VA U.S. Department of Veterans Affairs

EMPIRIC QUERI

EHRM Partnership Integrating
Rapid Cycle Evaluation
to Improve Cerner Implementation

Clinician and Staff Experiences with Electronic Health Record Modernization at Chalmers P. Wylie Veterans Outpatient Clinic in Columbus, OH

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EXECUTIVE SUMMARY

Purpose: This report presents experiences of electronic health record (EHR) users at the Chalmers P. Wylie Veterans Outpatient Clinic in Columbus, Ohio based on interviews and surveys at four points during the transition to the new Oracle-Cerner EHR (the month before go-live, during go-live, and 3 and 10 months post-go-live). These findings are part of a **Qu**ality **E**nhancement **R**esearch **I**nitiative (QUERI) evaluation, entitled, "**E**HR**M** **P**artnership **I**ntegrating **R**apid Cycle Evaluation to **I**mprove **C**erner Implementation" (EMPIRIC).

Key Findings

I. *EHR usability & proficiency*

a. The new EHR fails to meet basic expectations for most users.
b. There was little improvement in EHR usability, training and support over time.
c. Frequent glitches and a slow, "click-heavy" system negatively impacted patient care.
d. "It's not all bad" – some participants indicated they liked specific features in the new EHR (e.g., centralized patient and provider communication).

II. *Overall user experience with the new EHR and feelings about the transition*

a. Overall EHR satisfaction decreased, and stress increased after go-live. Stress due to the EHR remained high at 10 months, and employee satisfaction was low.
b. Burnout rose significantly post-go-live. While there was some improvement at the 10 month follow-up, burnout remained above pre-EHRM levels.
c. End users perceived that the new EHR was not built for VA use and Cerner staff "didn't know the VA."
d. Frustrations with EHRM impacts on patient care quality and timeliness negatively affected staff morale.
e. Comradery and confidence in colleagues had a protective effect on employee morale.

III. *Messaging & communication*

a. Local leadership generally communicated well with staff, sharing timely information, as well as acknowledging when they did not have information.
b. Messaging from and communication with local and senior leadership was most effective when leaders listened and accepted feedback.
c. Peer support via Microsoft Teams proved especially useful.
d. Many participants felt that there was poor communication to users on the recognition, status, and resolution, of major problems with the EHR.

IV. *Training & training support*

a. EHR training was very poor and submitted tickets for EHR problems were not resolved expediently; these problems were virtually unchanged at 10 months
b. Because of EHRM delays, many clinicians underwent training twice (once during the year prior to go-live and once just prior to go-live); training was better the second time, but deficiencies remained.
c. The Sandbox – and protected time to access it – remained inadequate.
d. Training often did not reflect participant roles and responsibilities.
e. Within-role training improved learning, but different responsibilities across service lines still resulted in irrelevant training content.
f. Staff wanted to be trained on their clinical workflows, not on where to click for different EHR functions or "buttonology", as one participant described.
g. Cerner staff had inadequate knowledge about VA workflows and "the VA way."
h. VA-led training, both formal and informal, was a strong supplement to Cerner-led training.

i. Lack of responsiveness to tickets was a major source of frustration.

V. *Workload burden & capacity*

a. When used, reduced patient volume and extra staffing support made workloads more manageable.
b. Community Care was overwhelmed with inadequate staffing and resources to meet demand.

VI. *Patient safety*

a. EHR safety perceptions deteriorated after go-live and remained virtually unchanged at 10 months.
b. The new EHR lacks features that clinicians and staff used in CPRS to optimize patient safety.
c. A significant increase in workarounds and extra steps in the new EHR contributed to safety concerns.
d. In the period immediately after go-live, there were specific concerns about orders that did not go through and concerns that erroneous nurse permissions allowed practice outside of scope.
e. Participants noted many cases where necessary patient care was delayed, sometimes by months, due to decreased patient load and provider backlogs while adapting to the new EHR.
f. Patient safety threats and delayed care led to moral distress and adversely affected clinician well-being.

VII. *Impact of EHRM on Veterans' experiences*

a. Veterans were negatively impacted by not being able to use the patient portal to refill medications, message their providers, or schedule appointments.
b. Veterans found their own way to handle problems with the transition, including filing complaints with patient advocates and walking in without appointments to get care.

Recommendations

I. *Leadership & communication*

a. Determine strategies to mitigate EHRM impacts on care disruptions, patient safety, and clinician operations in a way that supports local organizational goals.
b. Work with Oracle Cerner and EHRM stakeholders to improve the new EHR and ensure it meets VA needs.
c. Acknowledge clinician challenges and frustrations, and explore collaborative solutions.
d. Transparently communicate realistic information about EHRM timing, training load, known pain points (e.g., pharmacy issues), and the anticipated impact on clinical care.

II. *Training*

a. Revamp training to ensure that it is appropriate and relevant for clinician needs.
b. Provide protected time (i.e., not during staff breaks or after hours) for training, independent learning, customization, and peer support. Ensure ample opportunity for staff to model and practice in both Sandbox and production environments to familiarize themselves with the system and validate that role mapping is correct.
c. Identify, scale, and spread effective informal training pre-go-live and supplement these efforts with optimization training after go-live. Include team readiness trainings in the production environment.
d. Identify high-priority workflows and engage end users in "dry runs" with new workflow simulations.

III. *Support*

a. Solidify governance structures, incorporating clinical subject matter experts, so that local sites know how to escalate issues and facilities can receive real-time feedback about progress on issues. Ensure local sites have access to informatics experts with detailed knowledge of the new EHR.
b. Widely distribute up-to-date guidance on accessing support for different EHR issues and provide clear feedback on the status of efforts to address EHR issues and patient safety concerns.
c. Reinforce peer support networks that engage experienced users to disseminate lessons learned.

d. Expand National EHRM Supplemental Staffing Unit (NESSU) support.
e. Make early, large investments in preparing for new clinical workflows, including comprehensively reviewing employee roles to inform user provisioning and determining changes in responsibilities.

IV. Continuous improvement

a. Engage and empower end users to inform continuous improvement efforts that ensure EHR usability, adapt clinical workflows, and improve end-user acceptability.
b. Develop and support dashboards for reporting critical information on EHRM performance, including leading indicators that will support better EHRM outcomes.
c. Expand evaluation efforts to rapidly identify lessons learned that can improve the rollout at future transition sites.

DETAILED REPORT

I. Introduction & background

VA's EHRM is the largest EHR transition globally; other systems' transition experiences inform what we know about these processes:

All EHR transitions are challenging.

- Frontline clinicians often struggle with EHR-to-EHR transitions.[1]
- Disruptions to patient care and employee use can persist for years after the change to a new EHR.[12-14]
- Transitioning from a homegrown EHR (i.e., VistA/CPRS, hereafter "CPRS") to a commercial EHR (i.e., Oracle-Cerner) may be particularly challenging;[2] in contrast to commercial systems, homegrown EHRs are designed for specific health systems' needs.[3]

VA is a unique environment with distinct EHR transition challenges.

- CPRS is one of the oldest homegrown EHRs in the country, and has been consistently ranked highly by frontline clinicians,[4] which may result in more user resistance to change.
- Whereas each VA Medical Center can customize CPRS to meet local end users' needs, the new EHR is standardized and is more difficult to adapt to meet local needs.

II. Site context

General site features

- The Chalmers P. Wylie Veterans Outpatient Clinic ("Columbus") (Station 757 in VISN 10) was the third EHRM site. It is located in Columbus, Ohio and serves about 44,000 Veterans with more than 556,000 completed outpatient visits in 2021.[5]
- It is a Level 2 facility, focused on providing primary care (PC) and specialty health services, including foot care, mental health care, eye care services, pain management, prescriptions, prosthetics, and women's health services.
- Approximately 1,500 clinicians and staff are employed at Columbus.

As an ambulatory care setting, Columbus provides outpatient services, including diagnosis, treatment, consultation, and intervention services.

Specific site features

- The Columbus Chief of Staff brought critical experience having previously led the first round of EHRM preparations, including the development of multiple iterations of locally initiated training and support efforts.
- The site went through two rounds of EHRM preparations and training. The transition date was initially planned for Early summer 2021 but was delayed until April 30, 2022.
- EHR training was substantially changed between the between the first and second training

III. Overview of EMPIRIC

"**E**HR**M** **P**artnership **I**ntegrating **R**apid Cycle Evaluation to **I**mprove **C**erner Implementation (EMPIRIC)" (VA QUERI PEC 20-168) is a VA Quality Enhancement Research Initiative (QUERI) funded Partnered Evaluation Initiative designed to improve EHRM by identifying challenges and best practices to support clinicians on-the-ground while informing the nationwide EHRM rollout.

We have already conducted a detailed evaluation of clinician and staff experiences at 2-months and 10-months out from go-live at the Mann-Grandstaff VAMC in Spokane, WA (the first VA EHRM site), the findings of which comprise separate interim and summative reports. We have also developed an interim report on Columbus 3-month post-go-live findings. **This report builds upon our prior evaluation experiences and presents findings from a formative evaluation of Columbus frontline clinicians and staff across the go-live and subsequent months.**

Approach: We conducted a formative mixed-methods evaluation using quantitative and qualitative approaches to understand frontline clinician and staff experiences at initial EHRM sites (Figure 1).

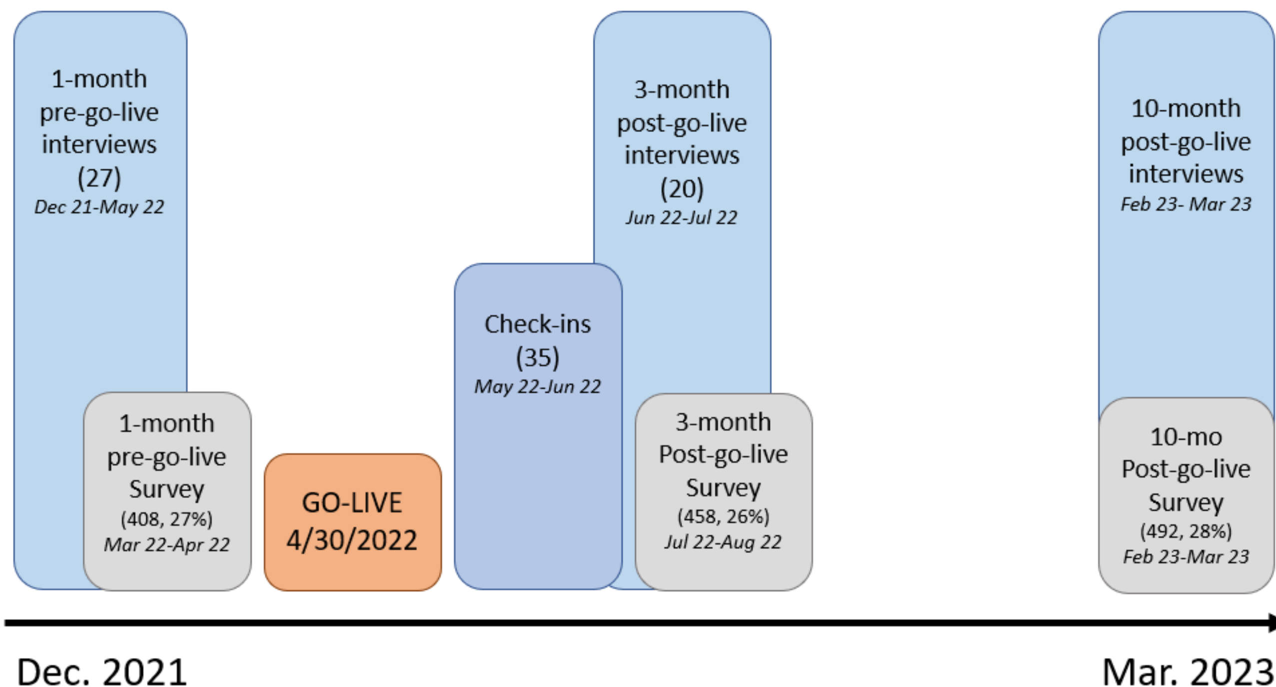
Figure 1. Overview of EMPIRIC approach

	Pre-implementation	Implementation	Sustainment
Objectives	• Identify & engage stakeholders • Assess EHRM attitudes & beliefs • Identify changes in clinical processes with new EHR	• Assess perspectives on Cerner change management • Identify best practices that clinical teams use to support EHRM	• Re-assess EHRM attitudes & beliefs • Re-evaluate changes in clinical processes with new EHR • Examine EHR use
Methods	Surveys, interviews, workflow mapping	Periodic reflections, EHR use data	Surveys, interviews, workflow mapping, EHR use data
Timeline	10 to 20 weeks prior to go-live (Cerner initiates regular site contact)	9 weeks prior to 6 weeks after go-live (Intense training & hands-on support)	7 to 24 weeks after go-live (After in person support leaves)

IV. Methods

We used simultaneous mixed methods (quantitative and qualitative) to evaluate end-user experience at four points during the transition to the new Oracle-Cerner EHR: the month before go-live, during go-live, and 3 months and 10 months post-go-live (Figure 2).

Figure 2. Timeline of Columbus qualitative and quantitative engagement



Quantitative

We conducted surveys with Columbus VA personnel before and after the new EHR go-live (April 30, 2022) to measure EHR use, effects of EHR transition on patients and staff, and factors that might influence EHR implementation. Surveys were distributed to approximately 1,500 Columbus employees via the all-staff email distribution group and up to three reminders were sent encouraging participation:

- Wave 1 was conducted 3/16/22-4/15/22 with 408 completed surveys (approximately 27% response rate).
- Wave 2 was conducted 7/18/22-8/5/22 with 458 completed surveys (approximately 31% response rate).
- Wave 3 was conducted 2/21/23-3/20/23 with 492 completed surveys (approximately 28% response rate).

Survey content

Surveys included three broad domains:

- Factors that could influence how well or poorly Columbus was able to **implement the new EHR,** e.g., measures of EHR training, workflow, support and communication (9 items) and measures of organizational readiness to change vis-a-vis the EHR (6 items).
- Measures related to proficiency and time spent in the EHR (5 items) and **EHR usability**, e.g., ease of use and confidence using the EHR (10 items).
- Measures of **employee and patient factors** potentially impacted by the EHR transition, including the effect of the EHR on patient safety (3 items), impact of the EHR on health-profession trainees (1 item), respondents' moral distress (1 item), job satisfaction and engagement (4 items), workload control and efficiency (3 items), job atmosphere, time spent on work at home, time spent on EHR work (7 items), and burnout and desire to leave the job (4 items).

The measures included a mix of published, validated measures and survey measures developed by the evaluation team. In total, 1-month pre-go-live surveys comprised 53 items, 3-month post-go-live surveys comprised 60, and 10-month post-go-live surveys 59, excluding respondent demographic and work role questions. Most survey items were repeated, with minor revisions made to some measures to compare respondents' perceptions of CPRS to the new EHR at pre-go-live versus post-go-live. Surveys also included open-text items that are described in the qualitative section below.

Data Presentation

Survey data are presented as bar graphs comparing measures from 1-month pre-go-live (CPRS) to 3-month-post-go-live and 10-month post-go-live (the new EHR). For most measures, we present the proportion of survey respondents who selected the top-two most favorable response options (for example, "agree or strongly agree"), which is sometimes referred to as a "top box" score. We used top-box scores for visual simplicity. We report results for respondents who indicated that they use the EHR for their work and omitted responses that had missing values or where the respondent selected not applicable. Survey item wording in the bar graphs has been abbreviated to improve readability.

Qualitative

Interviews

We conducted interviews and brief check-ins with clinicians, nurses, support staff, and a small number of clinical administrators and leaders at Columbus (Table 1). We first interviewed clinical administrators and leaders before go-live about their experiences with EHRM and asked them to identify additional contacts for interviews. Those contacts who participated in interviews were also asked to refer additional contacts iteratively until we had enough participants to sufficiently address the recruitment needs of our evaluation aim.

We conducted interviews (30-60 minutes) 1-month pre-go-live, 3-month post-go-live, and 10-month post-go-live. We also conducted brief check-ins (10-15 minutes) approximately two weeks apart between go-live and post-go-live interviews to understand participants' real-time experiences of EHRM.

We conducted 27 1-month pre-go-live interviews, 35 brief check-ins, 20 3-month post-go-live interviews, and 20 10-month post-go-live interviews with 27 unique participants between December 2021 and March 2023. All interviews were conducted virtually. Interviews were audio and video recorded and transcribed. We performed deductive content analysis relating to these categories of interest, as well as inductive analyses to identify emergent findings. These findings were iteratively reviewed, revised, and refined by our interdisciplinary team to determine categories and sub-categories of interest for this report.

Table 1. EMPIRIC interviews at Columbus

	1-month pre-go-live interviews	Check-ins	3-month post-go-live interviews	10-month post-go-live interviews	Total
Leadership & Providers*	18	26	13	13	**70**
Nurses**	7	7	6	6	**26**
Staff***	2	2	1	1	**6**
Total	**27**	**35**	**20**	**20**	**102**

*MDs, PharmDs, PAs, APRNs, Psychologists; **RNs and LPNs; *** MSAs and allied health professionals

Free-text survey responses

Survey respondents were asked two open-ended questions in the 1-month pre-go-live survey, four open-ended questions in the 3-month post-go-live survey, and four open-ended questions in the 10-month post-go-live survey (Table 2). We coded 2,155 free-text responses using qualitative data analysis software. Findings were iteratively reviewed, revised, and refined by our interdisciplinary team to support data merging with interview data categories and sub-categories of interest for this report.

Table 2. EMPIRIC survey open-ended questions and response rates

<table>
<tr><th>1-month pre-go-live items</th><th>3-month post-go-live items</th><th>10-month post-go-live items</th><th>1-month pre-go-live response rate</th><th>3-month post-go-live response rate</th><th>10-month post-go-live response rate</th></tr>
<tr><td>Please describe any positive or negative patient safety experiences you have had using the CPRS/Vista EHR in the last 3 months.</td><td colspan="2">Please describe any positive or negative patient safety experiences you have had using the new EHR in the last 2 months.</td><td>n=157 (38.5%)</td><td>n=284 (62%)</td><td>n=234 (27.6%)</td></tr>
<tr><td colspan="3">Please provide feedback or comments about your experiences with the new EHR implementation process.</td><td>n=132 (28.8%)</td><td>n=275 (60%)</td><td>n=260 (52.8%)</td></tr>
<tr><td>N/A</td><td>How has the new EHR implementation affected the VA's training mission at your facility?</td><td>N/A</td><td>N/A</td><td>n=126 (27.5%)</td><td>N/A</td></tr>
<tr><td>N/A</td><td colspan="2">Please describe what you found positive or negative and any other impressions related to role-based access you have experienced.</td><td>N/A</td><td>n=317 (69.2%)</td><td>n=249 (50.6%)</td></tr>
<tr><td colspan="2">N/A</td><td>If applicable, please provide any feedback about NESSU (the National EHRM Supplemental Staffing Unit).</td><td>N/A</td><td>N/A</td><td>n=121 (24.6%)</td></tr>
</table>

Quote presentation

Selected exemplar quotes from interviews and free-text responses are included in the following sections to illustrate the variation in the data for each finding and to provide a sense of the range of clinician and staff experiences at Columbus. Each quote includes an identification code. Codes beginning with "E" indicate quotes from qualitative interviews; codes beginning with "R" indicate free text survey responses. Codes also include “1-month pre,” “3-month post,” and “10-month post” referring to data collection relative to go-live.

Columbus Executive Team recommendations focus group

After- 3-month post-go-live analysis and data merging, we conducted one focus group (12/12/2022) with a team of local Columbus and national leadership team (n=5) to refine initial recommendations emergent from data. The group focused on EHRM roles and barriers and facilitators to effective EHR transitions to elicit recommendations for national leadership and future sites informed by high-level contextual concerns and pragmatics. Focus groups were recorded, transcribed, and reviewed to identify salient recommendations.

V. Findings

We have organized our findings into seven categorical areas of interest based on results from our data, as well as areas of importance to our evaluation team and operational partners. These include:

1. EHR Usability and proficiency
2. Overall user experience with the new EHR and feelings about the transition
3. Messaging and communication
4. Training and training support
5. Staffing and clinic capacity
6. Patient safety
7. Impact of EHRM on Veterans’ experiences

EHR usability and proficiency

Key findings:

- The new EHR is failing basic expectations for most users.
- There were particular concerns over the frequency of glitches and lags in the EHR, and the length of time it took to resolve identified/ticketed issues.
- Compared to CPRS, more time was spent in the new EHR outside of work/clinical hours, and longer amounts of time were required to complete standard tasks, which drove frustration amongst participants.
- The transition to role-based access (wherein EHR permissions are restricted based on the user role) impaired users’ access to needed patient information, their ability to provide technical support for one another.

The new EHR is failing basic expectations for most users

EHR usability metrics in all surveyed categories fell drastically from pre- to post-go-live with marginal improvement at 10-months. These included questions about positive aspects of usability which decreased post-go-live (Figure 3), and negative aspects of usability which increased (Figure 4).

Figure 3. EHR usability – positive experiences

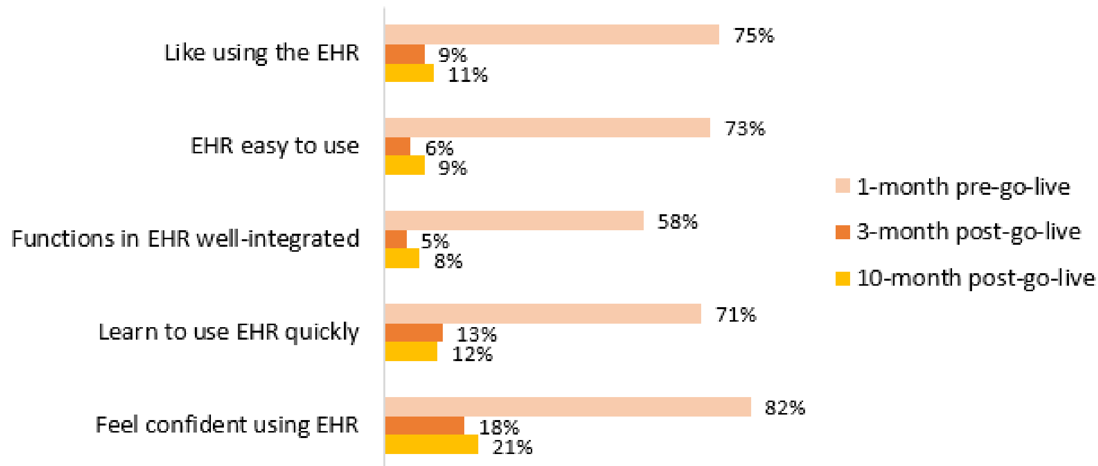
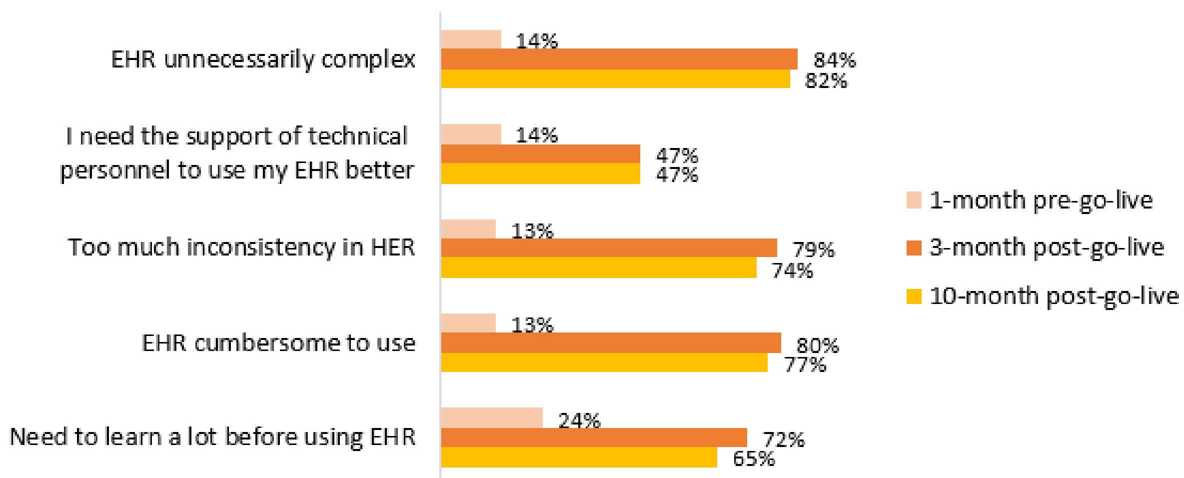


Figure 4. EHR usability – negative experiences



In survey free text responses and interviews, participants repeatedly conveyed that the new EHR system itself was deeply disappointing.

> *[THE NEW EHR] product is* ***not ready for real-time use.*** R26, 3-month post

> *[The new EHR] is slower, more cumbersome to navigate, does not interface with other programs that are necessary to do our jobs, and* ***the promised "Cerner versions" of those programs has not materialized, despite assurances they would soon be available.*** R386, 3-month post

> *…it takes a little bit of time to get used to and then* ***at a certain point it's just kind of 'that's how slow it's going to be*** *to get through a patient encounter' and… you just kind of have to accept that, I guess…I don't think there's any way to speed up certain aspects.* E209, 10-month post

> *A few of the biggest negatives that I frequently come across is that it is not simple, not user friendly, there are* ***too many places to go for the same information*** *with the* ***inability to find other things****. Medical errors are being made that can easily be avoided, there are delays in care as well as frustration from veterans regarding the* ***inability adequately to communicate with their care teams****. Of all of the medical EHR systems*

> *that I have used over my medical career, this is by far the worst. I am frequently worried that my license is at risks due to some of the "glitches' in the system. It was **far easier to work with Cerner in an in-patient setting than an out-patient**. I would honestly rather go back to paper based records.* R195, 10-month post

Frequent glitches and a slow, "click-heavy" system negatively impacted patient care

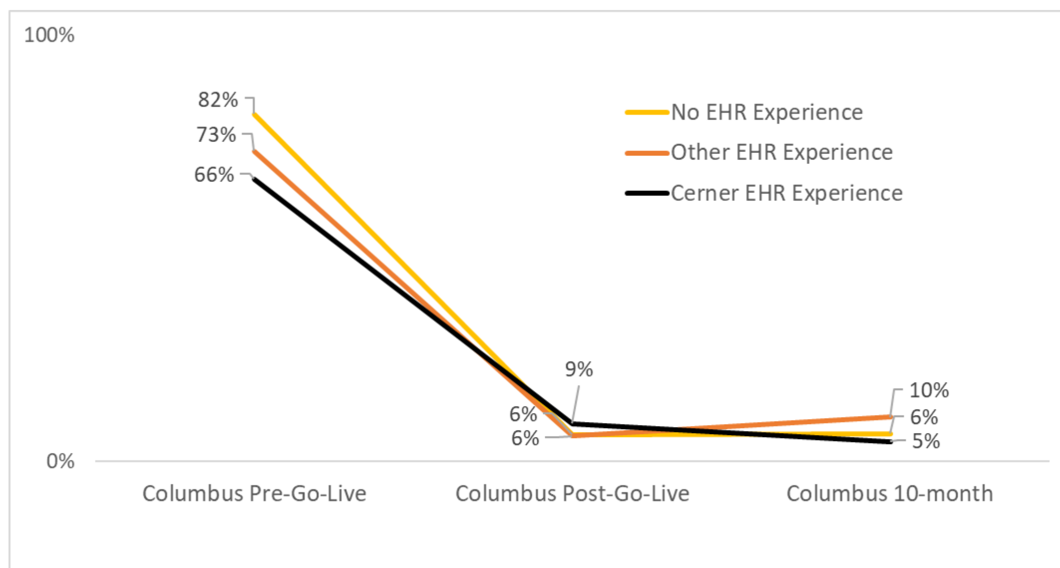
One of the most mentioned problems was that the system would frequently freeze, often requiring fixes throughout the day that included logging out/back into the new EHR, restarting computers, doing the same task multiple times, or simply waiting for the system to respond. Even at 10 months, extreme lags and crashes were still commonly reported.

> *I've had people from other future go-live sites coming to … learn a little bit, and … **I'll be like 'oh, this is a really cool feature' and I'll show it to them and then it doesn't work or it locks up my whole system and I have to reboot.*** E201, 10-month post

> ***The whole system slows down … around 3 o'clock … everybody notices it**. Sometimes the after-visit summaries or the procedure notes … they **print out in the middle of the night** so you find your after-visit note summaries [the next morning].* E208, 10-month post

Neither prior use of Cerner EHRs, nor prior use of other EHRs, appeared to be "protective" against the usability and functionality challenges reported by participants. For example, there was no difference in the proportions of respondents agreeing the EHR was easy to use among those who had prior non-VA Cerner EHR experience, prior experience with another EHR outside VA, or no EHR experience outside VA (Figure 5); we found a similar pattern across all 10 EHR usability questions (not pictured). Furthermore, comments from participants who had used Cerner elsewhere described usability deficits unique to the version of Cerner implemented at VA.

Figure 5. Respondents reporting the EHR is easy to use stratified by prior non-VA experience with Cerner, prior experience with another EHR, or no experience with EHRs outside of VA



> ***I have used a version of Cerner** with past jobs and **it has never been this problematic**, inconsistent, and cumbersome.* R496, 3-month post

> ***The Cerner Millennium product can be workable**. I used it for 5 years in a private-sector medical system before coming to the VA and we took good care of patients, passed inspections and stayed financially solvent. **The Cerner product built for the VA is a completely different matter**. I am sure that the people who*

designed it are clinical experts in their field, but they have NO CONCEPT of the infrastructure at the places where it has gone live. Therefore, it is unworkable and unsafe. R41, 10-month post

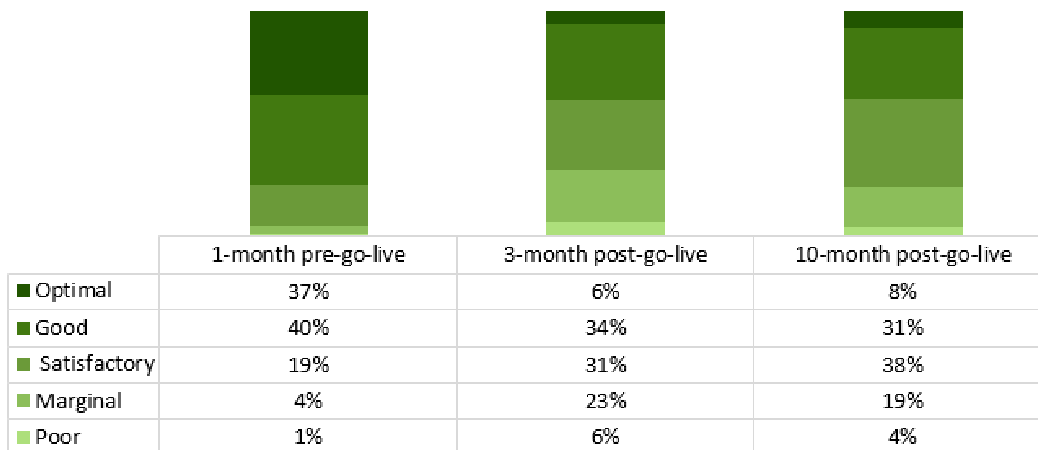
Many interview participants described the new EHR as inefficient and "click-heavy."

… a med refill for a Veteran, ***you used to take three clicks in CPRS, it's now a 40-click process*** *that takes you to an entire different portal to be able to refill a medication for Veteran, and then there's no way to see that where it is in the process. Was it accepted by pharmacy? Is it on the way to the Veteran? Is it in space? You don't know, so there's a risk for Veterans if they don't see the medication that they need and there's lapse in care because the refill, we have no clue where it went to.* E202, 3-month post

EHR proficiency

At pre-go-live, 77% of survey respondents reported that their EHR proficiency was optimal (37%) or good (40%) (Figure 6). At post-go-live it had dropped to 40%, and there was an increase in the proportion of survey respondents who described their EHR proficiency as "poor" or "marginal" at post-go-live, suggesting that respondents felt less proficient in the new EHR compared to CPRS. These findings remained virtually unchanged at 39% at 10-months. Nearly a quarter of respondents at 10 months reported marginal or poor proficiency with the EHR.

Figure 6. My proficiency with the EHR



	1-month pre-go-live	3-month post-go-live	10-month post-go-live
Optimal	37%	6%	8%
Good	40%	34%	31%
Satisfactory	19%	31%	38%
Marginal	4%	23%	19%
Poor	1%	6%	4%

Participant comments acknowledged modest improvements in proficiency over time, but suggested that for most users, these improvements were decisively outweighed by continued problems, many stemming from the workarounds they perceive as necessary to fulfill their responsibilities.

I do see since go-live that ***people have been able to get faster and more familiar as to where to find things****.* E205, 10-month post

Our "outdated" CPRS system was a whole lot more functional than Cerner. My workload has more than doubled due to the amount of time it takes for ***all the "work arounds" needed to try to make this system work****.* R96, 10-month post

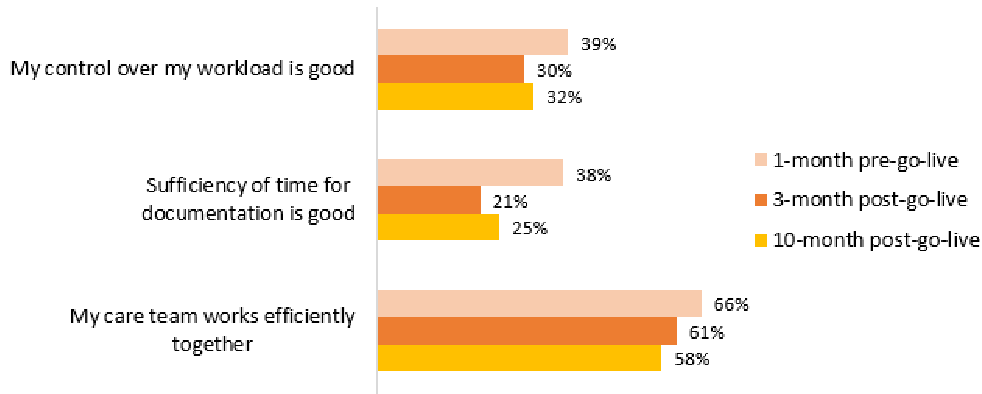
*Cerner makes small task[s] a mountain. For example … ability to check status, and update referrals is so time consuming that I rely on reaching out to departments/teams via phone, email, or Teams chat vs entering in Cerner***.** R179, 10-month post

Workload, time efficiency and team efficiency

At 3 months post-go-live, lower proportions of respondents reported having control over their workload; having sufficient time for documentation; and that their team works together efficiently (Figure 7). At 10 months, there was

slight recovery in the proportions of respondents who reported having control over their workload and having sufficient time for documentation, but there was a further decrease in those reporting that their team works together efficiently.

Figure 7. Workload, time efficiency and team efficiency

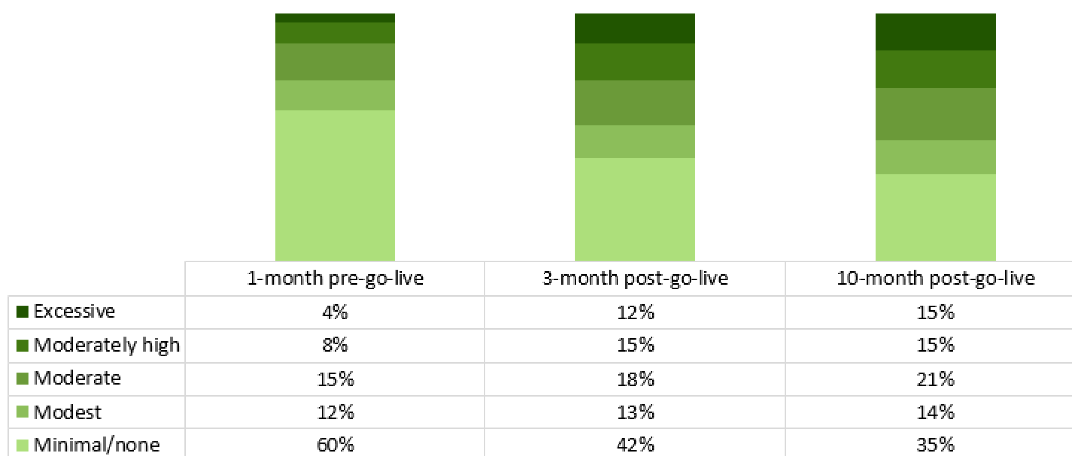


__More hours of working, because tasks take longer__ like ordering consults, [and] prosthetics, and nursing is not helping with facility orders anymore. This alone is making longer days, more difficult to find time to order supplies since it takes longer. Always behind because a 30 min [appointment] takes an hour and nursing taking 30 min to fill out reminders. R329, 3-month post

After-hours work and work at home

Survey respondents reported needing to spend more time on the EHR outside of working hours and at home at post-go-live than pre-go-live, and just over half of post-go-live survey respondents indicated spending more than 30 minutes on the EHR after working hours. The percentage of respondents reporting spending moderately high or excessive time on the EHR outside of scheduled clinical hours increased from 12% pre-go-live to 27% at 3 months post-go-live and 30% at 10 months (Figure 8).

Figure 8. Time spent on the EHR outside of scheduled clinic hours

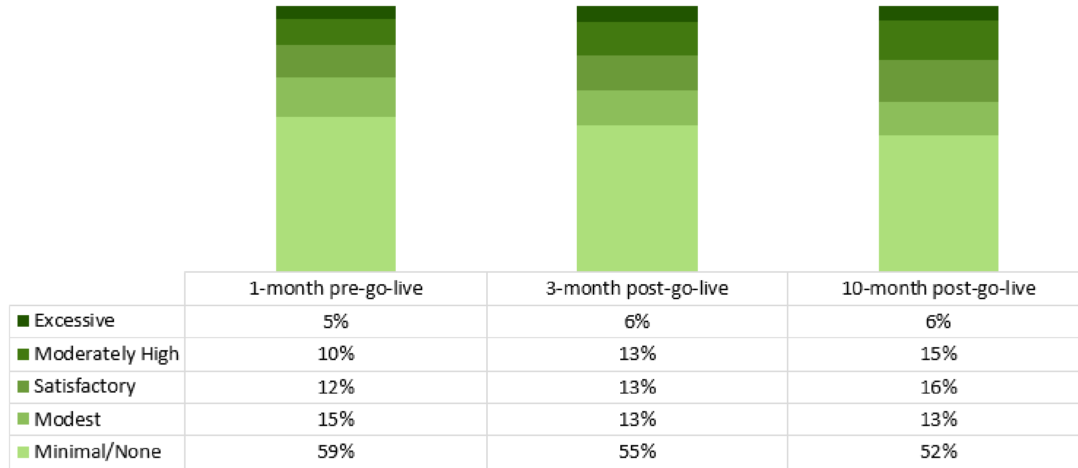


	1-month pre-go-live	3-month post-go-live	10-month post-go-live
Excessive	4%	12%	15%
Moderately high	8%	15%	15%
Moderate	15%	18%	21%
Modest	12%	13%	14%
Minimal/none	60%	42%	35%

Several of the doctors here at my facility __stay until late in the evening to finish__ charting, following up on their patient labs, and trying to keep up with their patient loads; and because they believe in doing what is right for their patients. These doctors often stay in excess of 8:00pm. R109, 10-month post

The percentage of respondents reporting spending moderately high or excessive time on work at home increased from 15% at pre-go-live to 19% at 3 months post-go-live and 21% at 10 months (Figure 9). Participants indicated that it had become common to work late into the evening to fulfill their obligations.

Figure 9. The amount of time spent on work at home



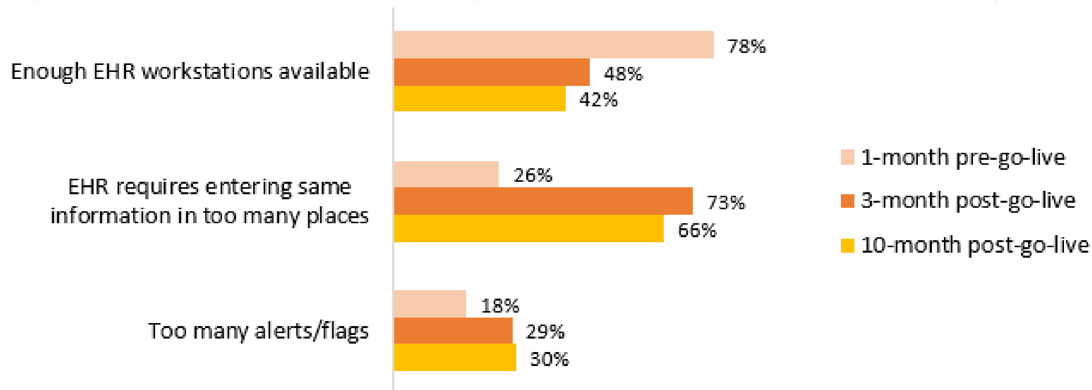
	1-month pre-go-live	3-month post-go-live	10-month post-go-live
Excessive	5%	6%	6%
Moderately High	10%	13%	15%
Satisfactory	12%	13%	16%
Modest	15%	13%	13%
Minimal/None	59%	55%	52%

I'll have five more hours of typing to do for ten patients so I will be going home typing until 11 o'clock tonight. Every single night. E206, 3-month post

Workflow and work processes

Perceptions of the EHR workflow and work processes worsened at 3-months post-go-live and at 10-months (Figure 10) with fewer survey respondents reporting there being enough workstations and three-quarters of respondents agreeing that the EHR requires redundant data entry; this improved modestly from 3-months post-go-live to 10-months (p=0.02) but remained far worse than at pre-go-live. As clinicians become more dependent on the EHR, and time on EHR increases, available workstations may become scarcer. There was also a slight increase at post-go-live in the proportion of survey respondents reporting there were too many alerts or flags in the EHR.

Figure 10. Agency for Healthcare Research and Quality (AHRQ)-derived measure: workflow/work process

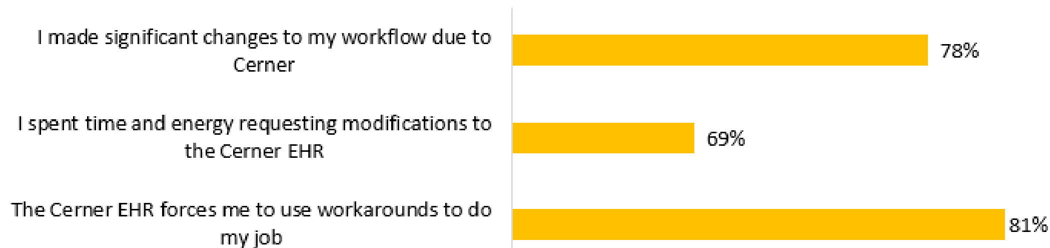


Workflow mismatch and workarounds

Based on findings in 3-month post-go-live interviews, we drafted a set of three questions for the 10-month survey about whether respondents felt they had made significant changes to their workflows due to Cerner; had spent time and energy requesting modifications to the new EHR; and that the new EHR had forced them to use workarounds to do their

jobs (Figure 11). Large proportions of respondents agreed or strongly agreed with all three items, with the highest proportion endorsing the item about the new EHR forcing them to use workarounds to do their job.

Figure 11. Workflow mismatch and workarounds



Role-based access presents multiple challenges

Participants described role-based access in the new EHR as a particular challenge. Survey participants' reported "ability to access appropriate views" dropped from 84% before go-live, to 45% at 10 months post-go-live (Figure 12). Unlike CPRS, the entirety of EHR permissions and privileges are determined by highly specific user roles, each associated with a role-specific interface.

> *I find the **limitation of access to information to be a hindrance to providing complete and competent care**. It was far far better to be able to see all information as needed.* R8, 10-month post

> *I have two user types and had to request a third in order **to get information that wasn't available** to me with my first two profiles. I learned about the information from another clinician during a meeting when he talked about tools and where to find them. I didn't have the tool in my two existing experiences**. With Cerner you don't know what you don't know.*** R95, 10-month post

Additionally, users with dual roles (e.g., clinician-administrator) noted the inefficiency of having to switch roles to complete work tasks, which was time consuming and impeded patient care.

> *Coworkers who are MSAs have often spoken negatively about **having to change roles to find information, a process which wastes time** and irritates veterans who have to wait longer for answers to their questions.* R38, 10-month post

Meanwhile, some participants felt their jobs did not fit the new EHR roles.

> *I do understand the fundamental idea about the roles but I just find it **cumbersome and feel it does not add value**.* R69, 10-month post

Many participants noted changes to their work duties.

> *[I am] sometimes **blocked from things I need or support staff is unable to access things they could previously** leading to increased work load, for example nurses checking PDMP for providers.* R11, 10-month post

Some participants suggested that the permissions assigned to their role were inappropriate for their scope, e.g., nurses ability to *order* rather than *propose* medications.

> *Another safety issue we're having is the fact that **when nurses put in proposed orders...** if they don't remember to switch it to 'propose' then **they can actually just order it**, so nurses can actually **place medication orders without the provider knowing.*** E201, 3-month post

Furthermore, the change to highly differentiated role-based access was observed to stymie interdisciplinary integration and prevent peer technical support.

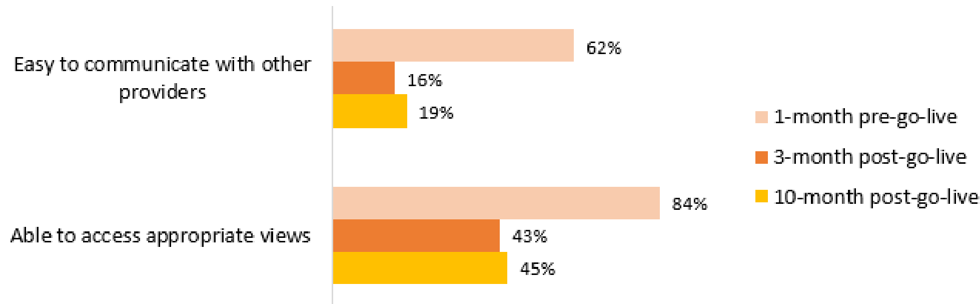
> *I can't help a lot of the providers the way that I was able to with CPRS. So: **siloing of the different disciplines**. And it's not even just us in primary care, it's us in social work, it's us in all these other clinics: **we're all looking at different things which does not help us work together as a team**. It does not help us integrate in the way that we are called to.* E217, 10-month post

One interview participant emphasized that this had already surfaced in an OIG review and that Columbus staff were under the impression it had been fixed for their go-live, when that turned out to not be the case. While there was purportedly an option for nurses to propose medications in the new EHR, not all nurses appeared to know about it.

> *[In the] previous OIG review that was an issue that nurses were able to order medications and that there wasn't a hard stop for that. **We understood from reading the follow up to the OIG review that it was supposedly corrected. [But] when we went live it was not corrected** and we had nurses ordering medications.* E202, 3-month post

Post-go-live, there was a substantial drop in the proportion of survey respondents who reported they could communicate with other providers and access appropriate views in the EHR (Figure 12).

Figure 12. EHR ease of communication and access to views



Some participants shared their belief that role-based access hindered communication between individuals. The new EHR's interface varies significantly depending on user role, compared to CPRS's near-identical interface for all users. Participants shared examples of impeded communication and support:

> *It is **very confusing and difficult to communicate re: a vet chart when you have different clinicians seeing different things in the chart** even within the same specialty. For example, a primary care social worker has different access than a mental health social worker which makes it more difficult to communicate for issues on the same patient (for no good reason).* R122, 10-month post

Role based access is also specifically identified as a hindrance to accessing views appropriate to their role, including that of supporting other team members.

> *I **can no longer assist others** as I am not able to see what they see. There is no 'role' for my position so I am in Cerner as a nurse (which I am not).* R69, 10-month post

It's not all bad – "some things I do like about the [new] system"

Although user experience was largely negative, some interview participants highlighted features of the new EHR that made their work more efficient.

> ***Making a note is just a breeze. I mean, it's superfast.*** *I love the fact that we can put in the social history and family history and all of that and actually have it stay. With our old system it didn't.* E201, 10-month post

> *It always bothered me that ...* ***certain things in CPRS were external to CPRS,*** *so if I collaborated with a VA colleague in an email, it was up to one of the two of us … to copy that conversation and put it into a note.* ***All of this is internal in Cerner****. Now … you can't … want the things that go into chart to all be pretty because the chart is not just going to have progress notes in it, it's going to have a progress note, next to an email that you sent to a colleague, next to a phone call from where you called the patient about their lab results.* E215, 10-month post

> *Our UCC [urgent care clinic] folks absolutely* ***rave about FirstNet*** *[the EHR package for urgent care].* E202, 10-month post

> *I like the* ***dynamic documentation*** *still and feel like I'm pretty proficient with that. The* ***auto text is a really nice feature****.* E204, 10-month post

<u>Overall user experience with the new EHR and perception of the transition</u>

Key findings:

- Participants expressed simultaneous decreases in overall EHR satisfaction and sharp increases in stress after the EHR transition.
- Many participants perceived a disconnect between Cerner operations and VA needs, resulting in feelings that the new EHR "is not built for VA use."
- Participant frustrations with using the EHR, as well as witnessing negative impacts on patient care, heightened feelings of low morale.

Poor fit for VA

There was an overarching perception from interview participants that the new EHR was not built for VA's context, population, or workflows. This perspective was shared even by those who had otherwise positive impressions of the new EHR.

> *You can do a lot of things [with the new EHR]. This software is very good stuff if you use it to the full potential …* ***It's just, how it is designed for the VA and DoD, it's not optimal****.* E206, 3-month post

> *This is not my first transition to a new method of keeping medical records… And usually by the time you're a year out, which we very nearly are, you've kind of settled in... and we are still struggling to find a rhythm because* ***there's still so many parts of the EHR that just don't fit our business model.*** *And there seems to be a reluctance to acknowledge that the way the VA delivers healthcare is pretty unique <...> I think if [someone] said 'listen, we need to take a step back, spend time in the facility, talk to all these people and really just what they're saying, and apply it to this build' rather than 'here's the build we made.* ***Let's try and shove the VA into this, the square VA into the round Cerner hole'.*** *That would be great, but I don't see that happening.* E226, 10-month post

Increases in stress, decreases in satisfaction

Prior to go-live, few survey respondents reported stress due to the EHR, and most reported satisfaction with the EHR. After go-live, in contrast, survey respondents indicated experiencing a great deal of stress due to the EHR and only a small percentage were satisfied with the EHR, and while satisfaction with the EHR may have improved incrementally at 10 months, the proportion of respondents feeling stress due to the EHR continued to increase at 10 months (Figure 13). Overall job satisfaction and job engagement were high prior to go-live and dropped only modestly after go-live and remained steady at 10 months (Figure 14). Participants identified specific factors that contributed to feelings of stress.

Figure 13. Stress and satisfaction with EHR

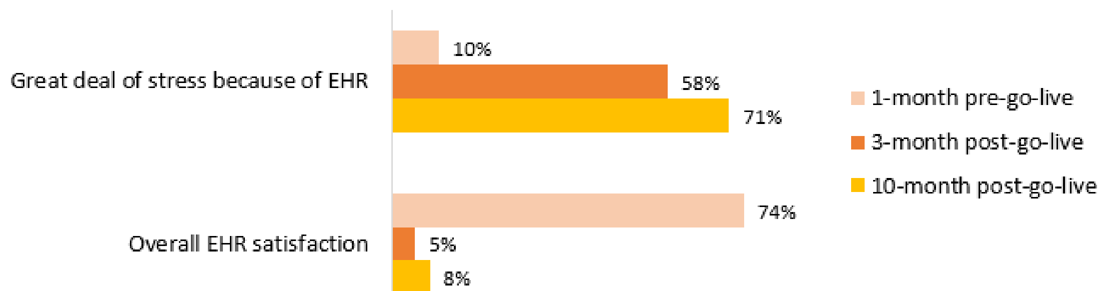
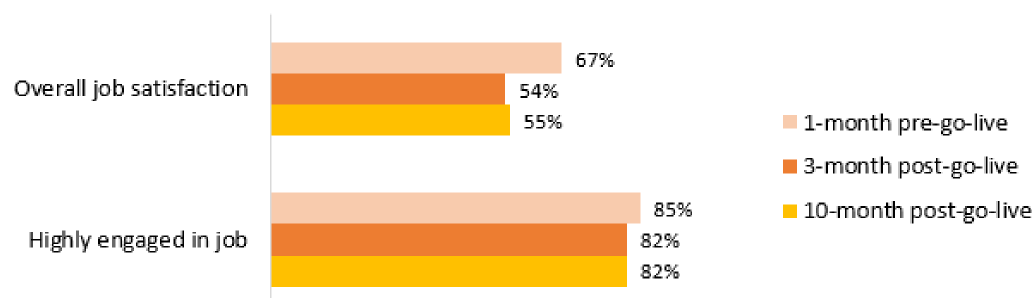


Figure 14. Overall job satisfaction and engagement

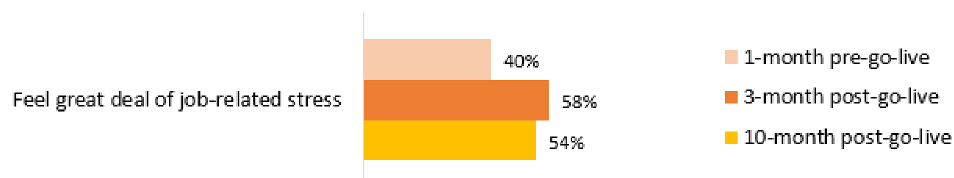


Frustrations with patient care quality and timeliness ultimately impacted staff morale

As covered in detail in subsequent sections, there was an overarching feeling that EHRM and the new EHR itself hindered providers' ability to take care of Veterans. Interview participants expressed numerous instances in which care was delayed (or repeated), care quality was compromised, and patient safety was jeopardized because of perceived problems or inefficiencies with the system and/or a lack of training on relevant tasks and workflows.

> *There's* ***nothing efficient about the system****. Everything is five more clicks, ten more clicks and it's like, you know,* ***these are people's lives, they're not clicks.*** *We have reduced them to giving us carpal tunnel and reordering things…this guy came back in to say "hey, I need my GI consult placed again." He shouldn't have had to come back in to do that.* E220, 3-month post

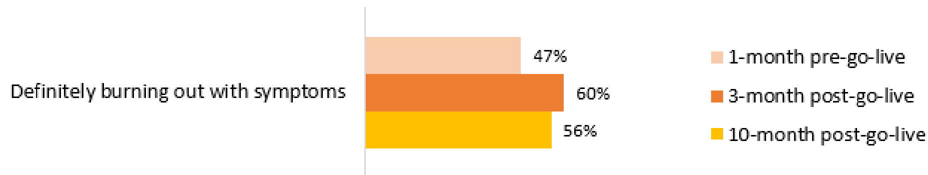
Figure 15. Job-related stress



Over time, frequent problems in the new EHR led to low morale. After go-live, there were substantial increases in the proportions of respondents reporting job-related stress (Figure 15), burnout (Figure 16), and frustration (Figure 17). At

10 months, those proportions had decreased modestly, though remained higher than at pre-go-live. There were moderate increases in the proportions of respondents reporting they would leave their job if they could at both 3 months and 10 months post-go-live, although the proportion of respondents who said they planned to leave their job within 6 months decreased modestly (Figure 17). This frustration and declining morale were also reflected in interviews.

Figure 16. Work-related burnout

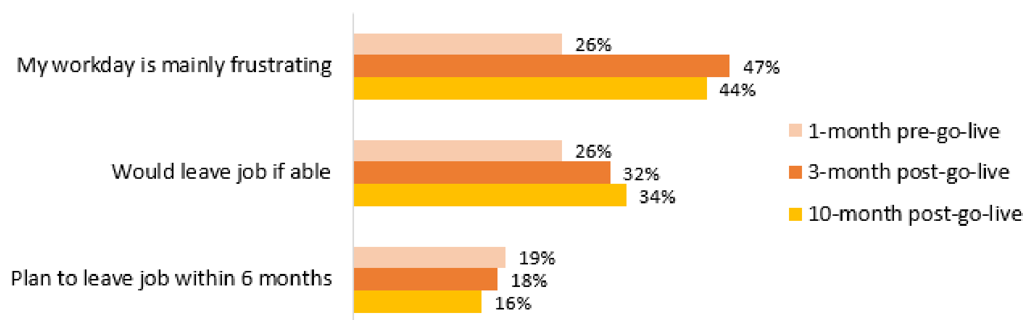


> *We have had several more people resign, and **the morale is so low**. They're just upset with Veterans yelling at them and how far behind they are, feeling like they can never get up, and some of the staff that have resigned are actual Veterans themselves. **I had one person say, "I just can't face my fellow Veterans."** I mean how do you fix that kind of morale in your team?* E225, 3-month post

> *Lots of people are frustrated. **There's a lot of burnout.** The morale is probably at an all-time low since I've been here. Not good.* E227, 3-month post

> *I go home and after dinner I literally fall asleep on the couch because I'm mentally unable to stay awake because I'm just exhausted. I loved my job before Cerner. I love my patients now but not my job. I hate feeling like that. It makes me absolutely nauseous. **I have literally sat in the car and contemplated calling off because I just didn't want to go in and deal with it** … It's a horrible program. It has made me take worse care of my patients.* E220, 10-month post

Figure 17. Work frustration and turnover intent

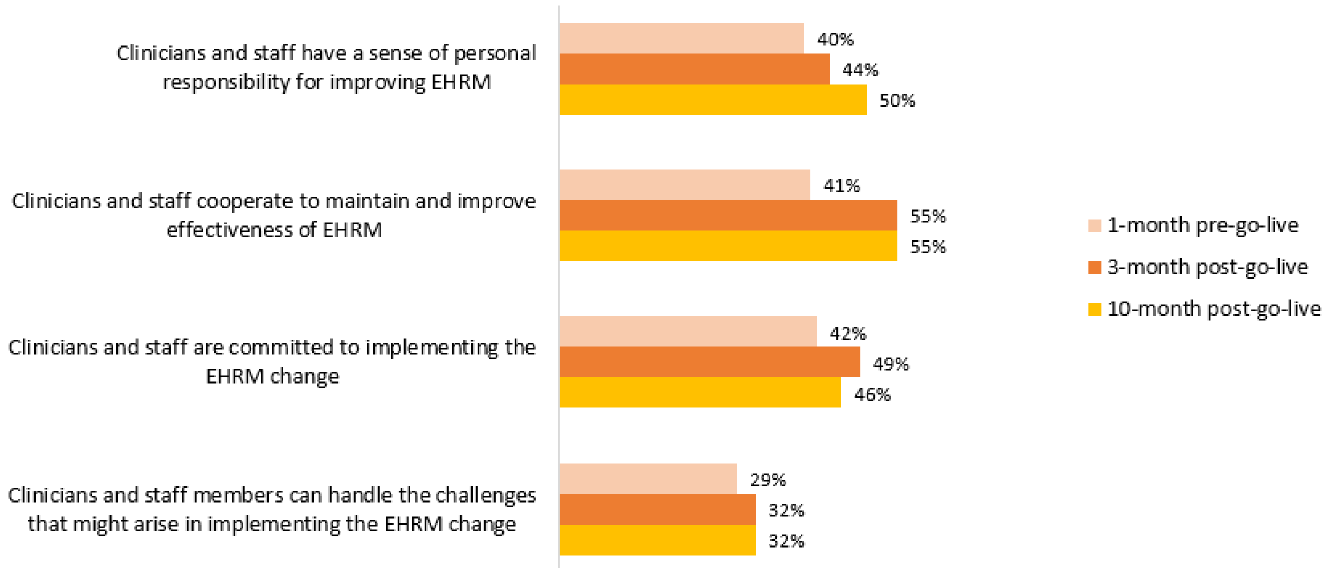


Comradery and confidence in colleagues had a positive effect on employee morale

Despite widespread frustrations about the EHR software, survey respondents' ratings of their colleagues' (Figure 18) and managers' (Figure 19) attitudes and actions related to EHRM improved modestly, with the largest increase in the proportion of respondents reporting clinicians and staff cooperate to maintain and improve the effectiveness of EHRM. These scores for collective responsibility for and cooperation to improve EHRM held steady at 10 months. This was echoed by some interview participants, who highlighted actions local leaders were doing to improve EHRM, including continuous messaging to show appreciation and boost morale.

> *… within our leadership we have continuous [messaging]. You know what I mean, our chief of staff, our director, is continuously putting out messages, whether it be about changes or things to watch out for… [or] "thank you, good job, keep up the good work." **[They're] trying to keep our morale up. So I think that's been a very positive thing**.* E202, 3-month post

Figure 18. Clinicians and staff organizational readiness to change



Inappropriate responsibility for transition success

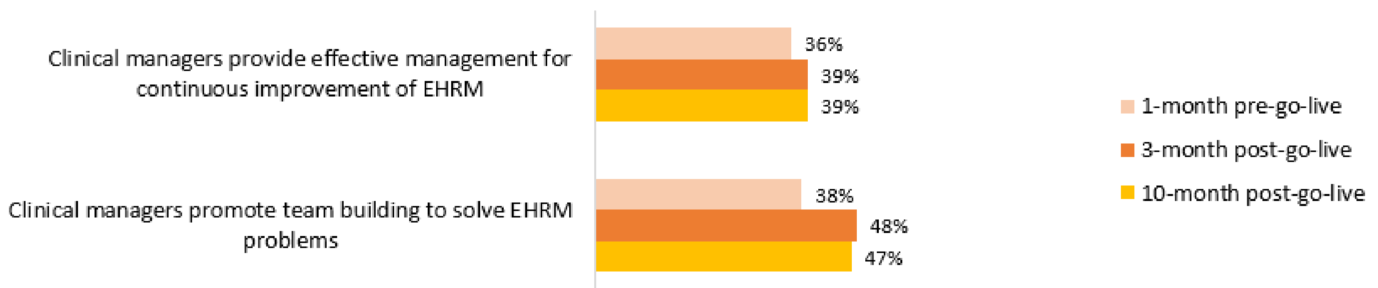
Some participants felt that the onus of the EHR transition's success was inappropriately placed upon end users when the system wasn't ready for at the time of transition.

> *When I have had issues/concerns with Cerner, the **first line of defense is often that it is a 'me' problem**. That is very frustrating for me when I am trying to learn all I can in order to make this system work for me... My role relies on data and 9 months in, I still have none. That is perhaps the most frustrating thing*. R69, 10-month post

Interview participants shared that they felt like both Cerner staff and VA leadership put the responsibility on providers and staff to change the way they worked to accommodate the new EHR. Participants voiced frustration at having to "figure out a way to make us fit with it."

> *We are nine months into Cerner implementation and I feel that **we are adapting to Cerner's shortcomings, rather than Cerner improving our work flow**.* R329, 10-month post

Figure 19. Clinical manager organizational readiness to change



Many participants suggested that EHRM successes were due to the attention and dedication of Columbus employees.

> *I feel **many things were not completed in this system and ready for use** which is obvious by the issues that we and the other facilities using Cerner have run into. An auto manufacturer would not send a car to a dealership if it wasn't fully capable of doing everything it should, but we were given an EHR that wasn't*

ready for everything that we need. It is ***only due to the hard-working conscientious staff using it that we haven't had more mishaps***. R151, 10-month post

Messaging and communication

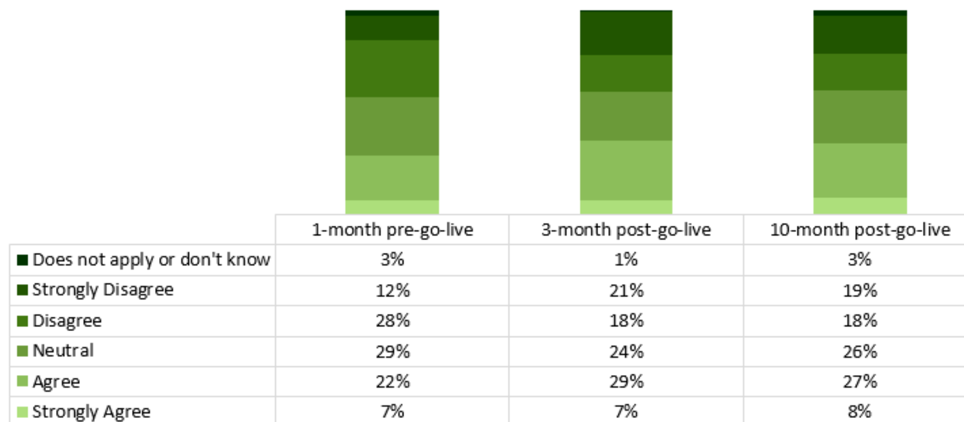
Key findings:

- The rationale for changes to clinical workflows, including the role of national standardization, was under-communicated to front line employees.
- Unfulfilled promises made by Cerner employees and national VA leaders were particularly troublesome, undermining trust and diminishing the opportunity to make contingency plans.
- The quality and frequency of messaging from local leadership had the potential to enhance or diminish user experiences of EHRM.
- Practical communication strategies (e.g., peer support via Microsoft Teams) were strongly favored and frequently leveraged by end users across subspecialties and roles.
- Lack of clear communication about ticket status was a major source of frustration; end users expressed a desire for improved communication about ticket status, including reasons for closure.

Two-way communication was key to feeling heard

Interview participants described a range of examples of both effective and poor communication about EHRM. Participants appreciated when communication was two-way, as this contributed to feeling "listened to," rather than simply having concerns relayed up the chain of command. This was echoed in surveys, where there was a slight increase from pre- to post-go-live in respondents' reporting they had been asked for input on ways to improve the EHR (29%, 36% and 35%, respectively agreed or strongly agreed); while the proportion who disagreed or strongly disagreed was essentially unchanged across waves (40%, 39% & 37%, respectively) (Figure 20).

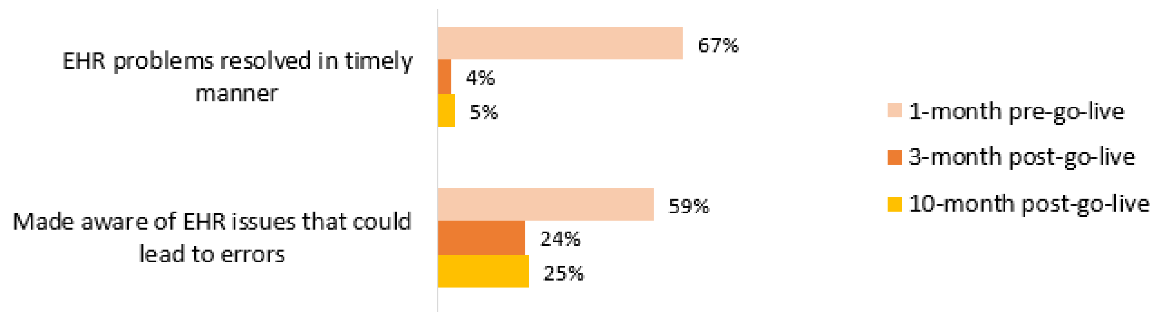
Figure 20. Asked for input on ways to improve the EHR



	1-month pre-go-live	3-month post-go-live	10-month post-go-live
Does not apply or don't know	3%	1%	3%
Strongly Disagree	12%	21%	19%
Disagree	28%	18%	18%
Neutral	29%	24%	26%
Agree	22%	29%	27%
Strongly Agree	7%	7%	8%

Conversely, there were significant drops in the proportions of respondents who agreed or strongly agreed that they had been made aware of EHR issues that could lead to errors (Figure 21). These proportions remained essentially unchanged at 10 months. Prior to go-live, there was a sense from interview participants that "bugs" and system errors were being fixed and would be resolved by go-live. The proportion of survey respondents agreeing that EHR problems were resolved in a timely manner dropped precipitously following go-live and remained essentially unchanged at 10 months (Figure 21).

Figure 21. AHRQ-derived measure: EHR system support and communication



Participants indicated that many glitches persisted even 10 months after go-live, and several participants described “ticket-fatigue” and a feeling of futility.

> *The other huge, huge issue is lag time and outages. I mean I’m talking* ***probably 15-16 freezes per user, per day, that’s not being captured because people are so ticket fatigued, they’re not calling in tickets****. They’re not calling in that anymore because nothing’s being done. They’re like, “Why? I just delayed patient care for 15 minutes waiting on my computer to unfreeze, I’m not taking another 5 minutes to call in a ticket when it’s still going to happen tomorrow.* E224, 3-month post

> *I think a lot of the staff has kind of* ***developed a kind of learned helplessness*** *with regard to some elements of Cerner.* E216, 10-month post

> *The frustration in the clinic is that* ***there’s no real-time fixes*** *because we depend on the third party to fix it. Where before, there used to be local [staff] being able to fix some of that stuff locally, and now that ability is completely gone with Cerner.* E223, 10-month post

> ***In [the] old system we could fix programs or upload templates to keep patients safe****… with Cerner we cannot do this quicky. We feel we have lost control of our safety with the EHR. Change request takes too long and Cerner cancels tickets.* R187, 10-month post

Lack of responsiveness to tickets was a particular source of frustration

Interview participants shared that they frequently did not receive feedback on the status of submitted ticket or were told “it’s being worked on” but their issue may take months to be fixed. While participants had an expectation that they would hear back in a timely manner and/or that resolution of “major things” would be expedited, our data revealed the actual experience rarely met these expectations, leading to ongoing frustration.

> *[The help desk] is where we place the ticket. We give our manager the [ticket] number that they gave us, and* ***we don’t really get any follow up****. And based on management they’re not getting follow up, either.* E223, 3-month post

> *... if you’re [having] a current [technical] issue where you really just need to figure out how to do something right now,* ***filing a ticket that they’re going to respond to in a few days is not helpful****.* E201, 3-month post

> *They sent a message out asking me to screenshot something else [yet again], and* ***I wonder how many hours we have lost putting in tickets****, [instead of] taking care of patients, just putting in tickets over and over again for the things that don’t work <…> we screenshot all of this stuff and we send it … and* ***nothing ever happens****.* E220, 10-month post

Messaging

Local leadership generally communicated well with staff

Interview participants shared that local medical-center and clinical leadership provided regular updates regarding EHRM progress and new information from Central Office and Cerner. Critically, participants noted an appreciation for when they perceived local leadership to have acknowledged when they did not have information or answers. They also expressed appreciation when local leadership listened to *and* accepted feedback.

> *… I think our clinical leadership – the [VA's] Cerner leadership team – did as best they could at* ***keeping us in the loop****... So I think every clinic may have a different response just depending on how far that information was trickled down.* E222, 3-month post

> *I feel like our [local] administration has done a good job communicating, they've been receptive to our feedback.* E204, 3-month post

> ***We were at least getting weekly updates*** *and they were sending … tips on, what they had experiences with and then what challenges they've had, and tips to either workaround or how to solve that and to be able to move forward. So* ***anything … that would arise, they would try to give us a tip sheet on****. We do get pretty regular emails even now … like topics and then it'll give us the direct link [on sharepoint] on that topic so we get those regularly. I think that* ***on a local level, they're trying to share information as best as they can****"*

E214, 10-month post

The role of national standardization was under-communicated

Some participants, particularly those in local leadership roles or who were otherwise connected to national decision-makers, explained that some changes to the EHR and to accompanying clinical process were motivated by a national push for increasing standardization across VA facilities. This standardization effort was also identified as the reason that some local requests for changes to the EHR were denied. However, only a small minority of participants articulated this rationale, with most left to wonder whether dramatic changes to their workflows were EHR bugs, intentional changes in policy, or merely reflected technical limitations of the new EHR. One participant suggested making changes to workflows in advance, prior to the EHR transition, to allow staff to understand and adjust to those changes before the tumult of the actual software implementation.

> *Even though we're all the VHA, we just had so much autonomy prior to Cerner … had we implemented some of the [new processes] prior to Cerner maybe it would've been easier, but what we had did not carry over and then* ***we're being told "no" to some things 'cause they're saying it's "site specific."*** *But it's not site specific, it was what we've always done … there's no national "this is how you do it," you know what I mean? We weren't out of compliance. But* ***now with Cerner, they're saying it isn't a national thing so they won't implement it****. <…> I don't think it was standardized prior to Cerner …* ***I mean if you want everybody to order an ED visit the same, you needed to implement that prior to Cerner*** *so that we were all doing that already;* ***then it wouldn't be such a culture shock when you went to Cerner.*** E223, 10-month post

"Empty promises" were problematic

Particularly at 10 months after go-live, participants noted unfulfilled promises of system improvements: both improvements to the problems experienced at prior implementation sites, and problems reported by Columbus staff upon implementation.

> *They have corrected some things but …* ***the aspects of the system that we feel are dangerous have not been corrected****, and they keep telling us they will be in future updates but as of yet, I'm not seeing them. ... The main thing is medication reconciliation. It's still … very easy to miss a medication. It's very easy to make*

mistakes. ***They've been telling us now for five, six months that was going to be fixed*** *in this last block upgrade which just happened over the weekend actually. But then* ***now they're saying that it'll come later*** *… so here we are, goodness, how long have we been live… like nine months? And we're still finding medications that weren't renewed at go-live … we're just finding a lot of things that are worrisome.* E201, 10-month post

I remember prior to go-live, we felt like they would fix any problems. That there was a lot of promises made that the system was going to be a lot better for patients and a lot easier to use for staff, *and I felt like it was at, you know, looking back it was misrepresented grossly but going into it we trusted that they were fixing the challenges that Spokane and Walla Walla were having and that we wouldn't have those same challenges.* E225, 10-month post

It wasn't proactive. Like, our facility standing orders is not working now but ***there was nothing proactively done [by our facility] because we were told it was going to be done [by Cerner]****…* ***I don't know what else to call it other than empty promises****. They promised we were going to get this and then they didn't fulfill it and then we've had to react and figure out what we're going to do in the meantime.* E223, 10-month post

Listening and accepting feedback has helped to improve communication

Participants expressed frustration that high-priority complaints were slow to be addressed, even after being communicated to national leaders who seemed to hear and understand their concerns. Following the announcement of a VA-wide "EHRM reset," in which further implementations would be suspended until improvements were made, participants were appreciative that their concerns had been taken seriously.

Everybody kind of voices… 'we hear the [message], we understand… that it's bad' but ***there doesn't really seem to be any – [it's] just kind of like placation of 'we hear ya.' There's not really much they… can do*** *… They understand that this isn't working the way it's supposed to* ***but there's not really any – they're just making slow changes … but it doesn't seem to be overly expedited,*** *and the Cerner team seems to make it seem like there's nothing they can do very quickly.* E209, 10-month post

The secretary came to Columbus and had a big discussion about it and took questions and whatnot *and that's why everything else was put on hold after that conversation to try to figure out the kinks and fix as much as we can before moving forward. So,* ***I think that did help and I think they're still working on certain things*** *that I don't totally know everything that they're working on but I think they are things that are getting better from that discussion with the secretary. <...> …****it was like, okay they are listening and paying attention*** *that we are having issues and they need to be addressed for patient safety and in all of VA*. E219, 10-month post

Facility-wide coordination, modeled after disaster response, was highly valued

Columbus established a "clinic incident command" group early in the preparation phase. The group provided a forum for facility leaders, service chiefs, managers, and informaticists to coordinate and engage national leaders and Cerner representatives to address high-priority problems including "patient safety risks." It also served as a mechanism to keep facility leaders aware of problems "on the ground," and ensure that closed tickets were appropriately resolved. Meeting cadence changed several times to reflect the pace of issues to be addressed; during the height of implementation, it was held daily. One participant described called the group as a "benchmark" that "all sites should be looking at."

The chief of staff stood up, like you would do for a disaster, a clinical incident command *and we* ***meet weekly*** *… we set up a list of patient safety risks and we've been working them ... Pharmacy is in there, nursing is in there, specialty and primary are in there …* ***You got people from across the facility in there so***

> ***that when you bring an issue up you get a lot of different ears on and it drives a lot of different solutions***. E226, 1-month pre

> *Columbus has set up a* ***daily clinical incident command*** *meeting with service chiefs and supervisors and managers …* ***It's good to see other areas' tickets because sometimes you're like "wait a minute, we have that issue too"*** *… It also gives the [Columbus leadership team] awareness on our tickets moving along. Do we have any areas that are just stalling out, they haven't had any movement? The informatics department, do they need to escalate items? That sort of thing. So I think that's been very helpful across the clinic, just to have that awareness … some things are minor and they were able to close them out pretty quickly … and then others are more complicated and they're taking more time to get resolution and others have had to be escalated to, like I said, a national level … the project deployment lead from Cerner is always on the call … several folks from national councils join.* E202, Check-in

> *[Clinical incident command]* ***continues to be, I think, a benchmark. I think that all sites should be looking at this.*** *… If multiple clinics are having the same problem, we can kind of consolidate who's digging for the information coming back.* ***It makes sure that our leadership****, like the Chief of Staff, the director,* ***[hear from] boots on the ground, the front line, people*** *… We've got a chat going on so you can enter information there, or add a chart or add data that needs to be considered …* ***Every so often a ticket will get closed****,* ***but we won't know what was done with it. And because we're keeping our own track of them we can say "No, this is not right. They closed it [but] they didn't fix it****. ... We need to do something."* ***It holds Cerner and national accountable.*** E226, 10-month post

Training and EHR support

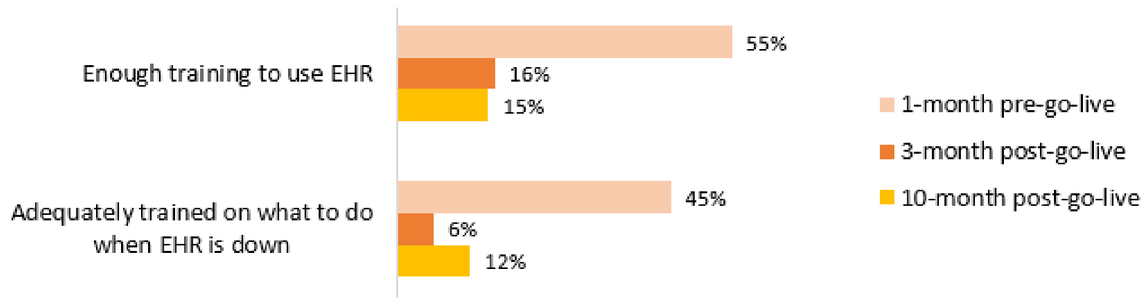
Key findings:

- Delayed go-live created an opportunity to enhance Cerner training—resulting in some improvements – yet further improvements in training and EHR practice are needed.
- End-user perceptions about having enough training to use the new EHR fell drastically from pre-go-live (55%) to post-go-live (16%) and remained unchanged at 10 months post-go-live.
- There was an overwhelming perception that training did not sufficiently prepare users on necessary workflows or for role-specific tasks that emerged from vendor-assigned role classifications.
- Peer-to-peer support, site-created resources, and VA-offered trainings were identified as the most helpful resources for learning the new EHR.

Training was better the second time around, but deficiencies remained

The training in Columbus was unique in that clinicians and staff received two rounds of pre-go-live training due to their original go-live date being postponed for a year. Interview participants noted modest improvements from the first to second round of training, but still described the training as woefully inadequate. There were large drops in the proportions of survey respondents who said they had enough training to use the EHR, and specifically training on what to do when the system went down (Figure 22). The percentage of respondents who agreed or strongly agreed increased from post-go-live to 10-months for both training customized to work area and adequate training on what to do when the EHR is down, however, both figures remained much lower than they were at pre-go-live. This point is particularly salient given the frequent occurrence of system glitches and outages.

Figure 22. AHRQ-derived measure: EHR system support and communication



The Sandbox – and protected time to access it – remained inadequate

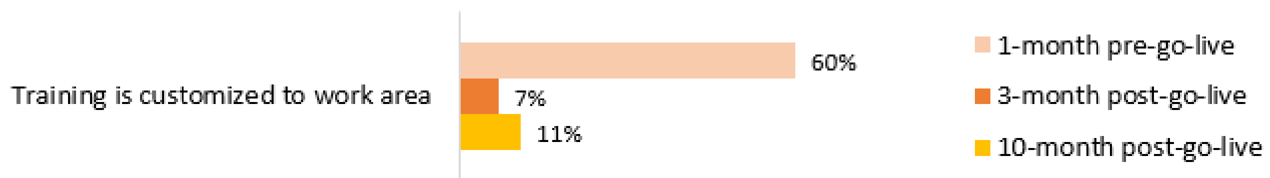
Interviews and free text survey responses revealed a perception that the sandbox was potentially valuable, but either difficult to access or difficult to find time to practice in. There was also a pervasive opinion that the sandbox could be further improved to mimic the production domain to practice in a "real-life setting."

> *The sandbox itself is a good idea and there [are] a lot of things that are worthwhile, so that's why **I encourage my staff to get into the sandbox as much as possible**. And yes, even though it has some… limitations, the fact that it is built for us we need to utilize it. However [the] sandbox just didn't have the connections needed to practice … and figure out a lot of our workflows.* E222, 1-month pre

Training did not reflect participant roles and responsibilities

The proportion of respondents who reported that EHR training was customized to their work area dropped dramatically at post-go-live, and while it recovered modestly at 10-months it remained very low (Figure 23). Free-text responses and interviews revealed that training about roles and responsibilities was deficient and needed improvement.

Figure 23. AHRQ-derived measure: EHR system training



> *The training sessions we had prior to implementation...were **deficient [in] real-time scenarios** as the trainers themselves were not properly trained...every time an issue was brought up during training sessions, I was told that they will get back to me with the answer and there was no getting back with me, even after months.* R325, 3-month post

There was a persistent feeling among interview participants that training contained unnecessary information. Participants reported often receiving instruction about tasks they would never complete or were outside their role and/or scope of practice, with one participant expressing how this contributed to their initial stress during the transition.

> ***I don't think it was very specific to our jobs or our departments or our roles**… there was stuff we all learned that we didn't need to know.* E223, 3-month post

> *It's almost if someone was saying "I'm going to teach you German and you're going to have like eight classes in German… and when you go to take the quiz it's all in Spanish." […] **None of it seemed to pertain to anything that we need.** Like, I'm not a doctor, I don't prescribe meds.* E220, 3-month post

Staff wanted to be trained on workflows, not "buttonology"

One issue that repeatedly surfaced was what some interview participants referred to as "buttonology" -- an approach to training that focused solely on individual EHR functions, stripped of the context of a complete clinical workflow. This approach was seen as particularly unhelpful, given a lack of contextual information to understand why they were doing what they were doing. Moreover, some participants suggested that training sessions missed an important opportunity to establish appropriate *norms* for how the system should be used.

> *The training is **still not very good in terms of being able to specifically, you know, do your job** on a day-to-day basis. It's still more navigating the record and where to click.* E205, 10-month post

> *…can you show me the flow, like I want a step-by-step process like a one, two, three, four, five but **the Cerner training only teaches you how to use the system not actually how you're going to do it in your everyday workflow**.* E224, 1-month pre

> *I think that [if] there's anything Cerner could've done [it should've been] to stress the uniformity of, the etiquette of how to send a message [in the EHR], how to receive a message, and who to respond to. The same messages are getting sent individually to providers [and] to the message pools. The string of … addendums on a message [are so overwhelming that] finally you lose the … train of thought. Somebody will, along the way, start another message cause they give up on it. Now you have two or three or four messages that belong to the same thread but … one message is missing the part that you really need... And it's turned into a nightmare for the messages. … So I think **stressing a certain message etiquette, with the uniform way in the beginning, before people developed their own ways, got their own workarounds on that, [would've helped]**.* E208, 10-month post

Cerner staff don't know VA workflows or "the VA way"

Participants described frustration with Cerner staff not understanding the VA and having insufficient knowledge about VA workflows. Reportedly, Cerner staff couldn't instruct staff on how to do their daily tasks in a way that made sense contextually as there was no "translation" from CPRS to the new EHR workflows that worked for VA staff.

> *… the Cerner trainers, **they didn't know the VA… they didn't know the VA way**. They didn't come from the VA. …They were just showing us this program and this is how great it is and this is what it can do. But when we had specific questions of "this is how the VA works and this is how we break it down, can you show me that?" they didn't have those answers.* E219, 3-month post

Ultimately, many interview participants felt that the lack of focus on daily workflows in training reflected a lack of understanding of what it means to care for patients.

> *The sequence and **the order of things that they teach make no sense to a provider** because they're bouncing all over the place. So, a provider likes to think in a… particular sequence, and I'm not talking about the things they do in their own exam, **I'm talking about the overall care of a patient**… And **the trainings would just bounce around**, from Message Center, to PowerChart, to doing a note, then to medications and then to recommendations.* E222, 1-month pre

> *They would focus on how you do this or how you do that, but **they never really gave a clear scenario, like, let's do a visit start to finish and see how things flow, so you have a good idea of the whole picture**. It was so choppy that … after all their training was done… most of the providers said they didn't even know how to even do a note. Like, the patient could be sitting there with them, and they had no clue what they were even supposed to do.* E201, 1-month pre

VA-led training, whether formal or informal, was a strong supplement to Cerner-led training

Interview participants reported that their learning improved with either formal, internally (i.e., VA) generated trainings or informal peer-to-peer learning to supplement Cerner training. Many service lines used their staff meeting times to address issues with the new EHR, and facility leaders frequently organized "Lunch and Learns" to help further train staff. Lunch and Learns were led by local staff or members of NESSU.

> *And so, **we built these supplemental trainings… For our staff, that's where they've learned**. The trainings that they have had from Cerner, some have been worthless, some have been okay but… It's [those] taught by VA [superusers]… that have been most beneficial.* E222, 1-month pre

> *… My supervisor has made it so that on Tuesdays and Thursdays **we have time locked in our schedule to attend the Lunch and Learns or to get into the sandbox to kind of practice** … or just to kind of … click around and see what it's going to look like.* E211, 1-mont pre

> *We've l**earned quite a bit from one of the NESSU providers who worked at** [previous go-live site] … [they] did a lot of peer support and [they] started a Teams chat group that still is going on today.* E208, 10-month post

> *There were lots of different chats and supports and things happening. We had reports from NESSU – **that was really helpful because they were actual clinical end users from Spokane**. Sometimes they provided different information than what the Cerner folks did because the Cerner folks aren't necessarily clinical, they just sort of know how it's built… I wished [NESSU] had been around longer than they were, they were only there until the end of May.* E204, 3-month post

Learning from peers and self-teaching

Interview participants reported that personalized training was helpful, especially once people had had an opportunity to use the system. They also described "taking it upon themselves" to learn from each other throughout the workday.

> *Training was not specific to my specialty, which made learning the new system difficult. **The only reason I felt trained and ready to use Cerner was because of service level super users** who spent a significant amount of their own time to ensure everyone in our service had the knowledge to use Cerner effectively.* R323, 10-month post

> *For that [first] couple of weeks **this hallway was just open doors** and people running in between offices and trying to answer each other's [questions] – so we were just very collaborative.* E215 3-month post

Peer support via Microsoft Teams® proved especially useful

Interview participants reported using Microsoft Teams® channels to provide technical support to one another. Several specific features of the Teams chat were highlighted as being useful. First, the information was rapidly shared. Once participants knew how to use the chat search functions, information was easier to locate and access.

> *I've gotten much more savvy at [using Teams]. And then I discovered that I could do a search and that it'll **look through all of the chats and find a particular topic** – so that has helped.* E204, 3-month post

Information and solutions coming from fellow VA staff who understood end-user problems were seen as especially supportive. The [National EHRM Supplemental Staffing Unit (NESSU)](), which included VA staff volunteers to support EHRM, was available to provide both clinical and technical support for the transition. Prior to go-live, NESSU staff created a live Teams support channel that many interview participants shared as being especially helpful.

> *So, when we went live,* ***NESSU made this really awesome live support [Teams] channel*** *where you could go in and it actually had a question, and then all the responses would be in a subfolder, [and that made it] so easy to find what you were looking for...* E201, 3-month post

Interview participants shared that NESSU also provided important technical support and explained how to complete tasks in the new EHR from a VA clinician's perspective – something that was lacking from Cerner-led support.

Staffing and clinic capacity

Key findings:

- Participants perceived the provision of extra staffing support to be a tangible resource that eased EHRM.
- Reduced patient volume resulted in its own scheduling and care challenges but was largely seen as necessary and helpful for many clinicians and staff.
- Many participants indicated that Community Care did not receive or benefit from the same resources that other services received during go-live.

Reduced patient volume and extra staffing support made workloads more manageable

To assist with the anticipated increase in workload demands of the new EHR, VA implemented a variety of workload-management strategies. One strategy involved reducing patient loads at go-live in most service lines, followed by a slow ramp-up period in the weeks following go-live. Prior to go-live, interview participants generally anticipated this to be beneficial for clinicians whose workloads consisted largely of planned outpatient visits.

> *I'm sure there'll be hiccups, there'll be things that won't work right but I think particularly with the way that they're doing it with the first week only,* ***having a patient in the morning, a patient in the afternoon, will leave plenty of time to figure any of those things out*** *they may have missed in training.* E209, 1-month pre

However, there were some concerns about how such patient load reduction might impact support staff or clinicians who do walk-in visits:

> *I believe [one patient in the morning and one in the afternoon will work] with the providers and the LPNs, but again I'm worried for the RNs. I feel like the call volume will increase.* ***The walk-ins might increase if nothing's being followed up on****.* E219, 1-month pre

To address some of the challenges of increased walk-in workload and other clinical tasks, extra staffing support was provided primarily through NESSU and Clinical Resource Hubs (CRHs). NESSU (in-person or virtual) and CRH staff (virtual only) provided direct patient care support by calling patients, seeing patients for walk-in/same day appointments, addressing alerts, and taking on other various clinical tasks. Not surprisingly, some challenges that were common before go-live persisted despite these resources, such as staffing shortages and slow hiring processes. Even so, NESSU and CRH support were seen as helpful by most interview participants.

> *You know, we had a couple [NESSU providers] on site that would see people in person but most of them were telehealth, but yes, their original purpose was to do telehealth and video appointments for people to pick up the slack from where we didn't have enough access because of it. And they were amazing and awesome.* ***We can't say enough good things about all the NESSU providers****.* E201, 3 -month post

> *… We can use [CRH staff] for stuff that doesn't necessarily need an eyeball on eyeball, hand on body. So, you get some triages. You get [a patient] that's calling in about, you know, "I got this going on or I got that going on."* ***We can do a same day telephone appointment with the CRH people … to address some of those immediate needs.*** E210, 3-month post

Several months after go-live, Columbus benefitted from NESSU and CRH support longer than initially planned because previously scheduled implementations at other facilities were cancelled, allowing those resources to support Columbus.

> *One of the things that changed, obviously,* ***when all the additional go-lives paused, was that fortunately for us, that meant we got to keep our CRH support*** *for this entire time, which has been fantastic. They've been amazing to work with and really been helpful,* ***and then the NESSU came back to us in January*** *and is with us until … they are needed elsewhere. So we actually have both of those teams supporting us again, which has been really helpful for us …* ***I know not every place is as fortunate to have double the support****.* E205, 10-month post

One interview participant recounted feeling that this combination of support – a reduced schedule as well as extra staff – made their job doable in a way they couldn't foresee being maintained once that support withdrew.

> *… before I was staying after, and now with the reduced schedule,* ***with the help – initially from the NESSU people and now [from] the nurse practitioner – [I feel like] I could do this job in a way that I obviously did not feel I could any longer at the time.*** *Obviously, I know they're going to increase the load, and… I fully expect at some point to revert back to [it] really not being a feasible job again.* E212, 3-month post

Both short- and long-term staffing increases in primary care were required

In addition to temporary supplemental staffing from CRH and NESSU, Columbus expanded a local, pre-EHRM pilot program to add several nurse practitioners (NP) to support primary care teams. This extra support was provided to primary care in part based on the observation that efficiency in primary care was disproportionately negatively affected by the transition. The pilot program was originally focused on hospital discharge planning, but the scope of the new NPs was expanded to help primary care teams avoid falling behind more generally.

> *So we had NESSU helping. We have CRH, and we hired like maybe 30 or 40 Millbrook Agency nurses. They hired a "pod NP" for each pod [PC unit]… that's what even scarier is* ***we have all this assistance [but] I can't imagine them staying in Columbus forever, you know? … we had to hire a lot more people to make Cerner work****. … It takes double the MSAs because the entire system to chart relies on an MSA. <…> The Pod NP helps to handle walk-ins, helps to handle the … hospital discharge stuff … They realized that they needed it and so they hired like 25 nurse practitioners, which, you know, is not cheap.* E224, 10-month post

> *"The nurse practitioners are there to, really they're supporting the [physicians] … They're helping with [messages] and they're also managing the hospital discharges … They'll help with paperwork and walk-ins if need be. …* ***our productivity [is] probably what an average facility this size is at, but with twice the amount of help****. <…> [Each]* ***NP is assigned to three [primary care] teams and … that's not part of the PACT model at all. It's just something we developed*** *… we planned [the discharge planning program] ahead of time and then Cerner came, and we hadn't hired any yet, and also the providers were complaining about the workload, so [we] kind of did a "kill two birds with one stone."* E208, 10-month post

Community Care was overwhelmed with inadequate staffing and resources to meet demand

In addition to receiving in-service NESSU and CRH support, service lines also sent more patients to Community Care during the transition to ensure their scheduled patients still had access to care. However, interview participants within *and* outside Community Care shared that the service line was completely overwhelmed. There was a sense that Community Care did not receive the same staffing support or resources given to other service lines; instead, it functioned as a support net for other services. Consequently, it did not experience a reduction in volume, but rather an unmanageable *increase* in referrals that created a bottleneck. On top of that, an interview participant noted that Cerner

did not build any community-care specific workflows to streamline processes and improve referral efficiency during this period of high demand.

> *They're sending [patients] here to Community Care. Yesterday we got an influx of 200 eye referrals because the eye clinic's shutting down its schedule [to] one [patient] in the morning and one in the afternoon at go-live for a couple of weeks. A couple days ago we got 150 cardiac referrals because the cardiac clinic here is shutting down. It's going to hundreds and hundreds that are coming to us and [our] team has gotten zero additional support. […] The VISN is sending [NESSU help]… to some of our clinics but* ***we're being told "nobody knows Community Care, so we don't have anybody to send you****."* E225, 1-month pre

This influx of patients reportedly so inundated Community Care that providers recounted instances of patients circling back to them without having been connected to care outside of VA within a reasonable timeframe. Some interview participants expressed concerns that the Community Care backlog contributed to an inability to provide necessary services to patients who were sick and needed timely specialty services.

> ***Community Care is having a huge influx of consults*** *because our clinics were reduced in size for the go-live – we only had one patient in the morning and one patient in the afternoon for the first week. And then we increased to two each time and then three and then right now they're still at half capacity, so all those patients that had been consults for within the facility are getting Community Care consults because they can't accommodate them within the 30 days, so then that increases our workload [in Community Care]...* ***we were already short staffed prior to go-live and now we're overwhelmed.*** E223, 3-month post

> *You know,* ***my patient with liver cancer comes in and is like, "I'm really sorry to bother you, but nobody has called me****, and I thought I was supposed to go to OSU but I don't know if I'm supposed to or not." So, then you find out, yes, Dr. X placed that consult emergently [a week or two ago] and he called down to the provider here and they're like … "we'll put that consult in and he can go to Community Care because he's really sick and he needs [inpatient] follow up." And it didn't happen.* ***So now he's like a week or two weeks out with no care*** *and … we just don't know. Do you think that feels acceptable? Absolutely not. That's heartbreaking. It makes me absolutely sick. And,* ***that's not like one patient. It's happening all the time****.* E220, 3-month post

Interview participants in community care shared that they were behind in responding to consults not only because of the influx of patients from other service lines, but also because Cerner apparently did not build any Community Care-specific workflows and the system made it hard to track patients who needed care.

> *We're supposed to … circle back with the provider in the community and get all the records back in house so that [the VA provider] can know what happened at the community provider. But there is no data field that captures an appointment day.* ***Any appointment that's made in the community has to be put in a free text field which none of my team can search. So now they're all trying to create these spreadsheets, which has been a disaster, to try and track their patients. And people are falling through the cracks,*** *and we have providers in-house yelling at us saying "I've sent this patient two months ago for this referral, you haven't done it" and we go and look and yeah, the patient had the appointment a month ago, we just didn't realize it to get the documents back.* E225, 3-month post

Patient safety

Key findings:

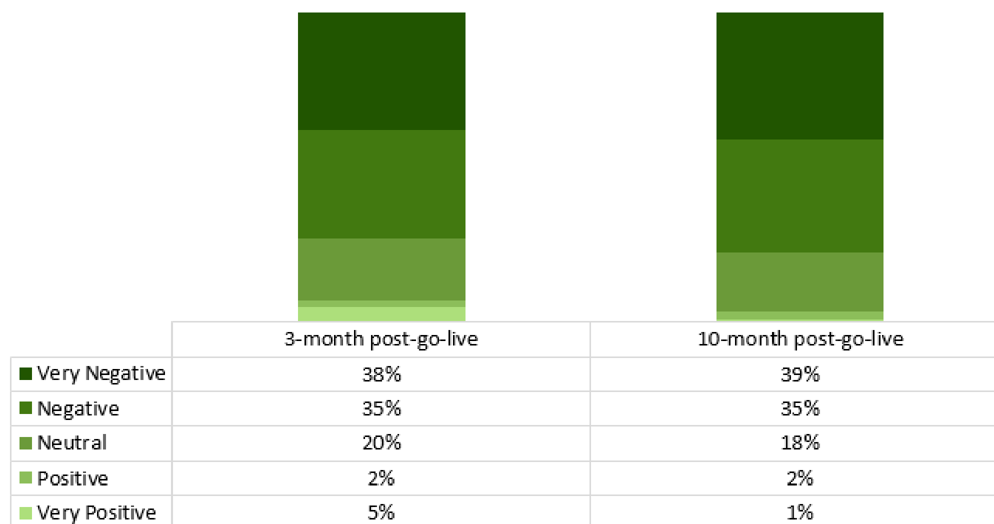
- Participants overwhelmingly perceived that the new EHR was less conducive to patient safety, with the perception that the "EHR helps keep patients safe" falling from 70% pre-go-live to 4% at 3 and 10 months post-go-live.
- Participants felt that the new EHR lacked features considered "critical to patient safety" that were present in CPRS, and perception of the EHR as preventing patient safety risks dropped substantially at post-go-live.
- Specifically, many participants noted problems related to placing orders for medications and services
- Concern about safety hazards contributed to moral distress. After go-live, 78% of survey participants reported moral distress related to the transition.

Perceived EHR safety dropped precipitously after go-live

There was a widespread concern among clinicians and staff that missing features and specific EHR issues made the new EHR overwhelmingly less safe than its predecessor. This perception came across in surveys and interviews alike. There was a precipitous drop in survey respondents reporting that the EHR kept patients safe or prevented safety risks, which remained virtually unchanged at 10-months (Figure 24). In 3-month post-go-live and 10-month post-go-live surveys (but not the 1-month pre-go-live survey), respondents were asked how the transition to the Cerner EHR affected patient safety; most respondents felt the transition had a negative (35% and 37%) or very negative (38% and 41%) effect on patient safety at 3-month post-go-live and 10-month post-go-live, respectively (Figure 25)

Figure 24. Patient safety

Figure 25. How has EHRM affected patient safety



	3-month post-go-live	10-month post-go-live
Very Negative	38%	39%
Negative	35%	35%
Neutral	20%	18%
Positive	2%	2%
Very Positive	5%	1%

One survey participant contextualized their response with a free-text comment:

> *The program is **a patient safety concern with the amount of errors in information, difficulty to use, time [consumption], and amount of time spent toggling** from program to program.* R274, 3-month post

The new EHR is missing features that clinicians and staff used in CPRS to optimize patient safety

Interview participants voiced frustration that the new EHR appeared to be missing features that they perceived as critical to ensuring patient safety. For example, default view settings, the inability to access reports for population health, the absence of computerized reminders for important preventive care – and numerous other examples – were highlighted as threats to patient safety that arose from the new EHR architecture and system build rather than system glitches.

> ***Since Cerner started and CPRS went away, we have not been able to run [antidepressant reports].** There is not an accurate report. [Before] …what we would do with that report is the RNs would call the patients, they would follow up and check to see, 'Okay, how have you been doing with this antidepressant?' …We are unable to do that …We used to be able to pull a high probability no-show list. So, if someone consistently missed an appointment, we could pull a list and we could call them and do appointment reminders. We can't get that list right now.* E214, 3-month post

> ***I have other patients who [have] end-stage kidney failure disease and … it will literally say no recommendations are due for this patient** … [Before Cerner, we'd ask them] do they have an advanced directive or living will? Are they consuming alcohol? … Are they feeling depressed? … Are they making it to the bathroom okay on time? Maybe they have prostate cancer and now they're peeing themselves. That leads to more depression. Are they getting enough to eat? … Maybe they've gained weight. There's no questions about BMI follow-up or anything like that. Are they living in safe and stable housing? Maybe they had a job before and now they can't work anymore and they're going to lose their house and they're going to be homeless … I can't do a suicide screen anymore. Maybe they started smoking. Maybe their feet are bad … **They have literally taken away my ability to chart any of that stuff short of pulling up a new note and just free-texting it, which will not go to the doc … There's no, like, checks and balances to make sure that any of that is getting taken care of for those people.** And those are our sickest people and we're basically saying "Off you go. You're going to die anyway. Have a good life even though it's going to be short."* E220, 10-month post

Feelings of frustration were compounded when Cerner staff suggested these issues were just "the way the system works."

> ***There's a frustration that the things we're saying are safety issues Cerner is saying, "that's not a safety issue, that's the way the system works."** [For example,] the default way medications can be viewed in our chart, like the moment a medication expires … it becomes unviewable in the medication list. So, unless you as a provider adjust your view, you won't be able to see something that expired even a day ago … so when you go to reconcile your med list, you could miss something and it could be … something as important as a diabetes med, a chemo med, something like that. … I know **we've had at least one instance where … medication for seizures was overlooked** and wasn't renewed because … the default view didn't facilitate seeing it, the renewal didn't happen and when we put it in a safety event, Cerner said, "Oh that's not a safety event. That's how the system works".* E226, 3-month post

Problems with placing orders

Many patient safety issues related to problems with order placement were raised. Interview participants reported that orders placed by clinicians for lab tests, medications, specialty care, or other services were frequently "cancelled," "rejected," or "discontinued" without any notification to the ordering clinician.

> *We've got issues with the injections as well. Like the mental health injections that people come in for on a routine basis.* ***Because they don't have the ability to order an injection like an every two-week thing, it has to be ordered on each occurrence on the day of … that's asking for a mistake.*** *But then also they realize that if the nurse went into the form just to review the medication order that they wanted the doctor to order, by them just reviewing it somehow it actually ordered it. So … there's just so many issues in that respect.* E201, 3-month post

Interview participants described the process of placing a referral as "one of the hardest things to accomplish in Cerner" – so difficult that 3 months after go-live, even superusers, as key users with additional system administration rights, were still struggling to fully understand the process, resulting in orders sometimes being "delayed by weeks." The difficulty of the process was attributed in part to extremely long lists of potential orders, only some of which were valid.

> ***...a lot of times we don't know where our orders or what we request goes****, or if it goes anywhere ... First of all, they have all the DoD choices in [Cerner] along with the VA choices. So, you have to know what the VA choices are, what, how to do it the VA way ... I mean for instance [if I] put an EMG order in, it looks like it goes through. It looks like it's fine. But it really goes nowhere but you don't know that.* E208, 3-month post

A related phenomenon was that of orders going "off into never-neverland." This "neverland" is officially known as the *unknown queue,* and patient safety issues related to the unknown queue have been previously well-documented. Orders placed into the unknown queue are presumably caught, but this was often not the case; referring providers would only find out that orders "went nowhere" weeks after placing them.

> *It was all driven out of sheer frustration of orders getting canceled, order not going through. Because the problem is with some of these things, if we choose the wrong one,* ***it looks like it went through and it's somewhere in cyberspace neverland and you may never know that the order was even placed****, you know?* ***And there's no way to follow up on it*** *necessarily until the Vet calls two weeks later – or a month later more likely – and says "uh, what happened to my referral for X, Y or Z or my order for A, B or C?"* E210, 3-month post

Medication orders also frequently failed to reach the appropriate destination. They were reportedly not received by the pharmacy, and providers reported not being able to track the progress of medication orders. This resulted in substantial delays in Veterans obtaining important medications.

> *One thing that's happening with Cerner that did not happen with CPRS is that our signature… is sometimes rendered invalid just randomly. So,* ***we sign the order, and we think we're done,*** *and the patient orders the med and starts to wait for it and* ***only at some point in the process does the pharmacy see that the signature was rendered invalid*** *and the only thing they can do at that point is get the doctor to authorize more medication ...* ***That loop will sometimes delay the process by one week****.* E215, 3-month post

In some cases, participants described medications being sent to the wrong address because of data migration errors.

> *The addresses didn't transfer over correctly. A lot of them had the DoD addresses on there, which may have been addresses [the Veterans] had fifteen years ago. So* ***prescriptions get sent to the wrong people****.* E208, 10-month post

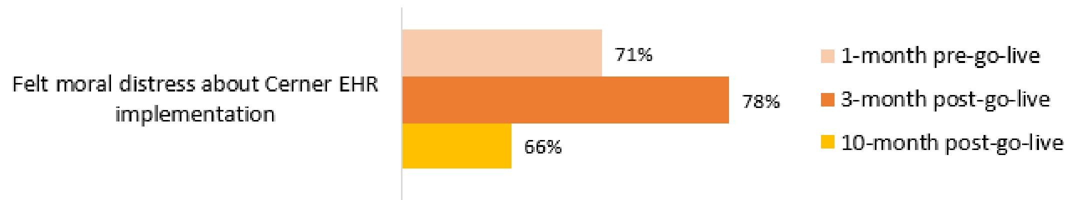
> *Data corruption sending* ***wrong meds to wrong patients, Wrong doses****. Dropped Rx'es.* ***If this program were a medication, the FDA would ban it****.* R52, 10-month post

Patient safety threats led to moral distress and negatively affected clinician well-being

"Moral distress," when used in a healthcare context, refers to the phenomenon of healthcare workers feeling like external conditions prevent them from doing the right thing on the job. Survey respondents were asked pre-go-live and post-go-live how often they felt moral distress in relation to the new EHR implementation. Pre-go-live, a high-proportion

of respondents reported feeling moral distress frequently, and the proportion increased modestly in the 3 months post-go-live survey, which may have reflected the threats to Veteran safety reported by clinicians and staff in Columbus (Figure 26). By 10 months, the proportion of respondents who reported feeling moral distress frequently had decreased significantly from post-go-live, though it remained high at 66%.

Figure 26. Moral distress



One interview participant described their experience of trying to provide safe patient care while severely hampered by the unsafe features of the new EHR through a colorful simile:

> *[Imagine] that you have to feed your children and your pets and you're doing it blindfolded … and you're **just blindly lobbing things at people hoping that they get it**. If you had to do that for a week... do you think your children would be well fed? […] That's how we are [providing patient care within Cerner].* E220, 3-month post

Another interview participant issued a desperate call for leadership at the national level to take notice of the numerous problems that need to be addressed prior to it being rolled out safely:

> *[It's like] the old fairy tale about the Emperor's New Clothes [where] nobody had the guts to stand up and tell the emperor he's naked. That's how I feel we are right now. **Somebody needs to stand up and tell Washington, Congress, all of them… this is bloody dangerous and it's a miracle that we haven't killed anybody, at least that we know of. There are too many things that need to be fixed.** And some of the stuff they're saying, "Well, it's going to be 18-24 months." Excuse me. Spokane has been live for 21 months and stuff that they brought up is still not addressed 21 months later. **It's like taking this new M35 [military cargo truck] and put it on a frontline combat unit and it's a prototype.** But "oh, oh, we'll fix that weapon system later. We're going to upgrade that computer later. We're going to do this and we're going to that. Meanwhile: use it!"* E210, 3-month post

One participant described how multiple EHR system issues delayed diagnostic imaging for a patient who was eventually diagnosed with cancer, explaining that the initial consult for imaging was delayed by the EHR transition, then a second attempt at a consult, months later "disappeared into some invisible queue," before a third attempt finally succeeded and identified cancer. The participant described the emotional toll of this incident:

> *[It gives me] the urge to **scream and cry because of the lack of care**. That's just one person. That's one person that I know of, that I care about, that has fallen through a hole, but it just **makes me absolutely sick to think these things are happening, because he is not the only one**.* E220, 10-month post

Finally, one interview participant attributed their colleagues' perceived intention to leave Columbus for other VAs to the safety concerns associated with the new EHR:

> *There's still a lot of safety issues that remain and our providers, **I've had several concerned enough that they're transferring… to other VAs that don't have Cerner. They're afraid that things are going to get missed and something's going to happen.*** E208, 3-month post

Impact of EHRM on Veterans' experiences

Key findings:

- Veterans were negatively impacted by the transition due to not being able to use the patient portal to refill medications, message their providers, or schedule appointments.
- Veterans found their own ways to handle problems with the transition, including filing complaints with patient advocates and walking in without appointments to get care.

Veterans are negatively impacted by the transition

Our interview findings provide examples of how the EHR transition impacted Veteran experiences with getting care through VA. Veterans reportedly experienced care delays, and encounters took longer due to system inefficiencies and errors processing referrals and orders. In addition, interview participants shared that patients had trouble accessing the new patient portal to complete previously routine tasks such as refilling medications. The presence of inaccurate and/or incomplete information on the portal was also reported as an issue. In addition, participants noted that Veterans encountered problems messaging their clinicians through secure messaging, with messages sometimes mistakenly ending up at the wrong VA.

> *[Veterans say **the portal puts] in wrong diagnoses, has the wrong medicines** … One patient… had in her problem list… all the medicines like she was transitioning to another sex and that she was not doing that at all. You know, [it had] testosterone in there and she wasn't taking any of that. Then on her problem list, it had problems that didn't exist. People say there's medicines that they're not supposed to take or… **some people just cannot access it**.* E208, 3-month post

> *It's been rough. I've heard multiple Vets [say]… **a lot of their information didn't transfer over** [to the new patient portal]. They can't get access, or they can't see their medications or appointments, so that's been stressful. Or, "am I not taking this medication anymore?" or "what's going on?" […] One of our pharmacists… caught [that] **a Vet from [a different VA site] sent a MyPortal (Cerner patient portal) message and it ended up here**.* E219, 3-month post

New process for medication refills not Veteran-centric

Interview participants expressed frustration with new procedures for refilling medications that they perceived as putting the burden on the Veteran. Having to explain new procedures to Veterans increased participant frustration.

> *… we're supposed to just give them a phone number to pharmacy to call. So, instead of trying to build out a better process for providers to help be Veteran-centric and just right-click a med and refill it for the patient, they're telling us to tell patients **"Well, you have to go through the portal**… you have to call pharmacy," and **that just isn't very Veteran-centric**. It just… you know, we're not, we're not like private offices, we're a VA, we have a VA in the pharmacy so it's, it's different. Uh, and I don't like that **they're setting us up to tell patients, "No, you're going to have to go call this number and talk to a machine**."* E222, 1-month pre

Another participant gave examples of other ways that care had become less Veteran-centric, including a less-intuitive portal and a less succinct after-visit summary:

> *They used to be able to message us and say, you know, "I need my medication refilled." Well they can't use that anymore. … I have one guy who … can't use the system. … So **their suggestion earlier today was that because [some Veterans] can't use the system anymore, … maybe we should, say, set up a class and have these people come in and take a class on how to use it better.*** E220, 10-month post

> *Previously, before Cerner, we wrote [after-visit summaries] to a six-grade level for patients [with] their medication list, and, you know, "here's what you need to do next" and it was maybe two pages. Now, [the summaries are] up to 19 pages long … and they're coming back in and they're going "I don't understand*

> *what this means." Sometimes it may just have their office notes. It may have things you know, you have a new diagnosis of heart failure. Here's what heart failure means. You know, "don't forget to see the podiatrist." … it can sometimes just be medication updates, sometimes it's not. It literally varies from person to person, and can be up to 19 pages is the most I've seen* ***… If you give a 75-year-old person 19 pages of 'here's your medical history,' he's not going to read that. You've just overwhelmed him. You have just taken their ability to focus on what was important away from them because you have flooded them with jibber jabber.*** E220, 10-month post

The new EHR caused patients to repeat procedures

Interview participants shared examples of Veterans who have had to return for repeat procedures due to the new EHR.

> *Patients have had to come back for procedures and for EKGs… all the way up to like pap smears. People had to have* ***repeat pap smears due to the failure of the system****. That's absurd. I mean people already are already nervous [about pap smears] and that's something that's very delicate that, you know, people don't want to do anyways and* ***the fact that you have to come back for a repeat due to system failure is totally unacceptable****.* E224, 3-month post

Veterans found their own ways to handle problems with the transition

In addition to sharing examples of how the EHR transition negatively impacted Veterans, interview participants also described ways in which Veterans took it upon themselves to improve their care in the wake of EHRM.

Complaints from Veterans increased

Some Veterans experiencing delays in care reportedly informed their patient advocates of their dissatisfaction. One patient apparently went even higher to the "White House Hotline."

> *We have had more patient advocate complaints than I've ever seen since I've been here… On top of the patient advocate complaints, I'm getting* ***multiple complaints via phone from Veterans*** *who, you know, that had a referral placed a month ago and it hasn't been scheduled yet.* E227, 3-month post

> *Oh my God. The number of complaints has like doubled, if not more than that. We even had one of our Vets call … the White House Hotline. We've had a bunch of congressionals because the Vets are going "man,* ***complaining to you guys isn't going to solve it cause you're victims like we are****." And they're calling, they're sending congressionals. And I don't blame them. You know, you're waiting two weeks for your prescription.* E210, 3-month post

Increased walk-ins due to issues using the new portal

Interview participants found that when Veterans were unable to send a message or complete transactions (e.g., refilling medications) through the portal or via phone, they visited the walk-in clinic, or they just gave up.

> *… [Veterans are] waiting … because they think medications are coming in the mail. They didn't realize the system kicked over and their refills went away... and so* ***they… come to the walk-in clinic to get refills because they can't get in to see their provider*** *or they can't send a message to the provider… or they did send it and the message pool sent it to somebody in [a different state] …* E202, 3-month post

Issues with the new portal discouraging patients from messaging their healthcare team

One interview participant described how Veterans have stopped messaging in the patient portal because they don't understand how to use it, which has resulted in anger and frustration and apologies from VA staff.

> *Some [Veterans]…* ***they don't message anymore because they can't make it work*** *and we've printed out stuff to say, "you know, here's how it works" and you know, they don't understand how to use it. It's, it's so not user-friendly for them at all. Uh, it's, it's really bad. They're,* ***they're angry, they're frustrated,*** *and I just say, "you know, I'm really sorry."* E220, 3-month post

CONCLUSION

Columbus was the third VA site to go live with the new VA EHR and was the second site of our evaluation. Columbus' rollout was moderately better than Spokane's. Perceived EHRM improvements were partly attributed to Columbus receiving two series of Cerner training, with the second being a notable improvement upon the first. In addition, Columbus went live at a more advanced stage of EHRM preparation than Spokane, having had the opportunity to learn from the first go-live site. At the same time, most of the challenges experienced in Spokane continued in Columbus. Cerner training and preparations insufficiently reflected VA's unique practices and workflows, and most participants were frustrated with the new EHR, finding it significantly more difficult to use than CPRS. These challenges contributed to multiple safety issues and compromised care access and quality, leaving many staff demoralized. Despite this lowered morale, Columbus staff remained committed to providing Veterans with the best possible care.

Some of the strategies used at Columbus to help mitigate the challenges discussed above may prove useful to future sites. Local leadership generally communicated well with staff, sharing timely information, as well as acknowledging when they did not have information. Forums, such as Townhalls, facilitated two-way communication and made staff feel their voices and concerns were heard. Some Columbus staff also developed supplemental training that helped explain how to use the new EHR in a VA context. Nationally, support from NESSU teams to mitigate workload was invaluable, and NESSU personnel also provided excellent technical support on using the new EHR in a VA context. Continued efforts to identify best practices and disseminate these to future EHRM sites can mitigate challenges and improve implementation outcomes. However, improvements in training and support may have limited impact without changes that increase usability and improve end user acceptability of the EHR.

Recommendations

IV. *Leadership & communication*

e. Determine strategies to mitigate EHRM impacts on care disruptions, patient safety, and clinician operations among local organizational goals.
f. Work with Oracle Cerner and EHRM stakeholders to improve the new EHR and ensure it meets VA needs.
g. Acknowledge clinician challenges and frustrations and explore collaborative solutions.
h. Transparently communicate realistic information about EHRM timing, training load, known pain points (e.g., challenges with training and pharmacy issues), and the anticipated impact on clinical care.

V. *Training*

e. Revamp training to ensure that it is appropriate and relevant for clinician needs.
f. Provide protected time (i.e., not during staff breaks or after hours) for training, independent learning, customization, and peer support. Ensure ample opportunity for staff to model and practice in both Sandbox and production environments to familiarize themselves with the system and validate that mapping is correct.
g. Identify, scale, and spread effective informal training pre-go-live and supplement these efforts with optimization training after go-live. Include team readiness trainings in the production environment.
h. Identify high-priority workflows and engage end users in "dry runs" with new workflow simulations.

VI. *Support*

f. Solidify governance structures, incorporating clinical subject matter experts, so that local sites know how to escalate issues and facilities can receive real-time feedback about progress on issues. Ensure local sites have access to informatics experts with detailed knowledge of the new EHR.

g. Widely distribute up-to-date guidance on accessing support for different EHR issues and provide clear feedback on the status of efforts to address EHR issues and patient safety concerns.
h. Reinforce peer support networks that engage experienced users to disseminate lessons learned.
i. Expand National EHRM Supplemental Staffing Unit (NESSU) support.
j. Make early, large investments in preparing for new clinical workflows, including comprehensively reviewing employee roles to inform user provisioning and determining changes in responsibilities.

VII. Continuous improvement

d. Engage and empower end users to inform continuous improvement efforts that ensure EHR usability, adapt clinical workflows, and improve end-user acceptability.
e. Develop and support dashboards for reporting critical information on EHRM performance, including leading indicators that will support better EHRM outcomes.
f. Expand evaluation efforts to rapidly identify lessons learned that can improve the rollout at future transition sites.

APPENDICES

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II. Manuscripts based on the EMPIRIC evaluation (based on Spokane data)

Rucci J, Ball S, Brunner J, Moldestad M, Cutrona SL, Sayre G, Rinne ST, "Like one long battle": Employee perspectives of the simultaneous impact of COVID-19 and an electronic health record transition. J Gen Intern Med. In press

Ahlness EA, Brunner J, Cutrona SL, Kim B, Molloy-Paolillo BK, Rinne ST, Rucci J, Sayre G, Orlander J, Anderson E. "Everything's so role-specific": VA employee perspectives' on Electronic Health Record transition implications for roles and responsibilities. J Gen Intern Med. In press

Molloy-Paolillo B, Mohr D, Levy DR, Cutrona SL, Anderson E, Rucci J, Helfrich C, Sayre G, Rinne ST. Assessing Electronic Health Record (EHR) Use during a Major EHR Transition: An Innovative Mixed Methods Approach. J Gen Intern Med. In press

Ahlness EA, Molloy-Paolillo BK, Brunner J, Cutrona S, Kim B, Rinne ST, Walton E, Wong E, Sayre G. "It's like a chore to stay here": Mixed methods analysis of Health Professions Trainee experience during an electronic health record transition. J Gen Intern Med. In press

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