EHR Usability Test Report of AuroraEHR version 2.0

Report based on NISTIR 7741 Common Industry Format for Usability Test Reports

https://www.nist.gov/publications/nistir-7741-nist-guide-processes-approach-improving-usability-electronic-health-records?pub_id=907313

AuroraEHR version 2.0

Date of Usability Test: July 13-14, 2017
Date of Report: September 15, 2017
Report Prepared By: Practice Alternatives, Inc
Cindy Naguib
Assistant Director of Operations
cnaguib@practice-alt.com
4000 Route 66, suite
Tinton Falls, NJ
732-382-1090

TABLE OF CONTENTS

EXECUTIVE SUMMARY

A usability test of AuroraEHR, version 2.0, was conducted on July 13, 2017 and July 14, 2017, in an Ambulatory Surgery Center, by Practice Alternatives, Inc. The center was in West Orange, NJ. The purpose of this test was to test and validate the usability of the current user interface, and provide evidence of usability in the EHR Under Test (EHRUT). The intended users are Ambulatory physicians, nurses and medical assistants. During the usability test, 10 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 6 tasks typically conducted on an EHR:

- 170.315   (a)(5) Demographics- enter and update
- 170.315   (a)(6) Problem list- add and update
- 170.315   (a)(9) Clinical decision support-configure, review and order
- 170.315   (a)(14) Implantable device list- add and review
- 170.315   (b)(2) Clinical information reconciliation and incorporation- reconciling medication and allergies

During the 45 minute, one-on-one usability test, each participant was greeted by the administrator and asked to review and sign an informed consent/release form (included in Appendix); they were instructed that they could withdraw at any time. Participants did have prior experience with the EHR.[4] The administrator introduced the test, and instructed participants to complete a series of tasks (given one at a time) using the

EHRUT. During the testing, the administrator timed the test and, along with the data logger recorded user performance data on paper and electronically. The administrator did not give the participant assistance on how to complete the task.

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 posttest 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 EHR

TASK	TASK SUCCESS MEAN (SD)	PATH DEVIATION	TASK TIME MEAN (SD)	TASK TIME DEVIATIONS	ERRORS MEAN (SD)	TASK RATINGS 5=EASY MEAN (SD)
DEMOGRAPHICS						
Enter gender identity						
Enter sexual orientation						
Enter preferred language						
Enter email address						
Enter phone number						
PROBLEM LIST						
Review active problems						
Search for a problem						
Add to the problem list						
Update clinical status of a problem						
CLINICAL DECISION SUPPORT						
Change CDS reference link						
Order CDS intervention						
IMPLANTABLE DEVICE LIST						
Search and select an implantable device						
Add date placed information						
Save the implantable device						
Review the device identifier						
Review manufacturer						
RECONCILING MEDICATION AND ALLERGIES						
Ignore a medication for reconciliation						
Add a medication for reconciliation						
Confirm medication reconciliation						
Add an allergy for reconciliation						
Confirm allergy reconciliation						

INTRODUCTION

The EHRUT tested for this study was AuroraEHR, version 2.0. Designed to present medical information to healthcare providers in Ambulatory and Vascular settings, the EHRUT consists of an all-in-one integrated platform that includes practice management and Electronic Health Records (EHR) solutions. 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, such as time taken on task were captured during the usability testing.

METHOD

PARTICIPANTS

A total of 10 participants were tested on the EHRUT(s). Participants in the test were doctors, nurses, and medical assistants. Participants were recruited by Practice Alternatives, Inc. In addition, participants had no direct connection to the development of or organization producing the EHRUT. 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.

For the test purposes, end-user characteristics were identified and translated into a recruitment screener used to solicit

potential participants; an example of a screener is provided in

the Appendix.

Part ID	Gender	Age	Education	Occupation/role	Professional Experience	Computer Experience	Product Experience	Assistive Technology Needs
1.	M	50-59	Doctorate degree	MD	360 months	240 months	44 months	N/A
2.	M	50-59	Doctorate degree	MD	360 months	240 months	44 months	N/A
3.	F	60-69	Associate's degree	RN	420 months	60 months	44 months	N/A
4.	F	40-49	Associate's degree	RN	240 months	120 months	18 months	N/A
5.	F	40-49	Associate's degree	RN	26 months	48 months	23 months	N/A
6.	M	40-49	Bachelor's degree	RN	26 months	120 months	23 months	N/A
7.	F	50-59	Trade/technical/ vocational training	Medical Assistant	180 months	72 months	36 months	N/A
8.	F	30-39	Trade/technical/ vocational training	Medical Assistant	48 months	60 months	24 months	N/A
9.	F	30-39	Trade/technical/ vocational training	Medical Assistant	60 months	180 months	44 months	N/A
10.	F	20-29	Trade/technical/ vocational training	Medical Assistant	48 months	120 months	34 months	N/A

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.

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

Participants were scheduled for 45 minute sessions with 15 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 by the recruiting firm.

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 used the system in the same location, and 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

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. Demographics- enter and update
2. Problem list- add and update
3. Clinical decision support-configure, review and order
4. Implantable device list- add and review
5. reconciling medication and allergies

PROCEDURES:

Upon arrival, participants were greeted; their identity was verified and matched with a name on the participant schedule. Participants were then assigned a participant ID. Each participant reviewed and signed an informed consent and release form. A representative from the test team witnessed the participant's signature.

To ensure that the test ran smoothly, two staff members participated in this test, the usability administrator and the data logger. The usability testing staff, conducting the test, were experienced usability practitioners with four years' experience.

The administrator moderated the session including administering instructions and tasks. The administrator also monitored task times, obtained post-task rating data, and took notes on participant comments. A second person 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 could give immaterial guidance and clarification on tasks, but not instructions on use.

- Without using a think aloud technique.

For each task, the participants were given a written copy of the task. 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.

Following the session, the administrator gave the participant the post-test questionnaire and thanked everyone 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 test facility included a waiting area and a quiet testing room with a table, computer for the participant, and recording computer for the administrator. Only the participant and administrator were in the test room. All observers and the data logger worked from a separate room where they could see the participant's screen and listen to the audio of the session. To ensure that the environment was comfortable for users, noise levels were kept to a minimum with the ambient temperature within a normal range. All the safety instruction and evacuation procedures were valid, in place, and visible to the participants.

TEST ENVIRONMENT:

AuroraEHR v 2.0 would be typically be used in a healthcare office or Ambulatory Care Facility.

For testing, the computers used were PC's running Windows 10. The participants used a mouse and keyboard when interacting with the EHR. The icon for the application was set up by Practice Alternatives, Inc. staff and connectivity to application was achieved via a high-speed internet connection. Technically, the system response time was representative to what actual users would experience in a field implementation.

AuroraEHR used a 20-inch standard ratio LCD monitor with a 1600-1200 pixel resolution.

The application was set-up by Practice Alternatives, Inc. according to the documentation describing the system set-up and preparation. The application itself was running on Windows Server 2008 using a test database on a Microsoft remote desktop connection. Technically, the system performance (i.e., response time) was representative to what actual users would experience in a field implementation. Additionally, participants were instructed not to change any of the default system settings (such as control of font size).

TEST FORMS AND TOOLS

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

1. Informed Consent
2. Moderator's Guide
3. Post-test Questionnaire

Examples of these documents can be found in the Appendix.

The Moderator's Guide was devised 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 test machine. Screen capture recorded user activities.

PARTICIPANT INSTRUCTIONS:

The administrator reads the following instructions aloud to each participant (also see the full moderator's guide in Appendix [B4]):

> *Thank you for participating in this study. Your input is very important. Our session today will last about 45 minutes. You will be using version 2.0. I will ask you to complete a few tasks using this system and answer some questions. You should complete the tasks on your own following the instructions very closely, working as you would on a normal day at the center. 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 be here in case you need specific help, but I am not able to instruct you or provide help in how to use the application.*

> *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. I did not have any involvement in its creation, so 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.*

The administrator gave the following instructions:

> *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. I would like to request that you* not *talk aloud or verbalize while you are doing the tasks.* [9] *I will ask you your impressions about the task once you are done.*

Participants were then given 5 tasks to complete. Tasks are listed in

the moderator's guide in the Appendix

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 AuroraEHR, v 2.0 by measuring participant success rates and errors

2. Efficiency of AuroraEHR, v 2.0 by measuring the average task time and path deviations

3. 3. Satisfaction with AuroraEHR, v 2.0 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 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 Moderator's Guide must be operationally defined by taking multiple measures of optimal performance and multiplying by some factor [e.g., 1.25] that allows some time buffer because the participants are presumably 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 should be 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 an "Failures." 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.[11] 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 should be 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.

	It is strongly recommended that task deviations be reported. Optimal paths (i.e., procedural steps) should be recorded when constructing tasks.
Efficiency:	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 [EHRUT] 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 5.[13]

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. The usability testing results for AuroraEHR 2.0 are detailed below.

TASK	TASK SUCCESS MEAN (SD)	PATH DEVIATION	TASK TIME MEAN (SD) seconds	TASK TIME DEVIATIONS seconds	ERRORS MEAN (SD)	TASK RATINGS 5=EASY MEAN (SD)
DEMOGRAPHICS						
Enter gender identity	100%	7/5	19[i]	19/11	0	4
Enter sexual orientation	100%	5/5	28	28/11	0	4
Enter preferred language	100%	5/5	12	12/9	0	4
Enter email address	100%	4/4	30	30/14	0	4
Enter phone number	100%	5/5	17	17/14	0	5
PROBLEM LIST						
Review active problems	100%	2/2	9	9/7	0	5
Search for a problem	100%	6/5	23	23/17	0	4
Add to the problem list	100%	3/2	8	8/4	0	4
Update clinical status of a problem	90%	8/6	27	27/20	0	5
CLINICAL DECISION SUPPORT						
Change CDS reference link	100%	8/6	60	60/45	0	3.5
Order CDS intervention	100%	2/2	17	17/15	0	4
IMPLANTABLE DEVICE LIST						
Search and select an implantable device	100%	6/4	50	50/35	0	4
Add date placed information	100%	3/3	12	12/10	0	5
Save the implantable device	100%	1/1	5	5/5	0	4
Review the device identifier	100%	1/1	10	10/10	0	5
Review manufacturer	100%	3/2	10	10/10	0	5
RECONCILING MEDICATION AND ALLERGIES						
Ignore a medication for reconciliation	75%	9/7	39	39/30	2	4
Add a medication for reconciliation	100%	9/9	90	90/60	0	4
Confirm medication reconciliation	100%	2/2	5	5/5	0	5
Add an allergy for reconciliation	100%	10/8	60	60/45	0	4
Confirm allergy reconciliation	100%	2/2	5	5/5	0	5

SYSTEM USABILTY SCALE:

The results from the SUS (System Usability Scale) scored the subjective

satisfaction with the system based on performance with these tasks to be:

80. Broadly interpreted, scores under 60 represent systems with poor

usability; scores over 80 would be considered above average

DISCUSSION OF THE FINDINGS

All tasks experienced high completion rates including most tasks related to demographics, gender identity/sexual orientation and the Implantable device list was observed that users were at ease completing the tasks. For many tasks, the click count deviation rates were relatively low (less than 2 times the clicks when compared to the optimal click path). This would include tasks for demographics, clinical decision support, problems, and implantable device. There was a small number of tasks that had click path deviations, specifically for clinical reconciliation with ignoring a medication for reconciliation and ordering a CDS intervention. Updating the clinical status of a problem added click path deviations where the user was not sure how to save the data without adding a descriptive note.. The overall SUS score was 80.

EFFECTIVENESS

AuroraEHR v 2.0 scored well on many measures of effectiveness. Based on the success data, participants effectively completed most tasks relatively successfully. The success rate for most of the tasks was 100%. There was only one task failure.

EFFICIENCY

AuroraEHR v 2.0 scored well on a task basis on measures of efficiency. The deviation rate ranged from 1 to 2 (the closer to 1 the better), with some participants deviating significantly from the optimal path on tasks such as clinical reconciliation. Time on task varied significantly based on task complexity, from 9 seconds to review the problem list to 90 seconds for medication reconciliation. There were many reasons for the time on task deviations. Some users were not familiar with some screens and clicked around before figuring out how to complete the task. Finally, many users would take time after completing the task

to review the input carefully before clicking the "done" button.. These factors contributed to some of the high deviation rates for time on task

SATISFACTION

AuroraEHR 2.0 scored well on measures of satisfaction.

MAJOR FINDINGS

- The users found it was user friendly and easy to use.
- The work flow was in a logical order.
- After doing repeated steps on various tasks, the users could locate where they needed to go in the system quicker, as most screens are laid out in the same format, making it easier for user to navigate.

AREAS FOR IMPROVEMENT

- Search options should allow partial word search instead of requiring complete words

- The Problem list should allow users to enter and save multiple problems at the same time

- Redesign the Clinical reconciliation screen to simplify it

- Allow duplicate medications to be canceled automatically on the reconciliation screen

- Allow updating the clinical status of a problem without manually add a description before saving.

- The curser should default to the left when entering a phone number.

APPENDICES

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

1: Recruiting screener

2: Participant demographics

3: Non-Disclosure Agreement (NDA) and Informed Consent Form

4: Moderator's Guide

5: System Usability Scale Questionnaire

Appendix 1: RECRUITING SCREENER

Hello, my name Cindy Naguib from Practice Alternatives, Inc. We

are recruiting individuals to participate in a usability study for an electronic health

record. We would like to ask you a few questions to see if you qualify and if would like

to participate. This should only take a few minutes of your time. This is strictly for

research purposes. If you are interested and qualify for the study, you will be paid to

participate. Can I ask you a few questions?

1. Are you male or female?

2. Have you participated in a focus group or usability test in the past *24* months?

3. Do you, or does anyone in your home, work in marketing research, usability research, web design?

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

5. Which of the following best describes your age? [23 to 39; 40 to 59; 60 - to 74; 75 and older

6. Which of the following best describes your race or ethnic group? [e.g., Caucasian, Asian, Black/African-American, Latino/a or Hispanic, etc.]

7. Do you require any assistive technologies to use a computer?

8. What is your current position and title?

    RN

    Physician

    Medical Assistant

9. How long have you held this position?

10. Describe your work location and environment? [e.g., ASC, private practice, health system, government clinic, etc.]

11. Which of the following describes your highest level of education? [e.g., high school graduate/GED, some college, college graduate (RN, BSN), postgraduate (MD/PhD), other (explain)]

Computer Expertise

12. Besides reading email, what professional activities do you do on the computer? [e.g., access EHR, research; reading news; shopping/banking; digital pictures; programming/word processing, etc.]

13. About how many hours per week do you spend on the computer? e.g., 0 to 10, 11 to 25, 26+ hours per week]

14. What computer platform do you usually use? [e.g., Mac, Windows, etc.]

15. What Internet browser(s) do you usually use? [e.g., Firefox, IE, AOL, etc.]

16. In the last month, how often have you used an electronic health record?

17. How many years have you used an electronic health record?

18. How many EHRs do you use or are you familiar with?

19. How does your work environment patient records?

   On paper

   Some paper, some electronic

   All electronic

May I get your contact information?

- Name of participant:

- Address:

- City, State, Zip:

- Daytime phone number:

- Evening phone number:

- Alternate [cell] phone number:

- Email address:

This study will take place at 741 Northfield Ave, West Orange, NJ. I will confirm your appointment a couple of days before your session and provide you with directions to our office.

Appendix 2: PARTICIPANT DEMOGRAPHICS

Following is a high-level overview of the participants in this study.

Gender

Men	3
Women	7
Total (participants)	10

Occupation/Role

RN/BSN	4
Physician	2
Medical Assistant	4
Total (participants)	10

Years' Experience

Years experience	30-2 years
Facility Use of EHR	4
All paper	12
Some paper, some electronic	4
All electronic	0
Total (participants)	10

Appendix 3: NON-DISCLOSURE AGREEMENT AND INFORMED CONSENT FORM

Non-Disclosure Agreement

THIS AGREEMENT is entered into as of _____ *, 2017* between
_____ ("the Participant") and the testing organization *Practice Alternatives, Inc. located at 4000 Route 66, suite 133, Tinton Falls, NJ.*

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 *Test Company*, 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 *Test Company* 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 s/he 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:

Signature: _____ **Date:**

Informed Consent

Practice Alternatives, Inc. 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 about *45* minutes. At the conclusion of the test, you will be compensated for your time.

Agreement

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

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 *Practice Alternatives, Inc.* and *Practice Alternatives, Inc.* client. I understand and agree that data confidentiality is assured, because only de-identified 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.

Please check one of the following:

☐ YES, I have read the above statement and agree to be a participant.
☐ NO, I choose not to participate in this study.

Signature: _____ **Date:**

EHRUT Usability Test Moderator's Guide

Administrator: _____

Data Logger: _____

Date: _____ Time: _____

Participant # _____

Prior to testing:
1. Confirm schedule with participants
2. Ensure lab environment is running properly
3. Ensure lab & data recorder is running properly

Prior to each participant:
1. Reset application
2. Start session recordings

Prior to each task:
1. Reset application to starting part for next task

After each participant
1. End session recording

After all testing
1. Backup data files

Orientation

Thank you for participating in this study. Our session today will last ***45 minutes***. During that time you will take a look at an electronic health record system.

I will ask you to complete a few tasks using this system and answer some questions. 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. You will be asked to complete these tasks on your own trying to do them as quickly as possible with the fewest possible errors or deviations. Do not do anything more than asked. If you get lost or have difficulty I cannot answer help you with anything to do with the system itself. Please save your detailed comments until the end of a task or the end of the session as a whole when we can discuss freely.

I did not have any involvement in its creation, so please be honest with your opinions.

The product you will be using today is *AuroraEHR, version 2.0.* Some of the data may not make sense as it is placeholder data.

We are recording the audio of our session today. All of the information that you provide will be kept confidential and your name will not be associated with your comments at any time.

Do you have any questions or

concerns?

Preliminary Questions

What is your job title / appointment?

How long have you been working in this role?

What are some of your main responsibilities?

Tell me about your experience with electronic health records.

Task 1: First Impressions (*30 Seconds*)

This is the application you will be working with. Have you heard of it?

____Yes ____No

If so, tell me what you know about it.

☐ *Show test participant the EHRUT.*

☐ Please don't click on anything just yet. What do you notice? What are you able to do here? Please be specific

Notes:

AuroraEHR v 2.0 Usability Study Instructions

Demographics
1. Record preferred language, phone number, email, sexual orientation, gender identity
2. Change preferred language, phone number, email, sexual orientation, gender identity
3. Access preferred language, phone number, email, sexual orientation, gender identity

Rate this task: _____ (1-5 with 5 being the easiest)

Problem List
1. Record a problem to the problem list
2. Change a problem on the problem list
3. Access and display the active problem list

Rate this task: _____ (1-5 with 5 being the easiest)

Clinical Decision Support
1. Change CDS reference link
2. Order CDS intervention

Rate this task: _____ (1-5 with 5 being the easiest)

Implantable Device List
1. Search & select an implantable device
2. Add date placed information
3. Save
4. Review the device identifier
5. Review manufacturer

Rate this task: _____ (1-5 with 5 being the easiest)

Clinical Information Reconciliation
1. Ignore a medication for reconciliation
2. Add a medication for reconciliation
3. Confirm medication reconciliation
4. Add an allergy for reconciliation
5. Confirm allergy reconciliation

Rate this task: _____ (1-5 with 5 being the easiest)

Appendix 5: SYSTEM USABILITY SCALE QUESTIONNAIRE

	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

Final Questions (*5 Minutes*)

What was your overall impression of this system?

What aspects of the system did you like most?

What aspects of the system did you like least?

Were there any features that you were surprised to see?

What features did you expect to encounter but did not see? That is, is there anything that is missing in this application?

What features did you expect to encounter but did not see? That is, is there anything that is missing in this application?

Compare this system to other systems you have used:

Would you recommend this system to your colleagues?

i