and focus on convergence in its effort to advance interoperability and drive the federal EHR. To achieve these goals, the FEHRM will:

- Continue its unifying efforts and delivery of common capabilities that add value to deployments including the EHR baseline; configuration and content management; software releases and upgrades; the Federal Enclave; cybersecurity; and virtual health.
- Maintain an integrated master schedule.
- Track joint risks, issues and opportunities.
- Manage the joint HIE.
- Position itself as the single operator of the federal EHR.
- Identify and lead joint sharing site efficiencies and opportunities.
- Capture lessons learned to inform continuous improvement.
- Lead efforts to onboard federal agencies to the federal EHR.
- Expand communications to ensure continued stakeholder engagement.

Implementation Milestones

Federal EHR Evaluation

An agreement was established with an independent entity, MITRE, to conduct an evaluation that confirms both the interoperability of the federal EHR and the ability for DOD and VA clinicians to access and meaningfully interact with a complete patient health record regardless of the source of the information (i.e., the federal EHR, DOD and VA legacy EHRs and available private sector health data sources).

With the adoption of a single, common federal EHR, the health care records that are in the same DOD and VA system result in inherent interoperability. Providers can view health data and treatment information created across all VA and DOD treatment facilities. However, DOD and VA are currently in a hybrid state as the federal EHR is being deployed.

Interoperability requires aligning the complex ecosystem of DOD, VA and other federal partners with private sector care, operational medicine, medical devices, third-party applications and legacy DOD/VA health records (as well as paper records) outside of the federal EHR. The FEHRM, in collaboration with MITRE, is engaged in a multi-phased evaluation to assess the current state of interoperability.

Due to VA's strategic review and its corresponding deployment schedule impact, testing as required by NDAA FY2020 of the interoperability was not possible in CY2021. Despite these deployment delays, the FEHRM proceeded with establishing the context of this evaluation and its relationships to previous and on-going evaluations in the federal EHR ecosystem, to further the multi-phase EHR evaluation.

Phase 0 of this evaluation is an assessment of the context of how the Federal Enclave interacts with the rest of the ecosystem, leveraging the contributions of other evaluations. Phase I of this evaluation will be performed at a level 4 joint sharing site that received the federal EHR. The FEHRM worked with DOD and VA to identify a schedule-dependent level 4 joint sharing site—Anchorage, Alaska—to host the Phase I evaluation of requirements as outlined in the NDAA FY2020. This phase will begin three months after deployment to a Level 4 sharing site. The evaluation's Phase II will be performed at FHCC, a Level 5 sharing site, three months after it has received the federal EHR. Outside of the scope and execution of the NDAA FY2020 evaluation are additional use cases that the FEHRM intends to explore such as patient experience, deployed operational medicine, medical devices and data ownership. The FEHRM will continue to advise on the study's completion timelines in accordance with the adjusted EHR deployment schedule.

Convening an Annual Meeting

During CY2021, the FEHRM convened the first-ever Federal EHR Annual Summit of clinical staff from DOD, VA and USCG; community providers; and other leading clinical experts to assess the use of the federal EHR. Participants engaged in valuable discussions on opportunities for enhancing the federal EHR to better serve Service members, Veterans and other beneficiaries. The summit allowed end users to provide valuable feedback to FEHRM, DOD and VA leadership.

More than 500 individuals registered for the three-day event, including congressional staffers and the VA Office of Inspector General. The summit allowed end users to provide valuable feedback to FEHRM, DOD and VA leadership. During the event, end users identified the patient portal, workflows and report functionality as the top three areas needing improvement. This, and other EHR input, helped produce more than 170 items in the form of questions and comments, as well as 40 actionable items for follow up with DHA and VHA Solution Owners and to determine if change requests are required to enhance the experience of the EHR.

Comments and feedback collected during the FY2021 Annual Summit, which highlighted training or workflow recommendations, were provided to DHA HI/DHMSM and VHA/EHRM-IO for review and consideration. During CY2021, the FEHRM worked with the DHA-HI/DHMSM and VHA/EHRM-IO Training and Configuration Teams to mitigate, solve or highlight training items identified during the summit, and close out open action items.

Patient Satisfaction Survey

During CY2021, the FEHRM continued to collaborate with DOD and VA patient and clinician satisfaction SMEs to establish common instruments and methodologies to survey and measure clinical use and satisfaction with the federal EHR. The FEHRM enacted this collaborative effort to equally assess satisfaction across DOD and VA, save government resources and reduce overall costs.

The survey instruments used for both clinician and patient satisfaction are nationally recognized: The KLAS Arch Collaborative for Clinician Satisfaction and The Consumer Assessment of Healthcare Providers and Systems Health Information Technology (CAHPS-HIT) item set for Patient Satisfaction. The Joint EHR Patient Satisfaction item sets were jointly selected and successfully included in the latter part of CY2021 surveys for both DOD and VA. The CAHPS-HIT item received approximately 2,800 responses from DOD legacy and federal EHR deployed sites while VA received 399 responses from active federal EHR sites. Results and responses are recorded monthly for both VA and DOD surveys and will continue to be analyzed for the remainder of CY2022 to capture longitudinal trends and analysis of Cerner deployment impact. Results will be relayed to the Patient Satisfaction Working Group for comparison across DOD and VA.

As for Clinician Satisfaction surveys, there is a plan to deploy the surveys in CY2022 for DOD and VA end users and the results analyzed and reported via the FEHRM.

Maintaining a Configuration Baseline

During CY2021, the FEHRM initiated management activities for maintaining the configuration baseline for the federal EHR. Accomplishments include:

- **Joint Functional Requirements Process (JFR)**: In late CY2021, the FEHRM initiated the project for standing up the Joint Functional Requirements (JFR) process for DOD, VA and other federal agencies. The JFR process will aid in the Departments' joint efforts for navigating the functional-business need planning and defining phases of the overall Requirements Management (RM) process, on the single federal EHR platform. To support the FEHRM's primary mission of implementing a federal EHR, establishment of a formalized approach to prioritizing functional requirements is an initial step toward system wide convergence.

- **Joint Configuration Management:** The FEHRM manages and optimizes the Joint Sustainment and Adoption Board (JSaAB). This joint governance body is responsible for the approval of all federal EHR content and configuration changes. The JSaAB directly informs the Joint Change Control Board (JCCB) and is essential to operating the single, common federal EHR, providing DOD, VA and USCG functional oversight of all configuration decisions impacting the production baseline.
  - For CY2021, the JSaAB approved more than 1400 items, including 23 changes directly related to COVID-19 response and 22 changes approved and implemented during the go-live events. The FEHRM coordinates an e-JSaAB process for urgent and emergent issue resolution during off-hours. It was successfully used 48 times in CY2021.
  - The FEHRM manages the Functional Decision Group (FDG), which is a body of senior clinical, business and health informatics leaders from EHRM-IO, VHA and DHA. The FDG reviews, analyzes and decides on critical joint issues that apply to the federal EHR.
  - During the reporting period, the FDG continued to monitor the Program Management Office (PMO) technical communities who were tasked to address the need for allergy and medication checks, to cross between both Departments' legacy and modern EHR systems. These checks continue with a proposed technical implementation in Q4 FY2022. The FDG continued to expand on an initiative to evaluate proposed DOD and VA configuration change requests for convergence.
  - In CY2021, the FDG staff evaluated the possibility of combining Functional SME Councils into joint DOD/VA Councils. Currently under development and review by FDG is to establish a much needed, high-impact joint DOD VA Federal Oncology Working Group (FOWG) to address joint oncology workflows and therapeutic

treatment regimens. FOWG was initiated with early success in converging high level oncology regimens while maintaining flexibility for unique protocols (e.g., research) across both Departments. The FEHRM anticipates the formalization of the FOWG and other working groups via FEHRM-sponsored charters in the future. Additionally, DOD and VA established common pre-production training and access requirements to ensure the user experience is consistent across the common platform. The FDG supported the development of a Federal Rules and Alert Working Group (FRAWG) to evaluate, optimize and normalize rules and alerts converging on a common user experience.

  - The FEHRM established and maintains a RIO process to actively manage risks, issues and opportunities that may negatively or positively impact deployment of the federal EHR. Each RIO item is categorized according to the joint functions listed in the FEHRM Charter. High priority RIO items are closely tracked and reported to leadership.

- **Joint Record Release of Information (ROI):** In Q3 CY2020, the FEHRM launched the Patient-Initiated ROI effort—initiated in direct response to congressional interest in developing a single pathway for requesting and delivering health records from DOD and VA sources. The FEHRM tasked the Health Information Policy Workgroup with clarifying departmental policies and defining the requirements of which documents be released to patients. In October 2021, the Health Information Policy Group, Defense Health Agency Patient Administrative Division and VA Health Information Management Leads submitted proposed definitions of the longitudinal health record and the mapping of a comprehensive, system-agnostic inventory list of all components of both VA and DOD health records. The deliverable contains a workbook that identifies VA and DOD health record components that are similar between the agencies and those that are unique to an agency in legacy EHR systems.

- **FEHRM Revenue Cycle/Business Processes:** In CY2021, the FEHRM completed the development and approval of Referral Management (RM) of system agnostic joint business requirements for ambulatory services (VA to DOD and DOD to VA), as well as ancillary services (i.e., laboratory and radiology).

  In CY2021 Q3, the FEHRM completed the development and approval of Interim-State Enterprise Joint Process Maps (ISEJPMs) to reflect referrals of VA patients to DOD services (in the direction of VA Legacy to DOD MHS GENESIS). The team closely collaborated with the DOD/DHA Business Functional Champion, DHA Unified Business Office (UBO), DHA Referral Management (RM) Working Group, DHA Healthcare Optimization Division, DOD/VA Program Office, VA/DOD Health Affairs Medical Sharing Office, VHA Office of Community Care Clinical Integration, VHA Business Operations Administration (BOA), and VA Payment Operations and Management (POM). The FEHRM/DHA/VHA team completed development and obtained executive leadership approval of:

  - Two interim-state enterprise process maps for ambulatory referral management at collocated and non-collocated staff facilities (VA to DOD), and
  - One interim-state enterprise process map for self-presenting/emergency referral (VA to DOD)

  In Q3 of CY2021, the FEHRM closely collaborated with DHA HI, VHA OHI, Tripler AMC, DOD and VA Behavioral Health Tripler Clinical Staff, DHA Business Functional Champion (BFC), DHA Clinical Functional Champion, DHA Solution Owners, VA/DOD Medical Sharing Office (MSO) and DHMSM Site Deployment Team to develop and obtain approval of ISEJPMs in five different scenarios pertinent to RM between embedded inpatient VA unit and the parent DOD facility.

  In Q4 of CY2021, FEHRM initiated the development of ISEJPMs to reflect referrals of DOD patients to VA services (in the direction of DOD MHS GENESIS to VA Legacy).

- **Joint Enclave Data Management:** The reporting period saw several ongoing efforts to address joint data management. The FEHRM stood up several joint DOD/VA groups with different focus areas including Cerner code sets, terminology and data governance. In CY2021, the FEHRM launched a project to apply the emerging Joint Executive Committee (JEC) data management strategy to a practical operational plan for the Joint Enclave. In partnership with joint stakeholders, the group sketched out a draft data governance structure to define data management activities under a unified understanding of responsibilities across DOD, VA and the FEHRM.

  In CY2021, the FEHRM stood up an executive body, Executive Data Management Board (EDMB), which functions as the formal Data Management and Governance of FEHRM Data Assets. The EDMB serves as the authorizing and prioritizing function for joint data management activities impacting the Federal Enclave. Under the executive body, data and analytics will be governed by the Data Governance Board (DGB) and Analytics Governance Board (AGB), respectively.

  Processes and workflows were developed to coordinate work across these new boards with a focus on efficiency, effectiveness and traceability. To further realize these areas of focus, the workflows and processes were built into an existing ticket management solution.

  The Federated Interagency Terminology Service (FITS) continued to engage with the vendor and Departments in collaboration to manage critical terminology projects. The FEHRM terminologists completed review and mappings of FITS 006 LOINC codes to Cerner Millennium Note Type for flow of clinical notes inbound to Cerner. This work was forwarded to VA Knowledge Base Systems (KBS) terminologists for final review. The FEHRM continues to monitor and normalize JLV and Clinical Data Repository/Health Data Repository (CHDR) legacy and Cerner clinical domains such as Medication Status (FITS011), allergens, medications, labs and document types.

- **Joint Technical Activities:** The FEHRM hosted 19 Joint Technical Activity (JTA) sessions, including Environment Management Operations Center (EMOC) activities in partnership with DOD, VA and USCG chief engineering teams; their respective program offices; their prime vendors; and key stakeholders responsible for the federal EHR ecosystem. These JTAs provide a series of technical discussions to solve joint challenges impacting the federal EHR in support of the intense schedule of go-live activities throughout CY2021.

- **Identity, Credential and Access Management (ICAM):** Ensuring the right information is provided to the right person at the right time is a foundational requirement for the federal EHR. In CY2021, the FEHRM facilitated technical working sessions with technical stakeholders from DOD, VA, USCG and enabling partners (e.g., Defense Manpower Data Center) in the evaluation of the four proposed unique identifier solutions. This eventual unique identifier will also support other federal agencies that adopt the federal EHR. The FEHRM anticipates completing this collaborative analysis in Q3 FY2022.

- **Federal Enclave Management and the Health Report:** The Federal Enclave plays a vital role in ensuring the federal EHR evolves to meet needs of the patients, providers and administrators who rely on it. In CY2021, the FEHRM, working with the Department's SMEs and vendors, developed process flow diagrams depicting how the Departments manage (i.e., sharing and updating) the Federal Enclave's domains. The federal government began standardizing the federal software release naming and numbering nomenclatures at the behest of the FEHRM, which will be used by all partners for capability releases and go-lives. The target for having the federal software release nomenclature standardized is Q3 CY2022.

  The FEHRM implemented a "Federal Enclave Health Report" to consolidate objective data from multiple agency-specific data sources to show the status of system deployment and the availability of the Federal Enclave. By pulling together and presenting month-over-month deployment progress and system availability trends, the Federal Enclave Health Report depicts the maturation of how the Federal Enclave, including the 36 discrete solutions within it and the numerous external solutions accessing it.

- **Enterprise Operations Center (EOC):** The EOC activity is a critical component of operationalizing the FEHRM. The EOC prepares the federal EHR system owners and partners in the ecosystem for the intense schedule of go-live activities. The EOC continued to support cross-organizational collaboration and executive level reporting on the Federal Enclave and ecosystem during federal go-live events. In CY2021, the EOC provided daily joint executive level briefings and updates for three DOD, one VA and two USCG go-live events—completing the USCG incorporation into the federal EHR. These briefings include root cause and corrective actions taken for unplanned incidents impacting the federal EHR and an overview of planned activities which could impact FEHRM partners. The EOC activity added value to the federal EHR through the following

activities: automating analysis tools, enabling shared agency reporting, refining response processes, participating in joint problem management improvement efforts, sharing observations regarding traceability of incidents and changes in the ecosystem, and continuing to expand and enrich stakeholder engagements.

- **Cybersecurity – Cyber Tabletop:** Consistent with the direction contained in Executive Order 14028, the FEHRM undertakes a series of focused exercises to evolve the cybersecurity posture of the federal EHR to include prevention, detection, escalation and response coordination. In CY2021, the FEHRM conducted a "Black Swan" tabletop exercise with technical SMEs from DOD, VA and their commercial partners.

- **Cybersecurity – Joint Incident Management Framework:** Foundational to the cybersecurity posture of the federal EHR is documenting and optimizing a framework for responding to cybersecurity incidents. The FEHRM is maturing an overarching incident management framework and associated processes that will continue to guide responses to cybersecurity incidents impacting the Federal Enclave. The FEHRM initiated an analysis of Incident Management Plans used by DOD, VA, the Leidos Partnership for Defense Health and Cerner.

- **Cybersecurity Risk Mitigation:** Consistent with its charter to orchestrate the joint cybersecurity program, the FEHRM continues actively addressing cybersecurity risks to the Federal Enclave. In CY2021, the FEHRM confirmed how the Federal Enclave complies with National Institute of Standards and Technology (NIST) and DOD cybersecurity requirements. Part of this evaluation focuses on onboarding activities to help federal agencies adopting the federal EHR meet applicable NIST and DOD guidelines.

The above efforts serve as a driving force for the FEHRM and Departments to get to an integrated plan for the federal EHR and work through technical issues as they deliver capabilities.

FEHRM Financial Summary

Amounts Expended for FEHRM Activities and Purpose

In support of these activities, during CY2021, the FEHRM obligated a combined total of $27.148 million from DOD and VA funds (Figure 2). These funds were allocated toward civilian employees and Public Health Service Officers' salaries, rent, general management and administration, program management, engineering and testing support, functional community requirements and software licenses and maintenance.

The FEHRM expended $27.914 million from DOD and VA funds in CY2021. The difference between what was obligated and expended resulted from changes in programmatic contract support.

Figure 2: CY2021 Financial Summary

FEHRM CY 2021 Funding ($ 000s)			Combined Department Obligations ($ 000s)	Combined Department Expenditures ($ 000s)
DOD	**Allocations**	**Expenditures**		
Application / Software	$ 2	$ 2		
End User / Other	$ 49	$ 49		
IT Management / External Labor	$ 8,347	$ 9,113		
IT Management / Internal Labor (DHA Civilian)	$ 1,627	$ 1,627		
IT Management / Other	$ 219	$ 219		
IT Management / Outside Services	$ 459	$ 459		
DOD Total	**$ 10,702**	**$ 11,468**		
VA	**Allocations**	**Expenditures**		
EHRM IO				
Labor - Government Employee Costs	$ 312	$ 312		
Labor - Support Contract Costs	$ 13,581	$ 13,581		
OIT				
Labor - Support Contract Costs	$ 1,968	$ 1,968		
VHA				
Labor - Government Employee Costs	$ 584	$ 584		
Other Non-Descriptive Costs	$ 1	$ 1		
Travel and Lodging Related Costs	$ 1	$ 1		
VA Total	**$ 16,446**	**$ 16,446**		
Total Calendar Year 2021 Funding ($ 000s)			**$ 27,148**	**$ 27,914**

This table captures allocations and expenditures as reported to the FEHRM by the Departments. Regarding the accounting in the table, VA does not directly provide funding to the FEHRM. Rather, VA maintains control of the funding and provides resource support to the FEHRM as requested. As such, the FEHRM does not have direct access or visibility into the VA financial management system.

The funding provided to the FEHRM is insufficient to carry out the activities of the office. Leadership from both Departments have yet to come to an agreement on how the FEHRM is to be resourced and staffed as per NDAA FY2020. Inadequate funding has limited the FEHRM's ability to perform activities mandated in the NDAA and FEHRM Charter, as

identified in the U.S. Department of Health and Human Services Office of Inspector General (OIG) 2022 Joint OIG Report and an independent study performed by the Mitre Corporation.

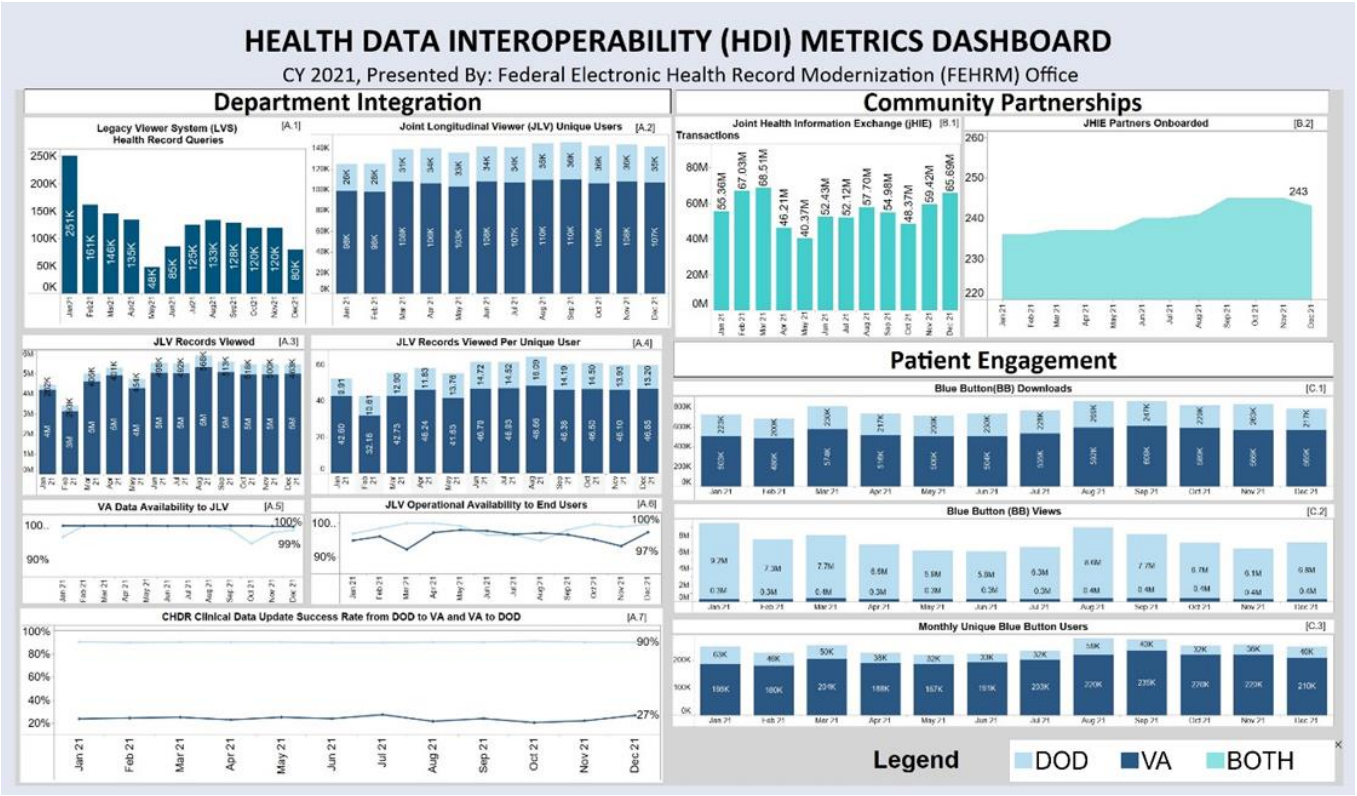
Appendix A: HDI Metrics Details

HDI Metrics Details: Throughout CY2021, the FEHRM, DOD and VA continued to collaborate to monitor baseline Health Data Interoperability (HDI) metrics and the progress toward modernization and enhancement of HDI by both Departments. Each section shows a different interoperability dimension, as derived from the FEHRM's HDI Measurement Framework: (A) Department Integration, (B) Community Partnerships and (C) Patient Engagement. Error! Reference source not found.Figure 3: CY2021 HDI Metrics Dashboard

represents a snapshot of the CY2021 HDI Metrics Dashboard. Detailed explanations of the metric trends follow Figure 3: CY2021 HDI Metrics Dashboard

. A snapshot of each individual metric is detailed, noting the change between quarters and any changes to systems that could result in potential impacts (for example, infrastructure outages or patches as well as new capabilities such as the joint HIE).

Figure 3: CY2021 HDI Metrics Dashboard



CY2021 Highlights: Metrics with a notable change during CY2021 are captured in Table 1.

Table 1: CY2021 Calendar Year Highlights

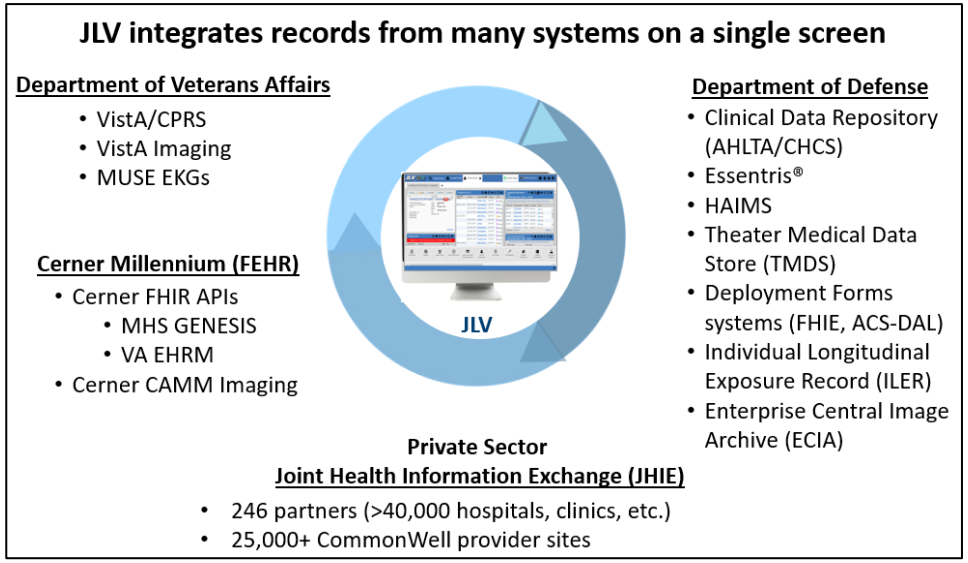
Metrics with a Notable Change in CY2021	Yearly Delta	Supporting Information
Metric A.3: JLV Records Viewed	116.97% increase between CY2020 and CY2021 to 5,364,261 transactions	The increase in DOD JLV usage was driven by the deployment of MHS GENESIS and increased training at DOD clinical sites in Wave CARSON+ during Q3 FY2021.
Metric B.1: Joint Health Information Exchange (joint HIE) Transactions	131.12% increase between CY2020 and CY2021 to 668,191,405 transactions	The increase in the total number of joint HIE transactions was driven by: • An increase in appointments at both DOD Military Treatment Facilities (MTFs) and VA Veterans Affairs Medical Centers (VAMCs) causing an increase in pre-fetch joint HIE transactions. • An increase in JLV usage from MHS GENESIS and VA EHRMIO wave deployments. • An increase in JLV usage from JLV training and increased awareness of joint HIE capabilities.
Metric C.1: Blue Button Downloads	62.54% increase between CY2020 and CY2021 to 229,953 average monthly downloads	The increase in the number of Blue Button Downloads was driven by: • Patients accessing their COVID-19 test results and vaccination records using Blue Button's Health Record. • TRICARE Online (TOL) gaining nearly 10k new users per week during quarter two of FY2021. • Patients accessing their health records from the 'legacy EHR' (AHLTA). Some patients believe they need the historical records if their provider team transitioned to MHS GENESIS.

DOD and VA use the following software applications and tools to support EHR data interoperability:

Joint Longitudinal Viewer (JLV): *The JLV, released in 2013, is a web-based graphical user interface that was jointly developed by DOD and VA to provide a near real-time, integrated and chronological view of EHR information. It allows clinicians to view an integrated, read-only display of patient data from DOD, VA and joint HIE civilian partners within a single application. JLV retrieves clinical data from numerous native data sources and systems, displayed in* ***Figure 4: JLV Data Sources and Systems***

1. .

Figure 4: JLV Data Sources and Systems



2. **Joint Health Information Exchange (HIE):** The joint HIE is a secure network that shares Veteran and Military Health System beneficiary health care information electronically with civilian network providers who join the eHealth Exchange and CommonWell. Private sector partners who join undergo stringent security requirements to access patient records and health information securely, regardless of if the facility is a civilian provider, military hospital or clinic or VA Medical Center.

3. **DOD Clinical Data Repository/VA Health Data Repository (CHDR):** CHDR enables DOD and VA to exchange computable outpatient pharmacy and drug allergy information for shared patients. To achieve computable interoperability, each clinical

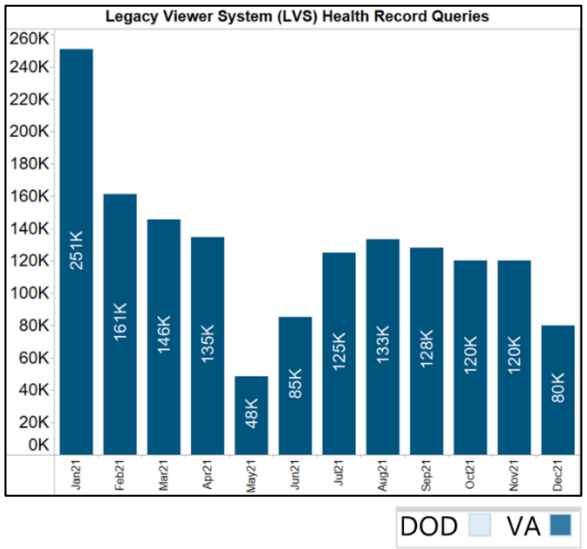
component data is first standardized to a mutually agreed upon mediating vocabulary that both systems comprehend, and provide decision support, such as drug-allergy or drug-drug interaction checks.

4. **Blue Button:** Blue Button enables patients from DOD and VA to access their personal health data from their EHR, including allergies; laboratory and radiology results; vital signs; and outpatient medications, problem lists and encounters. The new MHS GENESIS Patient Portal also allows TRICARE beneficiaries to exchange secure messages with their care team; schedule medical and active duty dental appointments online; access notes, labs and medications; and request prescription renewals online.

   The FEHRM, DOD and VA expand HDI by improving the more than 5.4 million patient records currently shared monthly between the two Departments, as defined by the total number of JLV records viewed by the Departments reported as of December 31, 2021.

Category A: Department Integration

Value Statement: The FEHRM tracks utilization of legacy and modern EHRs, which enables departmental leadership and Congress to assess the reliability of legacy systems and evaluate the Departments' progress in transitioning from legacy systems to the single, common federal EHR.

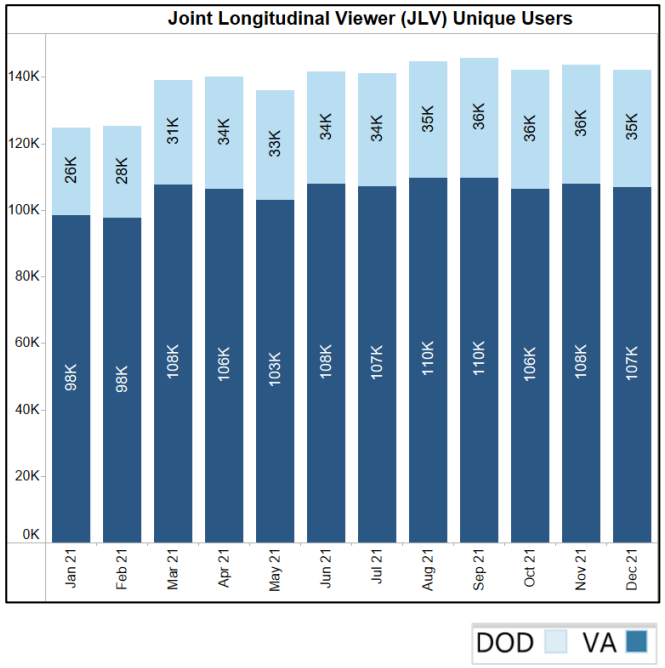


Metric A.1: Legacy Viewer System (LVS) Health Record Queries

Definition

Total number of health record queries made by DOD and VA to the Federal Health Information Exchange/Bidirectional Health Information Exchange (BHIE) Framework database using Computerized Patient Record System (CPRS) Remote Data View per year. Note: DOD discontinued use of the LVS in April 2019, so the data are no longer reported.

VA	Change	Impact Factors
▼	The total number of health record queries decreased by 31.30 percent between CY2020 and CY2021 to 1,533,031 queries.	The total number of health record queries for CY2021 was 1,533,031. The decrease in the total number of health record queries by VA users was driven by: 1) Planned downtime to address duplicate records in MedRec (enables practitioners to compare similar medications side by side), which is connected to CPRS and queries the BHIE. 2) A VistA patch install at VA clinical sites in April 2021. The patch resulted in a significant drop in queries from VA clinicians seeking access to DOD patient data during the quarter. The issue was corrected in June 2021 and query numbers have since returned to expected levels.

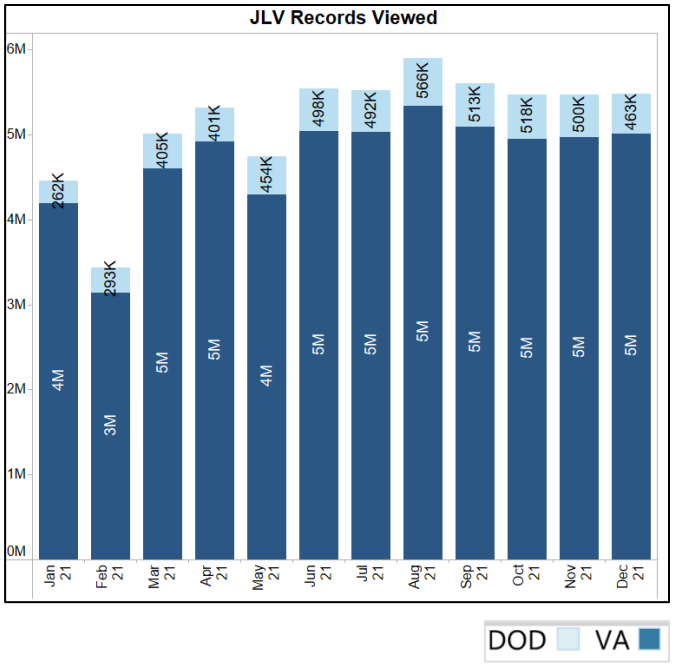


Metric A.2: JLV Unique Users

Definition

Monthly average number of active unique users (i.e., a user who has logged on during a specific month) recorded by the JLV for DOD and VA.

DOD	Change	Impact Factors
▲	The average monthly number of active JLV unique users increased by 38.57 percent between CY2020 and CY2021 to 33,168.	The increase in DOD JLV usage was driven by the deployment of MHS GENESIS and increased training at DOD clinical sites in Wave CARSON+ during Q3 FY2021.
VA	**Change**	**Impact Factors**
▲	The average monthly number of active JLV unique users increased by 17.11 percent between CY2020 and CY2021 to 105,725 users.	There are no factors of note.

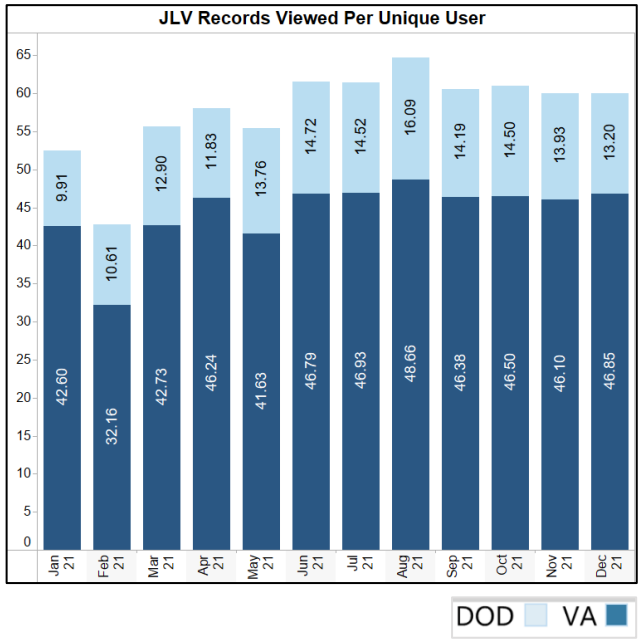


Metric A.3: JLV Records Viewed

Definition

Yearly total number of patient records viewed using the JLV for DOD and VA.

DOD	Change	Impact Factors
▲	The total annual number of JLV records viewed increased by 116.97 percent between CY2020 and CY2021 to 5,364,261.	The increase in DOD JLV usage was driven by the deployment of MHS GENESIS and increased training at DOD clinical sites in Wave CARSON+ during Q3 FY2021.
VA	**Change**	**Impact Factors**
▲	The total annual number of JLV records viewed increased by 33.80 percent between CY2020 and CY2021 to 56,570,867.	The increase in VA JLV usage was driven by greater awareness of JLV in the field and a heightened need to use JLV due to the federal EHR deployment at the Mann-Grandstaff VAMC.



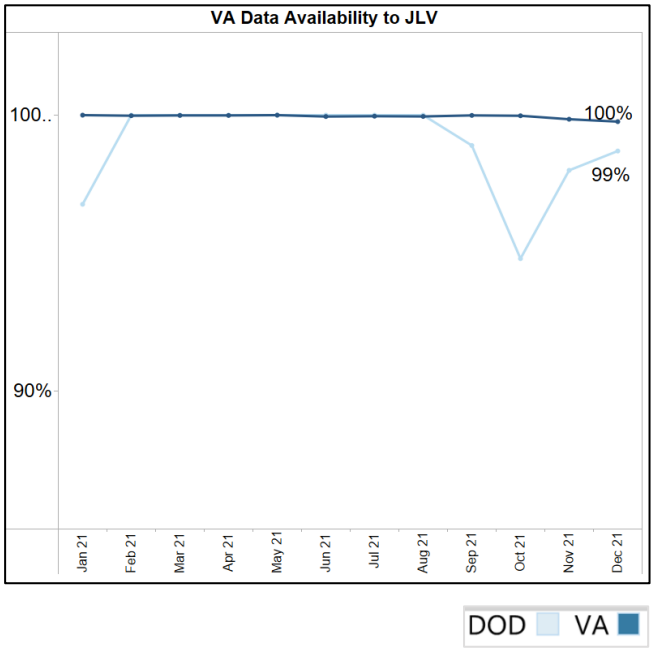
Metric A.4: JLV Records Viewed Per Unique User

Definition

Monthly average number of patient records viewed using the JLV for DOD and VA per active unique user.

Calculation: JLV Records Viewed divided by JLV Unique Users.

DOD	Change	Impact Factors
▲	The average monthly number of JLV records viewed per unique user increased by 55.12 percent between CY2020 and CY2021 to 13 percent.	The increase in DOD JLV usage was driven by the deployment of MHS GENESIS and increased training at DOD clinical sites.
VA	**Change**	**Impact Factors**
▲	The average monthly number of JLV records viewed per unique user increased by 14.51 percent between CY2020 and CY2021 to 44 percent.	There are no factors of note.



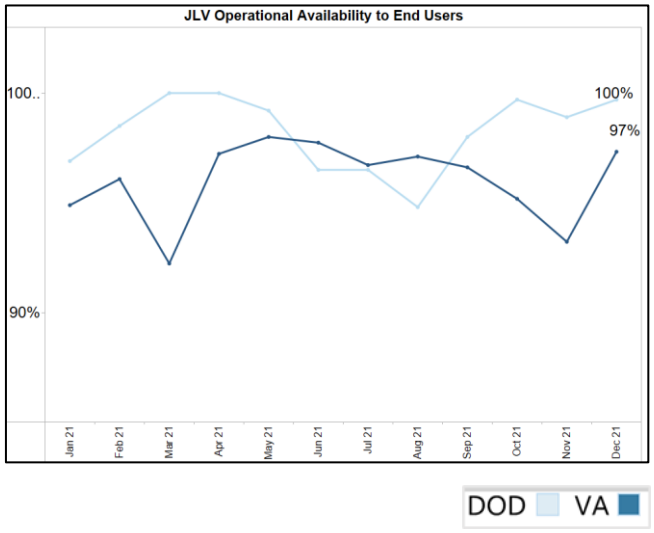
Metric A.5: VA Data Availability to JLV

Definition

DOD – The percentage of time the Data Exchange Service is available on the data server for all the sites located in the data centers in support of DOD-to-VA HIE.

VA – The percentage of time during the month that VistA Data Services was operational (no errors and VistA data available to both DOD and VA users) in all production environments.

DOD	Change	Impact Factors
▽	The average monthly data availability decreased by 0.85 percentage points between CY2020 and CY2021 to 98.93 percent.	There are no factors of note.
VA	**Change**	**Impact Factors**
▲	The average monthly data availability increased by 0.17 percentage points between CY2020 and CY2021 to 99.95 percent.	There are no factors of note.



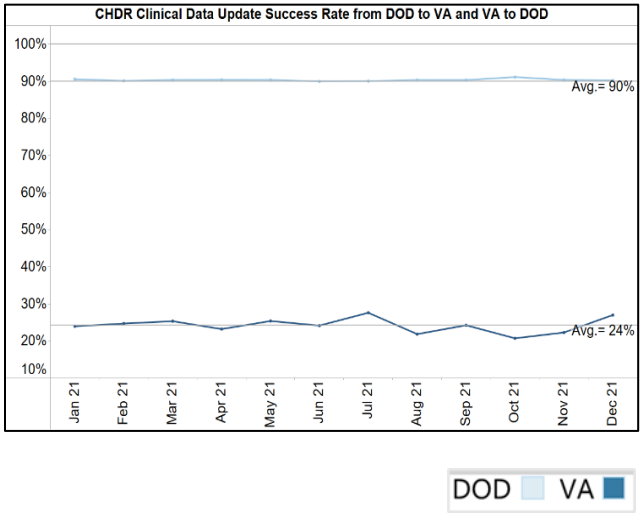
Metric A.6: JLV Operational Availability to End Users

Definition

DOD – The percentage of time during the month that the JLV was available for log in and functionally operational by DOD and VA users (i.e., available for users to conduct a patient search and to access both DOD and VA EHR data in the cloud environment).

VA – The percentage of time during the month representing the end-user experience where JLV was available for login and functionally operational (users able to conduct patient searched/lookup and retrieve DOD, VA and federal EHR (Cerner) EHR data in production environments).

DOD	Change	Impact Factors
▽	The average monthly operational availability decreased by 0.82 percent between CY2020 and CY2021 to 98.23 percent.	There are no factors of note.
VA	**Change**	**Impact Factors**
▲	The average monthly operational availability increased by 0.70 percentage points between CY2020 and CY2021 to 96.03 percent.	An ongoing DOD Data Exchange Service (DES)* issue that was finally resolved on December 10. It affected operational availability. * DOD DES is the data feed to JLV for all DOD legacy data, community partner records and certain federal EHR data.



Metric A.7: CHDR Clinical Data Update Success Rate from DOD to VA and VA to DOD

Definition

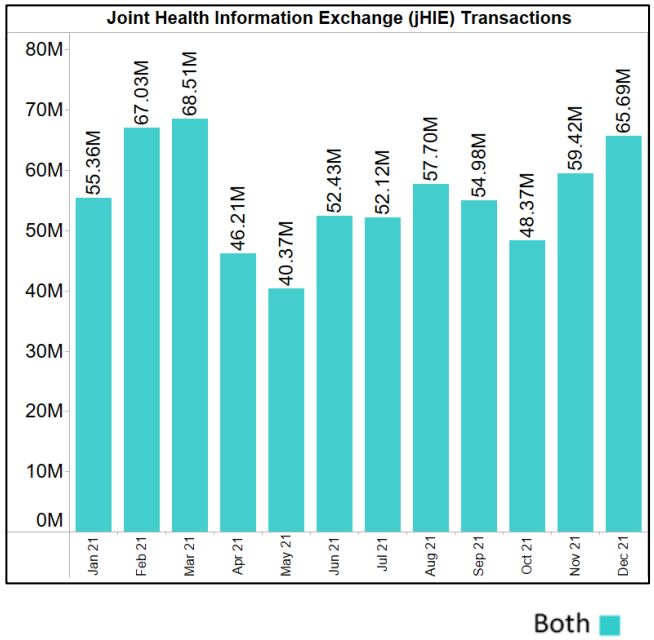
Percentage of CHDR clinical update messages with data (allergy or pharmacy) successfully processed (a successful process occurs when the sending agency receives a response from the receiving agency indicating successful receipt, translation and storage of clinical data).

DOD	Change	Impact Factors
▲	The average monthly CHDR clinical data update success rate had an increase of 0.53 percent from 89.78 percent in CY2020 to 90.31 percent in CY2021.	There are no factors of note.

VA	Change	Impact Factors
▼	The average monthly CHDR clinical data update success rate had a decrease of 5.54 percentage points from 29.64 percent in CY2020 to 24.10 percent in CY2021.	Analysis revealed large backlogs in messages from DOD to VA causing anywhere from 1 to 6 day delays in VA receiving DOD messages as well as receiving responses to VA messages. The DOD CHDR team is in the process of releasing a commercial off-the-shelf version of their product, which is intended to correct the response issue.

Category B: Community Partnerships

Value Statement: The FEHRM monitors the Departments' progress toward consistent, secure and reliable health data exchange by tracking joint HIE partner onboarding, as well as joint HIE transactions between the Departments and private care partners as best practices and improvements are implemented.

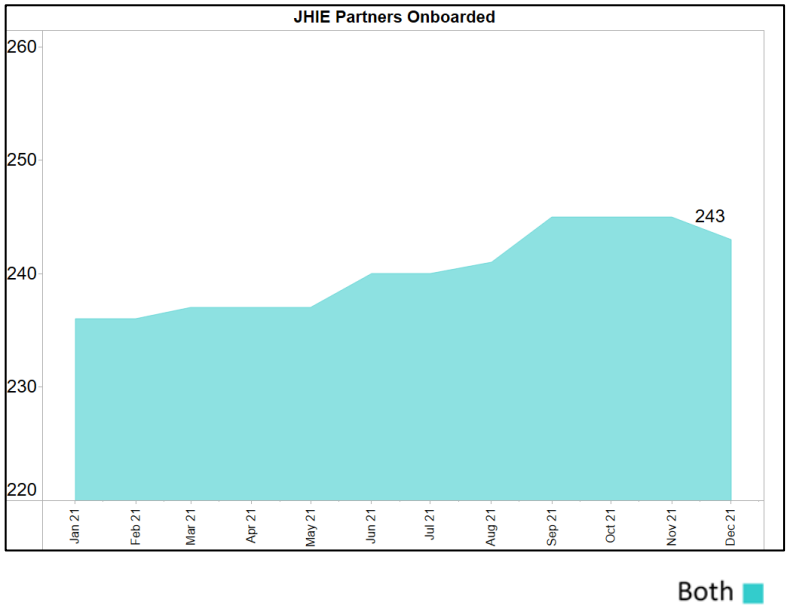


Metric B.1: Joint Health Information Exchange (joint HIE) Transactions

Definition

Monthly count of C-CDA, C32 or C62 (document architecture that facilitates interoperability of health data between EHR systems) documents exchanged between the Departments and private partners.

DOD/VA	Change	Impact Factors
▲	The total number of joint HIE transactions increased by 131.12 percent between CY2020 and CY2021 to 668,191,405 transactions.	The increase in the total number of joint HIE transactions was driven by: • An increase in appointments at both DOD MTFs and VA VAMCs, causing an increase in pre-fetch joint HIE transactions. • An increase in JLV usage from MHS GENESIS and VA EHRM-IO deployments • An increase in JLV usage from JLV training and increased awareness of joint HIE capabilities.



Metric B.2: Joint HIE Partners Onboarded

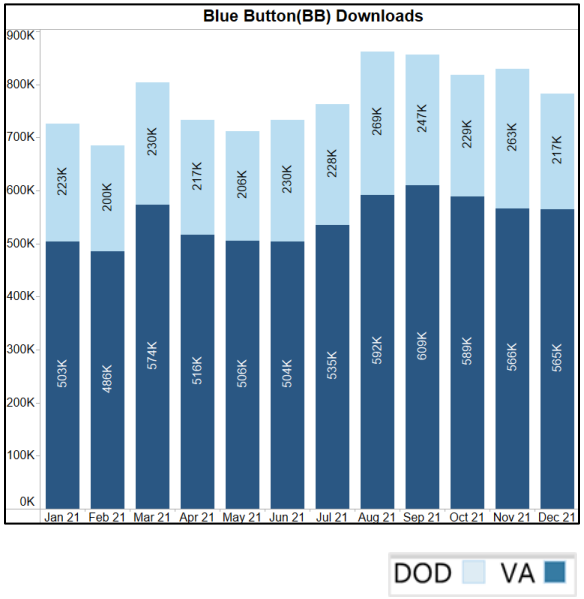
Definition

Monthly and cumulative count of private sector providers who are partners in the joint HIE (a private sector provider is counted as one partner if the provider has one or more data sharing agreement(s) with DOD or VA).

DOD/VA	Change	Impact Factors
▲	11 additional joint HIE partners were onboarded between CY2020 and CY2021, bringing the total to 243.	There are no factors of note.

Category C: Patient Engagement

Value Statement: Blue Button serves as the foundation for broader patient engagement activities within the Departments, enabling patients to have easy access to their own health information in a usable format. The FEHRM monitors several metrics associated with Blue Button that show patient engagement with their integrated and consolidated health records from DOD and VA legacy systems' patient portals over time.

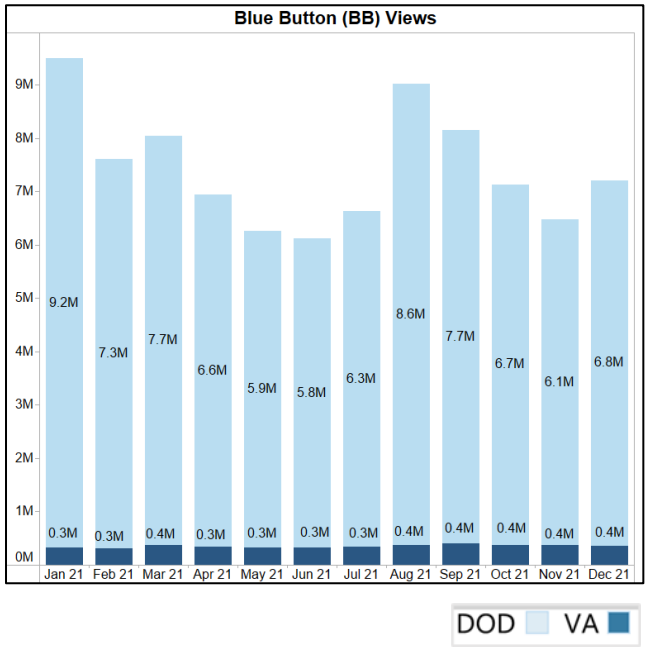


Metric C.1: Blue Button Downloads

Definition

Total number of data downloads (e.g., PDF, text) generated by end users per month.

DOD	Change	Impact Factors
△	The average monthly number of Blue Button downloads increased by 62.54 percent between CY2020 and CY2021 to 229,953.	The increase in the number of Blue Button Downloads was driven by: • Patients accessing their COVID-19 test results and vaccination records using Blue Button's Health Record. • TOL gaining nearly 10k new users per week during Q2 FY2021. • Patients accessing their health records from the 'legacy EHR' (AHLTA), some patients believe they need the historical records if their provider team transitioned to MHS GENESIS.
VA	**Change**	**Impact Factors**
▲	The average monthly number of Blue Button downloads increased by 20.76 percent between CY2020 and CY2021 to 545,323.	There are no factors of note.

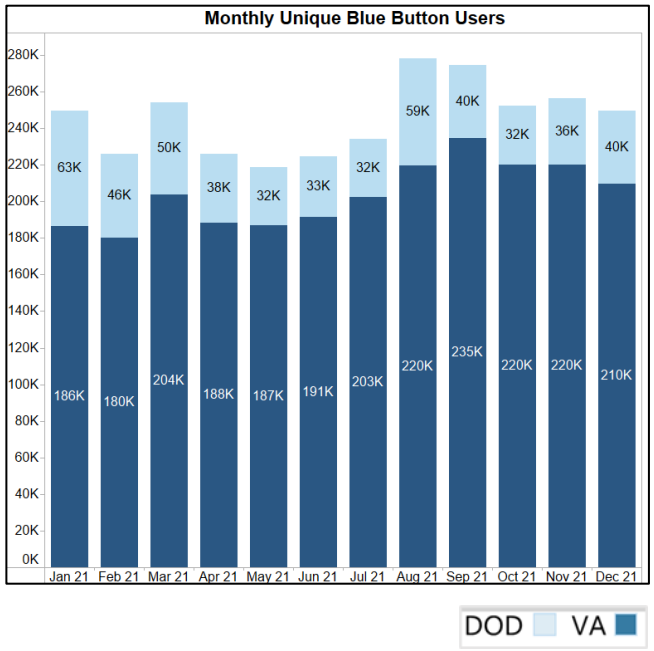


Metric C.2: Blue Button Views

Definition

Average number of views generated by end users per month.

DOD	Change	Impact Factors
▲	The average monthly number of Blue Button views increased by 56.52 percent between CY2020 and CY2021 to 7,068,018.	The increase in DOD Blue Button usage is driven by patients accessing proof of vaccination or COVID-19 test results as required to return to work or school.
VA	**Change**	**Impact Factors**
▲	The average monthly number of Blue Button views increased by 22.40 percent between CY2020 and CY2021 to 353,046.	There are no factors of note.



Metric C.3: Monthly Unique Blue Button Users

Definition

Number of unique Blue Button users within a month.

DoD	Change	Impact Factors
▲	The average monthly number of Blue Button unique users increased by 28.73 percent between CY2020 and CY2021 to 41,745.	The increase in DOD Blue Button usage is driven by patients accessing proof of vaccination or COVID-19 test results as required to return to work or school.
VA	**Change**	**Impact Factors**
▲	The average monthly number of Blue Button unique users increased by 28.49 percent between CY2020 and CY2021 to 203,601.	There are no factors of note.