I'EHR Usability Test Report of Praxis EMR v8.0

Report based on ISO/IEC 25062:2006 - Common Industry Format (CIF) for Usability Test Reports,
NISTIR 7741 NIST Guide to the Processes Approach for Improving the Usability of Electronic Health Records and NISTIR 7804
Guide to the Processes Approach for Improving the Usability of Electronic Health Records
Date of Usability Test: 01/13/2020-02/04/2020
Date of Report: 2/5/2020

Report Prepared By: Infor-Med Medical Information Systems, Inc.
Juliana Cacheiro, Interface Analyst. 818-963-9364
juliana.cacheiro@gmail.com
5800 S Eastern Avenue. Suite 500 | Commerce | CA | 9004

Table of Contents

EXECUTIVE SUMMARY

A usability test of Praxis EMR v8 was conducted from 1/13/2020 to 2/4/2020 remotely via internet by our company. The purpose of this examination was to test and validate the usability of the current user interface, and provide evidence of usability in the EHR under Test (EHRUT).

During the usability test, 15 healthcare providers matching the target demographic criteria served as participants and used the EHRUT in simulated, but representative tasks.

This study collected performance data on tasks typically conducted on an EHR:

- Record Medication Order
- Access Medication Order
- Change Medication Order
- Record Laboratory Order
- Access Laboratory Order
- Change Laboratory Order

- Record Radiology/imaging Order
- Access Radiology/imaging Order
- Change Radiology/imaging Order
- Create drug-drug and drug-allergy interventions prior to CPOE completion
- Record Medication List
- Access Medication List
- Change Medication List
- Record Medication Allergy List
- Access Medication Allergy List
- Change Medication Allergy List
- Problem List Interventions
- Medication List Interventions
- Medication Allergy List Interventions
- Demographics Interventions
- Use of Implantable Devices
- Clinical Information reconciliation and incorporation
- Electronic Prescribing
- Clinical Decision Support (Infobutton) functionality

During the one-on-one usability test, each participant was greeted by the administrator and instructed that they could withdraw at any time. Participants had prior experience with the EHR. The administrator introduced the test, showed videos on how to do each task for the specific features, and explained that once each test started no further assistance would be given, and that it was OK not to be able to complete any part of it. It was further explained that this was not testing the client but rather the user friendliness of the application. Participants were then instructed to complete a series of tasks (given one at a time) using the EHRUT. During the testing, the administrator timed the test and recorded user performance data electronically. During each test, the administrator did not give the participant further assistance in how to complete any tasks.

Participant screens and audio were recorded for subsequent analysis.

The following types of data were collected for each participant:

- 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 – no correspondence could be made from the identity of the participant to the data collected. Following the conclusion of the testing, participants were asked to complete a post-test questionnaire. 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 the EHRUT. Following is a summary of the performance and rating data collected on the EHRUT.

The results from the System Usability Scale scored the subjective satisfaction with the system based on performance with these tasks to be: 95.6%

In addition to the performance data, the following qualitative observations were made:

- Major findings

- Overall, the functionalities tested for Praxis v8 were well received by the users that took part in the Usability examination. The one comment that was made throughout was that Praxis has a learning curve and they'd likely need an extensive training session to be able to fully understand the capabilities of the system and the scope of the improvements made. One doctor in particular had not used Praxis in a very long time and found it harder than the rest examined to perform the tasks in the optimal expected time or following the optimal amount of steps.

- Areas for improvement

- Adapt training sessions to have an in-depth showcase of Praxis functionalities to ensure users will understand how far Praxis can go.

INTRODUCTION

The EHRUT tested for this study was Praxis EMR v8. The usability testing attempted to represent realistic exercises and conditions. The purpose of this study was to test and validate the usability of the current user interface, and provide evidence of usability in the EHR Under Test (EHRUT). To this end, measures of effectiveness, efficiency and user satisfaction were captured during the usability testing.

METHOD

PARTICIPANTS

A total of 15 participants were tested on the EHRUT. Each task was tested by 10 participants out of that pool of 15 participants. Participants in the test were not only medical physicians. Participants were not from the testing or supplier organization. Participants were given the opportunity to have the same orientation and level of training as the actual end users would have received.

Recruited participants had a mix of backgrounds and demographic characteristics. 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.

Table 1

Participant ID	Gender	Age	Education	Occupation/role	Professional Experience (months)	Computer Experience (moths)	Product Experience (moths)	Assistive Technology Needs
1	Female	50-59	High School	Office Administrator	420	360	95	None
2	Male	70-79	MD	Endocrinologist	539	324	324	None
3	Female	50-59	Associates Degree	Office Administrator	144	240	228	None
4	Male	70-79	MD	Physician	384	420	228	None
5	Male	60-69	MD	Physician	408	120	120	None
6	Male	70-79	MD	MD	539	240	144	None

7	Male	70-79	MD	Physician	479	420	180	None
8	Male	50-59	DPM	Physician	408	240	18	None
9	Male	60-69	MD	Outpatient Family Medicine	228	575	18	None
10	Male	30-39	MD	Physician	120	360	120	None
11	Male	50-59	MD	Physician	336	360	18	None
12	Male	50-59	MD	Physician	312	479	18	None
13	Male	50-59	MD	Physician	120	479	2	None
14	Female	30-39	College	Medical Assistant	95	240	36	None
15	Female	50-59	MD	MD	288	360	71	None

Fifteen participants (matching the demographics in the section on Participants) were recruited and fifteen participated in the usability test. Participants were scheduled for 90-minute sessions. A spreadsheet was used to keep track of the participant schedule, and included each participant's demographic characteristics.

STUDY DESIGN

Overall, the objective of this test was to uncover areas where the application performed well – that is, effectively, efficiently, and with satisfaction – and areas where the application failed to meet the needs of the participants. The data from this test may serve as a baseline for future tests with an updated version of the same EHR and/or comparison with other EHRs provided the same tasks are used. 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 one EHR. Each participant was provided with the same instructions. 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
- Time to complete the tasks
- Number and types of errors
- Path deviations
- Participant's verbalizations (comments)
- Participant's satisfaction ratings of the system

Additional information about the various measures can be found in the section on Usability Metrics.

TASKS

A number of tasks were constructed that would be realistic and representative of the kinds of activities a user might do with this EHR, including:

1. Record Medication Order
2. Change Medication Order
3. Access Medication Order
4. Record Laboratory Order
5. Change Laboratory Order
6. Access Laboratory Order
7. Record Radiology/imaging Order
8. Change Radiology/imaging Order
9. Create drug-drug and drug-allergy interventions prior to CPOE completion
10. Record Medication List
11. Change Medication List

12. Access Medication List
13. Record Medication Allergy List
14. Change Medication Allergy List
15. Access Medication Allergy List
16. Problem List Interventions
17. Medication List Interventions
18. Medication Allergy List Interventions
19. Demographics Interventions
20. Use of Implantable Devices
21. Clinical Information reconciliation and incorporation
22. Electronic Prescribing
23. Clinical Decision Support (Infobutton) functionality

Tasks were selected based on their frequency of use, criticality of function, and those that may be most troublesome for users.

PROCEDURES

The identity of each participant was verified and matched with a name on the participant schedule. Participants were then assigned a participant ID. The administrator provided instructions and tasks, monitored task times, obtained post-task rating data, and took notes on participant comments. The administrator also served as the data logger and took notes on task success, path deviations, number and type of errors, and comments.
Participants were instructed to perform the tasks (see specific instructions below):

- As quickly as possible making as few errors and deviations as possible.
- Without assistance; administrators were allowed to give immaterial guidance and clarification on tasks, but not instructions on use.

Task timing began once the administrator finished reading the question. The task time was stopped once the participant indicated they had successfully completed the task. Scoring is discussed below.
Following the session, the administrator gave the participant the post-test questionnaire (e.g., the System Usability Scale, see Appendix 2) and thanked each individual for their participation.
Participants' demographic information, task success rate, time on task, errors, deviations, verbal responses, and post-test questionnaire were recorded into a spreadsheet.

TEST LOCATION

The usability tests conducted as a part of this study were conducted remotely from a lab at Praxis EMR headquarters. The remote tests were conducted using stable and reliable screen share technology and independent and reliable teleconferencing systems.

TEST ENVIRONMENT

To ensure a realistic environment, participants were asked to interact with the system using their own computers and the networks they normally use to access the EHR system. Participants were given access to the remote screen share session and teleconference dial-in information. The administrator was able to view the participants' computer screen and hear the participants' comments via these mechanisms to ensure that data was captured in real time during the course of the test.

The test environment provided by the vendor laboratory, where the participants conducted the tested tasks, was a test database designed to only show patients pertinent to the test, set up on LAN network, running on Windows Server 2008 R2 Enterprise. The display was 1440x900, True Color (32 bits).

TEST FORMS AND TOOLS

During the usability test, various documents and instruments were used, including:
1. Administrator's guide
2. System Usability Scale (SUS) post-test questionnaire

Examples of these documents can be found in Appendices 1-2 respectively. The administrator's guide was devised so as to be able to capture required data.

The participant's interaction with the EHRUT was captured and recorded digitally with screen capture software running on the administrator's machine and verbal comments were recorded with a microphone.

PARTICIPANT INSTRUCTIONS

The administrator provided the following instructions to each participant (also see the full administrator's guide in Appendix 1):

Dear Praxis Tester,
Thank you for participating in this study. Your input is very important. Our session today will last about 90 minutes. During that time you will use an instance of an electronic medical record. I will show you a quick video on the tasks to complete for each session (there are 8 sessions). You may repeat the video if not clear. Then you should complete the tasks as quickly as possible, making as few errors as possible. Please try to complete the tasks on your own following the instructions very closely. Please note that we are not testing you, we are testing the system. Therefore if you have difficulty, all this means is that something needs to be improved in the system. I will assist you by reminding you of each specific task that is being requested if needed, but I am not able to instruct you or provide help on how to use the application or perform the task after you've viewed the demos. Upon completion of each task, I will ask you how easy it felt and obtain any other critiques from you. Overall, we are interested in how easy (or how difficult) this system is to use, what in it would be useful to you, and how we could improve it. Please be honest with your opinions. All of the information that you provide will be kept confidential and your name will not be associated with your comments at any time. Should you feel it necessary you are able to withdraw at any time during the testing. For each task, I will read the description to you and say "Begin." At that point, please perform the task and say "Done" once you believe you have successfully completed the task.
After the test has been completed, we would appreciate you filling out the form below and emailing or faxing this document to us. (FAX 1-818-337-2158)

THANK YOU VERY MUCH FOR YOUR ASSISTANCE!

Participants were then given the tasks to complete. Tasks are listed in the administrator's guide in Appendix 1.

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 Praxis EMR v8 by measuring participant success rates and errors
2. Efficiency of Praxis EMR v8 by measuring the average task time and path deviations
3. Satisfaction with Praxis EMR v8 by measuring ease of use ratings

DATA SCORING

The following table (Table 3) details how tasks were scored, errors evaluated, and the time data analyzed.

Table 2

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 calculated for each task and then divided by the total number of times that task was attempted. The results are provided as a percentage. Task times were recorded for successes. Observed task times divided by the optimal time for each task is a measure of optimal efficiency. Optimal task performance time, as benchmarked by expert performance under realistic conditions, is recorded when constructing tasks. Target task times used for task times in the administrator's guide were operationally defined by taking multiple measures of optimal performance and multiplying by a factor of 1.25 that allows some time buffer because the participants are not trained to expert performance. Thus, if expert, optimal performance on a task was [x] seconds then allotted task time performance was [x * 1.25] seconds. This ratio was aggregated across tasks and reported with mean and variance scores.
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 taken for errors. The total number of errors was calculated for each task and then divided by the total number of times that task was attempted. Not all deviations would be counted as errors. This should also be expressed as the mean number of failed tasks per participant. On a qualitative level, an enumeration of errors and error types were collected.
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 path was compared to the optimal path. The number of steps in the observed path is divided by the number of optimal steps to provide a ratio of path deviation.
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. 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. Variance measures (standard deviation and standard error) were also calculated.

Satisfaction: Task Rating	Participant's subjective impression of the ease of use of the application was measured by administering both a simple post-task question as well as a post-session questionnaire. After each task, the participant was asked to rate "Overall, this task was:" on a scale of 1 (Very Difficult) to 5 (Very Easy). These data are averaged across participants. Common convention is that average ratings for systems judged easy to use should be 3.3 or above. To measure participants' confidence in and likeability of the Praxis EMR v5.27 overall, the testing team administered the System Usability Scale (SUS) post-test questionnaire. Questions included, "I think I would like to use this system frequently," "I thought the system was easy to use," and "I would imagine that most people would learn to use this system very quickly." See full System Usability Score questionnaire in Appendix 3.

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
The usability testing results for the EHRUT are detailed below (see Table 4). The results should be seen in light of the objectives and goals outlined in the section on Study Design. The data should yield actionable results that, if corrected, yield material, positive impact on user performance.

Although 15 total participants helped us with the efforts of our Usability testing, each task was tested by only 10 participants. Due to the amount of tasks and time restraints, not all doctors tested all 20 evaluated tasks. Some users only participated in testing the electronic prescribing function, and some doctors tested all functionalities except electronic prescribing.

Measure	N	Task Success	Path Deviation	Steps	Task Time (sec)		Errors	Task Ratings 5=Very easy
Task	#	% Mean/SD	Mean (SD)	Observed / Optimal	Mean (SD)	Deviations: (Observed / Optimal)	Mean (SD)	Mean (SD)
§ 170.315 (a)(5) Demographics	10	90%/31.62	1.1/2.84	17/16	6306.3 (19034.82)	6306.3/309	0.1 (0.31)	4.6(1.05)
§ 170.315 (a)(14) Implantable device list	10	100%/0	0.2/0.42	6/6	61.6 (42.06)	61.6/69	0	5(0)

§ 170.315 (a)(6) Problem list	10	100%/0	0.1/0.31	7/7	124.8 (69.52)	124.8/64	0	4.73(0.59)
§ 170.315 (a)(4) Drug-drug, drug-allergy interaction checks for CPOE	10	100%/0	0.4/0.97	9/9	142.1 (78.25)	142.1/137	0	4.73(0.59)
§ 170.315 (a)(7) Medication list	10	90%/31.62	0.1/0.31	25/25	505.9 (283.2)	505.9/322	0.1(0.31)	4.53(0.91)
§ 170.315 (a)(8) Medication allergy list	10	90%/31.62	0.8/1.47	26/25	505.9 (283.2)	505.9/322	0.1(0.31)	4.53(0.91)
§ 170.315 (a)(2) Computerized provider order entry (CPOE) – laboratory	10	100%/0	0.1/0.31	25/25	505.9 (283.2)	505.9/322	0	4.53(0.91)
§ 170.315 (a)(1) Computerized provider order entry (CPOE) – medications	10	90%/31.62	0.2/0.42	25/25	505.9 (283.2)	505.9/322	0.1(0.31)	4.53(0.91)
§ 170.315 (a)(3) Computerized provider order entry (CPOE) – diagnostic imaging	10	100%/0	0.2/0.63	25/25	505.9 (283.2)	505.9/322	0	4.53(0.91)
§ 170.315 (a)(9) Clinical decision support (CDS)	10	100%/0	0/0	10/10	81.3 (30.56)	81.3/76	0	4.93(0.25)
§ 170.315 (b)(2) Clinical information reconciliation and incorporation	10	100%/0	0.4/0.51	12/12	278.2 (485.67)	278.2/128	0	4.66(0.81)
§ 170.315 (b)(3) Electronic prescribing	10	90%/31.62	6.8/10.3	31/24	778 (706.7)	778/438	1(2.53)	4.66(0.81)

The results from the SUS (System Usability Scale) scored the subjective satisfaction with the system based on performance with these tasks to be: 95.6%. Broadly interpreted, scores under 60 represent systems with poor usability; scores over 80 would be considered above average.

Measure	N	Mean	(SD)	Normalized Average Satisfaction
Task				
Clinical Reconciliation - 1. I think that I would like to use this system frequently. (5 totally agree 1 totally disagree)	15	4.86	0.51	97.2
Clinical Reconciliation - 2. I found the system unnecessarily complex. (5 totally agree 1 totally disagree)	15	1.06	0.25	98.6
Clinical Reconciliation - 3. I thought the system was easy to use. (5 totally agree 1 totally disagree)	15	4.73	0.79	94.6
Clinical Reconciliation - 4. I think that I would need the support of a technical person to be able to use this system. (5 totally agree 1 totally disagree)	15	1.20	0.77	96
Clinical Reconciliation - 5. I found the various functions in this system were well integrated. (5 totally agree 1 totally disagree)	15	4.53	0.99	90.6
Clinical Reconciliation - 6. I thought there was too much inconsistency in this system. (5 totally agree 1 totally disagree)	15	1.06	0.25	98.6
Clinical Reconciliation - 7. I would imagine that most people would learn to use this system very quickly. (5 totally agree 1 totally disagree)	15	4.73	0.45	94
Clinical Reconciliation - 8. I found the system very cumbersome to use. (5 totally agree 1 totally disagree)	15	1.06	0.25	98.6
Clinical Reconciliation - 9. I felt very confident using the system. (5 totally agree 1 totally disagree)	15	4.86	0.35	97.2
Clinical Reconciliation - 10. I needed to learn a lot of things before I could get going with this system. (5 totally agree 1 totally disagree)	15	1.46	1.12	90.6
Average normalized satisfaction				95.6%

DISCUSSION OF THE FINDINGS

Generally, our findings from this study were positive. All areas, including high risk areas, scored well in effectiveness, efficiency and satisfaction measures.

EFFECTIVENESS

The effectiveness of Praxis EMR v8 appears to be high due to the fact that few errors were recorded during the usability test, except mainly when the users hadn't made use of the system in a long time, or when performing a task that they don't normally implement at their practices (such as e-prescribing, for example, in the cases that doctors either use another software in the day-to-day, or don't electronically prescribe at all).

EFFICIENCY

Overall, most users followed the optimal paths to complete each task. When users deviated from the optimal path, not many steps were added. Sometimes users deviated from the optimal expected by the videos shown as demonstration to the participants without taking any extra steps. This is because Praxis EMR has multiple optimal paths for several tasks, and users have the flexibility to choose work paths based on their own preferences.

SATISFACTION

The satisfaction of Praxis EMR users appears to be high, considering the satisfaction ratings provided by the System Usability Scale.

MAJOR FINDINGS

Overall, Praxis EMR scored very highly in effectiveness, efficiency, and satisfaction. There were few errors and complaints made by the participants in the study.

AREAS FOR IMPROVEMENT
As previously mentioned, Praxis would benefit greatly by focusing on in-depth training sessions with our users to help them learn how to interpret the systems cues and teach them the scope of Praxis' functionalities. Once participants understood the logic behind each stage, it was much easier to intuitively follow the appropriate steps to achieve each task.

APPENDICES

Appendix 1: EHRUT Usability Test: Administrator's Guide
Appendix 2: System Usability Scale (SUS) Questionnaire

Appendix 1: EHRUT Usability Test: Administrator's Guide

Administrator:
Date:
Time:
Participant #:
Location:

CHECKLIST
Prior to testing:
- Confirm schedule with Participants
- Ensure EHRUT lab environment is running properly
- Ensure data recording equipment is running properly

Prior to each participant:
- Reset application

Upon receiving participant's consent:
- Start session recordings

After each participant:
- End session recordings

After all testing:
- Back up all video and data files

ORIENTATION
The identity of each participant will be verified and matched with a name on the participant schedule. Participants will then be assigned a participant ID.

The administrator will introduce the test. Sample text to read by participants:

Dear Praxis Tester,
Thank you for participating in this study. Your input is very important. Our session today will last about 90 minutes. During that time you will use an instance of an electronic medical record. I will show you a quick video on the tasks to complete for each session (there are 8 sessions). You may repeat the video if not clear. Then you should complete the tasks as quickly as possible, making as few errors as possible. Please try to complete the tasks on your own following the instructions very closely. Please note that we are not testing you, we are testing the system. Therefore if you have difficulty, all this means is that something needs to be improved in the system. I will assist you by reminding you of each specific task that is being requested if needed, but I am not able to instruct you or provide help on how to use the application or perform the task after you've viewed the demos.
Upon completion of each task, I will ask you how easy it felt and obtain any other critiques from you. Overall, we are interested in how easy (or how difficult) this system is to use, what in it would be useful to you, and how we could improve it. Please be honest with your opinions. All of the information that you provide will be kept confidential and your name will not be associated with your comments at any time. Should you feel it necessary you are able to withdraw at any time during the testing. For each task, I will read the description to you and say "Begin." At that point, please perform the task and say "Done" once you believe you have successfully completed the task.
After the test has been completed, we would appreciate you filling out the form below and emailing or faxing this document to us. (FAX 1-818-337-2158)

THANK YOU VERY MUCH FOR YOUR ASSISTANCE!

Participants will then be given 20 tasks to complete. Task timing will begin once the administrator finishes reading the task prompt. The task time will be stopped once the participant indicated they have successfully completed the task.

During the testing, the administrator will time the test and record user performance data. This should include qualitative observations of user reactions to work flows, navigation, types of errors, screen designs, things that tested well, etc. Participants' screens and audio will be recorded for subsequent analysis.

The following types of data will be collected for each participant:

- Demographic data: Gender, Age, Education, Occupation/role, Professional Experience, Computer Experience, Product Experience, Assistive Technology Needs
- Time to complete the tasks
- Number and types of errors
- Path deviations: going to a wrong screen, clicking on an incorrect menu item, following an incorrect link, or interacting incorrectly with an on-screen control
- Participant's verbalizations
- Participant's satisfaction ratings

PARTICIPANT DEMOGRAPHIC DATA
Gender:
Age:
Education:
Occupation/role:
Professional Experience:
Computer Experience:
Product Experience:
Assistive Technology Needs:

EVALUATED TASKS

§170.315(a)(5) Demographics

Task 1: Create a new patient, identify demographics and change demographics
Starting Point: Home page
Instructions: Create new patient Richard Imaginary, assign date of birth and gender. Assign Race, Ethnicity, Language, Sexual orientation and Gender Identity. Change all assigned values.
Success:
      □ Easily completed
      □ Completed with difficulty or help :: Describe below
      □ Not completed
      Comments:
Optimal Path:
      □ Correct
      □ Minor Deviations / Cycles :: Describe below
      □ Major Deviations :: Describe below
      Comments:
Observed Errors and Verbalizations:
      Comments:
Rating:
      Scale: "Very Difficult" (1) to "Very Easy" (5)
      Overall, this task was: ___
Administrator / Notetaker Comments:

§ 170.315 (a)(14) Implantable device list

Task 2: Copy the UID provided for the implantable device and paste in the software to apply the device to the patient
Starting Point: Patient's chart
Instructions: Copy the provided unique ID for the implantable device and then apply it to the patient's chart in the EHR to apply to the patient as active/inactive.
Success:
　　　□ Easily completed
　　　□ Completed with difficulty or help :: Describe below
　　　□ Not completed
　　　Comments:
Optimal Path:
　　　□ Correct
　　　□ Minor Deviations / Cycles :: Describe below
　　　□ Major Deviations :: Describe below
　　　Comments:
Observed Errors and Verbalizations:
　　　Comments:
Rating:
　　　Scale: "Very Difficult" (1) to "Very Easy" (5)
　　　Overall, this task was: ___
Administrator / Notetaker Comments:

§ 170.315 (a)(6) Problem list

Task 3: Change a status of a diagnosis and assign a new one
Starting Point: Patient's chart
Instructions: Take the current diagnosis and change it from Chronic to Resolved. Then assign a new diagnosis to the patient's chart, either as active, chronic, resolved or inactive.
Success:
　　　□ Easily completed
　　　□ Completed with difficulty or help :: Describe below
　　　□ Not completed
　　　Comments:
Optimal Path:
　　　□ Correct
　　　□ Minor Deviations / Cycles :: Describe below
　　　□ Major Deviations :: Describe below
　　　Comments:
Observed Errors and Verbalizations:
　　　Comments:
Rating:
　　　Scale: "Very Difficult" (1) to "Very Easy" (5)
　　　Overall, this task was: ___
Administrator / Notetaker Comments:

§ 170.315 (a)(4) Drug-drug, drug-allergy interaction checks for CPOE

Task 4: Create drug-drug and drug-allergy interventions prior to CPOE completion
Starting Point: SOAP Generator
Instructions: Enter a new office visit, prescribe drug that will trigger an allergy alert due to the current medication. Remove said medication and prescribe a new one that will trigger an allergy due to a patient's existing allergy. Remove said medication.

Success:
　　　□ Easily completed
　　　□ Completed with difficulty or help :: Describe below
　　　□ Not completed
　　　Comments:
Optimal Path:
　　　□ Correct
　　　□ Minor Deviations / Cycles :: Describe below
　　　□ Major Deviations :: Describe below
　　　Comments:
Observed Errors and Verbalizations:
　　　Comments:
Rating:
　　　Scale: "Very Difficult" (1) to "Very Easy" (5)
　　　Overall, this task was: ___
Administrator / Notetaker Comments:

§ 170.315 (a)(1) Computerized provider order entry (CPOE) – medications

Task 5: Access and Change Medication Order
Starting Point: SOAP Generator
Instructions: Choose a different medication to replace the one you just added.
Success:
　　　□ Easily completed
　　　□ Completed with difficulty or help :: Describe below
　　　□ Not completed
　　　Comments:
Optimal Path:
　　　□ Correct
　　　□ Minor Deviations / Cycles :: Describe below
　　　□ Major Deviations :: Describe below
　　　Comments:
Observed Errors and Verbalizations:
　　　Comments:
Rating:
　　　Scale: "Very Difficult" (1) to "Very Easy" (5)
　　　Overall, this task was: ___
Administrator / Notetaker Comments:

§ 170.315 (a)(2) Computerized provider order entry (CPOE) – laboratory

Task 6: Record Laboratory Order
Starting Point: SOAP Generator
Instructions: Enter a new lab order for the patient.
Success:
　　　□ Easily completed
　　　□ Completed with difficulty or help :: Describe below

□ Not completed
Comments:
Optimal Path:
□ Correct
□ Minor Deviations / Cycles :: Describe below
□ Major Deviations :: Describe below
Comments:
Observed Errors and Verbalizations:
Comments:
Rating:
Scale: "Very Difficult" (1) to "Very Easy" (5)
Overall, this task was: ___
Administrator / Notetaker Comments:

§ 170.315 (a)(3) Computerized provider order entry (CPOE) – diagnostic imaging

Task 7: Record Radiology/imaging Order
Starting Point: SOAP Generator
Instructions: Enter a new radiology/imaging order for the patient.
User Path:
1. Click the "Radiology and Imaging – Send out" label
2. Select a radiology/imaging order from the list

Success:
□ Easily completed
□ Completed with difficulty or help :: Describe below
□ Not completed
Comments:
Optimal Path:
□ Correct
□ Minor Deviations / Cycles :: Describe below
□ Major Deviations :: Describe below
Comments:
Observed Errors and Verbalizations:
Comments:
Rating:
Scale: "Very Difficult" (1) to "Very Easy" (5)
Overall, this task was: ___
Administrator / Notetaker Comments:

§ 170.315 (a)(8) Medication allergy list
Task 8: Remove medication allergy and add a new one.
Starting Point: SOAP Generator
Instructions: Remove medication allergy and add a new one.
Success:
□ Easily completed
□ Completed with difficulty or help :: Describe below
□ Not completed
Comments:
Optimal Path:
□ Correct
□ Minor Deviations / Cycles :: Describe below
□ Major Deviations :: Describe below
Comments:

Observed Errors and Verbalizations:
      Comments:
Rating:
      Scale: "Very Difficult" (1) to "Very Easy" (5)
      Overall, this task was: ___
Administrator / Notetaker Comments:

§ 170.315 (a)(7) Medication list
Task 9: Access Medication List and Record Medication
Starting Point: SOAP Generator
Instructions: Access the patient's medication list, remove the current medication and add a new one. Remove current prescription and add a new one.
User Path:
1. Click the "Medications" tab
2. Click "Click here to add new drugs"
3. Select a medication from the list

Success:
      □ Easily completed
      □ Completed with difficulty or help :: Describe below
      □ Not completed
      Comments:
Optimal Path:
      □ Correct
      □ Minor Deviations / Cycles :: Describe below
      □ Major Deviations :: Describe below
      Comments:
Observed Errors and Verbalizations:
      Comments:
Rating:
      Scale: "Very Difficult" (1) to "Very Easy" (5)
      Overall, this task was: ___
Administrator / Notetaker Comments:

§ 170.315 (a)(2) Computerized provider order entry (CPOE) – laboratory

Task 10: Access and Change Laboratory Order
Starting Point: SOAP Generator
Instructions: Choose a different lab order to replace the one you just added.
Success:
      □ Easily completed
      □ Completed with difficulty or help :: Describe below
      □ Not completed
      Comments:
Optimal Path:
      □ Correct
      □ Minor Deviations / Cycles :: Describe below
      □ Major Deviations :: Describe below
      Comments:
Observed Errors and Verbalizations:
      Comments:
Rating:
      Scale: "Very Difficult" (1) to "Very Easy" (5)
      Overall, this task was: ___
Administrator / Notetaker Comments:

§ 170.315 (a)(3) Computerized provider order entry (CPOE) – diagnostic imaging

Task 11: Access and Change Radiology/imaging Order
Starting Point: SOAP Generator
Instructions: Choose a new radiology/imaging order to replace the one you just added.
Success:
> □ Easily completed
> □ Completed with difficulty or help :: Describe below
> □ Not completed
> Comments:

Optimal Path:
> □ Correct
> □ Minor Deviations / Cycles :: Describe below
> □ Major Deviations :: Describe below
> Comments:

Observed Errors and Verbalizations:
> Comments:

Rating:
> Scale: "Very Difficult" (1) to "Very Easy" (5)
> Overall, this task was: ___

Administrator / Notetaker Comments:

§ 170.315 (a)(9) Clinical decision support (CDS)

Task 12: Test the Clinical decision support button
Starting Point: Home page
Instructions: Access a new office visit, assign a diagnosis to the patient and check the clinical decision support button. Make sure there's an agent being sent to the patient and confirm if you want to send.
Success:
> □ Easily completed
> □ Completed with difficulty or help :: Describe below
> □ Not completed
> Comments:

Optimal Path:
> □ Correct
> □ Minor Deviations / Cycles :: Describe below
> □ Major Deviations :: Describe below
> Comments:

Observed Errors and Verbalizations:
> Comments:

Rating:
> Scale: "Very Difficult" (1) to "Very Easy" (5)
> Overall, this task was: ___

Administrator / Notetaker Comments:

§ 170.315 (b)(2) Clinical information reconciliation and incorporation

Task 13: Check for a received document for clinical information and reconcile/incorporate into the patient's chart
Starting Point: Home page
Instructions: Access patient Mary Imaginary and note there has been a CCDA received into the patient's chart. Go to a new office visit and reconcile the information to show Allergies, Current medications and the Problem List.
Success:

□ Easily completed
　□ Completed with difficulty or help :: Describe below
　□ Not completed
　Comments:
Optimal Path:
　□ Correct
　□ Minor Deviations / Cycles :: Describe below
　□ Major Deviations :: Describe below
　Comments:
Observed Errors and Verbalizations:
　Comments:
Rating:
　Scale: "Very Difficult" (1) to "Very Easy" (5)
　Overall, this task was: ___
Administrator / Notetaker Comments:

§ 170.315 (b)(3) Electronic prescribing
Task 14: Send new prescription to the pharmacy.
Starting Point: SOAP Generator
Instructions: Note the prescribed drug assigned to the patient and make sure the prescription is sent to the Pharmacy.
Success:
　□ Easily completed
　□ Completed with difficulty or help :: Describe below
　□ Not completed
　Comments:
Optimal Path:
　□ Correct
　□ Minor Deviations / Cycles :: Describe below
　□ Major Deviations :: Describe below
　Comments:
Observed Errors and Verbalizations:
　Comments:
Rating:
　Scale: "Very Difficult" (1) to "Very Easy" (5)
　Overall, this task was: ___
Administrator / Notetaker Comments:

Task 15: Check for messages from the Pharmacy regarding a change request
Starting Point: Home page
Instructions: Check for messages received from the pharmacy and make a change to a previously prescribed drug as requested.
Success:
　□ Easily completed
　□ Completed with difficulty or help :: Describe below
　□ Not completed
　Comments:
Optimal Path:
　□ Correct
　□ Minor Deviations / Cycles :: Describe below
　□ Major Deviations :: Describe below
　Comments:
Observed Errors and Verbalizations:
　Comments:
Rating:

Scale: "Very Difficult" (1) to "Very Easy" (5)
Overall, this task was: ___
Administrator / Notetaker Comments:

Task 16: Check for messages from the Pharmacy regarding a refill request
Starting Point: Home page
Instructions: Check for messages received from the pharmacy and refill a previously prescribed drug as requested.
Success:
 □ Easily completed
 □ Completed with difficulty or help :: Describe below
 □ Not completed
 Comments:
Optimal Path:
 □ Correct
 □ Minor Deviations / Cycles :: Describe below
 □ Major Deviations :: Describe below
 Comments:
Observed Errors and Verbalizations:
 Comments:
Rating:
 Scale: "Very Difficult" (1) to "Very Easy" (5)
 Overall, this task was: ___
Administrator / Notetaker Comments:

Task 17: Check fill status
Starting Point: Home page
Instructions: Check to see if a previously prescribed drug has been received by the Pharmacy
Success:
 □ Easily completed
 □ Completed with difficulty or help :: Describe below
 □ Not completed
 Comments:
Optimal Path:
 □ Correct
 □ Minor Deviations / Cycles :: Describe below
 □ Major Deviations :: Describe below
 Comments:
Observed Errors and Verbalizations:
 Comments:
Rating:
 Scale: "Very Difficult" (1) to "Very Easy" (5)
 Overall, this task was: ___
Administrator / Notetaker Comments:

Task 18: Cancel a prescription
Starting Point: E-RX screen
Instructions: Take a previously prescribed drug that has been received by the pharmacy and cancel the prescription.
Success:
 □ Easily completed
 □ Completed with difficulty or help :: Describe below
 □ Not completed
 Comments:
Optimal Path:

□ Correct
□ Minor Deviations / Cycles :: Describe below
□ Major Deviations :: Describe below
Comments:
Observed Errors and Verbalizations:
Comments:
Rating:
Scale: "Very Difficult" (1) to "Very Easy" (5)
Overall, this task was: ___
Administrator / Notetaker Comments:

Task 19: Request RX History
Starting Point: E-RX screen
Instructions: Using patient History4 Imaginary, request the RX History from the Pharmacy
Success:
□ Easily completed
□ Completed with difficulty or help :: Describe below
□ Not completed
Comments:
Optimal Path:
□ Correct
□ Minor Deviations / Cycles :: Describe below
□ Major Deviations :: Describe below
Comments:
Observed Errors and Verbalizations:
Comments:
Rating:
Scale: "Very Difficult" (1) to "Very Easy" (5)
Overall, this task was: ___
Administrator / Notetaker Comments:

Task 20: Reconcile the medication's medical history
Starting Point: E-RX screen
Instructions: Using patient History5 Imaginary, obtain the current medical history from the Pharmacy via Surescripts and reconcile the medications into the patient's chart.
Success:
□ Easily completed
□ Completed with difficulty or help :: Describe below
□ Not completed
Comments:
Optimal Path:
□ Correct
□ Minor Deviations / Cycles :: Describe below
□ Major Deviations :: Describe below
Comments:
Observed Errors and Verbalizations:
Comments:
Rating:
Scale: "Very Difficult" (1) to "Very Easy" (5)
Overall, this task was: ___
Administrator / Notetaker Comments:

After all tasks are completely finished, the administrator will administer the System Usability Scale (SUS) post-test questionnaire.

Appendix 2: System Usability Scale (SUS) Questionnaire

Please place one x in each row.

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