



EHR Usability Test Report of Physician's Solution 11.0

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1 Executive Summary

A usability test of Physician’s Solution 11.0 was conducted on Sep XX, 2019 at two locations in NY by Physician’s Solutions EMR. 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, two healthcare providers, one practice administrator and one office manager matching the target demographic criteria served as participants and used the EHRUT in simulated, but representative tasks.

This study collected performance data on October 1, 2014 tasks typically conducted on an EHR:

- Computerized provider order entry – medications
- Computerized provider order entry – laboratory
- Computerized provider order entry – diagnostic imaging
- Drug-drug, drug-allergy interaction checks
- Demographics
- Problem list
- Medication list
- Medication allergy list
- Clinical decision support
- Implantable device list
- Clinical information reconciliation and incorporation
- Electronic prescribing

At start of the test, each participant was greeted by the administrator / moderator. Participants had prior experience with the EHR. The administrator introduced the test, and instructed participants to complete a series of tasks (given one at a time) using the EHRUT. During the testing, the administrator timed the test and recorded user performance.

The administrator did not give the participant assistance in how to complete the task. 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.

Sr.	Task	Completed Successfully?	Completed in Time?	Time Deviation
1	Computerized provider order entry– medications	Yes	No	Plus 4
2	Computerized provider order entry – laboratory	Yes	No	Plus 3
3	Computerized provider order entry – diagnostic imaging	Yes	No	Plus 2
4	Drug-drug, drug-allergy interaction checks	Yes	No	Plus 8
5	Demographics	Yes	Yes	None
6	Problem list	Yes	Yes	None
7	Medication list	Yes	Yes	None
8	Medication allergy list	Yes	No	Plus 6
9	Clinical decision support	Yes	No	Plus 14
10	Implantable device list	Yes	No	Plus 7
11	Clinical information reconciliation	Yes	No	Plus 6
12	Electronic prescribing	Yes	No	Plus 8

2 Introduction

The EHRUT tested for this study was Physician’s Solution 6.0, an Ambulatory EHR. 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 EHRUT.

3 Method

A total of 10 participants were tested on the EHRUT. Participants in the test were healthcare providers and nurse practitioners.

The participants had a mix of backgrounds and demographics. 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	Professional Role	Professional Experience	Computer Experience	Product Experience	Assistive Technology Needs	Facility Use of EHR
1	Female	20-29	Bachelor's Degree	Medical Assistant	5	230	15	No	Electronic
2	Female	30-39	Bachelor's Degree	Medical Assistant	12	240	13	No	Electronic
3	Female	30-39	Bachelor's Degree	Medical Assistant	15	250	12	No	Electronic
4	Female	30-39	Bachelor's Degree	Medical Assistant	15	210	13	No	Electronic
5	Female	20-29	Bachelor's Degree	Scribe	1	220	12	No	Electronic
6	Male	60-69	Master's Degree	Provider	31	240	16	No	Electronic
7	Male	50-59	Master's Degree	Provider	26	240	16	No	Electronic
8	Female	30-39	Bachelor's Degree	Medical Assistant	10	250	13	No	Electronic
9	Female	30-39	Bachelor's Degree	Medical Assistant	4	200	15	No	Electronic
10	Female	20-29	Bachelor's Degree	Medical Assistant	5	210	15	No	Electronic
11	Female	20-29	Bachelor's Degree	Medical Assistant	2	220	14	No	Electronic

3.1 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.

3.2 Tasks:

Several tasks were constructed that would be realistic and representative of the kinds of activities a user might do with this EHR, including:

- 170.315 (a)(1) Computerized provider order entry – medications
- 170.315 (a)(2) Computerized provider order entry – laboratory
- 170.315 (a)(3) Computerized provider order entry – diagnostic imaging
- 170.315 (a)(4) Drug-drug, drug-allergy interaction checks
- 170.315 (a)(5) Demographics
- 170.315 (a)(6) Problem list
- 170.315 (a)(7) Medication list
- 170.315 (a)(8) Medication allergy list
- 170.315 (a)(9) Clinical decision support
- 170.315 (a)(14) Implantable device list
- 170.315 (b)(2) Clinical information reconciliation and incorporation
- 170.315 (b)(3) Electronic prescribing

3.3 Procedure:

At start of the test, participants were greeted. Participants were then assigned a participant ID. The administrator / moderator moderated the session including administering instructions and tasks. The administrator / moderator also monitored task times, obtained post-task rating data, and took notes on participant comments.

Participants were instructed to perform the tasks keeping in view the following instruction:

- As quickly as possible making as few errors and deviations as possible.
- Without assistance; administrators were allowed to give immaterial guidance and clarification on tasks, but not instructions on use.
- Without using a think aloud technique.

For each task, the participants were given a written copy of the task. Task timing began once the administrator / moderator finished reading the question. The task time was stopped once the participant indicated they had successfully completed the task.

Following the session, the administrator gave the participant the post-test questionnaire (the System Usability Scale, see Appendix 3), and thanked each individual for their participation. Participants' demographic information, task success, and time on task were recorded into a spreadsheet.

3.4 Test Location:

Tests were conducted in the practices while provider and nurse practitioner had no patients there. Only the participant and administrator / moderator were in the test room. Administrator / moderator could see the participant's screen. To ensure that the environment was comfortable for users, noise levels were kept to a minimum with the ambient temperature within a normal range. All of the safety instruction and evacuation procedures were valid, in place, and visible to the participants

3.5 Test Environment:

The EHRUT would be used in a healthcare office. In this instance, the testing was conducted in provider's office. For testing, the computer used consisted of a desktop machine running Windows 7 Operating System.

The participants used a mouse and keyboard when interacting with the EHRUT. The application was set up by the administrator according to the requirements. The application itself was running on a Windows platform using a test database on a WAN connection. Technically, the system performance (i.e., response time) was representative to what actual users would experience in a field implementation. Additionally, participants were instructed not to change any of the default system settings (such as control of font size).

3.6 Test Forms and Tools:

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

1. Moderator's Guide
2. Post-test Questionnaire

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

3.7 Participant Instructions:

The administrator read the following instructions aloud to each participant:

Thank you for participating in this study. Your input is very important. Our session today will last about 30 minutes. During that time you will use an instance of an electronic health record. I will ask you to complete a few tasks using this system and answer some questions. You should complete the tasks as quickly as possible making as few errors as possible. Please try to complete the tasks on your own following the instructions very closely. Please note that we are not testing you, we are testing the system. Therefore if you have difficulty, all this means is that something needs to be improved in the system. I will be here in case you need specific help, but I am not able to instruct you or provide help in how to use the application. Overall, we are interested in how easy (or how difficult) this system is to use, what in it would be useful to you, and how we could improve it. I did not have any involvement in its creation, so please be honest with your opinions. Your name will not be associated with your comments at any time. Should you feel it necessary you are able to withdraw at any time during the testing.

Following the procedural instructions, participants were shown the EHR and as their first task and time were told to complete the task. Once this task was complete, the administrator gave the following instructions:

For each task, I will read the description to you and say "Begin." At that point, please perform the task and say "Done" once you believe you have successfully completed the task. I would like to request that you not talk aloud or verbalize while you are doing the tasks. I will ask you your impressions about the task once you are done.

3.8 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 Physician's Solution 6.0 by measuring participant success rates and errors.
2. Efficiency of Physician's Solution 6.0 by measuring the average task time.
3. Satisfaction with Physician's Solution 6.0 by measuring ease of use ratings.

4 Results

4.1 Data Scoring:

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

Measure	Rationale and Scoring
Effectiveness: Task Success	<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>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.</p>
Effectiveness: Task Failure	<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 a “Failures.”</p>
Efficiency: Task Deviation	<p>The participant’s path (i.e., steps) through the application was recorded. Deviations occur if the participant, for example, went to a wrong screen, clicked on an incorrect menu item, followed an incorrect link, or interacted incorrectly with an on-screen control. This path was compared to the optimal path. The number of steps in the observed path is divided by the number of optimal steps to provide a ratio of path deviation.</p>
Efficiency: Task Time	<p>Each task was timed from when the administrator said “Begin” until the participant said, “Done”. Only task times for tasks that were successfully completed were included in the average task time analysis.</p>
Satisfaction: 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. To measure participants’ confidence in and likeability of the Physician’s Solution 6.0 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 3.</p>

4.2 Results:

The results of the usability test were calculated according to the methods specified in the Usability Metrics section above.

Sr.	Task	Completed Successfully?	Completed in Time?	Time Deviation
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12	Electronic prescribing	Yes	No	Plus 8

Effectiveness:

Most users praised the new system. They were excited to see the newly built module for Clinical Information Reconciliation and Clinical Decision Support.

Major Findings:

The users took a little extra time on Clinical Information Reconciliation and Clinical Decision Support. Overall, they were satisfied to see the newly added parameters in the Clinical Decision Support but wanted to see a little improvement in the current work flow.

Efficiency:

Most of the tasks were completed by the users on time with deviations in Computerized Provider Entry (Lab), Clinical Information Reconciliation and Clinical Decision Support.

Satisfactions:

All the users were satisfied with the overall workflow and provided few suggestions to make it more user- friendly.

Areas for Improvement:

The users were a little unsatisfied with the speed of the system, and wanted to improve the speed and performance.

5. Appendix 1: Participant Demographics

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

Gender	
Men	2
Women	9
Total (Participants)	11

Occupation / Role	
Physician	2
Nurse Practitioner	
Other	9
Total (Participants)	11

Years of experience	
0-5	5
6-10	1
10+	5
Total Participants	11

Facility Use of EHR	
All Paper	
All Electronic	YES
Some Paper, Some Electronic	
Total Participants	

6 Task wise results

Task 1: Computerized Provider Order Entry (Medication)

Take the participant to the starting point for the task. Medications criteria to usability test tasks to aid verification that the report will contain all required test scenarios for this EHR capability submitted for testing.

ONC Criteria: 170.315 (a)(1) Computerized provider order entry—medications—

- Enable a user to record, change, and access medication orders.
- Optional. Include a “reason for order” field.

This criterion needs to complete all scenarios and each task mentioned in the below:

Scenario: Order Medications

- i. Navigate to Medication screen to place an order.*
 - a. Order for Pantoprazole injectable, 150 mg, IV, Once
 - b. Enter the order for reason in the comments section as “ordering for acidity problem”
- ii. Access and Change order for medication*
 - a. Access medication order which is added above
 - b. Change the Pantoprazole injectable, 350 mg, IV, Once

Success:

Easily completed (Yes/No): Yes

Completed with difficulty or help: Describe below (Yes/No)

Not completed: (Yes/ No)

Comments: It was easy to place order in the EMR and able to change it without any difficulty.

Task Time: 40 Seconds

Task Success: 98%

Task Errors: 2%

Rating:

Overall, this task was: Easy

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

Task 2: Computerized Provider Order Entry (Laboratory)

Take the participant to the starting point for the task. Laboratory criteria to usability test tasks to aid verification that the report will contain all required test scenarios for this EHR capability submitted for testing.

ONC Criteria: 170.315 (a)(2) Computerized provider order entry—laboratory—

- Enable a user to record, change, and access medication orders.
- Optional. Include a “reason for order” field.

This criterion needs to complete all scenarios and each task mentioned in the below:

Scenario: Order a Lab

- iii. Navigate to Lab ordering screen to place an order.*
 - a. Order for CBC
 - b. Enter the order for reason in the comment section as “Ordering for Viral Fever”
 - c. Set the Priority as ‘STAT’
 - d. Click on “Save” button
- iv. Access and Change order for Lab Order*
 - a. Edit the existing Order
 - b. Uncheck the Lab order which is added above from template
 - c. Change the order to Urinalysis
 - d. Click on “Save” button

Success:

Easily completed (Yes/No):

Completed with difficulty or help: Describe below (Yes/No)

Not completed: (Yes/ No)

Comments: It was easy to place order in the EMR and able to change it without any difficulty.

Task Time: 30 Seconds

Task Success: 98.56%

Task Errors: 6%

Rating: Overall, this task was: Very Easy

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

Task 3: Computerized Provider Order Entry (Diagnostic Imaging)

Take the participant to the starting point for the task. Imaging criteria to usability test tasks to aid verification that the report will contain all required test scenarios for this EHR capability submitted for testing.

ONC Criteria: 170.315 (a)(3) Computerized provider order entry— Diagnostic Imaging —

- Enable a user to record, change, and access Imaging orders.
- Optional. Include a “reason for order” field.

This criterion needs to complete all scenarios and each task mentioned in the below:

Scenario: Order a Diagnostic Imaging

- v. *Navigate to Image ordering screen to place an order.*
 - a. Order for CT SCAN
 - b. Enter the order for reason as “Ordering for Prolonged Posterior Neck Pain”
 - c. Click on “Save and Close” button in the Template
- vi. *Access and Change order for Other Imaging Order*
 - a. Edit the Template
 - b. Uncheck the Imaging Order which is added above from template
 - c. Change the order to X-Ray
 - d. Click on “Save and Close” button in the Template

Success:

Easily completed (Yes/No):

Completed with difficulty or help: Describe below (Yes/No)

Not completed: (Yes/ No)

Comments: It was easy to place order in the EMR and able to change it without any difficulty.

Task Time: 80 Seconds

Task Success: 99.54%

Task Errors: 5%

Rating:

Overall, this task was: Very Easy

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

Task 4: Drug-Drug, Drug-Allergy Interaction Checks

Take the participant to the starting point for the task. Interaction checks criteria to usability test tasks to aid verification that the report will contain all required test scenarios for this EHR capability submitted for testing.

ONC Criteria: 170.315 (a)(4) Drug-Drug, Drug-Allergy Interaction Checks

- Perform drug-drug interaction checks based on medication information included in the system
- Perform drug-allergy interaction checks based on medication allergy information included in the system

This criterion needs to complete all scenarios and each task mentioned in the below Scenario

Prescribe a Medication for Drug-Drug Alert

- Navigate to Medication screen to prescribe a medication.*
- Search and prescribe 'Warfarin'
- Save and prescribe 'Aspirin'
- Click on "Save" button to see the Drug-Drug Alert

Prescribe a Medication for Drug-Allergy Alert

- Navigate to template with Allergy list
- Add a Drug Allergy of Amoxicillin
- Navigate to Medication screen to prescribe a medication.*
- Search and prescribe 'Amoxicillin'
- Click on "Save" button to see the Drug-Allergy Alert

Success:

Easily completed (Yes/No):

Completed with difficulty or help: Describe below (Yes/No)

Not completed: (Yes/ No)

Comments: It was easy to place order in the EMR and able to change it without any difficulty.

Task Time: 90 Seconds

Task Success: 92.36%

Task Errors: 16%

Rating:

Overall, this task was: Easy

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

Task 5: Demographics

Take the participant to the starting point for the task. Demographics criteria to usability test tasks to aid verification that the report will contain all required test scenarios for this EHR capability submitted for testing.

ONC Criteria: 170.315 (a)(5) Demographics

This criterion needs to complete all scenarios and each task mentioned in the below Scenario

- a. Navigate to Demographic section
- b. Validate the ability of system to record “declined to specify” for sexual orientation and gender identity in addition to race, ethnicity and preferred language
- c. ‘Gender Identity’ is Multiselect
- d. Sexual orientation and gender identity added as required data elements

Success:

Easily completed (Yes/No):

Completed with difficulty or help: Describe below (Yes/No)

Not completed: (Yes/ No)

Comments: It was easy to place order in the EMR and able to change it without any difficulty.

Task Time: 30 Seconds

Task Success: 100%

Task Errors: zero

Rating:

Overall, this task was: Very Easy

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

Task 6: Problem List

Take the participant to the starting point for the task. Problem List criteria to usability test tasks to aid verification that the report will contain all required test scenarios for this EHR capability submitted for testing.

ONC Criteria: 170.315 (a)(6) Problem List

This criterion needs to complete all scenarios and each task mentioned in the below Scenario

- a. Navigate to Problem list section and launch Problem screen
- b. Search for a Problem by ICD10 code 'J11'
- c. Observe all the listed related problems are displayed with appropriate vocab standard terms and codes
- d. Select a specific problem from the list and save the changes
- e. Problems are saved in the patient record with appropriate vocab standard terms and codes as selected.

Success:

Easily completed (Yes/No):

Completed with difficulty or help: Describe below (Yes/No)

Not completed: (Yes/ No)

Comments: It was easy to place order in the EMR and able to change it without any difficulty.

Task Time: 30 Seconds

Task Success: 100%

Task Errors: Zero

Rating:

Overall, this task was: Very Easy

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

Task 7: Medication List

Take the participant to the starting point for the task. Medication List criteria to usability test tasks to aid verification that the report will contain all required test scenarios for this EHR capability submitted for testing.

ONC Criteria: 170.315 (a)(7) Medication List

This criterion needs to complete all scenarios and each task mentioned in the below Scenario

- a. Navigate to Medication list section
- b. Historic Medications added in different encounters are displayed along with the RxNorm as prescribed
- c. Launch Medication screen and prescribe a new medication
- d. Newly prescribed medication is displayed along with historic medications in the list.
- e. Select a Rx from the list, Click EDIT and set it as Discontinue.
- f. Save and the Rx is removed from the Active Medication List
- g. Select a Rx from the list, Click EDIT and check 'mark it as Inactive'
- h. Save and the Rx is removed from the Active Medication List

Success:

Easily completed (Yes/No):

Completed with difficulty or help: Describe below (Yes/No)

Not completed: (Yes/ No)

Comments: It was easy to place order in the EMR and able to change it without any difficulty.

Task Time: 30Seconds

Task Success: 100%

Task Errors: Zero

Rating:

Overall, this task was: Very Easy

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

Task 8: Medication Allergy List

Take the participant to the starting point for the task. Medication Allergy criteria to usability test tasks to aid verification that the report will contain all required test scenarios for this EHR capability submitted for testing.

ONC Criteria: 170.315 (a)(8) Medication Allergy List

This criterion needs to complete all scenarios and each task mentioned in the below Scenario

- a. Navigate to Medication Allergy list section
- b. Historic Medication Allergies added in different encounters are displayed along with the Status, Type, Reaction, Source, Severity as added
- c. Add a new Medication Allergy
- d. Newly added allergy is displayed along with historic medications in the list.
- e. Select an existing Allergy and update the Status, Severity or Reaction and save
- f. Allergy values are saved as updated

Success:

Easily completed (Yes/No): Yes

Completed with difficulty or help: Describe below (Yes/No) No

Not completed: (Yes/ No) Yes

Comments: It was easy to place order in the EMR and able to change it without any difficulty.

Task Time: 60 Seconds

Task Success: 96%

Task Errors: 8%

Rating:

Overall, this task was: Easy

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

Task 9: Clinical Decision Support

Take the participant to the starting point for the task. Clinical Decision Support criteria to usability test tasks to aid verification that the report will contain all required test scenarios for this EHR capability submitted for testing.

- **ONC Criteria: 170.315 (a)(9) Clinical decision support**

This criterion needs to complete all scenarios and each task mentioned in the below Scenario

Interaction Checking

Prescribe a Medication for Drug-Drug Alert

1. *Navigate to Medication screen to prescribe a medication.*
2. Search and prescribe 'Warfarin'
3. Save and prescribe 'Aspirin'
4. Click on "Save" button to see the Drug-Drug Alert

Prescribe a Medication for Drug-Allergy Alert

1. Navigate to template with Allergy list
2. Add a Drug Allergy of Amoxicillin
3. *Navigate to Medication screen to prescribe a medication.*
4. Search and prescribe 'Amoxicillin'
5. Click on "Save" button to see the Drug-Allergy Alert

Drug Formulary

1. Select a patient with active Insurance Plan
2. *Navigate to Medication screen to prescribe a medication.*
3. Search and try to prescribe a Branded Medication (Procardia) which has Generic equivalent (Nifedipine)
4. System suggests the Generic Medication to be prescribed
5. System also specifies whether the selected medication is reimbursable or not.

Patient Education (Info Buttons)

1. *Navigate to Medication screen to prescribe a medication.*
2. Search for a medication and click on the 'i' Icon/Button
3. System launches <https://www.healthline.com/> with detailed information about the medication in context

4. Similarly, 'i' Icon in Problem and Allergy section launches <https://www.healthline.com/> with detailed information about the clinical item in context

Trigger Alert

1. Navigate to Admin section, Tools=>Follow-Up Triggers
2. Set up a sql query that would fetch patient in bulk for the satisfying criteria. Say, fetch all Patient of age 02-18 Months and send out an Alert comment "DO NOT FORGET TO TAKE POLIO DROPS ON 10/10/2019 "
3. Bring the patient in context and check for the Alert populated in the Reminder section

Success:

Easily completed (Yes/No):

Completed with difficulty or help: Describe below (Yes/No)

Not completed: (Yes/ No)

Comments: It was easy to place order in the EMR and able to change it without any difficulty.

Task Time: 120 Seconds

Task Success: 87.12 %

Task Errors: 18%

Rating:

Overall, this task was: Moderate

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

Task 10: Implantable Device List

Take the participant to the starting point for the task. Implantable Device criteria to usability test tasks to aid verification that the report will contain all required test scenarios for this EHR capability submitted for testing.

ONC Criteria: 170.315 (a)(14) Implantable Device List

List of all devices and specifications like UDI and other device details, Implant and Removal Date allows the Clinicians know what devices their patients have and use that information to deliver safer and more effective care.

This criterion needs to complete all scenarios and each task mentioned in the below Scenario

- a. Navigate to Medical Equipment section and add a new equipment for a patient by selecting valid UDI from the list
- b. All corresponding device details like Brand Name, Version/Model are auto-populated in the appropriate fields
- c. Enter Patient Details and save
- d. Edit the existing details and update the given details
- e. User can add a new device and update the existing information as intended

Success:

Easily completed (Yes/No):

Completed with difficulty or help: Describe below (Yes/No)

Not completed: (Yes/ No)

Comments: It was easy to place order in the EMR and able to change it without any difficulty.

Task Time: 90 Seconds

Task Success: 90.14%

Task Errors: 15%

Rating:

Overall, this task was: Easy

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

Task 11: Clinical information reconciliation and incorporation

Take the participant to the starting point for the task. **Clinical information reconciliation** criteria to usability test tasks to aid verification that the report will contain all required test scenarios for this EHR capability submitted for testing.

ONC Criteria: 170.315 (b)(2) Clinical information reconciliation and incorporation

The patient in context should have the Clinical information like Medications, Drug Allergies and Problem imported from another source but not added to patient record yet.

This criterion needs to complete all scenarios and each task mentioned in the below Scenario

Medication Reconciliation

- a. Navigate to Medications section and click on the **Reconcile** hyperlink
- b. A Reconciliation Dialog will be popped up with Medications that are coming from the external source.
- c. Verify the Source details; Patient details and Check the Medications displayed with RxNorm and click on the Merge and then Reconcile button to add the Medication in to the patient record as 'Imported'

Med Allergy Reconciliation

- f. Navigate to Medications section and click on the **Reconcile Allergy** hyperlink
- g. A Reconciliation Dialog is popped up with Medication Allergies that are coming from the external source.
- h. Verify the Source details, Patient details and Check the Allergies displayed with RxNorm and click on the Merge and then Reconcile button to add the Medication Allergies in to the patient record as 'Imported'

Problem Reconciliation

- a. Navigate to Medications section and click on the **Reconcile Problem** hyperlink
- b. A Reconciliation Dialog is popped up with Problem that are coming from the external source.
- c. Verify the Source details, Patient details and Check the Problem displayed with SNOMED-CT and click on the Merge and then Reconcile button to add the Problem in to the patient record as 'Imported'

Success:

Easily completed (Yes/No):

Completed with difficulty or help: Describe below (Yes/No)

Not completed: (Yes/ No)

Comments: It was easy to place order in the EMR and able to change it without any difficulty.

Task Time: 90 Seconds

Task Success: 96.64%

Task Errors: 14%

Rating:

Overall, this task was: Easy

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

Task 12: Electronic prescribing

Take the participant to the starting point for the task. ePrescribing criteria to usability test tasks to aid verification that the report will contain all required test scenarios for this EHR capability submitted for testing.

ONC Criteria: 170.315 (b)(3) Electronic prescribing

This criterion needs to complete all scenarios and each task mentioned in the below Scenario

Scenario: ePrescribe Medication

- a. Navigate to Medication Screen and search and select a medication (cromolyn; RxNorm:831261)
- b. Fill all mandatory fields (allows mL units and no CC allowed in the system for Oral Meds) and check 'Send eRx' checkbox
- c. Click on "Save"
- d. Prescribed Rx saved in the patient record. Prescription sent to DrFirst (Surescripts console).
Response received from DrFirst (Surescripts console).
- e. User is able to repeat this for Rx Change, Rx Cancel, Rx Refill Workflows.

Success:

Easily completed (Yes/No):

Completed with difficulty or help: Describe below (Yes/No) No

Not completed: (Yes/ No)

Comments: It was easy to place order in the EMR and able to change it without any difficulty

Task Time: 90 Seconds

Task Success: 95.32%

Task Errors: 16%

Rating:

Overall, this task was: Easy

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

Final Questions:

1. What was your overall impression of this system? **Good**
2. What aspects of the system did you like most? **All**
3. What aspects of the system did you like least? **No**
4. Were there any features that you were surprised to see? **No**
5. What features did you expect to encounter but did not see? That is, is there anything that is missing in this application? **No**
6. Compare this system to other systems you have used. **The features are easy to use.**
7. Would you recommend this system to your colleagues? **YES**

5.3 Appendix 3: System Usability Scale Questionnaire:

Strongly Agree

Strongly Disagree

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

1	2	3	4	5
---	---	---	---	---

2. I found the system unnecessarily Complex.

1	2	3	4	5
---	---	---	---	---

3. I thought the system was easy to use. .

1	2	3	4	5
---	---	---	---	---

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

1	2	3	4	5
---	---	---	---	---

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

1	2	3	4	5
---	---	---	---	---

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

1	2	3	4	5
---	---	---	---	---

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

1	2	3	4	5
---	---	---	---	---

8. I found the system very cumbersome to use .

1	2	3	4	5
---	---	---	---	---

9. I felt very confident using the System.

1	2	3	4	5
---	---	---	---	---

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

1	2	3	4	5
---	---	---	---	---