# VISTA TRANSITION: ASSESSING THE FUTURE OF AN ELECTRONIC HEALTH RECORDS PIONEER

## HEARING

BEFORE THE

SUBCOMMITTEE ON TECHNOLOGY MODERNIZATION

OF THE

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**Thursday, July 25, 2019**

COMMITTEE ON VETERANS' AFFAIRS,
U. S. HOUSE OF REPRESENTATIVES,
*Washington, D.C.*

The Subcommittee met, pursuant to notice, at 10:15 a.m., in Room 210, House Visitors Center, Hon. Susie Lee [Chairwoman of the Subcommittee] presiding.

Present: Representatives Lee, Lamb, Cunningham, Banks, and Watkins.

## OPENING STATEMENT OF SUSIE LEE, CHAIRWOMAN

Ms. LEE. Good morning. Thank you all for being here. This hearing will now come to order.

During the '70s, a dedicated group of programmers and clinicians began a health care transformation as they built what would become the Veterans Health Information Systems and Technology Architecture, or what we know as VistA. It was the beginning of an age of personal computer and these IT pioneers saw the potential for bringing computing power to the health care space. The Department of Veterans Affairs was an early innovator and adopter of the electronic medical record, and established itself as a leader in health care IT.

Today, we have clinicians and researchers across VA using IT tools and powerful health data to improve care and find medical breakthroughs. However, the VA is at a technology crossroads and what began as a guerilla IT project has sprawled into a massive, decentralized system in an archaic coding language, and within the VA, there are at least 130 versions or instances of VistA across 1500 sites. No version is the same and the system connects to various applications and devices through interfaces.

VistA serves many offices, programs, staff, and veterans, but it has surpassed its technology life span.

VA has struggled to modernize VistA and past attempts to replace it or update it have not been successful, and now the VA is pursuing an approach with the acquisition of a commercial electronic health records system. However, the transition from one system to another is not a simple matter of just flipping the switch; it is a painstaking process that you all are aware of and that involves technical challenges, as well as policy changes. There are

many stakeholders who want to understand the impacts of the transition and how their equities in VistA will be affected.

VA has told the Subcommittee that there is a plan in draft to address both the technical and policy side of the transition from VistA to Cerner's electronic health record, but that plan is not expected to be completed until the fall of 2019. This plan will require the concurrence of the Office of Information and Technology, the Veterans Health Administration, and the Office of Electronic Health Record Modernization.

There are many unknowns in this transition. It is important that the VA's strategy be well timed to identify those unknowns and to mitigate potential disruptions to the health care and research. The fact that this plan is still being formulated is concerning. Further, as the Government Accountability Office will discuss today, the VA does not yet have a reliable accounting of all the costs associated with VistA management, and there is still ongoing work to understand all of the instances of VistA and to define them. We also need the VA to arrive at a transparent and accountable decision as to what VistA management will mean going forward, so that there are not gaps in care, that valuable research is not disrupted, and that expectations are established and met.

VistA cannot remain a static system over the 10 years that EHRM implementation will take. And, additionally, at least 40 percent of VistA will not be in Cerner, and this Subcommittee would like more information how VA will manage those functionalities and potentially modernize them in the future.

We think there are opportunities for VA to be forward-thinking in the transition and to harness the innovative approach that drove the creation of VistA. The pilot to move instances of VistA to the cloud has potential, but we need more information to understand its feasibility from a cost and impact perspective. At minimum, we need to maintain the legacy system until it has been fully replaced or modernized, but if there are potential efficiencies and health care innovations to be gained, we should identify them and also consider those opportunities.

I thank all of the witnesses for being here today and look forward to your testimony. And I now would like to recognize my colleague Ranking Member Banks for 5 minutes to deliver his opening remarks.

Mr. Banks?

**OPENING STATEMENT OF JIM BANKS, RANKING MEMBER**

Mr. BANKS. Thank you, Madam Chair.

It is no longer possible to talk about VistA without discussing Cerner and vice versa. Although the goal of VA's electronic health record modernization is to replace VistA and CPRS, these legacy systems will exist alongside Cerner for at least the next 9 years; that means they have to interoperate. This mixed environment will be extremely challenging, in which some medical centers will still use VistA while others use the Cerner EHR.

Up until now, this Subcommittee has focused on the total cost of ownership of VistA versus the total cost of implementing and operating Cerner. I still believe that is an important question and one

we have yet to receive a satisfactory answer to, but the complexity of the mixed environment is the biggest difficulty confronting VA.

Some key questions are, how will the Cerner data flow back into VistA? How will scheduling information be integrated across the two environments? Will referrals be transmitted uniformly in both systems? And how will different data be aggregated for reporting an analysis?

We are still in the middle of the beginning of the EHRM overall, but VA is nearing the end of its plan design and configuration process; in other words, the rubber is hitting the road.

With the MISSION Act implementation deadline behind us, the Veterans Health Administration and the Office of Information Technology appear to be reallocating personnel and executive attention to EHRM, and that is very good news. VA just completed the sixth of eight National Workflow Council meetings. New technical obstacles are being identified, especially with the data migration into Cerner and interoperability in this mixed environment.

At the outset of EHRM, the team made ambitious promises to migrate substantially more patient data into Cerner than DoD determined was feasible in MHS GENESIS. That optimistic plan seems to have run into technical difficulties. This is not a foregone conclusion and there may be good reasons why; I hope to get explanations for that this morning.

Relatedly, Cerner's Healthy Intent Population Health Software seems to have morphed from a vehicle for feeding data into the Millennium EHR to another repository of patient data that clinicians may have to access alongside community. Without a doubt, snags like this are inevitable in a project of this magnitude. The timeline is getting tight, but the important thing is that constraints are acknowledged and any tradeoffs that must be made to resolve them are presented transparently.

On the other hand, everyone in VA always expected that created the system interfaces between VistA and Cerner would be a tall order. There are 73 different groups of interfaces ranging in size and difficulty.

I am glad to see OIT assign more personnel, including some of their very best people, to this effort. I want to know how this work is being organized and whether it is being approached in a manner that will reduce rather than add complexity in the mixed environment. I am skeptical, though, that all the technical constraints are known and there aren't more intractable difficulties waiting to be discovered.

As we pass through September and the end of the plan design and configuration process for EHRM, VA may be presented with a choice, a choice to take the system live more quickly with initial, some would say limited sets of capabilities, or proceed more gradually with a complete set of capabilities. I expect that decision to be made in VHA based on input from the affected medical centers and I will support the decision wholeheartedly if I believe it is made for the right decisions.

So with that, Madam Chair, I yield back.

Ms. LEE. Thank you, Mr. Banks.

I would now like to introduce the witnesses we have before the Subcommittee today. Dr. Paul Tibbits is the Executive Director of

the Office of Technical Integration within the Office of Information and Technology at the Department of Veterans Affairs. Dr. Tibbits is accompanied by Charles Hume, Assistant Deputy Under Secretary for Health for the Office of Health Informatics, and Dr. Thomas O'Toole, who is the Senior Medical Advisor both within the Veterans Health Administration, as well as John Short, Chief Technology and Integration Officer in the Office of Electronic Health Record Modernization.

I would also like to introduce Carol Harris, who is the Director of Information Technology Acquisition Management at the Government Accountability Office.

We will now hear the prepared statements from our panel Members. Your written statements in fact will be included in the hearing record. And, without objection, Dr. Tibbits, you are recognized for 5 minutes.

**STATEMENT OF PAUL TIBBITS**

Dr. TIBBITS. Good morning, Chairwoman Lee, Ranking Member Banks, and Members of the Subcommittee. Thank you for the opportunity to testify today about the Department of Veterans Affairs IT modernization efforts, including the electronic health record modernization and VistA, also the program you mentioned earlier.

The Office of Information and Technology pioneered VistA to support the clinical, administrative, and financial operations of the Veterans Health Administration. Since its creation, VistA has evolved into an enterprise planning tool, used by multiple VA administrations. Today, VistA supports over 150 applications and the operations of more than 1500 VA clinics and VA medical centers. There are 130 unique instances of VistA nationwide that share core functionality, but are customized to each VAMC's needs and populations.

VistA has served VA and veterans for over 40 years, but it does not possess the modern capabilities that medical providers and veterans deserve. VistA's required critical upgrades alone could cost several billion dollars over the years and maintenance costs are higher. It is not interoperable with the Department of Defense, which keeps the health information of servicemembers and future veterans; instead, VA staff must use separate viewers to see the DoD data.

In May of 2018, VA awarded Cerner a contract to replace VistA with Cerner Millennium, a commercial, off-the-shelf solution currently deployed by the Department of Defense. VA is working with Cerner to achieve initial operating capability and deploy Cerner Millennium beginning in the spring of 2020 in the Pacific Northwest.

As the nationwide Cerner rollout progresses, VA will decommission VistA instances as necessary. However, during the transition period, VA must maintain VistA to ensure current patient record accessibility and continued delivery of quality care.

The cost of sustainment. GAO's report projects VA will spend $426 million to sustain VistA in fiscal year 2019. VA is currently developing a methodology to update the cost data and thereby define VistA, a recommendation in the GAO report.

We expect VistA to run without service degradation until all VAMCs are running in the new electronic health record solution. Sustainment costs during the transition include development for new capability and interfaces, congressional mandates, maintenance, and other costs.

The estimated minimum costs for VistA during the 10-year transition period is $4.89 billion, excluding any new required development.

Our long-term strategy. VA is leveraging more efficient means of sustainment, including OI&T's shift to a development and operations approach that develops, enhances, maintains, and rolls out better products more quickly. VAMCs will be required to run the nationally-released gold version of VistA, creating a common set of software routines where possible.

OI&T follows VA's guidance on needed patches and upgrades to VistA. These will continue as normal throughout the rollout of Cerner.

The newly-formed Office of Technical Integration facilitates communication and planning between program offices that are implementing the systems to replace VistA. OI&T is currently piloting a program to migrate all 130 instances of VistA to the cloud.

In conclusion, until the new electronic health record solution is implemented across the VA enterprise, VistA remains VA's authoritative source of veteran data. Sustaining VistA for the duration of the electronic health modernization ensures that VA continues to provide uninterrupted care and services.

Madam Chair, Ranking Member, Members of the Subcommittee, thank you for the opportunity to appear before you today to discuss OI&T's progress towards VistA transition. I look forward to continuing to work with the Subcommittee to address our greatest priorities.

This concludes my testimony and I look forward to answering your questions.

[THE PREPARED STATEMENT OF PAUL TIBBITS APPEARS IN THE APPENDIX]

Ms. LEE. Thank you.

Now Ms. Harris?

**STATEMENT OF CAROL HARRIS**

Ms. HARRIS. Thank you. Chair Lee, Ranking Member Banks, and Members of the Subcommittee, thank you for inviting us to testify today on VA's health information system, referred to as VistA. As requested, I will briefly summarize the findings from our report on this very mission-critical system.

VA provides health care services to roughly 9 million veterans and their families and relies on VistA to do so; however, the system is over 30 years old, is costly to maintain, and does not fully support exchanging health data with DoD and private health care providers. As such, VA has work underway to replace the system with a commercial one; however, the Department plans to continue using VistA during its decade-long transition to the new system. This morning, I would like to highlight three key points from our report.

First, VA lacks a comprehensive definition of VistA, but additional work is planned that could address the gaps. To maintain internal control activities over an IT system and its related infrastructure, organizations should be able to define the physical and performance characteristics of the system, as well as the environment in which it operates.

VA maintains multiple documents and a database that describes parts of VistA; it has also conducted multiple analyses to better understand customization of the system components at various medical facilities, yet the existing information in aggregate does not provide a thorough understanding of the local customizations reflected in about 130 versions of VistA that support health care delivery at more than 1500 sites. According to program officials, the decentralization of VistA's development is a reason why they have not been able to fully define it.

Cerner's contract to provide the new electronic health record system calls for the company to conduct comprehensive assessments to identify site-specific requirements where its system is to be deployed. Three site assessments have been completed thus far and additional ones are planned. If these assessments provide a complete understanding of the 130 VistA versions, the Department should be able to define VistA and be better positioned to transition to the new system.

Now my second point. VA believes VistA has cost $2.3 billion between 2015 and 2017, but this figure is neither reliable nor comprehensive. VA can only reliably account for 1 billion of the $2.3 billion total. The source data for the remaining $1.3 billion, which largely accounted for VistA's infrastructure, related software, and personnel costs were not well documented. As a result, VA's subject matter experts were unclear on how to account for VistA versus non-VistA costs. Furthermore, the Department omitted costs related to additional hosting and data standardization and testing from the total spend.

Given these issues, the Department is not in a position to accurately report annual costs to develop and sustain VistA. As such, VA lacks reliable information needed to make critical management decisions for sustaining the many versions of VistA over the next 10 years until Cerner is fully deployed.

My third point. VA has initiated a number of activities to transition from VistA to the Cerner system. Among other things, VA has taken steps to establish and staff a program office, as well as form a governance structure. The Department's actions in these critical areas are ongoing. Furthermore, additional actions are in progress to address our recommendations from September 2018 to clearly define the role and responsibilities of the Joint DoD and VA Interagency Program Office.

As the Department continues to work toward acquiring a new electronic health record, it will be important for VA to fully implement the recommendation we made in our report for improving the reporting of VistA costs. Doing so is essential to helping ensure that decisions related to the current system are informed by reliable cost information.

That concludes my statement and I look forward to addressing your questions.

[THE PREPARED STATEMENT OF CAROL HARRIS APPEARS IN THE APPENDIX]

Ms. LEE. Thank you. I would now like to recognize myself for 5 minutes to ask questions and I will first start with Ms. Harris.

In your report, you just stated that the VA identified $2.3 billion in VistA costs between 2015 and 2017, yet only—VA couldn't demonstrate reliability on $1.3 billion of that alleged VistA expenses. Can you explain the significance of what that lack of reliability means?

Ms. HARRIS. Sure. Chair Lee, more than half of VA's reported $2.3 billion costs couldn't be verified based on the source data that we looked at in our review and this is of concern, because without reliable information VA will not be in a position to make critical management decisions about the system and the system will be sustained for the next 10 years. So that is the major problem.

Ms. LEE. In your opinion, based on your past work with VA, do you expect the actual VistA-related costs to be more or less than the $2.3 billion?

Ms. HARRIS. It will likely be more than the $2.3 billion, because VA has omitted key costs from that 2.3 initial estimate that they provided to us, things like additional hosting as one example.

And just as an example of that with the additional hosting, last June the VA told us the cost for this particular line item was about $238 million per year. Shortly thereafter, they told us that the cost was actually $950 million, and in the end, they reported zero dollars per year. And so when we talked to VA's subject matter experts, they agreed that the $950 million was off base, but the fact that that additional hosting line item was not included in the $2.3 billion estimate suggests that the number is higher.

Ms. LEE. Okay. Thank you.

And the GAO, you made a recommendation in your report. And, Dr. Tibbits, I would like to ask, will the VA concur with that recommendation and how do you plan to address this cost-reliability issue?

Dr. TIBBITS. Great, Chairwoman Lee. Yeah, absolutely, our concurrence is on the way in. I, in fact, saw the signed-out version a few days ago. So, yes, we intend to fully concur with the report and the recommendations.

I guess I should introduce here the notion of the Technology Business Management framework, TBM. TBM is the framework that we are using with to properly categorize and classify information technology costs, we are working very closely with OMB to implement that framework. Our fiscal year 2021, in September of this year, will be submitted in accordance with that TBM framework.

As you might well imagine, a certain maturation will go on. The first implementation of that might require additional refinements and enhancements later on for sure, but we intend to fully comply with that TBM standard and, in so doing, address the GAO findings and recommendations.

Ms. LEE. Thank you for that. I am happy to hear that, but I want to know, what has prevented the VA from implementing this cost methodology in the past?

Dr. TIBBITS. Well, let me separate my answer into two parts. First of all, this cost methodology that I just mentioned is rel-

atively new as a commercial standard. It began around 2012 and I don't remember exactly when between 2012 and now, but somewhere in there OMB decided to make it a Federal standard. I don't know exactly when that happened, though, but I would say the TBM standard itself is relatively new. That is one part of my answer. The other part is, fiscal discipline with respect to information technology has been evolving over time; we are very interested in improving it all the time. We have been on a trajectory to try to improve it over time, hence, we fully agree with the GAO recommendations.

Some of the methodology we have used, for example, on the personnel cost that the GAO representative mentioned, we have not up to now seen the need, I guess I would say, to classify personnel costs by system. So we have personnel costs and we have system costs, but mapping personnel costs to system costs is not something we have done up to now. So we will in the future, obviously, consistent with this TBM framework, but that is a matter of those mappings and things that just were not considered necessarily high priority at the time. I can't tell you further why that was, it is just about I have exhausted my knowledge on the subject.

Ms. LEE. All right, thank you. And I am out of my time and I now recognize Congressman Banks.

Mr. BANKS. Thank you, Madam Chair.

Dr. Tibbits, in your testimony you seem to have adopted figures that GAO says is unreliable: four hundred and twenty six million dollars to sustain VistA for 2019 and $4.89 billion over the next 10 years, which is roughly ten times the 2019 number. Do you stand by the VistA cost information that VA gave to GAO?

Dr. TIBBITS. Yes, it is the using the—for the parts that GAO is referring to that are unsubstantiated, we had to use some form of estimation methodology; we did that, and it is the best we can do at the time up to now. That will certainly improve over the future as we move further into implementation of this TBM framework, but—

Mr. BANKS. Ms. Harris—

Dr. TIBBITS [continued]. —those are the best numbers we have at the time, yes.

Mr. BANKS [continued]. —do you have a response to that or anything to add to that?

Ms. HARRIS. The number that was reported, the $2.3 billion number, was never intended to be projectable, because it is not, and the $2.3 billion number is not reliable; only 1 billion of that figure was found to be reliable. So the projections that Dr. Tibbits stated does not come from the GAO report.

Mr. BANKS. Okay, interesting.

Dr. Tibbits, the purpose of figuring out how much VistA costs is to compare it to Cerner, but I don't see VA making much effort to argue that EHRM is going to save money, all things considered. Is there ever going to be a business case demonstrating savings even over the very long term or is that just unrealistic?

Dr. TIBBITS. Well, obviously, with—first of all, with respect to the TBM framework, again, certain Cerner costs will be incorporated into that TBM framework. So, from a transparency perspective, it will be included in all of our IT reporting. That said, the major mo-

tivation for going to Cerner, as I think all of you are aware of from the determination and findings, is to strengthen information interoperability with the Department of Defense.

So, yes, what the cost will turn out to be is very important. We certainly will make a great effort to make that very clear to whoever needs to know what that is, for our own internal management purposes as well. But, as I say, it is the well-being of the servicemember and veteran that is our principal motivation for going to Cerner, not necessarily an economic argument.

Mr. BANKS. Okay, let's move on.

Mr. Short, has it been decided whether to keep VA's My Healthy Vet patient portal and integrate it with Cerner, or adopt the Cerner patient portal and integrate it with VistA, in the mixed environment?

Mr. SHORT. Sir, at initial IOC go-live we will be rolling out the Cerner patient portal the same as DoD rolled out. While we are doing that, there is the initial enhancements going on in the patient portal for all the requirements that the Connected Care My Healthy Vet team has laid out with our program office.

In addition to that, Dr. Kroupa, myself, and the Office of Connected Care are doing a review currently and we will over the next couple months on what is the final answer to your question, and that is, will we integrate into My Healthy Vet or will we take all that functionality and put it in the commercial platform to make sure that it is a seamless, integrated view for the veteran.

Either way that goes, it will be integrated into the VA.gov portal, so all the veterans can go to one place, have one experience to access their health care.

Mr. BANKS. Okay. So, Dr. O'Toole, is VHA confident that the Cerner patient portal can integrate with VistA in all respects and meet your needs?

Dr. O'TOOLE. The driving force for all of this is to ensure, particularly during the IOC Block 1 and Block 2 implementations, is that the local facilities and local facility leadership and front-line providers are going to be comfortable with the interface with Cerner and that front-line clinicians will feel confident that patient safety will not be compromised, and that is really our driving force.

To date and through the workshop processes and through the local workshop efforts, all indications are that the patient safety and patient care will not be compromised and will be done efficiently, but this is something that we are monitoring closely, and this is something that clearly is of highest priority moving forward.

Mr. BANKS. Okay. So, Mr. Short, I would be remiss if I didn't ask you about the firm, it still has not been established. When is this supposed to happen? And, given the continued delay, how has the timeline for it to evolve into its various stages of operating capability changed?

Mr. SHORT. Sir, I can tell you that there is continual meetings on a weekly basis with DoD and VA. There may be a week or two here and there because of schedules that they did not meet, but routinely they meet on a regular basis and they are continuing to make progress. I know that some of the dates and announcements haven't come that the Hill has requested. I will have to take that question for the record; I don't have any new dates.

Mr. BANKS. My time has expired.

Ms. LEE. Thank you.

I now recognize Mr. Lamb for 5 minutes.

Mr. LAMB. Dr. Tibbits, I think it is a little hard for veterans in particular to understand how we are going to spend $5 billion over 10 years on a legacy system that we are trying to replace when the cost of the new system is $10 billion. I mean, essentially, we are spending half of what we are doing on the new system to just maintain the old one and that may not even represent all the costs.

So can you explain to me how I can explain to veterans in my community, what are the drivers of that cost to maintain and upgrade and sustain VistA over the next decade? What is making us spend the bulk of that $5 billion?

Dr. TIBBITS. Yes, certainly. Thank you for your question.

Well, first of all, I think everyone understands and we have had this, I think, out there for broad-based understanding, the complexity of VistA itself due to its age and that complexity drives costs. So understanding the interconnections—understanding and deal with the interconnections inside of VistA, understanding what to put a new capability into VistA, understanding break-fix work in VistA is complicated. However, to your point, that high maintenance cost, if you will, is part of the concern of what led us to the conclusion on top of the information interoperability, which was our primary reason, but getting out of the complexity and costs driven by that complexity is part of the reason why we wanted to move out of VistA.

That said, it is a 10-year period. We have to account for time to learn lessons as we go through this implementation process and at the same time, as you recognize, we have to continue to deliver quality care to veterans at the sites that have not yet received Cerner—

Mr. LAMB. But I guess are there any particular tasks or contractors that drive that $5 billion cost more than others? I mean, it is one thing to say it is complexity, yes, I understand that, but how does it end up being $5 billion? It just seems like so much.

Dr. TIBBITS. Well, that is not dramatically different in any way than our past experience and I would say, no, there is not any particular one contractor. The answer to the veterans' question that you asked me is to maintain quality service for those veterans at the places that haven't received Cerner, that is the bottom-line answer to a veteran. But, no, it is not one particular contractor; it is the overall complexity.

We have a network, a mosaic of contractors that are supporting VistA, keeping it up and running, and we—I guess I should hasten to add here, however, our migration to the cloud for VistA, we are anticipating cost savings from that migration to the cloud, which the first instance we have now successfully completed. So we believe that the remaining will be an equally efficient and effective migration. That will serve to keep the ongoing maintenance costs under control, I guess I can say.

Mr. LAMB. Okay. Ms. Harris, I know this is an issue you have stayed with for a long time, the EHR implementation and everything, was this foreseen 5, 10, 15 years ago, whenever? Did we understand in the past what we were spending on VistA and was that

used as an argument that maybe we should have started this whole replacement earlier? Can you give me a little bit of the history on that?

Ms. HARRIS. Well, with regards to VistA, I mean, even at this time right now, VA is unable to draw a circle around it and that is something that has persisted over the past 10—since the inception of VistA, because of the decentralized nature of how VistA was developed. And as a result of that decentralization, which began in the '80s, VA is not in a position to be able to at least effectively draw that circle and that perimeter around what is and isn't VistA, and, as a result, they aren't able to accurately report the annual development and sustainment costs.

So, because of that lack of, I guess, management in the beginning where there was a disciplined approach to understanding and documenting the physical and performance characteristics of the system, that is why they are in the position that they are in at this time. And the inability to be able to draw that perimeter is why they don't have accurate costs and why at this time they don't have an accurate basis for an ROI as to, you know, for moving to the Cerner system.

Mr. LAMB. Thank you.

I am out of time; I will yield back.

Ms. LEE. Thank you. I will now ask a few more questions.

I wanted to follow up with Ms. Harris. This TBM methodology that Dr. Tibbits discussed, do you believe that this approach will be sufficient?

Ms. HARRIS. I do not believe so. Until VA can fully define VistA, they will not be in a position to be able to accurately report the costs. I think the two go hand in hand and the definition of VistA is foundational. So, whether they use TBM or another type of methodology, the core issue remains that the definition of VistA is not fully defined and that is the problem.

Ms. LEE. And can you be a little more specific when you base it—you know, it sounds like just defining the nature of the beast is the real issue here—just improving that accuracy, what do you foresee needs to be done?

Ms. HARRIS. Understanding the 130 versions of VistA, the performance characteristics, as well as the environment in which those instances of VistA are operating. So having those clearly detailed and defined, adequately defined, is critical, so that is what I mean.

Ms. LEE. All right, thank you.

Dr. Tibbits, you have a plan to transition into the Cerner, but also continuing to support VistA. Why is—you are making this plan for the transition, but after you have already begun the implementation, why is that?

Dr. TIBBITS. Well, I would say right now what we are doing—and I will ask John Short to elaborate in a moment, but actually the thinking and planning for that transition began long ago when the determination and findings was written and the Department decided to go in this direction for a lot of reasons, which I will skip over right now, but the principal one being information interoperability for the benefit of servicemembers and veterans.

So the planning itself began, what IO—the proximity to the initial operating capability, as we get closer and closer to that, inter-

act more and more with Cerner itself, with the health care professionals in VHA, we are learning more as we go long. We have demonstrations, you have heard already about the workshops, we have had six of them already. So those are intensive interactions with respect to understanding clinical workflows and all those things, data migration, et cetera, all that is going to go into the actual documented plan.

So there is a lot of learning that has had to happen in order to actually put a pen to paper on a document called a plan, a pivot, we call it a pivot plan, but the process of thinking and gathering the information to do that has been going on for several years already during this entire ramp-up leading to the award decision, the award, and now the interactions with Cerner.

Ms. LEE. Yeah, I guess, you know, my concern is looking at all of the costs. Like we have a cost estimate that Cerner is going to cost $10 billion, you have a cost estimate of $4.8 billion to maintain VistA. We don't have any confidence, A, in what VistA actually entails, so I don't think we any confidence in that $4.8 billion. But then, more importantly, that makes me have less confidence in the $10 billion estimate for Cerner as well, and at what point do we sit down and really lay out exactly what this is going to cost? I mean, money does not grow on trees. So at what point do we lay out exactly what the costs are?

Dr. TIBBITS. So I think, as Ms. Harris pointed out earlier, part of this learning process, you mentioned I think the on-site surveys that are done in anticipation of the Cerner rollout, they are called current-state reviews. So, at those current-state reviews happen, certainly in a very definitive way we will understand everything about VistA interfaces and everything else at that site in anticipation of Cerner being implemented at that site.

So, as the waves roll forward, we will become more and more definitive about the cost estimates that we have to live with now. So that process is ongoing. As the GAO pointed out, we have conducted that process already at the first three sites. We are very confident that that process is going to yield very complete information based on the actual experience we have with it to date.

Ms. LEE. Thank you. I am out of my time and I will now recognize Ranking Member Banks.

Mr. BANKS. Thank you, Madam Chair.

Mr. Short, please give us an update on the data migration. What data in terms of types and magnitude do you currently plan to migrate into Cerner?

Mr. SHORT. Sir, the data we have identified was identified by the Chief Medical Officer and her clinical staff working with VHA. All the clinically relevant data, which includes 73 billion records—let me explain what a record is: it is an encounter, a lab report, a vital sign, each one of those is an individual record in VistA. So, initially, the initial load from VA to Cerner is 77 billion of those records. The oldest one is back from the early '80s, a lab report, and we can give you more details on that for the record, if you would like. Of those, in terms of 21 different clinical domains that were identified by VHA and CMO office, those records moved from VA to the Kansas City data center, into a data repository, in preparation for loading into the Cerner Healthy Intent platform. So, over

the next 30 days, it is intended to move that data into the Healthy Intent platform.

When we go live at a site, the current plan is for March 2020, the initial set of data domains that would be available would be ten of those 21 inside the EHR itself, but all 21 clinical domains will be available to the clinicians and other caregivers, MVBA, as needed, in the Healthy Intent viewer. So they will have the long record, all records available from DoD and VA that are in Healthy Intent, they will be able to see all those in the Healthy Intent viewer, and the initial clinically relevant records that they have prioritized for go-live will be in the EHR.

Mr. BANKS. So will all of this patient data be accessible in Millennium or will a user need to look in another system such as Healthy Intent?

Mr. SHORT. The CMO office in VHA determines some of the domains they don't want in Millennium. The initial set of data that will go in Millennium is ten data domains, within 5 to 8 months after we go live, we will add additional data domains. So at that point 18 of those 21, the most clinically relevant ones that they want in Millennium, will be in there.

Additionally, they have identified to have 3 years of records as the baseline that they want in there. For different purposes and reasons, that is the baseline they determined, and they briefed to the Under Secretary of Health's office.

And so that way all those records will be in Millennium to trigger clinical decision support and other information. However, if they need to pull in additional data further back, they can do that, or they can just view it in Healthy Intent.

Mr. BANKS. Okay. How many of the VistA-to-Cerner interfaces have been completed now and when is the deadline to complete all of them? My understanding is that this deadline has come sometime before the go-live deadline.

Mr. SHORT. Sir, there is 73 go-live minimum interfaces, system interfaces required; of those, there are a number of the interfaces that were already completed that we are reusing from DoD and a number of them from a commercial. So 12 of those system interfaces were already developed for DoD, so except for the testing in the end for VA use from the user level, those are complete.

And then, additionally, there is 25 interfaces that are commercial system interfaces that they are going to be able to reuse. And so, except for the testing and then validation by the user, those are already complete because they are reusing those.

Mr. BANKS. Okay. What is the deadline to determine which VistA modules get replaced by which Cerner's software package or other companies' software, and which VistA modules have you yet to determine a plan for?

Mr. SHORT. So all the clinical VistA modules with the exception of prosthetics will be replaced by the Cerner platform between the initial go-live and the IOC period. At the initial go-live, the different modules that will either be integrated versus replaced is being determined over the next 2 weeks. Dr. Kroupa, CMO for OEHRM, is meeting with Spokane and Puget Sound functional staff and facility directors to go over the 313 Cerner capabilities and validating which ones they will have at go-live. And at that

point we will know whether it would be two or five modules of VistA we will still integrate with, but by the end of the IOC exit it will be either one or no VistA models clinically relevant that we will use.

Mr. BANKS. All right. Dr. O'Toole, really quick, what is VHA's expectation for the Cerner data from the early sites coming back into VistA at the later sites? In other words, how seamless should the view of patient data be for VistA users in the mixed environment?

Dr. O'TOOLE. The expectation is that it is possible that one will need to use multiple systems in the context of a clinical encounter, whether it is looking at past chest X-rays to determine, you know, how things looked previously, or other clinical examples of that sort. The challenge for us, though, is to ensure that it can be done efficiently, whether it is going to the joint legacy view or other mechanisms, or being able to look at the Cerner interface. This is what the Spokane and Seattle IOC visits are going to be looking at within this context of specific clinical scenarios and clinical needs to be able to determine if it could be done efficiently and timely. And, if it can and it is sanctioned and agreed to by local leadership and front-line providers, then it will be proceeding, but the expectation is that there will be clinical scenarios where both interfaces are going to be needed.

Mr. BANKS. All right. My time has expired.

Ms. LEE. Thank you. I would now like to recognize Mr. Watkins for 5 minutes.

Mr. WATKINS. Thank you, Madam Chairwoman.

Ms. Harris, your testimony indicates the VA could not give you accurate numbers as to the costs to maintain VistA, because there is not an adequate methodology to determine the costs belonging—what costs belong to VistA. What kind of methodology does the VA need and how is it going to be developed?

Ms. HARRIS. Mr. Watkins, thank you for the question. So the finding that we had was that VA lacks a documented methodology for accounting for what is and isn't VistA. We don't have any recommendations related to the type of methodology that is necessary, but what is most important is that, whatever process that they choose, that it is documented and vetted throughout the organization.

Mr. WATKINS. Okay, thanks.

Dr. Tibbits, where are you in the process of developing this methodology?

Dr. TIBBITS. Yes. As I said earlier, we completely agree with the GAO report and the representative's current remarks.

I did mention earlier TBM and, as indicated in the prior discussion, TBM is only part—the Technology Business Manager framework was only part of the answer; the definitional boundary of CHS is clearly an important part of the answer as well. The two of those combined together is what is going to wind up with being our methodology.

I would say, in our response to GAO, we have indicated that I think at the next update, I believe that is 120 days from now, we will have a final answer as to what that methodology will be.

Mr. WATKINS. Thank you. Dr. Tibbits, your testimony references a pilot program to move VistA data to the cloud. Apparently, this

has already been successfully accomplished at one location. What is the scope of this pilot program? How much VistA data are you considering eventually moving to the cloud?

Dr. TIBBITS. So, let me be clear, it is not just VistA data. We are moving VistA in its entirety, so the ultimate scope of whatever instances of VistA remain operational as the Cerner platform rolls out. So, as things stand today, the scope would be 130 instances, but by the time we get VistA actually moving and Cerner rolled out, it is probably going to be a smaller number than that. The initial wave we are envisioning right now is 70, seven zero, 70. Because of their current location, the DoD facility, which is closing, we have to make sure we get those initial 70 moved first, because there is a date certain by which that facility will close.

Mr. WATKINS. And how long and how much will it cost to move all 130?

Dr. TIBBITS. I will have to get back to you on the exact cost figures. And we do have a schedule, again, driven by the DISA data center closure. I just happen not to remember that date right now, I will be happy to get that back to you, but the schedule for that first 70 is absolutely fixed because of that first closure date by DISA.

Mr. WATKINS. So I have got to yield my time.

Ms. LEE. Mr. Hume, we have heard from the VA on multiple occasions that Cerner's Millennium will only replace 60 percent of VistA's capabilities or functionality, and then that the EHR may have to link back to VistA to fulfill the other 40 percent. Can you address what functions make up this other 40 percent?

Mr. HUME. Yes, ma'am. The bulk of those other functionalities are being replaced by other modernization systems, the financial management modernization system and the supply chain modernization with the Defense Medical Logistics Standards support system. I will defer to Mr. Short for the details, but there is a small percentage of capabilities beyond that are not being replaced by one of those three modernization systems and we are in the process of identifying the solution to that. It may be an interface to VistA for some time, a replacement by a commercial product; we have yet to work that out.

Mr. Short, do you want to comment?

Mr. SHORT. Yes, thank you.

Ma'am, initially at IOC go-live, five to seven of the VistA clinical modules will be interfaced to, but the IOC exit the plan is to only have a dependency on one VistA modules being prosthetics and the solution for that, Cerner is developing additional clinical content and some IP development to make sure that all the nuances of prosthetics that VA has could be added to their platform, which will be beneficial to anyone else using that platform as well.

The other portions of VistA, the other 40 percent, a large portion of that are base core functionalities of VistA, it has nothing to do with any functionality at all. Like an XML parser, you know, like to be able to split out data, that is something that only if you need to use a system is that capability necessary, like an operating system is only important for an application. So those things go away when the application functionality goes away.

The other items Mr. Hume mentioned are business systems, accounting, acquisitions tracking, not medical-related, but tied into health care.

Ms. LEE. So just thinking about the costs. So you have these other capabilities, you have plans to modernize or replace those capabilities, where is that cost coming from? Is that included in the $10 billion that we have planned for Cerner, is that outside of it? Is that part of the $4.89 billion projected for VistA? Where are those costs coming from?

Dr. TIBBITS. Well, Madam Chair, if I understand your question correctly, with respect to the major efforts that address the 40 percent, FMBT, Financial Management Business Transformation, that is our ERP replacement, and DMLS, which is our supply chain modernization, they have their own cost boundaries and cost definitions. So that would not be part of the VistA boundary—

Ms. LEE. So it is in addition?

Dr. TIBBITS [continued]. —no—or the Cerner boundary, no. Those are all—

Ms. LEE. But it is not included in your $5 billion—

Dr. TIBBITS. Correct.

Ms. LEE [continued]. —to maintain VistA. So this is we have another cost on top of that to take care of this 40 percent?

Dr. TIBBITS. Right. Those are programs of record and have been in our budget submission now for a few years, the ERP replacement, FMBT, and DMLS, yes, those are separate programs already included in our budget submissions.

Ms. LEE. Okay. So just a question, then will Cerner be responsible for addressing any of this 40 percent, or is this all being taken care of?

Dr. TIBBITS. No, the 40 percent are the other systems.

Ms. LEE. The other stuff?

Dr. TIBBITS. So that is FMBT, Financial Management Business Transformation, DMLS, and then the remaining things that John Short just talked about, which might actually no longer be needed at all, some technical things, XML parser and whatnot. So, no, the Cerner is the 60 percent part of the question.

Ms. LEE. Okay, all right. So at go-live, how is the VA going to address these capabilities in Cerner that are not going to meet clinical needs such as prosthetics and where there is no alternative product?

Dr. TIBBITS. So I am going to ask perhaps Chuck Hume to comment on that in a minute. The prosthetics community, of course, is working very intensively with us. I have personally sat in on many of those meetings. I think the short-term approach, if I can say that, is to maintain a prosthetic system and build an interface over to that prosthetic system, until such time as that functionality is adequately developed and represented in the Cerner product itself.

So, as I think all of you are well aware of, prosthetics is a very well developed, very sophisticated capability at the VA, not something that Cerner necessarily encounters to that extent in their commercial practice, and so it is not surprising to us that they have to beef up that capability. But, in the meantime, I believe our

short-term answer is to maintain our prosthetics system and interface that as necessary.

Ms. LEE. Thank you.

I now recognize Ranking Member Banks.

Mr. BANKS. Thank you, Madam Chair.

Dr. O'Toole, I want to make sure that I understand the data migration answer that we discussed a little bit ago. Are you saying that the VHA physicians don't want all patient data to be in Millennium?

Dr. O'TOOLE. No, sir, I am not saying that. I think the issue is some—as we roll out and, obviously, with the staggered rollout across sites, and for veterans who may be migrating across systems, there may be instances where data may not initially be available on the Cerner platform, but it is available on the legacy platform, particularly longitudinal data going back. And from a clinical perspective and seeing a patient where having that longitudinal history is going to be necessary to provide their care, it is going to be important to be able to have access to both the legacy systems, as well as the current systems of care. So it is not an issue of preference, it is a matter or issue of practicality and good care.

Mr. BANKS. Okay. Mr. Hume and Mr. Short, how many other technology projects in VA have dependencies with EHRM? And can you list them, if you can, and tell me who is responsible for each set of dependencies?

Mr. HUME. Well, the predominant systems would be those we talked about, the financial management modernization and the supply chain modernization, each of those programs. The immediate relationship is with the supply chain modernization, the Defense Medical Logistics Support System, that system is to roll out to the sites that are modernizing to Cerner 4 months in advance of that, so that we can make sure that those interfaces are functioning.

We are fortunate that we are adopting the Defense Medical Logistics Support System, which they have already interfaced with Cerner as part of their rollout under MHS GENESIS.

Mr. Short, do you want to add anything?

Mr. SHORT. The two programs Mr. Hume mentioned, Terry Riffel and Harry Oland are the two people, the first FMBT and second one the DMLS, that are the SES executives over those programs. So both those programs have a dependency on some of our functionality and OHEM has a dependency on theirs. OHEM also has a dependency on the joint legacy viewer during the transition period, because there is some functionality that for some workarounds until all capabilities are released and tested and validated that they will need to use the joint legacy viewer at the transitional sites.

There are some ancillary systems that we have some dependencies on, and we can take that for the record and document that for you.

Mr. BANKS. Okay. Mr. Short, I read the Secretary a letter last month about patient matching. As you know, it is key to quality and interoperability. I appreciate the thorough response, but I would like you to explain one of the statements. It says, quote, "A single EHR solution between VA and DoD will guarantee 100 per-

cent patient matching within the new EHR solution for servicemembers and veterans," end quote. Does that pertain to VA and DoD or VA and the MISSION Act providers?

Mr. SHORT. Sir, I am not sure if it pertains to the MISSION providers, I would believe it pertains to the first, DoD and VA. I can get back to you for the record on the second question.

To answer part of that question, the Joint Patient Identity Management Service that we developed with DoD and we have tested out, what we have used to make sure that we have maintainability, we have a single EHR with an overlapping customer base, as you can imagine. DoD and VA and beneficiaries and veterans, servicemembers can go back and forth, Active duty members are seen at VA hospitals at times, et cetera, you could have a mismatch if you had different identity systems saying, no, this is John Short or that is John Short. And so by having one system with everything worked out in the background maintains we do that.

But for the record, on the other part of your question, I will take that back.

Mr. BANKS. Okay. Last question. What is VA's—Mr. Short, for you as well—what is VA's goal for patient matching with the MISSION Act providers in Cerner and how are you going to achieve it?

Mr. SHORT. Our goal is to have complete patient matching to ensure that everything is completely safe, accurate for every patient, that the veterans that deserve care get the care, and get the right care and the right prescriptions. So, for the record, I can take it back on our plans; I don't have that with me today.

Mr. BANKS. Thank you very much. I yield back.

Ms. LEE. Thank you.

Dr. Tibbits, there are many entities outside of VA using VistA that have agreements, like OSEHRA and World VistA. This Committee has heard from several of these groups with concerns about the future of their access to VistA code and possible future innovations. And I wanted to ask you, how is the VA leveraging outside experience through these groups to further the instances of VistA?

Dr. TIBBITS. Well, as we mentioned earlier, first of all, maintaining VistA over the 10-year roll-out period of Cerner is very important to us, critical to veteran care. So we are going to continue to focus on doing that. I can say that in the past from the open-source community we have certainly obtained very valuable contribution to FileMan, which is the underlying database in VistA. How that relation—so there have been additions and actually that FileMan upgrade was a substantial one, not some minor tweaks, from the open-source community—how that will play out in the future, I am not sure I know enough to exactly tell you that yet, other than we will continue to maintain VistA for the roll-out period; number two, we will continue to make available whatever the VistA code is at that point in time to those communities, we have no reason to stop any of that.

Since there is a 10-year roll-out period and since the roll-out process is geographic, not functional, the additional functionality and patching will have to continue for the majority of that 10 years until the last site gets turned off. So, with respect to those outside entities that are using VistA, they certainly have plenty of time to

prepare for what might eventually happen 10 years from now, it is not going to be a surprise to them in any way.

Ms. LEE. Do you have an agreement; do you have any licensing agreements with those groups and is there like a stop date at 10 years?

Dr. TIBBITS. Licensing, I think I am going to—we would be best advised to take that for the record. Licensing is very complicated when you get into Apache II licenses and commons and all that sort of stuff. So OSEHRA is quite expert at license management. I think we should take that for the record and get back to you on the license questions.

Ms. LEE. Okay. Thank you.

Dr. O'Toole, while the VA is using the electronic—the dual records, what clinical impacts are expected and tolerated, and which ones would be unacceptable?

Dr. O'TOOLE. Thank you. It is an extremely important issue and challenge for us. I think the expectation is that there will be workflows that require dual system use for different clinic scenarios. The challenge point and the things that we are going to be looking for are, one, clearly, how will that impact in terms of efficiency of patient care and the amount of time that it takes to care for a patient within those clinical settings. The expectation with the initial IOC roll-out sites is that clinical time needs to be extended for each clinical visit to ensure that adequate time is made available. We are in the process of expanding the traveling nursing corps at our IOC sites to enhance the staff capabilities there in order to ensure that.

The biggest challenges and the biggest risks to us, I think, are really related to complex clinical scenarios where patients may be migrating across multiple settings or where longitudinal care is critical to clinical decision making, and that is something that we are in the process of looking at very closely within the context of the IOC capabilities to ensure that those workflow processes are identified in advance, that clinicians up front know what to expect and what the workflow processes will be, but it is something we will be monitoring and watching very closely through this process.

Ms. LEE. Thank you. Just one last question.

Ms. Harris, obviously, there are a lot of uncertainties in the potential solutions that we are hearing today and, from a management perspective, do you have concerns and is the VA taking on risk that it may not be aware of, in your opinion?

Ms. HARRIS. Well, we have ongoing work for the Subcommittee related to the transition plans and activities that are underway. I think that having effective plans is a very critical thing and having plans that are at the right level of detail is certainly very critical.

I think that one of the things that we have some questions about at this time relates to the clinical workflows and when that will be completed and the level of granularity of those workflows in time for the IOC deployment. The timing of those two activities is something that we have some questions on and whether the VA will be in a position to be able to complete those workflows in time for the deployments at those IOC sites, that is something that we have some questions about at this time.

Ms. LEE. Thank you.

Well, this now concludes the Subcommittee hearing. I wanted to thank all of the witnesses for being here today, thank Ms. Harris for your report. We are heartened that the VA will take the recommendation of the GAO and has begun implementing the methodology, and we look forward to having transparent updates as we go along.

From my point of view, you know, continuing, Mr. Short, a lack of plan on joint governance continues to be a problem with the rollout of this program and our lack of having knowledge of what the plans are, when we can expect to see a joint governance really continues to concern us. And it is really, mostly for me about the risk of the rollout in this contract. I mean, this was a fixed-price contract, VA implemented it with indefinite deliverable, indefinite quality, which really would have shifted a lot of the risk onto the contractor, but with lack of knowledge of really what the extent of VistA is, to me, shifts a lot of that risk back onto the VA.

And when we start to talk about the cost, you know, the billions and billions of dollars of cost of this project, I just have concern and I hope that we can continue to have some transparency as we roll out. And when we get to specific decision points, to be able to stand up and make the proper decision based on the status of where we are at the time would be my hope as we move forward, especially given the track record that we have had in trying to update VistA multiple times in the past. And ultimately, you know, improved health care for our veterans is really the focus that we all and I know, Dr. O'Toole, we are all focused on, and obviously the interoperability being the number one objective in this rollout.

And so as we move forward, again, we thank you all for being here and continue to want to have that transparency, so we can make sure that ultimately, we are delivering the best care possible to veterans in our country. And thank you all for being here.

And I would like to thank the witnesses. I hope that we will work together with this Subcommittee as we continue this oversight.

All Members will have 5 legislative days to revise and extend their remarks and include extraneous material. And this hearing is now adjourned.

Thank you.

[Whereupon, at 11:23 a.m., the Subcommittee was adjourned.]

# A P P E N D I X

## Prepared Statement of Paul Tibbits

### INTRODUCTION

Good morning Chairwoman Lee, Ranking Member Banks, and distinguished Members of the Subcommittee. Thank you for the opportunity to testify today about the Department of Veterans Affairs' (VA) IT modernization efforts, including the Electronic Health Record Modernization (EHRM) initiative and the Veterans Health Information Systems and Technology Architecture (VistA): the system at the center of that effort.

I am accompanied today by Charles C. Hume, Assistant Deputy Under Secretary for Health Informatics, Veterans Health Administration; John Short, Chief Technology and Integration Officer, Office of Electronic Health Record Modernization; and Dr. Thomas O'Toole, Senior Medical Advisor, Office of the Assistant Deputy Undersecretary for Health for Clinical Operations, Veterans Health Administration.

### OVERVIEW

VA is committed to providing exceptional care, services, and a seamless, unified experience to our Veterans. The Office of Information and Technology (OIT) collaborates with various VA offices to achieve this mission through the delivery of state-of-the-art technology, including a modernized Electronic Health Record (EHR).

VA was an early pioneer of the EHR. We developed VistA to support the clinical, administrative, and financial operations of the Veterans Health Administration (VHA). Today, VistA and its integrated systems provide an integrated EHR for Veteran care and services. It supports over 150 applications, including the operations of more than 1,500 VA facilities, from small outpatient clinics to large VA Medical Centers (VAMC). There are 130 unique instances of VistA nationwide at four Regional data centers, apart from Manila which has an onsite instance. Each of the 130 VistA instances share a standard core of functionality but are customized to each VAMC's needs and patient population. VistA is also enhanced by many third-party commercial off-the-shelf (COTS) products which further customizes the environment. One instance of VistA, at Valley Coastal Bend, was successfully migrated to the cloud on June 22, 2019, which is the future direction for VistA instance maintenance until they are subsumed by Cerner Millennium.

Like any IT system, VistA requires updates and maintenance to keep it functioning at a high level. Critical upgrades to the system could be extremely costly over the years, and maintenance costs are even higher. Often, it becomes more expensive to maintain a legacy system than to replace it.

VistA has served VA and Veterans well, but after nearly 40 years in operation, we are also aware of its limitations. It does not possess the modern capabilities, analytics, and functionalities that medical providers and Veterans expect and deserve. It is not interoperable with other Federal records systems, including those at the Department of Defense (DoD) which contain the health information of Servicemembers who will eventually enter our system as Veterans. Instead, VA staff must use a separate viewer to see DoD's data and yet another system to provide allergen and medication alerts to VistA.

To modernize VA's legacy EHR systems and achieve interoperability with DoD and community care providers, VA decided to transition to a new EHR solution. In May 2018, VA awarded Cerner a contract to replace VistA with a COTS solution, Cerner Millennium, which is also currently being deployed by DoD.

VA is working with Cerner to achieve Initial Operating Capability (IOC) in the Pacific Northwest, where DoD has already deployed the MHS GENESIS system, which is at its core, Cerner Millennium. Beginning in Spring 2020, VA will deploy its new EHR solution in that region. Through the IOC period, VA will maximize efficiencies by building upon lessons learned from DoD. VA will then deploy its new EHR solution across the VA enterprise. During implementation of the new EHR solution, VA will need to maintain VistA systems for a period of time. This ensures

that current patient records remain accessible and that there will be no interruption in the delivery of quality care.

Keep in mind the Pacific Northwest region is only a small fraction of the VistA ecosystem. Instances occur across the country and it's even more important during the pre-deployment reviews that VA identifies the unique differences to effectively reach IOC on schedule. OIT has completed infrastructure readiness assessments for the IOC sites. More importantly, VistA is not only an EHR system; it is a complex system more like an Enterprise Resource Planning (ERP) with a variety of capabilities and functionalities, including financial, administrative, and supply chain management functions. It supports not only VHA but may be used by the Veterans Benefits Administration (VBA) and the National Cemetery Administration (NCA).

**FACILITIES USE OF VISTA DURING EHRM**

For the aforementioned reason, VA can only fully retire VistA when every capability and functionality used by a facility is replaced by a modernized replacement system, whether by Cerner or additional systems.

During the transition to VA's new EHR solution, VA facilities will continue to use their instance of VistA. VA is undertaking several concurrent modernization projects such as the following:

- Defense Medical Logistics Standard Support (DMLSS), a system that will manage all VHA supply chain functionality except for pharmacy, patient specific prosthetics, and possibly IT equipment; and
- Financial Management Business Transformation (FMBT), which will replace VA's current Financial Management System.

**COSTS OF SUSTAINMENT**

For the purposes of ensuring uninterrupted health care delivery, VA will continue to use VistA until all legacy systems are replaced by the new solution. It currently costs VA $426 million to sustain VistA through Fiscal Year (FY) 2019 based on the GAO–19–125 report. VA is developing projected sustainment costs over the course of VA's new EHR solution implementation.

Currently, there is no VistA sustainment cost reduction directly tied to the new EHR solution rollout. VistA is expected to run without service degradation until all VAMCs have been migrated to the new EHR solution, at which time the redundant VistA modules will be decommissioned. VistA modules that are not replaced by the new solution will be maintained until replacement capabilities are developed. The cost to maintain VistA will increase as we must include development for new capabilities and interfaces, Congressional mandates, cloud costs, hiring and retention of VistA support resources, and maintenance. The estimated minimum cost for VistA during this 10-year transition period is $4.89 billion, not including any required development. VA is currently developing a methodology to update the cost data and thereby define VistA, which was also a recommendation by GAO in a recent draft report.

**LONG–TERM STRATEGY FOR SUSTAINMENT**

VA is constantly looking for more efficient ways to sustain VistA throughout the course of the EHRM effort. The following are some of the key strategies:

- Development Operations Approach - OIT is shifting to a DevOps approach focused on collaboration, innovation, Agile principles, and automation-so that it can develop, enhance, maintain, and roll out better products at a faster pace than using the existing separate development and operations processes.
- VistA Standardization - VAMCs will be required to run the nationally released "Gold" version of VistA. A waiver process will allow for critical modifications. In addition to having a common set of software routines for each VistA instance, there are some additional normalization activities that includes the work on terminology extensions to account for local differences and others that will need to be addressed to ensure complete standardization of as much of the VistA database/file system as possible. VA's goal is for all VistA instances to be standardized.
- Merging Resources - OIT is merging VistA teams and resources for maximum efficiency throughout OIT.
- Maintain excellent customer support - Responding to patient safety issues; hiring and retention of VistA support resources; maintaining security and compliancy (scans and remediation, 508, ATO, etc.); refreshing hardware (life-cycle upgrade, hardware, cloud etc.); maintaining software versions/upgrades; decommissioning of VistA products as appropriate.

- Office of Technical Integration (OTI) - OTI facilitates communication and planning between OIT and various program offices that are implementing the systems that will replace VistA. OTI will track and report progress from these program offices, facilitate real-time conflict resolution, and manage risks between programs.
- VA Enterprise Cloud (VAEC) - OIT is currently piloting a program to migrate all 130 instances of VistA to the VAEC. Last month, OIT successfully migrated the first VistA instance to the cloud-a historic milestone and strong first step toward full cloud migration for VistA. Over the next year alone, VA will migrate 70 more instances of VistA from the St. Louis Defense Information Systems Agency (DISA) data center into the cloud.

**CONCLUSION**

As VistA functionality is replaced by a COTS solution and other systems, VA can decommission VistA products as appropriate. Until the new EHR solution is implemented across the VA enterprise, VistA remains VA's authoritative source of Veteran data. Sustaining VistA for the duration of our EHRM effort ensures that Veterans continue to receive uninterrupted care and services while VA looks to the future and improves the Veteran experience.

Madam Chair, Ranking Member, and Members of the Subcommittee, thank you for the opportunity to appear before you today to discuss OIT's progress toward VistA transition. I look forward to continuing to work with this Subcommittee to address our greatest priorities. This concludes my testimony, and I look forward to answering your questions.

1. Acknowledgement of GAO Report

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a. Definition of VistA

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ii. Interoperability
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**1. Acknowledgement of GAO Report**

The Department of Veterans Affairs (VA) Office of Information and Technology (OIT) acknowledges the Government Accountability Office's (GAO) report released in July 2019, titled "ELECTRONIC HEALTH RECORDS: VA Needs to Identify and

Report System Costs" regarding the costs and requirements of sustainment of the Veterans Health Information Systems and Technology Architecture (VistA) system during VA's transition to Cerner Millennium and other systems intended to replace VistA functionality.

Under the section titled "Recommendation for Executive Action," GAO recommended that the Assistant Secretary for Information and Technology and Chief Information Officer work with the Under Secretary for Health to develop and implement a methodology for reliably identifying and reporting the total costs of VistA sustainment. The report states that this methodology should include steps to define VistA and include planned sustainment activities. OIT acknowledges this recommendation and is currently developing such a methodology and continues to conduct current, ongoing, and planned sustainment activities. OIT presents this written testimony to provide further information regarding current and ongoing efforts related to VistA sustainment and the Electronic Health Record Modernization (EHRM) effort.

**2a. Definition of VistA**

VistA is VA's comprehensive information system for Veteran care and services. It supports a complex set of clinical, administrative, and financial operations for the Veterans Health Administration (VHA).

VistA is an architecture that includes servers, personal workstations, and a variety of applications within the supporting infrastructure including data centers, storage, and messaging technologies. It provides a wide variety of functionalities and therefore may also support functions outside of VHA.

VistA supports over 150 applications and the operations of more than 1,500 VA facilities. Applications focus on clinically-relevant record keeping that improves patient care by improving clinical and administrative decision-making. Facilities range from small clinics that provide solely outpatient care to large medical centers with significant inpatient populations and their associated specialties. VistA is deployed across VHA at more than 1,500 sites of care, including Veterans Affairs Medical Centers (VAMC), Community Based Outpatient Clinics (CBOC) and Community Living Centers (CLC), as well as at nearly 300 VA Vet Centers. VistA was designed and often developed and implemented jointly by VHA clinicians and IT personnel at VHA facilities. It has been in use since 1983, nearly 40 years.

**2ai. Definition of VistA: Electronic Health Record**

VistA is VHA's full-featured Health Information System and electronic health record (EHR). It contains an EHR for each patient and supports the clinical, administrative, and financial functions of VAMCs and VA facilities across the country. VistA interfaces with applications through messaging protocols and reporting mechanisms.

**2aii. Interoperability**

As an EHR, VistA sends and exchanges stored health data with other VA systems, other Federal agencies (e.g., Department of Defense), health information exchange networks, community care providers, and more than 100 commercial off-the-shelf (COTS) products. VistA is not currently interoperable with the Department of Defense (DoD), so VA users instead use the DoD/VA Joint Legacy Viewer (JLV), a Web-based graphical user interface. Additionally, VA and DoD share allergens and medication data with each other in a system called the Health Data Repository (HDR) which feeds data to other systems that can alert VA clinicians while using VistA.

**2aiii. Other functionalities**

As the GAO report notes, VistA provides functionality beyond traditional EHRs. It exchanges information with many other applications and interfaces. It provides a variety of other functionalities including asset management, financial transaction management, a billing system, and supply chain management. These functions primarily support VHA facilities, but instances of VistA may also be used by local Veterans Benefits Administration (VBA) and National Cemetery Administration (NCA) facilities and cemeteries. For example, a local cemetery may use VistA for its supply chain management needs.

**2b. Definition of Instances of VistA**

There are 130 instances of VistA across the VA enterprise. An instance of VistA is an occurrence of the system that serves a VAMC and its associated clinics, and other potential VA facilities within a defined geographical region. Generally, there is one instance of VistA per health care system or VAMC and associated clinics.

However, over the years, some VAMCs have been consolidated onto the same VistA instance, so there is not exactly a 1:1 ratio of instance and site. Each instance also consists of the hardware and software used to provide VistA capabilities for a health care system.

**2c. Explanation of Variation in Instances of VistA**

Each instance of VistA may have slight modifications and variations that serve requirements unique to that geographical region. However, the code between instances has been made nearly identical through work over the last 6 years through the VistA Evolution Program. Implementation of the new EHR solution will help consolidate and standardize VistA instances. OIT is working to avoid any changes to VistA which could needlessly alter VistA's configuration prior to full implementation of the new EHR solution would complicate and delay implementation efforts.

**2d. Plans to Further Define VistA**

VA is currently developing a methodology to refine the definition of VistA.

**3a. Note on GAO Report Assessment**

The GAO report examined cost data provided by OIT and VHA associated with the development and sustainment of VistA for FYs 2015, 2016, and 2017 only.

**3b. Methodology**

VA is currently developing a methodology to update the sustainment cost data.

**3c. Comprehensive Total Cost Assessment**

Cost data has been updated. It currently costs VA $426 million to sustain VistA through FY 2019. VA is developing projected sustainment costs over the course of the new EHR solution implementation. VA's estimated minimum cost for VistA during this 10-year transition period is at least $4.89 billion, not including newly required development. VA is currently developing a methodology to update the cost data and redefine VistA.

**3d. Limitations**

During the transition from VistA to the new EHR solution, the two systems will need to be operated in parallel. In addition, VistA is expected to run without service degradation until all VAMCs have been migrated to Cerner, at which time the redundant VistA modules will be decommissioned. For these reasons, there is currently no VistA sustainment cost reduction directly tied to the EHRM effort.

**4. Need for Sustainment**

Further, VistA modules whose functionality is not replaced by Cerner Millennium will need to be maintained until replacement solutions are developed and deployed. For example, Cerner Millennium does not replace some financial management and supply chain management functions provided by VistA. Other programs, such as Financial Management Business Transformation (FMBT) and Defense Medical Logistics Standard Support (DMLSS) will replace those functionalities. VistA cannot be decommissioned until all current functionality is replaced by a modernized replacement system, whether Cerner Millennium or otherwise. However, these other programs are expected to be developed and implemented on a shorter timeline (i.e., less than 10 years). Since implementation of the new EHR solution is currently projected to take 10 years, the EHRM effort is the ultimate driver of VistA sustainment and full transition.

**4a. Facilities Use of VistA During EHRM**

Facilities will continue to use their instance of VistA until other concurrent modernization projects have replaced all functionalities of that VistA instance. Only then can the facility fully transition from VistA to the new EHR solution and other replacement solutions.

**5. Long-Term Strategy for Sustainment**

Despite the need to maintain Vista over the course of the EHRM effort and the development and implementation of additional modernized replacement systems, there are current and ongoing efforts to reduce some costs of sustainment and make transition efforts more efficient. For example:

**5a. Consolidation of Teams and Resources**

OIT is consolidating teams and resources between Transition, Release and Support (TRS) and Enterprise Program Management Division for maximum efficiency.

**5b. OTI**

The newly established Office of Technical Integration (OTI) facilitates communication and planning between OIT and various program offices that are implementing the systems that will replace VistA. OTI will track and report progress from these program offices, facilitate real-time conflict resolution, and manage risks between programs.

**5c. Cloud Migration**

OIT is currently piloting a program to migrate all 130 instances of VistA to the VA Enterprise Cloud (VAEC). Last month, OIT successfully migrated the first instance of VistA to the cloud. This is a significant achievement which will support VA's "Cloud First" policy and modernization initiatives as established by the Federal Chief Information Officer.

Over the next year alone, VA will migrate 70 more instances of VistA from the St. Louis Defense Information Systems Agency (DISA) data center into the cloud. Hosting VistA in the cloud is more cost-effective than hosting in physical data centers. It allows OIT to make updates more quickly, saving labor hours. It also improves system and application speed and performance and is more scalable, making it more valuable to OIT's business partners.

**6. Activities to Plan for Transition**

VA is working closely with DoD during this major business transformation. DoD and VA have appointed co-chairs for all efforts. VA is collaborating with Cerner to understand the technical support requirements to connect to the Cerner Millennium Cloud Data Center and to develop the processes necessary to accommodate emerging technologies. VA is also working with its community care partners, focusing on interoperability and bidirectional information exchange.

To allow for seamless interoperability between Cerner and VistA over the course of implementation, JLV will be enhanced to include a Cerner viewer. This will allow sites that have not yet transitioned to access new electronic data repositories and to create stand-alone technical solutions to share data with the new EHR solution. In addition, the requisite interfaces with VistA and the new product capabilities and related workflows will be fully tested before transitioning to the operational environment.

During this time, Cerner HealtheIntent will become the authoritative data store for Veteran health care information, since it is populated with all Veteran information and since information from VistA sites will be written into HealtheIntent real-time through VDIF, the middleware.

**6a. Establishment of Program Office**

To establish a leadership accountable for planning and executing the EHRM effort and addressing difficulties to ensure program success, VA established the Office of Electronic Health Record Modernization (OEHRM) in June 2018. OEHRM's initial Program Management Plan guides management and defines program policies and processes.

**6a. Governance Structure**

OEHRM is comprised of three management structures. The Chief Medical Office oversees strategy and planning; communication efforts for business process changes; and user testing, training, and deployment. The Technology and Integration Office provides technical leadership, management, and oversight and supports interoperability with DoD. Lastly, the Program Management Office provides program support through adherence to cost, schedule, and performance objectives. OEHRM has a governance structure that is intended to allow leadership to address technical and functional issues as well as joint management issues that may arise between VA and DoD during the process of their respective EHR implementation efforts. The structure consists of a Steering Committee; a Governance Integration Board, which oversees a Technical Governance Board and Functional Governance Board; and the Electronic Health Record Councils.

OIT is also working closely with DoD on the organizational development of the Federal Electronic Health Record Modernization (FEHRM) Program Office. The FEHRM Program Office will serve as the re-chartered DoD/VA Interagency Program Office (IPO). In short, OIT is working collaboratively with VHA, OEHRM, IPO/FEHRM, and their associated partners to achieve successful implementation, leverage lessons learned and best practices, leverage common infrastructure, innovate to improve business processes, and facilitate effective adjudication of issues.

**16b. Role of OIT**

OIT plays several roles in this business transformation process. According to established baseline standards for initial operating capability (IOC), OIT is responsible for upgrades to the IT infrastructure and local area network infrastructure. These infrastructure upgrades are critical to success of the deployment of the new EHR solution.

OIT is also involved in the following areas:

- **Coordination, planning, and budgeting:** OIT works collaboratively with OEHRM, based on requirements submitted in VA IT Process Request (VIPR), to provide planning, budgeting, project management, infrastructure assessments, and other support to EHRM.
- **Fielding:** In support of VHA and the IOC/VAMC sites, OIT focuses on the infrastructure line of effort to ensure that all aspects of the network architecture will support accessing the new EHR solution and associated systems, within VHA-defined service levels response times.
- **Access Management:** OIT coordinates closely with Office of Operations, Security, and Preparedness in development and implementation of access control (PIV cards), and with OEHRM and DoD for secure access to Cerner Millennium resources in the DoD Medical Community of Interest (MedCOI) environment.
- **Cybersecurity:** OIT is in close coordination with DoD regarding shared network security standards and reciprocity between DoD and VA systems.
- **End user experience with system performance:** OIT organizes activities among multiple stakeholders to manage service provision and system access.

OIT is working closely with VHA and OEHRM to plan an accelerated implementation of the Cerner Standalone Scheduling module; design system interfaces between legacy applications and the Cerner Millennium suite; adjudicate requests for legacy VistA upgrades against pending Cerner Millennium functionality; and design service desk interface tools and business rules to improve collaboration with end user reported issues.

6c. Assessment of Sites

VA is currently conducting site assessments at IOC sites to refine requirements and prepare for implementation. VA has identified three primary IOC sites for assessment: VA Puget Sound Health Care System, American Lake Division; VA Puget Sound Health Care System, Seattle Division; and Mann-Grandstaff VA Medical Center. During assessment at these sites, VA determined that some infrastructure and workstations would need to be updated to achieve compatibility with Cerner Millennium. In addition, sites that offer such VA services as telehealth and behavioral and mental health services would need additional attention from Cerner to meet business and system requirements. These site assessments are intended to produce lessons learned and ease deployment and implementation efforts at the rest of the sites Nation-wide.

In the Pacific Northwest, there are the following:

- 5 VA Health Care Systems;
- 6 VA Medical Centers (VAMC);
- 9 Outpatient clinics;
- 17 Vet Centers; and
- 34 Community-based outpatient clinics (CBOC).

**6d. Initial Operating Capability**

VA is working with Cerner to implement the new EHR solution at three IOC sites in the Pacific Northwest. As DoD has already deployed to this region, VA selected the Pacific Northwest to maximize efficiencies through DoD's lessons learned. This strategy also allows VA to leverage DoD's data hosting environment and adopt enhanced cybersecurity protocols to facilitate interoperability.

For FY 2019, OIT is accessing OEHRM infrastructure funding to support IOC with network switch upgrades, bandwidth upgrades, Wi-Fi implementation and upgrades, new endpoint devices, surge implementation support, and monitoring tools and licenses.

**6e. System Implementation**

After implementation at the IOC sites in the Pacific Northwest, VA will deploy the new EHR solution across the enterprise. As previously discussed, VA will maintain and support VistA until full Cerner implementation. This ensures that current patient records are accessible and that there will be no interruption in the delivery of quality health care to our Nation's Veterans.

**Prepared Statement of Carol C. Harris**

ELECTRONIC HEALTH RECORDS

VA Needs to Identify and Report Existing System Costs

Chair Lee, Ranking Member Banks, and Members of the Subcommittee:

Thank you for the opportunity to participate in today's hearing regarding the Department of Veterans Affairs' (VA) health information system-the Veterans Health Information Systems and Technology Architecture (VistA)-which has been essential to the department's ability to deliver health care to veterans. This technically complex system has been in operation for more than 30 years, is costly to maintain, and does not fully support exchanging health data with the Department of Defense (DoD) and private health care providers.

VA has initiated a major program to replace the VistA electronic health record (EHR) with a commercial-off-the-shelf (COTS) product. The department plans to start deploying its new EHR system in March 2020. However, VA sites are to continue using VistA until they receive the new system during a phased transition over the next 10 years.

We recently reviewed key aspects of VistA in response to a request from the House Committee on Veterans' Affairs. We examined, among other things, the extent to which VA has defined VistA and the department's annual costs to develop and sustain the system.

At your request, my testimony for this hearing summarizes the findings discussed in our report on VistA, which is being released today.[1] More detailed information on our objectives, scope, and methodology for that work can be found in the issued report.

We conducted the work on which this statement is based in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

**Background**

VA's mission is to promote the health, welfare, and dignity of all veterans in recognition of their service to the Nation by ensuring that they receive medical care, benefits, social support, and lasting memorials. In carrying out this mission, the department manages one of the largest health care delivery systems in the United States that provides enrolled veterans with a full range of services. These services may include primary care; mental health care; and outpatient, inpatient, and residential treatment. The Veterans Health Administration (VHA), one of the department's three major components, is responsible for overseeing the provision of health care at all VA medical facilities.

Information technology (IT) is widely used and critically important to supporting the department in delivering health care to veterans. As such, VA operates and maintains an IT infrastructure that is intended to provide the backbone necessary to meet the day-to-day operational needs of its medical centers and other critical systems supporting the department's mission. The infrastructure is to provide for data storage, transmission, and communications requirements necessary to ensure the delivery of reliable, available, and responsive support to all VA staff offices and administration customers, as well as veterans. The Office of Information and Technology (OIT) is responsible for managing the majority of VA's IT-related functions. The office provides strategy and technical direction, guidance, and policy related to how IT resources are to be acquired and managed for the department.

**VistA's Role at VA**

VA provides health care services to approximately 9 million veterans and their families and relies on its health information system-VistA-to do so. VistA has been essential to the department's ability to deliver health care to veterans. It was developed based on the collaboration between staff in the VA medical facilities and VHA IT personnel. Specifically, clinicians and IT personnel at the various VA medical facilities collaborated to define the system's requirements and, in certain cases, car-

[1] GAO, Electronic Health Records: VA Needs to Identify and Report System Costs, GAO 19 125 (Washington, D.C.: July 25, 2019).

ried out its development and implementation. As a result of these efforts, the system has been in operation since the early 1980s.[2]

VistA supports a complex set of clinical and administrative capabilities. It is comprised of an architecture that ties together servers and personal computer workstations with various applications within VA facilities and the supporting infrastructure, such as data centers, storage, and messaging technologies. The core system and database code are programmed in the MUMPS programming language.[3] Among other things, VistA contains an EHR for each patient and supports clinics and medical centers.

In addition, the system provides functionality beyond the EHR and exchanges information with many other applications and interfaces. For example, the system also provides the functionality of a time and attendance program, asset management system, library, and billing system, among other things.

Users interact with VistA through a number of interfaces that connect stored health data. These interfaces enable the system to communicate (send or exchange data) with other VA systems, as well as with other Federal agencies (e.g., DoD), health information exchange networks, and COTS products. According to OIT officials, applications either interface with VistA directly through a messaging protocol[4] or extract data from the system via a reporting mechanism.

The Computerized Patient Record System is a graphical user interface to VistA that runs on workstations, laptops, and tablets and enables the department to support clinical workflows. Specifically, the Computerized Patient Record System enables the department to create and update an individual EHR for each VA patient. Among other things, clinicians can order lab tests, medications, diets, radiology tests, and procedures; record a patient's allergies or adverse reactions to medications; request and track consults; enter progress notes, diagnoses, and treatments for each encounter; and enter discharge summaries.

According to VHA officials, there are also more than 100 COTS products that interface with VistA. In addition to these commercial products, medical equipment or devices at local facilities may also require interfaces to the system, and these vary on a site-by-site basis.

**VA Has about 130 Different Versions of VistA**

Over the last several decades, VistA has evolved into a technically complex system that supports health care delivery at more than 1,500 locations,[5] including VA Medical Centers, outpatient clinics, community living centers, and VA vet centers. Customization of the system by local facilities has resulted in about 130 clinical versions of VistA-referred to as instances.[6]

According to the department, no two VistA instances are identical. Further, each instance is comprised of over 27,400 routines (executable modules of code), which are logically grouped into products or modules. VistA products or modules can also be comprised of one or more software applications that support health care functions, such as providing care coordination and mental health services. The department reported that there are approximately 140 to 200 products or modules that comprise the system.[7]

The 130 clinical instances of VistA are operated from four regional VA data centers.[8] Users interact with the system through the Computerized Patient Record Sys-

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[2] VistA began operation in 1983 as the Decentralized Hospital Computer Program. In 1996, the name of the system was changed to the Veterans Health Information Systems and Technology Architecture, referred to as VistA.

[3] The Massachusetts General Hospital Utility Multi-Programming System, now referred to as M, or MUMPS.

[4] VistA uses, for example, application programming interfaces, remote procedure calls, and Health Level 7 messaging to communicate with COTS software, selected IT systems of other Federal agencies, and health information exchange networks.

[5] The VHA Business Function Framework (Version 2.11, May 2016) is the department's architectural model that describes the core functions related to delivering health care services and supporting the needs of veterans, health care providers, and resource partners.

[6] A customization might include modifications required to address state and local laws regarding health care, such as those related to the inputs, outputs, and data required to produce a death certificate. A clinical VistA instance includes the EHR. There are a limited number of VistA instances that do not support clinical functions.

[7] Within VistA, nationally released and supported software are referred to by VA as Class I software. In addition, instances may also be comprised of Class II (regionally deployed and supported) and Class III (locally deployed and supported) software.

[8] According to VA officials, there are about 39 additional instances of VistA that are older and nonoperational but contain records and must be maintained or have their data migrated for maintenance.

tem. Aggregated clinical data from every instance of the system are located on servers hosted at VA's National Data Center.[9]

Over time, VA has identified the need for enhancements and modifications to VistA in order to ensure that the system keeps up with current technology and health care delivery. However, according to the department, the system has become difficult and costly to maintain. This is a result of, for example, being programmed in MUMPS, a language for which there is a dwindling supply of qualified software developers. It is also due to years of decentralized customization of the system by staff members who were permitted to develop and implement applications at the local level.

**OIT and VHA Share Responsibilities for VistA**

OIT and VHA serve as the technical and functional leaders, respectively, for the department's health care delivery and, together, they have worked to develop and maintain VistA for decades. Specifically, OIT is responsible for managing the majority of VA's IT-related functions. The office provides strategy and technical direction, guidance, and policy related to how IT resources are to be acquired and managed for the department.

According to the department, OIT's mission is to collaborate with its business partners (such as VHA) and provide a seamless, unified veteran experience through the delivery of state-of-the-art technology. The Assistant Secretary for Information and Technology/Chief Information Officer (CIO) serves as the head of OIT and is responsible for providing leadership for the department's IT activities.

The CIO also advises the Secretary regarding the execution of VA's IT systems appropriation, consistent with the Federal Information Technology Acquisition Reform Act.[10] For fiscal year 2019, the department has been appropriated $4.1 billion for IT. According to VA's budget documentation, about $1.2 billion of this amount is intended to support IT staffing and associated costs for approximately 8,100 full-time employees.

VHA provides information and expertise to OIT to support the department's health-related information systems. For example, VHA officials help identify clinical and business needs used to inform IT requirements development.[11] The Under Secretary for Health is the head of VHA and is supported by the Principal Deputy Under Secretary for Health, four Deputy Under Secretaries for Health, and nine Assistant Deputy Under Secretaries for Health.

**VA Has Begun to Acquire a New EHR System**

After nearly 2 decades of pursuing multiple efforts to modernize VistA, in June 2017, the former VA Secretary announced that the department planned to acquire the same EHR system that DoD is acquiring-Cerner Millennium.[12] According to the department, it has chosen to acquire this product because Cerner Millennium should allow VA's and DoD's patient data to reside in one system, thus, potentially reducing or eliminating the need for manual and electronic exchange and reconciliation of data between two separate systems.

Accordingly, the department awarded an indefinite delivery, indefinite quantity contract to Cerner Corporation in May 2018 for a maximum amount of $10 billion over 10 years. Cerner is to replace the 130 instances of VistA with a standard COTS

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[9] The National Data Center is located in Austin, Texas.

[10] Provisions in IT acquisition reform legislation (commonly referred to as the Federal Information Technology Acquisition Reform Act, or FITARA) require covered executive branch agencies, including VA, to ensure that the CIO has a significant role in the decisionmaking process for IT budgeting, and in the management, governance, and oversight processes related to IT. See Carl Levin and Howard P. 'Buck' McKeon National Defense Authorization Act for Fiscal Year 2015 , Pub. L. No. 113–291, div. A, title VIII, subtitle D, 128 Stat. 3292, 3438–3450 (Dec. 19, 2014).

[11] VHA is responsible for the Medical Support and Compliance budget, which includes "necessary expenses in the administration of the medical, hospital, nursing home, domiciliary, construction, supply, and research activities, as authorized by law.".

[12] In July 2015, DoD awarded a $4.3 billion contract for a commercial EHR system developed by Cerner-Cerner Millennium-to be known as MHS GENESIS. The transition to the new system began in February 2017 in the Pacific Northwest region of the United States and is expected to be completed in 2022. The former Secretary of VA signed a "Determination and Findings," to justify use of the public interest exception to the requirement for full and open competition, and authorized VA to issue a solicitation directly to Cerner. A "Determination and Findings" means a special form of written approval by an authorized official that is required by statute or regulation as a prerequisite to taking certain contract actions. The "determination" is a conclusion or decision supported by the "findings." The findings are statements of fact or rationale essential to support the determination and must cover each requirement of the statute or regulation. FAR, 48 C.F.R. § 1.701.

system to be implemented across VA. This new system is to support a broad range of health care functions including acute care, clinical decision support, dental care, and emergency medicine. When implemented, the new system will be expected to become the authoritative source of clinical data to support improved health, patient safety, and quality of care provided by VA.

The Electronic Health Record Modernization (EHRM) program is responsible for managing the Cerner contract implementation. For fiscal year 2019, the program was appropriated about $1.1 billion for planning and managing the transition from VistA to Cerner.[13]

Further, the department has estimated that an additional $6.1 billion in funding, above the Cerner contract amount, will be needed to fund additional project management support supplied by outside contractors, government labor costs, and infrastructure improvements over the 10-year contract period.

VA plans to deploy the new EHR system at three initial operating capability sites within 18 months of October 1, 2018,[14] with a phased implementation of the remaining sites over the next decade. Each VA medical facility is expected to continue using VistA until the new system has been deployed. The three initial deployment sites, located in the Pacific Northwest, are the Mann-Grandstaff, American Lake, and Seattle VA Medical Centers and related clinical facilities that operate the same instances of VistA. These are the first locations where the system is expected to "go live."

The task order to deploy the Cerner system at the three initial sites provides a detailed description of the steps Cerner needs to take in order to reach initial operating capability at the Mann-Grandstaff site in March 2020, and at the Seattle and American Lake sites in April 2020. According to the schedule, the initial operating capability sites are expected to be operational by July 2020.

**VA Has Undertaken Efforts to Define VistA, but Additional Work Remains**

In order to maintain internal control activities over an IT system and its related infrastructure, organizations should be able to define physical and performance characteristics of the system, including descriptions of the components and the interfaces.[15] Further, consistent with GAO's Cost Estimating and Assessment Guide, a comprehensive system definition should identify customization and the environment in which the system operates.[16] While defining a complex IT system can be challenging, having an adequate understanding of its characteristics will better position the organization to comprehensively project and account for costs over the life of a system or program as well as identify specific technical and program risks. Definition of VistA remains important because VA plans to continue using the system during the department's decade-long transition to the Cerner system.

VA maintains multiple documents and a database that describe parts of VistA, including various components and interfaces. However, despite these existing sources, OIT officials acknowledged that there is no comprehensive definition of the VistA system. Consequently, VA has completed a number of efforts to better define VistA and understand the environment in which it operates and additional work is planned in the future.

Specifically, VA has documented descriptions of the system, including the components that comprise it. These descriptions are documented in multiple sources: the VA Monograph, VA Systems Inventory, and VA Document Library.

- The VA Monograph is a document maintained by OIT that provides an overview of VistA and non-VistA applications used by VHA.[17] According to VHA officials, the VA Monograph is the primary document that describes the components of the system. The Monograph describes VistA in terms of modules. For modules identified, including VistA modules, information such as the associated business functions, VA Systems Inventory identification number, and a link to the VA Document Library for additional technical information are provided.
- The VA Systems Inventory is a database maintained by OIT that identifies current IT systems at the department, including systems and interfaces related to

[13] The EHRM appropriation is in addition to the $4.1 billion appropriated for IT in 2019.

[14] Initial operating capability is the contract milestone in which the system is intended to meet minimum operational capabilities.

[15] GAO, Standards for Internal Control in the Federal Government, GAO 14 704G (Washington, D.C.: September 2014).

[16] GAO, GAO Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Capital Program Costs, GAO 09 3SP (Washington, D.C.: March 2009).

[17] VA, VA Monograph (Washington, D.C.: February 2019).

VistA.[18] For systems identified, the database includes information such as the system name, the system status (i.e., active, in development, or inactive), and related system interfaces.
- The VA Document Library is an online resource for accessing documentation (i.e., user guides and installation manuals) on the department's nationally released software applications, including VistA.[19]

VA has taken additional steps to further define the system. For example, EHRM program officials recognized the need to further understand the customization of VistA components at the various medical facilities and have conducted analyses to do so. These analyses include:

- **Variance analysis:** As part of its VistA Evolution program,[20] which has focused on standardizing a core set of VistA functionality, the department implemented a process to compare the instances of VistA installed at sites to the Enterprise Standard version.[21] The results of this analysis allowed the department to assess the criticality of each variance, which is expected to help with VA's transition to the Cerner system.
- **Module analysis:** EHRM program subject matter experts undertook an analysis that involved reviewing and assessing capabilities provided by VistA modules. This analysis enabled department officials to determine whether the capability provided by a VistA module could be provided by the Cerner system, or whether another COTS solution would be required to support this function going forward.
- **Visual mapping:** EHRM program officials also directed an analysis that involved developing a notional visual mapping of VA's health care applications, components, and supporting systems within the health delivery environment. The results of this analysis provided a description of the current state of one instance of VistA and the VA health environment, which is intended to inform the department of possible opportunities for business process and IT improvements as it proceeds with the Cerner acquisition.

Nevertheless, even with these analyses, VA has not yet fully defined VistA, including, for example, identifying performance characteristics of the system and describing the environment in which it operates. The department's three sources that describe VistA and the additional analyses undertaken do not provide insight into site specific customizations of the system. For example, the VA Monograph does not include information on module customization at local facilities. In addition, according to OIT officials, the systems inventory does not reflect differences among the 130 different instances of VistA and does not take into consideration regional and local customizations of related components. Further, the visual mapping analysis noted that there was not full insight of the intertwined structure of data and applications or the various local customizations of VistA.

EHRM program officials stated that they have not been able to fully define VistA and understand all local customizations due to the decentralization of the development of the system and its evolution over more than 30 years. They explained that VistA's complexity is partly due to the various instances of the system, compounded by local customizations, which have resulted in differences in VistA instances operating at various facilities.

According to EHRM program documentation, Cerner's contract calls for the company to conduct comprehensive assessments to capture the current state of technical and clinical operations at specific facilities, as well as identify site-specific requirements where the Cerner system is planned to be deployed. As of June 2019, Cerner had completed site assessments for the three initial operating capability sites in the Pacific Northwest and had planned additional assessments at future deployment sites. The initial site assessments included, among other things, an assessment of

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[18] VA, VA Directive 6404: Department of Veterans Affairs VA Systems Inventory (VASI) (Washington, D.C., Feb. 23, 2016). According to VA Directive 6404, the VA Systems Inventory is the authoritative data source for VA's IT systems. OIT is responsible for the development and sustainment of the inventory.

[19] The VA Document Library includes links to documentation on VA software organized into the following categories: Clinical, Infrastructure, Financial-Administrative, HealtheVet, and Benefits.

[20] In December 2013, VA initiated VistA Evolution, a joint program between OIT and VHA that focused on implementing a collection of projects to improve the efficiency and quality of veterans' health care. Specifically, it focused on modernizing the VistA system, increasing the department's data exchange and interoperability with DoD and private sector health care partners, and reducing the time it takes to deploy new health information management capabilities.

[21] The Enterprise Standard version of VistA represents the compilation of different historical releases of VistA where patches have been installed.

the unique VistA instances and the environment in which the system operates. The continuation of planned site assessments should provide a thorough understanding of the 130 VistA versions, help the department better define VistA, and position it for transitioning from VistA to Cerner's COTS solution.

**VA Identified Total VistA Costs of about $2.3 Billion between 2015 and 2017, but Could Not Sufficiently Demonstrate the Reliability of All Data and Omitted Other Costs**

When using public funds, an agency must employ effective management practices in order to let legislators, management, and the public know the costs of programs and whether they are achieving their goals. To make those evaluations for a program or for a system as large and complex as VistA, a complete understanding of the system and reliable cost information is required.[22] By following a methodology and utilizing reliable data, an agency can ensure that all costs are fully accounted for, which in turn, better informs management decisions, establishes a cost baseline, and enhances understanding of a system's performance and return on investment.[23]

Fundamental characteristics of reliable costs are that they should be accurate (unbiased, not overly conservative or optimistic), well-documented (supportable with source data, clearly detailed calculations, and explanations for choosing a particular calculation method), credible (identifying any uncertainty or biases surrounding data or related assumptions), and comprehensive (costs are neither omitted nor double counted). Identification of VistA's costs remains important because VA plans to continue using the system during the department's transition to the Cerner system over the next decade.

VA identified costs for VistA and its related activities adding up to approximately $913.7 million, $664.3 million, and $711.1 million in fiscal years 2015, 2016, and 2017, respectively-for a total of about $2.3 billion over the 3 years.[24] However, the department could not sufficiently demonstrate the reliability of certain costs that were identified. In addition, VA identified other categories of VistA-related costs, but omitted these costs from the total.

**VA Did Not Sufficiently Demonstrate the Reliability of Data for All VistA Costs**

Of the $2.3 billion total costs for VistA, VA demonstrated that only approximately $1 billion of these costs were reliable. Specifically, OIT officials identified VistA-related costs within seven categories. The officials were able to sufficiently explain why these categories were included in the development and sustainment costs for VistA and how they were documented by the department; the officials also presented detailed source data for our examination. As a result of our review, we determined that the cost data for these seven categories were accurate, well-documented, credible, and comprehensive and, thus, sufficiently reliable.[25]

Table 1 provides a summary of the program costs identified for VistA by OIT and VHA for fiscal years 2015 through 2017 that we determined to be reliable.

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[22] In the case of VistA, costs reflect the complexity of the system itself and the environment in which it operates, beyond a single program.

[23] GAO's Cost Estimating and Assessment Guide describes a methodology for compiling an exhaustive and structured accounting of all resources and all costs required to develop and sustain a particular program or, in this case, a system. Specifically, the methodology describes the importance of documenting which costs are included and how they are calculated in detail, step by step, to provide enough information so that someone unfamiliar with the program or system could easily recreate or update cost calculations. Further, the methodology should include all assumptions and explanations for why particular data sets are chosen and why these choices are reasonable to allow for the assessment of the total accounting and the reliability of the cost data.

[24] We previously testified in June 2018 that preliminary costs reported by VA for VistA and related activities included approximately $1.1 billion, $899 million, and $946 million in fiscal years 2015, 2016, and 2017, respectively, for a total of about $3.0 billion over 3 years to support the system (see GAO, VA IT Modernization: Preparations for Transitioning to a New Electronic Health Record System Are Ongoing, GAO 18 636T (Washington, D.C.: Jun. 26, 2018)). Since that time, updates were made in OIT's budget tracking tool and EHRM program officials revised the approach to estimating certain types of costs.

[25] OIT program costs excluded pay and administrative costs, which are not tracked within OIT by program.

**Table 1: Program Costs for the Veterans Health Information Systems and Technology Architecture (VistA) for Fiscal Years 2015 through 2017, as Identified by the Department of Veterans Affairs, That GAO Determined to Be Reliable**

| | 2015 | 2016 | 2017 | Total |
|---|---|---|---|---|
| VistA Evolution | $317,851,492 | $101,214,171 | $130,552,085 | $549,617,748 |
| Interoperability | $55,811,302 | $32,755,060 | $51,617,011 | $140,183,373 |
| Virtual Lifetime Electronic Record Health | $45,854,411 | $28,953,893 | $6,356,457 | $81,164,761 |
| Veterans Health Administration (VHA) - contracts | $45,004,395 | $81,756,446 | $76,044,882 | $202,805,723 |
| VHA - intergovernmental personnel acts | $0 | $928,152 | $1,454,094 | $2,382,246 |
| VHA - memorandums of understanding | $0 | $1,013,984 | $1,277,178 | $2,291,162 |
| VHA - pay | $13,647,134 | $10,556,875 | $9,864,686 | $34,068,695 |
| **Total** | **$478,168,735** | **$257,178,581** | **$277,166,393** | **$1,012,513,709** |

Source: GAO analysis of data provided by the Department of Veterans Affairs. | GAO-19-679T

As shown in the table, VA identified costs for the following seven categories for fiscal years 2015 through 2017:

- **VistA Evolution -** The VistA Evolution program costs were associated with VistA strategy, system design, product development, and program management. These costs totaled approximately $549.6 million.
- **Interoperability -** The Interoperability program focused on sharing electronic health data between VA and non-VA facilities, including private sector providers and DoD.[26] For example, interoperability costs were associated with architecture, strategy, the Interagency Program Office, product development, and program management.[27] These VistA-related costs totaled approximately $140.2 million.
- **Virtual Lifetime Electronic Record (VLER) Health -** This program focused on streamlining the transition of electronic medical information between VA and DoD.[28] These VistA-related costs were associated with product development and program management and totaled approximately $81.2 million.
- **Contracts -** Contract costs for VistA Evolution included VHA's obligations associated with workload management, change management, clinical requirements, and clinical interoperability. These VistA-related costs totaled approximately $202.8 million.
- **Intergovernmental personnel acts -** Intergovernmental personnel acts are agreements for the temporary assignment of personnel between the federal, state, and local governments; colleges and universities; Indian tribal governments; federally funded research and development centers; and other eligible organizations. These costs accounted for VHA's need to use outside experts from approved entities for limited periods of time to work on VistA Evolution assignments. The total VistA-related costs were approximately $2.4 million.
- **Memorandums of understanding -** According to VHA, memorandums of understanding are agreements used by the administration to obtain the services of personnel between VA entities for VistA-related activities. These agreements accounted for approximately $2.3 million.
- **Pay -** Costs in this category included salaries for VHA staff who worked on VistA-related projects as well as travel, training, and supply costs associated with employment. These costs totaled approximately $34.1 million.

However, VA was not able to sufficiently demonstrate the reliability of approximately $1.3 billion in costs related to VistA. Specifically, OIT officials identified the additional legacy VistA costs that generally fell into three categories:

- **Legacy VistA:** Infrastructure, hosting, and system sustainment - Legacy VistA costs are generally related to the maintenance of fully operational items, such

[26] The Interoperability program was previously reported under the Electronic Health Record Interoperability program.

[27] Provisions included in the National Defense Authorization Act for Fiscal Year 2008 required VA and DoD to, among other things, jointly develop and implement fully interoperable EHR systems or capabilities and establish an Interagency Program Office to be a single point of accountability for their efforts. According to the act, the office was given the function of implementing, by September 30, 2009, EHR systems or capabilities that would allow for full interoperability of personal health care information between the departments. Pub. L. No. 110–181, § 1635, 122 Stat. 3, 460–463 (2008).

[28] VLER Health initially started in 2009. According to VA, this program is now referred to as the Veterans Health Information Exchange.

as VistA Imaging and Fileman-two key components related to VistA's operation.[29] The costs also included obligations for costs related to hosting health data in both VA and non-VA facilities.[30] The OIT officials and subject matter experts estimated these total costs to be approximately $343 million during fiscal years 2015 through 2017.

However, we were not able to determine the reliability of these costs because, for example, source data were not well documented; changes in the cost information provided to us during our review indicated that the cost data may not be credible; and subject matter experts were unclear about how to separate VistA costs from non-VistA costs.

- **Related software -** Related software costs are associated with the software supporting, or closely integrated with, VistA that were identified by EHRM officials, yet not tracked directly for one of the VistA-related programs. Both OIT and VHA identified software licensing costs as VistA-related obligations. The EHRM program reported these costs to be approximately $389 million in total during fiscal years 2015 through 2017.

However, we were not able to determine the reliability of the costs in this category for a variety of reasons, including that source data were not well documented. In addition, VA officials were not clear regarding how the total amounts in each category should be divided between OIT and VHA. Given this confusion, we were not able to determine if the costs were fully accurate or credible.

- **OIT personnel (pay and administrative) -** According to EHRM officials, OIT does not track labor costs by program. Instead, the department provided estimations of the amount of salaries paid to OIT government staff working on activities such as VistA Evolution, program management, and overall support of VistA and related applications. OIT personnel costs were estimated by the EHRM program office to be approximately $544 million total during fiscal years 2015 through 2017.

However, we were not able to determine the reliability of costs in this category because assumptions made for estimating the personnel and salary costs were not well documented and could not be verified.

**VA Omitted Certain Costs from the Total Cost of VistA**

In addition, VA omitted certain VistA costs from the total costs identified for fiscal years 2015, 2016, and 2017. Specifically, VA omitted the following costs:

- **Additional hosting -** OIT officials stated that additional costs related to hosting health data by an outside vendor, as well as hosting backup VistA instances at each of the medical center sites, should also be included in the total costs for VistA; however, VA omitted these costs from the total for fiscal years 2015 through 2017. Specifically, according to the officials, calculating costs for these hosting activities requires subject matter experts to identify equipment, space, utilities, and maintenance costs for resources allocated specifically for VistA. However, the department has not yet developed a methodology to calculate the costs. The officials said they were working on identifying a reliable approach for calculating these costs in the future.
- **Data standardization and testing -** OIT officials stated that additional costs related to work on clinical terminology mapping and functional testing were not included in the total costs for VistA for fiscal years 2015 through 2017. This work related to mapping existing clinical data to national standards and making updates to VistA or the Joint Legacy Viewer and included mapping data and building test scripts and reports.[31] OIT officials noted that this work had been critical to the VistA Evolution program, but they did not provide actual cost data in this category.

The lack of sufficiently reliable and comprehensive costs indicates that the department is not positioned to accurately report the annual costs to develop and sustain

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[29] According to the VistA 4 Product Roadmap, VistA Imaging is the clinical imaging interface designed and developed by VHA to incorporate image and document data, and attach said data to the veteran's EHR. It also provides specific applications used for Telehealth. File Manager (referred to as FileMan) serves as the data base management system for VistA, providing both structure for the data in VistA's database and the interface to VistA's data.

[30] Co-location is when an instance of VistA is hosted in a data center with other systems and includes costs, for example, of leasing space and related utilities.

[31] The Joint Legacy Viewer is a web-based graphical user interface, first released in 2013, that was developed jointly by VA and DoD. This tool provides a near real-time, integrated, and chronological view of EHR information contained in VistA and existing DoD systems, as well as data from some third-party providers. The Joint Legacy Viewer allows VA clinicians to view a read-only display of patient data from DoD as well as from a number of other medical providers.

VistA. This is due in part to VA not following a well-documented methodology that describes how the department determined the total costs for the system. In lieu of a methodology, OIT officials said that leadership and staff from the program took efforts to identify and track the cost components and contracts associated with the system. However, they noted that costs associated with VistA were not all clearly labeled as VistA in an IT system and it was necessary to estimate other costs. The officials were also unable to verify how VistA-related costs were separated from other department costs in all areas and subject matter experts were not consistently familiar with the estimation methods employed and how VistA was defined for the purposes of calculating costs. Further, VA officials noted that they were still working on the best approach to identifying and calculating omitted costs.

Without documenting the methodology for what costs are to be included and how they were identified and calculated, VA's total does not accurately reflect the development and sustainment costs for VistA. As a result, the department, legislators, and the public do not have the comprehensive, reliable information needed to understand how much it actually cost to develop and maintain the system. Further, VA does not have the reliable information needed to make critical management decisions for sustaining the many versions of VistA over the next 10 years until the Cerner system is fully deployed.

**Implementation of GAO's Recommendation Could Help Ensure VA Reliably Reports VistA Costs**

In our report, we are making a recommendation for VA to improve its reporting of VistA's costs. Specifically, we are recommending that the department develop and implement a methodology for reliably identifying and reporting the total costs of VistA. The methodology should include steps to identify the definition of VistA and what is to be included in its sustainment activities, as well as ensure that comprehensive costs are corroborated by reliable data. In written comments on a draft of the report, the department agreed with the recommendation and stated that it will provide the actions it plans to take to address this recommendation within 180 days.

In conclusion, although VA is not likely to be positioned to retire VistA for at least another 10 years, the department lacks the comprehensive and reliable cost information needed to make critical management decisions for sustaining the system. As the department continues to work toward acquiring a new electronic health record, it will be important for VA to take actions to address our recommendation for improving the reporting of VistA costs. Doing so is essential to helping ensure that decisions related to the current system are informed by reliable cost information and that there is an accurate basis for reporting on the return on its investment for replacing VistA.

Chair Lee, Ranking Member Banks, and Members of the Subcommittee, this completes my prepared statement. I would be pleased to respond to any questions that you may have.

**GAO Contact and Staff Acknowledgments**

If you or your staffs have any questions about this testimony, please contact Carol C. Harris, Director, Information Technology Management Issues, at (202) 512–4456 or harriscc@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this testimony statement. GAO staff who made key contributions to this testimony are Mark Bird (Assistant Director), Rebecca Eyler, Jacqueline Mai, Monica Perez-Nelson, Scott Pettis, Jennifer Stavros-Turner (Analyst in Charge), and Charles Youman.

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