

**LILLE GROUP 2015 EDITION TEST PLAN, 170.315(G)(3)
ESCRIBEHOST V7
USABILITY TEST REPORT
PREPARED 12/19/19**

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EHR Usability Test Report of escribeHOST version 7

Basis of the “custom” UCD process:

NISTIR 7741 <https://nvlpubs.nist.gov/nistpubs/Legacy/IR/nistir7741.pdf>

Outline and Description:

- We incorporate end-users to develop feature requirements using Agile approach to software delivery.
- Create Agile ‘user stories’ to document the specific needs of the user as it relates to a given function. Each story contains defined acceptance criteria that defines the user expectation.
- From a UI perspective we create basic wireframes which we share with the user and iterate the development until the user is satisfied with the basic design and flow.
- We convert the wireframe into a prototype.
- The software engineers implement the design.
- The end user tests the new feature.

Explanation:

scribeHOST EHR has been in active development for approximately 20 years. There are UI legacy functions which are impractical to re-engineer (e.g. aspects of accessibility).

AND

NISTIR 7742 Customized Common Industry Format Template for Electronic Health Record Usability Testing, ISO/IEC 25062:2006 Common Industry Format for Usability Test Reports:

http://www.nist.gov/manuscript-publication-search.cfm?pub_id=907312

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Title: (NISTIR 7742) Customized Common Industry Format Template for Electronic Health Record

Usability Testing

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Abstract: This document provides a template for the modified version of Software engineering Software product Quality Requirements and Evaluation (SQuaRE) Common Industry Format (CIF) for usability test reports (ISO/IEC 25062:2006(E)), the Common Industry Format (CIF) usability test report. This version of the CIF has been customized for use in usability testing of Electronic Health Records (EHRs). The intention of the CIF is to help vendors demonstrate evidence of usability in their final product in a format that allows both independent evaluation of a single product and comparison across multiple products.

Citation: NIST Interagency/Internal Report (NISTIR) - 7742

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INTRODUCTION

The EHRUT(s) tested for this study was escribeHOST version 7 using the NISTIR 7742 Industry standard as the basis for testing. Designed to present medical information to healthcare providers in hospital and medical office setting, escribeHOST is a web based electronic medical record consisting of multiple permission-based modules designed to facilitate collection, storage, and organization of patient information into meaningful ways. Further the application contains a patient facing patient health record (PHR) to facilitate communication and the transfer of information between providers and patients.

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 on task and a user reported “Ease of Use” rating (Likert Scale), were captured during the usability testing.

METHOD

PARTICIPANTS

A total of 10 participants, representative of the intended user population (both current and future), were tested on the EHRUT. 12 were initially selected, 2 were not able to conduct the test in the assigned time frame. Participants consisted of clinical staff including RNs, LPNs Medical Assistants and administrative staff with daily EHR responsibilities. Participants were recruited by Capital Cardiology Associates and were compensated with a \$20 gift card 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 had the same orientation and level of training as the actual end users would have received.

Participant names were replaced with Participant IDs so that an individual's data cannot be tied back to individual identities. A spreadsheet was used to keep track of the participant schedule and included each participant's demographic characteristics as provided by Capital Cardiology Associates (CCA). (See Appendix 1: Participant Data for high level summary of participant information)

TEST TIMING

Testing took place from December 11, through December 17, 2019. Participants were scheduled for 75 minute sessions with at least 1 hour in between each session for debrief by the administrator and to reset systems to proper test conditions where needed.

TEST LOCATION

The test facility included a quiet testing room with a table, computer for the participant, and recording software for the administrator. Only the participant and administrator were in the test. 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 designated training room at Capital Cardiology Associates (CCA) located at 8 Southwoods Blvd in Albany NY 12208. For testing, the computer

used a desktop running Ubuntu v18. The participants used a mouse and keyboard when interacting with the escribeHOST.

The application was set up by the vendor (Lille Group, Inc) according to the vendor's documentation describing the system set-up and preparation. The application itself was running on a Firefox browser (v 70.0.1) using the non-production environment labeled "ehr-qa" demo database on a LAN 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).

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 escribeHOST 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 1 EHR (escribeHOST v 7). 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
- Time to complete the tasks

- Path deviations
- Participant's verbalizations (comments)
- Participant's satisfaction ratings of the system (Using a 1-5 Likert Scale)

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. Logging into system
2. Access to Patients Demographic Information
3. Update Patients Demographic Information
4. Access Patients Active Problem List
5. Add a Patient Problem
6. Send Patient Education Resource- Problem
7. End a Patient Problem
8. View Patients Historical Problems List
9. View Patients Vitals History
10. Add a New Blood Pressure Measurement
11. Access Patient Allergies
12. View Inactive Allergies
13. Add a Medication Allergy
14. Modify and Allergy
15. Add a New Patient
16. Add Tobacco Use Assessment
17. Record Family Health History- Mother

18. Record Family Health History- Father
19. Edit Family Health History Record
20. Record Implanted Device
21. Access Patients Imaging Orders
22. Add and Imaging Order
23. Edit an Imaging Order
24. Cancel an Imaging Order
25. Access Patient's Medication List
26. Identify Active vs Inactive Medications in the Patient's Medications List
27. Add a Medication to the Patient's Medication List
28. Create and Send an ERX- Drug Allergy Alert
29. Create and Send an ERX- Drug/Drug Contraindication
30. Enter Medication Order (CPOE)
31. Edit a Medication
32. Check Drug Formulary
33. Send Patient Education Resource- Medication
34. Check for Clinical Decision Support Intervention- Problems
35. Check for Clinical Decision Support Intervention- Medications
36. Check for Clinical Decision Support Intervention- Medication Allergies
37. Check for Clinical Decision Support Intervention- Demographics
38. Check for Clinical Decision Support Intervention- Laboratory Results
39. Check for Clinical Decision Support Intervention- Vital Signs
40. Configure Contraindication Alert Levels
41. Download received Transition of Care (TOC)

42. Import Downloaded TOC

43. Match Patient to correct chart and incorporate TOC

44. Reconcile Medications

45. Reconcile Medication Allergies

46. Reconcile Problems

47. Create and send an ERX

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

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 (See Appendix 2). A representative from the test team witnessed the participant's signature.

The usability testing administrator conducting the test was an experienced practitioner with 12 years of experience using the application both in an operational context and as a consultant working with the development team for 3 years.

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. 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.

- Without using a think aloud technique.

For each task, the participants were read a 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 (DATA SCORING p.13) .

Following the session, the administrator gave the participant the post-test questionnaire (e.g., the System Usability Survey/SUS see Appendix 4), 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. Participants signed a receipt and acknowledgement form (See Appendix 5) indicating that they had received the compensation.

TEST FORMS AND TOOLS

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

1. Informed Consent (Appendix 2)
2. Moderator's Guide (Appendix 3)
3. Post-test Questionnaire/System Usability Survey (Appendix 4)
4. Incentive Receipt and Acknowledgment Form (Appendix 5)

Examples of these documents can be found in Appendices 2-5, respectively. 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. A screen share program (Zoom)

recorded each participant's verbal comments using a microphone. The test sessions were saved on a shared drive observable by the vendor.

PARTICIPANT INSTRUCTIONS

The administrator reads the following instructions aloud to each participant (also see the full moderator's guide in Appendix 3):

Thank you for participating in this study. Your input is very important. Our session today will last about 60 minutes. 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 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.

Following the procedural instructions, participants were asked to log into escribeHOST shown the EHR and as their first task. 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. I will ask you your impressions about the task once you are done.

Participants were then given 47 tasks to complete. Tasks are listed in the Moderator's Guide in Appendix 3.

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, user satisfaction and overall system usability were captured during the usability testing. The goals of the test were to assess:

1. Effectiveness of escribeHOST by measuring participant success and failure rates
2. Efficiency of escribeHOST by measuring the average task time and path deviations
3. Satisfaction with escribeHOST by measuring ease of use ratings
4. Overall system usability using the System Usability Scale (SUS)

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.
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. Not all deviations would be counted as errors. This is expressed as the mean number of failed tasks per participant.
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. 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 against the standard expected time to complete. Observed task times divided by the optimal time for the task is a measure of optimal efficiency. Scores of 0 indicated that on average users were able to complete this task in less time than expected.
Satisfaction: Task Rating	Participant’s subjective impression of each task was measured by administering User Satisfaction Survey. 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 10 participants. To measure participants’ confidence in and likeability of eScribeHOST overall, the testing team administered the System Usability Scale (SUS) post-test questionnaire. See full System Usability Score questionnaire in Appendix 4.

Table 1: 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 and Data Scoring 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 on the following page.

Measure	N	Task Success	Path Deviation	Task Time		Errors	Likert Scale Task Ratings	
				Mean (SD)	Deviations Observed/ Optimal		Mean (SD)	Mean (SD)
				Task	#		Mean (SD)	Mean (SD)
1 First Impressions	10	100/(0)	3/3	17.33/(3)	15/15	0/(0)	5 (0)	
2 Access Patient's Demographic Information	10	100/(0)	3/3	18.2/(3.1)	12/30	0/(0)	4.9 (.32)	
3 Update Patient's Demographic Information	10	100/(0)	4/4	24.9/(13.5)	24/30	0/(0)	4.9 (.32)	
4 Access Patient's Problems List	10	100/(0)	1/1	16.3/(11)	12/5	0/(0)	4.7 (.67)	
5 Add a Patient Problem	10	90/(0.32)	6/4	41/(21.4)	25/60	0.1/(0.32)	4.78 (.67)	
6 Send Patient Ed Resource - Problem	10	90/(0.32)	7/5	46.89/(27.5)	35/30	0.1/(0.32)	4 (1)	
7 End a Patient Problem	10	100/(0)	4/4	15.3/(12)	23/10	0/(0)	4.9 (.32)	
8 View Pt's Historical Problem List	10	100/(0)	1/1	12.7/(14.2)	6/5	0/(0)	4.8 (.63)	
9 View Pt's Vitals History	10	100/(0)	2/2	6.6/(2.2)	6/5	0/(0)	5 (0)	
10 Add a new BP measurement	10	100/(0)	4/4	12.5/(5.1)	12/20	0/(0)	4.9 (.32)	
11 Access Pt Allergies	10	100/(0)	1/1	6.5/(2.5)	8/5	0/(0)	5 (0)	
12 View Inactive Allergies	10	100/(0)	1/1	7.7/(10.3)	8/5	0/(0)	5 (0)	
13 Add a Med Allergy	10	90/(0.32)	5/4	32.1/(12.7)	36/60	0.1/(0.32)	4.9 (.32)	
14 Modify an Allergy	10	90/(0.32)	7/5	24.89/(17.3)	19/60	0.1/(0.32)	4.5 (1.27)	
15 Add a New Patient	10	100/(0)	6/4	99.1/(51.3)	121/120	0/(0)	4.8 (.42)	
16 Add Tobacco Use Assessment	10	70/(0.48)	8/6	47.43/(31.6)	62/60	0.3/(0.48)	4.75 (.46)	
17 Record Family Health History - Mother	10	90/(0.32)	9/5	68.44/(21.9)	68/45	0.1/(0.32)	4.4 (.84)	
18 Record Family Health History - Father	10	70/(0.48)	12/10	100.33/(32.3)	144/120	0.3/(0.48)	4.33 (.71)	
19 Edit Family Health History	10	80/(0.42)	8/6	23.11/(12)	19/30	0.2/(0.42)	4.4 (.84)	
20 Record Implanted Device	10	80/(0.42)	10/6	125.89/(40.4)	128/90	0.2/(0.42)	4.1 (1.37)	
21 Access Pt's Imaging Orders	10	100/(0)	3/3	14.4/(5.2)	16/10	0/(0)	5 (0)	
22 Add an Imaging Order	10	90/(0.32)	15/12	118.2/(46.3)	119/120	0.1/(0.32)	4.4 (.97)	
23 Edit an Imaging Order	10	100/(0)	7/7	30.8/(16.9)	22/30	0/(0)	4.9 (.32)	
24 Cancel and Imaging Order	10	100/(0)	8/6	25.6/(17.8)	10/10	0/(0)	4.8 (.42)	
25 Access Pt's Meds List	10	100/(0)	2/2	11.2/(3.9)	16/10	0/(0)	5 (0)	
26 Identify Active vs Inactive Meds	10	90/(0.32)	1/1	7.3/(2.3)	10/60	0.1/(0.32)	5 (0)	
27 Add A Medication	10	100/(0)	9/8	51.3/(45.2)	55/30	0/(0)	4.7 (6.7)	
28 Create and Send eRx - Drug Allergy Alert	10	90/(0.32)	6/5	20.44/(7.5)	22/30	0.1/(0.32)	4.5 (.97)	
29 Create and Send eRx - Drug /Drug Interaction	10	90/(0.32)	5/5	16.8/(7.9)	28/30	0.1/(0.32)	4.8 (.42)	
30 Enter Medication Order (CPOE)	10	100/(0)	9/8	46.6/(15.4)	20/60	0/(0)	5 (0)	
31 Edit a Medication	10	100/(0)	5/5	10.8/(3.3)	15/30	0/(0)	5 (0)	
32 Check Drug Formulary	10	80/(0.42)	7/5	60.75/(25.1)	39/60	0.2/(0.42)	4.44 (.73)	
33 Send Pt Education Resource - Medication	10	90/(0.32)	5/3	45.78/(21.7)	36/30	0.1/(0.32)	4.78 (.44)	
34 Check for CDSI - Problems	10	60/(0.52)	13/8	74.33/(21.8)	85/60	0.4/(0.52)	3.38 (2)	
35 Check for CDSI - Medication	10	100/(0)	8/8	17.4/(12.6)	24/60	0/(0)	4.7 (.67)	
36 Check for CDSI - Med Allergies	10	100/(0)	8/8	10.4/(7.9)	20/60	0/(0)	4.9 (.32)	
37 Check for CDSI - Demographics	10	100/(0)	8/8	7.6/(4.6)	10/60	0/(0)	5 (0)	
38 Check for CDSI - Lab Tests	10	100/(0)	8/8	6.9/(4.5)	8/60	0/(0)	5 (0)	
39 Check for CDSI - Vitals	10	100/(0)	8/8	6.4/(3.7)	4/60	0/(0)	5 (0)	
40 Configure Contraindications Alert Levels	10	90/(0.32)	7/5	45.67/(17.4)	45/30	0.1/(0.32)	4 (1.33)	
41 Download Received TOC	10	100/(0)	5/5	26/(16.8)	15/15	0/(0)	4.44 (.73)	
42 Import Downloaded TOC	10	100/(0)	6/5	35/(22.4)	93/15	0/(0)	3.89 (.33)	
43 Match Patient to Correct Chart and Incorporate TOC	10	100/(0)	5/5	36/(35.5)	20/30	0/(0)	4.67 (.5)	
44 Reconcile Medications	10	100/(0)	6/5	32/(17.9)	35/30	0/(0)	4.56 (.73)	
45 Reconcile Med Allergies	10	100/(0)	5/5	23/(14.4)	11/30	0/(0)	4.67 (.5)	
46 Reconcile Problems	10	100/(0)	5/5	21/(8.7)	15/30	0/(0)	4.89 (.33)	
47 Create and Send an eRx	10	100/(0)	6/5	43/(14.6)	46/60	0/(0)	5 (0)	

Table 2: Test Results by task

DISCUSSION

Summarizing the results of the testing, overall user comments indicated that the application was easy to use relative to other systems they have used elsewhere. The scoring of the results matched those comments as many of the tasks were completed with a very high degree of accuracy and efficiency. In some of the more recently developed tasks, users took additional time to look through the application to find new features. Where in those features were found, users were able to complete the task with some deviations or additional time.

It should be noted that all participants did have a familiarity with a previous version of the application. As a result, some tasks not affected by this version change would be tasks that the users have completed in an operational environment previously. Further, the nature of the eScribeHOST platform is to build both functionally and aesthetically on previous versions. This feature may have resulted in higher scores relative to newer/unfamiliar features than would have otherwise been attainable because the user could infer where new features were and how to use them as they were familiar with the overall function of the application from previous versions.

Deviations from the standard path or time can also be attributed to the degree to which the user's permissions had previously given them access to some features. For instance, users with no previous "Admin" privileges would see an increase in deviations and time in tasks related to "Admin" functions.

EFFECTIVENESS

There was a total of 10 test takers that attempted 47 tasks each for a total of 470 total tasks attempted. 80.21% of those tasks (377) were completed without difficulty. Only 5.74% of the tasks attempted (27) were failures and the user could not complete the task. The other 14% of the tasks (56) in total were completed with difficulty. Completed with difficulty involved initial deviations from the assigned path to complete the task but where the user realized their error and correctly navigated to the proper path.

EFFICIENCY

Users were consistently less efficient at completing the following tasks (Task 17: Record Family Health History-Mother, Task 20: Record Implanted Device, Task 33: Send Patient Education Resource - Medication, Task 34: Check for Clinical Decision Support Interventions- Problems). These tasks correspond to new features that users would not have seen previously and the efficiency of completing the task (wherein the cases that the task was completed and not failed) the user had to assess the new features location and functionality while in their test scenario. This took increased time and generally resulted in greater deviations from the standard path of completion. Of note, for Task 34: Check for Clinical Decision Support Interventions- Problems, once the user was able to find the location of the CDSI function, their subsequent facility with similar features (Task 35: Check for Clinical Decision Support Interventions- Medications, Task 36: Check for Clinical Decision Support Interventions- Medication Allergies, etc.) increased significantly. This points to efficiency being directly related to familiarity with

the feature. Commonly users would report that their difficulty with a task was related to their lack of awareness of it, not that the task in and of itself was difficult to do.

Users familiar with the system were routinely able to conduct tasks in a time that was slightly less than the expected. This resulted in a number of the tasks having few deviations from the expected task time.

SATISFACTION

Satisfaction with the application as a whole was generally high as evident by the SUS score of 86.75. Users would frequently discuss their satisfaction with the application in a post-test review as “easy to use”. Users have frequently commented anecdotally on the usability of escribeHOST relative to other EHRs they have worked with. The interface is intuitive, and this test version added newer features on top of the existing framework of features users were already used to. Where the user was asked to do a task in a module they were not familiar with, their exiting familiarity with the application was enough to give them a starting point to begin a search for the feature or function. While this search for a new feature did result in some minor deviations from the established optimal path, in most cases users were able to complete the assigned task without significantly adding time or needing assistance. Note: the questions on the SUS that scored the lowest were #4 (“I think that I would need the support of a technical person to use this system”) and #10 (“I needed to learn a lot of things before I could get going with this system”). The lower scores on these question in particular would agree with the anecdotal evidence form the testing sessions that indicated training would easily clarify the use case for any tasks that the user was otherwise unfamiliar with.

For the tasks, the lowest overall score for ease of use was for Task 34, which was the initial task to locate the CDSI interface. Subsequently after finding where the location was, the users scored the follow up CDSI related tasks quite high. 4.7-5.0. This would indicate that initial difficulty was due in large part to an unfamiliarity with the feature, not that it was necessarily ore difficult once training was provided.

This pattern holds true for Task 20: Record Implanted Device (scoring at an average difficulty of 4.1) and Task 40: Configuration of Contraindication Alerts (scoring at 4.0 in on the difficulty scale). In the case of Task 20: Recording an Implantable Device, users had not used a function like this previously. In the case of Task 40, most users had not accessed the admin section of the HER previously so this feature would not be one they would typically access or even see as they were using the system in general use.

MAJOR FINDINGS

Training is a key indicator of success with any feature that was used in the testing. Wherein a user knew the feature and used it frequently, the task was managed quickly. Where the users normal permissions or role would not have them use that feature or that the functionality was new enough to have no experienced it yet, the user would often would be able to determine the steps to completion in time or would be able to learn It quickly in a post task tutorial.

Newer features were received well and design changes to the current aesthetic of the application were few and largely unnoticed. CDSI was a new tool that once trained will be easy to access and review. Its application will require some further guidelines. More information isn't necessarily good information. Also of note was that the CDSI will only return information that relevant to the chart section and the information that it contains. Thus, using that feature without a robust data set or fully populated fields will largely result in a result that is to broad to be of significant use.

AREAS FOR IMPROVEMENT

Noted areas for improvement focused primarily on the functions of the application that users were unfamiliar with. This included the use of the CDSI support and the Miscellaneous Device module. Users were clear about how with some basic training these features would be easy to use. Additionally, users indicated that the language lookup ought to be a text look up field where in the user can type the language and have the application auto-populate possible suggestions.

Secondarily, putting the “English” option towards the top of the choosing field. In the History module, indicating that the “Add Disease” button must be selected under the family member social history was a frequent suggestion as users would frequently enter a disease and age range and then simply “Save” at the bottom of the window, thus missing causing the last disease they entered to not save.

While most areas of improvement were related to newer features others included a request to put the “show inactive” feature (used in problems, medications, and medication allergies) in a consistent location (on the right or left of the screen). Also noted were several requests for consistency in the location of the “i” feature (on the left of the screen for medications vs right of the screen for problems).

Relative to another current function, one user indicated that the pop out labels on the tool bar along the left-hand side of the chart would frequently impede their access to certain fields that needed data entry. Moving too close to the tool bar would cause the pop-out label to cover the area in which they were attempting to enter data

Finally, a user suggested that the patient address would be more appropriately located under the patient name or contact information vs on the far left of the demographic screen.

APPENDICES

The following appendices include supplemental data for this usability test report.

Following is a list of the appendices provided:

1. Participant demographics
2. Non-Disclosure Agreement (NDA) and Informed Consent Form
3. Moderator's Guide
4. System Usability Scale Questionnaire
5. Incentive receipt and acknowledgment form

APPENDIX 1: PARTICIPANT DEMOGRAPHICS

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

ID#	Gender	Age (Range)	Education	Specialty	Role	Healthcare experience (months)	Computer (EHR) experience (months)	Product Exp. (months)	Assisstive Technology Needs
ID1	F	20-29	Some College	Cardiology	MA	120	120	120	No
ID2	F	40-49	AA	Cardiology	MA	276	120	84	No
ID3	f	20-29	Some College	Cardiology	MA	132	96	88	No
ID4	F	40-49	AA	Cardiology	DOO	312	180	180	No
ID5	F	20-29	Bachelor's De	Cardiology	RN	54	54	54	No
ID6	F	30-39	AA	Cardiology	RN	120	72	60	No
ID7	F	40-49	Bachelor's De	Cardiology	RN	144	144	144	No
ID8	F	40-49	HS	Cardiology	LPN	300	60	42	No
ID9	F	50-59	Bachelor's De	Cardiology	LPN	468	144	120	No
ID10	M	30-39	AA	Cardiology	LPN	180	60	60	No
ID11	M	40-49	Doctorate De	Cardiology	MD	300	180	180	No
ID 12	F	60-69	Masters	Cardiology	Trainer	15	60	54	No

*User ID11 and ID10 did not participate in testing

APPENDIX 2: INFORMED CONSENT FORM

Informed Consent

escribeHOST 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 60 minutes. At the end of the test, you will be compensated for your time with a \$20 Amazon Gift Card

Agreement

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

I understand that the information is for research purposes only and that my name and image will not be used for any purpose. 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 outside of escribeHOST. 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.

Acknowledgement

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

Name (print): _____

• Professional Title: _____

• Signature: _____

• Date: _____

APPENDIX 3: MODERATOR'S GUIDE

EHRUT USABILITY TEST MODERATORS'G GUIDE

Administrator _____

Date _____ Time _____

Participant # _____

Location _____

Prior to testing

- Confirm schedule with Participants
- Ensure EHRUT lab environment is running properly
- Ensure lab and data recording equipment is running properly

Prior to each participant

- Reset applications
- Start session records with [tool]

Prior to each task

- Reset application to starting point for next task

After each participant

- End session recordings with [tool]

After all testing

- Back up all video and data files

ORIENTATION

Thank you for participating in this study. Our session today will last approximately 60 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 describe the state of the application, i.e., production version, early prototype, etc. Some of the data may not make sense as it is placeholder data.

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?

PRELIMINARY QUESTIONS

(X minutes)

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

(X 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 and log in with username [tbd] password [tbd] for non-prescriber user.

What do you notice. What are you able to do here? Please be specific.

Notes/Comments:

Certification Criterion: baseline

TASK 2: ACCESS PATIENT'S DEMOGRAPHIC INFORMATION

Before going into the exam room you want to review Diana Prince's demographic information. Find this information.

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- Not Completed

Comments:

Task Time: escribeHOST_____ seconds (30 seconds)

Optimal Path: [Select patient chart > click Documents tool > open most recent

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale "Very Difficult" (1) to "Very Easy" (5)

Administrator / Note Taker Comments:

Certification Criterion: baseline

TASK 3: UPDATE PATIENT'S DEMOGRAPHIC INFORMATION

From current location in application, access Diana Prince's demographic information and update the mailing address. Save changes and confirm the change.

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: escribeHOST _____ seconds (30 seconds)

Optimal Path: Click Patient Info tool > Click Edit > Change Address > Click Save

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale "Very Difficult" (1) to "Very Easy" (5)

Administrator / Note Taker Comments:5

Certification Criterion: a.5

TASK 4: ACCESS PATIENT'S ACTIVE PROBLEM LIST

From current location in application, access Diana Prince's Active Problems List

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: escribeHOST_____ seconds (5 seconds)

Optimal Path: Click Problems tool

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale "Very Difficult" (1) to "Very Easy" (5)

Administrator / Note Taker Comments:

Certification Criterion: a.6

TASK 5: ADD A PATIENT PROBLEM

From current location in application, add a new problem for Diana Prince: E03.9, Hypothyroidism, unspecified, with a start date = Jan 15 2017

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: *escribeHOST* _____ seconds (60 seconds)

Optimal Path: *Click Add Problem > select ICD-10 > Add Start Date > Save*

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale “Very Difficult” (1) to “Very Easy” (5)

Administrator / Note Taker Comments:

Certification Criterion: a.6

TASK 6: SEND PATIENT EDUCATION RESOURCE - PROBLEM

From current location in application, send a patient educational resource to Diana Prince's patient portal for her diagnosis of Essential (primary) Hypertension.

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: escribeHOST_____ seconds (30 seconds)

Optimal Path: Click Problems tool > Click "i" for I10 > click Create Patient Health Education Resource > Click Send to PHR

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale "Very Difficult" (1) to "Very Easy" (5)

Administrator / Note Taker Comments:

Certification Criterion: a.13

TASK 7: END A PATIENT PROBLEM

From current location in application (Problems chart section for Diana Prince) mark the Influenza Problem as inactive by inserting an end date of today.

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: escribeHOST_____ seconds (10 seconds)

Optimal Path: Click Problem row > Click Edit > Add End Date > Save

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale “Very Difficult” (1) to “Very Easy” (5)

Administrator / Note Taker Comments:

Certification Criterion: a.6

TASK 8: VIEW PATIENT'S HISTORICAL PROBLEM LIST

From current location in application, view all historical problems for Diana Prince.

SUCCESS:

- EASILY COMPLETED
- COMPLETED WITH DIFFICULTY OR HELP. DESCRIBE BELOW
- NO COMPLETED

COMMENTS:

TASK TIME: *escribeHOST_____ SECONDS (5 seconds)*

OPTIMAL PATH: Click "Show x inactive"

- CORRECT
- MINOR DEVIATIONS / CYCLES. DESCRIBE BELOW
- MAJOR DEVIATIONS. DESCRIBE BELOW

COMMENTS:

OBSERVED ERRORS AND VERBALIZATIONS:

COMMENTS:

RATING:

OVERALL, THIS TASK WAS: _____

SHOW PARTICIPANT WRITTEN SCALE "VERY DIFFICULT" (1) TO "VERY EASY" (5)

ADMINISTRATOR / NOTE TAKER COMMENTS:

Certification Criterion: a.6

TASK 9: VIEW PATIENT'S VITALS HISTORY

From current location in application, access Diana Prince's Vitals history to identify blood pressure trending.

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: escribeHOST_____ seconds (5 seconds)

Optimal Path: Click Vitals > View BP history in displayed grid

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale "Very Difficult" (1) to "Very Easy" (5)

Administrator / Note Taker Comments:

Certification Criterion: baseline

TASK 10: ADD A NEW BLOOD PRESSURE MEASUREMENT

From current location in application, add a new BP measurement (150/100) for Diana Prince for today.

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- Not Completed

Comments:

Task Time: eScribeHOST _____ seconds (20 seconds)

Optimal Path: Add Vitals > Add Systolic > Add Diastolic > Save > Confirm entry

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale “Very Difficult” (1) to “Very Easy” (5)

Administrator / Note Taker Comments:

Certification Criterion: baseline

TASK 11: ACCESS PATIENT ALLERGIES

From current location in application, access Diana Prince's list of allergies

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: escribeHOST_____ seconds (5 seconds)

Optimal Path: Click Med Concerns tool

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale "Very Difficult" (1) to "Very Easy" (5)

Administrator / Note Taker Comments:

Certification Criterion: a.8

TASK 12: VIEW INACTIVE ALLERGIES

From current location in application, access Diana Prince's historical allergies – those that are no longer active. (Subject should identify "allopurinol as inactive allergy")

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- Not Completed

Comments:

Task Time: escribeHOST _____ seconds (5 seconds)

Optimal Path: Click "Show 1 inactive"

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale "Very Difficult" (1) to "Very Easy" (5)

Administrator / Note Taker Comments:

Certification Criterion: a.8

TASK 13: ADD A MEDICATION ALLERGY

From current location in application, Diana reports a moderate allergy to Macrobid a start date of 12/15/2016. Add this allergy.

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: *escribeHOST* _____ seconds (60 seconds)

Optimal Path: *Click Add Concern > select Macrobid > Select Moderate > Save*

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale “Very Difficult” (1) to “Very Easy” (5)

Administrator / Note Taker Comments:

Certification Criterion: a.8

TASK 14: MODIFY AN ALLERGY

From current location in application, Diana Prince reports she is no longer allergic to acetaminophen. Make this change as of today.

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: *escribeHOST* _____ seconds (60 seconds)

Optimal Path: *Checkbox for acetaminophen > Click Edit > Add End Date of today > Save > Confirm*

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale “Very Difficult” (1) to “Very Easy” (5)

Administrator / Note Taker Comments:

Certification Criterion: a.8

TASK 15: ADD A NEW PATIENT

From current location in application, add a new patient NAMED Jennifer Walters, PREFERRED LANGUAGE: english, DOB: 12/1/2006, SEX: Female, RACE: White, ETHNICITY: Not hispanic / Latino , SEXUAL ORIENTATION: Straight , GENDER IDENTITY: Female

SUCCESS:

- EASILY COMPLETED
- COMPLETED WITH DIFFICULTY OR HELP. DESCRIBE BELOW
- NO COMPLETED

COMMENTS:

TASK TIME: escribeHOST _____ SECONDS (120 seconds)

OPTIMAL PATH: Click New Patient tool > Add all data > Save > Confirm

- CORRECT
- MINOR DEVIATIONS / CYCLES. DESCRIBE BELOW
- MAJOR DEVIATIONS. DESCRIBE BELOW

COMMENTS:

OBSERVED ERRORS AND VERBALIZATIONS:

COMMENTS:

RATING:

OVERALL, THIS TASK WAS: _____

SHOW PARTICIPANT WRITTEN SCALE "VERY DIFFICULT" (1) TO "VERY EASY" (5)

ADMINISTRATOR / NOTE TAKER COMMENTS:

CERTIFICATION CRITERION: a.5

TASK 16: ADD TOBACCO USE ASSESSMENT

From current location in application, record that today Jennifer Walters reported that she is a light tobacco smoker and record that someone in your practice conducted intermediate tobacco use counseling. (NOTE: subject will fail if the Tobacco Use Assessment Performed checkbox is not checked).

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: escribeHOST_____ seconds (60 seconds)

Optimal Path: Click Social History tool > Click Add Social History Entry > Record data as described > Save > Confirm

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale “Very Difficult” (1) to “Very Easy” (5)

Administrator / Note Taker Comments:

Certification Criterion: a.11

TASK 17: RECORD FAMILY HEALTH HISTORY – MOTHER

From current location in application, record that Jennifer Walters reported that her mother Angela died of heart disease on Nov 1 2019.

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: ecribeHOST_____ seconds (45 seconds)

Optimal Path: Click Family Health History tab in Social History > Click Add Member > Enter described data > Save > Confirm

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale “Very Difficult” (1) to “Very Easy” (5)

Administrator / Note Taker Comments:

Certification Criterion: a.12

TASK 18: RECORD FAMILY HEALTH HISTORY - FATHER

From current location in application, record today that Jennifer Walters reported that her father has a history of Angina (diagnosed when he was 55), Lupus erythematosus (diagnosed age 60), and tachycardia (diagnosed age 70)

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: escribeHOST_____ seconds (120 seconds)

Optimal Path:

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale “Very Difficult” (1) to “Very Easy” (5)

Administrator / Note Taker Comments:

Certification Criterion:

TASK 19: EDIT FAMILY HEALTH HISTORY RECORD

From current location in application, modify the information in Family Health History to delete tachycardia from Jennifer Walter's father's health history. Jennifer says that she reported that incorrectly for her father.

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: escribeHOST_____ seconds (30 seconds)

Optimal Path: Click Edit icon for FATHER > click X to remove Tachycardia > Record

Reason > Click Save > Confirm

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale "Very Difficult" (1) to "Very Easy" (5)

Administrator / Note Taker Comments:

Certification Criterion: a.12

TASK 20: RECORD IMPLANTED DEVICE

From current location in application, record that Jennifer Walter reported that she has had a knee replacement. DEVICE ID – ABCV123ZYX, ACTIVE, LOT – 4599, SERIAL NUMBER - TR4SX998, SNOME-CT – Knee joint prosthesis

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- Not Completed

Comments:

Task Time: ecribeHOST _____ seconds (90 seconds)

Optimal Path: Click Misc Devices tool > Click Add Misc Device > Enter all data > Click Save > Confirm

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale “Very Difficult” (1) to “Very Easy” (5)

Administrator / Note Taker Comments:

Certification Criterion: a.14

TASK 21: ACCESS PATIENT'S IMAGING ORDERS

From current location in application, access the history of imaging orders for patient Bruce Wayne [tbd]

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: eScribeHOST _____ seconds (10 seconds)

Optimal Path: Chart lookup > Click Orders tool > filter as needed

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale "Very Difficult" (1) to "Very Easy" (5)

Administrator / Note Taker Comments:

Certification Criterion: a.3

TASK 22: ADD AN IMAGING ORDER

Log out and log back in as provider wbest, applesauce. Create and sign an imaging order for a Stress Echo to be conducted within the week because patient Bruce Wayne has history of palpitations.

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: escribeHOST _____ seconds (120 seconds)

Optimal Path: Log in > patient lookup > Click Orders tool > Click Add Order > Click Ultrasound > select Urgent > Select Stress Echo > Select Palpitations > Click Sign > Confirm no AUC > Confirm

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale “Very Difficult” (1) to “Very Easy” (5)

Administrator / Note Taker Comments:

Certification Criterion: a.3

TASK 23: EDIT AN IMAGING ORDER

From current location in application, access the Stress Echo order for Bruce Wayne, and record the Prior Auth Status as Required with a Prior Auth Due Date of 01/01/2020.

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: escribeHOST_____ seconds (30 seconds)

Optimal Path: Click Order row > Click Edit > Record Prior Auth Status > Record Prior Auth Due Date > Save > Confirm

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale “Very Difficult” (1) to “Very Easy” (5)

Administrator / Note Taker Comments:

Certification Criterion: a.3

TASK 24: CANCEL AN IMAGING ORDER

From current location in application, cancel the Stress Echo order for Bruce Wayne because Bruce has been hospitalized.

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: ecribeHOST_____ seconds (10 seconds)

Optimal Path: Click Down Arrow in Order row > Select Cancel > Record reason >Click Mark this Order Cancelled > Confirm

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale “Very Difficult” (1) to “Very Easy” (5)

Administrator / Note Taker Comments:

Certification Criterion: a.3

TASK 25: ACCESS PATIENT'S MEDICATION LIST

From current location in application, access the medications list for Diana Prince.

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: escribeHOST_____ seconds (10 seconds)

Optimal Path: Patient lookup > Click Medications tool

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale "Very Difficult" (1) to "Very Easy" (5)

Administrator / Note Taker Comments:

Certification Criterion:

TASK 26: IDENTIFY ACTIVE VS INACTIVE MEDICATIONS IN THE PATIENTS MEDICATIONS LIST

From current location in application, identify which medications Diana Price's is currently taking and which medications are inactive.

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: escribeHOST_____ seconds (60 seconds)

Optimal Path: Active Meds are displayed; to view Inactive meds, user must click the checkbox labeled “Show x Discontinued Meds”

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale “Very Difficult” (1) to “Very Easy” (5)

Administrator / Note Taker Comments:

Certification Criterion:

TASK 27: ADD A MEDICATION TO PATIENT'S MEDICATIONS LIST

From current location in application, Diana reports she is taking Vitamin B-12, 500 mcg tablet, one tablet daily

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: escribeHOST_____ seconds (30 seconds)

Optimal Path: Click Down arrow to R of Prescribe New Med... > Click Add Med without Prescribing > Add drug, Dose, SIG > click Add Med button > confirm

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale "Very Difficult" (1) to "Very Easy" (5)

Administrator / Note Taker Comments:

Certification Criterion: a.7

TASK 28: CREATE AND SEND AN ERX – DRUG ALLERGY ALERT

From current location in application, attempt to create and send an eRx for captopril for Diana Prince. (observe if subject notices the drug allergy alert).

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- Not Completed.

Comments:

Task Time: ecribeHOST_____ seconds (30 seconds)

Optimal Path: Click Prescribe New Med > select Captopril in Drug field > view Severe Allergy contraindication > Cancel eRx

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale “Very Difficult” (1) to “Very Easy” (5)

Administrator / Note Taker Comments:

Certification Criterion: a.4

TASK 29: CREATE AND SEND AN ERX – DRUG / DRUG CONTRAINDICATION)

From current location in application (meds chart section for Diana Prince), attempt to create and send eRx for Eliquis. (observe if subject notices the drug / drug interaction alert).

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: ecribeHOST_____ seconds (30 seconds)

Optimal Path: Click Prescribe New Med > select Eliquis in Drug field > view Severe Drug/Drug interaction contraindication > Cancel eRx

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale “Very Difficult” (1) to “Very Easy” (5)

Administrator / Note Taker Comments:

Certification Criterion: a.4

TASK 30: ENTER MEDICATION ORDER (CPOE)

From current location in application (Diana Prince meds chart section), create and send an eRx for Procardia XL, 30 mg tablet, extended release, take 1 tablet a day by mouth each day, 30 tablets, 3 refills, Dispense as Written, CA Pharmacy Store 10.6.

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: escribeHOST _____ seconds (60 seconds)

Optimal Path: Click Prescribe New Med... > complete all fields as describe above > click Send to Pharmacy > select correct Pharmacy > Click Send to Pharmacy again > confirm Med and therapy added to medication list.

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale “Very Difficult” (1) to “Very Easy” (5)

Administrator / Note Taker Comments:

Certification Criterion: a.1

TASK 31: EDIT A MEDICATION

From current location in application (Diana Prince meds chart section), inactivate the coumadin with an end date of today.

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: escribeHOST_____ seconds (30 seconds)

Optimal Path: Click Therapies button min the Coumadin row > click Stop button > enter stopped date of today > click Stop > confirm medication is inactive

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale “Very Difficult” (1) to “Very Easy” (5)

Administrator / Note Taker Comments:

Certification Criterion: a.7

TASK 32: CHECK DRUG FORMULARY

From current location in application, lookup patient chart David Cross, create an eRx for Januvia 25 mg tablet and select the Preferred Generic alternative from the Patient's displayed formulary on the right side of the popup. Subject does not need to submit the eRx (Note: Januvia is expensive medication, instruct the subject that substitutions are allowed to accommodate the patient's drug formulary).

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: ecribeHOST_____ seconds (60 seconds)

Optimal Path: Search for and open chart for Cross, David > Click Prescribe New Med... > Complete the New Rx form as described above, select Preferred generic alternative as per the drug formulary >

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale "Very Difficult" (1) to "Very Easy" (5)

Administrator / Note Taker Comments:

Certification Criterion: a.10

TASK 33: SEND PATIENT EDUCATION RESOURCE - MEDICATION

Send a patient educational resource to Diana Prince's patient portal for Coumadin medication.

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: escribeHOST _____ seconds (30 seconds)

Optimal Path: Click "i" for Coumadin > click Create Patient Health Education Resource >

Click Send to PHR

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale "Very Difficult" (1) to "Very Easy" (5)

Administrator / Note Taker Comments:

Certification Criterion: a.13

TASK 34: CHECK FOR CLINICAL DECISION SUPPORT INTERVENTIONS – PROBLEMS

From current location in application, check for clinical decision support intervention information for Diana Prince's Problem list.

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: escribeHOST_____ seconds (60 seconds)

Optimal Path: Patient Lookup > Click hamburger > click Check CDSI... > Check Problem List > Click Search > open at least one to view content > return to chart

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale “Very Difficult” (1) to “Very Easy” (5)

Administrator / Note Taker Comments:

Certification Criterion: a.9

TASK 35: CHECK FOR CLINICAL DECISION SUPPORT INTERVENTIONS – MEDICATIONS

From current location in application, check for clinical decision support intervention information for Diana Prince's Medications list.

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: escribeHOST _____ seconds (60 seconds)

Optimal Path: Patient Lookup > Click hamburger > click Check CDSI... > Check Medication List > Click Search > open at least one to view content > return to chart

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale “Very Difficult” (1) to “Very Easy” (5)

Administrator / Note Taker Comments:

Certification Criterion: a.9

TASK 36: CHECK FOR CLINICAL DECISION SUPPORT INTERVENTIONS – MEDICATION ALLERGIES

From current location in application, check for clinical decision support intervention information for Diana Prince's Medication Allergies list.

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: escribeHOST _____ seconds (60 seconds)

Optimal Path: Patient Lookup > Click hamburger > click Check CDSI... > Check Medication Allergy List > Click Search > open at least one to view content > return to chart

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale “Very Difficult” (1) to “Very Easy” (5)

Administrator / Note Taker Comments:

Certification Criterion: a.9

TASK 37: CHECK FOR CLINICAL DECISION SUPPORT INTERVENTIONS – DEMOGRAPHICS

From current location in application, check for clinical decision support intervention information for Diana Prince's Demographic information.

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: escribeHOST_____ seconds (60 seconds)

Optimal Path: Patient Lookup > Click hamburger > click Check CDSI... > Check Demographics > Click Search > open at least one to view content > return to chart

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale “Very Difficult” (1) to “Very Easy” (5)

Administrator / Note Taker Comments:

Certification Criterion: a.9

TASK 38: CHECK FOR CLINICAL DECISION SUPPORT INTERVENTIONS – LABORATORY TESTS

From current location in application, check for clinical decision support intervention information for Diana Prince's Lab Test results.

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: escribeHOST _____ seconds (60 seconds)

Optimal Path: Patient Lookup > Click hamburger > click Check CDSI... > Check Laboratory Tests > Click Search > open at least one to view content > return to chart

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale “Very Difficult” (1) to “Very Easy” (5)

Administrator / Note Taker Comments:

Certification Criterion: a.9

TASK 39: CHECK FOR CLINICAL DECISION SUPPORT INTERVENTIONS – VITALS SIGNS

From current location in application, check for clinical decision support intervention information for Diana Prince's Medication Allergies list.

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: escribeHOST_____ seconds (60 seconds)

Optimal Path: Patient Lookup > Click hamburger > click Check CDSI... > Check Vitals Signs > Click Search > open at least one to view content > return to chart

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale “Very Difficult” (1) to “Very Easy” (5)

Administrator / Note Taker Comments:

Certification Criterion: a.9

TASK 40: CONFIGURE CONTRAINDICATION ALERT LEVELS

As a user with Admin permission and contraindication permission, set the Contraindications alert levels to display only for the Severe level all contraindication categories. (wbest/applesauce will serve for this purpose. Permissions have been assigned).

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: escribeHOST_____ seconds (30 seconds)

Optimal Path: Click Admin > Click Account Config > Click Contraindications > Remove all checkboxes except for severe in the right column

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale “Very Difficult” (1) to “Very Easy” (5)

Administrator / Note Taker Comments:

Certification Criterion: a.4

=TASK 41: DOWNLOAD RECEIVED TRANSITION OF CARE (TOC)

From Diana Prince's chart, download a received TOC for Diana Prince.

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed.

Comments:

Task Time: _____ seconds (15 seconds)

Optimal Path: Open any patient chart > click hamburger > select Show Received TOCs > click hyperlink of the matching TOC (NOT the magnifying glass)

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale "Very Difficult" (1) to "Very Easy" (5)

Administrator / Note taker Comments:

Certification Criterion: b.2

TASK 42: IMPORT DOWNLOADED TOC

From Diana Price's chart, import the received (and previously downloaded TOC).

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: _____ **seconds (15 seconds)**

Optimal Path: *Click hamburger > select Import/View CCDS...> Click Choose File button and navigate to and select the file downloaded in the prior task > click Import CCDS XML file*

- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale "Very Difficult" (1) to "Very Easy" (5)

Administrator / Note taker Comments:

Certification Criterion: b.2

TASK 43: MATCH PATIENT TO CORRECT CHART AND INCORPORATE TOC

From current location in application, confirm the patient name and incorporate TOC.

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: _____ **seconds (30 seconds)**

Optimal Path: Confirm Patient Name in the displayed TOC matches the name and dob of the open chart > Select TOC type (Transfer, Referral, New) > Select Thomas Brown for Receiving Provider > Click Save to chart for [patient, name]

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale “Very Difficult” (1) to “Very Easy” (5)

Administrator / Note taker Comments:

Certification Criterion: b.2

TASK 44: RECONCILE MEDICATIONS

From current location in application, reconcile the chart and TOC medication lists.

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: _____ **seconds (30 seconds)**

Optimal Path: *Click Reconcile CCDS tab > Compare the two lists > In the TOC, insert a checkmark for the medication that is missing from the chart list > click Reconcile Medications > Confirm the medication was added to the medications list in the patient chart*

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale “Very Difficult” (1) to “Very Easy” (5)

Administrator / Note taker Comments:

Certification Criterion: b.2

TASK 45: RECONCILE MEDICATION ALLERGIES

From current location in application, reconcile the chart and TOC medication allergy lists.

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: _____ **seconds (30 seconds)**

Optimal Path: *Click the Med Allergies tab > Compare the two lists > In the TOC, insert a checkmark for the Allergy that is missing from the chart list > click Reconcile Medication Allergies > Confirm the medication was added to the medication allergy list in the patient chart*

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale “Very Difficult” (1) to “Very Easy” (5)

Administrator / Note taker Comments:

Certification Criterion: b.2

TASK 46: RECONCILE PROBLEMS

From current location in application, reconcile the chart and TOC problems lists.

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: _____ **seconds (30 seconds)**

Optimal Path: *Click the Problems tab > Compare the two lists > In the TOC, insert a checkmark for the Problem that is missing from the chart list > click Reconcile Problems > Confirm the Problem was added to the Problem list in the patient chart*

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale “Very Difficult” (1) to “Very Easy” (5)

Administrator / Note taker Comments:

Certification Criterion: *b.2*

TASK 47: CREATE AND SEND AN eRX

From current location in application (Diana Prince meds chart section), create and send an eRx for Adalat CC, 60 mg tablet, extended release, take 1 tablet a day by mouth each day, 90 tablets, 3 refills, CA Pharmacy Store 10.6.

Success:

- Easily completed
- Completed with difficulty or help. Describe below
- No Completed

Comments:

Task Time: ecribeHOST _____ seconds (30 seconds)

Optimal Path: Click Prescribe New Med... > complete all fields as describe above > click Send to Pharmacy > select correct Pharmacy > Click Send to Pharmacy again > click activity log and confirm that the eRx was sent and verified by the pharmacy

- Correct
- Minor Deviations / cycles. Describe below
- Major Deviations. Describe below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

Show participant written scale "Very Difficult" (1) to "Very Easy" (5)

Administrator / Note Taker Comments:

Certification Criterion: b.3

APPENDIX 4: SYSTEM USABILITY RATINGS

1. I think that I would like to use this system frequently.

1 Strongly Disagree	2	3	4	5 Strongly Agree
------------------------	---	---	---	---------------------

2. I found the system unnecessarily complex.

1 Strongly Disagree	2	3	4	5 Strongly Agree
------------------------	---	---	---	---------------------

3. I thought the system was easy to use.

1 Strongly Disagree	2	3	4	5 Strongly Agree
------------------------	---	---	---	---------------------

4. I think that I would need the support of a technical person to be able to use this system.

1 Strongly Disagree	2	3	4	5 Strongly Agree
------------------------	---	---	---	---------------------

5. I found the various functions in this system were well integrated.

1 Strongly Disagree	2	3	4	5 Strongly Agree
------------------------	---	---	---	---------------------

6. I thought there was too much inconsistency in this system.

1 Strongly Disagree	2	3	4	5 Strongly Agree
------------------------	---	---	---	---------------------

7. I would imagine that most people would learn to use this system very quickly.

1 Strongly Disagree	2	3	4	5 Strongly Agree
------------------------	---	---	---	---------------------

8. I found the system very cumbersome to use.

1 Strongly Disagree	2	3	4	5 Strongly Agree
------------------------	---	---	---	---------------------

9. I felt very confident using the system.

1 Strongly Disagree	2	3	4	5 Strongly Agree
------------------------	---	---	---	---------------------

10. I needed to learn a lot of things before I could get going with this system.

1 Strongly Disagree	2	3	4	5 Strongly Agree
------------------------	---	---	---	---------------------

APPENDIX 5: INCENTIVE RECEIPT AND ACKNOWLEDGMENT FORM

Acknowledgement of Receipt

I hereby acknowledge receipt of a *\$20 Amazon gift card* for my participation in a research study run by *Lille Group, Inc.*

Printed Name: _____

Address: _____

Signature: _____ Date: _____

Tester/Researcher - Printed Name: _____

Signature of Tester / Researcher: _____ Date: _____

Witness - Printed Name: _____

Witness Signature: _____ Date: _____

LILLE GROUP ADDENDUM TEST PLAN, 170.315(b)(11)
ESCRIBEHOST V7
USABILITY TEST REPORT
PREPARED 12/26/25

LILLE GROUP, INC
PO BOX 35
GUILDERLAND, N.Y. 12084

EMAIL: EHR_CERT_INQUIRY@LILLEGROUP.COM

EHR Test Report of escribeHOST version 7

Basis of the “custom” UCD process:

NISTIR 7741 <https://nvlpubs.nist.gov/nistpubs/Legacy/IR/nistir7741.pdf>

Outline and Description:

- We incorporate end-users to develop feature requirements using the Agile approach to software delivery.
- Create Agile ‘user stories’ to document the specific needs of the user as it relates to a given function. Each story contains defined acceptance criteria that defines the user expectation.
- From a UI perspective we create basic wireframes which we share with the user and iterate the development until the user is satisfied with the basic design and flow.
- We convert the wireframe into a prototype.
- The software engineers implement the design.
- The end user tests the new feature.

Explanation:

scribeHOST EHR has been in active development for approximately 26 years. escribeHOST predates UCD standards such as ISO 9241, which is the foundation for many modern standards such as ISO 9241-210:2019. We have incorporated many ergonomic aspects and design principles from modern standards, especially on new functionality, such as 170.315 ONC certification criteria, but applying a single UCD government standard would require foundational changes that would disrupt our existing clients, some of whom have been performing critical patient services using escribeHOST for over 25 years. The first edition of ISO 9241-110 was issued in 2006.

AND

NISTIR 7742 Customized Common Industry Format Template for Electronic Health Record Usability Testing, ISO/IEC 25062:2006 Common Industry Format for Usability Test Reports:

http://www.nist.gov/manuscript-publication-search.cfm?pub_id=907312

Author(s): Robert M. Schumacher; Svetlana Z. Lowry;

Title: (NISTIR 7742) Customized Common Industry Format Template for Electronic Health Record

Usability Testing

Published: November 16, 2010

Abstract: This document provides a template for the modified version of Software engineering Software product Quality Requirements and Evaluation (SQuaRE) Common Industry Format (CIF) for usability test reports (ISO/IEC 25062:2006(E)), the Common Industry Format (CIF) usability test report. This version of the CIF has been customized for use in usability testing of Electronic Health Records (EHRs). The intention of the CIF is to help vendors demonstrate evidence of usability in their final product in a format that allows both independent evaluation of a single product and comparison across multiple products.

Citation: NIST Interagency/Internal Report (NISTIR) - 7742

Date of Usability Test: 12/22/25 - 12/23/25

Date of Report: 12/26/25

Report Prepared By: Lille Group, Inc.

Mailing Address: Lille Group, Inc., PO Box 35, Guilderland, N.Y. 1208

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INTRODUCTION

The EHRUT(s) tested for this study was escribeHOST version 7. Designed to present medical information to healthcare providers in hospital and medical office settings, escribeHOST is a web based electronic medical record consisting of multiple permission-based modules designed to facilitate collection, storage, and organization of patient information in meaningful ways. Further the application contains a patient facing patient health record (PHR) to facilitate communication and the transfer of information between providers and patients. The usability testing attempted to represent realistic exercises and conditions.

The purpose of this study was to validate the usability of the current user interface's enhancements for the §170.315(b)(11) Decision Support Interventions changes, and provide evidence of usability in the EHR Under-Test (EHRUT). To this end, measures of effectiveness, efficiency and user satisfaction, such as time on task and a user reported "Ease of Use" rating (Likert Scale), were captured during the usability testing.

METHOD

PARTICIPANTS

A total of 10 participants, representative of the intended user population (both current and future), were tested on the EHRUT. Participants consisted of clinical staff including clinical managers and administrative staff with daily EHR responsibilities. Participants were recruited by Capital Cardiology Associates. When participants were recruited, they were informed that the test would take place virtually. 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 had the same orientation and level of training as the actual end users would have received. Participant names were replaced with Participant IDs so that an individual's data cannot be tied back to individual identities. A spreadsheet was used to keep track of the participant schedule and included each participant's demographic characteristics as

provided by Capital Cardiology Associates. (See Appendix 1: Participant Data for high level summary of participant information)

TEST TIMING

Testing took place from December 22 through December 23, 2025. Participants were scheduled for 20 minute sessions with at least 15 minutes in between each session for debrief by the administrator and to reset systems to proper test conditions where needed.

TEST LOCATION

All sessions conducted during this study were remote sessions. For these remote testing sessions, the moderator and data logger were each at their personal office, and each participant was at their location. The remote testing sessions were conducted via Google Meet video conferencing software.

TEST ENVIRONMENT

The EHRUT would typically be used in a healthcare office or facility. Usability testing was conducted using a remote testing procedure. For the remote testing sessions, system data was not collected from participants.

The remote sessions were conducted via Google Meet. Participants were instructed to join a Google Meet meeting via the desktop and to share their entire screen. The participants used a mouse and keyboard when interacting with the eScribeHOST. The application was set up by the vendor (Lille Group, Inc) according to the vendor's documentation describing the system set-up and preparation.

STUDY DESIGN

During the usability test, participants interacted with 1 EHR (eScribeHOST v7). 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
- Time to complete the tasks
- Path deviations
- Participant's verbalizations (comments)
- Participant's satisfaction ratings of the system (Using a 1-5 Likert Scale)

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. Allow enabling/disabling access to evidence-based DSIs generation on a per-user basis.
2. Allow enabling/disabling access to DSIs feedback on a per-user basis.
3. Allow user to generate evidence-based DSIs
4. Allow user to provide positive feedback on DSIs
5. Allow user to provide negative feedback on DSIs
6. Allow user to filter and review positive feedback on DSIs with the intervention details, including date/time, patient, intervention, and action taken, user, location. Provide this data in a computable format.
7. Allow user to filter and review negative feedback on DSIs with the intervention details, including date/time, patient, intervention, and action taken, user, location. Provide this data in a computable format.

PROCEDURES

Upon joining the Google Meet, participants were greeted; their identity was verified and matched with a name on the participant schedule. Participants were then assigned a participant ID. The administrator moderated the session including administering instructions and tasks. The data logger also monitored task times, obtained post-task rating data, and took notes on participant comments, task success, path deviations,

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 read a copy of the task. Timing began once the administrator finished reading the task. The task time was stopped once the participant indicated they had successfully completed the task.

Following the session, the administrator asked the participant for a usability rating and thanked each individual for their participation.

Participants' demographic information, task success rate, time on task, errors, deviations, and post-test questionnaire were recorded into a spreadsheet.

TEST FORMS AND TOOLS

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

1. Informed Consent (Appendix 2)
2. Moderator's Guide (Appendix 3)

Examples of these documents can be found in Appendices 2-3, respectively. The Moderator's Guide was devised so as to be able to capture required data.

PARTICIPANT INSTRUCTIONS

The administrator reads the following instructions aloud to each participant (also see the full moderator's guide in Appendix 3):

Thank you for participating in this study. Your input is very important. Our session today will last about 20 minutes. 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. 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.

Should you feel it necessary you are able to withdraw at any time during the testing.

Following the procedural instructions, participants were asked to log into escribeHOST. 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. I will ask you your impressions about the task once you are done.

Participants were then given 7 tasks to complete. Tasks are listed in the Moderator’s Guide in Appendix 3.

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, user satisfaction and overall system usability were captured during the usability testing. The goals of the test were to assess:

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

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.
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. Not all deviations would be counted as errors. This is expressed as the mean number of failed tasks per participant.
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. 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 against the standard expected time to complete. Observed task times divided by the optimal time for the task is a measure of optimal efficiency. Scores of 0 indicated that on average users were able to complete this task in less time than expected.
Satisfaction: Task Rating	Participant’s subjective impression of each task was measured by administering User Satisfaction Survey. 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 10 participants.

Table 1: Details of how observed data were scored

RESULTS

DATA ANALYSIS AND REPORTING

The results of the tests were calculated according to the methods specified above.

Users found 170.315(b)(11) features and functionality easy to use and efficient. Testers provided an average rating of 4.4/5 for usability. We saw an average task time deviation of only 11.69 seconds from the optimal path and 1.5 clicks from the optimal path.

Testing tasks were 100% successful with no errors. 100% of users reported both ecribeHOST and the added 170.315(b)(11) functionality easy to use.

Measure\Task	N Task Success				Path Deviation				Task Time				Errors		Task Ratings (5=easy)	
	#	Mean	SD	Observed	Optimal	Mean	SD	Deviation Observed	Optimal	Mean	SD	Mean	SD			
Allow enabling/disabling access to evidence-based CDSI generation on a per-user basis	100	0	5.4	3	31.963	11.879	19.743	12.22	0	0	0	0	4.4	0.843274042		
Allow enabling/disabling access to CDSI feedback on a per-user basis	100	0	5.6	3	18.777	5.6669	7.737	11.04	0	0	0	0	4.4	0.843274042		
Allow user to generate evidence-based CDSIs	100	0	7.3	6	25.746	8.5329	11.636	14.11	0	0	0	0	4.4	0.843274042		
Allow user to provide positive feedback on CDSIs	100	0	8.9	8	20.621	6.8852	8.481	12.14	0	0	0	0	4.4	0.843274042		
Allow user to provide negative feedback on CDSIs	100	0	8.5	8	13.4	3.2437	1.26	12.14	0	0	0	0	4.4	0.843274042		
Allow user to filter and review feedback on CDSIs with the intervention details, including date/time, patient, intervention, and action taken, user, location. Provide this data in a computable format.	100	0	7.3	5	34.884	16.659	24.994	9.89	0	0	0	0	4.4	0.843274042		
Allow user to filter and review negative feedback on CDSIs with the intervention details, including date/time, patient, intervention, and action taken, user, location. Provide this data in a computable format.	100	0	5.5	5	17.856	9.2926	7.966	9.89	0	0	0	0	4.4	0.843274042		

DISCUSSION

Summarizing the results of the testing, overall user comments indicated that the application was easy to use relative to other systems they have used elsewhere. The scoring of the results matched those comments as many of the tasks were completed with a very high degree of accuracy and efficiency. In some of the more recently developed tasks, users took additional time to look through the application to find new features. Where in those features were found, users were able to complete the task with some deviations or additional time. It should be noted that all participants did have a familiarity with a previous version of the application. Deviations from the standard path or time can also be attributed to the degree to which the user's permissions had previously given them access to some features. For instance, users with no previous "Admin" privileges would see an increase in deviations and time in tasks related to

“Admin” functions.

EFFECTIVENESS

There were a total of 10 test takers that attempted 7 tasks each for a total of 70 total tasks attempted. 100% of tasks were completed successfully. 20% of users rated the usability 3/5, 20% of users rated the usability 4/5, leaving 60% of the users scoring the application a 5/5 for ease of use.

EFFICIENCY

Users performed the 7 testing tasks on average only 11.69 seconds slower than the optimal time. Task LG.2025.b11.5 was performed the most efficiently by testers, with an average deviation of only 1.26 seconds from the optimal time. The path to perform the testing tasks was on average deviated from the optimal path by 1.5 clicks, with the highest being task LG.2025.b11.2 at an average of 2.6 and the lowest being LG.2025.b11.5 with an average of only 0.5 clicks from the optimal path. Prior to testing, testers were not familiar with all 170.315(b)(11) functionality, but results show the new functionality added only seconds and 2-3 clicks on average. This demonstrates that escribeHOST is an efficient program focused on user centered design and ease of use.

SATISFACTION

On average, users rated the testing tasks for 170.315(b)(11) 4.5/5 for ease of use. Users would frequently discuss their satisfaction with the application in a post-test review as “easy to use”. Users have frequently commented anecdotally on the usability of escribeHOST relative to other EHRs they have worked with. The interface is intuitive.

MAJOR FINDINGS

Users found 170.315(b)(11) features and functionality easy to use, with an average rating of 4.4/5 for usability, and efficient with an average task time deviation of only 11.69 seconds from the optimal path and 1.5 clicks from the optimal path. Testing tasks were 100% successful with no errors. 100% of users reported both escribeHOST and the added 170.315(b)(11) functionality easy to use. This showcases Lille Group Inc.'s focus on user centered design and on-going ease of use with new features and versions. Newer features were received well and design changes to the current aesthetic of the application were few and largely unnoticed. DSI was a new tool that once trained will be easy to access and review. Its application will require some further guidelines. More information isn't necessarily good information. Also of note was that the DSI will only return information that is relevant to the chart section and the information that it contains. Thus, using that feature without a robust data set or fully populated fields will largely result in a result that is too broad to be of significant use.

AREAS FOR IMPROVEMENT

Noted areas for improvement focused primarily on the functions of the application that users were unfamiliar with. This included the use of the DSI support and the. Users were clear about how with some basic training these features would be easy to use.

APPENDICES

The following appendices include supplemental data for this usability test report.

Following is a list of the appendices provided:

1. Participant demographics
2. Informed Consent Form
3. Moderator's Guide

APPENDIX 1: PARTICIPANT DEMOGRAPHICS

Participant Identifier	Gender	Age	Education	Occupation/Role	Professional Experience	Computer Experience	Product Experience	Assistive Technology Needs
LG6701	Female	50-59	Some college credit, no degree	Management	180.00	180.00	240.00	No
LG6702	Female	30-39	Master's degree	Management	12.00	180.00	96.00	No
LG6703	Female	30-39	Some college credit, no degree	Quality Coordinator	96.00	180.00	96.00	No
LG6704	Male	30-39	Bachelor's degree	Medical Records Lead	120.00	300.00	120.00	No
LG6705	Female	20-29	Bachelor's degree	Management	24.00	180.00	84.00	No
LG6706	Female	50-59	Bachelor's degree	Management	72.00	360.00	96.00	No
LG6707	Female	40-49	Bachelor's degree	Management	84.00	456.00	120.00	No
LG6708	Female	40-49	Associate degree	Management	24.00	288.00	132.00	No
LG6709	Female	50-59	Some college credit, no degree	Management	36.00	300.00	312.00	No
LG6710	Female	40-49	Bachelor's degree	Management	24.00	360.00	60.00	No

APPENDIX 2: INFORMED CONSENT

Lille Group would like to thank you for participating in this study. The purpose of this study is to evaluate an electronic health records system (escribeHOST). 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 20 minutes.

Agreement

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

I understand that the information is for research purposes only and that my name and image will not be used for any purpose. 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 outside of Lille Group. 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.

Acknowledgement

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

Name (print): _____

- Professional Title: _____
- Signature: _____
- Date: _____

APPENDIX 3: MODERATORS GUIDE

Thank you for participating in this study. Our session today will last approximately 20 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 to 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. 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?

Scenarios to test:

1. Allow enabling/disabling access to evidence-based DSIs generation on a per-user basis.
2. Allow enabling/disabling access to DSIs feedback on a per-user basis.
3. Allow user to generate evidence-based DSIs
4. Allow user to provide positive feedback on DSIs
5. Allow user to provide negative feedback on DSIs
6. Allow user to filter and review positive feedback on DSIs with the intervention details, including date/time, patient, intervention, and action taken, user, location. Provide this data in a computable format.
7. Allow user to filter and review negative feedback on DSIs with the intervention details, including date/time, patient, intervention, and action taken, user, location. Provide this data in a computable format.