EHR Usability Test Reports of 1Life vs 1.0

This document contains both the original SED report completed in July 2022, and an addendum SED testing report for new HTI-1 criteria 315(b)(11) completed in November 2024.

The initial SED usability report was for ONC criteria of 315(a)(1), (a)(5), (a)(9), and (a)(14) for version 1.0 of the product. That usability testing was completed during the timeframe of July 6-13, 2022.

The second SED usability report was for ONC criteria of 315(b)(11) and addressed the new additions in 315(b)(11) compared to the prior 315(a)(9). No other criteria or tasks were usability tested as their respective design and interface were unchanged since the initial SED testing so the previous usability testing is applicable to this version. This most recent usability testing was completed during the timeframe of November 12-18, 2024.

EHR Usability Test Report of 1Life 1.0

Customized Common Industry Format Template for Electronic Health Record Usability Testing

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Date of Usability Test: July 13, 2022

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Table of Contents

EXECUTIVE SUMMARY

A usability test of 1Life vs 1.0 was conducted virtually on July 13, 2022 by Chart Lux Consulting. The purpose of this test was to test and validate the usability of the current user interface and provide evidence of usability in the EHR Under Test (EHRUT). During the usability test, ten (10) healthcare providers matching the target demographic criteria served as participants and used the EHRUT in simulated, but representative tasks.

This study collected performance data on nine (9) tasks typically conducted on an EHR:

- Record, Change, Access Demographics
- CDS-Problems and CDS-Combination
- CDS-Demographics
- Record, change, and access CPOE Medications
- CDS-Medication Allergy
- CDS-Medications
- Record and Change Implantable Device
- CDS-Lab Results
- CDS-Vitals

During the twenty (20) minute one-on-one usability test, each participant was greeted by the administrator and asked to review and agree to informed consent/release form (included in Appendix 3); they were instructed that they could withdraw at any time. Participants had very little prior experience with this version of the EHR so many of the tasks they were trying for the very first time. The administrator introduced the test and instructed participants to complete a series of tasks (given one at a time) using the EHRUT. During the testing, the administrator timed the test and, along with the data logger(s) recorded user performance data on paper and electronically. The administrator did not give the participant assistance in how to complete the task. Participant screens, head shots and audio were recorded for subsequent analysis.

The following types of data were collected for each participant:

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

All participant data was de-identified – no correspondence could be made from the identity of the participant to the data collected. Following the conclusion of the testing, participants were asked to complete a post-test questionnaire and were compensated for their time. Various recommended metrics, in accordance with the examples set forth in the *NIST Guide to the Processes Approach for Improving the Usability of Electronic Health Records*, were used to evaluate the usability of the EHRUT. Following is a summary of the performance and rating data collected on the EHRUT.

Measure	N	Task Success	Path Deviations	Task Time		Errors	Task Ratings (5=Easy)
Task	#	Mean (SD)	Deviations (Observed / Optimal)	Mean (SD)	Deviations (Observed / Optimal)	Mean (SD)	Mean (SD)
Record, Change, Access Demographics	10	100% (0%)	10 / 6	101 (40)	40 / 39	20% (24.49%)	4 (0.63)
CDS-Problems and CDS-Combination	10	100% (0%)	6 / 5	56 (26)	26 / 27	0% (0%)	4.7 (0.45)
CDS-Demographics	10	100% (0%)	4 / 3	41 (23)	23 / 12	0% (0%)	4.5 (1.02)
Record, change, and access CPOE Medications	10	100% (0%)	10 / 8	88 (29)	29 / 48	0% (0%)	5 (0)
CDS-Medication Allergy	10	100% (0%)	4 / 3	26 (8)	8 / 15	0% (0%)	5 (0)
CDS-Medications	10	100% (0%)	3 / 3	19 (6)	6 / 9	0% (0%)	5 (0)
Record and Change Implantable Device	10	100% (0%)	8 / 5	91 (33)	33 / 45	15% (23%)	3.5 (0.8)
CDS-Lab Results	10	100% (0%)	5 / 3	31 (15)	15 / 12	0% (0%)	5 (0)
CDS-Vitals	10	100% (0%)	6 / 4	27 (13)	13 / 15	0% (0%)	4.9 (0.3)

The results from the SUS (System Usability Scale) scored the subjective satisfaction with the system based on performance with these tasks to be 84.75. Broadly interpreted, scores under 60 represent systems with poor usability; scores over 80 would be considered above average.

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

Major Findings

Participants found the system to be very usable and easy to use, and they gave it high marks for its design. Testing results were very positive and confirmed the usability choices we have made. There were a few errors in the demographic update task as users needed to go to different parts of the chart to do all the necessary updates, and some participants were not expecting that.

Areas for Improvement

While feedback was very positive, some participants noted it would be nice if the ability to edit all demographic elements were in the same chart location rather than having to navigate to multiple locations. This is a change we are already considering, and this feedback was affirming of that. The implantable device task showed that training needs to be provided for this feature given its newness to our clinical users.

Usability Report

Introduction

The EHRUT tested for this study was 1Life EHR vs 1.0, designed to present medical information to healthcare providers in ambulatory care setting. 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 to complete the tasks and deviations from optimal pathways, were captured during the usability testing.

Method

Participants

A total of ten (10) participants were tested on the EHRUT. Participants in the test were physicians and nurse. Participants were recruited by 1Life Healthcare. In addition, participants had no direct connection to the development of the EHRUT. Participants were not from the testing or supplier organization. Participants were not given the opportunity to have a basic orientation and introductory level of training of this version of the EHR before participating in the study.

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

ID	Gender	Age	Edu	Role	Prof Expr (Months)	Comp Expr (Months)	Prod Expr (Months)	Assist Tech
01	F	60-69	Dr	Pediatrician	300	300	0	None
02	F	30-39	Dr	Physician Assistant	132	156	0	None
03	M	30-39	Dr	Physician	84	144	0	None
04	M	40-49	Dr	Physician	276	324	0	None

05	F	40-49	Mast	Nurse Practitioner	144	168	0	None
06	M	50-59	Dr	Physician	300	180	0	None
07	M	30-39	Bach	Physician Assistant	144	144	0	None
08	F	30-39	Dr	Physician	72	120	0	None
09	F	40-49	Dr	Physician	180	132	0	None
10	M	30-39	Dr	Physician	84	60	0	None

All ten participants (matching the demographics in the section on Participants) were recruited and participated in the usability test. Participants were scheduled for twenty (20) minute sessions with the test screener.

Study Design

Overall, the objective of this test was to uncover areas where the application performed well – that is, effectively, efficiently, and with satisfaction – and areas where the application failed to meet the needs of the participants. The data from this test may serve as a baseline for future tests with an updated version of the same EHR and/or comparison with other EHRs provided the same tasks are used. In short, this testing serves as both a means to record or benchmark current usability, but also to identify areas where improvements must be made.

During the usability test, participants interacted with one EHR. Each participant used the system in the same location and was provided with the same instructions. The system was evaluated for effectiveness, efficiency and satisfaction as defined by measures collected and analyzed for each participant:

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

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

Tasks

The tasks were constructed that would be realistic and representative of the kinds of activities a user might do with this EHR. Tasks were selected based on their frequency of use, criticality of function, and those that may be most troublesome for users. Tasks used in the study are listed below and with their relative risk associated with user errors noted.

1. Record, Change, Access Demographics (Low Risk)
2. CDS-Problems and CDS-Combination (Low Risk)
3. CDS-Demographics (Low Risk)
4. Record, change, and access CPOE Medications (High Risk)
5. CDS-Medication Allergy (Medium Risk)
6. CDS-Medications (Low Risk)
7. Record and Change Implantable Device (Low Risk)
8. CDS-Lab Results (Low Risk)
9. CDS-Vitals (Low Risk)

Procedures

Test participants were scheduled for twenty (20) minute sessions and arrived as individual participants. Each participant was assigned a number to identify results while detaching the identity of the individual from the response and observations. Demographic data was collected from each participant matched with a name on the participant schedule.

A test administrator moderated each test including administering instructions and tasks. The administrator also monitored path deviations and task success, obtained post-task rating data, and took notes on participant comments. The test administered monitored task times and took notes on number and types of errors, using the recorded video session to confirm details.

Participants were instructed to perform the tasks as quickly as possible, making as few errors and deviations as possible, and without assistance.

Each participant was provided with a clinical scenario providing the background context for the task workflows. Each participant was given the scenario script that provided instructions on the task to perform. Task timing began once the participant finished reading the script. The task time was stopped once the participant successfully completed the task. Scoring is discussed below.

Following the session, the administrator gave the participant the post-test questionnaire on usability (see Appendix D), provided instructions on how compensation for their time would occur, and thanked each individual for their participation.

Test administrators compiled the demographic information, task success rate, time on task, errors, deviations, comments, and post-test questionnaire for analysis and scoring.

Test Location

Testing was done using Zooms remote session. Only one participant was logged in at any given time with the administrator to ensure privacy.

Test Environment

The EHRUT would typically be used in an ambulatory setting, and the testing environment was setup to mimic this workflow. The test application was running on a private server using a test database on an Internet connection. The participants used a mouse and keyboard when interacting with the EHR.

The application was set up by 1Life engineering to mimic a live environment. Technically, the system performance (i.e. response time) was representative to what actual users would experience in a field implementation. Additionally, participants were not allowed to change any of the default system settings.

Test Forms and Tools

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

1. Demographics Questionnaire
2. Participant Briefing/Debriefing document
3. Usability Task Tracking document
4. Post-Test Questionnaire (System Usability Scale)

Examples of these documents can be found in Appendices A-D respectively.

The participant's interaction with the EHRUT was captured and recorded digitally with web conferencing software running on the test machine. The test administrator participated in each session live, with access to the recorded session afterwards.

Participant Instructions

The administrator reads the following instructions noted in Appendix B. Participants were given nine (9) tasks to complete. Tasks are listed in the Usability Task document in Appendix C.

Usability Metrics

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

The goals of the test were to assess:

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

Data Scoring

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

Measures	Rational and Scoring
Effectiveness: Task Success	A task was counted as a "Success" if the participant was able to achieve the correct outcome, without assistance, within the time allotted on a per task basis. The total number of successes were calculated for each task and then divided by the total number of times that task was attempted. The results are provided as a percentage. Task times were recorded for successes. Observed task times divided by the optimal time for each task is a measure of optimal efficiency. Optimal task performance time, as benchmarked by expert performance under realistic conditions, is recorded when constructing tasks. Target task times used for task times in the Moderator's Guide must be operationally defined by taking multiple measures of optimal performance and multiplying by some factor (e.g. 1.25) that allows some time buffer because the participants are presumably not trained to expert performance. Thus, if expert, optimal performance on a task was 60 seconds then allotted task time performance was 80 seconds (60 x 1.25). This ratio should be aggregated across tasks and reported with mean and variance scores.
Effectiveness: Task Failures	If the participant abandoned the task, did not reach the correct answer or performed it incorrectly, or reached the end of the allotted time before successful completion, the task was counted as an "Failures." No task times were taken for errors. The total number of errors was calculated for each task and then divided by the total number of times that task was attempted. Not all deviations would be counted as errors. This should also be expressed as the mean number of failed tasks per participant. On a qualitative level, an enumeration of errors and error types should be collected.
Efficiency:	The participant's path (i.e., steps) through the application was

Task Deviations	recorded. Deviations occur if the participant, for example, went to a wrong screen, clicked on an incorrect menu item, followed an incorrect link, or interacted incorrectly with an on-screen control. This path was compared to the optimal path. The number of steps in the observed path is divided by the number of optimal steps to provide a ratio of path deviation. It is strongly recommended that task deviations be reported. Optimal paths (i.e., procedural steps) should be recorded when constructing tasks.
Efficiency: Task Time	Each task was timed from when the administrator said "Begin" until the participant said, "Done." If he or she failed to say "Done," the time was stopped when the participant stopped performing the task. Only task times for tasks that were successfully completed were included in the average task time analysis. Average time per task was calculated for each task. Variance measures (standard deviation and standard error) were also calculated.
Satisfaction: Task Rating	Participant's subjective impression of the ease of use of the application was measured by administering both a simple post-task question as well as a post-session questionnaire. After each task, the participant was asked to rate "Overall, this task was:" on a scale of 1 (Very Difficult) to 5 (Very Easy). These data are averaged across participants. Common convention is that average ratings for systems judged easy to use should be 3.3 or above. To measure participants' confidence in and likeability of the 1Life EHR overall, the testing team administered the System Usability Scale (SUS) post-test questionnaire. Questions included, "I think I would like to use this system frequently," "I thought the system was easy to use," and "I would imagine that most people would learn to use this system very quickly." See full System Usability Score questionnaire in Appendix D.

Results

Data Analysis and Scoring

The results of the usability test were calculated according to the methods specified in the Usability Metrics section above. There were no participants who failed to follow session and task instructions and as a result all participants had their data included in the final analyses.

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

Measure	N	Task Success	Path Deviations	Task Time		Errors	Task Ratings (5=Easy)
Task	#	Mean (SD)	Deviations (Observed / Optimal)	Mean (SD)	Deviations (Observed / Optimal)	Mean (SD)	Mean (SD)
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Record, change, and access CPOE Medications	10	100% (0%)	10 / 8	88 (29)	29 / 48	0% (0%)	5 (0)
CDS-Medication Allergy	10	100% (0%)	4 / 3	26 (8)	8 / 15	0% (0%)	5 (0)
CDS-Medications	10	100% (0%)	3 / 3	19 (6)	6 / 9	0% (0%)	5 (0)
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CDS-Vitals	10	100% (0%)	6 / 4	27 (13)	13 / 15	0% (0%)	4.9 (0.3)

The results from the SUS (System Usability Scale) scored the subjective satisfaction with the system based on performance with these tasks to be 84.75. Broadly interpreted, scores under 60 represent systems with poor usability; scores over 80 would be considered above average.

Discussions of the Findings

Effectiveness

Based on the success, failure and path deviation data, the system was well designed, especially given the fact that the users had never worked with this specific version of the EHR software nor been trained on using these features. They were often having to figure out the steps based solely on reading the test script for the first time.

The areas of most confusion were updating of 1.) demographics and 2.) implantable devices. The participants typically don't make update changes to demographics for patients, so this was new experience, and for many, the first time they had ever done all of these steps. Also, the implantable device functional is completely new to this EHR, and it is not likely it will be a feature widely used by most of the participants. However, the results for these tasks still scored relatively high and shows good usability.

Efficiency

Efficiency was measured as a function of time on task relative to pre-determined benchmark task times and clicks per task relative to benchmark task values. Based on the task completion times, users completed most of the tasks close to the optimal time. The biggest outlier was the demographic task and implantable device tasks which as noted previously are not features they are often asked to change and make updates to.

Satisfaction

Based on the task ratings, all the participants found the tasks to be intuitive and easy to perform. The SUS score was calculated to be 84.75, with the lowest score being 57.5 and the highest score being 100.

Major Findings

Participants found the system to be very usable and easy to use, and they gave it high marks for its design. Testing results were very positive and confirmed the usability choices we have made. There were a few errors in the demographic update task as users needed to go to different parts of the chart to do all the necessary updates, and some participants were not expecting that.

Areas for Improvement

While feedback was very positive, some participants noted it would be nice if the ability to edit all demographic elements were in the same chart location rather than having to navigate to multiple locations. This is a change we are already considering, and this feedback was affirming of that. The implantable device task showed that training needs to be provided for this feature given its newness to our clinical users.

Appendix A: Demographic Questionnaire

Name	
Gender	
Age	
Education (highest attained)	
Clinical Role	
Professional Experience (in months)	
Experience with Computers in Healthcare (in months)	
Experience with EHR (in months)	

Appendix B: Participant Briefing/Debriefing

Thank you for participating in this study. The purpose of this study is to evaluate the 1Life EHR system. You will be asked to perform several tasks using the prototype and give your feedback. The study will last about 20 minutes. By continuing in this study, you are acknowledging that you did not have any involvement in the creation or design of this EHR and that opinions and feedback are unbiased and accurate. At the conclusion of the test, you will be compensated for your time.

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.

For each task, I will share the tasks steps with you. At that point, please perform the task. After completing the tasks, I will ask you some additional questions. We are interested in how easy (or how difficult) this system is to use.

The product you will be using today is ready for its certification testing evaluation, but 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?

Appendix C: Usability Tasks

Task 1: Record, Change, Access Demographics

1. Take the participant to the starting point for the task. Instruct participant to perform the following steps and begin timer.
2. *New patient [PATIENT] has been registered in the system where Sex was recorded as "Male" and date of birth as "01/19/1987". However, in talking with new patient [PATIENT] in person, the clinical user (nurse or doctor) records patient demographic information as follows and records this in the patient record in the registration page: Date of Birth: 01/19/1997; Sex: Female; Gender Info: Female; Race: Asian; Ethnicity: Non-Hispanic*
3. Record Success:
    a. Completed according to proper steps.
    b. Completed with difficulty or help. Describe below in comments.
    c. Not completed.
    d. Comments:
4. Task Time Observed (seconds):
5. Task Time Optimal (seconds):
6. Optimal Path:
    a. Open patient account page
    b. Edit Sex to Female
    c. Edit DOB to 1/19/1997
    d. Edit Gender Info to "Female"
    e. Open patient chart page
    f. Edit Race to Asian
7. Results of Pathway Choice
    a. Correct
    b. Minor Deviations/Cycle (describe below)
    c. Major Deviations (describe below)
    d. Comments:
8. Record Errors and Verbalizations:
9. Ask participant: "overall, how would you rate this task? Rating: (5) Very Easy (4) Easy (3) Moderate (2) Difficult (1) Very Difficult":

Associated Criteria:

- 170.315(a)(5) Demographics

Task 2: CDS-Problems and CDS-Combination

1. Take the participant to the starting point for the task. Instruct participant to perform the following steps and begin timer.
2. *User selects patient's [PATIENT] chart. The user documents a problem of anxiety. The user then clicks the "Hide Tips" link at the bottom and reviews clinical suggestions for this problem. The user then goes to the bottom of the problem card and review a list of program recommendations. The user chooses the "OM: Shift Group Program" selection. After finishing the review, the user hits the "Submit" button.*
3. Record Success:
    a. Completed according to proper steps.
    b. Completed with difficulty or help. Describe below in comments.
    c. Not completed.
    d. Comments:
4. Task Time Observed (seconds):
5. Task Time Optimal (seconds):
6. Optimal Path:
    a. Open patient account page
    b. Add problem to problem list
    c. Search for "anxiety"
    d. Click "Show Tips" button
    e. Close tips
    f. Click "Pt Eligible"
    g. Select a program and click "Invite"
    h. Click Save button
7. Results of Pathway Choice
    a. Correct
    b. Minor Deviations/Cycle (describe below)
    c. Major Deviations (describe below)
    d. Comments:
8. Record Errors and Verbalizations:
9. Ask participant: "overall, how would you rate this task? Rating: (5) Very Easy (4) Easy (3) Moderate (2) Difficult (1) Very Difficult":

Associated Criteria:

- 170.315(a)(9) Clinical Decision Support

Task 3: CDS-Demographics

1. Take the participant to the starting point for the task. Instruct participant to perform the following steps and begin timer.
2. *In encounter with patient [PATIENT], the user goes to the Prevention and Screenings tab. A "cervical cancer screening" should be automatically inserted into the list. The user will select the "cervical cancer screening" and document a due date of two months from today's date. Finally, user hits the save button and returns to the patient's chart.*
3. Record Success:
    a. Completed according to proper steps.
    b. Completed with difficulty or help. Describe below in comments.
    c. Not completed.
    d. Comments:
4. Task Time Observed (seconds):
5. Task Time Optimal (seconds):
6. Optimal Path:
    a. Open patient account page
    b. Add screening for "Cervical Cancer"
    c. Select due date for 2 months out
    d. Click Save button
7. Results of Pathway Choice
    a. Correct
    b. Minor Deviations/Cycle (describe below)
    c. Major Deviations (describe below)
    d. Comments:
8. Record Errors and Verbalizations:
9. Ask participant: "overall, how would you rate this task? Rating: (5) Very Easy (4) Easy (3) Moderate (2) Difficult (1) Very Difficult":

Associated Criteria:

- 170.315(a)(9) Clinical Decision Support

Task 4: Record, change, and access CPOE Medications

1. Take the participant to the starting point for the task. Instruct participant to perform the following steps and begin timer.
2. *In encounter with patient [PATIENT], the treating physician orders a medication of: Medication: Amoxicillin 500 MG; SIG: One tablet by mouth every 12 hours for 4 days*

   Starting from the patient dashboard, the physician user goes to the CPOE medication order screen and records the order. After it is done, the physician closes the order entry screen and returns the patient dashboard. However, after completing the initial documentation, the physician decides to change the order as follows: Medication: Amoxicillin 500 MG; SIG: One tablet by mouth every 6 hours for 4 days

   The physician returns to the previous order and replaces it as described.

3. Record Success:
   a. Completed according to proper steps.
   b. Completed with difficulty or help. Describe below in comments.
   c. Not completed.
   d. Comments:
4. Task Time Observed (seconds):
5. Task Time Optimal (seconds):
6. Optimal Path:
   a. Add new medication
   b. Search for “amoxicillin”
   c. Click “customize”
   d. Click “specify duration”
   e. Type in 4 for days
   f. Click “write medication”
   g. Close the prescription cart
   h. Open the prescription cart
   i. Delete the prescription
   j. Add new medication
   k. Search for “amoxicillin”
   l. Click “customize”
   m. Change “q12h” to “q6h”
   n. Click “write medication”

7. Results of Pathway Choice
    a. Correct
    b. Minor Deviations/Cycle (describe below)
    c. Major Deviations (describe below)
    d. Comments:
8. Record Errors and Verbalizations:
9. Ask participant: “overall, how would you rate this task? Rating: (5) Very Easy (4) Easy (3) Moderate (2) Difficult (1) Very Difficult”:

Associated Criteria:

- 170.315(a)(1) CPOE-Medications

Task 5: CDS-Medication Allergy

1. Take the participant to the starting point for the task. Instruct participant to perform the following steps and begin timer.
2. *In encounter with patient [PATIENT], the user records a medication of ibuprofen. In doing so, the user is prompted with a list of potential medication allergies and intolerances. Upon review, the user considers the medication to be safe to prescribe. After finishing the review of the warning, the user hits the "Write Rx" button.*
3. Record Success:
    a. Completed according to proper steps.
    b. Completed with difficulty or help. Describe below in comments.
    c. Not completed.
    d. Comments:
4. Task Time Observed (seconds):
5. Task Time Optimal (seconds):
6. Optimal Path:
    a. Add new medication
    b. Search for "ibuprofen"
    c. Review interactions
    d. Click "write medication"
7. Results of Pathway Choice
    a. Correct
    b. Minor Deviations/Cycle (describe below)
    c. Major Deviations (describe below)
    d. Comments:
8. Record Errors and Verbalizations:
9. Ask participant: "overall, how would you rate this task? Rating: (5) Very Easy (4) Easy (3) Moderate (2) Difficult (1) Very Difficult":

Associated Criteria:

- 170.315(a)(9) Clinical Decision Support

Task 6: CDS-Medications

1. Take the participant to the starting point for the task. Instruct participant to perform the following steps and begin timer.
2. *In encounter with patient [PATIENT], the user attempts to write a medication prescription of albuterol sulfate. After entering the medication, the user is automatically presented some dosing recommendations, and the user selects the most appropriate one. After making the dosing selection, the user hits the "Write Rx" button.*
3. Record Success:
    a. Completed according to proper steps.
    b. Completed with difficulty or help. Describe below in comments.
    c. Not completed.
    d. Comments:
4. Task Time Observed (seconds):
5. Task Time Optimal (seconds):
6. Optimal Path:
    a. Add new medication
    b. Search for "albuterol"
    c. Review dosing suggestions and choose appropriate one
    d. Click "write medication"
7. Results of Pathway Choice
    a. Correct
    b. Minor Deviations/Cycle (describe below)
    c. Major Deviations (describe below)
    d. Comments:
8. Record Errors and Verbalizations:
9. Ask participant: "overall, how would you rate this task? Rating: (5) Very Easy (4) Easy (3) Moderate (2) Difficult (1) Very Difficult":

Associated Criteria:

- 170.315(a)(9) Clinical Decision Support

Task 7: Record and Change Implantable Device

1. Take the participant to the starting point for the task. Instruct participant to perform the following steps and begin timer.
2. *In encounter, patient [PATIENT] shares she recently had surgery and had some nonabsorbable sutures implanted but have since been removed. She provides the suture label ID/UDI for the implants. The clinical user records the sutures in the implantable device list of the patient as follows:*
   UDI: (01)10884521062856(11)141231(17)150707(10)A213B1(21)1234
   The user confirms the EHR displays the following details:
   - *GMDN PT Name: Polyester suture*
   - *Manufactured date: 12/31/2014*
   - *Expiration date: 07/07/2015*
   - *Lot: A213B1*
   - *Serial number: 1234*
   - *Company Name: Covidien LP*
   - *Brand Name: Ti-Cron*
   - *Model Number: 88863380-82*
   - *MRI safety information labeling contain: Labeling does not contain MRI Safety Information*

   The user saves this information in the record. The user then changes the status of the implantable device to inactive.
3. Record Success:
   a. Completed according to proper steps.
   b. Completed with difficulty or help. Describe below in comments.
   c. Not completed.
   d. Comments:
4. Task Time Observed (seconds):
5. Task Time Optimal (seconds):
6. Optimal Path:
   a. Add new implantable device
   b. Type “suture” for device type
   c. Copy and paste in UDI: (01)10884521062856(11)141231(17)150707(10)A213B1(21)123
   d. Hit Enter
   e. Review the lookup information

    f. Click Save
    g. Click the item for suture
    h. Change Active to Inactive
    i. Click Save
7. Results of Pathway Choice
    a. Correct
    b. Minor Deviations/Cycle (describe below)
    c. Major Deviations (describe below)
    d. Comments:
8. Record Errors and Verbalizations:
9. Ask participant: “overall, how would you rate this task? Rating: (5) Very Easy (4) Easy (3) Moderate (2) Difficult (1) Very Difficult”:

Associated Criteria:

- 170.315(a)(14) Implantable Device List

Task 8: CDS-Lab Results

1. Take the participant to the starting point for the task. Instruct participant to perform the following steps and begin timer.
2. *In encounter with patient [PATIENT], the user goes to the Lab Order section of the record and records an indication of "diabetes mellitus type 2". The user is prompted with a list of suggested lab tests associated with the indication. The user chooses one of the lab tests and saves the order.*
3. Record Success:
    a. Completed according to proper steps.
    b. Completed with difficulty or help. Describe below in comments.
    c. Not completed.
    d. Comments:
4. Task Time Observed (seconds):
5. Task Time Optimal (seconds):
6. Optimal Path:
    a. Add new lab order
    b. Type in "Diabetes Mellitus Type 2" into Indication
    c. Select "Diabetes annual labs" in Lab Tests
7. Results of Pathway Choice
    a. Correct
    b. Minor Deviations/Cycle (describe below)
    c. Major Deviations (describe below)
    d. Comments:
8. Record Errors and Verbalizations:
9. Ask participant: "overall, how would you rate this task? Rating: (5) Very Easy (4) Easy (3) Moderate (2) Difficult (1) Very Difficult":

Associated Criteria:

- 170.315(a)(9) Clinical Decision Support

Task 9: CDS-Vitals

1. Take the participant to the starting point for the task. Instruct participant to perform the following steps and begin timer.
2. *In encounter with patient [PATIENT], the user records the vitals of the patient. The user records "58 F" for temperature. The user confirms temperature field box changes color and prevents the user from saving the results. The user corrects the temperature value to "98 F" and the temperature field box removes its coloring highlight. Finally, the user saves the vitals and returns to the patient's chart.*
3. Record Success:
    a. Completed according to proper steps.
    b. Completed with difficulty or help. Describe below in comments.
    c. Not completed.
    d. Comments:
4. Task Time Observed (seconds):
5. Task Time Optimal (seconds):
6. Optimal Path:
    a. Add Vitals
    b. Type in 58 into Temp
    c. Change 58 to 98
    d. Click "Add"
7. Results of Pathway Choice
    a. Correct
    b. Minor Deviations/Cycle (describe below)
    c. Major Deviations (describe below)
    d. Comments:
8. Record Errors and Verbalizations:
9. Ask participant: "overall, how would you rate this task? Rating: (5) Very Easy (4) Easy (3) Moderate (2) Difficult (1) Very Difficult":

Associated Criteria:

- 170.315(a)(9) Clinical Decision Support

Appendix D: System Usability Scale

Ratings: Strongly Agree (5) Agree (4) Neutral (3) Disagree (2) Strongly Disagree (1)

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

EHR Usability Test Report of 1Life vs 1.0

Decision Support Intervention 315(b)(11) Supplemental Report

Customized Common Industry Format Template for Electronic Health Record Usability Testing Report based on ISO/IEC 25062:2006 Common Industry Format for Usability Test Reports

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Date of Usability Test: November 12-18, 2024

Date of Report: November 19, 2024

Table of Contents

EXECUTIVE SUMMARY

A usability test of 1Life vs 1.0 was conducted virtually during November 12-18, 2024, 2024 by Chart Lux Consulting. The purpose of this test was to test and validate the usability of the enhancements made for the ONC criterion § 170.315(b)(11) Decision Support Intervention functionality. This EHR Under Test (EHRUT) was previously certified and usability tested for the functionality of ONC criterion § 170.315(a)(9). The tasks and test results described in this supplemental report focus on the delta updates for § 170.315(b)(11) compared to its predecessor § 170.315(a)(9). Please refer to original usability test report covering § 170.315(a)(9) tasks for additional information.

During the usability test, ten (10) healthcare providers and individuals matching the target demographic criteria served as participants and used the EHRUT in simulated, but representative tasks. This study collected performance data on four (4) tasks which cover the changes from § 170.315(a)(9) to § 170.315(b)(11):

- Admin User Selects Evidenced-based DSI and Access / Record / Change Source Attributes
- User Triggers Evidenced-based DSI and Provides User Feedback
- Admin User Exports User Feedback
- Admin User Configures User-supplied Predictive DSI and Records / Changes / Access Source Attributes and Then User Triggers User-supplied Predictive DSI

During the 30 minute one-on-one usability test, each participant was greeted by the administrator, and they were given a instructions for the test event (included in Appendix B). Participants had varied experience with previous versions of this EHRUT, but this specific version was new to them and had some new features they had never experienced before. Participants received a brief training and orientation of new features prior to testing.

The administrator introduced the test and instructed participants to complete the task using the EHRUT. During the testing, the proctor timed the test and recorded user performance data on paper and electronically. The administrator did not give the participant assistance in how to complete the task. Participant screens, head shots and audio were recorded for subsequent analysis.

The following types of data were collected for each participant:

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

All participant data was de-identified – no correspondence could be made from the identity of the participant to the data collected. Following the conclusion of the testing, participants were asked to complete a post-test questionnaire. Various recommended metrics, in accordance with the examples set forth in the *NIST Guide to the Processes Approach for Improving the*

Usability of Electronic Health Records, were used to evaluate the usability of the EHRUT. Following is a summary of the performance and rating data collected on the EHRUT.

Measure	N	Task Success	Path Deviations	Task Time (Seconds)		Errors	Task Ratings (5=Easy)
Task	#	Mean (SD)	Deviations (Observed / Optimal)	Mean (SD)	Deviations (Observed / Optimal)	Mean (SD)	Mean (SD)
Admin User Selects Evidenced-based DSI and Access / Record / Change Source Attributes	10	100% (0%)	9 / 7	103 (51)	51 / 45	0% (0%)	4.7 (0.46)
User Triggers Evidenced-based DSI and Provides User Feedback	10	100% (0%)	8 / 5	60 (24)	24 / 30	00% (0%)	4.8 (0.4)
Admin User Exports User Feedback	10	100% (0%)	2 / 2	15 (0)	0 / 15	0% (0%)	5.0 (0.0)
Admin User Configures User-supplied Predictive DSI and Records / Changes / Access Source Attributes and Then User Triggers User-supplied Predictive DSI	10	100% (0%)	7 / 6	64 (23)	23 / 30	0% (0%)	4.8 (0.4)

The results from the SUS (System Usability Scale) scored the subjective satisfaction with the system based on performance with these tasks to be 90.25. Broadly interpreted, scores under 60 represent systems with poor usability; scores over 80 would be considered above average.

Major Findings

Participants gave the system high marks and noted it to be very usable, and they praised its purposeful design for primary care providers. They indicated the display layout was clear and user friendly. They also commented that the predictive DSI features were intuitive.

Areas for Improvement

While results were good and high marks given, some comments were made that that they would prefer if all features could be accessible directly from the main EHR workflow rather than leaving the patient chart in order to access functions such as the source attribute pages in a different tab. While there are valid reasons for this design choice, we will continue to evaluate ways to make relevant information as easily available as possible.

Usability Report

Introduction

The EHR Under Test (EHRUT) tested for this study was 1Life version 1.0, designed to test and validate the usability of the enhancements made for the ONC criterion § 170.315(b)(11) Decision Support Intervention functionality. This EHRUT was previously certified and usability tested for the functionality of ONC criterion § 170.315(a)(9). The tasks and test results described in this supplemental report focus on the delta updates for § 170.315(b)(11) compared to its predecessor § 170.315(a)(9). Please refer to original usability test report covering § 170.315(a)(9) tasks for additional information. The usability testing attempted to represent realistic exercises and conditions associated with the § 170.315(b)(11) functionality within the EHRUT.

The purpose of this study was to test and validate the usability of the current user interface and provide evidence of usability in the EHRUT for the associated tasks in this report. To this end, measures of effectiveness, efficiency and user satisfaction, such as time to complete the tasks and deviations from optimal pathways, were captured during the usability testing.

Method

Design Standard

1Life employed NISTIR 7741 usability standard in our product design. It is a user-centered design (UCD) created for improving the usability of electronic health records (https://www.nist.gov/publications/nistir-7741-nist-guide-processes-approach-improving-usability-electronic-health-records).

Participants

A total of ten (10) participants were tested on the EHRUT. Participants in the test primarily act in the role of physicians and nurse practitioners. Participants were recruited by the developer, and participants had no direct connection to the development of the EHRUT. While the Participants were familiar with older versions of the EHRUT, this specific version was new to them and had some new features they had never experienced before. Participants received a brief training and orientation of new features prior to testing.

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

ID	Gender	Age	Education	Role	Prof Experience (months)	Comp Experience (months)	Product Experience (months)	Assistive Technology Needs
11	F	30-39	Master's Degree	Nurse Practitioner	72	168	42	None
12	M	40-49	Doctorate	Physician	108	192	108	None
13	M	30-39	Doctorate	Physician	144	168	108	None
14	F	40-49	Master's Degree	Physician Assistant	240	240	132	None
15	F	30-39	Master's Degree	Physician Assistant	156	204	96	None
16	F	30-39	Master's Degree	Nurse Practitioner	132	156	96	None
17	F	30-39	Master's Degree	Nurse Practitioner	120	168	60	None
18	M	50-59	Doctorate	Physician	324	144	36	None
19	F	30-39	Master's Degree	Physician Assistant	132	216	96	None
20	M	50-59	Doctorate	Physician	300	192	81	None

All ten participants (matching the demographics in the section on Participants) were recruited and participated in the usability test. Participants were scheduled for 30 minute sessions with the test screener.

Study Design

Overall, the objective of this test was to uncover areas where the application performed well – that is, effectively, efficiently, and with satisfaction – and areas where the application failed to meet the needs of the participants. The data from this test may serve as a baseline for future tests with an updated version of the same EHR and/or comparison with other EHRs provided the same tasks are used. In short, this testing serves as both a means to record or benchmark current usability, but also to identify areas where improvements must be made.

During the usability test, participants interacted with one EHR. Each participant used the system in the same location and was provided with the same instructions. The system was

evaluated for effectiveness, efficiency and satisfaction as defined by measures collected and analyzed for each participant:

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

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

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 according to its respective ONC certified criteria. Tasks were selected based on their frequency of use, criticality of function, and those that may be most troublesome for users. Tasks used in the study are listed below and with their relative risk associated with user errors noted.

1. Admin User Selects Evidenced-based DSI and Access / Record / Change Source Attributes (Low Risk)
2. User Triggers Evidenced-based DSI and Provides User Feedback (Medium Risk)
3. Admin User Exports User Feedback (Low Risk)
4. Admin User Configures User-supplied Predictive DSI and Records / Changes / Access Source Attributes and Then User Triggers User-supplied Predictive DSI (Medium Risk)

Procedures

Test participants were scheduled for 30 minute sessions and arrived as individual participants. Each participant was assigned a number to identify results while detaching the identity of the individual from the response and observations. Demographic data was collected from each participant matched with a name on the participant schedule.

A test administrator moderated each test including administering instructions and tasks. The administrator also monitored path deviations and task success, obtained post-task rating data, and took notes on participant comments. The test administered monitored task times and took notes on number and types of errors, using the recorded video session to confirm details.

Participants were instructed to perform the tasks as quickly as possible, making as few errors and deviations as possible, and without assistance.

Each participant was provided with a clinical scenario providing the background context for the task workflows. Each participant was read the scenario and then provided instructions on the task to perform. Task timing began once the administrator finished reading the question. The task time was stopped once the participant successfully completed the task. Scoring is discussed below.

Following the session, the administrator gave the participant the post-test questionnaire on usability (see Appendix D) and thanked each individual for their participation.

Test proctor compiled the demographic information, task success rate, time on task, errors, deviations, comments, and post-test questionnaire for analysis and scoring.

Test Location

Testing was done using Teams or Zoom remote session. Only one participant was logged in at any given time with the administrator to ensure privacy.

Test Environment

The EHRUT would typically be used in an ambulatory setting, and the testing environment was setup to mimic this workflow. The test application was running on a private server using a test database on an Internet connection. The participants used a mouse and keyboard when interacting with the EHR.

The application was set up by 1Life Healthcare engineering to mimic a live environment. Technically, the system performance (i.e. response time) was representative of what actual users would experience in a field implementation. Additionally, participants were not allowed to change any of the default system settings.

Test Forms and Tools

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

1. Demographics Questionnaire
2. Participant Briefing/Debriefing document
3. Usability Task Tracking document
4. Post-Test Questionnaire (System Usability Scale)

Examples of these documents can be found in Appendices A-D respectively.

The participant's interaction with the EHRUT was captured and recorded digitally with web conferencing software running on the test machine. The test administrator participated in each session live, with access to the recorded session afterwards.

Participant Instructions

The administrator reads the following instructions noted in Appendix B. Participants were given all required tasks to complete. Tasks are listed in the Usability Task tracking document in Appendix C.

Usability Metrics

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

The goals of the test were to assess:

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

Data Scoring

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

Measures	Rational and Scoring
Effectiveness: Task Success	A task was counted as a "Success" if the participant was able to achieve the correct outcome, without assistance, within the time allotted on a per task basis. The total number of successes were calculated for each task and then divided by the total number of times that task was attempted. The results are provided as a percentage. Task times were recorded for successes. Observed task times divided by the optimal time for each task is a measure of optimal efficiency. Optimal task performance time, as benchmarked by expert performance under realistic conditions, is recorded when constructing tasks. Target task times used for task times in the Moderator's Guide must be operationally defined by taking multiple measures of optimal performance and multiplying by some factor (e.g. 1.25) that allows some time buffer because the participants are presumably not trained to expert performance. Thus, if expert, optimal performance on a task was 60 seconds then allotted task time performance was 80 seconds (60 x 1.25). This ratio should be aggregated across tasks and reported with mean and variance scores.
Effectiveness: Task Failures	If the participant abandoned the task, did not reach the correct answer or performed it incorrectly, or reached the end of the allotted time before successful completion, the task was counted as an "Failures." No task times were taken for errors. The total number of errors was calculated for each task and then divided by the total number of times that task was attempted. Not all deviations would be counted as errors. This should also be expressed as the mean number of failed tasks per participant. On a qualitative level, an enumeration of errors and error types should be collected.
Efficiency:	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.

Task Deviations	This path was compared to the optimal path. The number of steps in the observed path is divided by the number of optimal steps to provide a ratio of path deviation. It is strongly recommended that task deviations be reported. Optimal paths (i.e., procedural steps) should be recorded when constructing tasks.
Efficiency: Task Time	Each task was timed from when the administrator said "Begin" until the participant said, "Done." If he or she failed to say "Done," the time was stopped when the participant stopped performing the task. Only task times for tasks that were successfully completed were included in the average task time analysis. Average time per task was calculated for each task. Variance measures (standard deviation and standard error) were also calculated.
Satisfaction: Task Rating	Participant's subjective impression of the ease of use of the application was measured by administering both a simple post-task question as well as a post-session questionnaire. After each task, the participant was asked to rate "Overall, this task was:" on a scale of 1 (Very Difficult) to 5 (Very Easy). These data are averaged across participants. Common convention is that average ratings for systems judged easy to use should be 3.3 or above. To measure participants' confidence in and likeability of the 1Life overall, the testing team administered the System Usability Scale (SUS) post-test questionnaire. Questions included, "I think I would like to use this system frequently," "I thought the system was easy to use," and "I would imagine that most people would learn to use this system very quickly." See full System Usability Score questionnaire in Appendix D.

Results

Data Analysis and Scoring

The results of the usability test were calculated according to the methods specified in the Usability Metrics section above. There were no participants who failed to follow session and task instructions and as a result all participants had their data included in the final analyses.

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

Measure	N	Task Success	Path Deviations	Task Time (Seconds)		Errors	Task Ratings (5=Easy)
Task	#	Mean (SD)	Deviations (Observed / Optimal)	Mean (SD)	Deviations (Observed / Optimal)	Mean (SD)	Mean (SD)
Admin User Selects Evidenced-based DSI and Access / Record / Change Source Attributes	10	100% (0%)	9 / 7	103 (51)	51 / 45	0% (0%)	4.7 (0.46)
User Triggers Evidenced-based DSI and Provides User Feedback	10	100% (0%)	8 / 5	60 (24)	24 / 30	00% (0%)	4.8 (0.4)
Admin User Exports User Feedback	10	100% (0%)	2 / 2	15 (0)	0 / 15	0% (0%)	5.0 (0.0)
Admin User Configures User-supplied Predictive DSI and Records / Changes / Access Source Attributes and Then User Triggers User-supplied Predictive DSI	10	100% (0%)	7 / 6	64 (23)	23 / 30	0% (0%)	4.8 (0.4)

The results from the SUS (System Usability Scale) scored the subjective satisfaction with the system based on performance with these tasks to be 90.25. Broadly interpreted, scores under 60 represent systems with poor usability; scores over 80 would be considered above average.

Discussions of the Findings

Effectiveness

Based on the success, failure and path deviation data, the system was well designed, and the tasks scored well.

Efficiency

Efficiency was measured as a function of time on task relative to pre-determined benchmark task times and clicks per task relative to benchmark task values. Based on the task completion times, the majority of users completed all tasks close to the optimal time. A few participants needed to switch between opened browser tabs to enter in the correct information which delayed completion of the task.

Satisfaction

Based on the task ratings, all the participants found the tasks to be intuitive and easy to perform. The SUS score was calculated to be 90.25, with the lowest score being 77.5 and the highest score being 100.

Major Findings

Participants gave the system high marks and noted it to be very usable, and they praised its purposeful design for primary care providers. They indicated the display layout was clear and user friendly. They also commented that the predictive DSI features were intuitive.

Areas for Improvement

While results were good and high marks given, some comments were made that that they would prefer if all features could be accessible directly from the main EHR workflow rather than leaving the patient chart in order to access functions such as the source attribute pages in a different tab. While there are valid reasons for this design choice, we will continue to evaluate ways to make relevant information as easily available as possible.

Appendix A: Demographic Questionnaire

Name	
Gender	
Age	
Education (highest attained)	
Clinical Role	
Professional Experience (in months)	
Experience with Computers in Healthcare (in months)	
Experience with EHR (in months)	

Appendix B: Participant Briefing/Debriefing

Thank you for participating in this study. Our session today will last approximately 30 minutes. During that time, you will look at our EHR and be asked to do various tasks associated with its ONC certification criteria. The goal is for you to attempt to complete the various tasks to the best of your ability, and we will document your findings as part of our effort to certify our product in the ONC health IT certification program.

The product you will be using today is not ready for production, but the functionality you will be encountering in the testing tasks is nearly at its finish state for this upcoming release. While we provide a clinical story for the test tasks at hand, some of the test data we provide may not make sense for your personal day-to-day activities and it should be treated as placeholder data for testing.

I will ask you to complete a few tasks using this system and then 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. Please be honest with your opinions as this feedback will help improve the product.

We are recording our session today via web conferencing software. 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?

Appendix C: Usability Tasks

Task 1: Admin User Selects Evidenced-based DSI and Access / Record / Change Source Attributes

The authorized admin user goes to EHR to select or activate an evidenced-based DSI. After evidenced-based DSI is selected, the admin user will access source attributes and then record and change them.

1. Take the participant to the starting point for the task. Begin timer.
2. User will perform the actions according to the assigned patient data sheet and described above.
3. Record Success:
    a. Completed according to proper steps.
    b. Completed with difficulty or help. Describe below in comments.
    c. Not completed.
    d. Comments:
4. Task Time Observed (seconds):
5. Task Time Optimal (seconds):
6. Results of Pathway Choice
    a. Correct
    b. Minor Deviations/Cycle (describe below)
    c. Major Deviations (describe below)
    d. Comments:
7. Record Errors and Verbalizations:
8. Ask participant: “overall, how would you rate this task? Rating: (5) Very Easy (4) Easy (3) Moderate (2) Difficult (1) Very Difficult”:

Associated Criteria:

- 170.315(b)(11) Decision Support Intervention

Task 2: User Triggers Evidenced-based DSI and Provides User Feedback

The user engages the previously activated evidenced-based DSI and triggers an intervention. User then records user feedback on intervention

1. Take the participant to the starting point for the task. Begin timer.
2. User will perform the actions according to the assigned patient data sheet and described above.
3. Record Success:
    a. Completed according to proper steps.
    b. Completed with difficulty or help. Describe below in comments.
    c. Not completed.
    d. Comments:
4. Task Time Observed (seconds):
5. Task Time Optimal (seconds):
6. Results of Pathway Choice
    a. Correct
    b. Minor Deviations/Cycle (describe below)
    c. Major Deviations (describe below)
    d. Comments:
7. Record Errors and Verbalizations:
8. Ask participant: “overall, how would you rate this task? Rating: (5) Very Easy (4) Easy (3) Moderate (2) Difficult (1) Very Difficult”:

Associated Criteria:

- 170.315(b)(11) Decision Support Intervention

Task 3: Admin User Exports User Feedback

The admin user exports user feedback for evidenced-based DSI. The admin user confirms the file is in computable format with user feedback information

1. Take the participant to the starting point for the task. Begin timer.
2. User will perform the actions according to the assigned patient data sheet and described above.
3. Record Success:
    a. Completed according to proper steps.
    b. Completed with difficulty or help. Describe below in comments.
    c. Not completed.
    d. Comments:
4. Task Time Observed (seconds):
5. Task Time Optimal (seconds):
6. Results of Pathway Choice
    a. Correct
    b. Minor Deviations/Cycle (describe below)
    c. Major Deviations (describe below)
    d. Comments:
7. Record Errors and Verbalizations:
8. Ask participant: “overall, how would you rate this task? Rating: (5) Very Easy (4) Easy (3) Moderate (2) Difficult (1) Very Difficult”:

Associated Criteria:

- 170.315(b)(11) Decision Support Intervention

Task 4: Admin User Configures User-supplied Predictive DSI and Records / Changes / Access Source Attributes and Then User Triggers User-supplied Predictive DSI

The authorized admin user goes to EHR to select or activate a user-supplied predictive DSI. Then user engages and activates user-supplied predictive DSI and triggers an intervention. After user-supplied predictive DSI is evaluated, the admin user will access source attributes to record and change them.

1. Take the participant to the starting point for the task. Begin timer.
2. User will perform the actions according to the assigned patient data sheet and described above.
3. Record Success:
    a. Completed according to proper steps.
    b. Completed with difficulty or help. Describe below in comments.
    c. Not completed.
    d. Comments:
4. Task Time Observed (seconds):
5. Task Time Optimal (seconds):
6. Results of Pathway Choice
    a. Correct
    b. Minor Deviations/Cycle (describe below)
    c. Major Deviations (describe below)
    d. Comments:
7. Record Errors and Verbalizations:
8. Ask participant: “overall, how would you rate this task? Rating: (5) Very Easy (4) Easy (3) Moderate (2) Difficult (1) Very Difficult”:

Associated Criteria:

- 170.315(b)(11) Decision Support Intervention

Appendix D: System Usability Scale

Ratings: Strongly Agree (5) Agree (4) Neutral (3) Disagree (2) Strongly Disagree (1)

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