

# EHR Usability Test Reports of StrateqEHR vs 5

This document contains both the original SED report completed in December 2021 and an addendum SED testing report for new HTI-1 criteria 315(b)(11) completed in December 2024.

The initial SED usability report was for ONC criteria of 315(a)(1)-(a)(5), (a)(9), (a)(14), (b)(2), and (b)(3) for version 5 of the product. That usability testing was completed during the timeframe of November 22, 2021, and its report can be found on page 2 of this document.

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 December 9-20, 2024, and its report can be found on page 31 of this document.

# EHR Usability Test Report of StrateqEHR 5

Customized Common Industry Format Template for Electronic Health Record Usability Testing

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## EXECUTIVE SUMMARY

A usability test of StrateqEHR 5, was conducted virtually November 22, 2021 by Strateq Health. 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 9 tasks typically conducted on an EHR:

- Record and update demographics information
- Record, change, and access CPOE Imaging Order
- Record, change, and access CPOE Lab Order
- Enable and trigger clinical decision support rule
- Record, change, and access CPOE Med Order
- Enabled and use drug-drug/drug-allergy alert
- Clinical information reconciliation and incorporation
- Record, access, and use implantable device list
- Electronic prescribing a medication

During the 60 minute one-on-one usability test, each participant was greeted by the administrator and asked to review and sign an informed consent/release form (included in Appendix 3); they were instructed that they could withdraw at any time. Participants had very little prior experience with the EHR. The administrator introduced the test and instructed participants to complete a series of tasks (given one at a time) using the EHRUT. During the testing, the administrator timed the test and, along with the data logger(s) recorded user performance data on paper and electronically. The administrator did not give the participant assistance in how to complete the task. Participant screens, 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 and update demographics information	10	100% (0%)	15 / 13	234 (86.7)	86 / 60	6.67% (13.3%)	4.7 (0.45)
Record, change, and access CPOE Imaging Order	10	100% (0%)	4 / 3	84 (29.39)	29.39 / 60	10% (30%)	4.8 (0.4)
Record, change, and access CPOE Lab Order	10	100% (0%)	4 / 3	84 (72)	72 / 60	0% (0%)	5 (0)
Enable and trigger clinical decision support rule	10	100% (0%)	4 / 3	66 (18)	18 / 60	0% (0%)	4.9 (0.3)
Record, change, and access CPOE Med Order	10	100% (0%)	4 / 3	90 (40.2)	40.2 / 60	0% (0%)	4.9 (0.3)
Enabled and use drug-drug/drug-allergy alert	10	100% (0%)	13 / 12	150 (48.37)	48.37 / 60	6.67% (20%)	4.9 (0.3)
Clinical information reconciliation and incorporation	10	100% (0%)	13 / 11	204 (48)	48 / 120	1.67% (5%)	4.8 (0.6)
Record, access, and use implantable device list	10	100% (0%)	4 / 3	78 (38.4)	38.4 / 60	0% (0%)	4.9 (0.3)
Electronic prescribing a medication	10	100% (0%)	6 / 4	180 (53.6)	53.6 / 120	20% (24.5%)	4.5 (0.67)

The results from the SUS (System Usability Scale) scored the subjective satisfaction with the system based on performance with these tasks to be 90.5. 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. While there were relatively few errors with ePrescribing, it was the task where users experienced the most errors. Since this is a new solution to them, that is not necessarily unexpected, but given the importance of electronic prescribing to most users, it is important to note.

### Areas for Improvement

While results were good, more training on the tasks of incorporation of the patient data found in received C-CDAs and also medication ordering and electronic prescribing would be beneficial. We will note this in both our customer training efforts and future product design to ensure users are comfortable with these tasks.



# Usability Report

## Introduction

The EHRUT tested for this study was StrateqEHR v5, designed to present medical information to healthcare providers in inpatient and emergency care settings. 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 Strateq Health and were compensated \$100 for their time. In addition, participants had no direct connection to the development of or organization producing the EHRUT. Participants were not from the testing or supplier organization. Participants were given the opportunity to have a basic orientation and introductory level of training 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	Comp Expr	Prod Expr	Assist Tech
01	M	40-49	Mast	Nurse	312	180	0	None
02	M	40-49	Bach	Nurse	240	180	1	None
03	F	30-39	Bach	Nurse	108	108	0	None
04	F	30-39	Bach	Nurse	108	120	0	None
05	F	40-49	Bach	Nurse	252	132	0	None
06	F	60-69	Dr	Do	300	186	1	None
07	F	30-39	Bach	Nurse	120	120	0	None
08	F	50-59	Bach	Nurse	420	180	0	None

09	M	50-59	Bach	Nurse	360	240	1	None
10	F	30-39	Bach	Nurse	144	120	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 60 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. 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 and update demographics information (Low Risk)
2. Record, change, and access CPOE Imaging Order (Low Risk)

3. Record, change, and access CPOE Lab Order (Low Risk)
4. Enable and trigger clinical decision support rule (Low Risk)
5. Record, change, and access CPOE Med Order (Low Risk)
6. Enabled and use drug-drug/drug-allergy alert (Medium Risk)
7. Clinical information reconciliation and incorporation (Medium Risk)
8. Record, access, and use implantable device list (Low Risk)
9. Electronic prescribing a medication (High Risk)

## Procedures

Test participants were scheduled for sixty 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), 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 Teams 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 inpatient hospital, 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 Strateq Health 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 10 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 StrateqEHR by measuring participant success rates and errors
2. Efficiency of StrateqEHR by measuring the average task time and path deviations
3. Satisfaction with StrateqEHR 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
<p><b>Effectiveness:</b></p> <p>Task Success</p>	<p>A task was counted as a “Success” if the participant was able to achieve the correct outcome, without assistance, within the time allotted on a per task basis.</p> <p>The total number of successes were calculated for each task and then divided by the total number of times that task was attempted. The results are provided as a percentage.</p> <p>Task times were recorded for successes. Observed task times divided by the optimal time for each task is a measure of optimal efficiency.</p> <p>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.</p>
<p><b>Effectiveness:</b></p> <p>Task Failures</p>	<p>If the participant abandoned the task, did not reach the correct answer or performed it incorrectly, or reached the end of the allotted time before successful completion, the task was counted as an “Failures.” No task times were taken for errors.</p> <p>The total number of errors was calculated for each task and then divided by the total number of times that task was attempted. Not all deviations would be counted as errors. This should also be expressed as the mean number of failed tasks per participant.</p> <p>On a qualitative level, an enumeration of errors and error types should be collected.</p>
<p><b>Efficiency:</b></p>	<p>The participant’s path (i.e., steps) through the application was recorded. Deviations occur if the participant, for example, went to a wrong screen, clicked on an incorrect menu item, followed an</p>

Task Deviations	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.
<b>Efficiency:</b>  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.
<b>Satisfaction:</b>  Task Rating	<p>Participant’s subjective impression of the ease of use of the application was measured by administering both a simple post-task question as well as a post-session questionnaire. After each task, the participant was asked to rate “Overall, this task was:” on a scale of 1 (Very Difficult) to 5 (Very Easy). These data are averaged across participants.</p> <p>Common convention is that average ratings for systems judged easy to use should be 3.3 or above.</p> <p>To measure participants’ confidence in and likeability of the StrateqEHR 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.</p>

## 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)
Record and update demographics information	10	100% (0%)	15 / 13	234 (86.7)	86 / 60	6.67% (13.3%)	4.7 (0.45)
Record, change, and access CPOE Imaging Order	10	100% (0%)	4 / 3	84 (29.39)	29.39 / 60	10% (30%)	4.8 (0.4)
Record, change, and access CPOE Lab Order	10	100% (0%)	4 / 3	84 (72)	72 / 60	0% (0%)	5 (0)
Enable and trigger clinical decision support rule	10	100% (0%)	4 / 3	66 (18)	18 / 60	0% (0%)	4.9 (0.3)
Record, change, and access CPOE Med Order	10	100% (0%)	4 / 3	90 (40.2)	40.2 / 60	0% (0%)	4.9 (0.3)
Enabled and use drug-drug/drug-allergy alert	10	100% (0%)	13 / 12	150 (48.37)	48.37 / 60	6.67% (20%)	4.9 (0.3)
Clinical information reconciliation and incorporation	10	100% (0%)	13 / 11	204 (48)	48 / 120	1.67% (5%)	4.8 (0.6)
Record, access, and use implantable device list	10	100% (0%)	4 / 3	78 (38.4)	38.4 / 60	0% (0%)	4.9 (0.3)
Electronic prescribing a medication	10	100% (0%)	6 / 4	180 (53.6)	53.6 / 120	20% (24.5%)	4.5 (0.67)

The results from the SUS (System Usability Scale) scored the subjective satisfaction with the system based on performance with these tasks to be 90.5. 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. The areas of most confusion were updating of 1.) demographics, 2.) the incorporating of the C-CDAs and reconciling their contents into the patient record, and 3.) electronic prescribing. The participants typically don't make update changes to demographics for patients, so this was new experience. Also, these users typically don't receive many C-CDAs for reconciling problems, medications, and medication allergies from an external source. Still, nearly all the users were able to complete this task without an error but only a few path deviations. The electronic prescribing solution is new compared to the eRx solution they have previously worked with, so this represents more of a learning curve. 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, the majority of users completed all tasks close to the optimal time. The biggest outlier was the demographic task which as noted previously is not feature 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 90.5, with the lowest score being 45 and the highest score being 100. Ninety percent (90%) of the participants scored StrateqEHR in the 90+ category for SUS.

### Major Findings

Participants found the system to be very usable and easy to use. While there were relatively few errors with ePrescribing, it was the task where users experienced the most errors. Since this is a new solution to them, that is not necessarily unexpected, but given the importance of electronic prescribing to most users, it is important to note.

### Areas for Improvement

While results were good, more training on the tasks of incorporation of the patient data found in received C-CDAs and also medication ordering and electronic prescribing would be beneficial. We will note this in both our customer training efforts and future product design to ensure users are comfortable with these tasks.

# 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 StrateqEHR system. You will be asked to perform several tasks using the prototype and give your feedback. The study will last about 60 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 read the description to you and say "Begin." At that point, please perform the task and say "Done" once you believe you have successfully completed the task. I would like to request that you not talk aloud or verbalize while you are doing the tasks.

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 and update demographics information

1. Take the participant to the starting point for the task. Begin timer.
2. During the admission process, the patient's demographic data was entered. Review the demographics and change date of birth. You may select any date of birth.
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. sign on as Med/Surg Nurse- open to unit management screen, select patient, open patient profile
  - b. using search function - search for patient by name – click on the pencil icon to the right of the patient name – edit information and save
  - c. sign on as Med/Surg Provider - open to unit management screen, select patient, open patient profile – validate data has been updated
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: Record, change, and access CPOE Imaging Order

1. Take the participant to the starting point for the task. Begin timer.
2. During the admission process, the patient's demographic data was entered. Review the demographics and change date of birth. You may select any date of birth.
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 Add Orders Tab, Type in Chest and select appropriate order sentence
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)(3) CPOE-Imaging

### Task 3: Record, change, and access CPOE Lab Order

1. Take the participant to the starting point for the task. Begin timer.
2. During the admission process, the patient's demographic data was entered. Review the demographics and change date of birth. You may select any date of birth.
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 Add Orders Tab, type in CBC and select appropriate order sentence - type in Blood Culture- select appropriate sentence
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)(2) CPOE-Labs

## Task 4: Enable and trigger clinical decision support rule

1. Take the participant to the starting point for the task. Begin timer.
2. During the admission process, the patient's demographic data was entered. Review the demographics and change date of birth. You may select any date of birth.
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. On opening the Add Orders Screen a CDS screen displays with link for research/data regarding elevating HOB and Aspiration Pneumonia- review and accept the recommended intervention order.
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 5: Record, change, and access CPOE Med Order

1. Take the participant to the starting point for the task. Begin timer.
2. During the admission process, the patient's demographic data was entered. Review the demographics and change date of birth. You may select any date of birth.
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 Add Orders Tab, Type in Ceftriaxone, select or build appropriate order
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 6: Enabled and use drug-drug/drug-allergy alert

1. Take the participant to the starting point for the task. Begin timer.
2. During the admission process, the patient's demographic data was entered. Review the demographics and change date of birth. You may select any date of birth.
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. click on interaction alert, read alert, cancel order
  - b. From Add Orders tab type in Gentamicin, locate prebuilt order sentence and add order
  - c. From Add Orders tab, type in Lasix, locate order – you will see the interaction icon – click on icon to review information and close. Click on the save button and enter reason for overriding interaction. Confirm order
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)(4) Drug-drug/drug-allergy Notification

## Task 7: Clinical information reconciliation and incorporation

1. Take the participant to the starting point for the task. Begin timer.
2. During the admission process, the patient's demographic data was entered. Review the demographics and change date of birth. You may select any date of birth.
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. Click on the C-CDA menu bar, open the appropriate received document
  - b. Select any med/allergies/problems to add to the current record and select Reconcile – user will need to enter medication details
  - c. Click on Problems/Allergies and Orders to validate
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(b)(2) Clinical Information Reconciliation and Incorporation

## Task 8: Record, access, and use implantable device list

1. Take the participant to the starting point for the task. Begin timer.
2. During the admission process, the patient's demographic data was entered. Review the demographics and change date of birth. You may select any date of birth.
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. Go to the Implantable Device tab, enter the UDI data into the field, enter other pertinent information. 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 9: Electronic prescribing a medication

1. Take the participant to the starting point for the task. Begin timer.
2. During the admission process, the patient's demographic data was entered. Review the demographics and change date of birth. You may select any date of birth.
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. *Go to the Discharge pathway, Med Rec/eRX tab. eRX Valsartan*
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(b)(3) Electronic Prescribing

## 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 StrateqEHR vs 5

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: December 9-20, 2024

Date of Report: December 23, 2024

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## EXECUTIVE SUMMARY

A usability test of StrateqEHR vs 5 was conducted virtually during December 9-20, 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 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 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 (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%)	8 / 6	72 (52)	52 / 15	0% (0%)	4.90 (0.30)
User Triggers Evidenced-based DSI and Provides User Feedback	10	100% (0%)	4 / 4	25 (12)	12 / 15	0% (0%)	5.0 (0.0)
Admin User Exports User Feedback	10	100% (0%)	8 / 7	66 (24)	24 / 30	0% (0%)	4.70 (0.46)
Admin User Configures User-supplied Predictive DSI and Records / Changes / Access Source Attributes and Then User Triggers User-supplied Predictive DSI	10	100% (0%)	12 / 12	78 (26)	26 / 45	0% (0%)	4.90 (0.30)

The results from the SUS (System Usability Scale) scored the subjective satisfaction with the system based on performance with these tasks to be 83. Broadly interpreted, scores under 60 represent systems with poor usability; scores over 80 would be considered above average.

### Major Findings

Participant praised the system’s clean design with minimal clicking required to reach the various settings. Participants who were not current users of StrateqEHR said they found its design more user-friendly than their current EHR.

## Areas for Improvement

Some participants did not immediately find the respective intervention rule to select for the feedback download because the window for listing the interventions was relatively small and required scrolling through its list to find it. While this design does keep the screen display compact, we will evaluate if we want to enlarge it in future updates given this feedback.

# Usability Report

## Introduction

The EHR Under Test (EHRUT) tested for this study was StrateqEHR version 5, 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

StrateqEHR 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 physician assistants. Participants were recruited by the developer, and participants had no direct connection to the development of the EHRUT. Some participants were familiar with older versions of the EHRUT, but for others, this was their first time using StrateqEHR. However, for all participants, this specific version and the usability tasks being tested were new to them. 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	M	20-29	Some college credit, no degree	Admin	96	60	7	None
12	F	40-49	Some college credit, no degree	Office Manager	240	240	10	None
13	M	30-39	Associate degree	Admin	156	60	3	None
14	F	40-49	Doctor degree	Nurse Practitioner	240	240	0	None
15	M	40-49	Associate degree	Office Manager	144	36	6	None
16	F	20-29	Bachelor's degree	Nurse	48	48	0	None
17	F	40-49	Bachelor's degree	Nurse	264	180	12	None
18	F	30-39	Bachelor's degree	Analyst	120	120	0	None
19	F	30-39	Bachelor's degree	Nurse	132	168	0	None
20	M	30-39	Associate degree	Radiologist Supervisor	72	60	12	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), provided instructions on how compensation for their time would occur, 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 Strateq 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 StrateqEHR by measuring participant success rates and errors
2. Efficiency of StrateqEHR by measuring the average task time and path deviations
3. Satisfaction with StrateqEHR 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
<p><b>Effectiveness:</b></p> <p>Task Success</p>	<p>A task was counted as a “Success” if the participant was able to achieve the correct outcome, without assistance, within the time allotted on a per task basis.</p> <p>The total number of successes were calculated for each task and then divided by the total number of times that task was attempted. The results are provided as a percentage.</p> <p>Task times were recorded for successes. Observed task times divided by the optimal time for each task is a measure of optimal efficiency.</p> <p>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.</p>
<p><b>Effectiveness:</b></p> <p>Task Failures</p>	<p>If the participant abandoned the task, did not reach the correct answer or performed it incorrectly, or reached the end of the allotted time before successful completion, the task was counted as an “Failures.” No task times were taken for errors.</p> <p>The total number of errors was calculated for each task and then divided by the total number of times that task was attempted. Not all deviations would be counted as errors. This should also be expressed as the mean number of failed tasks per participant.</p> <p>On a qualitative level, an enumeration of errors and error types should be collected.</p>
<p><b>Efficiency:</b></p>	<p>The participant’s path (i.e., steps) through the application was recorded. Deviations occur if the participant, for example, went to a wrong screen, clicked on an incorrect menu item, followed an incorrect link, or interacted incorrectly with an on-screen control.</p>

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.
<b>Efficiency:</b>  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.
<b>Satisfaction:</b>  Task Rating	<p>Participant’s subjective impression of the ease of use of the application was measured by administering both a simple post-task question as well as a post-session questionnaire. After each task, the participant was asked to rate “Overall, this task was:” on a scale of 1 (Very Difficult) to 5 (Very Easy). These data are averaged across participants.</p> <p>Common convention is that average ratings for systems judged easy to use should be 3.3 or above.</p> <p>To measure participants’ confidence in and likeability of the StrateqEHR 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.</p>

## 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%)	8 / 6	72 (52)	52 / 15	0% (0%)	4.90 (0.30)
User Triggers Evidenced-based DSI and Provides User Feedback	10	100% (0%)	4 / 4	25 (12)	12 / 15	0% (0%)	5.0 (0.0)
Admin User Exports User Feedback	10	100% (0%)	8 / 7	66 (24)	24 / 30	0% (0%)	4.70 (0.46)
Admin User Configures User-supplied Predictive DSI and Records / Changes / Access Source Attributes and Then User Triggers User-supplied Predictive DSI	10	100% (0%)	12 / 12	78 (26)	26 / 45	0% (0%)	4.90 (0.30)

The results from the SUS (System Usability Scale) scored the subjective satisfaction with the system based on performance with these tasks to be 83. 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 extra time on the first task as it was a new experience for them, but they quickly sped up their work in subsequent tasks.

### 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 83, with the lowest score being 68 and the highest score being 98.

### Major Findings

Participant praised the system's clean design with minimal clicking required to reach the various settings. Participants who were not current users of StrateqEHR said they found its design more user-friendly than their current EHR.

### Areas for Improvement

Some participants did not immediately find the respective intervention rule to select for the feedback download because the window for listing the interventions was relatively small and required scrolling through its list to find it. While this design does keep the screen display compact, we will evaluate if we want to enlarge it in future updates given this feedback.

## 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. After user-supplied predictive DSI is selected, the admin user will access source attributes and then record and change them. Then user engages and activates user-supplied predictive DSI and triggers an 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

## 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.