KLAS RESEARCH | Arch Collaborative

Impact Report

Arch Collaborative Provider Guidebook 2023

September 2023

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Executive Insights

Arch Collaborative Provider Guidebook 2023

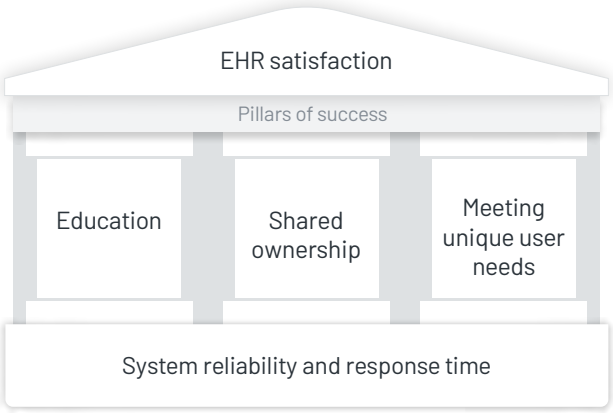
What Is the Arch Collaborative Provider Guidebook?

The Arch Collaborative Provider Guidebook—which focuses solely on providers (i.e., physicians, residents, fellows, and advanced practice providers)—is the result of thousands of hours of combined effort. Over 300 health systems around the world have used the Arch Collaborative survey to measure the EHR satisfaction of their providers. With the survey taking roughly 10 minutes to complete, the 145,000 providers who have participated have dedicated more than 24,000 hours to providing feedback about their EHR satisfaction.

This incredible effort has allowed the Arch Collaborative to identify universal best practices that any health system—regardless of their size, region, or EHR vendor—can use to improve their providers' EHR satisfaction. These best practices are shared here to help healthcare leaders find their organization's own path to EHR success. While the guidebook could be seen as a checklist, it will be most effective when its principles are skillfully customized to an organization's specific culture and circumstances.

The EHR House of Success

The principles in this guidebook are organized according to the Collaborative's EHR House of Success, which includes three pillars of EHR satisfaction and a foundation. The three pillars are (1) user mastery via strong education and training, (2) an organization-wide sense of shared ownership, and (3) EHR technology that meets users' unique needs (personalization). Collaborative analysis has shown that these three variables explain up to 70% of the variation in a clinician's EHR satisfaction and that focusing on these key areas can greatly improve the EHR experience. Each section of this guidebook will focus on the supporting data behind a given pillar. Additionally, these pillars rest on the foundation of system reliability and response time. Dissatisfaction in these areas creates significant barriers to provider EHR satisfaction and must be addressed in order for the three pillars to effectively support provider EHR satisfaction.



The guidebook also includes a section on provider burnout prevention and wellness. While the EHR is not the key driver of provider burnout, Arch Collaborative data shows that higher satisfaction with the three pillars and with the EHR correlates with higher clinician wellness and lower provider turnover.

Data Methodology

KLAS surveys clinicians using our Arch Collaborative EHR Experience Survey. This survey captures clinician feedback on various metrics, including 11 metrics (see the accompanying chart) that are aggregated into an overall Net EHR Experience Score (NEES). The NEES represents a snapshot of the clinician's overall satisfaction with the EHR environment at their organization and can range from -100 (all negative feedback) to 100 (all positive feedback).

Individual Metrics behind the NEES

Clinicians are asked to rate their agreement with the following statements

Foundation	
System reliability	This EHR is available when I need it (has almost no downtime)
System response time	This EHR has the fast system response time I expect
Performance	
Internal integration	This EHR provides expected integration within our organization
External integration	This EHR provides expected integration with outside organizations
Has needed functionality	This EHR has the functionality for my specific specialty/clinical care focus
Alerts prevent mistakes	This EHR has alerts that prevent care-delivery mistakes
Easy to learn	This EHR is easy to learn
Enables efficiency	This EHR makes me as efficient as possible
Purpose	
Enables patient safety	This EHR keeps my patients safe
Enables patient-centered care	This EHR allows me to deliver patient-centered care
Enables quality care	This EHR enables me to deliver high-quality care

Additionally, the insights in this guidebook draw from the following recommendations and resources:

Evidence-based practices: Best practices validated by Arch Collaborative research that differentiate high-performing organizations or that have been documented to help organizations improve.

Continued on next page

Key Changes from the 2020 Guidebook

The findings in this 2023 guidebook largely support those reported in the 2020 version. Some subtle differences are noted below.

- The three pillars of success have evolved into the EHR House of Success.The three pillars of success now rest on the foundation of system reliability and response time—a section focused on this foundation is included in the guidebook.
- This guidebook is focused solely on providers. KLAS intends to share updated nursing insights in our next version of the Arch Collaborative Nursing Guidebook (click here for the 2022 guidebook).
- Case studies from top-performing organizations are included in each section of the Appendix.
- Since 2020, new questions have been added to the Arch Collaborative EHR Experience Survey and the Executive Survey (conducted with the leadership teams at healthcare organizations), and the data from those surveys is reflected in this guidebook.
- Some best practices (and their accompanying charts) have been removed or revised.

Next Steps after Reading This Guidebook

- Measure with KLAS' Arch Collaborative to determine your organization's current EHR end-user experience
- Identify opportunities for improvement at your organization
- Use the included best practices to enhance your providers' EHR experience
- Measure with KLAS' Arch Collaborative again to see how your organization's end-user experience has changed

Leading practices (included in Appendix): Keys to success that are commonly identified by leading organizations but have not yet been broadly validated or are too unquantifiable to be fully validated.

Case studies (included in Appendix): Case studies of top-performing organizations that have worked with their vendor to improve different aspects of the EHR experience.

Please note that you may find some repetition between the different sections of this guidebook. This is intentional—each section is designed to be a standalone resource for a given topic and some principles and best practices apply to more than one area. That said, improving EHR satisfaction is rarely, if ever, a single-factorial effort. To truly have an impact, healthcare organizations should implement a variety of the best practices most applicable to their organization.

Creating EHR Mastery: Onboarding EHR Education

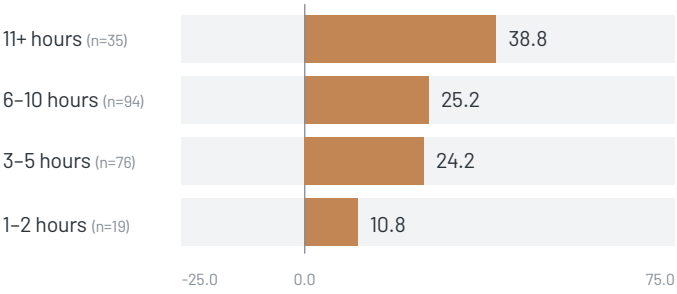
Onboarding education includes training that occurs when an EHR solution is upgraded or first implemented, but it more commonly refers to the EHR training offered to newly hired providers during their first 90 days at an organization.

Evidence-Based Practices

Providers should receive a minimum of three hours of onboarding EHR education and would greatly benefit from eleven or more hours

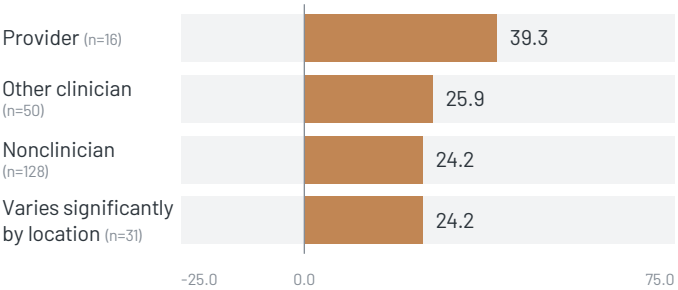
Net EHR Experience Score—by Amount of Required Initial Training

Amount of training time new providers are required to complete in first 3 months (-100 to 100 point scale) (n=organizations)



Provider EHR education should be taught by providers

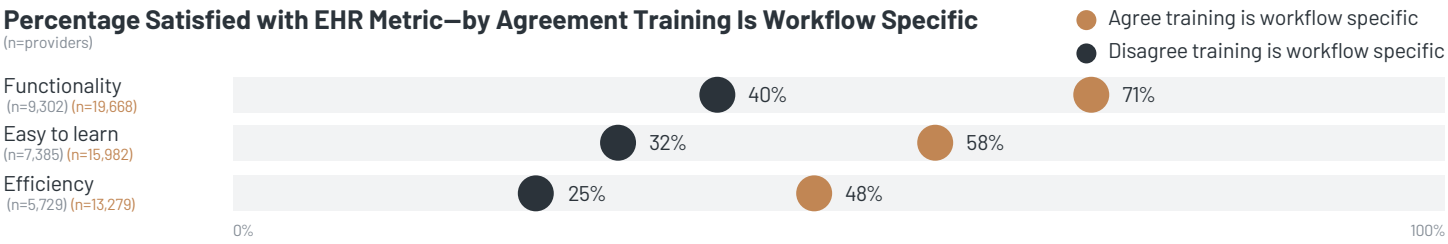
Net EHR Experience Score—by Who Conducts Initial Training (-100 to 100 point scale) (n=organizations)



EHR education is more effective at supporting a strong EHR experience when it is workflow specific

Percentage Satisfied with EHR Metric—by Agreement Training Is Workflow Specific

(n=providers)



Creating EHR Mastery: Ongoing EHR Education

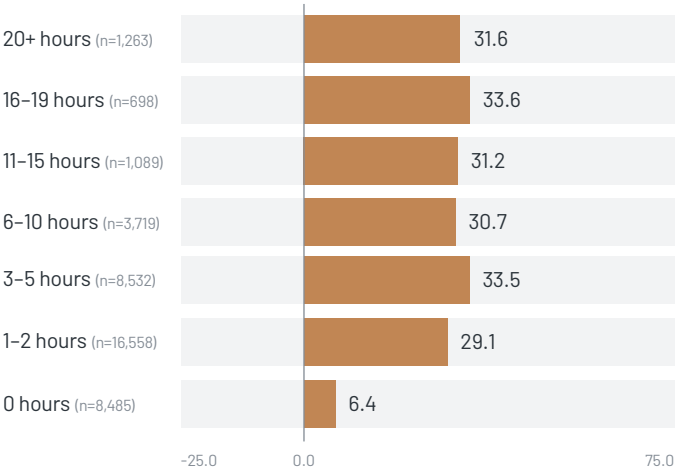
Ongoing EHR education builds on effective onboarding education, and most principles of success for onboarding training apply to ongoing EHR training as well.

Evidence-Based Practices

Providers should spend 3–5 hours annually refreshing their EHR knowledge; the majority of providers do not meet this threshold

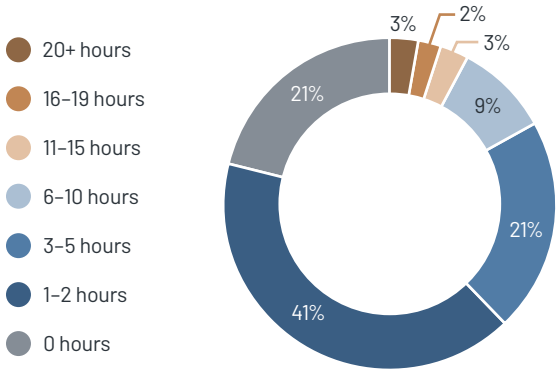
Net EHR Experience Score—by Self-Reported Ongoing Education per Year

Hours spent on ongoing EHR training/education per year (-100 to 100 point scale) (n=providers)



Self-Reported Ongoing EHR Education per Year

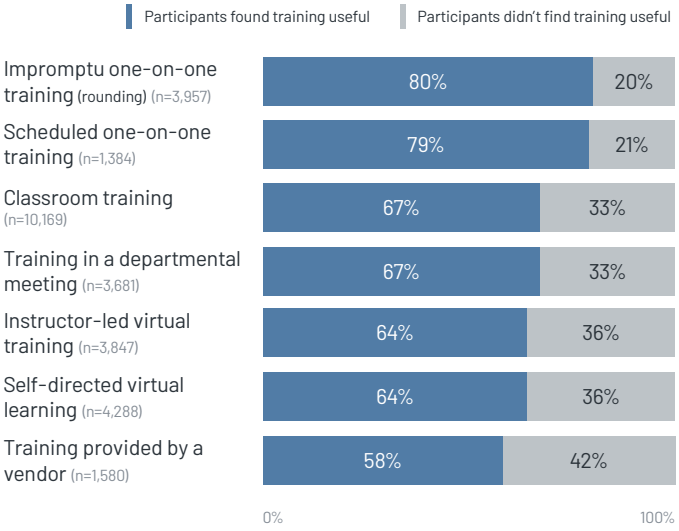
Hours spent on ongoing EHR training/education per year (n=40,344 providers)



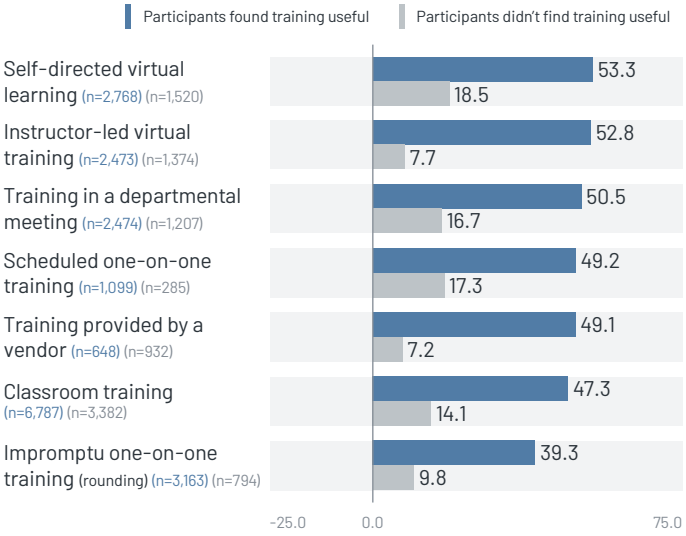
The quality of the training is more important than the type of training

Usefulness of Training Programs

(n=providers)

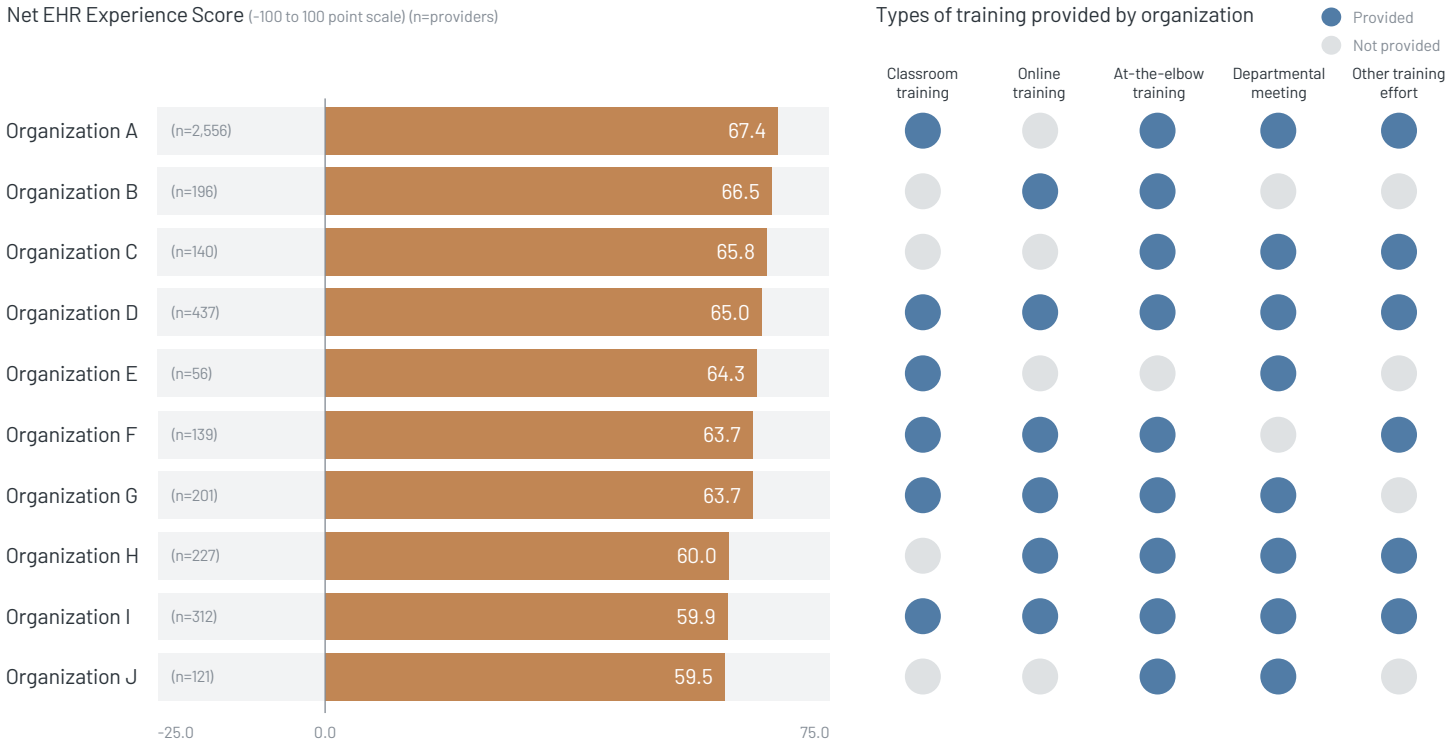


Net EHR Experience Score—by Types of Training and Their Usefulness (-100 to 100 point scale) (n=providers)



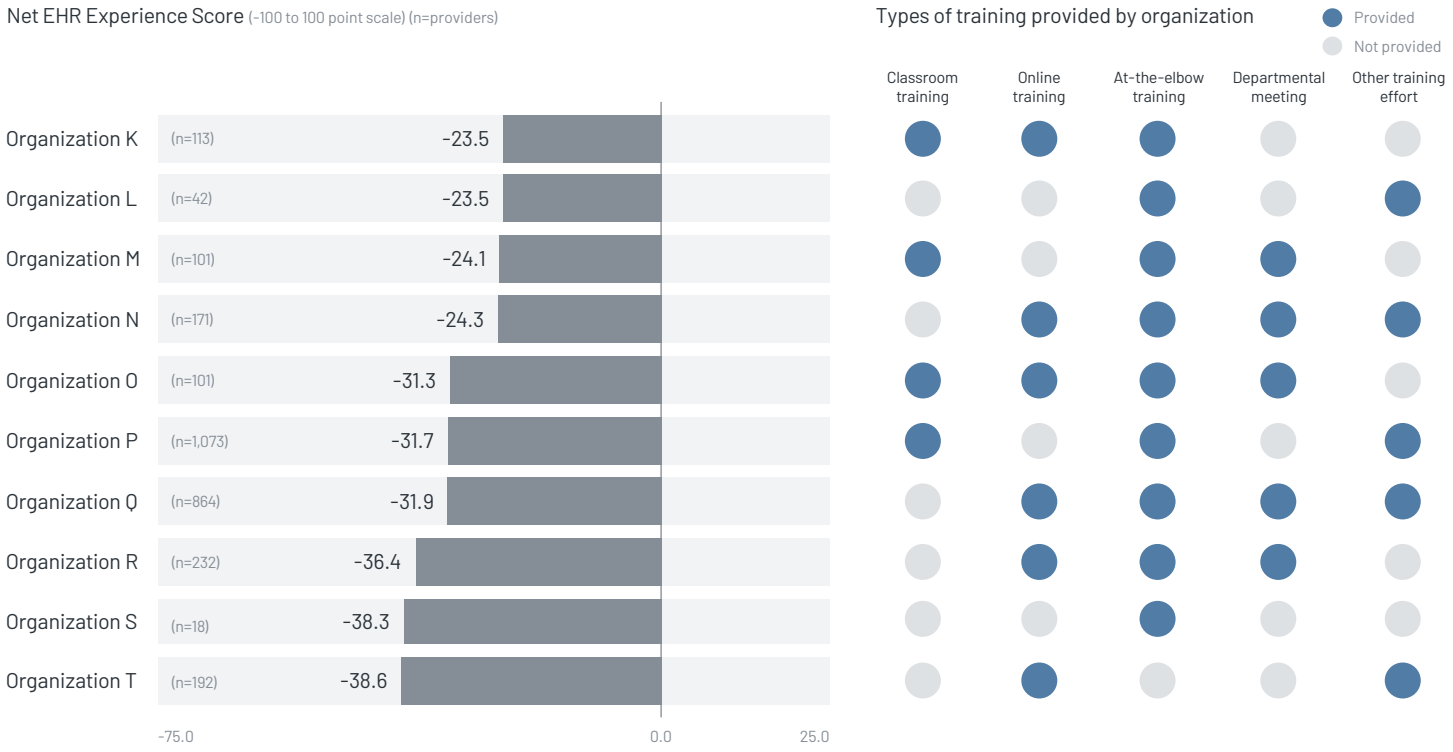
Types of Ongoing EHR Training Provided by 10 Most-Satisfied Organizations

Organizations with highest Net EHR Experience Scores



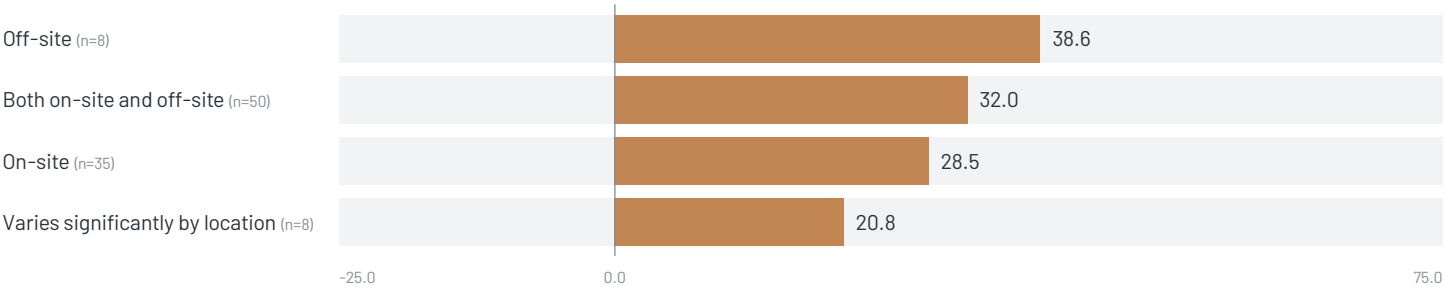
Types of Ongoing EHR Training Provided by 10 Least-Satisfied Organizations

Organizations with lowest Net EHR Experience Scores



Providing a distraction-free learning environment leads to higher EHR satisfaction

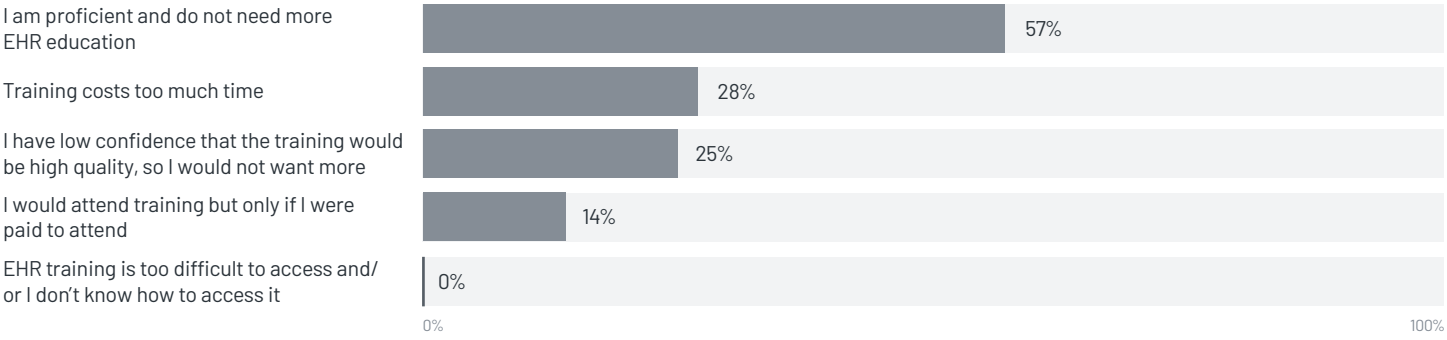
Net EHR Experience Score—by Location of Ongoing Training (-100 to 100 point scale) (n=organizations)



Providers want more training

Provider Desire for More EHR Training (n=51,896 providers)

Reasons Providers Don't Want More EHR Education Percent of respondents who cited reason; multiple selections possible (n=19,933 providers)



Creating Shared Ownership: Provider Relationships and Communication

EHR success is a journey, not a destination, so IT and informatics leaders must build strong working relationships with clinical and operational leaders. These relationships are healthiest when IT and informatics leaders create a framework within which clinical and operational leadership can successfully guide organizational goals (see **Creating Shared Ownership: Governance**).

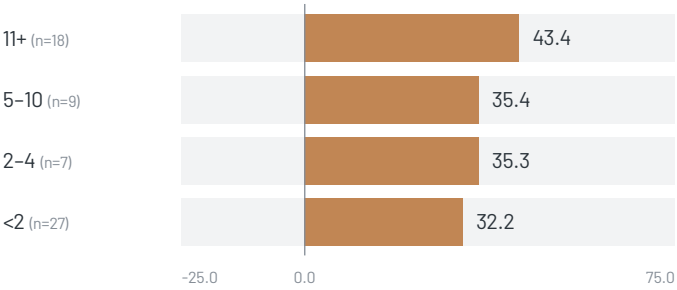
There is significant overlap between the success principles for (1) provider relationships and communication and (2) shared ownership and governance. However, for readability, these topics are broken out into two sections.

Evidence-Based Practices

For organizations to be able to build relationships with all users, a minimum of 2–4 providers should be employed by IT/informatics (full or part time) per 1,000 provider users

Net EHR Experience Score—by Number of Providers Employed by IT/Informatics per 1,000 Provider Users

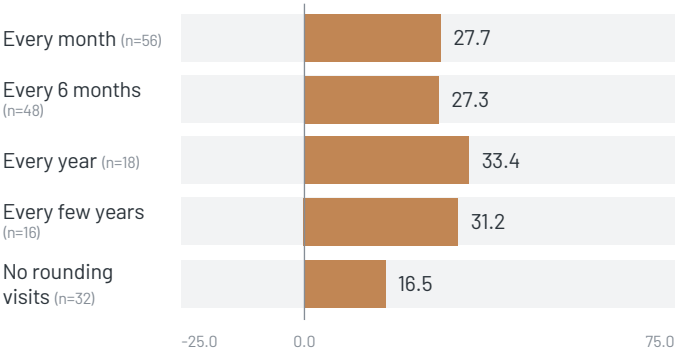
(-100 to 100 point scale) (n=organizations)



Consistent IT rounding works

Net EHR Experience Score—by Frequency of IT Rounding

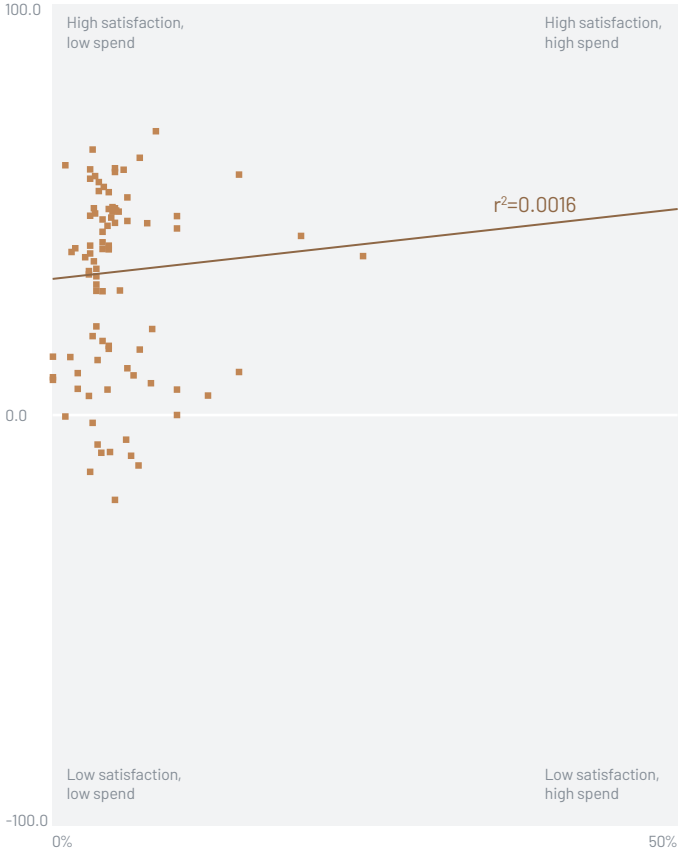
(-100 to 100 point scale) (n=organizations)



Higher IT spending does not guarantee higher EHR satisfaction

Net EHR Experience Score vs. Percentage of Budget Spent on IT (Operational Expenses)

Net EHR Experience Score (-100 to 100 point scale) (n=89 organizations)



Percentage of budget spent on IT (operational expenses) (n=89 organizations)

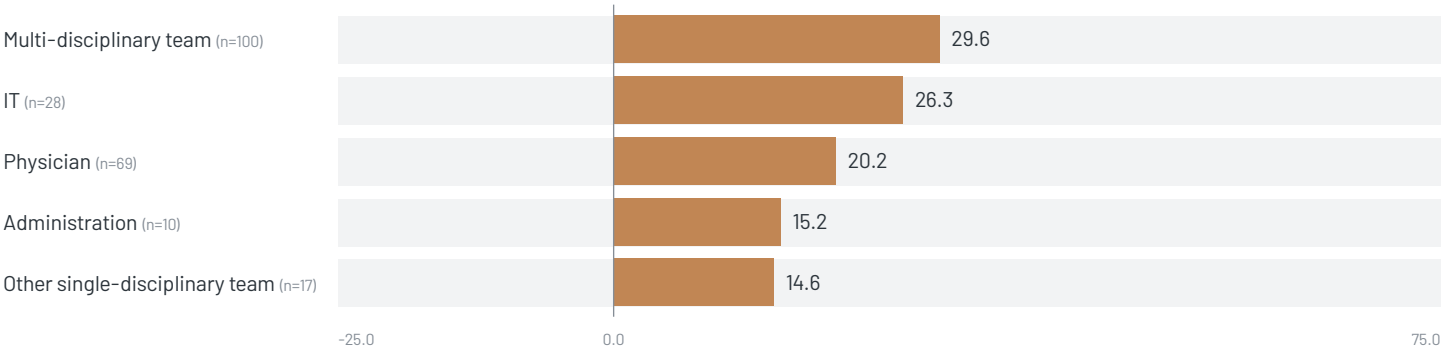
Creating Shared Ownership: Governance

The success principles for shared ownership and governance are closely related to those shared above for provider relationships and communication. However, for readability, the two areas have been broken out into two sections.

Evidence-Based Practices

Organizations with broad, multi-disciplinary team engagement in EHR governance see higher EHR satisfaction

Net EHR Experience Score—by Who Leads EHR Governance (-100 to 100 point scale) (n=organizations)



Creating Provider Efficiency: Personalization

Efficiency with the EHR is an area of acute pain for providers and one of the lowest-rated areas of EHR satisfaction. The power of personalization tools to allow organizations and individuals to meet the needs of end users without making any code changes (i.e., using functionality built into the system) is well documented in Collaborative research. We expect findings in this area to continue to expand in future years.

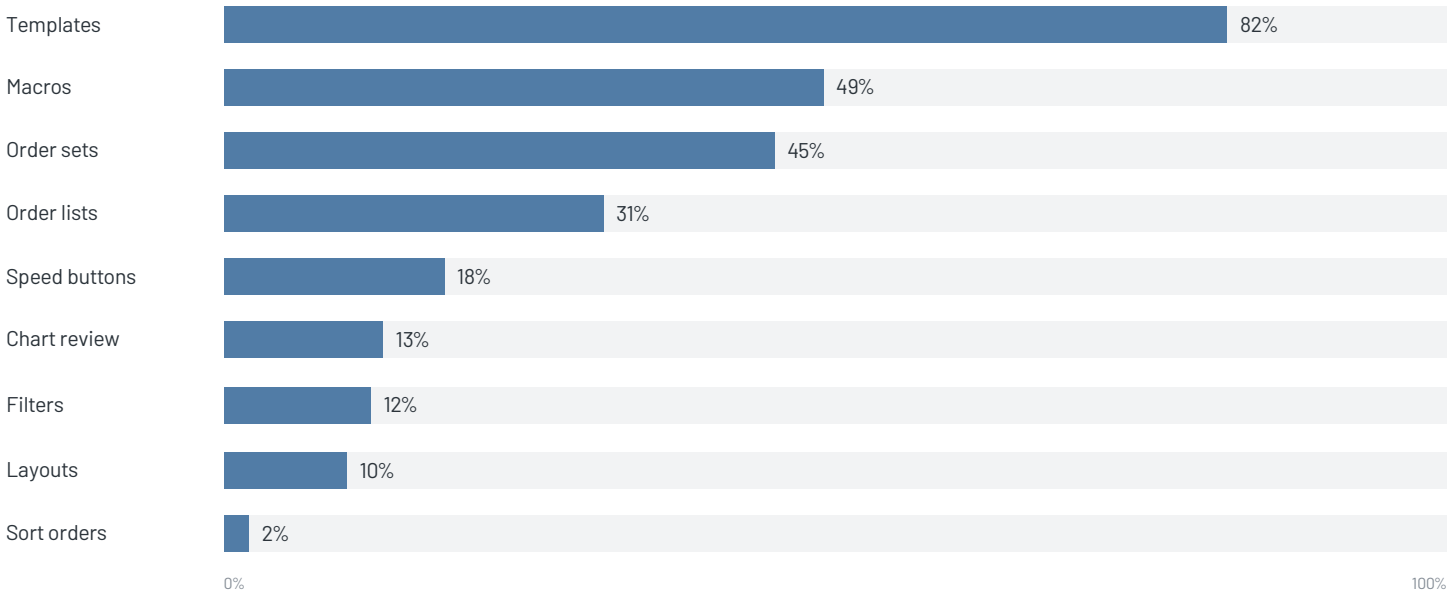
The effect of personalization tools on standardized care and care quality has not been studied by the Collaborative. There are many personalization tools that do not impact standardized care (e.g., personalized reports and chart filters).

Evidence-Based Practices

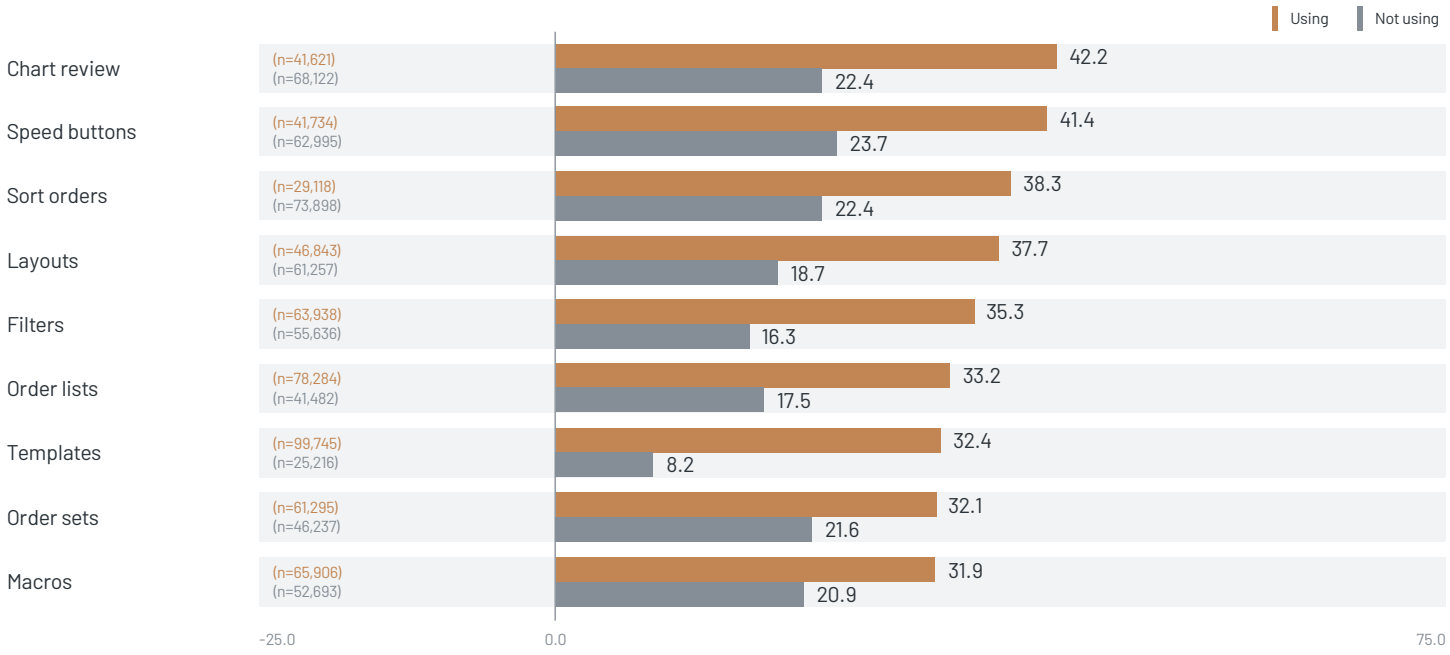
Personalization tools (sometimes called "user settings") are key to provider efficiency with the EHR

Top-Selected Personalization Tools That Have Had Positive Impact on Workflows

Percentage of respondents who cited tool; multiple selections possible (n=6,607 providers)

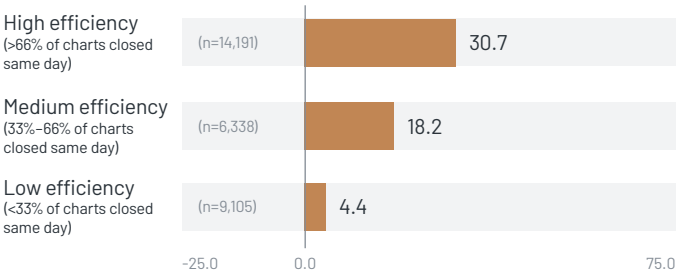


Net EHR Experience Score—by Whether Providers Use EHR Personalization Tools (-100 to 100 point scale) (n=providers)

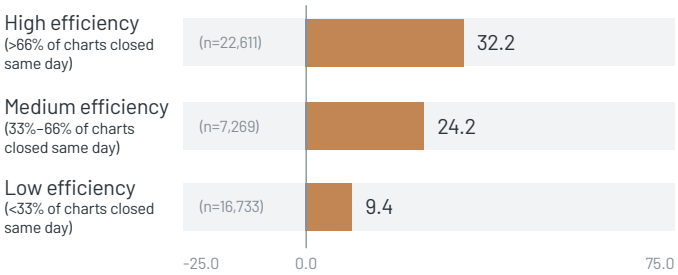


Whether they work in inpatient or ambulatory settings, providers who finish their documentation the same day report significantly higher satisfaction than those who do not

Net EHR Experience Score—by Ambulatory Documentation Efficiency (-100 to 100 point scale) (n=providers)



Net EHR Experience Score—by Inpatient Documentation Efficiency (-100 to 100 point scale) (n=providers)



Creating Provider Wellness: Reducing Burnout

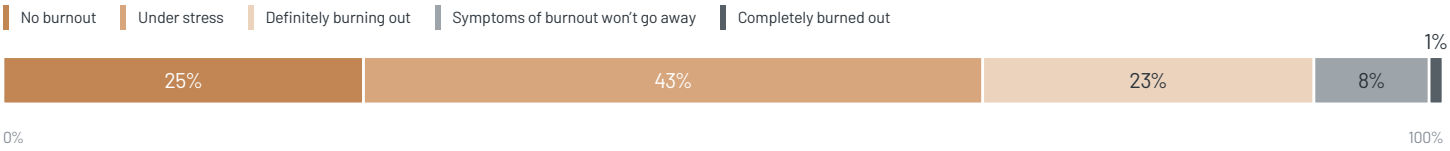
The mission of the Arch Collaborative is to ignite a revolution in EHR satisfaction. As part of that mission, the Collaborative measures provider satisfaction with the EHR and works to understand how the EHR experience impacts burnout. While the Collaborative is not focused on alleviating or preventing burnout, the following insights are valuable for organizations to consider as they work toward that goal.

28% of providers who have participated in the Arch Collaborative report symptoms of burnout. For providers, the EHR is a commonly reported source of burnout, after workload (including lack of control over workload and after-hours workload), time spent on bureaucratic tasks, and staffing shortages. Across clinician roles, the sense of administrative work being prioritized over clinical care is exacerbated by extra clicks, confusing screens, low-value alerts, and other EHR complexities. Organizations can lessen burnout by empowering IT teams to engage with providers to help them solve problems (whether through training or technology), ensuring providers' voices are heard and their concerns are addressed (see also **Shared Ownership: Provider Relationships and Communication** and **Shared Ownership: Governance**).

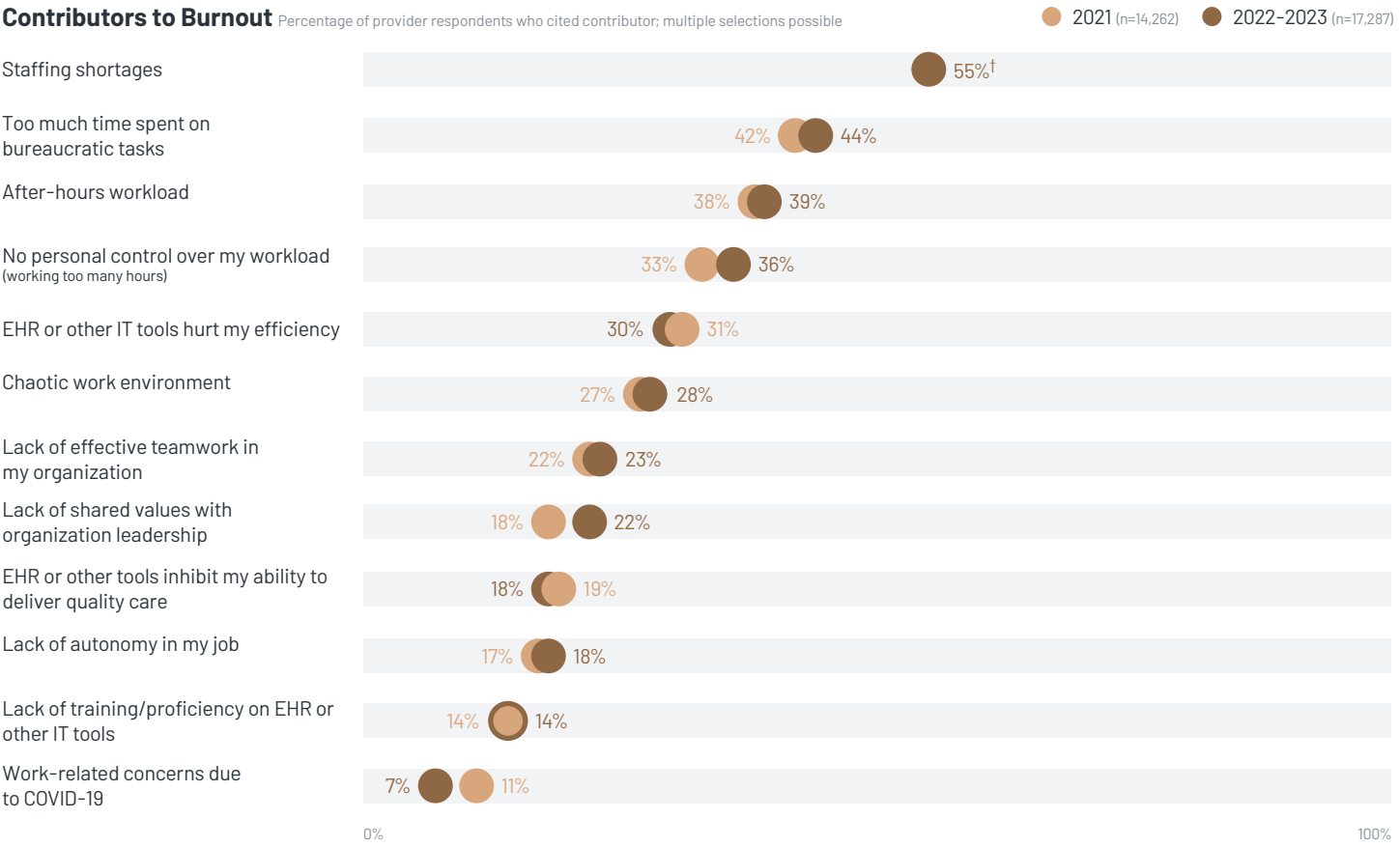
Evidence-Based Practices

Healthcare organizations should proactively optimize technology's ability to alleviate burnout by reducing time spent on bureaucratic tasks and reducing after-hours work

Self-Reported Burnout Status (n=88,203 providers)



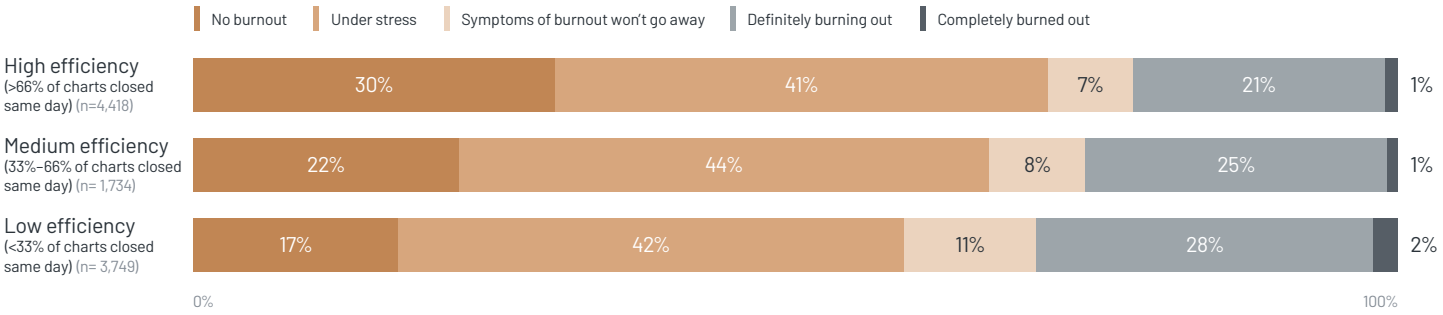
Contributors to Burnout Percentage of provider respondents who cited contributor; multiple selections possible



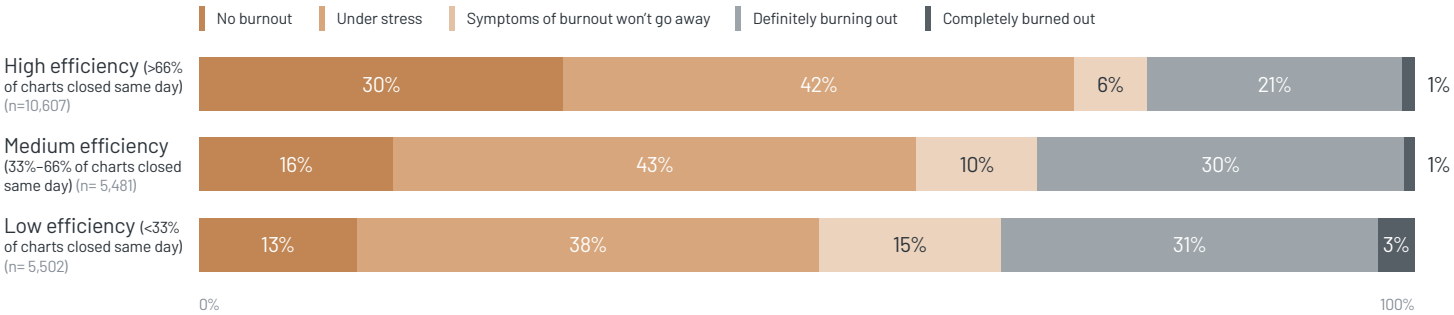
† The Arch Collaborative started asking about staffing shortages as a contributor to burnout in 2021. Thus, the sample size for 2021 is too small to show a percentage.

Inefficient charting can increase the likelihood of burnout

Self-Reported Burnout Status—by Inpatient Documentation Efficiency (n=providers)

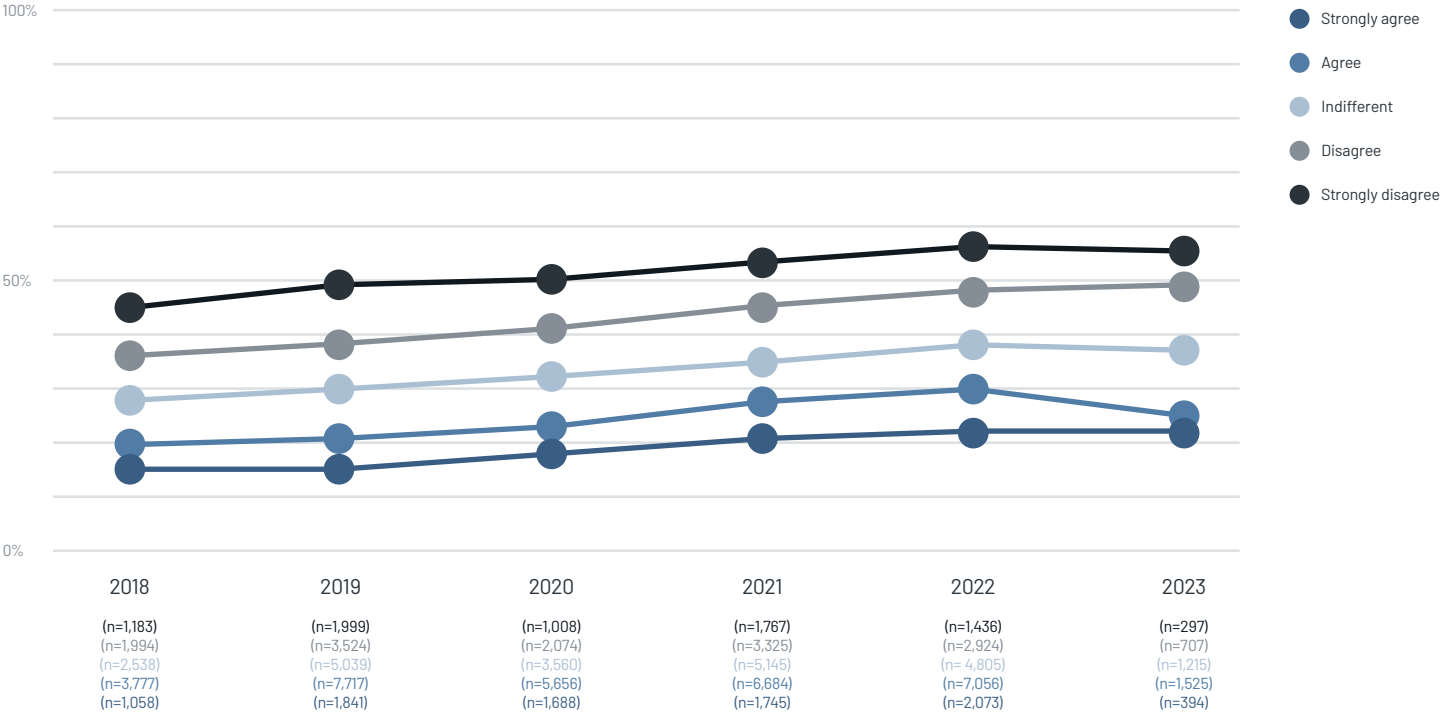


Self-Reported Burnout Status—by Ambulatory Documentation Efficiency (n=providers)



On average, providers who feel their organization is doing a great job with the EHR have lower rates of burnout

Trend in Percentage Reporting Burnout, 2018–2023—by Agreement Organization Has Implemented, Trained On, and Supported EHR Well (n=providers)



Percentage Reporting Burnout—by Agreement Organization Has Implemented, Trained On, and Supported EHR Well

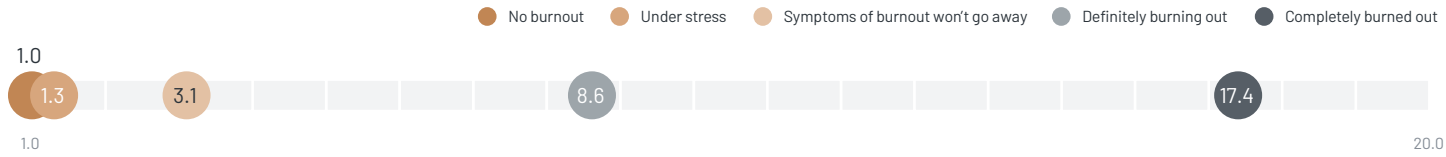
(n=providers)

Percentage Reporting Burnout—by Amount of After-Hours Charting per Week (n=providers)

Percentage Reporting Burnout—by Agreement EHR Fixes Are Timely (n=providers)

Providers who are completely burned out are 17 times more likely to report they are planning to leave their organization

Odds of Reporting Plans to Leave—by Self-Reported Burnout Status (n=45,229 providers)



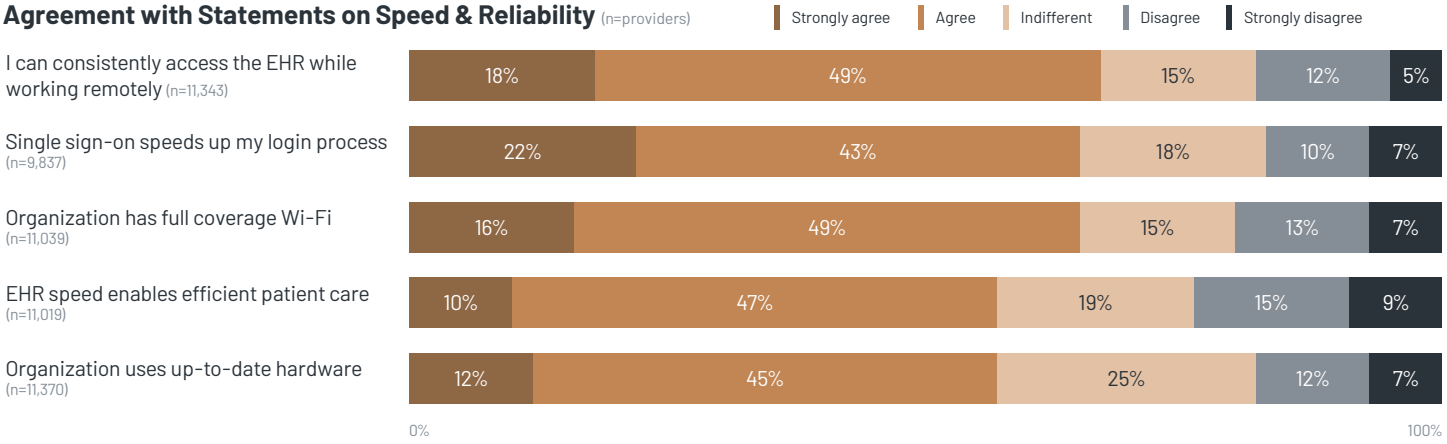
Building a Technological Foundation: System Reliability and Response Time

Meeting providers' basic technological needs—not only with the EHR but also with everything it touches (including internet and hardware)—is critical to EHR satisfaction. **System reliability and response time** play an important role in meeting providers' needs, yet they don't receive a lot of attention unless they aren't working as intended. While most organizations report having a moderately reliable system, those with unreliable systems have significant problems. Response time is a more common pain point across Collaborative respondents and requires more focus from the organization (proactively tracking login time, using solutions from other vendors, keeping software and hardware up to date, etc.). Organizations who are most successful with their system reliability and response time seek out and manage technological recommendations from vendors and proactively address updates, fixes, and hardware replacements.

Evidence-Based Practices

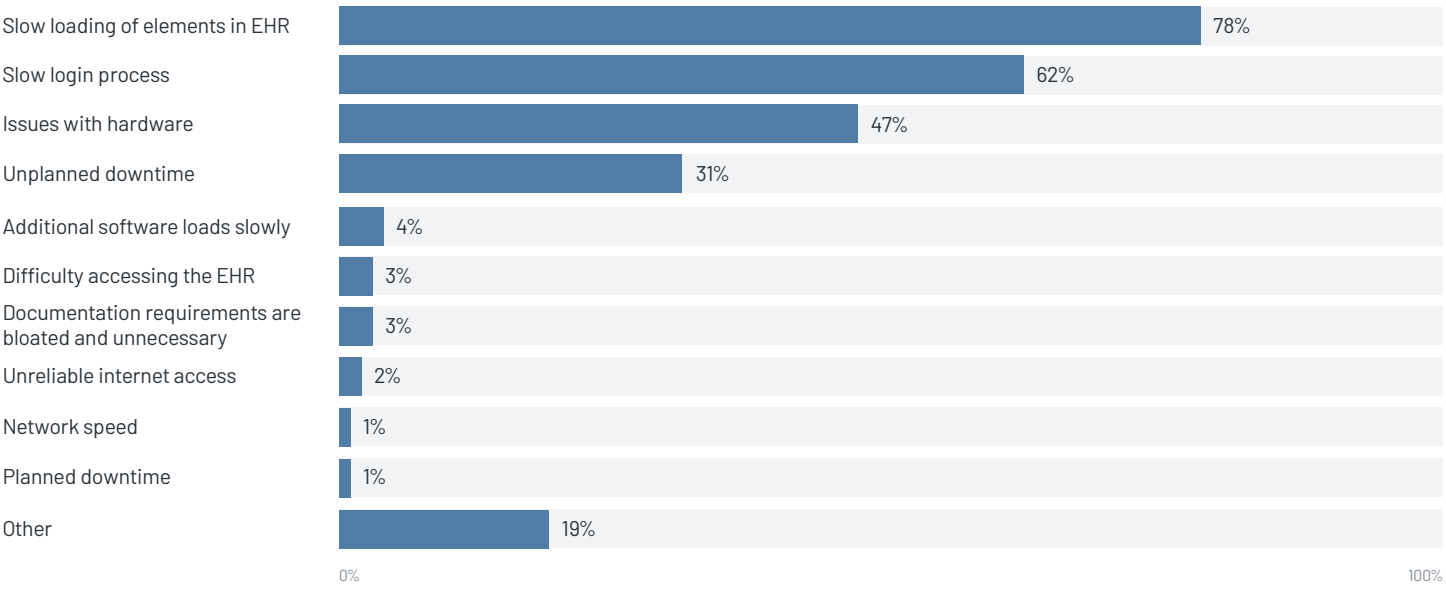
Consistent remote access to the EHR is correlated with response-time satisfaction

Agreement with Statements on Speed & Reliability (n=providers)



Poor response time can negatively impact perception of reliability, even if there is very little downtime

Percentage Reporting EHR Availability/Response Time Issues Providers who disagree their EHR is reliable/responsive; multiple selections possible (n=2,458 providers)



Report Information

Maximize your clinicians' EHR experience.
To participate in the Arch Collaborative, go to klasresearch.com/arch-collaborative.

What Is the KLAS Arch Collaborative?

The Arch Collaborative is a group of healthcare organizations committed to improving the EHR experience through standardized surveys and benchmarking. To date, almost 300 healthcare organizations have surveyed their end users and over 400,000 clinicians have responded. Reports such as this one seek to synthesize the feedback from these clinicians into actionable insights that organizations can use to revolutionize patient care by unlocking the potential of the EHR.

Reader Responsibility

KLAS Arch Collaborative data and reports are a compilation of research gathered from websites, healthcare industry reports, interviews with healthcare organization executives and clinicians, and interviews with vendor and consultant organizations. Data gathered from these sources includes strong opinions (which should not be interpreted as actual facts) reflecting the emotion of exceptional success and, at times, failure. The information is intended solely as a catalyst for a more meaningful and effective investigation on your organization's part and is not intended, nor should it be used, to replace your organization's due diligence.

KLAS Arch Collaborative data and reports represent the combined candid opinions of actual people from healthcare organizations regarding how their EHR vendors and products perform against their organization's objectives and expectations. The findings presented are not meant to be conclusive data for an entire client base. Significant variables—including a respondent's role within their organization as well as the organization's type (rural, teaching, specialty, etc.), size, objectives, depth/breadth of software use, software version, and system infrastructure/network—impact opinions and preclude an exact apples-to-apples comparison or a finely tuned statistical analysis.

We encourage our clients, friends, and partners using KLAS research data to take into account these variables as they include KLAS data with their own due diligence. For frequently asked questions about KLAS methodology, please refer to klasresearch.com/faq.

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www.KLASresearch.com

Appendix

Creating EHR Mastery: Onboarding EHR Education

Onboarding education includes training that occurs when an EHR solution is upgraded or first implemented, but it more commonly refers to the EHR training provided to newly hired providers during their first 90 days at an organization.

Evidence-Based Practices

Providers should receive a minimum of three hours of onboarding EHR education and would greatly benefit from eleven or more hours

- This training does not need to occur in one block. It can, and likely should, be spread across multiple sessions over the first few weeks.
- No single type of training is best: it can be done in a classroom, at the elbow, virtually, or through a combination of such programs.

Provider EHR education should be taught by providers

- Clinicians who train others should do so because they are great clinicians *and* great teachers. Knowledge alone is not enough.
- Training should be focused mostly on workflows and how the EHR can facilitate better medical practice. Having a shared clinical background helps make this possible.
- The quality of educators is critical to success. Successful organizations often report that they hire and keep only the most creative, engaging, and effective teachers.
- It is possible for non-clinicians to be effective instructors, but they need to be completely "fluent" in the clinical workflows of those they are training.

EHR education is more effective at supporting a strong EHR experience when it is workflow specific

- Organizations with the most effective onboarding EHR education infuse their training with meaning; educators and department leadership work hand in hand to (1) help new providers see that the EHR embodies shared clinical workflows and (2) make sure that when providers learn EHR functionality, they learn the teamwork processes the organization uses to deliver care.
- Case-based training and education, in which providers mimic EHR use from real patient care scenarios, are used by many successful organizations to align EHR learning with clinical scenarios.
- Just over half of providers agree that their training was workflow specific. Less than half agree they had enough training on how to access external data—this knowledge should consistently be included in provider education.

Leading Practices

Organizations with successful onboarding programs understand that setting proper expectations is crucial to success

- Providers need to understand where to get help, how changes are made to the EHR, and how they can continue to learn.
- Providers must understand that workloads can become overwhelming regardless of which EHR is in use. It is the organization's and the provider's responsibility to manage workloads, not the EHR's.
- Successful organizations go far beyond helping providers learn to effectively enter data into the EHR—they also teach them how to quickly retrieve insights and demonstrate the benefits experienced by patients and other clinicians when data is accurately entered into the system.
- EHR personalization can be taught effectively during onboarding, but it can also be beneficial when taught at later dates. Clinicians should be expected to continually learn about the EHR as it evolves and their knowledge of organizational workflows improves (for more details, see Creating Provider Efficiency: Personalization).

Top-Performing Organizations for Onboarding EHR Education

Figure 1

Allina Health	
Case study publish date	May 2018
EHR vendor	Epic
Organization type	Midsize health system
Area of high performance	87th percentile for satisfaction with initial training
Program goals	Offer convenient and quality training for providers
Keys to success	• Physicians are busy, and the training program, above all, respects their time. Bringing the training to them also uncovers numerous process improvement opportunities both large and small. • When IT shows a concerted and frequent effort to improve a provider's efficiency, it helps establish trust.

What Allina Health did

Allina Health, like many other organizations, does not employ many of their physicians, but for all who obtain privileges to practice at Allina, a time is scheduled for a non-clinician educator to provide initial training. The goal is to make training as convenient as possible for the provider, so much so that educators will often travel to the provider. This meeting with an educator takes place before a provider begins their clinical practice with Allina. Providers are offered an optional eLearning course that they can take before their first day. The goal of the eLearning is to introduce Epic software to those who are unfamiliar with it. The educator will visit the provider, log them in to Epic, verify appropriate system security access, personalize the system to meet the needs of their specialty, and finally, review any workflows specific to Allina. Over years of training, more than 100 specialty-specific setups are available to the trainer to meet the needs of a new provider. These setups were created with consultation from specialty groups to identify what workflows are most important.

Training at Allina Health continues beyond the initial session. On the ambulatory side, the most experienced trainers have evolved into Performance Support Trainers (PSTs). The PSTs travel to clinics and offer at-the-elbow training. Allina Health has five PSTs and 65 clinics. Appointments for the PSTs are scheduled three months in advance, and every clinic in Allina Health is visited monthly by a PST. The PSTs can work with an individual provider or complete a group training at each clinic. PSTs, along with clinical leadership, use Epic's PEP data to determine areas where efficiency can be improved. This information, in Allina's words, has been a real game changer.

Figure 2

Baptist Health Jacksonville	
Case study publish date	October 2021
EHR vendor	Allscripts and Oracle Health (Cerner)
Organization type	Midsize health system
Area of high performance	96th percentile for satisfaction with initial training
Program goals	Reduce onboarding time spent in a classroom and facilitate virtual learning during COVID-19 pandemic and beyond
Keys to success	• eLearning content was verified and edited by a physician group, making the training more palatable to fellow physicians • eLearning content is focused on the best practice workflows as defined by high-performing individuals at Baptist Health Jacksonville • eLearning content is interactive, allowing for clinicians to listen to a simulated case and document that case while they learn the workflow

What Baptist Health Jacksonville did

During an assessment of their training protocols before an implementation of Epic's software, Baptist Health Jacksonville identified time spent in a classroom during onboarding (4–12 hours, depending on specialty and role) as an area that needed to be improved. With the onset of COVID-19, Baptist Health Jacksonville also recognized that eLearning could be used to both continue onboarding training as well as experiment with the ability to reduce classroom time.

The new eLearning courses had to be relevant to the real workflows to remain engaging, and interactive courses were designed by Divurgent to enable that engagement to take place. Divurgent and Baptist Health Jacksonville worked together to interview physicians at all levels of leadership to understand the needs and desires of the leadership and end users in the initial onboarding process. Key high-performing individuals were identified and observed to create new best practice workflows, and key physician leaders were identified to verify that eLearning courses were accurate and engaging.

Once the key goal of reducing onboarding training and the resources were understood, Divurgent and Baptist Health Jacksonville began building scripts and a digital eLearning tool that was embedded in their learning management system. These courses and their content were approved of by the key leaders in the health system. The courses often follow a simulation-based training focus, allowing end users to follow along with a case and interact with the tool to document the case properly. As the tool is embedded in the learning management system, the leadership can monitor how far along end users are in their onboarding training process and how well end users are learning the EHR and best practice workflows. This process adjusts to real-time changes in the EHR, enabling trainings to always be up to date.

Divurgent and Baptist Health Jacksonville have implemented 4 hospitalist modules that replace 8 hours of classroom training. There are 6 anesthesia modules as well that replace 8 hours of classroom training and 11 nursing modules that currently save 16 hours of in-person classroom training. During a recent rehab system update, Divurgent and Baptist Health Jacksonville implemented 5 modules that replaced 4 hours of on-the-floor training.

The eLearning courses have resulted in a dramatic reduction of classroom time for physicians; now, they need only 1–2 hours in person and in a classroom. This has likely saved the organization $37,500 for each of the 25 newly onboarded physicians and has freed up 0.5 FTEs among the clinical informatics team.

Figure 3

Door County Medical Center	
Case study publish date	November 2022
EHR vendor	MEDITECH
Organization type	Community hospital
Area of high performance	92nd percentile for satisfaction with initial training
Program goals	Ensure physicians have a solid base knowledge of the EHR system from the start of their onboarding
Keys to success	• Initial one-on-one onboarding training promotes clinician satisfaction with EHR system

What Door County Medical Center did

When new physicians are onboarded at Door County Medical Center (25-bed hospital), they get 2–4 hours of in-person computer training with a registered nurse. During this training, physicians get a brief overview of the functionality of MEDITECH 6.15. Door County originally had this training scheduled for a 4-hour time slot, but through feedback over time, it was decided that 2 hours for this training was sufficient. In addition to the one-on-one overview functionality training, there is an additional 2–5 days of at-the-elbow support where a registered nurse spends one-on-one time with them while they are seeing patients in real time and then does additional training.

At-the-elbow training time depends on the physician and how quickly they catch on to the EHR system. There are some physicians that have been in training much longer than the others and probably could use someone sitting by them still, but there isn't enough time or resources for those accommodations. Door County has not spent more than 4–5 days with a single clinician, and any exception was due to external factors.

These 2–5 days of at-the-elbow training are used for real-time training. The EHR educator stays in the physician's office waiting for the end of their visits to help with documentation or placing orders right after they see the patient. When placing orders, which often results in the nursing staff completing ordering tasks, Door County has the physicians place the orders themselves a few times in the beginning to ensure they know how to do the process if the nurses don't. If a physician has bigger gaps in their day from seeing patients, the educator goes back to their own desk to finish the work but comes back for scheduled visits. During the training days, the educator books out their days to be solely dedicated to one-on-one training with each new physician.

Training starts from the first steps of logging in and discussing the clinical home screen, doing individual scheduling, doing different things that physicians might see depending on their focus, and giving a run-through of each tab of the patient's chart and the items they can find there. New hires are then given the opportunity to set up their user preferences right away. Preferences start with having the new hires arrange some widgets on the summary tab and in the reference region to allow their first time opening a patient's chart in real time to go smoother.

Ongoing training consists of emails, rounding, and teach-and-learn sessions. Emails called "Tuesday Tips" are sent out and consist of questions that were received in the past week with the idea being that if one person doesn't know how to do something, odds are there are other people that don't know as well. Important emails are occasionally printed out and physically put on clinicians' desks. Rounding occurs at all four of the organization's satellite sites but most frequently at three due to heavier travel-time coordination to visit the fourth site. Door County found that when the trainer was out in the clinic

with the users and didn't necessarily have specific items to share, this opened up more opportunities for providers to ask their questions in real time. A lot of the questions were better suited for a real-time scenario and weren't normally being asked due to the time it takes to write an email or make a phone call. Providers don't have the time to reach out in between patients; thus, they appreciate the face-to-face rounding. The teach-and-learn sessions occur once a month, and the topics vary but are dependent on the needs and requests from the providers.

Figure 4

Lee Health	
Case study publish date	June 2023
EHR vendor	Epic
Organization type	Large health system
Area of high performance	97th percentile for satisfaction with initial training
Program goals	Provide onboarding training that is accessible and tailored specifically to providers' needs
Keys to success	• Provide monthly follow-up education for the first 60 days after onboarding • Hire trainers who have a sincere desire to help providers succeed • Allow providers with EHR experience to test out of a portion of the initial training

What Lee Health did

When Lee Health redesigned their ambulatory APP and physician (provider) training, the overarching goal was to ensure that the training was more accessible and tailored to the specific needs of Lee Health's providers. The training team was reorganized, and emphasis was placed on the importance of having a single point of contact for providers and creating dedicated follow-up time. EHR training by a credentialed trainer is required, and Lee Health aims to educate everyone to their highest capabilities. The organization believes in capturing what has been taught using a competency checklist. They also ensure that providers have the resources they need to do their job effectively. These resources include live educators, tip sheets, training material, a sandbox environment, a direct line of contact to educators via Secure Chat, and a dedicated phone line for providers. Lee Health attributes their success to collaboration with leadership, a well-organized training team, strong follow-up, and clear communication.

Onboarding training includes 8 hours of classroom instruction with credentialed trainers and assistance in setting up preferences and using speech recognition. Immediately following the classroom training, there is a 32-hour period of at-the-elbow support where an educator works directly with the provider in their clinic. During this time, the educator helps the provider set up specialty-specific personalizations and navigate the system, using actual patient visits to tailor the workflow and create favorites.

At 30 days, the provider receives a 4-hour follow-up at-the-elbow session. The educator assists with any remaining questions or issues related to In Basket items and fine-tuning workflows. During the 30-day follow-up, the educator ensures that the 60-day follow-up appointment is scheduled during a protected time. At 60 days, the medical director of informatics, the educator, and the provider have a 1-hour virtual session. They focus on optimization and addressing any areas that need additional attention based on Signal data and input from the provider. Lee Health analyzes specific EHR metrics to inform this training by reviewing time spent in chart review, orders, In Basket, and notes. The medical director reviews Signal data to compare providers to their peers and look for opportunities to improve overall efficiency. At 120

days, the medical director sends a follow-up email with a snapshot of Signal data showing the provider the trends for their EHR use over the past few months.

A provider line and a Secure Chat help group are available for support throughout the training process and beyond. After the 60-day mark, providers are considered onboarded and are included in regular office rounding by the educators assigned to their specific offices. Lee Health rounds once every three months at each of their 100+ locations, which span four counties.

There are 12 trainers on the team who onboarded 221 providers in the past year at an average rate of 18.5 providers per month. These trainers are primarily nurses and medical assistants who have been assisting providers and understand their needs well. Having that clinical buy-in is critical to the success of Lee Health's training program. The main qualities emphasized for successful trainers are a genuine desire to help providers succeed, patience, empathy, and a love for learning and problem-solving.

If a provider has recent experience with Epic in an area matching the role they are entering, they are emailed the Epic Sphinx assessment, and a pool of educators automatically receives the results. If a provider scores 80% or higher on the test, they are eligible for abbreviated training. This means that they can skip the full 1-day classroom training. Instead, they participate in 2–3 hour Webex sessions over 1–2 days that cover workflows, navigators, and personalization. The length of the training depends on the unique workflows and preferences required before the provider is allowed to use the system on their own.

Figure 5

Mediclinic Middle East	
Case study publish date	August 2023
EHR vendor	InterSystems
Organization type	Non-US health system
Area of high performance	89th percentile for satisfaction with initial training
Program goals	Provide tailored, up-to-date training for onboarding providers
Keys to success	• Use a combination of online and in-person training • Use superusers to provide ongoing support • Assess EHR competency to ensure providers are ready to make use of EHR for patients' treatment documentation • Keep training up to date by routinely reviewing release notes from the EHR vendor and incorporating changes into training content

What Mediclinic Middle East did

Mediclinic's learning and development department employs a four-step onboarding process for new employees, including tailored online training; general, hands-on classroom training; additional face-to-face specialty-specific training; and practical simulations and dry runs. Competency assessments and ongoing support are administered to ensure proficiency, and the learning and development team keeps the training content up to date with input from the EHR vendor and internal Mediclinic teams.

The learning and development department at Mediclinic, which consists of about 20 em-ployees, manages the onboarding of new employees. The onboarding training consists of a combination of online and hands-on training. The online courses are developed and contin-ually updated using Articulate Storyline 360 as the authoring tool and are consumed by the learners through the Mediclinic SAP learning

management system. Tailored according to the employee's job responsibilities, the online training typically takes around one to two hours and includes knowledge checks at the end of each module as a means of validating the learner's understanding of the system.

The design of each module covers the usage of the different functionalities of the EHR sys-tem as applied to the relevant processes (i.e., outpatient, emergency, and various sections of the inpatient services such as the operation theater, critical care for adults and neonates, labor and maternity, and other disciplines). All the training content is developed in-house and continually updated through close collaboration between the learning and development department, the ICT team, and the EHR provider.

Hands-on training is competency based and delivered primarily by the learning and devel-opment team through trainer-facilitated sessions, which are either virtual or face to face.

The trainer-facilitated training varies in length depending on the job classification. Allied training can take around 4–8 hours, a doctor's or nurse's training takes around 6–8 hours, and a patient administration course takes as long as 36 hours to complete.

Included in every EHR rollout plan is the identification of facility superusers (FSUs) who play an essential role during the go-live implementation and consequently during the onboarding training of new users. The FSUs are generally selected based on their level of proficiency in using the EHR system as well as their familiarity with the overall patient journey process. Each Mediclinic facility has FSUs in various disciplines, such as patient administration, nurs-ing, allied health professions (e.g., laboratory, radiology, and pharmacy), and clinicians.

Mediclinic also has a physician informatics lead and a few provider superusers in key areas. The superusers help test new EHR functionality and provide support during the implementa-tion process.

Assessments of competency are an essential part of the Mediclinic onboarding process. With support from the physician informatics lead and clinical specialists, the learning and development team created detailed assessment tools that involve review and evaluation sessions, online and trainer-facilitated simulations, questionnaires, and scoring based on competency levels. The competency levels range from level one, which advises that more training and familiarity with the EHR system is required, to level three, which indicates a comprehensive understanding and ability to apply the concepts in practical examples. Mediclinic's goal is to bring all staff members to competency level three, and providers scoring at levels one and two receive additional support and training to improve their EHR mastery.

To ensure the training content remains current, the learning and development team re-ceives release notes from the EHR vendor. These release notes are reviewed internally by the ICT team and relevant stakeholders from the discipline. As soon as release notes are reviewed and tested, the information is endorsed by the learning and development team, who manages the design and development of the content and spearheads the knowledge and skills transfer to the relevant users according to the most appropriate methodology, such as webinars, online courses, video tutorials or quick guides. The training module is consequently updated to ensure that the learning provided to new users is kept relevant.

Creating EHR Mastery: Ongoing EHR Education

Ongoing EHR education builds on effective onboarding education, and most principles of success for onboarding training apply to ongoing EHR training as well.

Evidence-Based Practices

Providers should spend 3–5 hours annually refreshing their EHR knowledge; the majority of providers do not meet this threshold

- Spending more than 3–5 hours can be helpful but the resulting gains in satisfaction are not as significant. Most providers report receiving only 1-2 hours of follow-up training per year.
- Successful organizations understand that users learn the most about the EHR outside the classroom during day-to-day use within a clinical context.
- Peers are a provider's most common source of EHR learning. Successful organizations work to create practice environments in which a knowledgeable peer—e.g., a rounding informaticist or a successful local user—is always accessible.
- Some training is better than no training. Not having any ongoing training leads to lower EHR satisfaction.

The quality of the training is more important than the type of training

- The 10 most satisfied organizations in the Collaborative and the 10 least satisfied organizations employ many of the same types of training programs. Finding the programs that work best for your organization is key. Some training methods that result in high satisfaction (e.g., one-on-one training) are not scalable and therefore not a good option for wide-scale training. On the other hand, what eLearning lacks in popularity it makes up for in its efficiency and accessibility. Pairing the right training method with the right message and population can help maximize EHR education.
- On average, clinicians who attend ongoing training estimate that the training saves them over 1.2 hours of time per week.
- Poor training can be detrimental to the provider experience. Request feedback about the training experience and make changes as needed.

Providing a distraction-free learning environment leads to higher EHR satisfaction

- When possible, provide EHR education that is held off-site. At a minimum, education should be in an environment that is distraction free.

Providers want more training

- Most providers report receiving 1-2 hours of ongoing training each year rather than the minimum of 3-5 hours.
- More than half of providers report wanting more training.
- Even providers who say they do not want more training have room for improvement. Improving the quality of training and shifting the focus of training from proficiency to mastery could help providers get more out of their EHR training experience.

Leading Practices

Advertising is beneficial for successful EHR education

- Catchy headlines such as "Remove the Suck from Your EHR Use," "Home for Dinner," or "SWAT Program" pique interest.
- If emails are used as a conduit for EHR education, they should have a familiar structure and be sent at a regular cadence.
- Focus more education on influential organization leaders and clinicians, such as chief residents who will teach other residents.
- Keep training materials in one accessible location so providers know where to look when they have questions.

Integrate trainers into the EHR governance so they know what EHR changes are coming, why they are coming, and how to help communicate those changes

- Being able to speak to *why* an EHR change is being made is just as important as being able to speak to *what changes* have been made. Similarly, trainers can be critical in guiding EHR governance and IT efforts.

Be open to feedback about what is and isn't working well, and be willing to make adjustments

- Using post-training surveys and monitoring completion rates can help identify pain points and areas of success within provider EHR education.

Top-Performing Organizations for Ongoing EHR Education

Figure 6

Essentia Health	
Case study publish date	August 2023
EHR vendor	Epic
Organization type	Large health system
Area of high performance	88th percentile for satisfaction with ongoing training
Program goals	Keep providers' systems optimized and up to date with changes to the EHR
Keys to success	• Regularly follow up with providers after onboarding to optimize and fine-tune the EHR to their workflows • Provide regular upgrade education with the method tailored to the complexity of the changes

What Essentia Health did

Essentia Health (Essentia) has a comprehensive ongoing education and optimization pro-cess for providers after their initial training. New hires receive a combination of instructor-led and eLearning classes followed by personalized optimization sessions to fine-tune the EHR according to individual needs and specialty-specific workflows. Regular peer-to-peer sessions are offered, and ongoing optimizations and support are available to all providers. The organization follows a regular upgrade schedule and provides education and resources to keep providers updated on EHR changes.

New Essentia inpatient providers go through a six-hour instructor-led class, and additional one- to three-hour eLearning modules are provided to delve deeper into the provider's spe-cialty. In the ambulatory setting, new providers receive a list of eLearning classes to com-plete at their own pace within the first three days of employment. They then have a one-hour Q&A session with a trainer to discuss the eLearning content and set up personal pref-erences in the EHR. More in-depth personalization comes during two-hour peer-to-peer training sessions, which take place three to four weeks from the provider's start date. Addi-tionally, a standard checklist ensures providers have specialty-specific orders and prefer-ences based on what has worked well for established providers in the same specialty. Es-sentia's goal is to provide a customized learning experience and a good starting point for new hires, including a basic progress note template. This new-hire training typically takes place within the first week of employment.

After the initial training, Essentia offers new providers EHR optimization sessions with expe-rienced providers to fine-tune the EHR according to individual needs. These peer-to-peer optimizations occur around the four- to six-week mark and last two hours. The optimizer works closely with the clinician to identify areas for improvement based on data analysis and provides targeted suggestions. This process aims to address specific pain points and further enhance the provider's experience with the EHR. For new users, the focus is on are-as such as customization options, note templates, and quick action buttons.

Onboarding APPs at Essentia receive additional support, including a one-on-one mentor who guides them through various aspects of the organization, including clinical and opera-tional processes. The APP onboarding process includes multiple sessions with the optimiza-tion team within the first few months, gradually ramping up the APP's familiarity with the EHR. The optimization sessions are tailored to address the provider's specific needs, identi-fied through Signal data analysis. Additionally, new APPs are paired with a resource mentor on-site who meets with them twice a week to address any issues or questions. This mentor is also available for consult on patient cases. The meetings occur more frequently when the APP is new and gradually taper off as the APP becomes more comfortable. The frequency and duration of these meetings vary depending on the APP's experience and specialty.

Additional peer-to-peer sessions are offered after four to six months, and yearly sessions are recommended for all providers. The eight-person optimization team works with ambu-latory providers as well as the ER team and cardiology nurse practitioners. Each member of the optimization team dedicates half a day per week to these sessions. Most sessions last two hours and are typically conducted virtually, allowing screen sharing and walk-throughs. The optimization sessions are personalized based on the provider's familiarity with the EHR. As providers become more comfortable, deeper dives into specific areas of interest can be conducted. A Microsoft booking system has been implemented to allow providers to easily schedule sessions at their convenience. Providers can also contact the IS groups for phone assistance or request additional training through a help desk or self-service form.

To keep providers updated with changes and upgrades in the EHR, the organization follows a regular upgrade schedule with upgrades occurring every six months. Principal trainers within the organization review the upcoming changes, assess their impact, and determine the level of education needed. Ideally, a provider participates in a two-hour follow-up edu-cation session each year, and while the ideal is preferred, sometimes other means of edu-cation are needed. Depending on the complexity of the changes, education can be provided through slide decks, tip sheets, custom recordings, or virtual training. The organization also maintains an upgrades dashboard where users can readily and consistently access relevant information and training resources. The goal is to communicate changes effectively and provide support during the upgrade process.

The principal trainers are members of the IS team and have backgrounds in teaching or adult learning principles. They excel in training and understanding the inner workings of the EHR. Some principal trainers previously worked in Essentia's learning and development group, while others joined based on their aptitude for adult learning principles and effective communication skills. These principal trainers are responsible for creating and maintaining training scripts and ensuring that the credentialed course trainers, who deliver provider training, understand the course objectives.

Figure 7

Franciscan Health	
Case study publish date	June 2023
EHR vendor	Epic
Organization type	Large health system
Area of high performance	89th percentile for satisfaction with ongoing training
Program goals	Offer convenient, accessible, tailored ongoing provider training
Keys to success	• Keep upgrade training materials in an accessible place where providers can easily find answers to their questions • Use data and communication with providers to tailor in-depth training to the needs of individuals • Ensure protected time and incentives, such as payment for missed RVUs and CME for provider training

What Franciscan Health did

Franciscan Health (Franciscan) keeps all upgrade training resources on their upgrades dashboard, which includes a toolbar button that every user can select to see all of the upgrade materials. The materials include PowerPoint presentations, tip sheets, and microlearning videos. The materials are provided by the EHR vendor and supplemented by original materials created by the organization. This approach focuses on having educational materials readily available when EHR changes happen rather than requiring users to review education before a significant EHR change. Each user can personalize the dashboard based on how much information they want to see, and role-specific components for inpatient providers and physician practices are covered. The upgrades dashboard was created after Franciscan realized that the previous upgrade strategy did not conveniently meet providers' needs. At that time, provider accountability for utilizing classes like webinars or recorded training was low (around 30%), so making training readily available was essential.

For providers who need more in-depth training, the refresher training program is individualized to each provider's needs. The ongoing refresher training includes a one-on-one, hour-long session with a trainer, and the provider's schedule is blocked for the hour. In addition, the provider is paid for the missed RVUs related to the block schedule. The refresher training also qualifies for CME credit. Before each session, the provider completes a presurvey so they can explain where they are struggling and what they want to learn most. The survey is especially helpful since perceived pain points do not always align with what the data suggests.

Franciscan's provider trainers come from diverse backgrounds, including corporate training, coaching, and informatics technology. Two of the trainers focus on curriculum development and four additional trainers work directly with providers to offer training. Over the past three years, an average of 315 providers (out of 900 total) have received the refresher training each year. The trainers are taught the curriculum and how to effectively use the EHR and incorporate usage data before being assigned to train providers. The trainers work with informatics technicians, who are former medical assistants and superusers. Informatics technicians are assigned a specific number of providers and clinics and round on those providers every two weeks to inform them of upcoming changes in their workflow. The trainers shadow workflows in the clinics and are paired with informatics technicians to learn about the provider workflow and the context of how the provider uses the EHR. The trainers help train the informatics technicians by providing them with any new information that needs to be shared with providers. Provider trainers' knowledge of the provider workflow and EHR usage is developed as they go.

The provider trainers partner closely with informatics to spread the word about upcoming EHR changes and any education information that everyone needs to be aware of. The cooperative relationship enables them to get in front of many more people and ensure everyone is aware of the changes and the needed training. Franciscan is working on further strengthening the relationship between the trainers and the informatics group. The trainers help provide the technicians with the necessary information to help the providers better understand any changes.

The organization monitors EHR usage metrics to determine the training program's success, such as same-day chart closure, which is tied to provider satisfaction. Additionally, the trainers work with the provider wellness representative from the EHR vendor to select metrics that will be monitored to determine the training program's success. The trainers monitor several internal metrics within Signal, some of which are tied to provider satisfaction. The trainers use these metrics to monitor provider progress and determine whether they are improving in specific areas.

Figure 8

The Guthrie Clinic	
Case study publish date	July 2021
EHR vendor	Epic
Organization type	Community health system
Area of high performance	82nd percentile for satisfaction with ongoing training
Program goals	• Decrease provider turnover rate • Get rid of outdated or inefficient workflows • Increase EHR personalization • Enhance trust in organization leadership/IT
Keys to success	• Focusing on organizations' relationships with their providers • Giving providers a voice in making changes and encouraging them to speak up when they are in need of help • Repeating things around training helps the information sink in

What The Guthrie Clinic did

Six years ago, The Guthrie Clinic was experiencing an above-average turnover rate. During exit interviews, the EHR was frequently mentioned as a contributor to why people were leaving. Guthrie took that feedback and realized their technology and training needed to be enhanced to improve that turnover rate. They started out by conducting listening tours with providers and learned there was a perception that the IT department didn't care about their providers, and if they weren't located on the main campus, their voices weren't being heard. They leaned into these new findings and decided to improve their culture and EHR functionality.

When a new provider is being onboarded, the organization trains the provider within the first week of coming to Guthrie. New providers have an option to test out and have an abbreviated training process if they've used Epic's system at another organization. Guthrie wants to ensure that new providers are familiar with Guthrie-specific workflows. The questions on the test for new providers who have used Epic's system at other organizations are functionality based, not workflow based. Those same providers can also bring in their smart phrases from their previous organization in a document, and they will be imported into Guthrie's system.

After the initial session, new providers receive a hands-on service for other technology needs to eliminate barriers to efficiency for providers, such as setting up email, Haiku, and Canto accounts. If the provider needs additional one-on-one support, they can schedule that service. The additional one-on-one trainings occur in the provider's own practice where the trainer shadows them during their workday and helps them personalize their Epic settings, preferences, and templates.

The Guthrie Clinic used Physician Efficiency Profile (PEP) scores and Signal data to figure out how they were going to staff their credentialed trainer (CT) rounding program. This program is mainly ambulatory focused; depending on the size of someone's practice, they are visited once or twice a month. This scheduled time includes working with individual providers to go over their questions, shortcomings, or any new upgrades. This training program lets the providers know their voices are being heard because they are first asked what their issues within the EHR are, and then using PEP and Signal data, the organization decides what problems to focus on.

The CTs for this rounding program are trained on scenarios more than just technology. They spend time shadowing other trainers, participate in teach-backs after their initial training on workflows, and do some support-desk work that helps them recognize what types of issues are coming in.

The Guthrie Clinic has implemented Epic Thrive trainings that focus on the following areas: working the in basket, placing orders, doing chart review, and writing notes. The trainers teach providers the best tips and tricks around these areas. During the COVID-19 crisis, they streamed the classes from Epic's Wisconsin headquarters, and Guthrie made the recordings available on an internal site.

Epic has Physician Power User certification where providers take a series of eight classes and are eligible to receive eight hours of CME. Guthrie began encouraging their providers to sign up for the program so that they could learn many tips and tricks to help them more easily navigate the EHR. They have found that providers who have attended even a portion of the training have reported more satisfaction with the EHR. However, it has been difficult to get providers to complete the program due to limited times available.

Guthrie has also started implementing virtual trainings for their providers. They ensure these videos are engaging by having high-quality trainers and by splitting the screen between the trainer and what they're teaching. They also make the Epic system available while providers are completing the trainings so that they can test out what they're learning and create their own Epic personalization as they go.

Through all these efforts, The Guthrie Clinic has seen significant success with their providers' EHR experience. They cite many different keys to success that have helped this change. First, an organization must focus on their relationships with their providers. Having a robust system where people can reach out and get help if needed and allowing them to have a voice if they're frustrated is crucial. Next, an organization should dedicate the necessary time to train providers and create a well-planned process for that training. Repetition and variety are key factors in information retention. The organization follows the "Rule of 7" for the number of times or ways a lesson is repeated.

Figure 9

Kaiser Permanente Southern California	
Case study publish date	April 2022
EHR vendor	Epic
Organization type	Large health system
Area of high performance	92nd percentile for satisfaction with ongoing training
Program goals	Help clinicians improve their EHR experience and efficiency by training with techniques relevant to physicians
Keys to success	• Using a tiered structure in which EHR curriculums are designed at a regional level with training and support leveraging local teams and relationships to deliver consistent, effective EHR education across a large region • Pairing new physicians with experienced physician mentors to improve clinicians' skills, workflows, and willingness to learn • Providing ongoing EHR education and support (KP HealthConnect Essentials) drives higher proficiency and user satisfaction

What Kaiser Permanente Southern California did

Kaiser Permanente Southern California (KPSC) describes the process of learning to effectively utilize the EHR as "learning to ride the wave." Just as it is unlikely that someone will master surfing on their first ride, so too is it unlikely that a physician will master the EHR with their initial training. How well one surfs also greatly depends on the surfer's skill and their ability to handle variably sized waves. Therefore, KPSC put great effort into an ongoing process to achieve a sound foundation in user mastery through initial EHR education as well as ongoing optimization trainings to increase skills, improve efficiency, and decrease the potential clinician burnout caused by the EHR.

KPSC faces the challenge of managing a high level of EHR education and support in a broad geographic area because Southern California is the largest KP region. It not only includes 15 hospitals and 234 clinics but also is expanding to provide EHR support for the entire KP Hawaii region. To combat this challenge, KPSC adopted the structure in which the EHR education is designed at the regional level, and the EHR support is at the local level. The regional training team consists of 60 team members who drive and develop the training curriculum, maintain the educational resource portal, MyHelp, and build and maintain the training environment for not only clinicians but also medical students. At local levels, 30 credentialed trainers are serving 14 medical centers. They deliver new-hire training classes based on a regionally developed curriculum but adjust it to meet local needs and provide local training support.

The onboarding EHR education is designed based on unique needs for clinicians' work settings, including ambulatory (three sessions with a total of 16 hours), inpatient (one 8-hour session), and emergency department (two sessions with a total of 8 hours). All training sessions feature physician champions and site-support rounding. For ambulatory education, cases studies are shared for specific specialties to reinforce the workflow-based training.

The onboarding emergency department (ED) education is slightly different from the other education because it features a physician mentorship program from the start. Many ED-physician new hires are already equipped with a certain degree of EHR proficiency. Therefore, KPSC builds smart tools to allow for customization, and on the same day, each new ED physician is partnered with a mentor and gets onto the ED floor to actually start seeing patients. This relationship-based program helps new physicians observe the workflow in a clinically relevant environment, build their own EHR tools with real-time guidance by an experienced physician, and understand how the EHR works at KPSC.

Initial training lessons are like the first surfing lesson. No matter how good one session is, it is not going to create an expert surfer, and providers tend to begin to struggle with the EHR a few weeks after completing their training and doing clinical work. This can lead to potential stresses, burnout, and frustration if EHR knowledge gaps are left unchecked. Therefore, an ongoing optimization program was created called the KP HealthConnect Essentials program. The goals are ongoing EHR optimization and improved proficiency. Each session has its own protected time from patient care, counts as CME, and is taught by same-specialty physicians in most forms to ensure that the physician teachers are speaking the same language that the learners are speaking. The teachers walk the same daily walk as the learners. The program contains 10 specialty tracks, each running independently but based on a uniform set of principles, and the curriculum is modified to fit each track's particular workflow needs.

The KP HealthConnect Essentials program started in 2014 as an off-site, three-day immersion training and is sponsored by the board of directors and the CEO. Physicians are encouraged to attend every few years. During the pandemic, shorter virtual trainings (3.5 hours with CME on Wednesdays) and live, virtual lunchtime sessions (45 minutes with CME on Tuesdays and Thursdays) were offered. The virtual training videos are stored in a dedicated KP HealthConnect Essentials website for people to review on their own time in addition to registering for more courses. The in-person, off-site training will resume in 2022.

KPSC makes it a point not to force people to attend KP HealthConnect Essentials sessions. Framing the KP HealthConnect Essentials program as giving physicians back three to five minutes per hour in charting is encouraging enough, and the physicians themselves do most of the promotion to their peers. Over 12,000 physicians have attended the program since its inception. KPSC's internal data shows that attendees indeed save on average four minutes an hour after the program, and 98% of attendees would recommend the training to their peers. KLAS data also shows that KPSC's burnout or stress level is not correlated with the EHR.

Figure 10

MDVIP	
Case study publish date	July 2023
EHR vendor	athenahealth
Organization Type	Ambulatory care group
Area of high performance	• 99th percentile for agreement that initial EHR education was helpful • 91st percentile for agreement that ongoing EHR education is sufficient • Highest score in the Collaborative for agreement that there is training on specialty-specific workflows
Program goals	Train providers well enough that they are confident in their EHR use to provide the best care for their patients
Keys to success	• Clinicians should receive a minimum of five hours of onboarding EHR education • Clinicians need to understand where to get help, how changes are made to the EHR, and how they can continue to learn

What MDVIP did

Acquiring a new practice

MDVIP first measured their provider end users in fall of 2022 with the Arch Collaborative. From these results, we recognized that MDVIP has a well-rounded approach to their onboarding and ongoing

education practices that has resulted in high satisfaction from their providers. MDVIP has a unique concierge model where they support over 1,000 primary care physicians across the United States with a philosophy of always putting the patient first. If a practice is looking to make the change to athenahealth, MDVIP partners with them to figure out up front whether the solution is right for the provider and the right timing for the implementation. There are multiple factors that could determine whether a practice is ready to go live with a new EHR solution, such as whether they're a one-provider practice, significant changes to their practice in the near future, whether they're retiring soon, or whether they already use a different platform that would make migrating the data difficult. The potential practice's providers will see a demo of the new solution and speak with other MDVIP colleagues so they understand the involved data conversions and setting up possible worst-case scenarios so they can avoid issues in the future.

Choosing the correct EHR solution

If the practice decides to move forward with the solution, MDVIP helps them determine whether athenahealth's solution is the right solution for them. MDVIP also acts as a liaison between the practice and the EHR vendor to interpret what the vendor is saying into clinical language, and they also sit on implementation calls to ensure their implementation playbook is being followed. Key portions of the playbook MDVIP wants athenahealth to cover are incorporating codes and descriptions used at MDVIP and MDVIP custom Cost to Implement Program Goals Organizational Outcomes Collaborative-Verified Best Practices Keys to Success What MDVIP Did Implementation Timeline content (including encounter plans, order sets, templates, practice roles, appointment types, custom clinical paper forms, Salesforce integration, etc.) being pushed through the end user's version. They also encourage their end users to use athenahealth's learning modules. MDVIP also gives pretraining online and later conducts on-site training, which lasts up to three days.

Before go-live training, custom MDVIP content is loaded into the provider's EHR, and MDVIP ensures all templates for primary care are present, along with special appointment types and reporting tools.

EHR go-live education

On the first day of the go-live on-site training, MDVIP encourages the practice to shut down and hosts classroom training for most of the day, but toward the end of the day, MDVIP allows one or two patients to make appointments. This allows the physicians to have a stressfree first encounter with their EHR. It is a big ask for the providers to close their practice for a day for EHR education, but MDVIP has tested out different educational offerings in the past and has had 600+ implementations in the books, and they have found that closing the practice on the first day of a go-live is a best practice.

During the second day of go-live training, the provider sees patients, and the trainer is there to answer questions as needed sometimes in the exam room or waiting outside of it depending on the provider's level of expertise. The trainers pay attention to areas where they can personalize the EHR for the provider's use. If customizations need to be made, the trainer returns the next day with those built out for the provider.

MDVIP's EHR trainers have had a lot of experience in athenahealth-specific training. They have previously worked for either athenahealth or another health system using the same EHR. MDVIP also conducts intense training for their educators that lasts up to six months, so they understand the provider's workflows and functionality. MDVIP covers a large geographic footprint across the country, so trainers go everywhere whenever they are needed. MDVIP typically tries to keep a 1:1 ratio between providers and educators to ensure the providers are getting the attention and education they need.

MDVIP offers a wide variety of ongoing training opportunities for their providers. In their EHR Experience Survey, they measured participation in and usefulness of MDVIP-led general ongoing trainings,

optimization trainings, and MIPS trainings. The majority of MDVIP's providers reported participating in general follow-up training and optimization training. They found these opportunities most useful as well. They also asked about athenahealth-led training offerings, like provider-coaching sessions, eLearning modules, online help, virtual training both live and on demand, and online resources such as Success Community. When end users reported utilizing these resources and finding them helpful, they also experienced a higher Net EHR Experience Score than others. Out of the athenahealth-led training opportunities, most providers felt that their coaching sessions, eLearning modules, and 0-Help are most helpful to them.

MDVIP does not require proficiency testing prior to EHR login for new users; rather, they are confident that their education will be effective and the follow-up with providers is consistent and helpful. Also, the providers know they can call the support team when they need additional assistance. If there are big issues in proficiency at a practice or with an individual, MDVIP will send out a member of their training team to refresh their original training.

Handling EHR upgrades

When upgrades occur (three times a year), MDVIP uses their field training team and their call center team to evaluate release notes and do internal training to ensure they're ready for any questions that might arise from providers once the upgrades take place. They will decide what new features need to be covered in on-site training if necessary, and they also create webinars or make more friendly versions of the release notes that consist of only the information pertinent to the practices.

Figure 11

University of Vermont Health Network	
Case study publish date	May 2023
EHR vendor	Epic
Organization type	Academic health system
Area of high performance	Provider satisfaction with ongoing training increased by 42%
Program goals	Improve clinician workflows and overall EHR satisfaction
Keys to success	• Create a standard training curriculum with the opportunity for specialty or clinic-specific training built in • Use EHR data, pre-surveys, and structured conversations with end users and clinic leaders to identify pain points • Take the time to develop trust between clinicians and the sprint team • Use a post-survey to measure and share about success and learn how to improve for future sprints • Perform a prioritization exercise with clinicians and operational leaders to help them understand the informatics point of view

What University of Vermont Health did

The sprint program at University of Vermont Health Network (UVM) is a two-week initiative that has a team of informatics experts and clinical leaders who optimize clinicians' EHR use. The informatics team works with medical, nursing, and technology directors and representatives of each role in the clinical setting. The program focuses on individual training and teaches clinicians how to optimize workflows. A physician informaticist leads the team, and the team also includes a project manager, a nursing informaticist, an EHR-credentialed trainer, and partners from the medical group education and training

teams. The sprint team uses a hybrid model to complete some work remotely and other work in person. The training and coaching sessions take place almost entirely in person. The peer training, such as nurse-to-nurse or physician-to-physician training, is usually a positively received aspect of the program. The program requires much preparation, and stakeholders meet regularly to set expectations and goals. Specific clinical sites are selected each year via a collaborative process between informatics and health network leaders. Local factors such as staffing and other kinds of initiatives, EHR efficiency data, and prior survey data from KLAS' Arch Collaborative are used to inform these decisions.

The planning process at each clinic involves holding conversations with the clinic's medical and staff directors to understand the clinic's unique needs and pain points. Around 80%–85% of the training content for the sprints covers standard workflows, while the other 15%–20% is specific to each clinic or specialty. Engaging with the clinic's leadership team to identify challenges ahead of time and solidify engagement is crucial to a successful sprint. The team preparing for the sprint also reviews data from the EHR user log and presurvey results to determine additional areas of concern or focus. The presurvey results help the team understand the needs of the staff and capture any pain points that may have been missed. Although there are other ways to approach efficiency analysis, part of the success of the program is due to the philosophy of shared decision-making, which requires a needs assessment in the form of directly asking what is bothering the clinicians rather than relying only on reviews of user log data. The team believes that with guidance, users will reach the best workflow decisions themselves and that this approach, rather than a top-down approach, will result in more persistent increases in user satisfaction. A significant component of the prework for the team involves building trust and relationships between the informatics experts, the clinical leaders, and the clinical team. As a standard, the informatics experts ask the clinical team prior to the sprint to prioritize things, and that helps the clinical team understand the need for prioritization because a limited group of people are working on the team's requests. This exercise helps to break down clinicians' sense that the IT team and the EHR are a black box and improves the relationship between clinicians, informatics experts, and IT staff.

At the end of the sprint, the clinic is given all of the sprint-related documentation materials (such as the spreadsheet of prioritized pain points, including the related documentation and notes) as well as a packet of tip sheets and workflow guides. The clinic is also empowered to continue the work. UVM also conducts post-surveys to measure satisfaction, and UVM shares the results with the clinic in summary form. The program aims to improve user satisfaction rather than accomplish specific tasks.

Creating Shared Ownership: Provider Relationships and Communication

EHR success is a journey, not a destination, so IT and informatics leaders must build strong working relationships with clinical and operational leaders. These relationships are healthiest when IT and informatics leaders create a framework within which clinical and operational leadership can successfully guide organizational goals (see Creating Shared Ownership: Governance).

There is significant overlap between the success principles for (1) provider relationships and communication and (2) governance. However, for readability, these topics are broken out into two sections.

Evidence-Based Practices

For organizations to be able to build relationships with all users, a minimum of 2–4 providers should be employed by IT/informatics (full or part time) per 1,000 provider users

- Successful organizations build a customer service–oriented culture of flipping the most frustrated providers into EHR promoters. Reward efforts by analysts to turn detractors into promoters. To maintain relationships and ensure providers understand the priority of their requests, make sure to close the loop on all communications.
- Successful teamwork happens when IT/informatics efforts are focused on making changes for clinicians instead of imposing changes on them. Taking negative provider stakeholders on rounds with other clinicians can help them understand the impact changes could have on the EHR and other clinicians' workflows.
- Some organizations have a learning lab, often centrally located in a major hospital. These labs have open front doors and invite clinicians to take a snack or finish documentation in addition to participating in EHR learning. Some training is better than no training. Not having any ongoing training leads to lower EHR satisfaction. To accomplish the same ends in ambulatory clinics, organizations can utilize rotating pop-up centers.
- A strong program of provider liaisons can act as an important communication layer if the liaisons see themselves as knowledgeable and able to assist their peers.

Higher IT spending does not guarantee higher satisfaction

- Monetary incentives are not the only way to establish a communication layer; many successful organizations have found ways to engage providers by creatively repaying their time with empowerment, autonomy, engagement, increased personal mastery, or even titles.
- Some successful organizations use EHR rounding to interact frequently with providers. Rather than merely asking whether there is anything users need, rounders share specific tips or tricks they know will help providers and track the adoption of these tips over time.
- Today's most disaffected EHR users may be tomorrow's provider champions. Many of these leaders are simply frustrated with a lack of teamwork; when asked to be part of the solution, they can be strong drivers of success.
- A word of caution: calling some users "superusers" can inadvertently label others as "poor users" or imply that EHR mastery is something only a small number of providers can or should obtain. Some organizations sidestep the issue by focusing on terms that encourage teamwork and communication, such as IT Ambassador, Informatics Liaison, or Associate Director of Clinical Informatics. Such titles and status can activate providers' intrinsic motivation.

Consistent IT rounding works

- Providers don't need to be visited in clinic every month for rounding to be effective.
- Rounding does not need to be scheduled to be successful. Sometimes the best interactions occur when an informaticist witnesses firsthand a provider becoming frustrated with their technology.
- Many organizations who successfully round do some or all of the following:
    - Prepare brief content (a quick tip or best practice) so that regardless of the length of the conversation, providers feel it was valuable.
    - Ask probing questions: "What do you do 100 times a day that you feel could be better?" Workarounds that providers create out of necessity often become ingrained in their workflows without them realizing there might be a better way.
    - Observe, then intervene and report back. Rounding informaticists must watch what happens daily, intervene to demonstrate better workflows, and report common issues so they can be fixed either through widespread training or back-end building in the EHR.

Leading Practices

Build teamwork and alignment by encouraging clinical leaders and IT/informatics groups to share their goals with each other

- EHR efforts should be clinically led and IT supported. Clinical leaders should passionately share why projects are being rolled out so providers don't feel a change is being forced on them by IT/informatics. Comments such as "We are working to move forward on the vision that Dr. Johnson and his team have for this workflow" can help remind providers that IT is there to support clinical efforts.

Frontline IT analysts should not be expected or allowed to say no to providers; they should focus on building relationships with providers by working with them to find solutions

- Instead of saying no, frontline analysts should escalate issues or work to find a different but acceptable solution. When a provider request is denied, it should come from a senior peer who speaks the provider's language and can help them understand why a change cannot be made.
- It is critical that expectations be set with providers that rounding informaticists can help the fastest if they are given clearly defined problems, not solutions.

Don't skimp on communication

- Information about the EHR may need to be pushed to providers in many different ways, including rounding and team meetings, to catch the attention of those who do not frequently read their emails. Those working on building provider relationships must ensure that they find balance between being available to providers and interacting with governance leaders.

Top-Performing Organizations for Provider Relationships and Communication

Figure 12

Dayton Children's Hospital	
Case study publish date	August 2022
EHR vendor	Epic
Organization type	Children's hospital
Area of high performance	95th percentile for agreement that end users have a voice in changes to the EHR
Program goals	Bridge the gap between IT, builders, clinical informatics, and end users to create a cohesive and effective governance structure
Keys to success	• Application teams/informatics efforts are focused on making changes for clinicians instead of imposing changes on them • EHR efforts are clinically led and IT supported • Strong relationship and high level of trust between IT, informatics, and clinicians • The impact of significant EHR changes is carefully considered before the changes are made, and organizations should be transparent and objective when prioritizing EHR enhancement ideas • Requests follow a consistent processt

What Dayton Children's Hospital did

Dayton Children's Hospital builds trust between IT and providers by deploying an infrastructure that prioritizes transparency and enables end users to define how resources related to optimization are allocated. In 2018, Dayton Children's Hospital didn't have a clinical informatics team, and governance didn't formally exist either. The perception of transparency and shared decision-making was lacking at that time because they didn't have the right infrastructure in place to include the clinicians' voices. End users felt as if the IT teams were making all the decisions instead of enabling the end users and their leaders to define the priorities.

Now, Dayton Children's Hospital has a unique clinical IT governance model that comprises different workgroups. Each workgroup is also part of a team that reports to the clinical decision support council and ultimately to the IT Governance Committee, comprised of senior leadership, all making up their IT governance model. The workgroups include both inpatient and ambulatory clinical IT oversight with provider, nursing, and ancillary services workgroups for each environment. Two other examples of Dayton Children's Hospital workgroups include the best practice alert (BPA) workgroup and the order set committee that are supported through the clinical governance structure.

Each clinical workgroup has a charter with a format and general scope that are consistent regardless of the clinical area. Dayton Children's Hospital includes clinicians in their workgroups because they are subject matter experts on the efficiency, documentation, and workflow needs of their own groups. The committees select voting members based on position rather than a specific individual due to rotations of other responsibilities. The meetings occur either monthly or quarterly, depending on need.

Requests are placed in a standardized format, and the requesting clinician presents their request so the committee can ask any clarifying questions as needed. When fielding requests, the groups determine whether the change is the right thing and whether the timing is right. A workgroup quorum votes to approve the request and decisions are then communicated back to the original requester. Prioritization of approved requests is completed by the oversight committee for that clinical area.

In order to prioritize requests, Dayton Children's Hospital uses a tool for issue tracking, and each request is assigned a total priority score. Two values are assigned to each request. The first value assigned is for the clinical value criteria, and the second value assigned is for the ability to execute the criteria. These two values are added to calculate the total priority score. The score is used to help drive the prioritization discussion, but the final priority is determined by the committee members.

The clinical value criteria include the following measures:

- Safety
- Regulatory compliance
- Efficiency productivity
- Revenue cost
- Patient experience
- Scale

The ability to execute criteria include the following measures:

- IT effort
- Disruption
- Cost category

If an urgent issue arises, the clinical informatics and builder teams can respond in the moment if necessary. The build teams are remote, and their job is to build the code based on the requirements that are elicited by the clinical informatics team, who collaborates to ensure that all policies, procedures, regulatory requirements, and HIPAA risks have been considered.

The clinical informatics team do not serve as voting members in any governance group; instead, they serve as facilitators to ensure that decisions are driving results and that the work is accurately scoped to identify the impact on other clinical areas. The clinical informatics team reports to the CMO, the IT team reports to the CIO, and both groups report to the CEO.

For Dayton Children's Hospital, the key to building trust between clinician end users and IT comes down to the effectiveness of their decisions and changes. Members of the senior leadership team participate in the governance committees, giving them access and visibility from the top down as projects are approved,

risks are identified, and barriers that need to be removed are discussed. It is important to have the right people engaged in these groups.

Ensuring clinician end users have a voice in decision-making is critical at Dayton Children's Hospital. The VP of operations attends several governance group meetings and brings awareness of the operational and strategic priorities to the discussion, as end users often don't have that perspective.

Figure 13

MetroHealth System	
Case study publish date	July 2023
EHR vendor	Epic
Organization type	Community health system
Area of high performance	93rd percentile for agreement that changes are well communicated
Program goals	Supply providers with regular, two-way communication related to technology and the EHR
Keys to success	• Involve as many people as possible in the informatics process • Incentivize clinician involvement in the informatics team with titles, experience, and potential career growth • Employ two-way communication to allow providers to share their concerns and to hear back that their concerns are being taken seriously

What MetroHealth System did

MetroHealth believes in the importance of engaging as many providers as possible with the assistant and associate directors of the clinical informatics team. The group meets monthly and provides input on major changes and disseminates information within their departments and specialties. They use multiple communication tools and personalized emails to address individual concerns and gather feedback. They also use peer-to-peer communication through the assistant and associate directors (see MetroHealth's Power of Titles case study for more details) by giving providers a designated contact within the informatics team. Effective communication takes a lot of time and effort and is best delivered by providers with similar clinical backgrounds, so MetroHealth believes in the value of leveraging peers as a reliable source of information.

The assistant and associate directors of the clinical informatics group include about 60 members from a variety of clinical specialties and physical locations, and the group is led by the associate CMIO. Subgroups of the team, such as ambulatory, emergency department, and inpatient groups, also meet separately to address their needs and interests. With such a large group, the shift to virtual meetings during the COVID-19 pandemic made it easier for people who couldn't attend in person to participate and stay informed. The virtual format also allowed for more flexibility in inviting additional participants without worrying about physical space limitations. The overall provider informatics structure at MetroHealth includes several levels:

- Executive leadership includes the CMIO and the associate CMIO.
- Directors are providers with specialized build skills that are beyond what is included in the standard EHR builder course; these providers have substantial protected time for informatics and support all levels of the program with technical expertise. Most have long tenures with the organization.
- Associate directors are providers with some protected time for informatics who support full services lines, help with projects, and act as resources for the assistant directors.

- Assistant directors are volunteers who support their peers at the clinic or specialty level as the primary informatics contact.
- The provider informatics group is also supported by a nursing informatics team consisting of nurse informaticists, provider liaisons, and a training team.

This multi-layered communication approach facilitates more focused discussions on relevant topics and ensures that information is disseminated effectively. MetroHealth emphasizes the advantages of this top-down structure, which enables easier integration of more people into the group's activities.

To track requests and complaints, the informatics teams utilize a formal ticket system called Giva, which is used for technical issues and new requests. It manages and prioritizes problems that require technical solutions or resources. The informatics teams meet with end users and work closely with them to understand their needs, evaluate workflows, and ensure that reported problems are accurately identified. The goal is not to bypass the standard ticketing request system but to expedite or provide additional support when necessary. Sometimes, issues can be resolved during a meeting by skilled physician informaticists, who may offer quick tips, tricks, or workflow adjustments within the Epic system. Additionally, the technical team members are proactive and can also fix problems mentioned during the meeting before the meeting concludes, and that eliminates the need for formal ticketing.

The involvement of members in the provider informatics group is voluntary. The benefits of these positions include the title, the experience, and the opportunity to enhance their academic CVs, and those benefits can potentially lead to further career opportunities within the organization. Some members are motivated by career advancement, while others are content with being knowledgeable and sharing information with their peers. The meetings serve as a platform for sharing information and providing practical guidance on various topics, such as medication adherence, health information exchange, and system efficiency. While the group primarily aims to provide information to its members, it also encourages feedback and two-way communication. Members are encouraged to raise questions, share concerns, and even bring forward problems the group may not know about. The group takes these concerns seriously and works to address them to improve patient care and save time for healthcare providers and their staff.

After taking the Arch Collaborative survey, the group successfully addressed concerns about the accessibility of the IS help desk phone number and ensured it was readily available to all members. The group fosters a supportive environment where problems are discussed and solutions are sought. Squeaky wheels, or individuals with more persistent issues, tend to reach out directly to the informatics leaders, but the group structure provides a framework for addressing and resolving their concerns. The leaders emphasize maintaining transparency, managing expectations, and striving to deliver on commitments. They acknowledge that not all problems can be solved immediately, but they try to explore potential solutions and communicate what is feasible.

The informatics leadership has extensive tenure within the organization. Their long-standing commitment and experience demonstrate the dedication of the leaders to the organization and their willingness to go above and beyond to help resolve issues, even if complete resolution may not always be possible. The transparency and commitment exhibited by the leadership team contribute to positive and trusting relationships with the group members.

Figure 14

SUNY Upstate Medical University	
Case study publish date	February 2023
EHR vendor	Epic
Organization type	Academic health system
Area of high performance	94th percentile for agreement that providers have a voice in changes to the EHR
Program goals	• Identify ways to better engage SUNY physicians and providers in use of Epic's EHR • Increase efficiency and productivity in use of Epic's EHR • Track intervention metrics • Ease the sense of EHR burnout
Keys to success	• Personalized training for physicians and providers • Use of survey results to identify areas of focus and connect with providers who voluntarily provided their names • Use of Signal data to identify areas where time in the system could be reduced • Anecdotal responses indicate providers are satisfied with time spent with training coaches and with the new Epic build that came from survey requests

What SUNY Upstate Medical University did

Upstate Medical University (SUNY) has measured three times in the Arch Collaborative and each time has seen a significant increase in their Net EHR Experience Score (NEES). One thing that SUNY did was read through the commentary and look at their data from the survey to determine what their providers wanted and what additional tools they would need to be successful. As an example, in a prior survey, 59 SUNY providers requested that SUNY implement Dragon Medical One. Shortly thereafter, it was implemented by the organization. The physicians and providers were heard.

A team of vested SUNY staff came together to form the steering committee for this important initiative. Communication pathways were established, and with the establishment of the logo above, the initiative was kicked off. EPIC4Me started small with releasing a Tip of the Day, specific to an Epic feature, that might save a few clicks.

In addition to the steering committee, a practitioner advisory council (PAC) was established. PAC is comprised of physicians and providers who are asked for decision-making input for their organization regarding any changes that occur in the Epic system. SUNY wanted their providers to know they've been heard, so the Epic build and training team created a special email called We Heard You. The We Heard You emails announced the launch of enhanced Epic functionality that was requested from providers who completed the Arch Collaborative survey. This was an additional venue for providers to gain a voice about their EHR experience and to know their suggestions were taken seriously.

In collaboration with the chief wellness officer and Epic physician champions, the SUNY Epic build and training teams enlisted inpatient and ambulatory provider trainers to complete the EPIC4Me team. These specialized Epic training coaches offer one-on-one shadow and optimization sessions with providers. The team also attend department-level team meetings. Preparation for each session can take up to 10 hours of Signal data analysis and workflow shadowing. Based on the data analysis, each coaching session is then tailored to the specific needs of the provider or department. Epic Honor Roll topics are incorporated into each training session as an additional effort to optimize things.

The EPIC4Me team promotes their services through email invitations. They have created a provider email LISTSERV and offer individual Epic coaching support as well as departmental optimization meetings. Over 10 departments have responded. The Epic build and training teams collaborate at these sessions to present useful tips and content, receive input on custom build requests, and answer questions. These sessions create a more transparent relationship and build trust between the Epic teams and providers.

The use of Epic Signal data proved to be most advantageous. Using Signal data, Epic staff members are able to identify areas of focus and target certain Epic functionality that can save providers clicks and time in the system. Epic training coaches use dialogue and Signal data to guide the discussion and show providers ways that they can increase their efficiency in the Epic system. One notable improvement was seen in the outcome metric of reducing Epic pajama time by 10% from the previous measurement. The focus of these sessions also includes personalization strategies. At the conclusion of a session, training interventions are documented in Signal, which adds a time stamp and allows for the tracking of outcomes. Analyzing data provides valuable insight into what interventions work to help providers meet measurable goals.

Supporting SUNY physicians and providers is at the heart of the EPIC4Me initiative. SUNY wants them to know they are being heard and ultimately supported.

Creating Shared Ownership: Governance

The success principles for shared ownership and governance are closely related to those shared above for provider relationships and communication. However, for readability, the two areas have been broken out into two sections.

Evidence-Based Practices

Organizations with broad, multi-disciplinary team engagement in EHR governance see higher EHR satisfaction

- Successful organizations empower governance leaders to make critical decisions, often without a voting process. Governance leaders are responsible for the outcomes and level of teamwork that result from decisions made, but they have executive power that allows efforts to move forward without bureaucratic deadlock. While voting or consultation with multiple committees may be used to build consensus and ensure stakeholders are engaged, successful leaders will not let these methods rule their decision-making.
- To allow for agility, changes or enhancements that are truly department specific should not be forced through the full governance process.
- The impact of significant EHR changes should be carefully considered before the changes are made, and organizations should be transparent and objective when prioritizing EHR enhancement ideas. Governance leaders can create formal scoring sheets that allow all impacted stakeholders to rate a change's expected effectiveness. The metrics on the scoring sheet should be unique to each organization since each organization will have a different perspective on what qualifies as an effective change.

Leading Practices

Leaders should be well versed in change management methodologies

- Change management is about changing how people work. Leaders should not be disheartened when communication must be delivered multiple times. They understand that people want to hear from trusted leaders, not other departments. And they understand that partnerships with middle managers and department chiefs are critical to driving change efforts.
- Informatics leaders must be given more autonomy to quickly make EHR changes that require quick-reaction feedback loops. A prime example of this is optimizing clinical decision support alerts.
- Change requests should be invited and framed as a team effort. Successful organizations do not put undue bureaucratic weight related to enhancement requests on the shoulders of the users. Instead they listen to and work with their users.

Change requests should follow a consistent process

- Successful organizations make it easy for requests to be submitted and also provide a strong feedback loop, knowing that trust in IT will falter if submitted requests are never replied to.
- There must be clinical agreement as to the prioritization of requests. When disputes over system design arise among clinical and/or operational leadership, IT should be rigorous in pushing for agreement before starting to build. This avoids the impression that IT is the primary decision maker. If IT makes the decision on their own, they remove critical responsibility from clinical leadership.

Successful organizations have a fast track for quick, obvious EHR changes

- Some organizations set aside one day each month (or one day each week) when all analysts make quick needed changes.
- While there should be a fast track for EHR improvements, break fixes should be handled outside of this fast track and should be prioritized even higher.
- Some organizations train certain physicians (i.e., physician builders) to make EHR changes and give them authority to make limited-scope changes.
- Efforts to improve quickly won't work if IT analysts aren't plugged in to providers' needs. There must be a strong relationship and high level of trust.
- Avoid long lists of EHR enhancement priorities. Providers often judge IT personnel's competence by how quickly they react to organizational needs, and organizations cannot be agile in responding to changing needs when the EHR enhancement schedule is set a year in advance.

Top-Performing Organizations for Governance

Figure 15

Bellin Health	
Case study publish date	March 2023
EHR vendor	Epic
Organization type	Midsize health system
Area of high performance	94th percentile for agreement that fixes are timely
Program goals	Create a ticketing system that improves efficiency and allows clinicians to keep tabs on their requests
Keys to success	• Keep end users in the loop as requests go through the review process • Have a specific process for different types of requests • Expedite quick fixes to keep requests from getting stuck • Be very clear about the problem being solved and what the solution looks like to be more efficient with more complex requests

What Bellin Health did

A few years ago, clinicians at Bellin Health expressed that it felt like their requests went into a black hole because they never received updates. As a result, Bellin implemented a process in which every ticket submitted receives a response about where the ticket is going. While these responses are not automated, analysts utilize canned text to quickly update end users on their requests. Clinicians can also follow up with the service desk personnel to check on the status of a ticket at any time. This transparency helps manage clinician wait time and prevents clinicians from submitting duplicate tickets, which is a drain on time and resources.

Each ticket goes through a process where it is bucketed as a larger system-resource request that requires a director or above to sponsor it due to the cost or impact, an enhancement/optimization request, a break-fix request that requires immediate attention, or a wish-list request. Wish-list requests include items from previous upgrades that were de-scoped or valid ideas that need additional investigation before they can be assigned for work. Each submission goes through a process, which includes following up with the person who submitted the request within 24 hours. Things that are broken are immediately queued to be fixed. Clinical governance groups and/or the operations team together with business relationship managers prioritize optimization/enhancement work. Sprint requests are simple requests or small projects that do not require a project manager. The organization has collaborative sprint meetings when more than one team is needed to complete the work to manage resourcing. They use EHR governance groups and standardized request forms to aid in reviewing, prioritizing, and allocating time and resources for the requests. Some EHR governance groups use a prioritization tool to aid in the prioritization process. Bellin is continuing to improve transparency to have a quarterly review together with the operations team of everything in the backlog so they can review which requests might need to be reprioritized or are no longer relevant. They are also working on an IT-improvement project to improve the system-resource-request process to create a more consistent and transparent process.

One way that Bellin helps save time and improve communication during the request process is to have relationship managers in clinical informatics groups work with the requester to establish a clear understanding of what the finished product should look like early on. This information helps reduce frustration for the analysts and the end user requesting the fix. This collaboration also helps develop a better end product because the analyst can offer recommendations for how to best address the clinician's

needs without compromising other functions. Bellin also engages the training team early in the process to help ensure existing solutions are explored.

Throughout this process, the goal is to keep the lines of communication open so that the requester knows where in the process the request is. Even if a request is against regulations or there is some good reason not to do it, Bellin follows up with the requester to close the loop and provide education.

Figure 16

Confluence Health	
Case study publish date	June 2023
EHR vendor	Epic
Organization type	Community health system
Area of high performance	92nd percentile for agreement that providers can request fixes
Program goals	Provide consistent, quality support for requested EHR fixes
Keys to success	• Use the help desk as the first line of EHR support for providers but be open to other communication channels to enable providers to easily express their technological needs • Have a fast track and a prioritization process to help resolve tickets • Communicate regularly about the status of tickets and what to expect for system changes

What Confluence Health did

Confluence Health's (Confluence) help desk helps maintain a good relationship with providers. The organization has promoted their help desk over the past year for technical and dedicated EHR support. The value of the help desk became apparent when there was an occasion where a surgeon asked for help from leadership, and the initial response was to physically send someone to assist. However, a board member—a primary care physician—corrected the situation by guiding the surgeon to call the help desk. This experience led the organization's leadership team to realize that promoting the help desk as a first point of contact was more efficient. The organization is now considering rebranding the help desk as the "how desk" to emphasize its role in guiding users to accomplish specific tasks. The help desk, staffed by two dedicated nonclinical staff members, has received positive feedback and high survey ratings for ongoing training opportunities, highlighting its value to clinicians and providers. The organization's leadership has received feedback from physicians who have had a positive experience with the help desk, emphasizing the help desk people's kindness and willingness to assist without making the caller feel inadequate.

When issues are uncovered, the help desk people enter tickets in ServiceNow for themselves and other IT teams if necessary to ensure the problems are addressed. This approach aims to make it easy for providers to report issues without disrupting their workflow. The help desk team also goes beyond EHR support by teaching providers how to use communication tools like Microsoft Teams, further establishing the help desk team as a go-to resource. The informatics team assists providers in articulating their problems and expedites the resolution process by eliminating unnecessary steps and involving the right teams to address the issues efficiently.

When a ticket is submitted by a subject matter expert (SME) who attends monthly meetings, it is given priority. The SMEs are registered nurses (RNs) and medical assistants (MAs) in the outpatient clinical setting and various disciplines such as RT, OT, and PT in the hospital setting. They represent their

department and possess clinical expertise and experience with the EHR system, enabling them to contribute valuable insights to the optimization process. These SMEs have already discussed the request with their managers. However, the team follows a standardized approach for new or unfamiliar requests. They send back a comment in the ticket with five questions to clarify the problem the requester is trying to solve.

The following are five standard questions used to evaluate requests:

- What problem are you trying to solve?
- What do you think you need the system to do?
- How is that being accomplished now?
- What guideline, policy, or data supports the request?
- How will you measure the success of this change if implemented?

The SMEs do not use any scoring system or matrix for evaluation, as they find these to be subjective, time consuming, and ultimately not valuable. This approach ensures that the requested change is the best option and that alternative solutions are considered. The requests and the associated five questions are then presented to an optimization committee. The committee includes outpatient optimization and inpatient department members, such as provider informatics personnel, nursing informaticists, analysts, and leadership. The committee discusses the requests and evaluates their feasibility and impact.

To communicate the status of requests to providers, the informatics team can update the ticket's status from "new" to "approved" and include relevant notes in the ticket. These updates are then sent back to the end user via email. When changes are made to optimize processes, Confluence uses various communication channels. Provider-specific changes are communicated by leadership for outpatient and inpatient settings. A primary care provider also conducts demo meetings to give updates on EHR changes. Additionally, the informatics team holds monthly meetings with inpatient and outpatient SMEs to share information and gather feedback.

Confluence believes that having standards and a shared philosophy is crucial to success. They recommend codifying guiding principles to streamline decision-making and reduce unnecessary debates. Their guiding principles are as follows:

- We leverage existing partnerships to meet business needs.
- We use what we have before purchasing new.
- We prefer to purchase a service rather than build/support on premises.
- We standardize and reduce the complexity of our environment.
- We utilize IT governance to guide project prioritization and alignment with the business.

The organization also has a working group called the clinical informatics team that is focused on standardizing BPAs to ensure a consistent end-user experience, and the order set team does the same. The goal is to move away from individualized approaches and toward standardized practices. Confluence suggests creating relationships through longevity, rounding, and fostering support from leadership.

Figure 17

Cottage Health	
Case study publish date	November 2022
EHR vendor	Epic
Organization type	Midsize community hospital
Area of high performance	86th percentile for agreement that clinicians have a voice in EHR changes
Program goals	• Create a new structure for a high-performing informatics team to better align work efforts with clinical, operational, and strategic goals, enhance the voice of the clinician in driving EHR improvements, and demonstrate enterprise value
Keys to success	• Remember that successful teamwork happens when IT/informatics efforts are focused on making changes for clinicians instead of imposing changes on them • Use EHR rounding to interact frequently with clinicians • Build teamwork and alignment by encouraging clinical leaders and IT/informatics groups to share their goals with each other

What Cottage Health did

Cottage Health, a midsized community hospital, engaged with Chartis in 2020 to create a road map for informatics clinical governance improvement. Between Cottage Health's 2018 and 2021 measurements, there was a 15% increase in repeat respondent agreement that their organization/IT team delivers well, and Cottage Health scored in high percentiles for agreement that end users have a voice in EHR changes. Due to their shared success, Cottage Health and Chartis presented at the Arch Collaborative Learning Summit 2022. If you would like to learn more, you can watch their session here.

A previous Collaborative report shows a Net EHR Experience Score difference of 124.1 points between those who strongly disagree that their organization/IT team delivers well versus those who strongly agree. This report also outlines the impact of other kinds of third-party involvement on increasing EHR satisfaction with examples from other case studies.

Chartis brought in highly experienced physician and nurse consultants who ran a series of workshops with Cottage Health's leadership and clinical informatics team to create a road map to EHR governance success. Cottage Health came out of the workshop with short-term, mid-term, and long-term goals to be completed in the following months/years.

Cottage Health's governance structure consists of two clinical informaticists, who are a part of the clinical informatics team reporting to the manager of clinical informatics, along with an inpatient physician lead and an ambulatory physician lead, both inpatient and ambulatory physician leads each with 0.2 FTE. All these people report to the CMIO. As seen in data from their 2018 measurement, Cottage Health identified that they were battling low engagement and trust in the IT and informatics teams with their end users. Clinicians felt that the IT team was like a black hole and stopped submitting requests to the team. Cottage Health's general focus on this journey to improvement was on partnership and collaboration. They sought to gain their end users' insights to prioritize needed requests. The IT team began to have a regular presence in all clinical workplaces through purposeful rounding. They went everywhere, listened, and taught as they went.

The utilization of consistent rounding is supported by data from the Arch Collaborative 2022 Guidebook. This report summarizes what successful organizations do with rounding: prepare brief content, ask probing questions, observe, then intervene and report back.

The clinical informatics team developed a monthly scorecard to present to executives and their medical community. This scorecard is concise (a single page), easy to read and digest, a way to celebrate wins (both quick and big), and a tool for accountability and transparency. This monthly scorecard is helpful to Cottage Health for gaining executive and clinical buy-in on their clinical informatics progress.

These are the ongoing and continuous steps Cottage Health is taking to advance clinical informatics maturity and adoption:

1. Establish or refine leadership roles
2. Integrate nursing and other clinical informatics resources into a unified clinical informatics program
3. Organize physician informatics leadership resources under the CMIO
4. Leverage clinical informatics to increase clinician engagement and ownership
5. Develop a clinical informatics value identification, tracking, and reporting methodology
6. Adopt and communicate standard work, tools, and techniques for the clinical informatics team
7. Establish/refine a superuser and physician champion program
8. Develop clinical informatics staffing, succession, client support, and communication plans

As a result of Cottage Health's efforts, Cottage Health's clinicians have seen the value of reporting and now want to partner with the clinical informatics team to solve the issues they are experiencing.

Figure 18

Harris Health System	
Case study publish date	February 2023
EHR vendor	Epic
Organization type	Community health system
Area of high performance	Highest score in the Collaborative for agreement that fixes are timely
Program goals	Better understand the needs of end users through frequent engagement with the informatics and IT teams
Keys to success	• Focus IT/informatics teams' efforts on making changes for clinicians instead of imposing changes on them • Use EHR rounding to interact frequently with clinicians • Provide a fast track for quick, obvious EHR changes • Requests are submitted following a consistent process

What Harris Health System did

Harris Health System attributes their success with EHR governance to their informatics and IT teams' structure that enables end users to submit requests easily and puts in place a strong feedback loop for the requests. When a clinician submits a request, there are two pathways the clinician can follow. The first pathway is submitting via the informatics team. This pathway requires the end user to email or go to the informaticist in their area or specialty. That allows for back-and-forth investigation so the informaticist can define the problem by digging into the real issue with the clinician and can see whether the request is feasible for approval. The second pathway is via the IT team. This pathway requires end users to enter tickets into a system, and then the IT team routes the requests to the IT analysts in their focus area. The

analysts will bring in informaticists in that same area who have more in-depth conversations with the end user who submitted the original request. These two different pathways make end users feel heard and create a quicker turnaround process for changes. Notably, both pathways involve the clinical informatics team at some point along the way, and those informaticists involve the clinician who made the request in order to gain a better understanding of what they are asking for.

Many departments at Harris Health System have an informaticist assigned to them, and for those areas without a specific informaticist or with inpatient and outpatient components, the organization leverages the informaticists on a position basis. The main point is getting people with the right knowledge to reach out to the best-fitting departments since they will be able to better analyze their workflows and help define the issues for those specific areas.

The process of request prioritization has three different levels at Harris Health System:

1. User groups: For requests with a smaller impact or that will only impact one area
2. Informatics and IT teams: For requests that will impact more than one area
3. Executive team: For requests that require budgeting and higher involvement

The user groups have members who are physician informaticists, nursing informaticists, and clinical representatives. They each have their own list of items to prioritize requests internally.

The informatics and IT teams have a standard way of prioritizing requests. Each submission is ranked on a 1–9 scale in three main categories: patient safety, regulatory, and efficiency. Each of these categories is broken down further into three different subcategories for ranking in prioritization. To learn more about Harris Health System's method, see the rubric at the bottom of the page.

When the executive team is involved with requests, that typically means the request involves much larger changes and more budgeting decisions. These requests are handled differently because they involve a lot of different decision-making parties that approve the changes and move them forward in the process.

A key to Harris Health System's EHR governance success is the communication and relationships between the informatics and IT teams. The IT analysts have regular meetings with the informaticists to review their work. The informaticists provide the context the analysts need in order to help prioritize the request, and the IT analysts are very receptive to the informaticists' feedback.

At Harris Health System, informaticists roles are mainly 0.2 FTEs, with a couple being 0.4 FTEs. Harris hopes in the future to have more full-time informaticists who can focus on clinician experience and spread across all pavilions so they can engage with end users on a regular basis. Having these boots-on-the-ground people who are consistently rounding helps bring back information from end users that will drive the day-to-day activities of the IT and informatics teams. When these informaticists do round, they present tips and updates, take feedback on the spot, and bring the feedback back to their team to discuss any issues. This creates greater transparency between the informatics team and the end users and therefore strengthens the trust and relationships between clinicians and informaticists.

Figure 19

Sharp Rees-Stealy	
Case study publish date	July 2023
EHR vendor	Epic
Organization type	Community health system
Area of high performance	99th percentile for agreement that providers can request fixes
Program goals	Ensure that providers are involved in and communicate regularly about the EHR improvement process
Keys to success	• Provide multiple avenues for submitting EHR fixes and requests. • Maintain provider workgroups with standard schedules and procedures to address EHR requests • Keep providers informed about the status of their requests and any upcoming EHR changes without overwhelming them with information

What Sharp Rees-Stealy did

Sharp Rees-Stealy (Sharp) takes a comprehensive approach to addressing provider requests for EHR changes by actively involving providers, using specialized provider workgroups, disseminating regular updates, and rewarding engagement. Workgroups led by clinical informaticists and physician champions evaluate and address provider requests using a standardized process. Sharp facilitates communication through monthly insights, and providers have flexible submission methods. The organization uses direct emails, monthly updates, and staff meetings for communication and progress updates.

Sharp has a multipronged approach to addressing provider requests for changes to the EHR. Their efforts contribute to high EHR satisfaction levels and the perception that fixes can be requested and implemented effectively within the organization. The organization has established four monthly workgroups: the Note Workgroup, the Order Workgroup, the Charge Workgroup, and the RX/Immunization Workgroup. Clinical informaticists and physician champions lead each group. The clinical informaticists are responsible for managing and filtering provider requests for each group. When a request is received, it is assigned to the appropriate workgroup. The workgroups follow a standardized process for evaluating and addressing the requests, and that process includes gathering relevant information, preparing an SBAR document, and presenting it at monthly meetings attended by IT personnel, clinical informaticists, physicians, compliance and operations representatives, and nursing staff. The goal is to make decisions quickly and efficiently, usually within 30 days.

All requests are logged, and clinical informaticists update providers on the progress of their requests. The clinical informatics associates (CIA) physician group provides feedback to the workgroups and reviews any decisions regarding broad changes made to the system. The CIA physician group then communicates updates to their colleagues. Communication is also facilitated through the organization's monthly clinical informatics insights newsletter, which includes updates on implemented changes and sometimes short videos demonstrations. Providers can enter a raffle by correctly responding to a question at the end of these updates. Winners receive a small reward, such as a Starbucks gift card, to incentivize provider engagement.

Sharp emphasizes the importance of striking a balance in communication. While it is crucial to keep providers informed, informaticists avoid overwhelming them with minor updates or changes. Informaticists act as "air traffic control" by curating information and ensuring that it benefits providers. For convenience and ease, providers submit requests through a variety of methods, such as direct communication with physician champions or clinical informaticists, that don't require lengthy

forms or surveys. This flexibility in the request process makes it easy and convenient for providers to offer recommendations.

The organization uses tools such as Microsoft OneNote and SharePoint to keep records of requests and their statuses, and specific clinical informaticists are assigned to manage the tracking process. Communication with providers primarily occurs through direct emails thanking them for their ideas and informing them when their requests will be implemented. There can be roadblocks in implementing specific requests, especially those requiring changes by the EHR vendor. In these cases, clinical informaticists continue to track requests until they are resolved. Additionally, monthly updates and staff meetings serve as opportunities to highlight the progress made on provider requests.

Figure 20

University of Michigan Health-West	
Case study publish date	June 2023
EHR vendor	Epic
Organization type	Academic health system
Area of high performance	92nd percentile for agreement that fixes are timely
Program goals	Resolve EHR issues and requests quickly and efficiently
Keys to success	• Provide multiple avenues through which providers can reach out for support or request a fix • Consistently communicate with providers to keep them informed of the status of their requests • Have a fast track for urgent requests and a process that allows for short turnarounds of standard requests • Regularly follow up on aging requests to ensure they are resolved promptly • Develop a prioritization process for all request types, including long-term projects

What University of Michigan Health-West did

The University of Michigan Health-West (UMH West) balances having necessary guardrails and enabling rapid change. Once changes are approved, standard requests can be implemented within two weeks, and changes for urgent or critical issues can be made within 24–48 hours.

The organization has created an open culture where end users are empowered to provide suggestions via many avenues, and suggestions are eventually processed through an internal work system for prioritization. Organization leaders have an open-door policy and work closely with end users. A strong nursing informatics program and a group of six health informatics providers from a variety of specialties round regularly and act as conduits of change, and both groups attend meetings to provide input on improvements. Additionally, a team of analysts plays a significant role and works closely with end users, resulting in prompt fixes.

The organization uses email and Webex spaces for collaboration and communication, empowering superusers to interact with the IT team to collaborate on workflow questions and system improvements. UMH West also has associate clinical leads of positive practice, who provide users with elbow-to-elbow support and show them how to make changes. The associate clinical leads of positive practice are not builders, but they help clinicians effectively use and optimize the EHR. Users can self-schedule time with a clinical lead to address their needs, leading to immediate improvements.

Break-fix issues are usually reported through the IT service desk, and tickets are created to track progress. The organization prioritizes and communicates updates to the requester based on the severity of the issue. To ensure prompt updates, the communication frequency ranges from hourly to every four hours for high- and urgent-priority tickets. The organization uses the same ticketing process for change requests and avoids letting tickets age beyond a week without providing updates. The resources assigned to change requests aim to proactively provide status updates to requesters for lower-priority requests at least every seven days. In addition, most requesters are actively involved in the fix process, providing subject matter expertise. End users also receive email notifications whenever their ticket is touched to inform them of progress.

Approved long-term change requests, such as plans to implement new modules, are placed on a three-year road map that is reviewed quarterly. These changes include financial considerations and require careful planning and decision-making processes to ensure they align with organizational goals and resources.

Creating Provider Efficiency: Personalization

Efficiency with the EHR is an area of acute pain for providers and one of the lowest-rated areas of EHR satisfaction. The power of personalization tools to allow organizations and individuals to meet the needs of end users without making any code changes (i.e., using functionality built into the system) is well documented in Collaborative research. We expect findings in this area to continue to expand in future years.

The effect of personalization tools on standardized care and care quality has not been studied by the Collaborative. There are many personalization tools that do not impact standardized care (e.g., personalized reports and chart filters).

Evidence-Based Practices

Personalization tools (sometimes called "user settings") are key to provider efficiency with the EHR

- About 37% of physicians use almost no personalization tools. Successful organizations help providers understand that personalization is critical for strong EHR efficiency and satisfaction. Less personalization is needed when the EHR has been optimized for the needs of specific specialties.
- Templates, chart review, and layouts are three personalization tools with the largest positive impact on EHR satisfaction—providers who use these tools report a higher NEES than those who do not. While templates are widely adopted, chart review and layouts are utilized less often.
- Personalization tools take time to set up, so just teaching personalization is often not enough. Providers need protected time to set up successful personalization. Off-site trainings can be especially effective for this. Additionally, personalization should be approached as an ongoing endeavor, not a one-and-done effort.

Whether they work in inpatient or ambulatory settings, providers who finish their documentation the same day report significantly higher satisfaction than those who do not

- Consistent same-day documentation requires personalization, strong workflows, a reasonable schedule, and discipline. Organizations with strong same-day documentation rates report it is possible to make improvements.
- IT leadership cannot help improve efficiency if they don't thoroughly understand current workflows. Successful and efficient organizations start with understanding.
- It is possible for scribes to help improve EHR efficiency, but they have not been proven to consistently improve EHR satisfaction. Organizations who use scribes successfully focus on a partnership between provider and scribe and ensure that both receive training on how to best work together to improve documentation.

Leading Practices

Organizations should holistically audit the full spectrum of technology used by providers, including hardware, badge logins, Citrix, network infrastructure, and system response time, as this technology impacts EHR satisfaction and efficiency

- The EHR is often treated as the scapegoat for inefficiency complaints. Downtime, login issues, old hardware, and old operating systems are frequently mentioned in conjunction with EHR frustrations. Keeping supporting technology running smoothly helps providers feel that their EHR is running smoothly too.
- Providers often aren't good at evaluating how well they utilize their technology and therefore will stay closed off to workflow-improvement help. Successful education often makes providers feel less proficient before it helps them feel more proficient.

Top-Performing Organizations for Personalization

Figure 21

Penn Medicine	
Case study publish date	July 2023
EHR vendor	Epic
Organization type	Academic health system
Area of high performance	92nd percentile for providers using personalization tools
Program goals	Enhance EHR workflow efficiency
Keys to success	• Build tailored personalization sessions into onboarding to help make personalization adoption more seamless for providers • Conduct regular marketing campaigns to spread awareness about available personalization resources and support

What Penn Medicine did

Penn Medicine's PennChart Advanced Clinical Education (PACE) team focuses on personalization and workflows in clinical education. They have implemented several efforts to personalize the use of the EHR for providers. One of their standard practices is to proactively reach out to providers who are new to the system and offer them a one-on-one EHR orientation session. There is also logic built into the PennChart Access Request form that automatically notifies the PACE team of a request for a personalization session. This session, which lasts two hours, is designed to cater to the specific needs of the providers and can be conducted virtually or in person.

Additionally, the PACE team has been working on a nine-month onboarding plan for new providers in primary care and specialty settings. This plan includes a two-hour new EHR orientation session followed by timed interventions and follow-ups to assess the providers' progress and identify any additional support they may need. The team leverages EHR usage data to evaluate the providers' performance and to determine what topics should be covered during the sessions. Education offered at Penn includes one-on-one, group, virtual, and in-person classes; monthly education; and a repository for education on the PACE website that includes eLearning, tip sheets, and knowledge links.

The personalization efforts are tailored to each individual provider, taking into account their specialty, role (e.g., inpatient or ambulatory), and specific needs. They cover layout preferences, recommend shortcuts, and create preference lists. The team also uses Signal data and a survey given to the provider to help determine what should be covered during the session. Each provider is paired with a member of the PACE team that has expertise in an area that best matches the provider's specialty and role. The team aims to provide efficient layouts and configurations for the EHR right from the beginning, as adopting changes later can be challenging. They also encourage knowledge sharing among providers by encouraging them to share effective layouts and tools they have discovered during their sessions. The team actively engages with providers during the sessions, tests their setup in a simulated environment, and provides suggestions based on their unique needs. The goal is to optimize EHR usage and promote efficient workflows across all providers.

To track the progress and effectiveness of the personalization sessions, the team maintains detailed documentation of each session, including the topics covered and any recommendations made. The team also conducts two concentrated marketing campaigns per year to raise awareness among providers about the available resources and support for personalization. Any provider can sign up for a personalization session at any time via a link on Penn's intranet. The team acknowledges that providers joining from other organizations may bring different perspectives and expectations based on their previous experiences. They leverage these insights to improve their own system and accommodate suggestions that align with their goals.

Figure 22

UCSF Health	
Case study publish date	August 2023
EHR vendor	Epic
Organization type	Academic health system
Area of high performance	93rd percentile for providers using personalization tools
Program goals	Optimize APPs' workflows and EHR experience
Keys to success	• Provide opportunities for new APPs to personalize the EHR with guidance from another provider in their specialty • Focus on establishing optimal workflows and overall efficiency, not just high personalization rates • Provide personalized, ongoing training for APPs

What UCSF Health did

UCSF Health's practices emphasize three key factors in achieving a high level of personali-zation for their APPs. First, new hires undergo an extensive onboarding process that in-cludes at-the-elbow EHR training with experienced providers to accumulate SmartTools and personalize their workflow. Second, initiatives within the organization address efficiency and optimization, leading to personalized solutions for providers. Finally, ongoing EHR train-ing is conducted through tailored courses based on individual APPs' needs, and feedback is collected to refine the program. The organization values input from APPs and prioritizes implementing suggestions for improvement. The focus is on empowering providers, opti-mizing workflows, and tailoring the EHR experience to enhance efficiency and meet shared goals. Through these efforts, in fiscal year 2023, there was a 19% decrease in after-hours EMR use among APPs.

At UCSF Health, it is required for a newly hired APP to spend six months working with anoth-er provider as part of their department onboarding. An experienced provider shows the new APP how to use existing tools and resources, such as SmartPhrases, templates, order pref-erences, and user preferences. That allows the new APP to accumulate a range of Smart-Tools and personalize their workflow. During the at-the-elbow training, the new APP works with someone within the same specialty, such as a physician, nurse practitioner, or physi-cian assistant, who has been established at the organization for a few years. This ensures that the training is relevant and tailored to the specific needs of the new provider's special-ty.

The second factor contributing to the high adoption of personalization within the organiza-tion is efficiency initiatives. UCSF Health believes in the importance of providing context to providers about the rationale behind the initiatives. Simply stating that something is a best practice may not convince providers to embrace changes. Instead, the focus is on estab-lishing a shared goal and demonstrating how alternative approaches can simplify tasks. This approach empowers providers to complete the requested tasks while minimizing the addi-tional burden on their workload.

The In Basket initiative aims to help providers effectively manage their time. It involves re-ducing the time spent in In Basket and minimizing the frequency of instances when provid-ers are the initial touchpoint for patient messages. Additionally, the initiative establishes pools and standard work based on profession type. This cross-institutional effort encour-ages all ambulatory departments to achieve a 10% reduction in provider-first interactions with patient messages by the end of the fiscal year. To implement the In Basket initiative, a work group visited different departments, starting with those with the highest rates of pa-tient advice requests going directly to APPs and physicians. The work group analyzed the processes involved in creating pools, including defining the responsibilities of nurses and addressing any knowledge gaps

among providers. As part of efficiency training, APPs were trained to optimize quick actions and develop other relevant skills for managing In Basket work. Deficiencies were identified as the initiative progressed rather than being identified at the outset.

In addition, UCSF Health evaluated the utilization of APPs by assessing the number of work relative value units (wRVU) and charges generated per full-time equivalent (FTE). They eval-uated areas with low wRVUs to identify underlying issues, which may have stemmed from gaps in education about EHR functionality and limitations in the EHR that prevent certain billing workflows. APP education plays a crucial role in addressing these issues. Personali-zation is key in lowering the barrier for providers to achieve institutional goals more easily. Specific recommendations include incorporating charge capture in activity tabs, organizing coding-speed buttons, and compliant documentation and billing for shared visits.

The third factor is ongoing EHR training for established APPs. The organization conducted a pilot program including one inpatient and two outpatient APP groups. Initial proficiency was measured using data from Epic's Signal tool. The interventional program involved a combi-nation of asynchronous and live virtual classroom sessions. The APPs were enrolled in Ep-ic's Power User courses. The courses were tailored to the specific needs of each APP based on their individual Signal data, which identified areas of opportunity. The APPs were given protected time to complete the courses. At the end of the program, there was a two-hour group meeting to integrate efficiency optimizations, such as chart filters, order organiza-tion, and builds for SmartTools. The presence of an instructor during the training sessions and the protected time helped ensure effective learning and the implementation of person-alized workflows. Six weeks after training, there was an average 21% increase in Signal pro-ficiency scores and a 41% increase in EHR satisfaction scores. 86% of participants were in-terested in additional EHR training.

UCSF Health recognizes the challenge of getting protected time for training and plans to make improvements based on the lessons they have learned. They aim to provide a live, virtual orientation with the ongoing EHR training program to encourage course completion. They also recommend providing CME credits for the courses because that can be an addi-tional incentive for providers to participate. In addition to personalization efforts, the organi-zation also values insights and feedback from APPs regarding improving the EHR experi-ence and EHR training. UCSF Health collects feedback about enhancing the system and ad-dresses the suggestions through an APP informatics work group.

Figure 23

WellSpan Health	
Case study publish date	July 2023
EHR vendor	Epic
Organization type	Community health system
Area of high performance	93rd percentile for providers using personalization tools
Program goals	Improve provider efficiency through data-driven personalization tool adoption
Keys to success	• Introduce personalization options to providers early in the onboarding process • Make recommendations for data-driven EHR personalization • Use screen recordings of provider EHR usage to inform personalization recommendations for established providers

What WellSpan Health did

WellSpan Health (WellSpan) attributes their high provider personalization tool adoption to the early introduction of personalization tools during training and continual at-the-elbow support from physician leaders. The organization has established a culture that values efficiency and emphasizes the role of operational leadership in driving personalization tool adoption. WellSpan provides individualized support and data-driven recommendations, and they analyze provider interactions to troubleshoot EHR issues and improve workflows overall. WellSpan also highlights the importance of prioritizing efficiency when adopting personalization tools and guides providers to make informed choices.

WellSpan encourages personalization tool adoption within each provider's first two weeks of seeing patients. During the classroom training for newly onboarded providers, WellSpan introduces the possibility of greater efficiency through personalization tool use. They highlight potential benefits and showcase available personalization tools. WellSpan prepares providers to see the value of the at-the-elbow support they will receive after the initial training, when they will have the opportunity to adopt personalization tools with the support of the physician informatics training and support liaisons (PITSL) team. During at-the-elbow sessions, providers are encouraged to adopt personalization tools from the checklist provided by the PITSL team. This checklist includes personalization tool recommendations for inpatient and ambulatory providers. The recommended tools have been found to improve provider efficiency based on Signal data and screen recordings of provider workflows. The screen recordings are automatically collected for each provider and stored for 48 hours to help give the PITSL team context when reviewing provider workflows or troubleshooting issues. The PITSL team also helps providers set up the EHR according to their personal preferences while encouraging choices that promote efficiency.

The PITSL team is comprised of 16 full-time employees from diverse backgrounds, including individuals with clinical or teaching experience and a deep knowledge of EHR functionality. The PITSL team is also partially composed of Epic-credentialed trainers. The team handles various responsibilities for initial training and ongoing EHR education using methods such as classroom training, phone support, at-the-elbow support, rounding in the hospital, and additional clinical support by request. The team demonstrates their value to WellSpan's leadership through monthly quantitative reports that show improvements in efficiency due to at-the-elbow support and positive qualitative feedback from providers. The quantitative reports record the number of support calls, at-the-elbow support sessions for new and established providers, practice visits, days of hospital rounding, classes conducted, and personalization labs held. Qualitative feedback from providers is collected in the LMS after each provider has completed at-the-elbow education, and a link is sent to providers that leads them to the KLAS trainer quality benchmark survey.

WellSpan benefits by utilizing practice managers to drive the personalization tool adoption process. They leverage the support of management and reinforce the benefits of personalization during training sessions. They also provide dedicated time for personalization tool education during onboarding and encourage managers to prioritize personalization tool setup for new providers. The practice management team strives to accommodate individual provider preferences while guiding providers to avoid note bloat.

In addition to assisting newly onboarded providers, WellSpan's PITSL team provides at-the-elbow support for established providers. Providers can request assistance through their practice managers, or members of the PITSL team may invite a provider to schedule a session when they notice the provider might benefit from personalization tool use. The PITSL team uses a similar checklist of personalization tool recommendations for new and established providers, but the team also reviews the recordings of each provider's workflow to identify additional efficiency tips.

Creating Provider Wellness: Reducing Burnout

The mission of the Arch Collaborative is to ignite a revolution in EHR satisfaction. As part of that mission, the Collaborative measures provider satisfaction with the EHR and works to understand how the EHR experience impacts burnout. While the Collaborative is not focused on alleviating or preventing burnout, the following insights are valuable for organizations to consider as they work toward that goal.

28% of providers who have participated in the Arch Collaborative report symptoms of burnout. For providers, the EHR is a commonly reported source of burnout, after workload (including lack of control over workload and after-hours workload), time spent on bureaucratic tasks, and staffing shortages. Across clinician roles, the sense of administrative work being prioritized over clinical care is exacerbated by extra clicks, confusing screens, low-value alerts, and other EHR complexities. Organizations can lessen burnout by empowering IT teams to engage with providers to help them solve problems (whether through training or technology), ensuring providers' voices are heard and their concerns are addressed (see also Shared Ownership: Provider Relationships and Communication and Shared Ownership: Governance).

Evidence-Based Practices

Healthcare organizations should proactively optimize technology's ability to alleviate burnout by reducing time spent on bureaucratic tasks and reducing after-hours work

- While the EHR is often cited by providers as a key contributor to burnout—a fact that cannot be overlooked—EHR improvements alone are unlikely to significantly improve provider wellness.
- Providers who agree that their organization has implemented the EHR well and has appropriately trained users are 2.1 times less likely to report burnout.
- Burnout is a very people- and team-centric problem that requires very people- and team-centric solutions. Making EHR or related-technology improvements is only part of the solution. When providers feel like they are being heard and are part of the solution, they have a higher tolerance for EHR-related challenges.
- Team leaders/managers and care teams can help combat burnout, but many physicians don't have a manager or a strong team. It is important to set up teams to help physicians create a sense of community and a structure for organizational feedback. While physician managers might not be needed to manage physician activities, they should be engaged and knowledgeable about their physicians' needs.

Inefficient charting can increase the likelihood of burnout

- Providers who spend fewer than six hours per week charting after hours are 2.4 times less likely to report symptoms of burnout.
- Teaching providers how to personalize the EHR can give them a sense of control over their own documentation. Providers who feel efficient and get through charting faster are less likely to experience burnout.
- Organizations can help providers personalize workflows and set up processes that ensure documentation is completed at the time of care.
- Improving same-day documentation rates requires concerted effort from all stakeholders. Organizational leadership must examine workflows to ensure they are reasonable and allow documentation to be completed quickly.
- Users must similarly manage their own workloads and must be proficient and disciplined enough to finish documentation quickly.

On average, providers who feel their organization is doing a great job with the EHR have lower rates of burnout

- Burnout levels are lower among providers who feel their organization implemented, trained on, and supports the EHR well.
- Providers are less likely to report burnout when they report fewer than six hours of afterhours charting per week, are satisfied with how quickly EHR fixes are made, and/or agree their organization effectively communicates about changes to the EHR.

Providers who are completely burned out are 17 times more likely to report they are planning to leave their organization

- The more burned out a provider is, the more likely they are to report wanting to leave their organization.

Leading Practices

Burnout is multi-factorial, and focusing on only one aspect won't have sufficient impact—it is important to check in with providers frequently about their sense of burnout

- Organizational leaders need to keep a finger on the pulse of their teams' sense of burnout. It is critical to identify teams that need assistance. There are many ways to accomplish this (monthly surveys, morning huddles, escalation opportunities, monthly leadership reporting, etc.).
- Caregivers notice the heart of an organization's culture. If the patient is truly the focus, that prioritization of a larger good reduces burnout. While it is difficult to quantify culture, there seems to be a correlation between an organization's sense of mission and the level of burnout their providers report.
- All clinical team members should be cognitive partners in the care team. Scribes, medical assistants, and other team members should be listened to and encouraged to contribute meaningful feedback on decisions.
- Investment in all clinical roles, including medical assistants and scribes, is critical. Successful organizations encourage all team members to practice at the top of their license because the organization has invested in their competence.
- Organizations with low burnout rates understand that some location-specific EHR personalization is important for efficiency and provides autonomy, reducing burnout. These organizations work with location leadership to understand their needs and allow for the right level of local control.
- Medicine is a high-tension and high-risk profession. In this environment, communication can be strained. One important tactic for reducing burnout is focusing training on successful communication strategies.

Top-Performing Organizations for Reducing Burnout

Figure 24

Harbin Clinic	
Case study publish date	May 2023
EHR vendor	athenahealth
Organization type	Ambulatory care group
Area of high performance	97th percentile for clinicians reporting no burnout
Program goals	• Help clinicians feel a part of the community, not simply part of a medical group • Create a team and a family atmosphere within departments
Keys to success	• Focus on maintaining a community and culture within the organization through acknowledging accomplishments and encouraging participation in EHR changes • Implement team events throughout the year both at and outside of work to build comradery

What Harbin Clinic did

Harbin Clinic has focused on having their culture be an integral part of clinical life at their organization. This has led to clinician happiness at the organization and in turn has helped clinicians want to keep working at the organization. Being part of the community is important to clinicians at Harbin Clinic. Many of the clinicians employed by Harbin Clinic grew up in the area, and this has helped them to create a family atmosphere within the organization. New employees in orientation discuss why they want to work at the organization. Clinicians are reminded that they are simply people caring for people. This enables them to be genuine and authentic in giving high-quality care to patients.

One thing that is emphasized is remembering in the end that we are social creatures that thrive from comradery whether at work or outside of it. Gathering throughout the year is a high priority for Harbin Clinic to strengthen comradery within the organization. The gatherings can be simple things, such as trivia nights or pumpkin decorating contests, more complex yearly gatherings to celebrate employees who have invested time into Harbin Clinic, or holiday celebrations. Other simple things that the organization does include T-shirt Fridays. Through these events, Harbin Clinic has developed a cohesiveness between groups and departments. The results of these events and activities have been lower burnout as well as an organization that clinicians want to work for and stay at for many years.

The events that occur at Harbin Clinic are brought forth through internal communication across clinics and departments. Events are organized by marketing and HR departments in collaboration with executives, managers, and directors. Monthly communications go out via email to all employees to celebrate the successes within departments. These successes are not all work-related endeavors; they can be things such as winners of the pumpkin decorating contest, or they can be work-related things like good reviews from patients. Through these monthly communications, Harbin Clinic has been able to build momentum within their organization and build a culture of looking for and celebrating individual successes as well as the successes of their peers. This has helped clinicians to feel invested in the organization.

A key to having good events at the organization is maintaining communication between managers, directors, and executives to ensure that events are meaningful and impactful for clinicians. Other emphases include ensuring that clinicians' schedules align so that these activities can take place and determining whether the events are team-building activities or family events.

Honoring the accomplishments of team members is a big emphasis for Harbin Clinic. They want each individual to know that they are appreciated for their hard work. Harbin Clinic's yearly night of celebration highlights anniversaries of working at the organization. They roll out the red carpet to recognize these team members for their accomplishments.

Outside of events, Harbin Clinic has helped clinicians be engaged in what occurs in their EHR. Participation is encouraged to ensure that certain features and functionalities are installed or improved in their system. Clinicians are instructed to make their voice heard so that changes can be made and enhancements can be implemented. This has created a more efficient product for clinicians to use in their clinical practice. An important aspect of implementing and delivering change is Harbin Clinic's Health Education Assessment Team. This team plans what education needs to be done to bridge the gaps for clinicians and to deliver meaningful content.

Harbin Clinic has alleviated burnout and helped clinicians stay at their organization by having fun events at or outside of work, focusing on being a part of the community, honoring the accomplishments of clinicians, maintaining communication between departments, and helping clinicians to feel that their voice is heard in improving their EHR.

Figure 25

Illinois Primary Health Care Association	
Case study publish date	July 2023
EHR vendor	athenahealth, eClinicalWorks, Epic
Organization type	Ambulatory care group
Area of high performance	89th percentile for providers reporting no burnout
Program goals	• Build a culture that encourages open discussion of burnout • Empower clinicians to identify and address the symptoms of burnout in themselves and their peers
Keys to success	• Provide educational resources and practical tools so that clinicians can identify and address their personal sources of burnout • Focus on building a culture that fosters clinicians and administrators working together to proactively discuss and treat burnout

What Illinois Primary Health Care Association did

As burnout continues to be one of the biggest challenges that healthcare organizations grapple with, it is becoming glaringly apparent that every clinician experiences burnout differently. A pain point for one clinician may be only a minor inconvenience for another. This dilemma creates a difficult obstacle to overcome because broad wellness interventions may not have as large of an impact as hoped for. To overcome this barrier, Indiana Primary Health Care Association (IPHCA) developed a toolkit to help each individual clinician identify and participate in the intervention that will most effectively address their personal stressors and needs.

At the heart of IPHCA's approach to burnout prevention and intervention is a toolkit known as the IPHCA Stress Screening and Resource Guide. This toolkit was developed in collaboration with administrators, clinicians, and behavioral health consultants and includes a combination of educational resources and practical tools aimed to improve workplace culture and enhance the resiliency of every member of the care team. This toolkit allows for an evidenced-based assessment of the level of stress experienced by

employees at an individual level and offers suggestions and strategies to address these concerns before it is too late.

The educational resources contained in the toolkit are two-fold. First, there are resources aimed at reshaping the workplace culture. This component of the toolkit focuses on educating and guiding administrators and clinical leaders as they work to establish communities of wellness by encouraging them to create spaces for shared experiences, foster a culture of gratitude, restore employee break rooms, and require breaks so employees can take needed time to disconnect, decompress, and bond with their colleagues. Second, additional educational resources are aimed at helping employees and administrators alike learn how to recognize the signs, symptoms, and risk factors of burnout in themselves as well as in their coworkers. These resources teach employees how to initiate and effectively discuss the signs of burnout with their peers so that members of each care team can check in with and support one another. Gathering in small groups is a simple but powerful method to initiate a meaningful reduction in stress associated with the workplace. By establishing a focus on improving the work environment and raising awareness on how to identify early signs of burnout, IPHCA is better able to apply the practical tools and interventions needed to successfully treat each individual's stress.

The Workforce Support Toolkit also includes various assessments such as the Healthcare Burnout Inventory (adapted from the Maslach Burnout Inventory) as well as the Stress Vulnerability Assessment. Once employees have completed these assessments, there are lists of resources and strategies that can be used to alleviate the specific type of stress that is causing the biggest burden for each individual clinician. Examples of strategies included range from in-the-moment coping techniques (breathing exercises, initiating a quick conversation with a colleague) to interventions for sustaining long-term wellness (learning how to ask for help when overwhelmed, spending time in nature, saying "no" to extra responsibilities). Likewise, the listed resources range from crisis support groups to digital apps and tools that can be used daily to help manage stress.

While the Workforce Support Toolkit is a powerful educational tool and can prepare employees to identify burnout, IPHCA recognizes that it is equally important to provide solutions to alleviate the associated stress. For example, staffing shortages are frequently cited as one of the largest contributors to clinician burnout. Because of this, IPHCA has established a range of tools aimed at reducing stress associated with staffing challenges. This includes IT support groups, various automation tools, and EHR plugins. In essence, the Workforce Support Toolkit helps employees recognize what their personal pain point is, and IPHCA follows up by providing targeted solutions so that clinicians have a means to address their personal stressors.

Finally, IPHCA recognizes that all burnout intervention and prevention strategies must be interdisciplinary. If even one member of the care team is having a rough day, the well-being of everyone else on that team may be impacted. Through the Workforce Support Toolkit and other intervention strategies, IPHCA has successfully provided resources for their employees so that they can adequately identify the signs of burnout, know what tools are available to them to reduce their personal pain points, and effectively use tools to improve their overall well-being while at work. By taking this approach, IPHCA embodies the idea that wellness is achieved not by the Herculean effort of one but by the aggregate of the many small efforts made by each individual.

Building a Technological Foundation: System Reliability and Response Time

Meeting providers' basic technological needs—not only around the EHR but also around everything it touches (including internet and hardware)—is critical to EHR satisfaction. System reliability and response time play an important role in meeting providers' needs, yet they don't receive a lot of attention unless they aren't working as intended. While most organizations report having a moderately reliable system, those with unreliable systems have significant problems. Response time is a more common pain point across Collaborative respondents and requires more focus from the organization (proactively tracking login time, using solutions from other vendors, keeping software and hardware up to date, etc.). Organizations who are most successful with their system reliability and response time seek out and manage technological recommendations from vendors and proactively address updates, fixes, and hardware replacements.

Evidence-Based Practices

Consistent remote access to the EHR is correlated with response-time satisfaction

- Providers want to have a consistent EHR experience, whether they are in their office, the clinic, or working remotely.

Poor response time can negatively impact perception of reliability, even if there is very little downtime

- Uptime is only one aspect of how providers perceive reliability. Anything that slows down EHR use or impedes provider efficiency can negatively impact provider trust in the system.

Leading Practices

Schedule monthly downtime to stay on top of updates and fixes

- Organizations who are highly satisfied with system reliability and response time schedule routine, brief instances of downtime that impact the fewest number of patients and clinicians as possible (usually around 2 a.m. on a weekday).

Keep scheduled downtimes as short as possible; consider all instances of downtime as a risk to patients

- Successful organizations do a lot of planning, preparing, and testing prior to scheduled downtimes to ensure everything runs smoothly and that things that don't absolutely have to be completed during downtime can be done before or after.

Build redundancies into your technological infrastructure

- Organizations can create a backup plan to keep the lights on for patients and providers in the event of a technical emergency, like a network or internet outage. To be highly successful, failovers should be routinely tested, and if an outage occurs, a root-cause analysis should be conducted to determine how to avoid the same problem in the future.

Dedicate a team to hardware maintenance and replacement

- Budgeting and planning for hardware upkeep and purchases can prevent outdated or broken hardware from causing problems with system reliability and response time.

Top-Performing Organizations for System Reliability and Response Time

Figure 26

Carle Health	
Case study publish date	August 2023
EHR vendor	Epic
Organization type	Community health system
Area of high performance	91st percentile for satisfaction with system response time
Program goals	Promote patient safety and clinician satisfaction through fast EHR response time
Keys to success	• Budget for and follow the infrastructure recommendations from the EHR vendor • Proactively monitor response time to prevent and quickly resolve potential problems in addition to investigating complaints from clinicians • Adhere to a hardware maintenance and replacement schedule

What Carle Health did

Carle Health (Carle) prioritizes provider satisfaction and patient safety with the EHR system's response time and reliability through adhering to vendor recommendations, testing extensively, doing regular server upgrades based on inventory assessments, and including upgrades in their budget planning. They maintain 100% capacity in their data centers to ensure redundancy while continuously collecting and analyzing data to allow for proactive monitoring. An infrastructure team handles hardware maintenance, and a complaint registration process and thorough investigation are used to address response time issues.

At Carle, clinician satisfaction with the EHR system's response time is achieved through several strategies. First, they rely on the recommendations and extensive testing conducted by the EHR vendor. The EHR vendor performs tests on different platforms and provides explicit recommendations on the number of servers required for specific functions. During system upgrades, an inventory is conducted, and based on the results, additional servers are added to meet the requirements of the upgraded version. Doing inventory on the servers reveals that older servers often can no longer support the new version of the EHR effectively. In such cases, replacing those servers, which may be nearing five years of age, with fresh ones is recommended. By eliminating outdated servers, the organization avoids the need to support multiple versions of processors, thus enhancing system performance. Carle includes the cost of anticipated upgrades in their budget. The budgeting process occurs in September or October, and assessment meetings with the EHR representatives are held in June to plan for the upcoming fiscal year. This proactive approach allows Carle to anticipate the hardware needs and allocate resources accordingly.

The organization has an infrastructure team responsible for maintaining the hardware. They generally have a five-year maintenance contract, and when the hardware is about to go off maintenance, it is replaced. The specific schedule for hardware maintenance ensures that the infrastructure remains up-to-date and can support the EHR system effectively. Maintaining 100% capacity in both data centers is another practice followed by Carle. This means they have 200% capacity over what is required on the server side, ensuring redundancy and minimizing the risk of system failure. By having at least 100% capacity, even if one server fails, the system can continue to operate smoothly.

Carle has established a process for registering complaints and investigating them. Users can contact the help desk or contact the EHR team directly. The EHR collects performance data, allowing Carle to drill down and analyze specific issues. Carle also uses tools within Epic that collect real-time data and capture screenshots to diagnose and resolve workflow or configuration issues. Response time issues are often found to be related to configuration rather than technical problems. If there is a problem with internet

and Wi-Fi connectivity, users can reach out to the help desk for support. Different locations within the organization have IT personnel who provide on-site assistance. The networking aspect is crucial to ensure fast and reliable connections, and the organization works to maintain sufficient bandwidth and diverse paths to minimize downtime. The organization emphasizes the use of Cisco hardware for its network infrastructure and places importance on diverse connectivity paths. While ensuring diverse paths requires additional work during circuit requests, the organization collaborates with carriers to achieve complete diversity along the pathway. This focus on redundancy and carrier diversity sets Carle apart from other organizations that may prioritize cost savings.

Figure 27

Connecticut Children's	
Case study publish date	June 2023
EHR vendor	Epic
Organization type	Children's hospital
Area of high performance	99th percentile for agreement that system is reliable
Program goals	Keep planned and unplanned EHR system downtimes to a minimum and reduce lag time in the EHR
Keys to success	• Build in redundancy and automatic failover to technological infrastructure to keep providers online in case of a system failure • Keep planned downtimes to less than an hour to reduce the impact on providers and their patients • Stay on top of software and hardware updates, fixes, and replacements to reduce unplanned downtimes

What Connecticut Children's did

At Connecticut Children's, system reliability starts with having a highly dependable infrastructure with two active data centers serving their entire population, allowing 50% of users to run out of each data center. They use server-based computing to improve performance and update their system in a single data center, updating hundreds of devices simultaneously. They have virtualized 99% of their infrastructure, providing resilience and automated failovers for any component that experiences too much load or a slowdown. The network infrastructure is also redundant, providing seamless failovers in case of data circuit loss. The system has rare unplanned downtimes, with most downtime planned for upgrades and maintenance events.

Planned downtimes are divided into two maintenance windows. The first is for nonclinical applications, during which Windows Server patching and other maintenance tasks are performed overnight or early in the morning when there are fewer people working in the system. The second maintenance window is for clinical applications, including the EHR. The goal is to keep downtimes to less than an hour. The process has been refined over time, and some tasks are automated, such as server patching and using a clear runbook for EHR patching and upgrades. The organization also periodically conducts drills on downtimes and performs database failovers at least once a year to ensure the downtime process is efficient. They also test the changes in a test environment the week before the downtime. There has been a clear focus on streamlining processes and limiting downtime—even scheduled downtime, which requires a lot of preparation.

Connecticut Children's has a five-year refresh cycle for their data center equipment and follows their EHR vendor's recommended target platforms. They also use virtual desktops and published apps to extend the lifespan of their desktop environment, with a seven-year refresh cycle for thin clients. The organization routinely assesses their Wi-Fi performance and network infrastructure to ensure connectivity and accessibility. They have set up alarms and alerts to monitor and address issues with equipment and keep their infrastructure resilient and redundant.

The organization recommends using a daily management system (DMS) to track important metrics. This may include using a DMS board and having daily huddles to talk about situational awareness, safety concerns, staffing, and equipment. They also suggest reviewing weekly all performance metrics on the EHR while looking at response times and exception rates. They emphasize the importance of identifying the issues negatively impacting the EHR by isolating them and monitoring infrastructure design architecture for the right issues. Troubleshooting at Connecticut Children's involves a root-cause analysis so that they can learn from the problem and work to prevent such incidents from happening again. Finally, they suggest building the right team that listens to ideas to improve the organization's processes and infrastructure.

Figure 28

Hennepin Healthcare	
Case study publish date	July 2023
EHR vendor	Epic
Organization type	Large health system
Area of high performance	96th percentile for agreement that system is reliable
Program goals	Minimize planned and unplanned system downtime
Keys to success	• Establish monthly and quarterly scheduled downtime to keep abreast of system maintenance and EHR updates as well as prevent outages • Keep scheduled downtime as short as possible through extensive planning, testing, and preparation • Conduct root-cause analysis for unplanned downtime and help prevent problems from recurring • Work with executive leadership to prioritize investing in technology

What Hennepin Healthcare did

Hennepin Healthcare (Hennepin) maintains system stability using a monthly scheduled downtime window for routine system maintenance and updates. They conduct major system updates quarterly and are transitioning to a biannual maintenance schedule. To keep the downtime window short, the team focuses on preparation and proactive work effort and completing tasks such as updates and patches within the specified time. Unplanned downtime is infrequent and mostly related to network outages. The team has implemented testing procedures to mitigate unplanned downtime, including reviewing release notes, creating testing scripts, and reporting issues to the EMR vendor. These measures minimize the impact of issues during planned or unplanned downtime.

Hennepin attributes the success in maintaining system stability to establishing a scheduled downtime window since the beginning of the EHR implementation. This planned downtime window enables Hennepin to perform system maintenance, apply updates, and keep the system running optimally. The established downtime window occurs on the third Monday of every month from 4:00 a.m. to 4:30 a.m.

The organization created this schedule after working with operational partners and considering factors such as the census and the need to bring the system back up before an influx of patients arrives for same-day surgery. The team performs major system updates on the first Tuesday of each quarter, and they are transitioning to a biannual maintenance schedule. Hennepin had challenges keeping up with the quarterly cadence from a project standpoint and also due to the impact to the end user while still moving other organization priorities ahead at the same time. Their goal is to maintain our quarterly cadence and do system upgrades twice a year and bucket other projects the other two quarters.

The team that supports the back-end infrastructure is comprised of three people and focuses on preparation and proactive work effort to keep the downtime window short. They aim to complete all standard maintenance tasks within the specified window, such as EHR updates, Windows and Linux patches, and application patches. They use the same processes each and every month to help ensure they can meet the downtime window. On the rare occasion that they run long, they can easily reach their house supervisor and ED charge nurse and provide them updates. The ED and inpatient staff members during the 4:00 a.m. hour are well trained and can typically handle things without too much worry. The Hennepin team continually strives to improve efficiency and ensure timely updates while maintaining system health. Hennepin also uses rigorous testing practices such as leveraging a team of system architects to review release notes and develop specific testing scripts for monthly and major updates. The organization minimizes the frequency of changes and schedules minor changes during the already-scheduled downtime window to reduce the impact on end users. Major system upgrades are coordinated with the training team so that during the downtime window, clinicians are trained on the changes, better preparing them for the modifications reflected in the update.

When implementing major upgrades, the team follows a consistent process, focusing on minimizing the amount of work needing to be completed during the actual system downtime and prioritizing what must be done before users return online. The Hennepin team conducts extensive testing, and a small team manages the EHR infrastructure with access to necessary tools for quick and efficient updates. The application side of the team also tests upgrades in multiple environments and performs a final practice run in a full copy of the production environment before the change or upgrade. Hennepin strives to ensure a smooth system transition during upgrades, and they have reduced the downtime for upgrades to between 8 and 15 minutes.

Unplanned downtime is infrequent at Hennepin; when downtime occurs, it is mainly related to network outages rather than issues with the EHR infrastructure. The organization has downtime procedures in place, but some departments and shifts may be more familiar with them than others. Downtime binders containing necessary paper documentation tools and downtime medical record numbers can be issued as well. The organization also has links to electronic copies of necessary paperwork. However, due to the short downtime, the departments typically just go into a holding pattern. If they do have an emergent patient in the ED, they proceed with treating the patient and catch up on the paperwork side of things as necessary.

To mitigate unplanned downtime, the team has implemented a robust testing structure. They review release notes, create testing scripts, and identify and report issues with downtime to the EHR vendor. The team's proactive approach to identifying and fixing problems aims to prevent any end-user impact. The team conducts root-cause analyses for each instance of unplanned downtime to identify the reasons behind significant events and enact further preventive measures. They examine technical aspects, such as human error or automation issues, and process-related factors, including event management and communication. The team constantly learns from previous experiences with EHR system downtime and other system downtime to improve their practices and minimize future incidents.

Figure 29

Intermountain Health	
Case study publish date	November 2022
EHR vendor	Oracle Health (Cerner)
Organization type	Large health system
Area of high performance	• 26% increase in agreement that the EHR is reliable • 22% increase in agreement that the EHR has a fast system response time
Program goals	Monitor EHR performance to help identify issues that are impacting end users in real time
Keys to success	The use of Goliath Technologies' solution to constantly monitor difficult-to-find but easy-to-fix reliability and speed issues with the EHR

What Intermountain Health did

Intermountain Health experienced a 26% jump in agreement that their EHR is reliable between their first measurement in June of 2019 and their second measurement in November of 2020. They also experienced a 22% increase in agreement that their EHR has a fast system response time, a 15% increase in agreement that their EHR vendor (Oracle) delivers well, and an 8% increase in agreement that their organization/IT delivers well.

Goliath Technologies (Goliath) can help healthcare organizations by providing software that will isolate and solve performance issues that impact EHR satisfaction. These identified issues are typically easy to fix but very difficult to find without added technology. Goliath also provides this software with a total cost of ownership that considers the financial constraints that many healthcare organizations face.

Intermountain started their journey with Goliath in March of 2019 in two of their three regions after identifying their need to improve their overall EHR performance. Intermountain needed to have as much data as possible on their EHR system's performance, and they needed enough granularity to see individual end-user data, so they decided to select Goliath's solution for its robustness. Goliath's solution provides 20–30 more data points than other solutions. Goliath provides Intermountain with dashboard views that allow them to gain a more in-depth look at EHR performance on a real-time basis, and with constant monitoring, this type of visibility allows Intermountain to catch issues right away.

Previous research has shown how an EHR system's reliability and response time or speed can impact perceptions of patient safety and overall EHR satisfaction. This research also informs us that some challenges with reliability and response time are tied to bigger infrastructure issues such as computers, monitors, workstations, or other IT equipment.

Intermountain relayed one story to us about a physician in a rural Intermountain clinic in Utah. This physician was complaining about issues with how her EHR was operating in the clinic. The system was taking about 20 minutes just to load. After analyzing the physician's data with Goliath, Intermountain noticed her connection wasn't native to the clinic. It was coming from a different location. That location ended up being her house, where she did the majority of her charting after work. There ended up being infrastructure issues within her home network that she was able to fix.

When Intermountain first decided to use Goliath's solution, it required a big lift from the organization due in part to the sheer size of Intermountain. It took about 18 months to get the solution's functionality completely up and running. However, due to the effort Intermountain put in with Goliath before the go-live (Intermountain has Goliath's gold-level support, which includes ad hoc consulting and support), the transition was completely seamless and didn't affect end users in any way. Intermountain and Goliath

teams collaborated often during the implementation and the integration into Goliath's enterprise data warehouse. This collaboration helped smooth out the integration process as well. Goliath's main target during the implementation was Intermountain's clinics, as the clinics were citing more issues (mainly with internet connectivity and performance) than other locations. Intermountain also uses Goliath's solution in their hospital locations. With the solution, Intermountain can monitor every Citrix connection they have through Oracle. Intermountain's iCentra integration technical team monitors the data, which can be seen on a dashboard and is viewable daily. Data will run in the background, and the solution will alarm the technical team when something is out of a benchmark.

Goliath provided valuable insights, which assisted Intermountain in delivering on a comprehensive plan that included upgrading their infrastructure, reducing the frequency of changes to the system, moving to model code, and launching a training program focused on mastery. These projects led to increased results in EHR satisfaction.

In the future, Intermountain hopes Goliath can create and push live functionality to monitor single sign-on performance, as that feature is lacking now. Intermountain noted that their main takeaway from their partnership with Goliath is that issues are not always the EHR vendor's problem and not always the organization's problem. Rather, there is a shared responsibility between the vendor and the organization that has the EHR product.

Figure 30

University of Wisconsin Health	
Case study publish date	May 2023
EHR vendor	Epic
Organization type	Academic health system
Area of high performance	97th percentile for agreement that system is reliable
Program goals	Reduce the length of planned instances of downtime and prevent unplanned system outages
Keys to success	• Schedule monthly downtime to reduce unexpected outages and break needed maintenance into manageable pieces • Do as much work as possible before and after instances of downtime to reduce the amount of time when the system is unavailable • Do extensive planning and testing before instances of downtime to ensure they run as quickly as possible and without incident • Have a team dedicated to a hardware maintenance and replacement schedule who can also address unexpected hardware problems • Build redundancies into the technological infrastructure in case of unexpected outages

What University of Wisconsin Health did

At UW Health, scheduled downtime usually occurs on the third Thursday morning of every month, starting no earlier than 2:30 a.m. and with a hard stop at 4 a.m. before the lab starts. The date and time of the monthly schedule was chosen through a combination of data analysis and discussion. The enterprise analytics team provided trend data of hospital census and ED throughput, as well as trends of patient acuity in the ED. Discussions with ED leadership were informed by that data. ED leadership opted for a monthly downtime schedule when the ED tends to be the least busy. UW Health plans to review the data and revisit discussions with ED leadership to ensure the downtime schedule continues to strike the right

balance between limiting disruption to the ED and ensuring technical maintenance can be completed on a reliable schedule. They rely on this agreed-upon schedule as their usual cadence but also adjust for local events that are known to result in busier nights in the ED. For example, they would shift the downtime if it were to occur on the same night as a University of Wisconsin football home game.

The length of the downtime depends on the functions deemed necessary to perform during the outage that month. Their instances of downtime for upgrades are usually only 15–20 minutes long, and non-upgrade instances of downtime tend to be 30–35 minutes long. The instances of downtime at UW Health have been reduced to their current length by constantly questioning what is essential to do during downtime and what can be done before or after the downtime. UW Health will also break up work that will take longer into multiple instances of downtime to reduce the length of each outage. UW Health's upgrade downtime is noticeably shorter than that of most other organizations using the same EHR vendor because of the work UW Health has done to reduce their downtime length for upgrades. They hope to continue reducing the length of non-upgrade downtime through the same process.

UW Health also relies on technical testing and preparation before upgrades are implemented in production. They conduct three dry runs, including a technical-only dry run, with their database administrator team and two build-migration dry runs. These dry runs aim to ensure that all necessary changes can be quickly and smoothly moved into production without any issues. Problems can arise if multiple teams have builds in progress and are not communicating effectively. That can cause delays during the actual upgrade. Those delays could be significant and may require people to be woken up in the middle of the night to untangle the build and avoid further unnecessary delays.

One recurring issue for the organization is related to their PACS. UW Health specifically monitors their PACS after their downtime ends so they can respond to and correct any issues quickly. While their PACS is the specific system UW Health focuses on after an upgrade, other organizations may experience challenges with other systems. UW Health suggests identifying the problematic systems and making an action plan to increase the reliability of systems with challenges. If there are multiple systems that require improvement, organizations should focus on improving the reliability of their most critical systems first. They recommend using targeted interfaces and integrated testing as part of making significant changes, including a cutover process to minimize the duration of their downtime.

Regular maintenance during scheduled downtime helps to reduce unplanned downtime. Continually postponing maintenance can create a riskier environment for an EHR, and that may result in something breaking down. UW Health also believes it is important to follow EHR vendor guidelines for infrastructure requirements to ensure the system functions optimally. They monitor the EHR system's capacity and load balance and shift things around as necessary. By doing so, the system can handle increased usage and perform optimally. UW Health uses alerts and monitoring systems that notify the database team immediately if something goes down, allowing the team to address any issues proactively.

Additionally, UW Health's IS director is always on call, and if there is an issue with the system, they can rally the necessary resources to fix the problem. Having a leader who is accountable and knows how to pull in people to solve issues is essential. Having redundant infrastructure ensures that the system can handle any unplanned downtime. Having multiple data centers and sufficient internet infrastructure allows for failover in case of server maintenance or other issues.

There is also a dedicated team at UW Health that focuses on end-user hardware, and they have a schedule for maintenance and device replacements. UW Health makes hardware replacement schedules based on the expected lifetimes of devices, the purpose of devices, whether issues are occurring, and their budget. For instance, they might replace devices before their expected end of life if they are experiencing issues or degradations in service. Conversely, UW Health might not replace a device on or near its expected end of life if it isn't experiencing issues and isn't a prioritized need. They plan for device replacement

in their budget to avoid or limit unexpected costs. The team is responsible for replacing devices that have reached the end of their lives and ensuring that they are functioning properly. UW Health plans to monitor devices and identify when they need to be replaced before they cause issues. It is easy to push hardware maintenance to the bottom of the priority list, but having a team to monitor and maintain devices is essential. The team can identify problem points and adjust plans to address them before they cause downtime.

UW Health's system also has opportunities for speed improvement. That is not related to downtime. Instead, it is related to the slowness of certain processes. UW Health suggests that this could be related to the platforms they are running on and whether those platforms meet minimum requirements. The infrastructure team proactively monitors this and plans for infrastructure upgrades, such as adding processing power or changing servers. They also integrate 80%–90% of available system updates from their EHR into the upgrade process. That reduces the volume of ad hoc critical fixes and helps address some performance concerns.