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Product Name: EHR1 v.2.0

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For public release:

EHR One, LLC attests that the usability standard/process and usability report submitted for the certification of EHR1 v.2.0 is accurate and complete per the requirements of the ONC criterion 170.315(g)(3).

Ross Seymour
Chief Executive Officer
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08/24/2019

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For public release:

EHR One, LLC used the following usability design standard, ISO 9241-210 in developing and designing their HIT system, EHR1.

Title: Ergonomics of human-system interaction -- Part 210: Human-centered design for interactive systems.

Description: ISO 9241-210:2010 provides requirements and recommendations for human-centered design principles and activities throughout the life cycle of computer-based interactive systems. It is intended to be used by those managing design processes and is concerned with ways in which both hardware and software components of interactive systems can enhance human–system interaction.

URL: http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=52075

Ross Seymour
Chief Executive Officer
EHR One, LLC
08/24/2019

Usability Test Report for EHR1 v.2.0

Report based on the NISTIR 7742 Customized Common Industry Format Template for Electronic Health Record Usability Testing.

EHR1 v.2.0

Date of Usability Test: 12/9/19-12/15/19
Date of Report: 12/15/2019
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EXECUTIVE SUMMARY

A usability test of EHR1 v.2.0 was conducted from 12/9/19-12/15/19 via remote sessions. EHR1 is a cloud based, dental electronic health record software. A computer terminal at an office in Santa Ana, CA was setup for usability testing and was shared with each participant. The purpose was to test and validate the usability of the current user interface and provide evidence of expected the functionality in the EHR. During the usability test, 10 participants matching the target demographic criteria served as participants and used the EHR in simulated, but representative tasks.

This study collected performance and usability data on 10 tasks typically conducted in the EHR during the following workflow processes:

- Computerized Provider Order Entry: Meds, Labs, and Diagnostic Imaging
- Demographics
- Problem List
- Medication List
- Medication Allergy List
- Clinical Decision Support
- Clinical Information Reconciliation
- Implantable Device List

During the one-hour, one-on-one usability tests, each participant was greeted by the administrator, provided an introduction and the goals of the study, test procedures, and guidelines. Each participant was asked to review and sign/complete the following documents: (1) Participant Recruitment Information Form, (2) Non-Disclosure Agreement, (3) Informed Consent & Participant Agreement Form, and (4) System Usability Scale Questionnaire. Participants were instructed that they could withdraw at any time. None of the participants had any prior experience with EHR1 v.2.0. The administrator then briefly described each task one-by-one including the objective of each task and then instructed participants to complete each task, recording the time each task begun and/or finished. During the testing, the data logger(s) recorded test times, performance data, and feedback from each participant on paper, that was later additionally recorded electronically. The test administrator did not assist participants regarding how to complete any tasks during the test.

Participants had no prior experience with EHR1 v.2.0. Training materials such as user guides with instructions and screenshots of how to complete tasks were provided during the test, as well sample test data such as laboratory test names, medication names, dosages, etc. Participants were instructed to reference these user guides at any time during each task as needed. The user guides provided are the same guides provided to actual users; no additional training was provided to participants for the purposes of this study.

The following types of data were collected during each participant's test:

- Number of tasks successfully completed within the allotted time without assistance
- Time to complete the tasks
- Number and types of errors
- Path deviations
- Participant's verbalizations
- Participant's satisfaction ratings of the system

All participant data was de-identified. Following the conclusion of the tests, participants were asked to return their signed Non-Disclosure Agreement, Informed Consent & Participant Agreement, and complete a System Usability Scale Questionnaire. Each participant was also compensated 100$ (gift card) for their time and asked to return a signed Compensation Receipt Acknowledgment once their compensation was received. Various recommended metrics, in accordance with the examples set forth in the *NIST Guide to the Processes Approach for Improving the Usability of Electronic Health Records*, were used to evaluate the usability of EHR1. The table below is a summary of the performance and rating data collected from the study on EHR1:

INTRODUCTION

The EHR tested for this study was EHR1 v.2.0 EHR1 was designed for ambulatory dental practices to record and manage patient health information and charts electronically, including dental and periodontal charting. Dental providers and their staff can order medications, input orders and results for labs and imaging, reconcile updated clinical information, receive clinical decision support alerts, and more. Many practice management functions are also built into EHR1, such as managing patient appointments, exchanging secure messages with patients and providers, and sharing updated patient health information electronically through a Patient Portal. The usability study performed was meant to represent realistic functions and tasks.

The purpose of this study was to satisfy the 170.315(g)(3) Safety-Enhanced Design test requirement to achieve a 2015ONC EHR Certification, as well as test and validate the usability of the current user interface and provide evidence of usability in EHR1. Measures of effectiveness, efficiency and user satisfaction were recorded during the usability study.

USER-CENTERED DESIGNED PROCESS

In its initial design and subsequent development stages, EHR1 used a user-centric design strategy, focusing on that first and foremost, and then integrated ONC required features and functions into the user-centric designed foundation. Our goal from the beginning to was to develop an EHR that was user-friendly and intuitive to use by our target users. Our target users would then able to achieve their specific goal in the EHR with effectiveness, efficiency, and satisfaction per the ISO standard, ISO 9241-210 wanted. The goal

is to achieve the 2015 ONC HER Certification while at the same time, providing the required features and functions to promote and report for Meaningful Use and an increased usage of healthcare technology. We referred to the standards of ISO 9241-210 to guide our user-centric design strategy.

Our user-centric design strategy includes the following:

- Ensure all design and development team members understand the overall goals of our target users utilizing the EHR
- Emphasis on usability, in terms of effectiveness, efficiency, and satisfaction
- Using the right project management tools such as Zendesk to regularly communicate UI improvements, suggest UI design changes, etc. to the right team members
- Enabling and encouraging feedback from our users; providing multiple ways to contact us and share their feedback and user experiences
- Researching the latest health care technology requirements to integrate so that users will always have an EHR that meets their health care technology compliance needs

METHOD

Participants

A total of 1-, matching the target participant eligibility criteria (see Table 2 below), tested EHR1. Participants in the test included dental providers, dental hygienists, dental assistants, and dental practice administrators/office managers. Participants were existing or previous consulting clients with a partner company, iHealthOne, and were compensated with a $100 (gift card) each for their time. In addition, all participants had no direct connection to the development of EHR1. Additionally, none of the participants were employees or contractors with iHealthOne. Participants were provided with basic task guides.

For the test purposes, end-user characteristics were identified and translated into a recruitment screener used to solicit potential participants; an example of a participant screening script is provided in Appendix 1 and a Participant Recruitment Information Form in Appendix 2.

Recruited participants had a mix of backgrounds and demographic characteristics conforming to the recruitment screener. The following is a table of participants by characteristics, including demographics, professional experience, computing experience and user needs for assistive technology. Participant names were replaced with Participant IDs so that an individual's data cannot be tied back to individual identities.

Target Participant Eligibility Criteria

1. Has no prior experience with EHR1 v2.0
2. Has not participated in a focus group or usability test in the past 6 months
3. Does not, nor does anyone in their home, work in marketing research, usability research, or web design
4. Does not, nor does anyone in their home, have a commercial or research interest in an electronic health record software or consulting company

Participant Demographic Data

Part ID	Gender	Age	Education	Current Title	Years at Current Position	Years using EHR/Practice Mgmt Software	EHR1 v2.0 Experience	Assistive Tech. Needs
1	F	30-39	HS	OM	6	6	0	n
2	M	20-29	BS	Front Office	5.1	5.1	0	n
3	f	40-49	HS	OM	9	4	0	n
4	F	40-49	BS	OM	17	4	0	n
5	F	40-49	HS	Front Office	3	3	0	n
6	F	50-59	BS	OM	15	3	0	n
7	F	50-59	BS	F/Back Office	3.4	4	0	n
8	F	30-39	HS	FO Supervisor	1	3	0	n
9	F	30-39	HS	Front Office	15	2	0	n
10	F	30-39	BS	Admin Assist	1.2	1.2	0	n

Table 2: Participant Demographic Data

Ten (10) participants (matching the demographics and eligibility criteria in the section on Participants) were recruited and ten (10) participated in the usability test. Zero (0) participants failed to show for the study.

Participants were scheduled for 60-minute sessions with 5-10 minutes in between each session for debrief by the administrator and data logger, and to reset systems to proper test conditions. A spreadsheet was used to keep track of the participant schedule and included each participant's demographic characteristics as provided to the recruiting staff.

Study Design

Overall, the objective of this test was to satisfy the 170.315(g)(3) Safety-Enhanced Design test requirement. We also sought to identify areas where the EHR functions performed well and areas where the EHR failed to meet the needs of the participants and needed improvement. The data from this test will serve as a baseline for future usability tests for an updated version of EHR1. In short, this testing serves as both a means to record or benchmark current usability, but also to identify areas where improvements must be made.

During the usability test, participants interacted with only with EHR1. Each participant accessed the EHR remotely via an established computer workstation setup specifically for this test. The computer workstation was in the same location for each test and participants were provided remote access to the testing computer workstation through Zoom, a remote conferencing service. The system was evaluated for effectiveness, efficiency and satisfaction as defined by measures collected and analyzed for each participant:

- Number of tasks successfully completed within the allotted time without assistance
- Task Ease/Efficiency Ratings
- Time to complete the tasks
- Number and types of errors
- Path deviations
- Participant's verbalizations (comments and feedback)
- Participant's satisfaction ratings of the system

Additional information about the various measures can be found in Section 4.K. on Usability Metrics.

Tasks

Tasks chosen for this usability study were based on functions required by the ONC for EHR Certification. One or more individual, specific tasks were then selected to be representative each of the ONC-required functions to be tested. The test administrator provided any necessary sample test data such as medication names and dosages to participants to complete each task during the test. The tasks selected were also meant to be typical for users demonstrating Meaningful Use. The nine ONC-required functions are:

- Computerized Provider Order Entry: Meds, Labs, and Diagnostic Imaging
- Demographics
- Problem List
- Medication List
- Medication Allergy List
- Clinical Decision Support
- Clinical Information Reconciliation
- Implantable Device List

Since the workflow process of creating, editing, and viewing 170.315(a)(1) Computerized Provider Order Entry of Laboratory Orders is identical to that of 170.315(a)(1) Computerized Provider Order Entry of Diagnostic Imaging Orders, creating, editing, and viewing 170.315(a)(1) Computerized Provider Order, the risk ratings will be the identical.

This is also true for enabling/disabling any of the Clinical Decision Support alerts as well as viewing any of the on the patient's chart; all five Clinical Decision Support alerts are enabled or disabled individually in an identical manner in the EHR.

A risk level (low, moderate, or high) was also determined for each ONC-required function as well as any of the specific representative tasks. The factors determining the risk level include the health safety risk to patients and whether or any health information is edited that may affect an alert such as a critical Clinical Decision Support alert from displaying.

Below is a table of all tasks tested and their determined risk level:

Test	Task	Risk Category
170.315(a)(1)	CPOE Meds	High
	1. Record Medication via CPOE	High
	2. Change Medication via CPOE	High
	3. Display Changed CPOE Medication Order	Low
170.315(a)(2)	CPOE Labs	
	4. Record Lab via CPOE	High
	5. Change Lab order via CPOE	High
	6. Display changed CPOE lab order	Low
170.315(a)(3)	CPOE Diagnostic Imaging	
	7. Record Imaging order via CPOE	High
	8. Change Imaging order via CPOE	High
	9. Display changed CPOE imaging order	Low
170.315(a)(5)	Demographics	
	10. Record patients pref. language, dob, birth sex, race, ethnicity, sexual orientation, and gender identity.	Low
	11. Change patients pref. language, dob, birth sex, race, ethnicity, sexual orientation, and gender identity.	Low
	12. Display patients pref. language, dob, birth sex, race, ethnicity, sexual orientation, and gender identity.	Low
170.315(a)(6)	Problem List	
	13. Record a problem to the problem list	High

	14. Change a problem on the problem list	High
	15. Display the active problem list	Low
	16. Display the historical problem list	Low
170.315(a)(7)	Medication List	
	17. Record a medication to the medication list	High
	18. Change a medication on the medication list	High
	19. Display the active medication list	Low
0	20. Display the historical medication list	Low
170.315(a)(8	Medication Allergy List	
	21. Record a medication allergy	High
	22. Change a medication allergy	High
	23. Display the active medication allergy list	Low
	24. Display the historical medication allergy list	Low
170.315(a)(9)	Clinical Decision Support	
	25. Add a CDS intervention and/or reference resource for each of the required elements: problem list, medication list, medication allergy list, at least one demographic, laboratory results, vital signs, and a combination of at least 2 of the elements listed	High
	26. Trigger the CDS intervention/resources added using the applicable data elements from each of the required elements	High
	27. View the intervention/resource information using the Infobutton standard for the data elements in the problem list, medication list, and demographics	Low
	28. Trigger the CDS interventions/resources based on data elements in the problem list, medication list, and medication allergy list by incorporating patient information from a transition of care/referral summary	High
	29. Access the following attributes for one of the triggered CDS interventions/resources: bibliographic citation, developer, funding source, release/revision date	Low
170.315(a)(14)	Implantable Devices	
	30. Record UDI	High
	31. Change UDI status	High
	32. Access UDI, device description, identifiers, and attributes	Low
170.315(b)(2)	Clinical Information Reconciliation and Incorporation	

	33. Incorporate a CCDA and conduct reconciliation of the medications, medication allergies, and problems in the CCDA with the information currently in the patient's record	High
	34. Generate a new CCDA with reconciled data	High

Table 3: Risk Levels for Tasks

Procedures

Prior to the start of each test session, the test administrator prepared the computer workstation used for testing. This included removing any unnecessary folder and files from the computer's Desktop, other than the EHR1 user guide resources and test data information made available to each participant during their session. The test administrator also verified that the Internet connection was fully working, all hardware equipment was functional, and that she and the data logger could both view the monitor and hear any audio together without any impediments.

Each test session began once the participant, test administrator, and data logger were all securely connected via a Zoom conference call and remote session connection. Both the conference call phone number and remote session link were sent to each participant prior to their scheduled test date and time. The test administrator first confirmed the identity of the participant, delivered an introduction and overview of the test, and asked permission to record the test session. Once permission was given by the participant, the test administrator began the recording of the test session.

The test administrator moderated all sessions which included explaining the objective and providing instructions for each task that each participant was asked to attempt and/or complete. The test administrator also monitored task start and end times and took notes on participants' comments and feedback. The data logger was responsible for logging start/end times, notes on task success, and path deviations. At the conclusion of each test session, the test administrator would end the recording and save the recording to the secure server folder and the data logger would scan and save all handwritten notes to the server, and then transcribe all data and notes to spreadsheets. The data logger also then collected the post-test System Usability Scale Questionnaires, verified that all testing documentation had been completed and returned by all participants, and sent out compensation payments and obtained a signed Compensation Receipt Acknowledgment in return.

Test Location

EHR1 is a cloud-based electronic health records system and was designed to be accessed anywhere, anytime by our users. For this reason and because we selected eligible participants in multiple geographical locations and time zones, we conducted all test sessions remotely, following guidelines and recommendations from https://www.usability.gov/how-to-and-tools/methods/remote-testing.html.

All test sessions were conducted remotely from a computer workstation in Santa Ana, California via Zoom. Participants were asked to call into a conference call phone number with assigned Meeting ID #'s and join the remote test session via a Zoom meeting link. Each test session was conducted in a controlled environment in which the same computer workstation was used for all participants, and the same fictitious patient sample data and EHR user guide resources were provided to all participants.

Test Environment

In order to simulate as realistic a user experience as possible, a computer workstation from the EHR One, LLC office, specifically setup for usability testing, was shared remotely with all participants; participants used their own computer hardware locally. Participants were granted access via remote connection through a secure connection to the EHR1 usability testing computer workstation and given mouse control by the test administrator near the beginning of the test session. Audio was available through a phone on speaker so that the test administrator and data logger could both hear the participant at the same time. The test administrator controlled the EHR1 usability testing computer workstation (other than when the participant was given mouse control) and the data logger was positioned next to the test administrator during each test session.

The EHR1 usability testing workstation included a Dell tower, LG monitor, and ran on Windows 10 OS. The browser used for all participants was Google Chrome.

Test Forms and Tools

During the usability test, various documents and instruments were used, including:

1. Participant Recruitment Information Form
2. Informed Consent & Participant Agreement
3. Non-Disclosure Agreement
4. Moderator's Guide & Data Tracking Sheets
5. System Usability Scale Questionnaire
6. Compensation Receipt Acknowledgment

Examples of these documents are in the Appendices. The Moderators' Guide was devised to guide the test administrator on the overall procedure. Each Data Tracking Sheet was used by the data logger to capture task successes and failures, task times, path deviations, errors, ratings and notes in real time during the

test from one task to the next. EHR1 user guides were also provided on the EHR1 usability testing computer workstation, saved to the Desktop for each participant.

The participant's interaction with EHR1 was captured and recorded digitally with remote connection software (Zoom) running on the EHR1 usability testing computer workstation. All audio was transmitted between the participant, test administrator and data logger via a conference call that was recorded also in conjunction with the remote connection session.

Participant Instructions

During the screening process, each prospective participant was asked to complete a Participant Recruitment Information Form that collected required demographic and background information.

As part of the introduction at the beginning of each test session, the test administrator explained the goals for the usability test and how the test session would be conducted as well as any guidelines the participant should follow. They also encouraged participants to freely share their thoughts and feedback when prompted, and not to worry about hurt feelings they might cause.

For each task participants were instructed to attempt/complete per the following instructions:

- As quickly and efficiently as possible, making the least number of errors and deviations as possible.
- Without assistance from administrators who could give immaterial guidance and clarification on tasks only.
- Limit the use of a think aloud technique.

For each task, participants were given a written copy of the task. Task timing began once the administrator finished explaining the task and answering any preliminary questions from the participant. "Begin" was verbally said aloud by the test administrator for the participant to begin the task and for the data logger to begin tracking the time. The task time was stopped once the participant indicated aloud, they had successfully completed the task, or the test administrator noted that the task had been completed. Data Scoring is discussed below in Section 4.L. After all tasks have been attempted and/or completed by the participant, the test administrator read the name of each task one-by-one and asked the participant to rate the ease of use and efficiency for each task on a scale of 1 to 5 (1 being Very Easy or Very Efficient and 5 being Very Difficult or Very Inefficient). Following the conclusion of the test session, the data logger sent the participant the post-test System Usability Scale Questionnaire (see Appendix 6), checked all documentation had been completed and returned, compensated them for their time, and obtained a completed Compensation Receipt Acknowledgment.

Usability Metrics

According to the *NIST Guide to the Processes Approach for Improving the Usability of Electronic Health Records*, EHRs should support a process that provides a high level of usability for all users. The goal is for users to interact with the system effectively, efficiently, and with an acceptable level of satisfaction. To this end, metrics for effectiveness, efficiency and user satisfaction were captured during the usability testing. The goals of the test were to assess:

1. Effectiveness of EHR1 by measuring participant success rates and errors
2. Efficiency of EHR1 by measuring the average task time and path deviations
3. Satisfaction with EHR1 by measuring ease of use ratings

Data Scoring

The following table details how tasks were scored, errors evaluated, and the time data analyzed.

Measures:	Rationale and Scoring:
Effectiveness: ***Task Success***	A task was counted as a "Success" if the participant was able to achieve the correct outcome, without assistance, within the time allotted on a per task basis. The total number of successes were tallied and then divided by the total number of participants. The results are provided as a percentage. Task times were recorded for successes only.
Effectiveness: ***Task Failures***	If the participant abandoned the task, did not reach the correct answer or performed it incorrectly, or reached the end of the allotted time before successful completion, the task was counted as a "Failure." No task times were recorded for "failures".
Efficiency: ***Task Deviations***	The participant's path (i.e., steps) through the application was recorded. Deviations occur if the participant, for example, went to a wrong screen, clicked on an incorrect menu item, followed an incorrect link, or interacted incorrectly with an on-screen control. This participant's path was then compared to the optimal path.
Efficiency: ***Task Time***	Each task was timed from when the administrator said "Begin" until the participant said, "Done." If he or she failed to say "Done," the time was stopped when the participant stopped performing the task or completed the task successfully. Only task times for tasks that were successfully completed were included in the average task time analysis. Average time per task was calculated for each task.

Satisfaction: ***Task Rating***	At the end of each test session, each participant was asked to rate the ease of use of each task on a scale of 1 (Very Easy) to 5 (Very Difficult). Each participant was also asked to rate the efficiency of each task on a scale of 1 (Very Efficient) to 5 (Very Inefficient). Participants' subjective responses were averaged across participants. To measure participants' confidence in and likeability of the EHR1 overall, the testing team administered the System Usability Scale (SUS) post-test questionnaire. A full copy of the System Usability Score questionnaire is in Appendix 6.

Table 4: Details of how observed data were scored. **RESULTS**

Data Analysis and Reporting

The results of the usability test were calculated according to the methods specified in the Usability Metrics section above. Participants who failed to follow session and task instructions had their data excluded from the analyses. In a few test sessions, participants did not closely follow the test instructions or did not complete the task assigned and their results do not represent ideal test results. An example of participants not following test instructions include talking and commenting excessively during their attempt to complete the task.

The usability testing results for EHR1 are detailed below (see Table 5 below). The results should be seen in light of the objectives and goals outlined in Section 4.D. Study Design. The data should yield actionable results that, if corrected, yield material, positive impact on user performance, which is discussed in further detail in Major Findings and Areas for Improvement (see Section 5.F.).

a.1 CPOE Meds: 1. Record Medication via CPOE						
Part ID	**Task Success**	**Path Deviations**	**Task Time (sec)**	**Errors**	**Task Ease Ratings** *(1=Very Easy; 5=Very Difficult)*	**Task Efficiency Ratings** *(1=Very Efficient; 5=Very Inefficient)*
1	y	0	54	0	1	1
2	y	0	50	0	1	1
3	y	1	87	1	2	2
4	y	0	30	0	1	1
5	y	0	60	1	1	1
6	y	0	120	2	2	2
7	y	1	77	1	2	2
8	y	0	58	1	1	1
9	y	1	70	1	2	2
10	y	0	30	0	1	1
	Mean:	**0.3**	**63.6**	**0.7**	**1.4**	**1.4**
	SD:	**0.48304589**	**26.93283828**	**0.6749486**	**0.51639778**	**0.51639778**

a.1 CPOE Meds: 2. Change Medication via CPOE						
Part ID	**Task Success**	**Path Deviations**	**Task Time (sec)**	**Errors**	**Task Ease Ratings** *(1=Very Easy; 5=Very Difficult)*	**Task Efficiency Ratings** *(1=Very Efficient; 5=Very Inefficient)*
1	y	0	20	0	1	1
2	y	0	15	0	1	1
3	y	0	8	0	1	1
4	y	0	11	0	1	1
5	y	0	45	0	1	1
6	y	0	22	0	1	1
7	y	0	29	0	1	1
8	y	0	40	0	1	1
9	y	0	45	1	1	1

10	y	1	31	1	1	1
	Mean:	**0.1**	**26.6**	**0.2**	**1**	**1**
	SD:	**0.31622777**	**13.62350909**	**0.421637**	**0**	**0**

a.1 CPOE Meds: 3. Display change via CPOE Med Order						
Part ID	**Task Success**	**Path Deviations**	**Task Time (sec)**	**Errors**	**Task Ease Ratings** *(1=Very Easy; 5=Very Difficult)*	**Task Efficiency Ratings** *(1=Very Efficient; 5=Very Inefficient)*
1	y	0	1	0	1	1
2	y	0	1	0	1	1
3	y	0	10	0	1	1
4	y	0	7	0	1	1
5	y	0	11	0	1	1
6	y	0	1	0	1	1
7	y	0	14	0	1	1
8	y	1	20	1	1	1
9	y	0	5	0	1	1
10	y	0	4	0	1	1
	Mean:	**0.1**	**7.4**	**0.1**	**1**	**1**
	SD:	**0.31622777**	**6.345602152**	**0.3162278**	**0**	**0**

a.2 CPOE Labs: 4. Record labs via CPOE						
Part ID	**Task Success**	**Path Deviations**	**Task Time (sec)**	**Errors**	**Task Ease Ratings** *(1=Very Easy; 5=Very Difficult)*	**Task Efficiency Ratings** *(1=Very Efficient; 5=Very Inefficient)*
1	y	2	181	2	3	3
2	y	6	75	5	5	5
3	y	6	301	6	5	5

4	y	0	57	1	2	2
5	y	1	120	2	2	2
6	y	1	83	1	2	2
7	y	2	73	3	2	2
8	y	2	240	3	3	3
9	y	0	90	1	2	2
10	y	1	125	1	2	2
	Mean:	**2.1**	**134.5**	**2.5**	**2.8**	**2.8**
	SD:	**2.18326972**	**81.15588566**	**1.779513**	**1.22927259**	**1.22927259**

a.2 CPOE Labs: 5. Change lab via CPOE						
Part ID	**Task Success**	**Path Deviations**	**Task Time (sec)**	**Errors**	**Task Ease Ratings** *(1=Very Easy; 5=Very Difficult)*	**Task Efficiency Ratings** *(1=Very Efficient; 5=Very Inefficient)*
1	y	1	30	1	2	2
2	y	0	45	1	1	1
3	y	0	49	1	2	2
4	y	0	39	0	1	1
5	y	1	121	1	2	2
6	y	0	24	0	1	1
7	y	0	32	0	1	1
8	y	1	112	1	2	2
9	y	0	30	0	1	1
10	y	0	27	0	1	1
	Mean:	**0.3**	**50.9**	**0.5**	**1.4**	**1.4**
	SD:	**0.48304589**	**35.51666276**	**0.5270463**	**0.51639778**	**0.51639778**

a.2 CPOE Labs: 6. Display change to lab order						
Part ID	**Task Success**	**Path Deviations**	**Task Time (sec)**	**Errors**	**Task Ease Ratings** *(1=Very Easy; 5=Very Difficult)*	**Task Efficiency Ratings** *(1=Very Efficient; 5=Very*

						Inefficient)
1	y	0	1	0	1	1
2	y	0	1	0	1	1
3	y	0	8	0	1	1
4	y	0	12	0	1	1
5	y	0	1	0	1	1
6	y	0	15	0	1	1
7	y	0	11	0	1	1
8	y	1	45	1	2	2
9	y	0	30	0	1	1
10	y	0	1	0	1	1
	Mean:	**0.1**	**12.5**	**0.1**	**1.1**	**1.1**
	SD:	**0.31622777**	**14.60783656**	**0.3162278**	**0.31622777**	**0.31622777**

a.3 CPOE Imaging: 7. Record Imaging order via CPOE						
Part ID	**Task Success**	**Path Deviations**	**Task Time (sec)**	**Errors**	**Task Ease Ratings** *(1=Very Easy; 5=Very Difficult)*	**Task Efficiency Ratings** *(1=Very Efficient; 5=Very Inefficient)*
1	y	0	40	0	2	2
2	y	0	42	0	1	1
3	y	1	74	1	2	2
4	y	0	20	1	1	1
5	y	1	51	1	1	1
6	y	1	83	1	2	2
7	y	0	55	1	2	2
8	y	1	143	2	2	2
9	y	1	82	1	2	2
10	y	0	70	1	1	1
	Mean:	**0.5**	**66**	**0.9**	**1.6**	**1.6**
	SD:	**0.52704628**	**33.77704678**	**0.5676462**	**0.51639778**	**0.51639778**

a.3 CPOE Imaging: 8. Change Imaging order						
Part ID	**Task Success**	**Path Deviations**	**Task Time (sec)**	**Errors**	**Task Ease Ratings**	**Task Efficiency**

					(1=Very Easy; 5=Very Difficult)	**Ratings** *(1=Very Efficient; 5=Very Inefficient)*
1	y	0	18	0	1	1
2	y	0	10	0	1	1
3	y	0	45	0	1	1
4	y	0	12	0	1	1
5	y	0	15	0	1	1
6	y	0	15	0	1	1
7	y	1	19	1	1	1
8	y	0	25	0	1	1
9	y	0	30	1	1	1
10	y	0	27	0	1	1
	Mean:	**0.1**	**21.6**	**0.2**	**1**	**1**
	SD:	**0.31622777**	**10.50079362**	**0.421637**	**0**	**0**

a.3 CPOE Imaging: 9. Display changed CPOE Imaging order						
Part ID	**Task Success**	**Path Deviations**	**Task Time (sec)**	**Errors**	**Task Ease Ratings** *(1=Very Easy; 5=Very Difficult)*	**Task Efficiency Ratings** *(1=Very Efficient; 5=Very Inefficient)*
1	y	0	1	0	1	1
2	y	0	5	0	1	1
3	y	0	5	0	1	1
4	y	0	6	0	1	1
5	y	0	12	0	1	1
6	y	0	19	0	1	1
7	y	0	14	0	1	1
8	y	1	12	1	1	1
9	y	0	1	0	1	1
10	y	0	15	0	1	1
	Mean:	**0.1**	**9**	**0.1**	**1**	**1**
	SD:	**0.31622777**	**6.218252702**	**0.3162278**	**0**	**0**

a.5. Demographics: 10. Record patients pref. language, dob, birth sex, race, ethnicity, sexual orientation, and gender identity.						
Part ID	**Task Success**	**Path Deviations**	**Task Time (sec)**	**Errors**	**Task Ease Ratings** *(1=Very Easy; 5=Very Difficult)*	**Task Efficiency Ratings** *(1=Very Efficient; 5=Very Inefficient)*
1	y	1	120	1	2	2
2	y	1	71	1	2	2
3	y	0	91	0	1	1
4	y	0	30	0	1	1
5	y	0	64	0	1	1
6	y	0	30	0	1	1
7	y	1	44	1	1	1
8	y	1	112	1	2	2
9	y	1	105	1	2	2
10	y	0	36	1	1	1
	Mean:	**0.5**	**70.3**	**0.6**	**1.4**	**1.4**
	SD:	**0.52704628**	**34.95727551**	**0.5163978**	**0.51639778**	**0.51639778**

a.5. Demographics: 11. Change patients pref. language, dob, birth sex, race, ethnicity, sexual orientation, and gender identity.						
Part ID	**Task Success**	**Path Deviations**	**Task Time (sec)**	**Errors**	**Task Ease Ratings** *(1=Very Easy; 5=Very Difficult)*	**Task Efficiency Ratings** *(1=Very Efficient; 5=Very Inefficient)*
1	y	0	30	0	1	1
2	y	0	45	0	1	1
3	y	0	53	0	1	1
4	y	0	37	0	1	1
5	y	0	114	2	2	2
6	y	0	32	0	1	1
7	y	1	56	2	2	2
8	y	0	45	0	1	1

9	y	0	45	0	1	1
10	y	0	51	1	2	2
	Mean:	**0.1**	**50.8**	**0.5**	**1.3**	**1.3**
	SD:	**0.31622777**	**23.81316163**	**0.8498366**	**0.48304589**	**0.48304589**

a.5. Demographics: 12. Display patients pref. language, dob, birth sex, race, ethnicity, sexual orientation, and gender identity.						
Part ID	**Task Success**	**Path Deviations**	**Task Time (sec)**	**Errors**	**Task Ease Ratings** *(1=Very Easy; 5=Very Difficult)*	**Task Efficiency Ratings** *(1=Very Efficient; 5=Very Inefficient)*
1	y	0	1	0	1	1
2	y	0	12	0	1	1
3	y	0	10	0	1	1
4	y	0	6	0	1	1
5	y	0	2	0	1	1
6	y	0	6	0	1	1
7	y	1	19	1	1	1
8	y	0	1	0	1	1
9	y	0	9	0	1	1
10	y	0	25	0	1	1
	Mean:	**0.1**	**9.1**	**0.1**	**1**	**1**
	SD:	**0.31622777**	**7.89444249**	**0.3162278**	**0**	**0**

a.6 Problem List: 13. Record a problem to problem list						
Part ID	**Task Success**	**Path Deviations**	**Task Time (sec)**	**Errors**	**Task Ease Ratings** *(1=Very Easy; 5=Very Difficult)*	**Task Efficiency Ratings** *(1=Very Efficient; 5=Very Inefficient)*
1	y	1	25	1	1	1
2	y	0	49	0	1	1
3	y	0	61	0	1	1
4	y	0	50	1	1	1

5	y	0	41	0	1	1
6	y	1	39	1	1	1
7	y	0	25	0	1	1
8	y	0	41	0	1	2
9	y	0	29	0	1	1
10	y	0	35	1	1	1
	Mean:	**0.2**	**39.5**	**0.4**	**1**	**1.1**
	SD:	**0.42163702**	**11.63567312**	**0.5163978**	**0**	**0.31622777**

a.6 Problem List: 14. Change a problem to problem list						
Part ID	**Task Success**	**Path Deviations**	**Task Time (sec)**	**Errors**	**Task Ease Ratings** ***(1=Very Easy; 5=Very Difficult)***	**Task Efficiency Ratings** ***(1=Very Efficient; 5=Very Inefficient)***
1	y	1	40	1	1	1
2	y	0	8	0	1	1
3	y	0	29	0	1	1
4	y	0	20	0	1	1
5	y	0	12	0	1	1
6	y	1	50	1	1	1
7	y	1	35	1	1	1
8	y	0	25	0	1	1
9	y	0	45	0	1	1
10	y	0	15	0	1	1
	Mean:	**0.3**	**27.9**	**0.3**	**1**	**1**
	SD:	**0.48304589**	**14.39482932**	**0.4830459**	**0**	**0**

a.6 Problem List: 15. Display active problem list						
Part ID	**Task Success**	**Path Deviations**	**Task Time (sec)**	**Errors**	**Task Ease Ratings** ***(1=Very Easy; 5=Very Difficult)***	**Task Efficiency Ratings** ***(1=Very Efficient; 5=Very Inefficient)***

1	y	0	1	0	1	1
2	y	0	1	0	1	1
3	y	0	9	1	1	1
4	y	0	11	0	1	1
5	y	0	6	0	1	1
6	y	0	14	0	1	1
7	y	0	19	0	1	1
8	y	0	24	0	1	1
9	y	1	12	1	1	1
10	y	0	1	1	1	1
	Mean:	**0.1**	**9.8**	**0.3**	**1**	**1**
	SD:	**0.31622777**	**7.871185143**	**0.4830459**	**0**	**0**

a.6 Problem List: 16. Display historical problem list						
Part ID	**Task Success**	**Path Deviations**	**Task Time (sec)**	**Errors**	**Task Ease Ratings** *(1=Very Easy; 5=Very Difficult)*	**Task Efficiency Ratings** *(1=Very Efficient; 5=Very Inefficient)*
1	y	0	1	0	1	1
2	y	0	1	0	1	1
3	y	0	9	0	1	1
4	y	0	11	0	1	1
5	y	0	6	0	1	1
6	y	0	1	0	1	1
7	y	0	13	0	1	1
8	y	0	9	0	1	1
9	y	0	12	0	1	1
10	y	0	1	0	1	1
	Mean:	**0**	**6.4**	**0**	**1**	**1**
	SD:	**0**	**5.015531433**	**0**	**0**	**0**

a.7. Medication List: 17. Record a medication to ML						
Part ID	**Task Success**	**Path Deviations**	**Task Time (sec)**	**Errors**	**Task Ease Ratings** *(1=Very Easy;*	**Task Efficiency Ratings**

					5=Very Difficult)	*(1=Very Efficient; 5=Very Inefficient)*
1	y	0	62	2	2	2
2	y	0	25	0	1	1
3	y	0	32	0	1	1
4	y	0	21	0	1	1
5	y	1	129	1	2	2
6	y	0	32	0	1	1
7	y	0	41	1	1	1
8	y	0	30	1	1	1
9	y	0	70	0	1	1
10	y	0	33	0	1	1
	Mean:	**0.1**	**47.5**	**0.5**	**1.2**	**1.2**
	SD:	**0.31622777**	**32.67091809**	**0.7071068**	**0.42163702**	**0.42163702**

a.7. Medication List: 18. Change a medication on ML						
Part ID	**Task Success**	**Path Deviations**	**Task Time (sec)**	**Errors**	**Task Ease Ratings** *(1=Very Easy; 5=Very Difficult)*	**Task Efficiency Ratings** *(1=Very Efficient; 5=Very Inefficient)*
1	y	0	10	0	1	1
2	y	0	21	0	1	1
3	y	0	45	0	1	1
4	y	0	20	0	1	1
5	y	0	25	0	1	1
6	y	0	18	0	1	1
7	y	1	33	1	1	1
8	y	0	16	0	1	1
9	y	0	30	0	1	1
10	y	1	18	1	1	1
	Mean:	**0.2**	**23.6**	**0.2**	**1**	**1**
	SD:	**0.42163702**	**10.07968253**	**0.421637**	**0**	**0**

a.7. Medication List: 19. Display active ML

Part ID	Task Success	Path Deviations	Task Time (sec)	Errors	Task Ease Ratings *(1=Very Easy; 5=Very Difficult)*	Task Efficiency Ratings *(1=Very Efficient; 5=Very Inefficient)*
1	y	0	1	0	1	1
2	y	0	1	0	1	1
3	y	0	15	0	1	1
4	y	0	12	0	1	1
5	y	0	8	0	1	1
6	y	0	1	0	1	1
7	y	0	21	0	1	1
8	y	0	5	1	1	1
9	y	0	15	0	1	1
10	y	0	1	1	1	1
	Mean:	**0**	**8**	**0.2**	**1**	**1**
	SD:	**0**	**7.363574011**	**0.421637**	**0**	**0**

a.7. Medication List: 20. Display historical ML

Part ID	Task Success	Path Deviations	Task Time (sec)	Errors	Task Ease Ratings *(1=Very Easy; 5=Very Difficult)*	Task Efficiency Ratings *(1=Very Efficient; 5=Very Inefficient)*
1	y	0	1	0	1	1
2	y	0	1	0	1	1
3	y	0	15	0	1	1
4	y	0	12	0	1	1
5	y	0	8	0	1	1
6	y	0	12	0	1	1
7	y	0	9	0	1	1
8	y	0	6	0	1	1
9	y	0	10	0	1	1
10	y	0	1	0	1	1

	Mean:	**0**	**7.5**	**0**	**1**	**1**
	SD:	**0**	**5.104464277**	**0**	**0**	**0**

Part ID	**Task Success**	**Path Deviations**	**Task Time (sec)**	**Errors**	**Task Ease Ratings** *(1=Very Easy; 5=Very Difficult)*	**Task Efficiency Ratings** *(1=Very Efficient; 5=Very Inefficient)*
1	y	0	50	0	2	2
2	y	2	125	2	2	2
3	y	1	85	1	2	2
4	y	0	45	0	1	1
5	y	1	104	1	2	2
6	y	2	180	2	2	2
7	y	0	59	1	2	2
8	y	1	121	1	2	2
9	y	3	55	3	3	3
10	y	0	40	1	0	0
	Mean:	**1**	**86.4**	**1.2**	**1.8**	**1.8**
	SD:	**1.05409255**	**45.56850764**	**0.9189366**	**0.78881064**	**0.78881064**

a.8 Medication Allergy List. 22: Change a medication allergy						
Part ID	**Task Success**	**Path Deviations**	**Task Time (sec)**	**Errors**	**Task Ease Ratings** *(1=Very Easy; 5=Very Difficult)*	**Task Efficiency Ratings** *(1=Very Efficient; 5=Very Inefficient)*
1	y	0	20	0	1	1
2	y	0	25	0	1	1
3	y	0	5	0	1	1
4	y	0	20	0	1	1
5	y	0	31	0	1	1
6	y	0	20	0	1	1

7	y	0	22	0	1	1
8	y	0	23	1	1	1
9	y	0	25	1	1	1
10	y	0	11	0	1	1
	Mean:	**0**	**20.2**	**0.2**	**1**	**1**
	SD:	**0**	**7.375635566**	**0.421637**	**0**	**1**

a.8 Medication Allergy List. 23. Display active a medication allergy list						
Part ID	**Task Success**	**Path Deviations**	**Task Time (sec)**	**Errors**	**Task Ease Ratings** *(1=Very Easy; 5=Very Difficult)*	**Task Efficiency Ratings** *(1=Very Efficient; 5=Very Inefficient)*
1	y	0	1	0	1	1
2	y	0	1	0	1	1
3	y	0	7	0	1	1
4	y	0	21	0	1	1
5	y	0	10	0	1	1
6	y	0	17	0	1	1
7	y	0	8	0	1	1
8	y	0	8	0	1	1
9	y	1	15	1	1	1
10	y	0	1	0	1	1
	Mean:	**0.1**	**8.9**	**0.1**	**1**	**1**
	SD:	**0.31622777**	**7.015063158**	**0.3162278**	**0**	**0**

a.8 Medication Allergy List. 24. Display historical a medication allergy list						
Part ID	**Task Success**	**Path Deviations**	**Task Time (sec)**	**Errors**	**Task Ease Ratings** *(1=Very Easy; 5=Very Difficult)*	**Task Efficiency Ratings** *(1=Very Efficient; 5=Very Inefficient)*
1	y	0	1	0	1	1
2	y	0	1	0	1	1

3	y	0	7	0	1	1
4	y	0	21	0	1	1
5	y	0	10	0	1	1
6	y	0	17	0	1	1
7	y	0	9	0	1	1
8	y	0	7	1	1	1
9	y	0	15	0	1	1
10	y	0	1	0	1	1
	Mean:	**0**	**8.9**	**0.1**	**1**	**1**
	SD:	**0**	**7.03088425**	**0.3162278**	**0**	**0**

a.9 CDS: 25. Add a CDS intervention and/or reference resource for each of the required elements: problem list, medication list, medication allergy list, at least one demographic, laboratory results, vital signs, and a combination of at least 2 of the elements listed

Part ID	Task Success	Path Deviations	Task Time (sec)	Errors	Task Ease Ratings *(1=Very Easy; 5=Very Difficult)*	Task Efficiency Ratings *(1=Very Efficient; 5=Very Inefficient)*
1	y	1	125	1	3	3
2	y	1	61	1	2	2
3	y	0	72	1	2	2
4	y	1	65	2	2	2
5	y	1	45	1	2	2
6	y	0	50	1	1	1
7	y	1	31	1	1	1
8	y	0	90	1	2	2
9	y	2	84	2	2	2
10	y	0	25	0	1	1
	Mean:	**0.7**	**64.8**	**1.1**	**1.8**	**1.8**
	SD:	**0.67494856**	**29.87306479**	**0.5676462**	**0.63245553**	**0.63245553**

a.9. CDS: 26. Trigger the CDS intervention/resources added using the applicable data elements from each of the required elements

				Errors	Task Ease	Task

Part ID	Task Success	Path Deviations	Task Time (sec)		Ratings *(1=Very Easy; 5=Very Difficult)*	Efficiency Ratings *(1=Very Efficient; 5=Very Inefficient)*
1	y	0	15	0	1	1
2	y	0	52	0	1	1
3	y	0	30	0	1	1
4	y	0	35	0	1	1
5	y	0	45	0	1	1
6	y	0	11	0	1	1
7	y	0	16	0	1	1
8	y	1	50	1	1	1
9	y	1	45	1	1	1
10	y	0	69	0	1	1
	Mean:	**0.2**	**36.8**	**0.2**	**1**	**1**
	SD:	**0.42163702**	**18.85500228**	**0.421637**	**0**	**0**

a.9. CDS: 27. View the intervention/resource information using the Infobutton standard for the data elements in the problem list, medication list, and demographics

Part ID	Task Success	Path Deviations	Task Time (sec)	Errors	Task Ease Ratings *(1=Very Easy; 5=Very Difficult)*	Task Efficiency Ratings *(1=Very Efficient; 5=Very Inefficient)*
1	y	0	15	0	1	1
2	y	0	45	0	1	1
3	y	0	61	0	1	1
4	y	0	30	0	1	1
5	y	0	51	0	1	1
6	y	0	50	1	1	1
7	y	1	47	1	2	2
8	y	0	11	1	1	1
9	y	1	41	1	2	2
10	y	1	75	1	2	2

	Mean:	**0.3**	**42.6**	**0.5**	**1.3**	**1.3**
	SD:	**0.48304589**	**19.60838823**	**0.5270463**	**0.48304589**	**0.48304589**

a.9. CDS: 28. Trigger the CDS interventions/resources based on data elements in the problem list, medication list, and medication allergy list by incorporating patient information from a transition of care/referral summary

Part ID	Task Success	Path Deviations	Task Time (sec)	Errors	Task Ease Ratings *(1=Very Easy; 5=Very Difficult)*	Task Efficiency Ratings *(1=Very Efficient; 5=Very Inefficient)*
1	y	0	15	0	1	1
2	y	0	21	0	1	1
3	y	2	165	2	2	2
4	y	0	39	0	1	1
5	y	0	65	0	1	1
6	y	0	30	0	1	1
7	y	1	48	2	2	2
8	y	0	15	0	1	1
9	y	0	20	0	1	1
10	y	0	75	0	1	1
	Mean:	**0.3**	**49.3**	**0.4**	**1.2**	**1.2**
	SD:	**0.67494856**	**45.68746485**	**0.843274**	**0.42163702**	**0.42163702**

a.9. CDS 29. Access the following attributes for one of the triggered CDS interventions/resources: bibliographic citation, developer, funding source, release/revision date						
Part ID	**Task Success**	**Path Deviations**	**Task Time (sec)**	**Errors**	**Task Ease Ratings** *(1=Very Easy; 5=Very Difficult)*	**Task Efficiency Ratings** *(1=Very Efficient; 5=Very Inefficient)*
1	y	0	12	0	1	1
2	y	0	21	0	1	1
3	y	0	15	0	1	1
4	y	0	25	0	1	1
5	y	0	125	1	2	2
6	y	2	181	3	3	3
7	y	1	71	2	2	2
8	y	0	15	0	1	1
9	y	0	20	0	1	1
10	y	0	5	0	1	1
	Mean:	**0.3**	**49**	**0.6**	**1.4**	**1.4**
	SD:	**0.67494856**	**59.16267592**	**1.0749677**	**0.6992059**	**0.6992059**

a.14. Implantable Devices: 30. Record UDI						
Part ID	**Task Success**	**Path Deviations**	**Task Time (sec)**	**Errors**	**Task Ease Ratings** *(1=Very Easy; 5=Very Difficult)*	**Task Efficiency Ratings** *(1=Very Efficient; 5=Very Inefficient)*
1	y	0	241	2	3	3
2	y	0	75	0	1	1
3	y	0	65	1	1	1
4	y	1	131	1	2	2
5	y	0	93	1	2	2
6	y	1	54	1	1	1
7	y	2	210	3	3	3
8	y	0	29	0	1	1

9	y	0	55	1	2	2
10	y	1	76	1	2	2
	Mean:	**0.5**	**102.9**	**1.1**	**1.8**	**1.8**
	SD:	**0.70710678**	**70.32851484**	**0.875595**	**0.78881064**	**0.78881064**

a.14. Implantable Devices: 31. Change UDI Status						
Part ID	**Task Success**	**Path Deviations**	**Task Time (sec)**	**Errors**	**Task Ease Ratings** *(1=Very Easy; 5=Very Difficult)*	**Task Efficiency Ratings** *(1=Very Efficient; 5=Very Inefficient)*
1	y	0	30	0	1	1
2	y	0	25	0	1	1
3	y	0	45	0	1	1
4	y	0	25	0	1	1
5	y	0	21	0	1	1
6	y	0	45	0	1	1
7	y	1	41	1	1	1
8	y	0	30	1	1	1
9	y	0	37	0	1	1
10	y	0	33	0	1	1
	Mean:	**0.1**	**33.2**	**0.2**	**1**	**1**
	SD:	**0.31622777**	**8.547904227**	**0.421637**	**0**	**0**

a.14. Implantable Devices: 32. Access UDI, device description, identifiers, and attributes						
Part ID	**Task Success**	**Path Deviations**	**Task Time (sec)**	**Errors**	**Task Ease Ratings** *(1=Very Easy;*	**Task Efficiency Ratings**

					5=Very Difficult)	(1=Very Efficient; 5=Very Inefficient)
1	y	0	1	0	1	1
2	y	0	5	0	1	1
3	y	0	9	0	1	1
4	y	0	15	0	1	1
5	y	0	8	0	1	1
6	y	0	25	0	1	1
7	y	1	22	1	1	1
8	y	0	15	1	1	1
9	y	0	32	0	1	1
10	y	0	1	0	1	1
	Mean:	**0.1**	**13.3**	**0.2**	**1**	**1**
	SD:	**0.31622777**	**10.46740974**	**0.421637**	**0**	**0**

b.2. Clinical information reconciliation and incorporation: 33. Incorporate a CCDA and conduct reconciliation of the medications, medication allergies, and problems in the CCDA with the information currently in the patient's record

Part ID	Task Success	Path Deviations	Task Time (sec)	Errors	Task Ease Ratings *(1=Very Easy; 5=Very Difficult)*	Task Efficiency Ratings *(1=Very Efficient; 5=Very Inefficient)*
1	y	0	20	0	1	1
2	y	0	45	0	1	1
3	y	0	30	0	1	1
4	y	0	49	0	1	1
5	y	0	25	0	1	1
6	y	0	22	0	1	1
7	y	1	29	1	2	2
8	y	0	15	0	1	1
9	y	0	25	0	1	1
10	y	0	27	0	1	1
	Mean:	**0.1**	**28.7**	**0.1**	**1.1**	**1.1**

	SD:	**0.3**	**10.63589311**	**0.3**	**0.31622777**	**0.31622777**

b.2. Clinical information reconciliation and incorporation: 34. Generate new CCDA with reconciled data						
Part ID	**Task Success**	**Path Deviations**	**Task Time (sec)**	**Errors**	**Task Ease Ratings** *(1=Very Easy; 5=Very Difficult)*	**Task Efficiency Ratings** *(1=Very Efficient; 5=Very Inefficient)*
1	y	0	5	0	1	1
2	y	0	10	0	1	1
3	y	0	8	0	1	1
4	y	0	5	0	1	1
5	y	0	10	0	1	1
6	y	0	8	0	1	1
7	y	0	12	1	1	1
8	y	0	9	1	1	1
9	y	1	30	1	1	1
10	y	0	1	0	1	1
	Mean:	**0.1**	**9.8**	**0.3**	**1**	**1**
	SD:	**0.3**	**7.771743691**	**0.4830459**	**0**	**0**

Discussion of the Findings

Data collected from each participant during the usability test provided valuable feedback on the overall usability of EHR1. Any errors or deviations that demonstrated a need for a design and/or usability improvement to the product was sent to the development department for evaluation. Errors that were primarily technical in nature such as the slow loading time for a patient chart were reported to the development department as well. Any errors for which there was concern about patient safety were immediately reported to the development team to address as soon as possible. It was determined that most errors observed and those reported directly by participants during the usability test could be resolved primarily with prior user-end training and professional education
While all participants were provided a task sheet for how to complete each task assigned, none received any training prior to their test session.

Effectiveness

The study was completed effectively as all 10 subjects were able to complete all tasks despite some deviations in workflow and errors. Some of the users had a difficult time utilizing the task sheets since they were trying to access them on their cell phones, which resulted in near illegible text and some tried to toggle between screens, which slowed their completion times. Since all 10 subjects were able to complete every task, we are confident that our target users would be able to use EHR1 effectively given the right resources and training.

Efficiency

According to the results of our study, there was a high level of efficiency for a vast majority of the tasks, however there were a couple tasks that were not completed efficiently. Scoring suggests that task #4 Record a lab via CPOE and task #21 Recording a medication allergy may need to be designed due to the low efficiency rate. The rate of efficiency across all subjects was effectively very low and there higher than expected deviations and errors; higher than optimal task times are also a point of interest here. On a positive note, all subjects were able to complete the task despite obvious deviations and errors. Other than these tasks, subjects completed tasks efficiently. After speaking with many of the participants, it became clear that a many dental practices do not submit labs or imaging orders in systems like ours and as such, they had difficulty navigating the related workflows.

Satisfaction

Feedback from the SUS questionnaire and general feedback received from our subjects show that there is a high level of satisfaction with our software for what they would use it for. Aside from a few tasks that need to be optimized and streamlined, users believed that they would be able to easily use this software to complete their tasks and that they would like to use our software. Feedback was overwhelmingly positive with a few notes for improvement in the areas of labs and imaging as well as medication allergy recording.

Major Finding & Areas for Improvement

We will be focused on addressing some of the issues observed throughout the study as well as further optimizing already working workflows. The primary areas of concern are workflows associated with computerized order entry of Labs and Imaging as well as the recording of medication allergies. It was a good sign that all our subjects were able to complete all the tasks, even though a few tasks yielded a low rate of efficiency and high rate of errors. This may be a sign that the learning curve for these functions are too high. We will investigate either simplifying the workflow, making the workflow more intuitive, or adding in guidance systems such as training “wizards” and “tooltips” to assist users in completing the more technical tasks. Our goal in the short-term will be to optimize these elements and to focus on making our software more intelligent and easier to use.

APPENDICES

The following appendices include supplemental data for this usability test report. Following is a list of the appendices provided:

Appendix 1: Participant Recruiter Screening
Appendix 2: Participant Recruitment Information Form
Appendix 3: Non-Disclosure Agreement
Appendix 4: Informed Consent & Participant Agreement Form
Appendix 5: Moderator's Guide
Appendix 6: System Usability Scale Questionnaire
Appendix 7: Compensation Receipt Acknowledgement

Appendix 1: Participant Recruiter Screening

Hello, my name is _____ [recruiting staff name]. We are currently conducting a usability test of our software, EHR1. We are looking for participants to perform a series of tasks during a one hour appointment that will provide us with valuable feedback on how well the software meets the needs of our users, easily and efficiently. This is for research purposes only. If you are interested in participating and meet the qualifications below, we do offer a one-time compensation in the form of a $50 gift card.2

[*If the individual is interested in participating*] I will now ask you a few questions:

1. Have you participated in a focus group or usability test in the past 6 months?
   [If Yes, then not eligible to participate.]

2. Do you, or does anyone in your home, work in marketing research, usability research, web design […etc.]?
   [If Yes, then not eligible to participate.]

3. Do you, or does anyone in your home, have a commercial or research interest in an electronic health record software or consulting company?
   [If Yes, then not eligible to participate.]

Appendix 2: Participant Recruitment Information Form

Recruiter Qualification Questions:

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4. Have you participated in a focus group or usability test in the past 6 months?

5. Do you, or does anyone in your home, work in marketing research, usability research, web design […etc.]?

6. Do you, or does anyone in your home, have a commercial or research interest in an electronic health record software or consulting company?

Participant Demographics & Professional Experience:
(complete all fields below if answered No to all Recruiter Qualification Questions)

Name: _____
Contact Phone: _____
Contact Email: _____
Practice/Work Address: _____

Gender *(circle one)*: M / F / Other
Age: _____
Education Completed *(check all that apply)*: [
] H.S. Diploma/GED
[ ] Undergraduate Degree (BA, BS, AA)
[ ] Non-Health Care Graduate Degree (MS, MA, Ph.D, JD, MBA)
[ ] Health Care Graduate Degree (MD, DO, DDS, DMD, PA, NP)
[ ] Other HealthCare Degree/Certificate

Position Title: _____
(Examples: Dentist, Dental Assistant, Hygienist, Office Manager, Front/Back Office)

1. How long have you worked in this position?
2. Describe your work location/environment/setting: (Examples: small private practice, dental office, etc.)

Computer & EHR Experience:

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1. Besides reading email, what professional activities do you do on the computer? (Examples: accessing EHR/practice management software, research, reading news, shopping/banking, digital pictures, programming/word processing, etc.)

2. About how many hours per week do you spend on the computer (circle one)?
   0-10 hours 11-25 hours 26+ hours

3. What computer operating system do you usually use? (Examples: Mac, Windows, Linux, etc.)

4. What Internet browser(s) do you usually use? (Examples: Internet Explorer, Google Chrome, Safari, Firefox, etc.)

5. How many years have you used an electronic health record system (EHR)?

6. How many EHR systems have you used or are familiar with?

7. What form(s) of patient records are used in your work environment (check all that apply)?
   [ ] Paper
   [ ] Electronic/Digital
   [ ] Paper & Electronic/Digital

8. Have you used EHR1 previously?

Appendix 3: Non-Disclosure Agreement

Non-Disclosure Agreement

THIS AGREEMENT is entered into as of ____[month]____ __[date]__, ____[year]___ , between _____[participant full name] _____ ("the Participant") and the testing organization *EHR One, LLC* ("EHR One") located at 960 N. Tustin St. #272, CA 92867.

The Participant acknowledges his or her voluntary participation in today's usability study may bring the Participant into possession of Confidential Information. The term "Confidential Information" means all technical and commercial information of a proprietary or confidential nature which is disclosed by *EHR One*, or otherwise acquired by the Participant, in the course of today's study.

By way of illustration, but not limitation, Confidential Information includes trade secrets, processes, formulae, data, know-how, products, designs, drawings, computer aided design files and other computer files, computer software, ideas, improvements, inventions, training methods and materials, marketing techniques, plans, strategies, budgets, financial information, or forecasts.

Any information the Participant acquires relating to this product during this study is confidential and proprietary to *EHR One* and is being disclosed solely for the purposes of the Participant's participation in today's usability study. By signing this form, the Participant acknowledges that he or she will receive monetary compensation for feedback and will not disclose this confidential information obtained today to anyone else or any other organizations.

Participant's Printed Name: _____

Participant's Signature: _____ Date: _____

Appendix 4: Informed Consent & Participant Agreement Form

Informed Consent & Participant Agreement

EHR One, LLC ("EHR One") would like to thank you for participating in this study. The purpose of this study is to evaluate an electronic health records system. If you decide to participate, you will be asked to perform several tasks using the prototype and give your feedback. The study will last approximately *60* minutes. At the conclusion of the test, you will be compensated for your time.

Participant Agreement

I understand and agree that as a voluntary participant in the present study conducted by *EHR One* I am free to withdraw consent or discontinue participation at any time. I understand and agree to participate in the study conducted and videotaped by the *EHR One*.

I understand and consent to the use and release of the audio and visual recording by *EHR One*. I understand that the information recorded is for research purposes only and that my name will not be used for any purpose other than research. I relinquish any rights to the recording and understand the recording may be copied and used by *EHR One* without further permission.

I understand and agree that the purpose of this study is to make software applications more useful and usable in the future.

I understand and agree that the data collected from this study may be shared with outside of *EHR One* and *EHR One's* client. I understand and agree that data confidentiality is assured, because only deidentified data – i.e., identification numbers not names – will be used in analysis and reporting of the results.

I agree to immediately raise any concerns or areas of discomfort with the study administrator. I understand that I can leave at any time.

☐ YES, I have read the above statement and agree to be a participant.

Participant's Printed Name: _____

Participant's Signature: _____ Date: _____

Appendix 5: Moderator's Guide & Data Tracking Sheets

Introduction & Orientation

Thank you for participating in our study. We hope to get valuable feedback from you on how well our software performs and if we can further improve our software for a better user experience. Our session today will be approximately 60 minutes.

I will ask you to complete a series of tasks, one-at-a-time in our software, EHR1. These tasks are typical routine tasks that are also required for Meaningful Use attestation. We are interested in how easy or how difficult it is to use our EHR, what parts you find useful to you, and how we could improve it.

You will be completing each task on your own try without guidance from me, as quickly as possible, with the fewest possible errors, and in the most direct, straightforward method, with the fewest deviations. Please do not do anything more than asked. If you do get confused while performing a task, unfortunately, I cannot provide help to you regarding the EHR system at that time. Please try to complete the task to the best of your ability. Please only provide your feedback comments at the end of each task or the end of the session as a whole, when we can discuss all tasks attempted and/or completed freely. Please be as honest as possible.

All the information that you provide will be kept confidential and your name will not be associated with your comments at any time.

Prior to Testing:

- Confirm schedule with participants
- Confirm latest version of Java has been installed on participant's computer
- Check EHR is ready for testing
- Confirm all forms have been completed completely and signed
- Check EHR is ready for testing, including any preloaded sample patient data

Beginning of each participant's Test Session:

- Check that participant, test administrator, and data logger are all able to access the correct Zoom meeting
- Give warning about recording for test study and research purpose and begin recording once agreement from participant given
- Give Introduction & Orientation above
- Give test guidelines and protocols to follow

Prior to Each Task:

- Disable remote sharing temporarily and set EHR to the beginning of the task's optimal pathway
- Announce "Begin" to participant and data logger to record Start Time

During Each Task:

- Check that all errors or deviations are recorded
- Note any verbal comments by the participant

At the end of each Task:

- Announce “Done” if participant does not first announce “Done”
- Confirm End Time has been recorded for that Task if completed successfully

At the end of participant’s Test Session:

- Ask participant to rate each task assigned for ease of use and efficient on a scale of 1 (Very Easy or Very Efficient) to 5 (Very Difficult or Very Inefficient)
- Record any final feedback or comments from participant
- Confirm all data and notes needed have been recorded in each participant’s Usability Test Data spreadsheet
- End recording of the test session and save to secure server folder

Post-test session:

- Collect completed SUS Questionnaire from participants
- Collect any missing or incomplete forms from the participants
- Ensure compensation payment is made to participants and Receipt Acknowledgment Form returned by Participants

Data Tracking Sheet

Participant's Name:		Test Date:		Test Time:	

Test	Task	Start Time	End Time	Completed?	Deviations	Ease Rating	Efficiency Rating
a.1 CPOE Meds	1. Record Med via CPOE						
	2. Change Med via CPOE						
	3. Display Changed CPOE Med order						
a.2 CPOE Labs	4. Record lab via CPOE						
	5. Change lab via CPOE						
	6. Display changed CPOE Lab order						
a.3 CPOE Diagnostic Imaging	7. Record Imaging order via CPOE						
	8. Change Imaging order via CPOE						
	9. Display changed CPOE Imaging order						
a.5 Demographics	10. Record patients pref. language, dob, birth sex, race, ethnicity, sexual orientation, and gender identity.						
	11. Change patients pref. language, dob, birth sex, race, ethnicity, sexual orientation, and gender identity.						
	12. Display patients pref. language, dob, birth sex, race, ethnicity, sexual orientation, and gender identity.						
a.6 Problem List	13. Record a problem to problem list						
	14. Change a problem on problem list						
	15. Display the active problem list						
	16. Display the historical problem list						

a.7 Medication List	17. Record a medication to the medication list						
	18. Change a medication on the medication list						
	19. Display the active medication list						
	20. Display the historical Medication list						
a.8 Medication Allergy List	21. Record a medication allergy						
	22. Change a medication allergy						
	23. Display active medication list						
	24. Display historical medication list						
a.9 Clinical Decision Support	25. Add a CDS intervention and/or reference resource for each of the required elements: problem list, medication list, medication allergy list, at least one demographic, laboratory results, vital signs, and a combination of at least 2 of the elements listed						
	26. Trigger the CDS intervention/resources added using the applicable data elements from each of the required elements						
	27. View the intervention/resource information using the Infobutton standard for the data elements in the problem list, medication list, and demographics						

	28. Trigger the CDS interventions/resources based on data elements in the problem list, medication list, and medication allergy list by incorporating patient information from a transition of care/referral summary						
	29. Access the following attributes for one of the triggered CDS interventions/resources: bibliographic citation, developer, funding source, release/revision date						
a.14 Implantable Devices	30. Record UDI						
	31. Change UDI status						
	32. Access UDI, device description, identifiers, and attributes						
b.2 Clinical Information Reconciliation and Incorporation	33. Incorporate a CCDA and conduct reconciliation of the medications, medication allergies, and problems in the CCDA with the information currently in the patient's record						
	34. Generate new CCDA with reconciled data						

Appendix 6: System Usability Scale Questionnaire

In 1996, Brooke published a "low-cost usability scale that can be used for global assessments of systems usability" *known as the System Usability Scale or SUS.*[16] *Lewis and Sauro (2009) and others have elaborated on the SUS over the years. Computation of the SUS score can be found in Brooke's paper, in at* http://www.usabilitynet.org/trump/documents/Suschapt.doc *or in Tullis and Albert (2008).*

	Strongly disagree				Strongly agree
1. I think that I would like to use this system frequently	1	2	3	4	5
2.I found the system unnecessarily complex	1	2	3	4	5
3.I thought the system was easy to use	1	2	3	4	5
4.I think that I would need the support of a technical person to be able to use this system	1	2	3	4	5
5.I found the various functions in this system were well integrated	1	2	3	4	5
6.I thought there was too much inconsistency in this system	1	2	3	4	5
7.I would imagine that most people would learn to use this system very quickly	1	2	3	4	5
8.I found the system very cumbersome to use	1	2	3	4	5
9.I felt very confident using the system	1	2	3	4	5
10. I needed to learn a lot of things before I could get going with this system	1	2	3	4	5

Appendix 7: Compensation Receipt Acknowledgement

Acknowledgement of Receipt

I hereby acknowledge receipt of a one-time compensation payment of $50.00 (gift card) for my participation in a usability research study run by *EHR One, LLC.*

Participant's Printed Name: _____

Participant's Signature: _____ Date: _____