

EHR Usability Test Report of AWARDS 3.0

Report based on ISO/IEC 25062:2006 Common Industry Format for Usability Test Reports

AWARDS 3.0

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Contents

EXECUTIVE SUMMARY	2
INTRODUCTION	5
METHOD	5
RESULTS	10
EFFICIENCY	11
SATISFACTION	11
MAJOR FINDINGS	11
AREAS FOR IMPROVEMENT	11
APPENDICES	12

EXECUTIVE SUMMARY

A usability test of AWARDS, 3.0, Ambulatory EHR was conducted on November 28, 2017 in NYC by Foothold Technology. 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). 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 tasks typically conducted on an EHR as below:

- (a.1) CPOE - Meds
 - Record medication via CPOE
 - Change medication via CPOE
 - Display changed CPOE medication order
- (a.2) CPOE - Labs
 - Record Lab order via CPOE
 - Change Lab order via CPOE
 - Display changed CPOE Lab order
- (a.3) CPOE - Diagnostic Imaging
 - Record Imaging order via CPOE
 - Change Imaging order via CPOE
 - Display changed CPOE Imaging order
- (a.4) Drug-drug, drug-allergy interaction checks for CPOE
 - Using CPOE, trigger a drug-drug interaction by entering a new medication order
 - Using CPOE, trigger a drug-allergy interaction by entering a new medication order
 - Adjust the severity level of a displayed drug-drug interaction
- (a.5) Demographics
 - Record a patient's preferred language, date of birth, birth sex, race, ethnicity, sexual orientation, gender identity, preliminary cause of death (inpatient only), and preliminary date of death (inpatient only)
 - Change the patient's preferred language, date of birth, birth sex, race, ethnicity, sexual orientation, gender identity, preliminary cause of death (inpatient only), and preliminary date of death (inpatient only)
 - Display the patient's changed preferred language, date of birth, birth sex, race, ethnicity, sexual orientation, gender identity, preliminary cause of death (inpatient only), and preliminary date of death (inpatient only)
- (a.6) Problem List
 - Record a problem to the problem list
 - Change a problem on the problem list
 - Display the active problem list
 - Display the historical problem list
- (a.7) Medication list
 - Record a medication to the medication list
 - Change a medication on the medication list
 - Display the active medication list
 - Display the historical medication list
- (a.8) Medication allergy list
 - Record a medication allergy
 - Change a medication allergy
 - Display the active medication allergy list
 - Display the historical medication allergy list
- (a.9) Clinical Decision support
 - 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 Test
 - Vital Signs
 - And a combination of at least 2 of the elements listed above

- Trigger the CDS interventions/resources added using the applicable data elements from each of the required elements
- View the intervention/resource information using the Infobutton standard for data elements in the problem list, medication list, and demographics
- 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
- Access the following attributes for one of the triggered CDS interventions/resources: bibliographic citation, developer, funding source, release/revision date
- (a.14) Implantable Device List
 - Record UDI
 - Change UDI Status
 - Access UDI, device description, identifiers, and attributes
- (b.2) Clinical Information Reconciliation and Incorporation
 - 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
 - Generate a new CCDA with reconciled data
- (b.3) e-Prescribing
 - Create new prescription
 - Change prescription (dosage or duration)
 - Cancel prescription
 - Refill prescription
 - Receive fill status notification
 - Request and receive medication history information

During the usability test, each participant was greeted by the administrator and asked to review and sign an informed consent/release form (included in Appendix 3); they were instructed that they could withdraw at any time. Participants had prior experience with the EHR. 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(s) recorded user performance data on paper and electronically. The administrator did not give the participant assistance in 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 post-test questionnaire and were compensated with lunch for their time. 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.

Task Identifier
Task Description
Task Success - Mean (%)
Task Success - Std Dev (%)
Task Path Deviation - Observed #
Task Path Deviation - Optimal #
Task Time - Mean (seconds)
Task Time - Standard Deviation (seconds)

Task Time Deviation - Mean Observed Seconds
Task Time Deviation - Mean Optimal Seconds
Task Errors Mean(%)
Task Errors - Std Dev %)
Task Rating - Scale Type
Task Rating
Task Rating - Standard Deviation
Participant Identifiers
UCD Process Selected

The results from the System Usability Scale scored the subjective satisfaction with the system based on performance with these tasks to be: 75.5. In addition to the performance data, the following qualitative observations were made:

Major findings

Participants demonstrated much more difficulty with the CCDA than was expected. Path deviations and time to completion was higher than expected and observers noted some frustration when integrating CCDA data into the database. We also observed that some error notifications were placed on the page in such a way as to be hidden from the users, thus leaving them unable to navigate and uncertain of the reason why. The number of path deviations was highest for work with the CCDA and CDS interventions. Diagnostic work also exhibited more path deviations and slightly longer times to completion than expected.

Areas for improvement

The study yielded a number of actionable results that are presently undergoing specification for development work. The placement of error messages should be moved so that users can read the message and confirm it so that they can continue working. CDS interventions and CCDA manipulation are undergoing a usability review to see where, specification, participants were challenged and what can be done to increase the usability of these areas of the software.

INTRODUCTION

The EHRUT tested for this study was AWARDS 3.0. Designed to present medical information to healthcare providers in private offices and clinics the EHRUT consists of a range of modules and features designed to track all the data associated with the provision of a range of behavioral health services. 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 10 participants were tested on the EHRUT(s). Participants in the test were clinicians. Participants were recruited by vendor and were compensated with lunch for their time. In addition, participants had no direct connection to the development of or organization producing the EHRUT(s). 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.

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.

	Part ID	Gender	Age	Education	Occupation/role	Professional Experience	Computer Experience	Product Experience	Assistive Technology Needs
1									
2									
N									

15 participants (matching the demographics in the section on Participants) were recruited and 10 participated in the usability test. 5 participants failed to show for the study. Participants were scheduled for 10-minute sessions with 10 minutes in between each session for debrief by the administrator(s) and data logger(s), 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

Additional information about the various measures can be found in Section 3.9 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. Tasks were selected based on their frequency of use, criticality of function, and those that may be most troublesome for users. Tasks should always be constructed in light of the study objectives.

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.⁷ Each participant reviewed and signed an informed consent and release form (See Appendix 3). 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 was experienced usability practitioners with dozens of years of experience in the Behavioral Health service sector, software training, software quality assurance, usability and the like.

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 were allowed to 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. Scoring is discussed below in Section 3.9.

Following the session, the administrator gave the participant the post-test questionnaire (e.g., the System Usability Scale, see Appendix 5), compensated them for their time, 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 test facility included a waiting area and a quiet testing room with a table, computers for the participants, and recording computer for the administrator. Observers and loggers were in the room with the participants, silently tracking their work. 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 of the safety instruction and evacuation procedures were valid, in place, and visible to the participants.

TEST ENVIRONMENT

The EHRUT would be typically be used in a healthcare office or facility. In this instance, the testing was conducted in vendor's training facility. For testing, the computer used a Chromebook running Chrome. The participants used a mouse and keyboard when interacting with the EHRUT. The testers used a 13-inch UHD screen with high resolution. The application was set up by the vendor according to the vendor's documentation describing the system set-up and preparation. The application itself was running on Chrome using a test database on a secure WAN 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. Non-Disclosure
2. Moderator's Guide
3. Usability Survey

Examples of these documents can be found in Appendices. The Moderator'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 test machine. Verbal comments were recorded with a microphone. The test session was observed in real time with data loggers observing no more than two testers at a time. Additionally, testers were asked to record their own start and end times.

PARTICIPANT INSTRUCTIONS

The administrator reads the following instructions aloud to the each participant:

Thank you for participating in this study. Your input is very important. Our session today will last about 3 hours. During that time you will use an instance of an electronic health record. I will ask you to complete a few tasks using this system and answer some questions. 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 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 the comments 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.

Following the procedural instructions, participants were shown the EHR and as their first task, were given time (10 minutes) to explore the system and make comments. Once this task was complete, 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. Please record your end time when you are done.

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

DATA SCORING

The following table (Table [x]) details how tasks were scored, errors evaluated, and the time data analyzed.¹⁰

Measures	Rationale and Scoring
<p>Effectiveness: Task Success</p>	<p>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.</p> <p>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.</p> <p>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.</p>
<p>Effectiveness: Task Failures</p>	<p>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.”</p> <p>No task times were taken for errors.</p> <p>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.</p> <p>On a qualitative level, an enumeration of errors and error types should be collected.</p>
<p>Efficiency: Task Deviations</p>	<p>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.</p>

	<p>It is strongly recommended that task deviations be reported. Optimal paths (i.e., procedural steps) should be recorded when constructing tasks.</p>
<p>Efficiency: Task Time</p>	<p>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.</p>
<p>Satisfaction: Task Rating</p>	<p>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.¹²</p> <p>Common convention is that average ratings for systems judged easy to use should be 3.3 or above.</p> <p>To measure participants’ confidence in and likeability of AWARDS 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</p>

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 in the attached spreadsheet. Table below is the template only. The results should be seen in light of the objectives and goals outlined in Section 3.2 Study Design. The data should yield actionable results that, if corrected, yield material, positive impact on user performance.

Task Identifier	Task Description	Task Success - Mean (%)	Task Success - Std Dev (%)	Task Path - Deviation - Observed #	Task Path - Deviation - Optimal #	Task Time - Mean (seconds)	Task Time - Standard Deviation (seconds)	Task Time - Deviation - Mean Observed Seconds	Task Time - Deviation - Mean Optimal Seconds	Task Errors - Mean(%)	Task Errors - Std Dev (%)	Task Rating - Scale Type	Task Rating	Task Rating - Standard Deviation	Participant Identifiers	UCD Process Selected
<ul style="list-style-type: none"> • (a.1) CPOE - Meds <ul style="list-style-type: none"> ○ Record medication via CPOE ○ Change medication via CPOE ○ Display changed CPOE medication order • (a.2) CPOE - Labs <ul style="list-style-type: none"> ○ Record Lab order via CPOE ○ Change Lab order via CPOE ○ Display changed CPOE Lab order • (a.3) CPOE - Diagnostic Imaging <ul style="list-style-type: none"> ○ Record Imaging order via CPOE ○ Change Imaging order via CPOE ○ Display changed CPOE Imaging order • (a.4) Drug-drug, drug-allergy interaction checks for CPOE <ul style="list-style-type: none"> ○ Using CPOE, trigger a drug-drug interaction by entering a new medication order ○ Using CPOE, trigger a drug-allergy interaction by entering a new medication order ○ Adjust the severity level of a displayed drug-drug interaction • A (a.5) Demographics <ul style="list-style-type: none"> ○ Record a patient's preferred language, date of birth, birth sex, race, ethnicity, sexual orientation, gender identity, preliminary cause of death (inpatient only), and preliminary date of death (inpatient only) ○ Change the patient's preferred language, date of birth, birth sex, race, ethnicity, sexual orientation, gender identity, preliminary cause of death (inpatient only), and preliminary date of death (inpatient only) ○ Display the patient's changed preferred language, date of birth, birth sex, race, ethnicity, sexual orientation, gender identity, preliminary cause of death (inpatient only), and preliminary date of death (inpatient only) • (a.6) Problem List <ul style="list-style-type: none"> ○ Record a problem to the problem list ○ Change a problem on the problem list ○ Display the active problem list ○ Display the historical problem list • (a.7) Medication list <ul style="list-style-type: none"> ○ Record a medication to the medication list ○ Change a medication on the medication list ○ Display the active medication list ○ Display the historical medication list • (a.8) Medication allergy list <ul style="list-style-type: none"> ○ Record a medication allergy ○ Change a medication allergy ○ Display the active medication allergy list ○ Display the historical medication allergy list • (a.9) Clinical Decision support <ul style="list-style-type: none"> ○ Add a CDS intervention and/or reference resource for each of the required elements • Problem list <ul style="list-style-type: none"> • Medication list • Medication Allergy List • At least one Demographic • Laboratory Test • Vital Signs • And a combination of at least 2 of the elements listed above <ul style="list-style-type: none"> ○ Trigger the CDS interventions/resources added using the applicable data elements from each of the required elements ○ View the intervention/resource information using the Infobutton standard for data elements in the problem list, medication list, and demographics ○ 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 ○ Access the following attributes for one of the triggered CDS interventions/resources: bibliographic citation, developer, funding source, release/revision date • (a.14) Implantable Device List <ul style="list-style-type: none"> ○ Record UDI ○ Change UDI Status ○ Access UDI, device description, identifiers, and attributes • (b.2) Clinical Information Reconciliation and Incorporation <ul style="list-style-type: none"> ○ 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 ○ Generate a new CCDA with reconciled data • (b.3) e-Prescribing <ul style="list-style-type: none"> ○ Create new prescription ○ Change prescription (dosage or duration) ○ Cancel prescription ○ Refill prescription ○ Receive fill status notification Request and receive medication history information 																

The results from the SUS (System Usability Scale) scored the subjective satisfaction with the system based on performance with these tasks to be: 75.5. Broadly interpreted, scores under 60 represent systems with poor usability; scores over 80 would be considered above average.

DISCUSSION OF THE FINDINGS

In each of the main research areas of the EHRUT, participants performed in alignment with expectations and previous experiences. All participants were current users of the system though intentionally, not of those parts of the system under study. Participants demonstrated some difficulty with various parts of the system including working with the CCDA and changing data in various parts of the system including medications. Participants also took longer than expected in their work with CDS interventions.

EFFECTIVENESS

Participants exhibited a generally high level of effectiveness. All tasks were completed by almost all participants in the vast majority of cases.

EFFICIENCY

Time to task completion, time taken through path deviation and so on, all resulted in average scores for efficiency.

SATISFACTION

Participants reported relatively high levels of satisfaction with the application. The mean SUS score of 75.5 belies some very high scores and two sub-60 scores as well.

MAJOR FINDINGS

Participants demonstrated much more difficulty with the CCDA than was expected. Path deviations and time to completion was higher than expected and observers noted some frustration when integrating CCDA data into the database. We also observed that some error notifications were placed on the page in such a way as to be hidden from the users, thus leaving them unable to navigate and uncertain of the reason why. The number of path deviations was highest for work with the CCDA and CDS interventions. Diagnostic work also exhibited more path deviations and slightly longer times to completion than expected.

AREAS FOR IMPROVEMENT

The study yielded a number of actionable results that are presently undergoing specification for development work. The placement of error messages should be moved so that users can read the message and confirm it so that they can continue working. CDS interventions and CCDA manipulation are undergoing a usability review to see where, specification, participants were challenged and what can be done to increase the usability of these areas of the software.

APPENDICES

Appendix: PARTICIPANT DEMOGRAPHICS

Participant Identifier	Participant Gender	Participant Age	Participant Education	Participant Occupation/Role	Participant Professional Experience	Participant Computer Experience	Participant Product Experience	Participant Assistive Technology Needs
ID01	Male	40-49	High school graduate, diploma or the equivalent (for example: GED)	Case aide/Independent Living Specialist	120	96	60	No
ID02	Female	30-39	Bachelor's Degree	LPN/Healthcare Coordinator	48	84	24	Yes
ID03	Female	30-39	Bachelor's Degree	Data Manager	140	120	72	No
ID04	Female	40-49	Master's Degree	Program Director	120	96	36	No
ID05	Male	50-59	Master's Degree	Case Manager	110	84	12	No
ID06	Male	30-39	Master's Degree	Psychiatric Mental Health Nurse Practitioner	120	72	2	No
ID07	Female	30-39	Bachelor's Degree	Database Administrator	200	180	96	No
ID08	Female	30-39	Bachelor's Degree	Case Aide	110	60	48	No
ID09	Female	30-39	Bachelor's Degree	Case Manager	300	240	2	No
ID10	Male	40-49	Bachelor's Degree	Case Manager	210	120	60	No

NON-DISCLOSURE AGREEMENT



Non-Disclosure Agreement

THIS AGREEMENT is entered into as of November 28th, 2017, between _____
("the Participant") and the testing organization Foothold Technology located at 36 E. 12th St, NY NY. The Participant acknowledges their 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 Foothold Technology, 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 Foothold Technology 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 they will not disclose this confidential information obtained today to anyone else or any other organizations.

Participant's printed name: _____

Signature: _____ Date: _____

Orientation (X minutes)

Thank you for participating in this study. Our session today will last **4 hours**. 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.

We are recording the audio and screenshots 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?

- (a.1) CPOE - Meds
 - Record medication via CPOE
 - Change medication via CPOE
 - Display changed CPOE medication order
- (a.2) CPOE - Labs
 - Record Lab order via CPOE
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 - Adjust the severity level of a displayed drug-drug interaction
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- (a.9) Clinical Decision support
 - 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 Test
 - Vital Signs
 - And a combination of at least 2 of the elements listed above
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- View the intervention/resource information using the Infobutton standard for data elements in the problem list, medication list, and demographics
- 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
- Access the following attributes for one of the triggered CDS interventions/resources: bibliographic citation, developer, funding source, release/revision date
- (a.14) Implantable Device List
 - Record UDI
 - Change UDI Status
 - Access UDI, device description, identifiers, and attributes
- (b.2) Clinical Information Reconciliation and Incorporation
 - 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
 - Generate a new CCDA with reconciled data
- (b.3) e-Prescribing
 - Create new prescription
 - Change prescription (dosage or duration)
 - Cancel prescription
 - Refill prescription
 - Receive fill status notification
 - Request and receive medication history information

SYSTEM USABILITY SCALE QUESTIONNAIRE

Timestamp	I think that I would like to use this system frequently	I found the system unnecessarily complex	I thought the system was easy to use	I think that I would need the support of a technical person to be able to use this system	I found the various functions in this system were well integrated	I thought there was too much inconsistency in this system	I would imagine that most people would learn to use the system very quickly	I found the system very cumbersome to use	I felt very confident using the system	I needed to learn a lot of things before I could get going in this system	Totals
11/29/2017 12:03:29	4	2	4	3	4	2	4	2	4	3	32
11/29/2017 12:03:58	3	3	3	5	5	1	3	1	4	1	29
11/29/2017 12:04:40	4	3	5	1	5	1	5	1	1	1	27
11/29/2017 12:05:07	5	1	5	2	5	2	5	1	5	1	32
11/29/2017 12:05:36	4	3	3	1	4	1	4	3	4	1	28
11/29/2017 12:06:03	5	3	5	1	4	2	3	3	5	2	33
11/29/2017 12:07:48	5	1	4	2	5	1	5	2	5	2	32
11/29/2017 12:08:25	3	2	4	2	4	2	3	3	4	2	29
11/29/2017 12:08:57	3	1	5	1	3	2	4	2	5	2	28
11/29/2017 12:09:19	5	4	4	2	2	4	3	3	3	3	33
11/29/2017 12:09:44	3	3	3	3	2	2	3	3	3	4	29
Totals											
Processed Scores	3	3	3	2	3	3	3	3	3	2	70
	2	2	2	0	4	4	2	4	3	4	67.5
	3	2	4	4	4	4	4	4	0	4	82.5
	4	4	4	3	4	3	4	4	4	4	95
	3	2	2	4	3	4	3	2	3	4	75
	4	2	4	4	4	3	2	2	4	3	77.5
	4	4	3	3	4	4	4	3	4	3	90
	2	3	3	3	3	3	2	2	3	3	67.5
	2	4	4	4	2	3	3	3	4	3	80
	4	1	3	3	1	1	2	2	2	2	52.5
	2	2	2	2	1	3	2	2	2	1	47.5

