VETERANS HEALTH ADMINISTRATION

The New Electronic Health Record’s Unknown Queue Caused Multiple Events of Patient Harm

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Office of Healthcare Inspections

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# Executive Summary

The VA Office of Inspector General (OIG) conducted a focused healthcare inspection to assess a Veterans Health Administration (VHA) identified high-risk patient safety concern that resulted in harm to patients due to a dysfunction in the new electronic health record (EHR) that was known to Cerner. There has been significant interest from stakeholders, including members of Congress, on whether the use of the new EHR resulted in patient harm. In May 2021, after VHA identified several patient safety concerns with the new EHR, a VHA National Center for Patient Safety team (patient safety team) was deployed to Mann-Grandstaff VA Medical Center (facility). The patient safety team identified 60 safety concerns across nine core domains and ranked these issues based on severity. One of three concerns with the highest patient safety risk was described as the “unknown queue.”[[1]](#footnote-2)

The OIG reviewed the unknown queue patient safety risk and found that the new EHR failed to deliver thousands of orders for medical care to the requested services (e.g., specialty care, laboratory, diagnostic imaging) but sent the orders to an undetectable location or unknown queue. The new EHR did not alert the healthcare providers that the order was not delivered.

The OIG learned that Cerner’s design allowed healthcare providers to select locations from a drop-down menu that, depending on the specific order, would not be recognized as a “match” by the system. This “mismatch” would ultimately send these orders to an unknown queue and not to the requesting service location to initiate the ordered care. As a result, from facility go-live in October 2020 through June 2021 the new EHR failed to deliver more than 11,000 orders for requested clinical services.

Every version of Cerner’s EHR has an unknown queue and the OIG found examples of customer concerns with the unknown queue dating back to 2014. The OIG determined that despite awareness, Cerner did not inform VA of the unknown queue. Cerner leaders did not provide a rationale for the failure to notify VA.

After VHA identified the unknown queue, VHA established a process whereby facility staff were instructed to cancel and reenter each order. Cerner admitted to failing to inform VA of the existence of the unknown queue that ultimately placed the burden on VHA to identify and address the problem. Absent VHA actions, the existence of the unknown queue may not have been identified, and patient care orders may not have been completed. Cerner responded to VHA concerns by taking steps to remove the unmatched locations and update the new EHR with an alert to providers when they attempted to create an order with an unmatched location. However, in May 2022 a VHA leader notified Cerner that the technology mitigations were inadequate and had not been wholly successful. Cerner acknowledged the unknown queue’s ongoing risk at future go-live sites.

On May 16, 2022, the OIG used the new EHR to generate a report of the orders in the unknown queue for VHA sites with the new EHR and found 206 orders. The OIG contacted facility leaders who reported using the VHA-established process to monitor and remediate the unknown queue, but shared that gaps in the mitigation process could still lead to orders remaining in the queue.[[2]](#footnote-3) In October 2021, VHA provided a briefing to VHA, the Electronic Health Record Modernization Integration Office, and Cerner staff, that predicted each facility that goes live with the new EHR will require an ongoing commitment from facility staff to monitor and address the new EHR’s unknown queue.

The OIG found that VHA determined the new EHR’s unknown queue created significant risk and caused harm to multiple patients. In late 2021, VHA informed senior VA and Office of Electronic Health Record Modernization leaders about the risk and harm to patients.[[3]](#footnote-4) VHA staffing resources were required to assess, remedy, manage and mitigate the unknown queue. VHA initiated a clinical review in June 2021 to ensure that staff acted on orders sent to the unknown queue and assessed patients for harm from delays in care. The clinical review was multistep and enlisted varied healthcare providers and substantial staff hours. Assessments of patient safety events included evaluation of the severity of harm, likelihood of how frequently an event may occur, and detectability of the technology risk. The clinical reviewers conducted 1,286 facility event assessments and identified and classified 148 adverse events for patients (see table 1 for VHA-assessed patient harm examples).[[4]](#footnote-5)

* Major harm: 1
* Moderate harm: 52
* Minor harm: 95

Table 1. Examples of VHA-Assessed Cases of Patient Harm

| Level of Harm | Example |
| --- | --- |
| **Major** | A healthcare provider entered a follow-up psychiatric care order for a homeless patient identified as at risk for suicide. The new EHR sent the order to the unknown queue. The patient was not scheduled for follow-up care and later contacted the Veterans Crisis Line reporting a razor in hand and a plan to kill himself. The patient was psychiatrically hospitalized. |
| **Moderate** | A healthcare provider ordered an appointment for a patient to be measured for and receive compression hose to help with lower leg edema (swelling). However, the new EHR delivered the medical order to the unknown queue and the patient did not receive the compression hose. The patient required urgent care treatment for worsening of the edema. |
| **Minor** | A healthcare provider entered an order for a patient with uncontrolled diabetes to be scheduled with a clinical pharmacist for diabetes education and treatment. The new EHR sent the order to the unknown queue. The patient was not scheduled for care until 14 months later after a new order was entered. |

Source: OIG summary of VHA identified patient-harm incidents.

Note: Appendix A provides additional detail for each example.

Based on the multiple events of patient harm, insufficient mitigations that burden VHA staff, and continued risk to patient safety, the OIG remains concerned with the existence of the new EHR’s unknown queue.

The OIG made two recommendations to the Deputy Secretary related to Cerner’s failure to inform VA of the unknown queue and evaluation of the unknown queue technology and mitigation process.

Comments

[To be added]

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# Abbreviations

| EHR | electronic health record |
| --- | --- |
| EHRM | electronic health modernization |
| EHRM IO | Electronic Health Modernization Integration Office |
| OIG | Office of Inspector General |
| VHA | Veterans Health Administration |
| VISN | Veterans Integrated Service Network |

# Introduction

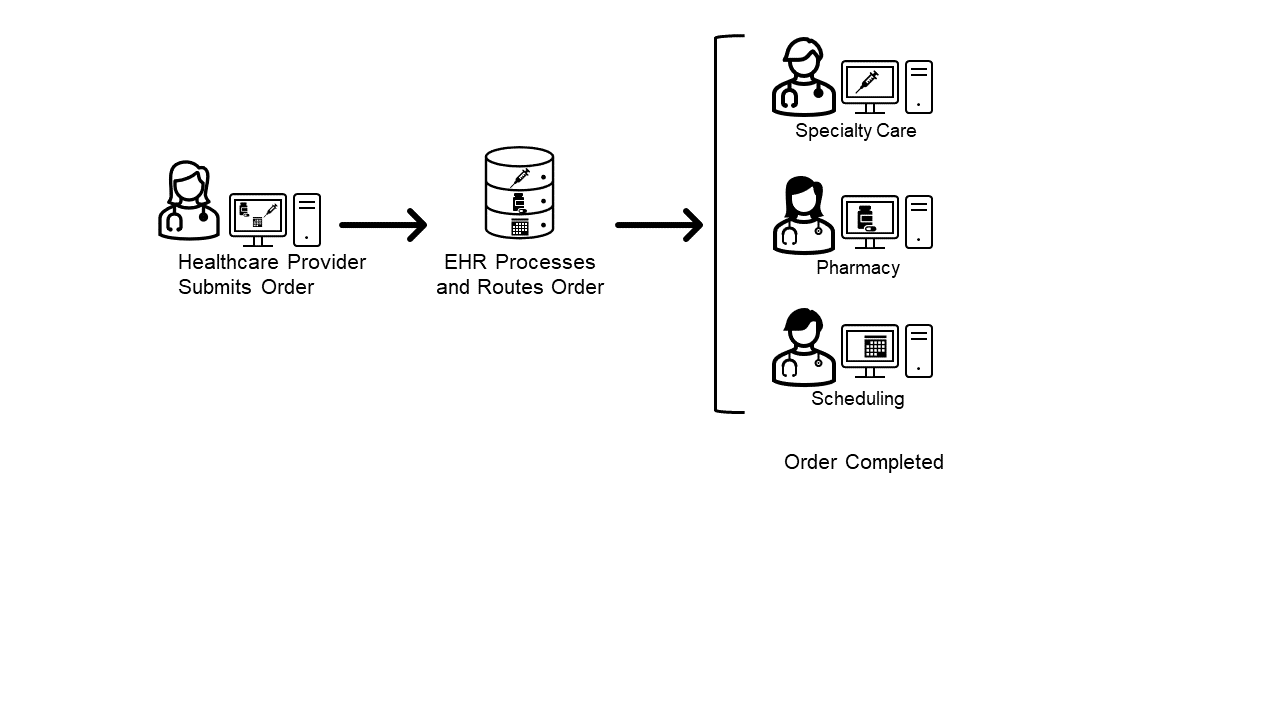
The VA Office of Inspector General (OIG) conducted a focused healthcare inspection to assess one of many identified patient safety concerns with a dysfunction of the new electronic health record (EHR). There has been significant interest from stakeholders, including members of Congress, on whether the use of the new EHR resulted in patient harm. The OIG chose to address the order entry “unknown queue” EHR safety concern after VHA assessed it as high risk and identified multiple events that resulted in patient harm.[[5]](#footnote-6)

Background

“Virtually every intervention in patient care outside of surgery… is initiated by a physician’s written order.”[[6]](#footnote-7) An EHR enables healthcare providers to generate computerized orders to enter and send treatment instructions, such as medications, laboratory, and radiology orders (see figure 1). Computerized orders

* reduce errors and improve patient safety,
* improve efficiency, and
* improve reimbursements for care provided.[[7]](#footnote-8)

The benefits of computerized orders depend upon reliable delivery of the order to the requested service.



**Figure 1**. Processing of an order using an EHR.

Source: OIG analysis.

Prior OIG Reports

Prior OIG reports published on VA’s implementation of the new EHR and the status of report recommendations are listed on the [VA OIG site](https://www.va.gov/oig/apps/info/OversightReports.aspx?REN=21-03020-168,21-00656-110,21-00434-233,21-00781-109,21-00781-108,20-01930-183,20-03185-151,20-03178-116,19-09447-136,19-08980-95,18-04227-91,21-02889-134,19-09017-64&RPP=25&RS=1).

Concern

OIG focused on a VHA identified patient safety risk created by the new EHR that led to patient harm. Specifically, the new EHR did not deliver certain orders to the requested services but sent the orders to an undetectable location or unknown queue. The new EHR did not alert the health care providers that the order was not delivered to the requested service.

In a briefing by a VHA leader (see figure 2) this new EHR safety issue was described as analogous to the post office stuffing “undeliverable mail behind a bush instead of placing them back in your mailbox.”

Text from the slide reads:
Imagine having what you think is a list of your entire extended family on your list to send holiday cards
Now, imagine half those addresses are incorrect
Finally, when the post office tried to return the cards that went to the wrong address, they stuffed them behind a bush instead of placing them back in your mailbox
End result: Your family doesn’t know you made the effort, and you don’t know your effort failed


**Figure 2**. VA briefing slide providing an analogy for the concern with orders not being delivered.

Source: VA briefing, October 12, 2021.

### VHA’s Efforts to Address EHR Safety

In May 2021, after VHA identified several patient safety concerns with the new EHR, a patient safety team was deployed to Mann-Grandstaff VA Medical Center (facility) to intervene.[[8]](#footnote-9) The team was led by VHA National Center for Patient Safety and included staff from VHA program offices, leaders from the Office of Electronic Health Record Modernization (now called the Electronic Health Record Modernization Integration Office, EHRM IO), EHRM councils, VISN 20, and the facility.[[9]](#footnote-10)

In December 2021, VA held a Safety Summit about the new EHR.[[10]](#footnote-11) At the Safety Summit, the patient safety team shared the results from the comprehensive review of identified safety concerns with the new EHR. Findings included 60 safety concerns with the new EHR across nine core domains.[[11]](#footnote-12) VA staff ranked the issue with the unknown queue as one of the three concerns with the highest patient safety risk.[[12]](#footnote-13)

The OIG commends VHA staff that worked to identify, assess, and mitigate new EHR patient safety risks, to include the concern with the new EHR not delivering orders placed by healthcare providers. The OIG repeatedly heard of the long hours and considerable workload of VA staff dedicated to this mission and recognize their efforts to ensure safe care for veterans.

### New EHR Patient Safety Risks and Facility Patient-Harm Events

VHA has worked to identify and evaluate EHR patient safety risks and harm to patients. For example, in a reference document prepared for the Deputy Secretary’s attendance at the November 2, 2021, hearing of the House Committee on Veterans’ Affairs Subcommittee on Technology Modernization, VHA identified that ongoing clinical reviews of facility patient safety events related to the new EHR identified 2 major harms, 21 moderate harms, and 185 “mild” harms.[[13]](#footnote-14)

### New EHR Patient Safety Risks and VHA Patient-Harm Events

VHA has identified safety events and patients harmed since the go-live at three facilities.[[14]](#footnote-15) From October 24, 2020, through May 8, 2022, there have been 1,134 reports of patient safety events related to the new EHR.Analysis of new EHR patient safety events by VHA identified one catastrophic patient harm (death or major permanent loss of function) and two major patient harms (permanent lessening of bodily functioning) one of which, was related to the unknown queue.[[15]](#footnote-16)

# Scope and Methodology

The OIG initiated the inspection on February 10, 2022, and concluded on May 25, 2022. The inspection included interviews and written questions for VA and Cerner staff.[[16]](#footnote-17) The OIG reviewed relevant VA and VHA policies. Other documents reviewed included emails, briefings, data spreadsheets, and documents related to the planning, preparation, and implementation of the new EHR.[[17]](#footnote-18)

The OIG did not independently verify VHA data for accuracy or completeness.

In the absence of current VA or VHA policy, the OIG considered previous guidance to be in effect until superseded by an updated or recertified directive, handbook, or other policy document on the same or similar issue(s).

Oversight authority to review the programs and operations of VA medical facilities is authorized by the Inspector General Act of 1978, Pub. L. No. 95-452, 92 Stat. 1101, as amended (codified at 5 U.S.C. App. 3). The OIG reviews available evidence within a specified scope and methodology and makes recommendations to VA leaders, if warranted. Findings and recommendations do not define a standard of care or establish legal liability.

The OIG conducted the inspection in accordance with *Quality Standards for Inspection and Evaluation* published by the Council of the Inspectors General on Integrity and Efficiency.

# Inspection Results

The OIG found that the new EHR failed to successfully deliver thousands of orders placed by healthcare providers at the facility. The impact of this failure by the new EHR caused delays in or omission of care, an “extraordinary risk” to patient safety, and multiple events of patient harm.[[18]](#footnote-19)

## 1. The New EHR Failed to Successfully Deliver Certain Orders

The OIG found that the new EHR failed to successfully process thousands of patient care orders at the facility without any indication of the dysfunction. Unbeknownst to facility healthcare providers who placed the orders, the new EHR failed to successfully deliver orders for a broad range of requested services (e.g., specialty care, laboratory, diagnostic imaging) and stored the orders in a list referred to as the unknown queue.

### Relevant Policies and Standards

The OIG did not identify a relevant policy or standard related to new EHR processing of orders; however, the OIG considers that quality, safe health care is contingent on reliable and timely processing of medical orders.

### Findings

The OIG made the following determinations:

The new EHR delivered certain orders to an unknown queue.

The new EHR required a healthcare provider to use a service location drop-down list when entering an order for patient care (see figure 3). For the order to be delivered to the requested service, the healthcare provider was required to choose the facility location to which, the specific order had been matched through the process of data “mapping” in the underlying software code.[[19]](#footnote-20)

The new EHR design allowed ordering healthcare providers to select locations that were not matched to their orders. For example, when entering an order for the patient to be scheduled for a clinic follow-up appointment, the ordering provider had to select the correctly matched clinic location from a list that included all possible facility locations, both matched and unmatched. When the healthcare provider selected an unmatched location, the new EHR did not alert the provider but accepted the entry as successful and then routed the order to the unknown queue.

Diagram

Description automatically generated**Figure 3**. View of the new EHR’s order screen showing the location drop-down field.

Source: VA EHR.

Note. The OIG added circles around the locations that were included in the drop-down list but not matched to the selected service and, if chosen, would send the order to the unknown queue.

The new EHR failed to alert providers that the orders were sent to the unknown queue.

The new EHR gave healthcare providers submitting orders the false feedback that the orders had been successfully entered to be delivered to the requested service for action. However the requested service did not receive the orders (see figure 4).

Diagram

Description automatically generated

**Figure 4**. Process of the new EHR routing an order to the “unknown queue.”

Source: OIG analysis.

Shortly after VA’s go-live with the new EHR, facility staff identified missing orders.

A VHA review of trouble tickets identified that on October 28, 2020, four days after go-live, a facility radiology technician placed the first Cerner trouble ticket regarding lost orders.[[20]](#footnote-21) The next day, while responding to the trouble ticket issue, Cerner service-desk staff identified that the reported lost order was not isolated to a single event and found over 2,000 lost orders. Each of these orders had to be reentered into the new EHR by a VHA staff member for patients to be scheduled for the needed care.[[21]](#footnote-22)

The new EHR failed to deliver more than 11,000 orders to the correct service locations from facility go-live from October 2020 through June 2021.

The new EHR failed to deliver certain types of orders. The majority (77 percent) of orders that were not delivered were requests for radiology services.[[22]](#footnote-23) Additionally, orders at the facility sent to the unknown queue included scheduling appointments, outpatient electrocardiogram (EKG) procedures and referrals.[[23]](#footnote-24)

The unprocessed orders included

* 8,531 requests for radiology services, and[[24]](#footnote-25)
* 2,512 requests for other clinical services.

Facility staff could not see orders sent to the unknown queue.

To clear the unknown queue, a Cerner employee had to send a daily report of the orders to facility staff. Facility staff then had to cancel and reenter each order with a matched location.[[25]](#footnote-26) Prior to March 11, 2022, VHA could not directly generate a report of unknown queue orders using the new EHR.

VA staff worked with Cerner staff to decrease the likelihood of the new EHR routing orders to the unknown queue.

In June 2021, a VHA leader identified that removing unmapped locations for orders could decrease the likelihood of orders being sent to the unknown queue. In September 2021, Cerner completed the work of removing unmapped locations from the new EHR order options. In February 2022, Cerner updated the new EHR to provide an alert if a provider attempted to create an order with an unmapped location.[[26]](#footnote-27)

Cerner was aware of the EHR’s unknown queue issue prior to VA’s go-live with the new EHR.

A VHA leader reported finding online Cerner documentation that the unknown queue was known to be a problem by Cerner and other clients. On a Cerner user help forum, the OIG found several instances, going back to 2014, where Cerner customers identified challenges with the unknown queue. A Cerner leader reported that, while not knowing when the unknown queue was added to the Cerner EHR, every Cerner client has the unknown queue. Another Cerner leader concurred that all Cerner clients have the unknown queue in their EHR that “they monitor and work through” and has “heard it has been in existence for many years.”

Cerner did not warn VA of the unknown queue or provide guidance to address the unknown queue in advance of go-live with the new EHR.

VA and VHA leaders reported that Cerner did not provide any information to VA regarding the unknown queue prior to VA’s identification of the issue. A Cerner leader confirmed that communication by Cerner “did not occur for a few months.” A Cerner vice president, identified by the company’s general counsel as a subject matter expert on the unknown queue, told the OIG of having no knowledge that Cerner provided information regarding the unknown queue to OEHRM prior to VA go-live. The OIG did not identify any evidence that supported Cerner informed VA of the unknown queue prior to go-live. Cerner leaders did not provide a rationale for the failure to notify VA.

Absent VHA actions, the existence of the unknown queue may have not been identified, and patient care orders may have not been completed.

## 2. Orders Being Routed to the Unknown Queue Placed Patients at Risk and Caused Harm.

VHA determined that the new EHR’s unknown queue created significant patient risk and caused harm to multiple patients. VHA provided the Deputy Secretary and the EHRM IO Executive Director details of the risk and harm to patients caused by the unknown queue. VHA staffing resources were required to assess, remedy, and mitigate the unknown queue. Cerner acknowledged that the unknown queue’s ongoing risk would require mitigation at future go-live sites.

A VHA physician summarized in a statement to the Deputy Secretary the safety risk and patient harm created by the new EHR’s unknown queue[[27]](#footnote-28)

We have never in our careers used a system that generated unmanned queues. This is a programming deficiency which has been readily apparent in working these queues. In discussing with Cerner personnel these queues exist even in the commercial sector, were well known but Cerner seemingly waited until we stumbled upon them. Really inexcusable and indefensible in the case of patient harm. These require a great deal of staff time to research and redirect to proper location. This is unsafe and rather than having a well-constructed conduit, these queues reflect a fraying rope, poorly constructed and conceptualized product from its foundation.

### Relevant Policies and Standards

VHA National Patient Safety Improvement Handbook.

This handbook provides procedures used to accomplish “VHA’s goal of preventing inadvertent harm to patients” as a result of medical care. VHA defines patient safety as “ensuring freedom from accidental or inadvertent injury” while accessing health care. One factor in accomplishing this goal is identifying and reporting adverse events and close calls.[[28]](#footnote-29)

**Adverse event.** Unexpected or untoward incidents directly associated with the medical care or services provided at VHA facilities.

**Close call.** An event that could have resulted in an adverse event but did not, either by chance or intervention.[[29]](#footnote-30)

VHA National Center for Patient Safety, Guidebook for Assessing Reported Adverse Events*.*

This guidebook provides direction for VHA’s assessment of reported adverse events and close calls. Assessment of patient safety events includes evaluation of the severity of harm (see table 1), and the likelihood of how frequent an event may occur (see table 2) to generate an overall assessment of the event or close call.[[30]](#footnote-31)

Table 1. VHA Severity of Harm

|  |  |
| --- | --- |
| Severity of Harm | VHA Definition |
| Catastrophic | Death or permanent loss of functioning not related to natural course of the patient’s illness or underlying condition |
| Major | Permanent decrease in the body’s functioning or disfigurement, requires surgery or inpatient care |
| Moderate | Increased length of hospital stay or required increase in level of care |
| Minor | No injury, no increased length of stay, no increased level of care |

Source: VHA National Center for Patient Safety.

Table 2. VHA Frequency of Event

|  |  |
| --- | --- |
| Frequency of Event | VHA Definition |
| Frequent | Likely to occur immediately or within a short period (may happen several times a year) |
| Occasional | Probably will occur (may happen several times in 1 to 2 years) |
| Uncommon | Possible to occur (may happened sometime in 2 to 3 years) |
| Remote | Unlikely to occur (may happened sometime in 5 to 30 years) |

Source: VHA National Center for Patient Safety.

EHRM Safety Summit Health Information Technology Risk Scoring

To assess technology patient safety issues created by the new EHR, VHA added risk scoring for detectability. Detectability refers to how readily a patient safety risk created by the new EHR can be identified and ranges from very difficult to very easy to detect (see figure 5.)

Table has a red square indicating the following actions should be taken regarding the unknown queue, immediate mitigation to prevent harm, an action plan to address the risk, and reporting and monitoring the risk while waiting on needed technology changes.


**Figure 5**. VA’s Scoring Matrix for Health Information Technology Patient Safety Risk.

Source: VA EHRM Safety Summit Domain Summary, November 2021.

### Findings

The OIG made the following determinations:

The new EHR’s delivery of orders to the unknown queue created a patient safety risk. VHA assessed the risk as major severity, frequently occurring, and very difficult to detect.

The total risk score for the unknown queue indicated the need for required actions that included

* immediate mitigation to prevent harm,
* an action plan to address the risk, and
* reporting and monitoring the risk while waiting on needed technology changes.[[31]](#footnote-32)

VHA determined that the new EHR’s delivery of orders to the unknown queue caused patient harm.

VHA initiated a clinical review in June 2021 to ensure that staff acted on orders sent to the unknown queue and to assess patients for harm from delays in care. The clinical reviewers conducted 1,286 assessments and identified 148 adverse events for patients[[32]](#footnote-33)

* Major harm: 1[[33]](#footnote-34)
* Moderate harm: 52
* Minor harm: 95

The assigned level of harm measures the effect from the delay of care.[[34]](#footnote-35) Table 3 provides examples of VHA identified patient harm.

Table 3. Examples of VHA-Assessed Cases of Patient Harm

| Level of Harm | Example |
| --- | --- |
| **Major** | A healthcare provider entered a follow-up psychiatric care order for a homeless patient identified as at risk for suicide. The new EHR sent the order to the unknown queue. The patient was not scheduled for follow-up care and later contacted the Veterans Crisis Line reporting a razor in hand and a plan to kill himself. The patient was psychiatrically hospitalized. |
| **Moderate** | A healthcare provider ordered an appointment for a patient to be measured for and receive compression hose to help with lower leg edema (swelling). However, the new EHR delivered the medical order to the unknown queue and the patient did not receive the compression hose. The patient required urgent care treatment for worsening of the edema. |
| **Minor** | A healthcare provider entered an order for a patient with uncontrolled diabetes to be scheduled with a clinical pharmacist for diabetes education and treatment. The new EHR sent the order to the unknown queue. The patient was not scheduled for care until 14 months later after a new order was entered. |

Source: OIG summary of VHA identified patient-harm incidents.

Note: Appendix A provides additional detail for each example.

VHA staff provided the Deputy Secretary and EHRM IO Executive Director information about the unknown queue patient safety risks and patient harm.

The Deputy Secretary completed a virtual visit to the facility in November 2021 to receive staff concerns with the new EHR. A presentation included details about the safety concerns and identified patient harm due to the unknown queue. The presentation provided a description of the major patient-harm event described in this report. The Deputy Secretary received the written statement along with other virtual visit materials on November 22, 2021, and on December 27, 2021, the Deputy Secretary forwarded that information to the EHRM IO Executive Director. Furthermore, on December 23, 2021, VHA staff provided the EHRM IO Executive Director additional detailed information on new EHR related patient safety events and patient harms, that included the unknown queue.

The new EHR’s delivery of orders to the unknown queue resulted in substantial VHA staff hours for clinical review to assess patient risk and harm.

VHA undertook a multi-step clinical review of patients who had unknown queue orders. The initial clinical review included 1,286 orders entered by 273 different healthcare providers.[[35]](#footnote-36) The first level clinical review by healthcare providers took over 400 hours to complete. A physician second level review of a subset of the orders took almost an additional 56 hours to complete. Facility staff then completed a clinical review and took necessary actions to implement the orders from the unknown queue. A facility leader estimated that staff spent 597 hours to complete the work.

Remediation of the unknown queue required significant facility staff support.

The demands of remedying the unknown queue by facility staff led a facility senior leader to comment

MG [the facility] needs outside support for monitoring this Q [unknown queue]. It is already enough loss of efficiency and time to have to reenter the orders on our side. Any additional demand on our FTEs [staff] ultimately reduces access to care on our end. Given the current poor order design that is a set up for clinician failure, I think it is reasonable and appropriate to expect Cerner to monitor the Q and help generate the comms [communication] back to providers to reenter the orders.

A facility leader estimated that facility staff monitoring and managing orders in the unknown queue from November 1, 2021, through May 3, 2022, took 165 hours.

Each facility that goes live with the new EHR will require an ongoing commitment from facility staff to monitor and address the new EHR’s unknown queue.

In October 2021, VHA provided a briefing to VHA, EHRM IO and Cerner staff that predicted ongoing mitigation of the unknown queue would be necessary at VHA sites for at least the year following go-live. The briefing concluded that Cerner and EHRM IO must coordinate with staff at go-live sites “from day 1” to monitor the queue. Cerner identified the unknown queue as a risk for go-live of the new EHR at future sites.[[36]](#footnote-37) Cerner’s mitigation plan included, “continuing to reinforce management of unknown queue in deployment activities.”

The OIG has concern with the effectiveness of Cerner’s plan to mitigate the safety risk of the unknown queue. On May 16, 2022, the OIG used the new EHR to generate a report of orders in the unknown queue for VHA sites with the new EHR and found 206 orders that had not been cleared from the unknown queue.[[37]](#footnote-38) Facility leaders reported using the established process to monitor and remediate the queue, but shared that steps in the mitigation process could lead to orders remaining in the queue.[[38]](#footnote-39) Additionally, a VHA leader identified that Cerner technology mitigations were inadequate. The VHA leader engaged Cerner in May 2022 and identified that Cerner’s mitigation efforts had not been wholly successful. The VHA leader shared that “[i]n the recent past Cerner has seemed to expect the VA to prove every single hole is truly a hole” and called for a weekly check-in (“we need active vigilance”) by Cerner staff to review gaps in the unknown queue’s mitigations.

Despite VHA’s costly use of staffing to stem the number of patient harms, the OIG concluded that the current mitigations do not eliminate the patient safety risk of the unknown queue.

# Conclusion

The new EHR’s unknown queue represented a dysfunction that ultimately led to thousands of orders for medical care not being delivered to the requested service, placed patients at risk for incomplete care, and caused multiple events of patient harm. Cerner failed to inform VA of the existence of the unknown queue and put the burden on VA to identify and address the problem.

While Senior VA leaders were aware of the impact of the unknown queue, the current identification and ongoing remediation efforts continue to consume VHA staff resources. The OIG remains concerned that the mitigation process is an inadequate solution.

# Recommendations

1. The Deputy Secretary reviews the process that led to Cerner’s failure to inform VA of the unknown queue and takes action as indicated.

2. The Deputy Secretary evaluates the unknown queue technology and mitigation process and takes action as indicated.

# Appendix A: Case Summaries of VHA-Assessed Patient Harm

Major Harm

A homeless veteran in their 60s with a history of depression, a recent positive screen for suicide, anxiety, and possible cognitive impairment, saw a facility psychiatrist on December 6, 2020, for an assessment and medication management of symptoms of depression.

At the appointment on December 6, 2020, the facility psychiatrist documented that the patient denied suicidal ideation and the appointment concluded with a plan to re-start the patient’s anti-depressant medications and for the patient to be seen again in one month for further assessment. The psychiatrist wrote an order that indicated that the patient should be scheduled for a follow-up appointment for psychiatric medication management on or about January 7, 2021.

This order was routed to the “unknown queue” and no appointment was scheduled. The patient was not seen for follow-up care around the first week of January as ordered by the psychiatrist.

On January 27, 2021, the patient called the veteran’s crisis line (VCL) from a local park reporting suicidal ideation with a plan to use a razor for self-harm. The patient allowed the VCL respondent to call emergency services and the patient was transported to a local non-VA hospital and was subsequently admitted to the non-VA hospital’s mental-health inpatient unit.

Moderate Harm

A veteran in their 60s with a history of morbid obesity, lower leg edema (swelling) and chronic knee pain called a facility nurse in late September 2020 requesting a new pair of “compression socks” for treatment of the lower leg swelling. The patient was required to come to the facility to be measured for the compression socks, an order was entered for the patient to be scheduled for an appointment.

The initial order was written in the prior legacy EHR system. The appointment had not been scheduled by the time the new EHR was started, so the order needed to be reentered into the new EHR. The new order was entered on December 3, 2020, for an appointment to be scheduled on or about December 14, 2020.

The order could not be acted upon because it was routed by the new EHR to the “unknown queue,” no scheduling action was taken, and the patient did not get measured for nor receive new compression hose.

On May 24, 2021, the patient presented to the facility urgent care clinic due to increased swelling in his right foot and leg. Physical examination showed swelling in both lower legs with more on the right than the left. The patient underwent an ultrasound examination of the right leg to evaluate for the presence of a clot in the large veins of the leg. The ultrasound did not reveal a clot. The patient was diagnosed as suffering from an exacerbation of the known edema. The patient was discharged to home with a prescription for medications to decrease the foot and leg swelling and a plan to follow up with his primary care provider.

Minor Harm

A veteran in their 60s with hypertension and diabetes was seen by a primary care provider in March, 2021 for an annual medical assessment. At the conclusion of the assessment an order was placed by the primary care provider for the patient to be scheduled for an appointment in the pharmacy’s metabolic clinic for diabetes education and treatment for the patient’s “uncontrolled diabetes.”

The appointment was never scheduled because the order was routed to the unknown queue and scheduling staff were unaware of the order.

The primary care provider placed another order for the patient to be scheduled with the pharmacy metabolic clinic for diabetes education and treatment and the appointment took place in early May 2022.[[39]](#footnote-40)

# Appendix B: Office of the Deputy Secretary Memorandum

**Department of Veterans Affairs Memorandum**

Date: Date

From: Office of the Deputy Secretary

Subj: The New Electronic Health Record’s Unknown Queue Caused Multiple Events of Patient Harm

To: Assistant Inspector General for Healthcare Inspections (54)

1. .
2. .

*(Original signed by:)*

Signature/title

Office of the Deputy Secretary Response

Recommendation 1

The Deputy Secretary reviews the process that led to Cerner’s failure to inform VA of the unknown queue and takes action as indicated.

Concur.

Target date for completion:

### Deputy Secretary Comments

Recommendation 2

The Deputy Secretary evaluates the unknown queue technology and mitigation process and takes action as indicated.

Concur.

Target date for completion:

### Deputy Secretary Comments

# OIG Contact and Staff Acknowledgments

|  |  |
| --- | --- |
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1. The nine core domains identified included: behavioral health, ambulatory, referrals, roles/position/privileging, pharmacy, identity, orders, medication administration, and unspecified. The other two concerns VA staff ranked as the highest patient safety risks included resolution of identifiers that impacted matching records in the new EHR, and manual cancelation of appointments not acted on within 24 hours. The OIG found that the term “unknown queue” was used years prior to VA’s adoption of Cerner’s EHR. The OIG identified examples of the term dating back to 2014 used on a Cerner user online help forum. [↑](#footnote-ref-2)
2. The facility leaders reported that since establishing the process with VHA’s National Center for Patient Safety there has been no Electronic Health Record Modernization Integration Office (EHRM IO) or VHA contact involved in the ongoing effort to address the unknown queue. [↑](#footnote-ref-3)
3. The Office of Electronic Health Record Modernization is now called the EHRM IO. [↑](#footnote-ref-4)
4. VHA defined major harm as permanent decrease in the body’s functioning or disfigurement, requires surgery or inpatient care; moderate as increased length of hospital stay or required increase in level of care; and minor as no injury, no increased length of stay, no increased level of care. [↑](#footnote-ref-5)
5. The OIG found that the term “unknown queue” was used years prior to VA’s adoption of Cerner’s EHR. The OIG identified examples of the term dating back to 2014 used on a Cerner user online help forum. [↑](#footnote-ref-6)
6. “Computerized Physician Order Entry: Costs, Benefits and Challenges, A Case Study Approach”, Agency for Healthcare Research and Quality, accessed March 17, 2022, https://digital.ahrq.gov/sites/default/files/docs/page/Leapfrog-CPOE\_Costs\_Benefits\_Challenges.pdf. [↑](#footnote-ref-7)
7. “What is computerized order entry?” Office of the National Coordinator for Health Information Technology, <https://www.healthit.gov/faq/what-computerized-provider-order-entry>. [↑](#footnote-ref-8)
8. The patient safety team was a part of a larger team tasked to address broad concerns with the new EHR. [↑](#footnote-ref-9)
9. EHRM IO responsibilities include management of the preparation, deployment, and maintenance of the new EHR. The EHRM project included 18 clinical councils formed of subject matter experts from VA, VHA, and Cerner who determined what functions needed to be further developed to meet VHA’s clinical and administrative requirements. Mann-Grandstaff VA Medical Center in Spokane, Washington was the first VA facility to go-live with the new EHR on October 24, 2020. [↑](#footnote-ref-10)
10. VA, *Electronic Health Record Comprehensive Lessons Learned, Progress Update*, November 2021. VA identified a planned EHR Safety Summit for December 2021 to review the “safety incident engagement process.” VA published the progress update following VA’s strategic review of the EHR modernization effort completed earlier in the year. The progress update did not specifically define the “safety incident engagement process.” [↑](#footnote-ref-11)
11. VHA, “VA, Patient Safety Domain Summary,” November 10, 2021. The nine core domains of EHR safety concerns included: behavioral health, ambulatory, referrals, roles and position and privileging, pharmacy, identity, orders, medication administration, and unspecified. [↑](#footnote-ref-12)
12. The other two concerns VA staff ranked as the highest patient safety risks included resolution of identifiers that impacted matching records in the new EHR and manual cancelation of appointments not acted on within 24 hours. [↑](#footnote-ref-13)
13. At the time of the hearing, VHA had completed 1,225 “full clinical reviews” of reported new EHR patient safety events and acknowledged the review was ongoing with more than 2,000 reports of patient safety events still needing review. VHA definitions of major, moderate, and minor patient harms are provided in Issue 2. The reference document for the Deputy Secretary used the term “mild,” however the VHA definition of harm uses the term “minor.” [↑](#footnote-ref-14)
14. The three VA facilities are Mann Grandstaff VA Medical Center, Spokane WA, Jonathan M. Wainwright Memorial VA Medical Center, Walla Walla, WA, and VA Central Ohio Healthcare System, Columbus. [↑](#footnote-ref-15)
15. The analysis was from October 24, 2020, through May 8, 2022. Catastrophic harm is further defined by VA as “death or major permanent loss of function (sensory, motor, physiologic, or intellectual) **not related to the natural course of the patient’s illness or underlying condition** (i.e., acts of commission or omission).” Major harm is further defined by VA as “permanent lessening of bodily functioning (sensory, motor, physiologic, or intellectual) **not related to the natural course of the patient’s illness or underlying condition** (i.e., acts of commission or omission).” VA caveated that one of the major patient harms may be updated to a catastrophic harm. [bolding emphasis not added by OIG] [↑](#footnote-ref-16)
16. VHA program offices, EHRM IO, EHRM Councils, facility staff, and Cerner provided responses to OIG interview and written questions. Two of four Cerner employees (including a Cerner vice president) did not respond to OIG’s repeated requests for information. [↑](#footnote-ref-17)
17. The OIG utilizes electronic discovery tools to review emails. [↑](#footnote-ref-18)
18. In a VA meeting of leaders addressing EHR patient safety, a VA physician leader identified the unknown queue as an “extraordinary risk due to the chance of missed critical appointments.” [↑](#footnote-ref-19)
19. “What is Data Mapping,” talend, accessed March 10, 2022, <https://www.talend.com/resources/data-mapping/>. Data mapping is the process of matching software fields from one database to another database. If not properly mapped, data may become corrupted. Cerner is responsible for mapping. [↑](#footnote-ref-20)
20. The OIG learned that the facility radiology technician placed the trouble ticket after patients inquired about radiology services that had not been scheduled. [↑](#footnote-ref-21)
21. The OIG learned that these unscheduled orders were created during the facility transition from VHA’s legacy EHR to the new EHR. The transition required a manual reentry of legacy EHR radiology orders into the new EHR. The OIG uses the term legacy EHR to refer to VistA (Veterans Health Information Systems and Technology Architecture) the EHR used prior to the Cerner EHR. [↑](#footnote-ref-22)
22. The majority of orders VHA classified as radiology were for radiographs (x-rays). [↑](#footnote-ref-23)
23. Appointment types included return to clinic for follow-up, telehealth, dietary therapy, laboratory, respiratory therapy, blind rehabilitation, recreation therapy, surgery, neurology, occupational therapy, physical therapy, speech therapy, and cardiology. [↑](#footnote-ref-24)
24. Unprocessed radiology orders could be found in a “virtual room” by radiology staff who had a specific EHR access level. A facility radiology technician discovered this “virtual room” of unprocessed radiology orders. [↑](#footnote-ref-25)
25. A February 28, 2022, briefing for the Department of Defense and VA group overseeing EHR modernization titled, “VA Patient Safety Domains and Intellectual Property (IP) Enhancements,” stated that, “[c]urrently Cerner sends an email to a group of individuals to manage the Unknown Queue, this is not sustainable for future sites.” [↑](#footnote-ref-26)
26. A VHA leader provided the OIG with the date for the completed work. [↑](#footnote-ref-27)
27. This statement was included in materials provided to the Deputy Secretary following his November 2021 visit to the facility. The Deputy Secretary forwarded the email with this statement to the EHRM IO Executive Director in December 2021. [↑](#footnote-ref-28)
28. VHA Handbook 1050.01, *VHA National Patient Safety Improvement Handbook*, March 4, 2011. [↑](#footnote-ref-29)
29. VHA Handbook 1050.01. [↑](#footnote-ref-30)
30. VHA National Center for Patient Safety, “Guidebook for Assessing Reported Adverse Events: A resource for Safety Assessment Code (SAC) Evaluation,” ver.1, May 2020. [↑](#footnote-ref-31)
31. See Figure 5, for box shaded in red. [↑](#footnote-ref-32)
32. The data provided to the OIG of the clinical reviews was dated February 24, 2022. [↑](#footnote-ref-33)
33. While the VHA clinical review identified one major harm of a patient, an additional assessment by a facility provider identified a second incident of major harm. [↑](#footnote-ref-34)
34. This description was provided by a VHA physician leader. [↑](#footnote-ref-35)
35. Some patients had more than one order that the new EHR sent to the unknown queue. The most orders sent to the unknown queue for a single patient was 29. [↑](#footnote-ref-36)
36. Cerner shared this information in presentation slides for a planned February 3, 2022, briefing with the EHRM IO Executive Director. [↑](#footnote-ref-37)
37. The OIG provided this information to VHA leaders to facilitate action to address orders in the unknown queue. [↑](#footnote-ref-38)
38. The facility leaders reported that since establishing the mitigation process with VHA’s National Center for Patient Safety there has been no EHRM IO or VHA contact involved in the ongoing effort to address the unknown queue. [↑](#footnote-ref-39)
39. During a review of the patient’s EHR, OIG found that the patient was next seen by a new primary care provider in April 2022 when the diabetes was again described as “uncontrolled” and the patient was newly diagnosed with chronic kidney disease secondary to diabetes. [↑](#footnote-ref-40)