



EHR Usability Test Report of InSync

Date of Usability Test: December 27, 2018

Date of Report: December 27, 2018

Criteria: 170.315(a)(1-9, 14); 170.315(b)(2 & 3)

EHR b(11) Supplemental Usability Test Report of InSync

Date of Usability Test: November 25 to December 5, 2024

Date of Report: December 6, 2024

Criterion: 170.315(b)(11)



Electronic Health Record Usability Testing
(EHRUT) Report



EHR Usability Test Report of InSync v9.0

InSync v9.0

Date of Usability Test: December 27, 2018
 Date of Report: December 27, 2018
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1. EXECUTIVE SUMMARY

A usability test of InSync v 9.0 Complete EHR Ambulatory was conducted by InSync Healthcare Solutions via online one-to-one GoToMeeting sessions with the test participants on December 27, 2018. The purpose of this test was to test and validate the usability of the current user interface and provide evidence of usability in the EHR Under Test (EHRUT). During the usability test, 10 healthcare providers matching the target demographic criteria served as participants and used the EHRUT in simulated, but representative tasks.

This study collected performance data on 12 tasks typically conducted on an EHR:

1. § 170.315 (a)(1) Computerized Provider Order Entry (CPOE) – medications
2. § 170.315 (a)(2) CPOE – laboratory
3. § 170.315 (a)(3) CPOE – diagnostic imaging
4. § 170.315 (a)(4) Drug-drug, Drug-allergy Interaction Checks for CPOE
5. § 170.315 (a)(5) Demographics
6. § 170.315 (a)(6) Problem List
7. § 170.315 (a)(7) Medication List
8. § 170.315 (a)(8) Medication Allergy List
9. § 170.315 (a)(9) Clinical Decision Support
10. § 170.315 (a)(14) Implantable Device List
11. § 170.315 (b)(2) Clinical Information Reconciliation and Incorporation
12. § 170.315 (b)(3) Electronic Prescribing

During the one-on-one usability test, the administrator introduced the test, and instructed participants to complete a series of tasks (given one at a time) using the EHRUT. Out of 10 participants, 1 participant had 5+ years of previous experience with EHR software. During the testing, the administrator 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.

The Customized Common Industry Format Template for Electronic Health Record Usability Testing (NISTIR 7742) is used for usability test reports (ISO/IEC 25062:2006(E)).

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. Following is a summary of the performance and rating data collected on the EHRUT.



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Task#	Measure	Task Success (Percentage Success / Failure)	Path Deviation (Observed / Optimal)	Path Deviation Mean (SD)	Task Time Deviations (Observed / Optimal)	Errors Mean (SD)	Task Ratings 5=Easy Mean (SD)
Task 1	Record Medication Order	100/0	14/12	14.2 (1.62)	31.5/30	0 (0)	4.3 (0.48)
Task 2	Change Medication Order	100/0	16/14	15.6 (1.58)	39.3/40	0 (0)	4.2 (0.63)
Task 3	Access Medication Order	100/0	5/4	5 (0.95)	9.4/10	0 (0)	4.3 (0.67)
Task 4	Record Laboratory Order	100/0	11/9	11 (1.42)	21.6/20	0 (0)	3.8 (0.92)
Task 5	Change Laboratory Order	100/0	9/8	8.8 (0.92)	20.9/20	0 (0)	3.7 (0.95)
Task 6	Access Laboratory Order	100/0	3/3	2.7 (0.68)	9.1/10	0 (0)	4 (0.82)
Task 7	Record Radiology/Imaging Order	100/0	6/5	5.8 (0.64)	21.7/20	0 (0)	3.8 (0.92)
Task 8	Change Radiology/Imaging Order	100/0	6/5	6.1 (1.6)	22.3/20	0 (0)	3.7 (0.82)
Task 9	Access Radiology/Imaging Order	100/0	5/5	4.8 (0.79)	14.6/15	0 (0)	3.8 (0.92)
Task 10	Interact with Create drug-drug and drug allergy interventions prior to Medication Order completion	100/0	11/9	10.6 (1.18)	40.3/40	0 (0)	4.2 (0.79)
Task 11	Adjustment of severity level of drug-drug interventions	80/20	10/8	9.5 (2)	34.88/35	0.2 (0.43)	3.88 (0.99)
Task 12	Record Medication List	100/0	9/7	9.1 (0.88)	35.4/35	0 (0)	4.1 (0.57)
Task 13	Change Medication List	100/0	10/7	9.8 (1.48)	35.9/35	0 (0)	4.3 (0.48)
Task 14	Access Medication List	100/0	5/4	5.1 (0.88)	9.5/10	0 (0)	4.4 (0.52)
Task 15	Record Allergy List	100/0	8/7	8.4 (1.08)	25/25	0 (0)	4.3 (0.67)
Task 16	Change Allergy List	100/0	10/8	10.2 (1.62)	25/25	0 (0)	4.3 (0.67)
Task 17	Access Allergy List	100/0	8/6	7.5 (0.98)	9.6/10	0 (0)	4.4 (0.52)
Task 18	Electronic Prescribing	100/0	15/12	14.8 (1.04)	33.5/30	0 (0)	3.9 (0.88)
Task 19A	Configuration of CDS interventions (for medication list) by user	100/0	7/5	7.1 (1.29)	20.9/20	0 (0)	3.7 (0.95)
Task 19B	Medication List Interventions	100/0	14/12	13.5 (1.65)	39.6/40	0 (0)	3.9 (0.88)
Task 20A	Configuration of CDS interventions (for medication allergy list) by user	100/0	7/5	6.9 (1.38)	21.2/20	0 (0)	3.7 (0.95)



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Task 20B	Medication Allergy List Interventions	100/0	8/7	8.4 (1.08)	25.1/25	0 (0)	3.7 (0.95)
Task 21A	Configuration of CDS interventions (for problem list) by user	100/0	7/5	7.2 (1.55)	30.8/30	0 (0)	3.5 (0.85)
Task 21B	Problem List Interventions	100/0	7/6	6.8 (1.23)	36.2/40	0 (0)	3.8 (1.03)
Task 22A	Configuration of CDS interventions (for demographics) by user	100/0	6/5	6.4 (1.27)	20.5/20	0 (0)	3.9 (0.99)
Task 22B	Demographics Interventions	100/0	6/4	6.2 (1.04)	14.7/15	0 (0)	4.1 (0.88)
Task 23A	Configuration of CDS interventions (for lab test) by user	100/0	6/5	5.7 (0.68)	18.8/20	0 (0)	3.8 (0.92)
Task 23B	Lab Test Interventions	100/0	7/6	6.9 (0.88)	24.4/25	0 (0)	3.7 (0.95)
Task 24A	Configuration of CDS interventions (for lab result) by user	100/0	8/6	8.3 (1.16)	22.5/20	0 (0)	3.7 (0.95)
Task 24B	Lab Result Interventions	100/0	8/6	8 (0.82)	24.7/25	0 (0)	3.7 (0.95)
Task 25A	Configuration of CDS interventions (for vital signs) by user	100/0	7/5	6.9 (1)	21/20	0 (0)	3.9 (0.99)
Task 25B	Vital Signs Interventions	100/0	7/6	6.6 (0.7)	35.1/40	0 (0)	3.9 (0.99)
Task 26A	Configuration of CDS interventions (for User Diagnostic and Therapeutic Reference) by user	100/0	8/6	7.6 (0.97)	21.1/20	0 (0)	3.7 (0.95)
Task 26B	Identify User Diagnostic and Therapeutic Reference Information	100/0	8/7	7.5 (0.85)	36/40	0 (0)	3.6 (0.97)
Task 27	Reconcile patient's active medication list with another source	90/10	10/9	9.67 (0.71)	46.56/50	0.1 (0.32)	4.11 (0.78)
Task 28	Reconcile patient's active problem list with another source	90/10	10/9	10.44 (0.89)	49.34/50	0.1 (0.32)	3.89 (0.93)
Task 29	Reconcile patient's active medication allergy list with another source	90/10	11/9	10.56 (1.59)	49.45/50	0.1 (0.32)	4.11 (0.78)



Task 30	Record patient's demographic information.	100/0	5/4	5.4 (1.18)	28.4/30	0 (0)	4.3 (0.67)
Task 31	Change patient's demographic information.	100/0	6/5	6.4 (1.27)	25/25	0 (0)	4.3 (0.67)
Task 32	Access patient's demographic information.	100/0	3/3	3 (0.48)	8.8/10	0 (0)	4.4 (0.52)
Task 33	Record patient's Problem List.	100/0	9/8	8.6 (0.85)	33.2/35	0 (0)	4.3 (0.67)
Task 34	Edit patient's Problem List.	100/0	8/7	8 (0.95)	28.9/30	0 (0)	4.1 (0.74)
Task 35	Access patient's historical and current Problem List.	100/0	7/5	7 (0.95)	26/25	0 (0)	4 (0.82)
Task 36	Locate the new Implantable Device section.	100/0	8/6	7.5 (0.98)	26.2/25	0 (0)	4.4 (0.7)
Task 37	Add the new Implantable Device section.	100/0	10/9	9.7 (1.34)	33.9/35	0 (0)	4.4 (0.7)
Task 38	Change the new Implantable Device section.	100/0	10/8	10 (1.42)	30.8/30	0 (0)	4.4 (0.7)
Task 39	Access the new Implantable Device section.	100/0	9/7	8.8 (1.32)	25/25	0 (0)	4.5 (0.53)

The results from the SUS (System Usability Scale) scored the subjective satisfaction with the system based on performance with these tasks to be: **88**.

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

Major Findings

- Overall all the tasks were found very much user-friendly.
- Users were comfortable performing the tasks and they were found satisfied with their experience with the system.
- The new layout was very much appreciated by some of the participants.
- Medication module needed some level of guidance, after that, participants found it easy to test the tasks.



Areas for Improvement

- Considering the overall feedback from the participants, the workflows were very easy to perform. The users were quite comfortable to perform the tasks that were given to them. Overall layout and smart search features were very much useful for the participants; however, few cosmetic changes were suggested that can be taken care of while designing the new features in future.



2. INTRODUCTION

The EHRUT(s) tested for this study was InSync Version 9.0 Complete EHR Ambulatory, designed to record and present medical information to healthcare providers in practicing in specialty such as, internal medicine, pediatrics, orthopedic, Mental and Behavioral Health, Physical Therapy, etc. The EHRUT consists of modules to document patient visits along with full medical information, including patient's medical, social, surgical, and family history, vitals, physical exam findings, review of systems, problem list, chief complaints, medications & allergies, diagnosis, immunizations, health maintenance, and the complete treatment plan. 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, the time taken to complete a task, and the user's level of comfort and positive attitude towards the system, were captured during the usability testing.



3. METHOD

3.1 PARTICIPANTS

A total of 10 participants were tested on the EHRUT(s). Participants in the test were mainly medical assistants serving in the healthcare industry. Participants were selected by InSync Healthcare Solutions and were not compensated for their time. In addition, participants had no direct connection to the development of or organization producing the EHRUT(s). Participants were not from the testing or supplier organization.

For the test purposes, end-user characteristics were identified and used to select potential participants.

Recruited participants had mixed 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.

Sr. No.	Part ID	Gender	Age Range In years	Education	Occupation / Role	Professional experience (in months)	Computer experience (in months)	Product experience (in months)	Previous EHR Experience	Assistive Technology Needs
1	User 01	Female	30-39	Bachelor's degree	RN	120	240	36	Yes	No
2	User 02	Female	30-39	High school graduate	MA	120	120	36	Yes	No
3	User 03	Female	30-39	High school graduate	P+A	120	120	36	Yes	No
4	User 04	Male	30-39	Bachelor's degree	Practice Administrator	96	96	84	No	No
5	User 05	Male	30-39	Master's degree	Physician Assistant	180	180	12	Yes	No
6	User 06	Female	30-39	Master's degree	MD	168	168	84	Yes	No
7	User 07	Female	20-29	Trade/technical/vocational training	Front Desk	48	48	4	None	No
8	User 08	Female	20-29	Trade/technical/vocational training	Medical Office Assistant	108	108	4	Yes	No
9	User 09	Female	30-39	Trade/technical/vocational training	LPN	84	84	24	Yes	No
10	User 10	Female	20-29	Associate degree	Medical Billing	60	36	36	Yes	No



All 10 participants (matching the demographics in the section on Participants) were recruited and all of them participated in the usability test. A document was sent to the participants to get their demographic characteristics as provided.

Participants were scheduled for 15 minute sessions with 5 minutes in between each session for debrief by the administrator to reset systems to proper test conditions. A spreadsheet was used to keep track of the participant schedule, and included each participant's demographic characteristics.

3.2 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 was provided with the same instructions. The system was evaluated for effectiveness, efficiency and satisfaction as defined by measures collected and analyzed for each participant:

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

Additional information about the various measures can be found in Section 3.8 on Usability Metrics.

3.3 TASKS

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

1. Record Medication Order
2. Change Medication Order
3. Access Medication Order
4. Record Laboratory Order
5. Change Laboratory Order
6. Access Laboratory Order
7. Record Radiology/Imaging Order



8. Change Radiology/Imaging Order
9. Access Radiology/Imaging Order
10. Interact with drug-drug and drug-allergy interventions prior Medication Order completion
11. Adjustment of severity level of drug-drug interventions (may be an admin type function)
12. Record Medication List
13. Change Medication List
14. Access Medication List
15. Record Allergy List
16. Change Allergy List
17. Access Allergy List
18. Electronic Prescribing
19. Configuration of CDS interventions (for medication list) by user Medication List Interventions
20. Configuration of CDS interventions (for medication allergy list) by user Medication Allergy List Interventions
21. Configuration of CDS interventions (for problem list) by user Problem List Interventions
22. Configuration of CDS interventions (for demographics) by user Demographics Interventions
23. Configuration of CDS interventions (for lab test) by user Lab Test Interventions
24. Configuration of CDS interventions (for lab result) by user Lab Result Interventions
25. Configuration of CDS interventions (for vital signs) by user Vital Signs Interventions
26. Configuration of CDS interventions (for User Diagnostic and Therapeutic Reference) by user Identify User Diagnostic and Therapeutic Reference Information
27. Reconcile patient's active medication list with another source
28. Reconcile patient's active problem list with another source
29. Reconcile patient's active medication allergy list with another source
30. Record patient's demographic information
31. Change patient's demographic information
32. Access patient's demographic information
33. Record patient's Problem List
34. Edit patient's Problem List
35. Access patient's historical and current Problem List
36. Locate the new Implantable Device section
37. Add the new Implantable Device section
38. Change the new Implantable Device section
39. Access the new Implantable Device section



Tasks were selected based on their importance with relationship to Meaningful Use criteria and were prioritized in accordance with the complexity and risk associated with the likelihood of user errors.

3.4 PROCEDURES

Upon joining the meeting, participants were greeted by the administrator. Each participant acknowledged the meeting agenda and objective per orientation document sent by administrator beforehand. The administrator who conducted the usability testing was a Software Engineer who had experience of 8+ years in healthcare domain.

The administrator moderated the session including administering instructions and tasks. The administrator also monitored task times, obtained post-task rating data, took notes on participant comments, took notes on task success, number and type of errors, and comments.

Participants were instructed to perform the tasks (see specific instructions below):

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

Task timing began once the administrator finished reading the question. The task time was stopped once the participant indicated they had successfully completed the task. Scoring is discussed below.

Following the test session, the administrator gave the participant the post-test questionnaire, and thanked each individual for their participation.

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

3.5 TEST ENVIRONMENT

The EHRUT would typically be used in a healthcare office or facility. In this instance, the test was performed in a virtual setting, using one-on-one online GoToMeeting sessions. The participants joined the sessions from their respective work locations via a personal computer and browser. They accessed to the EHRUT via a dedicated and secure login.

For testing, the computers ran Windows 7 as an operating system. The participants used mouse and keyboard when interacting with the EHRUT. The environment setup with display monitor size of 19 inch with screen resolution 1280 x 1024. Color Settings data was not collected during the test. The application was set up by the vendor.

The application was running on a web using a test database on a WAN connection. The system performance 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.



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3.6 TEST FORMS AND TOOLS

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

- Pre-test Questionnaire
- Post-test Questionnaire

3.7 PARTICIPANT INSTRUCTIONS

The administrator read the following instructions to each participant.

Thank you for participating in this study. Your input is very important. Our session today will last about 150 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. All of the information that you provide will be kept confidential and your name will not be associated with your comments at any time. Should you feel it necessary you are able to withdraw at any time during the testing.

Following the procedural instructions, participants were shown the EHR and as their first task, were given 5 minutes to explore the system and make comments.

Participants were then given the tasks mentioned in this report to complete.

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



3.8.1 DATA SCORING

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

Measures	Rationale and Scoring
<p>Effectiveness: Task Success</p>	<p>A task was counted as a “Success” if the participant was able to achieve the correct outcome, without assistance, <u>within the time allotted on a per task basis</u>. (Refer to “Task Success” column in table).</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. Average of observed task times was used and shown against optimal time to measure optimal efficiency. (Refer to “Task Time Deviations” column in table).</p>
<p>Effectiveness: Task Failures</p>	<p>If the participant abandoned the task, did not reach the correct answer or performed it incorrectly, or reached the end of the allotted time before successful completion, the task was counted as “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. The percentage of failure records were shown in the “Task Success (Percentage Success / Failure)” column in table.</p>
<p>Efficiency: Task Deviations</p>	<p>The participant’s path (i.e., steps) through the application was recorded. Deviations occur if the participant, for example, went to a wrong screen, clicked on an incorrect menu item, followed an incorrect link, or interacted incorrectly with an on-screen control. Mean and Standard Deviation were calculated based on the total number of steps used in actual path. Refer to the “Path Deviation” column in the table.</p>
<p>Efficiency: Task Time</p>	<p>Optimal time was decided for each task. Actual time taken by the participants for each task was recorded. Average time per task was calculated for each task. Task Time Deviations were recorded as Observed Vs. Optimal. Refer to the “Task Time Deviations” column in the table.</p>
<p>Satisfaction: Task Rating</p>	<p>Participant’s subjective impression of the ease of use of the application was measured by administering both a simple post-task question as well as a post-session questionnaire. After each task, the participant was asked to rate “Overall, this task was:” on a scale of 1 (Very Difficult) to 5 (Very Easy). These data are averaged across participants. Refer to “Task Ratings” column in the table.</p>



To measure participants' confidence in and likeability of the [EHRUT] 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."

4. RESULTS

4.1 DATA ANALYSIS AND REPORTING

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

The usability testing results for the EHRUT are detailed below.

Task#	Measure	Task Success (Percentage Success / Failure)	Path Deviation (Observed / Optimal)	Path Deviation Mean (SD)	Task Time Deviations (Observed / Optimal)	Errors Mean (SD)	Task Ratings 5=Easy Mean (SD)
Task 1	Record Medication Order	100/0	14/12	14.2 (1.62)	31.5/30	0 (0)	4.3 (0.48)
Task 2	Change Medication Order	100/0	16/14	15.6 (1.58)	39.3/40	0 (0)	4.2 (0.63)
Task 3	Access Medication Order	100/0	5/4	5 (0.95)	9.4/10	0 (0)	4.3 (0.67)
Task 4	Record Laboratory Order	100/0	11/9	11 (1.42)	21.6/20	0 (0)	3.8 (0.92)
Task 5	Change Laboratory Order	100/0	9/8	8.8 (0.92)	20.9/20	0 (0)	3.7 (0.95)
Task 6	Access Laboratory Order	100/0	3/3	2.7 (0.68)	9.1/10	0 (0)	4 (0.82)
Task 7	Record Radiology/Imaging Order	100/0	6/5	5.8 (0.64)	21.7/20	0 (0)	3.8 (0.92)
Task 8	Change Radiology/Imaging Order	100/0	6/5	6.1 (1.6)	22.3/20	0 (0)	3.7 (0.82)
Task 9	Access Radiology/Imaging Order	100/0	5/5	4.8 (0.79)	14.6/15	0 (0)	3.8 (0.92)
Task 10	Interact with Create drug-drug and drug allergy interventions prior to Medication Order completion	100/0	11/9	10.6 (1.18)	40.3/40	0 (0)	4.2 (0.79)
Task 11	Adjustment of severity level of drug-drug interventions	80/20	10/8	9.5 (2)	34.88/35	0.2 (0.43)	3.88 (0.99)
Task 12	Record Medication List	100/0	9/7	9.1 (0.88)	35.4/35	0 (0)	4.1 (0.57)
Task 13	Change Medication List	100/0	10/7	9.8 (1.48)	35.9/35	0 (0)	4.3 (0.48)



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Task 14	Access Medication List	100/0	5/4	5.1 (0.88)	9.5/10	0 (0)	4.4 (0.52)
Task 15	Record Allergy List	100/0	8/7	8.4 (1.08)	25/25	0 (0)	4.3 (0.67)
Task 16	Change Allergy List	100/0	10/8	10.2 (1.62)	25/25	0 (0)	4.3 (0.67)
Task 17	Access Allergy List	100/0	8/6	7.5 (0.98)	9.6/10	0 (0)	4.4 (0.52)
Task 18	Electronic Prescribing	100/0	15/12	14.8 (1.04)	33.5/30	0 (0)	3.9 (0.88)
Task 19A	Configuration of CDS interventions (for medication list) by user	100/0	7/5	7.1 (1.29)	20.9/20	0 (0)	3.7 (0.95)
Task 19B	Medication List Interventions	100/0	14/12	13.5 (1.65)	39.6/40	0 (0)	3.9 (0.88)
Task 20A	Configuration of CDS interventions (for medication allergy list) by user	100/0	7/5	6.9 (1.38)	21.2/20	0 (0)	3.7 (0.95)
Task 20B	Medication Allergy List Interventions	100/0	8/7	8.4 (1.08)	25.1/25	0 (0)	3.7 (0.95)
Task 21A	Configuration of CDS interventions (for problem list) by user	100/0	7/5	7.2 (1.55)	30.8/30	0 (0)	3.5 (0.85)
Task 21B	Problem List Interventions	100/0	7/6	6.8 (1.23)	36.2/40	0 (0)	3.8 (1.03)
Task 22A	Configuration of CDS interventions (for demographics) by user	100/0	6/5	6.4 (1.27)	20.5/20	0 (0)	3.9 (0.99)
Task 22B	Demographics Interventions	100/0	6/4	6.2 (1.04)	14.7/15	0 (0)	4.1 (0.88)
Task 23A	Configuration of CDS interventions (for lab test) by user	100/0	6/5	5.7 (0.68)	18.8/20	0 (0)	3.8 (0.92)
Task 23B	Lab Test Interventions	100/0	7/6	6.9 (0.88)	24.4/25	0 (0)	3.7 (0.95)
Task 24A	Configuration of CDS interventions (for lab result) by user	100/0	8/6	8.3 (1.16)	22.5/20	0 (0)	3.7 (0.95)
Task 24B	Lab Result Interventions	100/0	8/6	8 (0.82)	24.7/25	0 (0)	3.7 (0.95)
Task 25A	Configuration of CDS interventions (for vital signs) by user	100/0	7/5	6.9 (1)	21/20	0 (0)	3.9 (0.99)
Task 25B	Vital Signs Interventions	100/0	7/6	6.6 (0.7)	35.1/40	0 (0)	3.9 (0.99)
Task 26A	Configuration of CDS interventions (for User Diagnostic and Therapeutic	100/0	8/6	7.6 (0.97)	21.1/20	0 (0)	3.7 (0.95)



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	Reference) by user						
Task 26B	Identify User Diagnostic and Therapeutic Reference Information	100/0	8/7	7.5 (0.85)	36/40	0 (0)	3.6 (0.97)
Task 27	Reconcile patient's active medication list with another source	90/10	10/9	9.67 (0.71)	46.56/50	0.1 (0.32)	4.11 (0.78)
Task 28	Reconcile patient's active problem list with another source	90/10	10/9	10.44 (0.89)	49.34/50	0.1 (0.32)	3.89 (0.93)
Task 29	Reconcile patient's active medication allergy list with another source	90/10	11/9	10.56 (1.59)	49.45/50	0.1 (0.32)	4.11 (0.78)
Task 30	Record patient's demographic information.	100/0	5/4	5.4 (1.18)	28.4/30	0 (0)	4.3 (0.67)
Task 31	Change patient's demographic information.	100/0	6/5	6.4 (1.27)	25/25	0 (0)	4.3 (0.67)
Task 32	Access patient's demographic information.	100/0	3/3	3 (0.48)	8.8/10	0 (0)	4.4 (0.52)
Task 33	Record patient's Problem List.	100/0	9/8	8.6 (0.85)	33.2/35	0 (0)	4.3 (0.67)
Task 34	Edit patient's Problem List.	100/0	8/7	8 (0.95)	28.9/30	0 (0)	4.1 (0.74)
Task 35	Access patient's historical and current Problem List.	100/0	7/5	7 (0.95)	26/25	0 (0)	4 (0.82)
Task 36	Locate the new Implantable Device section.	100/0	8/6	7.5 (0.98)	26.2/25	0 (0)	4.4 (0.7)
Task 37	Add the new Implantable Device section.	100/0	10/9	9.7 (1.34)	33.9/35	0 (0)	4.4 (0.7)
Task 38	Change the new Implantable Device section.	100/0	10/8	10 (1.42)	30.8/30	0 (0)	4.4 (0.7)
Task 39	Access the new Implantable Device section.	100/0	9/7	8.8 (1.32)	25/25	0 (0)	4.5 (0.53)



4.2 DISCUSSION OF THE FINDINGS

4.2.1 EFFECTIVENESS

In general, the system tested was found to be effective based on task success. Total 39 tasks were performed. 35 out of the 39 tasks tested have a task percentage of 100%. Remaining 4 tasks have a success percentage of 87.5%. However, for the tasks having less than 100% success rates, the users that encountered difficulty was with tasks that were outside of their routine practice and daily job functions.

4.2.2 EFFICIENCY

Considering the data collected for the tasks indicate a high level of efficiency in the system. Very few path deviations were observed during the usability test just because the user followed the path with which he/she was comfortable to meet the needs rather than following the optimal path.

4.2.3 SATISFACTION

Overall, the system received excellent scores that indicate a high level of user satisfaction. On the scale of 1 (Very Difficult) to 5 (Very Easy), the range of satisfaction scores recorded is from 3 to 5. Out of 39 tasks, only few tasks scored the rating less than 4.

4.2.4 MAJOR FINDINGS

Overall all the tasks were found very much user-friendly. Users were comfortable performing the tasks and they were found satisfied with their experience with the system and their ability to complete the tasks. The new layout was very much appreciated by some of the participants. For some participants, medication module needed some level of guidance, however, once cleared their doubts, it became easier for the participants to perform the tasks related for this module.

4.2.5 AREAS FOR IMPROVEMENT

Considering the overall feedback from the participants, the workflows were very easy to perform. The users were quite comfortable to perform the tasks that were given to them. Overall layout and smart search features were very much useful for the participants; however, few cosmetic changes were suggested that can be taken care of while designing the new features in future.



5. USER CENTERED DESIGN – METHOD AND IMPLEMENTATION

5.1 OVERVIEW

InSync has been following a non-industry standard User Centered Design process during EHR development. This process closely matches with the NISTIR 7741 standard. This demonstrates how our internal process is aligned with the principles summarized in NISTIR 7741. This process is utilized throughout our EHR development for all criteria/feature sets.

5.2 ABOUT USER CENTERED DESIGN (UCD)

UCD (User Centered Design) process focuses on the end users of the software product and considers their involvement in the design and development of the new software. It needs an understanding of the customers and the environment where they will actually be using the product. Clear understanding of the customers' (users') needs and their workflow ensure more accuracy in user requirements, which eventually leads to the development of more usable systems. UCD is an iterative process that involves design and testing of the product at each stage. The principles outlined by the NIST (the National Institute of Standards and Technology) resembles in our organizations internal UCD process. The activities involved, understanding the context of use, specifying user requirements, designing multiple iteration of sketches, Evaluate the design and review it post deployment. At each stage the requirements are reviewed and made necessary changes at times when required.

5.2.1 UNDERSTAND USER NEEDS, WORKFLOW, AND WORK ENVIRONMENTS

Process of designing new feature or module begins by understanding the purpose of the new software. How the new features will fulfill the users' requirements is identified to create the best suitable design. The information is collected by initiating meetings various stakeholders, creating use cases and user goals while working with customers/end users. Client interaction can be encouraged to observe current workflow in the environment where the features will be used, to further aid the design process.

5.3 ENGAGE USERS EARLY AND OFTEN

Customers / end users are involved in various phases of the development lifecycle. The following techniques may be employed throughout a project:

Focus Groups – Created groups of end users representing several customer organizations. The purpose of groups is to provide consistent qualitative input on our product design throughout the development cycle.

High and Low Fidelity Prototypes – Prototypes allows design staff members to test various aspects of the design. A low fidelity prototype may be used as a proof of concept during early design process. At a later stage, high fidelity interactive prototypes can be used to evaluate the look and feel, navigation, and workflow with end users before finalizing the design or start of code development.

Input from Subject Matter Expert (SME) – For certain projects, a contracted or employed SME (Physician Advisor or an Expert User Champion from a customer organization) may participate to share the end user's needs during the development process.



Feedback –Feedback can take place as an efficient method to gather valuable inputs from a high numerous users.

Usability Testing – Usability testing evaluates the effectiveness, efficiency, and satisfaction of a design by requesting end users representative to use a prototype or actual software to perform simulated but realistic tasks. Several quantitative measures are gathered such as success rates, task completion time, path deviations, and number of clicks as well as general comments.

Interaction with End Users – User interviews can be used to obtain input from end users for a variety of purposes. Requirement gathering interviews help to understand use cases, user goals, and expected workflows.

User Roles – Various user roles in the industry are outlined for better understanding of target audience who would be using the released features, what are their goals, responsibilities, and background and so forth.

5.4 SET USER PERFORMANCE OBJECTIVES

Objective measures of success play a vital role in deciding when the design has reached its goal of usability. User performance objectives can be set to effectiveness, efficiency, and satisfaction.

- Effectiveness (ability to complete tasks successfully)
- Efficiency (speed to complete the task)
- Satisfaction (Ease of using a feature to complete a task)

Usability testing can be performed to measure the above objectives. Before releasing the feature set to the customers, it is to be assured that the satisfactory test results are achieved.

5.5 DESIGNING THE USER INTERFACE

In order to provide the best user experience, design staff is trained on the basic usability principles and product design standards. Numerous reference materials support the design team during designing the new feature. Once the requirement specification document is complete, it is reviewed by the stakeholders to ensure that it adhere the usability principles and design standards.

5.6 TESTING AND EVALUATION

During the development process, multiple iterations take place for testing and evaluating the new feature sets. In early phase of design, the sketches/prototypes may be shared with stakeholders/end users to ensure the design is progressing as expected. Based on feedback, design team modifies the prototypes. Once the coding is complete, the software it completely tested to ensure that it meets the specified requirements as defined in early phase. Validation testing is carried out to ensure internal exit criterion has been met. End



users representatives perform usability testing. These types of testing ensure that the software meets the user goals and designed as stated in the project during initiation phase.

5.6.1 TESTING LOCATION

The InSync software solution is delivered as a service over the internet, with our production servers located at a co-location facility located in Tempa, FL. For convenience, this facility is located less than 5 miles away from our operations offices, also located in Tempa, FL.

During conduct of evaluation and certification testing, the primary moderator for the testing is located at our office location in Tempa, with a backup/secondary moderator located at our offshore development facility located in Vadodara, Gujarat, India.

InSync is currently accessed by medical practices located in 49 out of the 50 states within the U.S., including Alaska and Hawaii. Customers/End Users who participate in the testing are located at various medical practices located primarily in the states of New York and New Jersey, as well as Connecticut, California, and Hawaii.



6. APPENDICES

6.1 Appendix A: Proctor Sheets

Task 1: Record Medication Order (30 Seconds)

Take the participant to the starting point for the task.

After examining *Patient*, you have decided to order a Medication (Paracetamol).

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. On top left smart search box, type in "Medications/Allergies".
2. Select the "Medications/Allergies in Charting" option.
3. On the Patient Search screen, select patient.
4. On Facesheet, expand Medications section.
5. Click the Prescribe/Manage button.
6. Type "Paracetamol" in the medication name and select medication from the list.
7. Record other necessary details such as dose, unit, rout, frequency, days-supply, quantity, refill, and so forth.
8. Enter any notes that you want to send to pharmacy.
9. Click Save. The medication is added to the grid.
10. Click Next to access the Medications Review screen.
11. Select a pharmacy from the list.
12. Click the Review & Transmit Rx button.

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:



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Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 2: Change Medication Order (40 Seconds)

Take the participant to the starting point for the task.

After ordering Paracetamol, you decided to change the medication to “isoniazid”.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. On top left smart search box, type in “Medications/Allergies”.
2. Select the “Medications/Allergies in Charting” option.
3. On the Patient Search screen, select patient.
4. On Facesheet, expand Medications section.
5. Click the Prescribe/Manage button.
6. Type “isoniazid” in the medication name and select medication from the list.
7. Record other necessary details such as dose, unit, rout, frequency, days-supply, quantity, refill, and so forth.
8. Enter any notes that you want to send to pharmacy.
9. Click Save. The medication is added to the grid.
10. Click Next to access the Medications Review screen.
11. Select a pharmacy from the list.
12. Click the Review & Transmit Rx button.
13. On the Prescribe Medication screen, click the Manage tab.
14. In the Current Medications section, click the Cancel Rx button for “Paracetamol”.

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:



Rating:

Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 3: Access Medication Order (10 Seconds)

Take the participant to the starting point for the task.

As part of our job responsibilities, you may want to access a medication order.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. On top left smart search box, type in “Medications/Allergies”.
2. Select the “Medications/Allergies in Charting” option.
3. On the Patient Search screen, select patient.
4. On Facesheet, expand Medications section to review the medications.

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 4: Record Laboratory Order (20 Seconds)

Take the participant to the starting point for the task.

After examining *Patient*, you have decided to order a Laboratory test.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. From the left pane, click the Facesheet icon.
2. On the Patient Search screen, select patient.
3. On Facesheet, expand Pending Services section.
4. Click Order Labs button
5. Select Laboratory
6. Select Ordering Provider
7. Type "hemoglobin" in Test field
8. Select "Hemoglobin A1c – 001453" from the list
9. Click Save button

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 5: Change Laboratory Order (20 Seconds)

Take the participant to the starting point for the task.

You may want to update the lab order details later on.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. From the left pane, click the Facesheet icon.
2. On the Patient Search screen, select patient.
3. On Facesheet, expand Pending Services section.
4. Click Order Labs button
5. Select Laboratory
6. Click Edit icon for any unprocessed order
7. Change the diet to Regular
8. Click Place Order button

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 6: Access Laboratory Order (10 Seconds)

Take the participant to the starting point for the task.

As part of our job responsibilities, you may want to access a lab order.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. From the left pane, click the Facesheet icon.
2. On the Patient Search screen, select patient.
3. On Facesheet, expand Pending Services section to review placed orders.

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 7: Record Radiology/Imaging Order (20 Seconds)

Take the participant to the starting point for the task.

After examining *Patient*, you have decided to order a chest x-ray.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. From the left pane, click the Facesheet icon.
2. On the Patient Search screen, select patient.
3. Start a new encounter or edit an in-progress encounter.
4. From the links shown on the top, click Treatment Plan.
5. In the Radiology section, select check boxes for ordering radiology tests.

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 8: Change Radiology/Imaging Order (20 Seconds)

Take the participant to the starting point for the task.

After ordering the x-ray, you may want to change the urgency to STAT.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. From the left pane, click the Facesheet icon.
2. On the Patient Search screen, select patient.
3. Start a new encounter or edit an in-progress encounter.
4. From the links shown on the top, click Treatment Plan.
5. In the Radiology section, select check boxes for ordering radiology tests and clear the check boxes for the radiology tests those are already ordered.

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 9: Access Radiology/Imaging Order (15 Seconds)

Take the participant to the starting point for the task.

As part of our job responsibilities, you may want to access radiology orders.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Optimal Path:

1. From the left pane, click the Facesheet icon.
2. On the Patient Search screen, select patient.
3. Start a new encounter or edit an in-progress encounter.
4. From the links shown on the top, click Treatment Plan.
5. Expand the Radiology section.

Actual Path:

Task Time: _____ Seconds

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 10: Interact with drug-drug and drug-allergy interventions prior Medication Order completion (40 Seconds)

Take the participant to the starting point for the task.

You want to order an electronic prescription, but before that, want to check drug-allergy interventions prior to completing the CPOE.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

Note: Make sure “Rifadin” is ordered prior to performing following steps:

1. From the left pane, click the Facesheet icon.
2. On the Patient Search screen, select patient.
3. On Facesheet, expand Medications section.
4. Click Prescribe/Manage button
5. Type “isoniazid” in the medication name and select medication from the list.
6. Record other necessary details such as dose, unit, rout, frequency, days-supply, quantity, refill, and so forth.
7. Enter any notes that you want to send to pharmacy.
8. Click Save. The medication is added to the grid.
9. Click Next to access the Medications Review screen for interactions.

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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



Administrator / Note taker Comments:

Task 11: Adjustment of severity level of drug-drug interventions (35 Seconds)

Take the participant to the starting point for the task.

You are a system admin and you want to adjust the severity level of drug-drug interactions.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. From the left pane, click the Facesheet icon.
2. On the Patient Search screen, select patient.
3. On Facesheet, expand Medications section.
4. Click Prescribe/Manage button
5. Click the Admin Configuration icon from top right corner
6. Expand the Provider Configuration panel.
7. Select/Deselect “Hide All Less Severe Drug Interactions (Show Only Contraindicated)” check box
8. Click Save.

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 12: Record Medication List (35 Seconds)

Take the participant to the starting point for the task.

You are checking a patient in and you want to record the patient's list of current medications.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. From the left pane, click the Facesheet icon.
2. On the Patient Search screen, select patient.
3. On Facesheet, expand Medications section.
4. Click Prescribe/Manage button
5. On the Prescribe Medication screen, click the Manage tab.
6. Type "penicillamine" in the medication name and select medication from the list.
7. Click Add. Medication will be added to current medications list.

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 13: Change Medication List (35 Seconds)

Take the participant to the starting point for the task.

You are checking in an existing patient and need to update medications list.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. From the left pane, click the Facesheet icon.
2. On the Patient Search screen, select patient.
3. On Facesheet, expand Medications section.
4. Click Prescribe/Manage button
5. On the Prescribe Medication screen, click the Manage tab.
6. Click the Edit icon next to medication name.
7. Change Sig details and click Update.

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 14: Access Medication List (10 Seconds)

Take the participant to the starting point for the task.

You are preparing to examine a patient and want to check to see what medications they are currently taking.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. On top left smart search box, type in "Medications/Allergies".
2. Select the "Medications/Allergies in Charting" option.
3. On the Patient Search screen, select patient.
4. On Facesheet, expand Medications section to review the medications.

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 15: Record Allergy List (25 Seconds)

Take the participant to the starting point for the task.

You are checking a patient in and you want to record the patient’s list of allergies.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. On top left smart search box, type in “Medications/Allergies”.
2. Select the “Medications/Allergies in Charting” option.
3. On the Patient Search screen, select patient.
4. On Facesheet, expand Medications section.
5. Click the Prescribe/Manage button.
6. In the Allergy section, click the Plus icon.
7. Type in allergy name and a list of allergies will appear. Select an allergen and click Add. Allergen will be added to the following grid.

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 16: Change Allergy List (25 Seconds)

Take the participant to the starting point for the task.

You are checking in an existing patient and need to change allergy details.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. On top left smart search box, type in “Medications/Allergies”.
2. Select the “Medications/Allergies in Charting” option.
3. On the Patient Search screen, select patient.
4. On Facesheet, expand Medications section.
5. Click the Prescribe/Manage button.
6. In the Allergy section, click the Plus icon.
7. Click the Edit icon next to allergen name.
8. Update the allergen details such as Severity, Type, Reaction, and so forth, and click Update.

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 17: Access Allergy List (10 Seconds)

Take the participant to the starting point for the task.

You are preparing to examine a patient and want to check to see what allergy they are currently taking.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. On top left smart search box, type in “Medications/Allergies”.
2. Select the “Medications/Allergies in Charting” option.
3. On the Patient Search screen, select patient.
4. On Facesheet, expand Medications section.
5. Click the Prescribe/Manage button.
6. In Allergies section, review recorded allergies

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 18: Electronic Prescribing (30 Seconds)

Take the participant to the starting point for the task.

You want to electronically prescribe a medication.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. On top left smart search box, type in “Medications/Allergies”.
2. Select the “Medications/Allergies in Charting” option.
3. On the Patient Search screen, select patient.
4. On Facesheet, expand Medications section.
5. Click the Prescribe/Manage button.
6. Type “Paracetamol” in the medication name and select medication from the list.
7. Record other necessary details such as dose, unit, rout, frequency, days-supply, quantity, refill, and so forth.
8. Enter any notes that you want to send to pharmacy.
9. Click Save. The medication is added to the grid.
10. Click Next to access the Medications Review screen.
11. Select a pharmacy from the list.
12. Click the Review & Transmit Rx button.

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating: Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 19-A: Configuration of CDS interventions (for medication list) by user (20 Seconds)

Take the participant to the starting point for the task.

You want to configure Clinical Decision Support Intervention for specific medication.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. On top left smart search box, type in “Clinical Decision Support Intervention”
2. Type intervention name in Intervention field, e.g. “Medication Alert”
3. In “Users associated to the intervention” field, select user(s) from the drop-down list to whom the alert should be prompted
4. In Medication section, type “Paracetamol 500 mg tablet”, and click Add.
5. Click Save button

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 19-B: Medication List Interventions (40 Seconds)

Take the participant to the starting point for the task.

You want to generate an alert to the user while prescribing specific medication.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. On top left smart search box, type in “Medications/Allergies”.
2. Select the “Medications/Allergies in Charting” option.
3. On the Patient Search screen, select patient.
4. On Facesheet, expand Medications section.
5. Click the Prescribe/Manage button.
6. Type “Paracetamol 500 mg tablet” in the medication name and select medication from the list.
7. Record other necessary details such as dose, unit, rout, frequency, days-supply, quantity, refill, and so forth.
8. Enter any notes that you want to send to pharmacy.
9. Click Save. The medication is added to the grid.
10. Click Next to access the Medications Review screen.
11. Select a pharmacy from the list.
12. Click the Review & Transmit Rx button. The alert pops up.

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating: Overall, this task was: _____

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



Administrator / Note taker Comments:

Task 20-A: Configuration of CDS interventions (for medication allergy list) by user

(20 Seconds)

Take the participant to the starting point for the task.

You want to configure Clinical Decision Support Intervention for specific medication allergy.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. On top left smart search box, type in “Clinical Decision Support Intervention”
2. Type intervention name in Intervention field, e.g. “Allergy Alert”
3. In “Users associated to the intervention” field, select user(s) from the drop-down list to whom the alert should be prompted
4. In Allergy section, type “Gluten”, and click Add.
5. Click Save button

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating: Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 20-B: Medication Allergy List Interventions (25 Seconds)

Take the participant to the starting point for the task.

You want to generate an alert to the user while recording specific allergy.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. On top left smart search box, type in “Medications/Allergies”.
2. Select the “Medications/Allergies in Charting” option.
3. On the Patient Search screen, select patient.
4. On Facesheet, expand Medications section.
5. Click the Prescribe/Manage button.
6. In the Allergy section, click the Plus icon.
7. Type in allergy name and a list of allergies will appear. Select an allergen “Gluten” and click Add. The alert pops up.

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 21-A: Configuration of CDS interventions (for problem list) by user (30 Seconds)

Take the participant to the starting point for the task.

You want to configure Clinical Decision Support Intervention for specific problem.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. On top left smart search box, type in “Clinical Decision Support Intervention”
2. Type intervention name in Intervention field, e.g. “Problem List Alert”
3. In “Users associated to the intervention” field, select user(s) from the drop-down list to whom the alert should be prompted
4. In Diagnosis Codes section, type “Headache”, and click Add.
5. Click Save button

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating: Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 21-B: Problem List Interventions (40 Seconds)

Take the participant to the starting point for the task.

You want to generate an alert to the user while recording specific problem.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. On the top menu bar, click Facesheet
2. Select patient from the list
3. Start a new encounter or edit in-progress encounter
4. Click Problem List link
5. In Illness field, type the problem name for which alert is setup, for example, "Headache"
6. Click Save. The alert pops up.

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 22-A: Configuration of CDS interventions (for demographics) by user (20 Seconds)

Take the participant to the starting point for the task.

You want to configure Clinical Decision Support Intervention for specific demographic details.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. On top left smart search box, type in “Clinical Decision Support Intervention”
2. Type intervention name in Intervention field, e.g. “Demographics Alert”
3. In “Users associated to the intervention” field, select user(s) from the drop-down list to whom the alert should be prompted
4. Select Age > 100 years
5. Click Save button

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 22-B: Demographics Interventions (15 Seconds)

Take the participant to the starting point for the task.

You want to generate an alert to the user while recording specific demographic detail.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. From left menu, click Patient Search icon.
2. Edit any existing patient.
3. Change DOB to make the patient more than 100 years.
4. Click Save. The alert pops up.

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 23-A: Configuration of CDS interventions (for lab test) by user (20 Seconds)

Take the participant to the starting point for the task.

You want to configure Clinical Decision Support Intervention that will pop up when ordering specific lab test.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. On top left smart search box, type in “Clinical Decision Support Intervention”
2. Type intervention name in Intervention field, e.g. “Lab Test Alert”
3. In “Users associated to the intervention” field, select user(s) from the drop-down list to whom the alert should be prompted
4. In Lab Test (Ordered) section, type test name, for example, “CBC”, “Lipid Panel”, and click Add.
5. Click Save button

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 23-B: Lab Test Interventions (25 Seconds)

Take the participant to the starting point for the task.

You want to generate an alert to the user while ordering specific test.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. From the left pane, click the Facesheet icon.
2. On the Patient Search screen, select patient.
3. On Facesheet, expand Pending Services section.
4. Click Order Labs button
5. Select Laboratory
6. In the Test field, type the test name for which alert is configured, e.g., CBC, Lipid Panel. The alert pops up.

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 24-A: Configuration of CDS interventions (for lab result) by user (20 Seconds)

Take the participant to the starting point for the task.

You want to configure Clinical Decision Support Intervention while recording specific lab result.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. On top left smart search box, type in “Clinical Decision Support Intervention”
2. Type intervention name in Intervention field, e.g. “Lab Result Alert”
3. In “Users associated to the intervention” field, select user(s) from the drop-down list to whom the alert should be prompted
4. In Lab Result section, select the parameter, for example, “Dengue Fever”
5. Define the lab result range along with unit and click Add
6. Click Save button

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 24-B: Lab Result Interventions (25 Seconds)

Take the participant to the starting point for the task.

You want to generate an alert to the user while recording specific result.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. From the left pane, click the Facesheet icon.
2. On the Patient Search screen, select patient.
3. On Facesheet, expand Pending Services section.
4. Click Add Result link.
5. In the Observation Identifier field, type the parameter (e.g., Dengue Fever) and enter values within the configured range.
6. Click Add. The alert pops up.

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 25-A: Configuration of CDS interventions (for vital signs) by user (20 Seconds)

Take the participant to the starting point for the task.

You want to configure Clinical Decision Support Intervention for specific vital sign.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. On top left smart search box, type in “Clinical Decision Support Intervention”
2. Type intervention name in Intervention field, e.g. “Vital Sign Alert”
3. In “Users associated to the intervention” field, select user(s) from the drop-down list to whom the alert should be prompted
4. In Vitals section, select “Weight (Kgs)” from drop-down list with value 200, and click Add.
5. Click Save button

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating: Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 25-B: Vital Signs Interventions (40 Seconds)

Take the participant to the starting point for the task.

You want to generate an alert to the user while recording specific vital sign.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. From the left pane, click the Facesheet icon.
2. On the Patient Search screen, select patient.
3. Start a new encounter or edit an in-progress encounter.
4. From the links shown on the top, click Vitals.
5. In the Weight field, select the parameter for which you have configured alert, for example, "200 kgs. Weight"
6. Click Save. The alert pops up.

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 26-A: Configuration of CDS interventions (for User Diagnostic and Therapeutic Reference) by user (20 Seconds)

Take the participant to the starting point for the task.

You want to configure Clinical Decision Support Intervention for user diagnostic and therapeutic reference.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. On top left smart search box, type in "Clinical Decision Support Intervention"
2. Type intervention name in Intervention field, for example, "Vital Sign Alert"
3. Click Browse to attach a file.
4. Type reference link in the Reference Links field.
5. Click Attach button
6. Click Close

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating: Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 26-B: Identify User Diagnostic and Therapeutic Reference Information (40 Seconds)

Take the participant to the starting point for the task.

You want to view the diagnostic and therapeutic reference information when the alert pops up.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. From the left pane, click the Facesheet icon.
2. On the Patient Search screen, select patient.
3. Start a new encounter or edit an in-progress encounter.
4. From the links shown on the top, click Vitals.
5. Select the parameter for which you have setup an alert, for example, click Vitals link
6. In the Weight field, select the parameter for which you have configured alert, for example, "200 kgs. Weight"
7. Click Save. The alert pops up with diagnostic and therapeutic reference information.

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating: Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 27: Reconcile patient’s active medication list with another source (50 Seconds)

Take the participant to the starting point for the task.

You want to reconcile patient’s active medications with another source.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. From the left pane, click the Facesheet icon.
2. On the Patient Search screen, select patient.
3. Start a new encounter or edit an in-progress encounter.
4. From the links shown on the top, click Medications/Allergies.
5. Click the Reconcile Medications & Allergies button.
6. In the Medications List section, click the Browse button; select the xml file.
7. Click Upload.
8. Once the xml file is uploaded, add it to the preview list.
9. Click Confirm. The imported medications will be merged with the existing medications in the system.

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating: Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 28: Reconcile patient's active problem list with another source (50 Seconds)

Take the participant to the starting point for the task.

You want to reconcile patient's active problem list with another source.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. From the left pane, click the Facesheet icon.
2. On the Patient Search screen, select patient.
3. Start a new encounter or edit an in-progress encounter.
4. From the links shown on the top, click Problem List.
5. Click the Reconcile Problem List button.
6. Click the Browse button; select the xml file.
7. Click Upload.
8. Once the xml file is uploaded, add it to the preview list.
9. Click Confirm. The imported problems will be merged with the existing problems in the system.

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating: Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 29: Reconcile patient's active medication allergy list with another source.

(50 Seconds)

Take the participant to the starting point for the task.

You want to reconcile patient's active medications allergy with another source.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. From the left pane, click the Facesheet icon.
2. On the Patient Search screen, select patient.
3. Start a new encounter or edit an in-progress encounter.
4. From the links shown on the top, click Medications/Allergies.
5. Click the Reconcile Medications & Allergies button.
6. In the Allergies List section, click the Browse button; select the xml file.
7. Click Upload.
8. Once the xml file is uploaded, add it to the preview list.
9. Click Confirm. The imported allergies will be merged with the existing allergies in the system.

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating: Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 30: Record patient’s demographic information. (30 Seconds)

Take the participant to the starting point for the task.

You want to add a new patient into the system.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. From the left pane, click Patient Search icon.
2. Click the Add Patient button.
3. Record mandatory details marked with red asterisk sign.
4. Click Save.

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 31: Change patient’s demographic information. (25 Seconds)

Take the participant to the starting point for the task.

You already have a patient into the system and now you want to update some of the patient details.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. From the left pane, click Patient Search icon.
2. Using smart search box, type in patient name whose details are to be updated.
3. Click the Edit icon appearing next to the patient name.
4. Change the details as per your requirement.
5. Click Save.

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating: Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 32: Access patient’s demographic information. (10 Seconds)

Take the participant to the starting point for the task.

You want to access/view patient’s demographic information.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. From the left pane, click Patient Search icon.
2. List of patients will appear on the Patient Search screen along with the demographic details.
3. To view demographic details of specific patient, type in patient name in the smart search box and click Search.

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 33: Record patient's Problem List. (35 Seconds)

Take the participant to the starting point for the task.

You want to add any new problems for the patient.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. On the top menu bar, click Facesheet.
2. Select a patient from the list.
3. Start a new encounter or edit an in-progress encounter.
4. From the links shown on the top, click Problem List.
5. Start typing in Illness and you will see a list of matching illnesses. Select the one from the list.
6. Enter the Onset Date.
7. Enter other mandatory fields.
8. Click Save. Problem will be added to the following grid.

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating: Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 34: Edit patient's Problem List. (30 Seconds)

Take the participant to the starting point for the task.

You want to change some details recorded in the patient's problem list.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. On the top menu bar, click Facesheet.
2. Select a patient from the list.
3. Start a new encounter or edit an in-progress encounter.
4. From the links shown on the top, click Problem List.
5. Click the Edit icon next to the problem name.
6. Change the details such as Onset Date, Illness Status, Illness Type, or Comments, if any.
7. Click Save. Updated problem details can be seen in the following grid.

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating: Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 35: Access patient’s historical and current Problem List. (25 Seconds)

Take the participant to the starting point for the task.

You want to view historical problems for the patient.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. On the top menu bar, click Facesheet.
2. Select a patient from the list.
3. Start a new encounter or edit an in-progress encounter.
4. From the links shown on the top, click Problem List. Patient’s current problems appear on the screen.
5. Select the Show History check box. This will show patient’s problem history.

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 36: Locate the new Implantable Device section. (25 Seconds)

Take the participant to the starting point for the task.

You want to locate a new Implantable Device recorded in the system.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. On the top menu bar, click Facesheet.
2. Select a patient from the list.
3. Start a new encounter or edit an in-progress encounter.
4. From the links shown on the top, click History.
5. Click the Medical History tab.
6. Locate the Implantable Device tab in Medical History.

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating: Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 37: Add the new Implantable Device section. (35 Seconds)

Take the participant to the starting point for the task.

You want to add a new Implantable Device in the system.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. On the top menu bar, click Facesheet.
2. Select a patient from the list.
3. Start a new encounter or edit an in-progress encounter.
4. From the links shown on the top, click History.
5. Click the Medical History tab.
6. Access the Implantable Device tab in Medical History.
7. Type in Device Detail, for example, (01)00643169007222(17)160128(21)BLC200461H, and click Search.
8. All the details will automatically be filled up in the respective fields. Click Save.
9. The device will be added in the following grid.

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating: Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 38: Change the new Implantable Device section. (30 Seconds)

Take the participant to the starting point for the task.

You want to update details about the Implantable Device added in the system.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. On the top menu bar, click Facesheet.
2. Select a patient from the list.
3. Start a new encounter or edit an in-progress encounter.
4. From the links shown on the top, click History.
5. Click the Medical History tab.
6. Access the Implantable Device tab in Medical History.
7. The device details appear in the grid. Click the Edit icon next to device name.
8. Change necessary details and click Save.

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating: Overall, this task was: _____

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

Administrator / Note taker Comments:



Task 39: Access the new Implantable Device section. (25 Seconds)

Take the participant to the starting point for the task.

You want to access the Implantable Device section to view all the devices recorded in the system.

Success:

- Easily completed
- Completed with difficulty or help (Describe below)
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path:

1. On the top menu bar, click Facesheet.
2. Select a patient from the list.
3. Start a new encounter or edit an in-progress encounter.
4. From the links shown on the top, click History.
5. Click the Medical History tab.
6. Click the Implantable Device tab in Medical History.
7. Access all the implantable devices that are recorded in the system.

Actual Path:

- Correct
- Minor Deviations / Cycles (Describe below)
- Major Deviations (Describe below)

Comments:

Observed Errors and Verbalizations:

Comments:

Rating: Overall, this task was: _____

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

Administrator / Note taker Comments



6.2 Appendix B: PARTICIPANT DEMOGRAPHICS

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

Gender

Men	:	2
Women	:	8
Total Participants	:	10

Occupation/Role:

Physician	:	1
Medical Assistant	:	5
Office Manager	:	1
Nurse	:	2
Front Desk Executives	:	1
Total Participants	:	10

Years of Experience:

(0-5) years	:	4
(6-10) years	:	4
(11-15) years	:	2
Total Participants	:	10



6.3 Appendix C: SYSTEM USABILITY SCALE QUESTIONNAIRE

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



EHR b(11) Supplemental Usability Test Report of the Insync EMR/PM

Product Version: *10*

Report based on NISTIR 7742 Common Industry Format for Usability Test Reports

Date of Usability Test: November 25 to December 5, 2024

Date of Report: December 6, 2024

Report Prepared By:



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Executive Summary

On November 25th through December 5, 2024, Brainstorm, Ergonomics, LLC conducted a summative usability test of the Insync EMR/PM system. The test was conducted in the Fairfax, VA office of Brainstorm Ergonomics over remote tele-conferencing sessions. The purpose was to provide a b(11) supplemental test to amend their previously certified system. This b(11) criteria supplemental test validates the usability of the updated b(11) features, the current user interface and provides evidence of usability of Insync EMR/PM version (10) as the EHR Under Test (EHRUT). Ten (10) persons matching the target demographic criteria participated in the usability test using the EHRUT in simulated, but representative tasks.

The study focused on measuring the effectiveness of, efficiency of, and satisfaction with Insync EMR/PM among a sample of participants representing potential users of the system.

Performance data was collected on fifteen (15) tasks related to clinical decision support features on an EHR. Tasks created were based upon the updated b(11) criteria specified within the test procedure structure for evaluating conformance of Electronic Health Record (EHR) technology to the certification criteria defined in certification criteria identified in 45 CFR Part 170 Subpart C of the Health Information Technology: Health Information Technology (Health IT) Certification Criteria.

Results of the study indicated that the Insync EMR/PM system was quite satisfactory with regards to effectiveness and efficiency and that the participants were satisfied with the system.

Introduction

The Electronic Health Record System Under Test (EHRUT) tested for this study, InSync EMR/PM, was specifically designed to present medical information to healthcare providers on desktop computers in standard ambulatory healthcare settings. This study tested and validated the usability of the Insync EMR/PM user interface and provides evidence of the usability of Insync EMR/PM with representative exercises and in realistic user conditions. To this end, measures of effectiveness and efficiency, such as time on task, number of errors made, and completion rates were captured during usability testing. Satisfaction was assessed and user comments collected using the System Usability Scale (SUS), an industry-standard questionnaire.

Method

Participants

Ten (10) individuals (2 men and 8 women) participated in the EHRUT (InSync). A group of healthcare providers that have no experience with Insync EMR/PM we recruited to take place from a database of usability participants from previous summative usability studies. Those who responded to the invitation to take part in the study were directed to an online questionnaire that served as the participant screener. (The screening questionnaire is provided as Appendix A.) Participants meeting the criteria for participation in the study were contacted and scheduled via email, or telephone and confirmed for their testing session.

Participants in the usability test of Insync EMR/PM had a variety of healthcare backgrounds and demographic characteristics.

Table 1 presents participant characteristics, including demographics, professional experience, computing experience, and previous EHR experience. Participant characteristics reflect the audience of current and future users and meet the criteria designated in the Certification Companion Guide for Safety-enhanced design - 45 CFR 170.315(g)(3). None of the participants were from the vendor organization (Qualifacts) that produced and supplied the evaluated system, nor did any participant have any direct connection to the testing organization.

Table 1. Participant Characteristics

Part ID	Gender	Age	Education	Role/Title	Professional Experience (Months)	EHR Experience (Months.)	Experience with InSync (Months.)	Assistive Tech Needs
P0101	Female	60 to 69	Master's degree	RN	480	180	0	None
P0102	Male	40 to 49	Bachelor's degree	EHR Instructor	48	132	0	None
P0103	Female	30 to 39	Bachelor's degree	RN	192	192	0	None
P0104	Female	40 to 49	Bachelor's degree	Oncology Nurse Manager	276	96	0	None
P0105	Female	50 to 59	Bachelor's degree	Radiation Therapist	216	48	0	None
P0106	Male	30 to 39	Doctorate Degree	MD	48	60	0	None
P0107	Female	40 to 49	Some College	Medical Assistant	48	48	0	None
P0108	Female	40 to 49	Bachelor's degree	RN	132	132	0	None
P0109	Female	30 to 39	Master's degree	RN	180	156	0	None
P0110	Female	50 to 59	Associate degree	RN	180	168	0	None

Summary of Participant Characteristics:

Participants had experience with the occupation and expertise that aligns with the capability under testing. The cohort of users who are selected as participants varied and its intended users and was not limited to clinicians. The demographic characteristics of the test participant characteristics reflected the audience of current and future users.

Gender	
Male	2
Female	8
Age Range	
20 to 29	0
30 to 39	3
40 to 49	4
50 to 59	2
60 to 69	1
70 to 79	0
Education	
Some college credit, no degree	1
Trade technical vocational training	0
Associate degree	1
Bachelors degree	5
Masters degree	2
Doctorate Degree	1
Experience with InSync	
None	10

Study Design

The overall objective of this usability test was to uncover areas where the Insync EMR/PM system performed well – that is, effectively, efficiently, and with satisfaction – and areas where the system failed to serve the clinical documentation and workflow needs of users.

Participants had a range of experience with EHRs in general, and none had direct experience and/or training with the Insync EMR/PM system. Participants completed the test of Insync EMR/PM usability during individual 60-minute remote conference sessions. During the test, each participant interacted with various components of the Insync EMR/PM system. Each participant was provided with the same instructions.

Insync EMR/PM was evaluated for effectiveness, efficiency and satisfaction as defined by the following measures collected and analyzed for each participant:

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

Tasks

The team at Qualifacts, Inc., in close collaboration with Brainstorm Ergonomics, constructed a total of fifteen (15) tasks, to be realistic and representative of the clinical documentation and workflow activities a user might engage with the updated features of the Insync EMR/PM system in actual medical settings. The fifteen (15) tasks were created based upon the b(11) criteria specified within the test procedure structure for evaluating conformance of Electronic Health Record (EHR) technology to the certification criteria as defined in 45 CFR Part 170 Subpart C of the Health Information Technology: Standards, Implementation Specifications, and Certification Criteria for Electronic Health Record Technology.

A copy of the tasks presented to participants in the usability test of Insync EMR/PM system can be found in Appendix C.

Test Location

All participants were tested on the Insync EMR/PM system during remote conferencing sessions. Each participant was requested in advance to secure a quiet room with minimal distractions and a desktop or laptop computer that could connect to the Internet with a remote conferencing system. Although the type of computer, operating system and display resolution of the remote participant system was unknown, the system that was used by the test administrator and controlled by the remote participant was an HP Desktop computer running the Windows 10 operating system at a resolution of 1920x1080 pixels. During a given session, only the test administrator and participant communicated with one another.

The remote usability test session was conducted by a test administrator from the testing organization (*Brainstorm Ergonomics, LLC*) working from a small conference room at Brainstorm Ergonomics' Fairfax, VA location. A data logger from the EHRUT organization also took detailed notes on each session, including user comments and other ratings following each task. During a session both the test administrator and the data logger could see only the participant's screen and hear the participant's comments, questions, and responses.

Test Environment

While the EHRUT typically would be used in a healthcare office, ambulatory center facility, testing of the Insync EMR/PM system was conducted via remote connection during individual remote conference sessions. Each participant called into a remote session and was connected by the test administrator to the application.

The Insync EMR/PM application itself ran with a web browser. For this test, the Google Chrome Browser was used. on a LAN connection using a sample database that was set up specifically for the test. Participants used a mouse and keyboard when interacting with the EHRUT and were given remote control of the administrator's workstation to perform the tasks.

Test Forms and Tools

As part of the usability test, several documents and instruments were used. Examples of the documents used during the usability test, including an informed consent form, the tasks, and post-test questionnaire, can be found in Appendices B to E, respectively.

Participants' interaction with Insync EMR/PM was captured and recorded digitally. Verbal responses were recorded through either the microphone integrated into the participant's computer or through a telephone connection. This information was electronically transmitted to the administrator and to the data logger during each test session.

Participant Instructions

The administrator read the following instructions aloud to each participant:

Thank you for participating in this study. Our session today will last approximately 60 minutes. The purpose of this study is to gauge the usability of the software. We are interested in how easy (or how difficult) this system is to use, and the features and benefits that would be useful to you. We also want to know how we could improve it.

As the moderator, I cannot help you problem solve the system, itself. I did not have any involvement in its creation, so please be honest with your opinions. If you feel lost or have difficulty completing the scenario, please continue to try as best you can. If you are unable to complete the task, we will stop the task and move you on to the next scenario.

All the information you provide will be kept confidential. Your name will not be associated with your comments at any time. At the end of the session, I may ask you additional questions and there will be a short survey.

Please understand, we are evaluating the ease of use on the software and not your performance on this system. Do you have any questions or concerns?

Participants were then given fifteen (15) tasks to complete.

Procedure

Upon connection to the online meeting, each participant was greeted, his or her identity verified, and matched to a name on the participant schedule. Participant names were replaced with participant IDs so that a given individual's data cannot be linked to his/her identity. Prior to beginning testing, each participant reviewed and signed an informed consent form (See Appendix B).

Staff members of Brainstorm Ergonomic, a usability test administrator, administered the test. The administrator moderated the session by providing both verbal and written instructions for the overall usability test and for each of the tasks comprising the test. The administrator also monitored task success, path deviations, number and description of errors, and audio-recorded participant verbal comments. A data logger logged task times, obtained post-task rating data, and took notes on participant comments and administrator feedback.

For each of the fifteen (15) tasks, participants were provided written instructions to their computers. Following the administrator's instructions, each participant performed each task by first reading the task then stating in his or her own words his or her interpretation of the task requirements. When the participant's interpretation matched the actual goal of the task, the administrator instructed the participant to begin and task timing began. Task time was stopped and recorded when the test administrator observed on their workstation that the participant had successfully completed the task.

If a participant failed to complete a task before the expected amount of time for each task, that task was marked as "Timed Out."

After each task, the test administrator asked the participant, "On a scale from 1 to 5, where 1 is 'Not Satisfied' and 5 is 'Very Satisfied,' how satisfied were you with the ease of use for this task?" This same procedure was conducted for each of the fifteen (15) tasks.

Following completion of the fifteen (15) EHR tasks, the administrator electronically presented to the participant a post-test questionnaire (namely the System Usability Scale (SUS), see Appendix D). After the participant completed the questionnaire, the administrator thanked each participant

for their time and allowed the participant to make any comments on or ask any questions about the system and/or the tasks presented.

For each session, the participant's schedule, demographic information, task success rate, time on task, errors, deviations, verbal responses, and post-test questionnaire were digitally recorded.

The system was then reset to proper test conditions for the next participant.

Usability Metrics

According to the *NIST Guide to the Processes Approach for Improving the Usability of Electronic Health Records* (NIST IR 7741, November, 2010) 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 Insync EMR/PM by measuring participant success rates and errors.
2. Efficiency of InSynch by measuring the average task time and path deviations.
3. Satisfaction with Insync EMR/PM by measuring ease-of-use ratings.

Table 2 details how tasks were scored, errors evaluated, and the time data analyzed:

Data Scoring

Table 2. Scoring Protocols for Effectiveness, Efficiency, and Satisfaction

Measures	Rationale and Scoring
Effectiveness:	
Task Success	<p>A task was counted as “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 was calculated for each task and then divided by the total number of times that task was attempted. Results are provided as a percentage.</p>
Effectiveness:	
Task Failures	<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 “Fail.” No task times were taken for failed attempts.</p> <p>The total number of errors was calculated for each task and divided by the total number of times that task was attempted. Results are presented as the average error rate.</p> <p>Note: Not all deviations are counted as errors</p>
Effectiveness:	
Prompted Successes	<p>Because some tasks are dependent upon the successful completion of previous tasks, participants may receive a limited number of “prompts” to help prepare the system data for the pre-requisites for subsequent tasks.</p> <p>When a participant was able to complete the data entry on a task with 3 or fewer prompts, the task was counted as an “Assisted” competition. No task times were recorded for Assisted completions.</p>
Efficiency:	

Task Deviations	<p>The participant’s path (i.e., steps) through the application was recorded. Deviations occur if for example, the participant navigated to an incorrect screen, clicked on an incorrect menu item, followed an incorrect link, or interacted incorrectly with an on-screen control.</p>
Efficiency:	
Task Time	<p>Each task was timed from the administrator’s prompt “Begin” until said, “Done.” If the participant failed to say, “Done,” timing stopped when the participant stopped performing the task.</p> <p>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.</p>
Satisfaction:	
Ease of Use ratings System Satisfaction	<p>Participant’s subjective impression of the ease of use of the application was measured by administering both a single post-task question as well as two post-session questionnaires.</p> <p>After each task, the participant determined on a scale of 1 to 5 their subjective satisfaction with performance on the task. These data are averaged across participants.</p> <p>To measure participants’ confidence in and likeability of the EHR overall, the testing team administered electronic versions of the System Usability Scale (SUS).</p>

Results

Data Analysis and Reporting

The results of the usability test of the Insync EMR/PM system were analyzed according to the methods described in the Usability Metrics section above and are detailed below. Note that the results should be evaluated relative to the study objectives and goals, as outlined in the study design section above. The data should yield actionable results that, if corrected, yield material, positive impact on user performance.

Reliability

During the entire data collection phase, it was observed that the system provided a consistent and reliable interface to each participant as they completed their tasks. As each participant completed their assigned tasks, the system provided the same information and responded to their input with the same verbiage and using the same mode of communication (e.g. Pop-up message, or embedded assistance). On several occasions, an error screen was displayed when interacting with the EHRUT, however this was always easily remedied by performing a refresh on the browser.

Effectiveness and Efficiency

Table 3 presents a summary of overall task performance showing task, mean time on task, task completion rates, mean path deviations and mean task satisfaction:

Table 3. Usability Test Results

Task #	n	Task Success		Path Deviation		Task Time		Time Deviation		Errors		Task Rating	
		Mean	SD	Observed	Optimal	Mean	SD	Observed	Optimal	Mean	SD	Mean	SD
Task 1: Updating Gender Identity and Triggering Transgender/Non-binary Best Practices Alert													
10	100	0	1.2	6	0:03:06	0:00:48	0:00:06	0:03:00	0.0%	0	4.2	0.6	
Task 2: Providing Feedback on Gender Identity Update													
10	100	0	0	2	0:00:31	0:00:10	0:00:29	0:01:00	0.0%	0	5.0	0.0	
Task 3: Viewing Feedback													
10	100	0	0	4	0:00:42	0:00:19	0:00:18	0:01:00	0.0%	0	5.0	0.0	
Task 4: Adding Medication Nicotine Replacement and Triggering Smoking Cessation Review													
10	90	1	0.9	8	0:02:50	0:00:31	0:01:17	0:02:30	10.0%	1	4.6	0.7	
Task 5: Entering Diagnoses and Triggering Schizophrenia and Pregnancy Risk Alerts													
10	90	1	1.8	12	0:03:47	0:00:41	0:00:47	0:03:00	10.0%	1	4.0	1.1	
Task 6: Modifying Clinical Support Information for Pregnancy-related Risk Assessment													
10	100	0	0.3	10	0:02:40	0:00:34	0:00:40	0:02:00	0.0%	0	4.6	0.5	
Task 7: Entering Lab Results and Triggering Pre-diabetes Alert													
10	60	4	3.2	11	0:04:27	0:01:16	0:01:27	0:03:00	40.0%	4	3.3	0.8	
Task 8: Entering Vital Signs and Triggering Hypertension Alert													
10	100	0	0.1	7	0:01:37	0:00:24	0:00:23	0:02:00	0.0%	0	4.7	0.5	
Task 9: Incorporating an Allergy and Triggering Allergy-Related Alert													
10	90	1	1.5	8	0:02:43	0:01:02	0:00:17	0:03:00	10.0%	1	4.0	0.6	
Task 10: Adding RXs and Triggering Drug/Drug Alert													
10	100	0	0	6	0:00:49	0:00:12	0:00:19	0:00:30	0.0%	0	4.9	0.3	
Task 11: Entering an Embedded Device and Triggering Device-Related Alert													
10	90	1	0.2	8	0:01:35	0:00:50	0:00:25	0:02:00	10.0%	1	4.5	0.5	
Task 12: Completing a Scheduled Appointment and Triggering Abuse Prevention Alert													
10	90	1	1.2	7	0:03:09	0:00:50	0:00:09	0:03:00	10.0%	1	3.6	0.7	
Task 13: Enabling Predictive Decision Support													
10	100	0	0	4	0:00:56	0:00:16	0:00:04	0:01:00	0.0%	0	4.7	0.5	
Task 14: Record and update source attributes for PDSI													
10	100	0	0.1	4	0:01:10	0:00:17	0:00:50	0:02:00	0.0%	0	4.7	0.5	
Task 15: Access Predictive Decision Support Information													
10	100	0	0.4	2	0:00:33	0:00:11	0:00:03	0:00:30	0.0%	0	4.5	0.7	

As Table 3 shows, relative to optimal performance standards as defined by Qualifacts and Brainstorm Ergonomics, participant performance in the Insync EMR/PM usability test was satisfactory. The overall average task completion rate was ninety-four (94) percent.

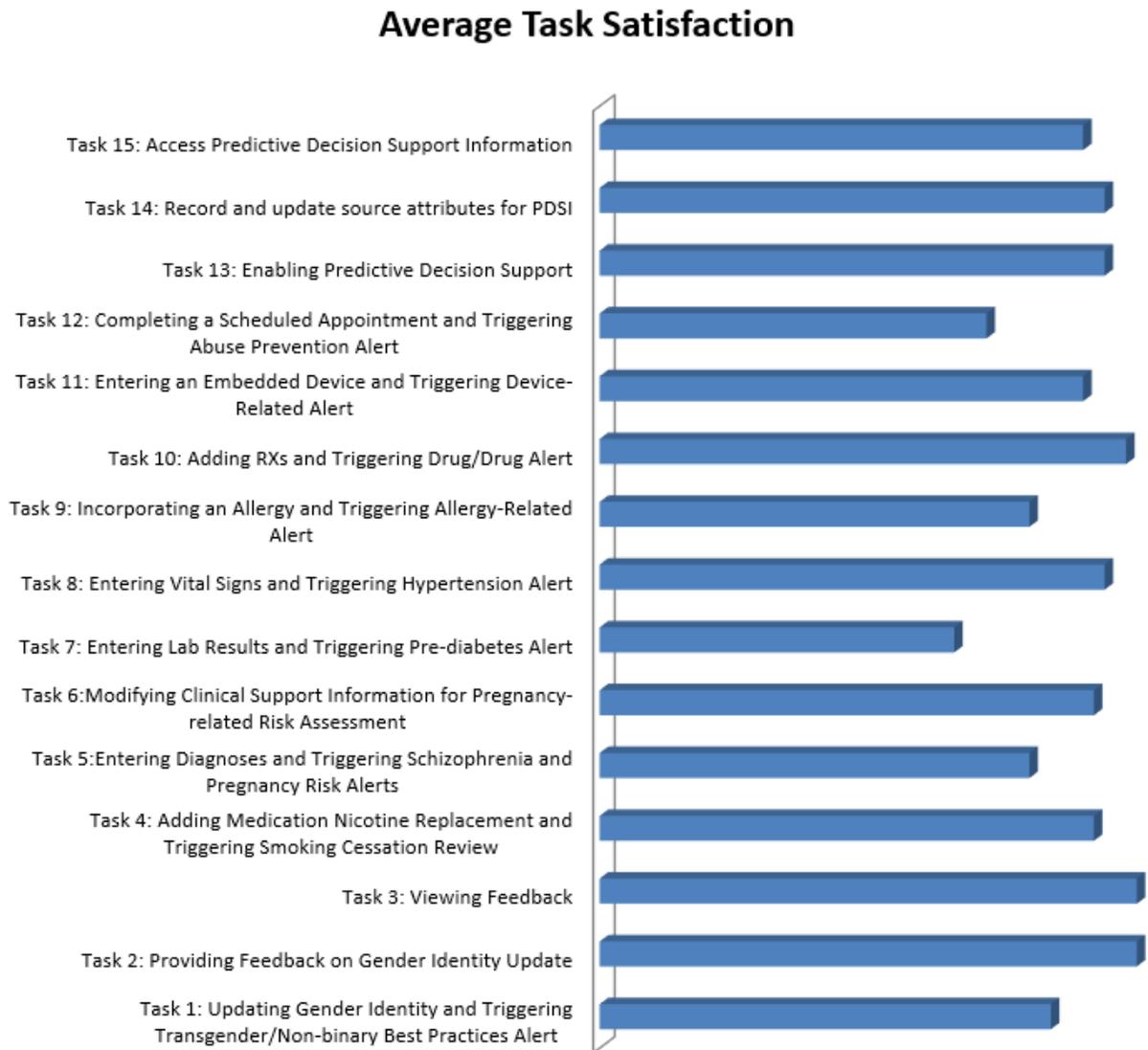
Satisfaction

Individual Task Satisfaction

Participants verbally indicated their satisfaction with the ease of use for each task using a scale of “1” (“Very Difficult”) to “5,” (“Very Easy”). As Figure 1 shows individual task satisfaction

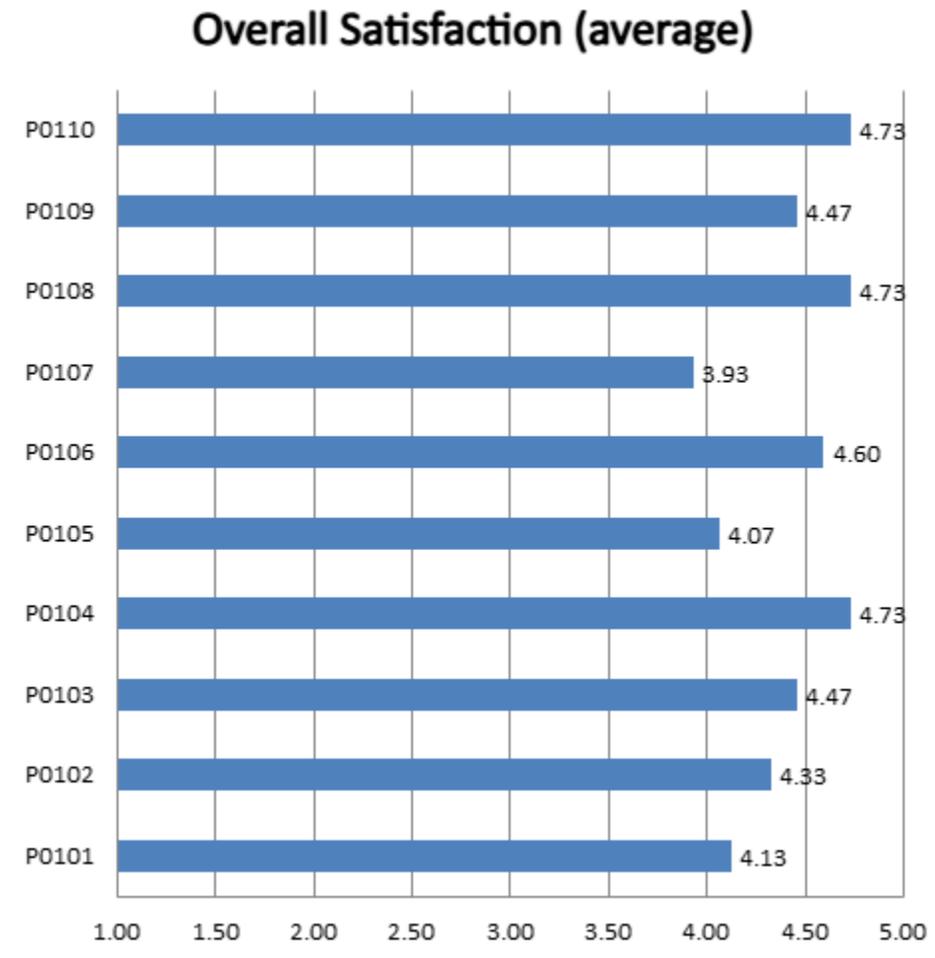
ranged from a low of 3.3 out of 5 on Task 7 (Entering Lab Results) to a high of 5 out of 5 on Tasks 3 and 4 (*Viewing Feedback*).

Figure 1. Satisfaction Ratings of Individual Tasks



Individual Participant Satisfaction

In general, the participants were satisfied with the ease of use of the Insync EMR/PM system. The following chart displays overall satisfaction for each participant:



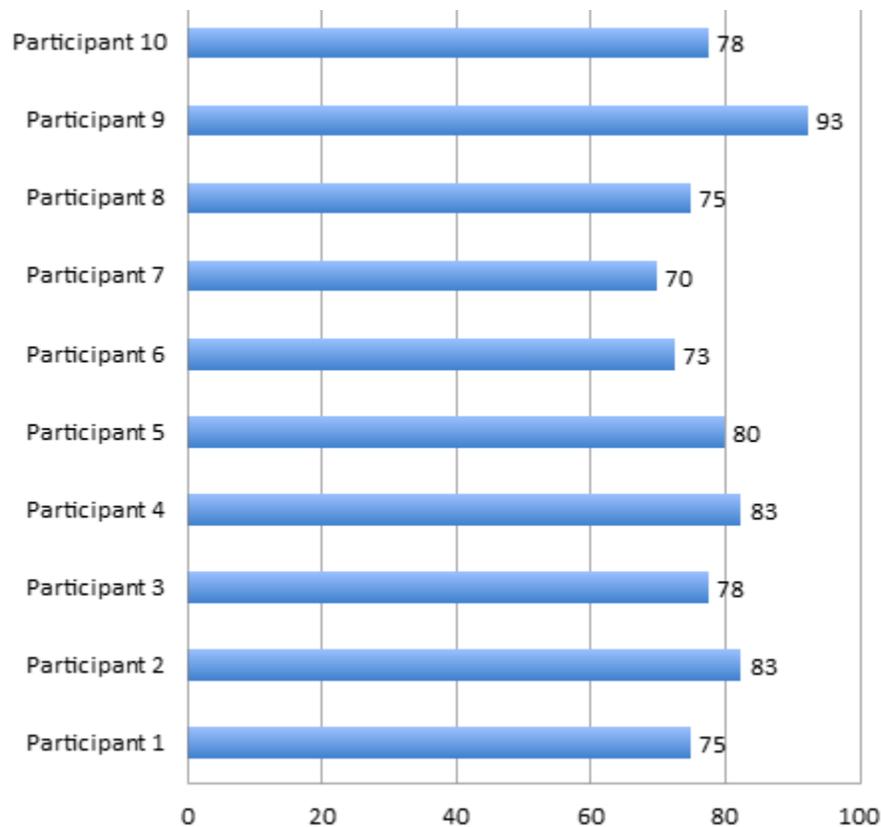
The average overall task satisfaction rate was 4.4 out of 5.

System Usability Scale

The System Usability Scale (SUS) is a simple, 10-item Likert-type attitude scale providing a global subjective assessment of usability from the user’s perspective (John Brooke at Digital Equipment Company developed the SUS in 1986). The SUS scale is scored from 0 to 100; scores under 60 represent systems with less than optimal usability, scores over 80 are considered better than average. See Appendix D for a copy of the SUS.

The mean total SUS score for the Insync EMR/PM was seventy-eight (78) and ranged from a low of seventy (70) and a high of ninety-three (94). Overall, participant-users rated their satisfaction with the Insync EMR/PM system to be within the high-normal-range of a usable and satisfying EHR.

The following chart shows the SUS score by each participant:



Specific Task Result Details

Participant Number	Task 1: Updating Gender Identity and Triggering Transgender/Non-binary Best Practices Alert			
	Task Time	Outcome	# Path Deviations	Task Satisfaction
P0101	3:34	Success	1	4
P0102	3:44	Success	3	3
P0103	3:51	Success	2	4
P0104	2:42	Success	0	5
P0105	3:48	Success	1	4
P0106	3:06	Success	2	4
P0107	3:38	Success	2	4
P0108	2:34	Success	0	5
P0109	2:52	Success	1	4
P0110	1:08	Success	0	5

Expected Time on Task	3:00	(SD)
Average Time on Task	3:06	0:48
Average Task Satisfaction	4.20	0.60
Average #Path Deviations	1.20	0.98
Optimal Number of Steps		6
Percent Success	100%	

Participant Number	Task 2: Providing Feedback on Gender Identity Update			
	Task Time	Outcome	# Path Deviations	Task Satisfaction
P0101	0:16	Success	0	5
P0102	0:25	Success	0	5
P0103	0:31	Success	0	5
P0104	0:38	Success	0	5
P0105	0:51	Success	0	5
P0106	0:34	Success	0	5
P0107	0:35	Success	0	5
P0108	0:37	Success	0	5
P0109	0:19	Success	0	5
P0110	0:21	Success	0	5

Expected Time on Task	1:00	(SD)
Average Time on Task	0:31	0:10
Average Task Satisfaction	5.00	0.00
Average #Path Deviations	0.00	0.00
Optimal Number of Steps		2
Percent Success	100%	

Participant Number	Task 3: Viewing Feedback			
	Task Time	Outcome	# Path Deviations	Task Satisfaction
P0101	1:12	Success	0	5
P0102	0:18	Success	0	5
P0103	0:23	Success	0	5
P0104	0:19	Success	0	5
P0105	0:51	Success	0	5
P0106	0:31	Success	0	5
P0107	0:55	Success	0	5
P0108	0:53	Success	0	5
P0109	1:06	Success	0	5
P0110	0:36	Success	0	5

Expected Time on Task	1:00	(SD)
Average Time on Task	0:42	0:19
Average Task Satisfaction	5.00	0.00
Average #Path Deviations	0.00	0.00
Optimal Number of Steps		4
Percent Success	100%	

Participant Number	Task 4: Adding Medication Nicotine Replacement and Triggering Smoking Cessation Review			
	Task Time	Outcome	# Path Deviations	Task Satisfaction
P0101	3:49	Success	4	3
P0102	1:59	Success	1	5
P0103	2:31	Success	0	5
P0104	2:42	Success	0	5
P0105	3:34	Success	2	4
P0106	2:45	Success	0	5
P0107	3:24	Success	1	4
P0108	2:32	Success	0	5
P0109	2:57	Success	0	5
P0110	3:03	Success	1	5

Expected Time on Task	2:30	(SD)
Average Time on Task	2:50	0:31
Average Task Satisfaction	4.60	0.66
Average #Path Deviations	0.90	1.22
Optimal Number of Steps		8
Percent Success	90%	

Participant Number	Task 5: Entering Diagnoses and Triggering Schizophrenia and Pregnancy Risk Alerts			
	Task Time	Outcome	# Path Deviations	Task Satisfaction
P0101	3:49	Success	4	3
P0102	4:14	Success	3	2
P0103	3:38	Success	1	5
P0104	4:02	Success	0	5
P0105	5:43	Time Out	4	3
P0106	3:04	Success	1	5
P0107	4:04	Success	3	3
P0108	3:14	Success	1	5
P0109	3:58	Success	0	4
P0110	3:57	Success	1	5

Expected Time on Task	3:00	(SD)
Average Time on Task	3:47	0:41
Average Task Satisfaction	4.00	1.10
Average #Path Deviations	1.80	1.47
Optimal Number of Steps		12
Percent Success	90%	

Participant Number	Task 6: Modifying Clinical Support Information for Pregnancy-related Risk Assessment			
	Task Time	Outcome	# Path Deviations	Task Satisfaction
P0101	2:26	Success	1	4
P0102	1:57	Success	0	4
P0103	2:18	Success	0	5
P0104	2:12	Success	0	5
P0105	3:31	Success	1	4
P0106	2:42	Success	0	5
P0107	3:51	Success	1	4
P0108	2:48	Success	0	5
P0109	2:11	Success	0	5
P0110	2:41	Success	0	5

Expected Time on Task	2:00	(SD)
Average Time on Task	2:40	0:34
Average Task Satisfaction	4.60	0.49
Average #Path Deviations	0.30	0.46
Optimal Number of Steps		10
Percent Success	100%	

Participant Number	Task 7: Entering Lab Results and Triggering Pre-diabetes Alert			
	Task Time	Outcome	# Path Deviations	Task Satisfaction
P0101	4:50	Success	3	3
P0102	4:34	Success	2	3
P0103	6:18	Time Out	5	2
P0104	4:32	Success	2	5
P0105	7:50	Time Out	3	3
P0106	4:02	Success	2	4
P0107	6:54	Time Out	4	3
P0108	4:11	Success	3	3
P0109	6:33	Time Out	4	3
P0110	4:33	Success	4	4

Expected Time on Task	3:00	(SD)
Average Time on Task	4:27	1:16
Average Task Satisfaction	3.30	0.78
Average #Path Deviations	3.20	0.98
Optimal Number of Steps		11
Percent Success	60%	

Participant Number	Task 8: Entering Vital Signs and Triggering Hypertension Alert			
	Task Time	Outcome	# Path Deviations	Task Satisfaction
P0101	1:35	Success	0	5
P0102	1:06	Success	0	5
P0103	1:31	Success	0	5
P0104	1:18	Success	0	5
P0105	2:02	Success	1	5
P0106	1:27	Success	0	5
P0107	2:31	Success	0	4
P0108	1:11	Success	0	5
P0109	1:51	Success	0	4
P0110	1:41	Success	0	4

Expected Time on Task	2:00	(SD)
Average Time on Task	1:37	0:24
Average Task Satisfaction	4.70	0.46
Average #Path Deviations	0.10	0.30
Optimal Number of Steps		7
Percent Success	100%	

Participant Number	Task 9: Incorporating an Allergy and Triggering Allergy-Related Alert			
	Task Time	Outcome	# Path Deviations	Task Satisfaction
P0101	2:11	Success	1	5
P0102	1:56	Success	0	5
P0103	2:45	Success	0	4
P0104	3:02	Success	0	4
P0105	3:44	Success	2	3
P0106	2:37	Success	1	4
P0107	5:42	Time Out	4	3
P0108	3:11	Success	3	4
P0109	2:09	Success	1	4
P0110	2:55	Success	3	4

Expected Time on Task	3:00	(SD)
Average Time on Task	2:43	1:02
Average Task Satisfaction	4.0	0.63
Average #Path Deviations	1.50	1.36
Optimal Number of Steps		8
Percent Success	90%	

Participant Number	Task 10: Adding RXs and Triggering Drug/Drug Alert			
	Task Time	Outcome	# Path Deviations	Task Satisfaction
P0101	1:17	Success	0	5
P0102	0:42	Success	0	5
P0103	0:36	Success	0	5
P0104	0:51	Success	0	5
P0105	0:56	Success	0	5
P0106	0:38	Success	0	5
P0107	0:58	Success	0	4
P0108	0:47	Success	0	5
P0109	0:39	Success	0	5
P0110	0:41	Success	0	5

Expected Time on Task	0:30	(SD)
Average Time on Task	0:49	0:12
Average Task Satisfaction	4.9	0.30
Average #Path Deviations	0	0.00
Optimal Number of Steps		6
Percent Success	100%	

Participant Number	Task 11: Entering an Embedded Device and Triggering Device-Related Alert			
	Task Time	Outcome	# Path Deviations	Task Satisfaction
P0101	4:12	Time Out	1	4
P0102	1:20	Success	1	4
P0103	1:10	Success	0	4
P0104	1:33	Success	0	5
P0105	1:47	Success	0	5
P0106	1:35	Success	0	4
P0107	2:03	Success	0	4
P0108	1:08	Success	0	5
P0109	1:43	Success	0	5
P0110	1:55	Success	0	5

Expected Time on Task	2:00	(SD)
Average Time on Task	1:35	0:50
Average Task Satisfaction	4.50	0.50
Average #Path Deviations	0.20	0.40
Optimal Number of Steps		8
Percent Success	90%	

Participant Number	Task 12: Completing a Scheduled Appointment and Triggering Abuse Prevention Alert			
	Task Time	Outcome	# Path Deviations	Task Satisfaction
P0101	3:41	Success	1	2
P0102	2:35	Success	0	4
P0103	2:48	Success	1	4
P0104	3:02	Success	0	4
P0105	5:37	Time Out	3	3
P0106	3:26	Success	1	4
P0107	3:46	Success	3	3
P0108	2:55	Success	0	4
P0109	2:43	Success	1	4
P0110	3:21	Success	2	4

Expected Time on Task	3:00	(SD)
Average Time on Task	3:09	0:50
Average Task Satisfaction	3.60	0.66
Average #Path Deviations	1.20	1.08
Optimal Number of Steps		7
Percent Success	90%	

Participant Number	Task 13: Enabling Predictive Decision Support			
	Task Time	Outcome	# Path Deviations	Task Satisfaction
P0101	0:55	Success	0	4
P0102	0:21	Success	0	5
P0103	0:43	Success	0	5
P0104	0:48	Success	0	4
P0105	1:14	Success	0	5
P0106	0:56	Success	0	5
P0107	1:01	Success	0	5
P0108	0:51	Success	0	5
P0109	1:04	Success	0	4
P0110	1:22	Success	0	5

Expected Time on Task	1:00	(SD)
Average Time on Task	0:56	0:16
Average Task Satisfaction	4.70	0.46
Average #Path Deviations	0.00	0.00
Optimal Number of Steps		4
Percent Success	100%	

Participant Number	Task 14: Record and update source attributes for PDSI			
	Task Time	Outcome	# Path Deviations	Task Satisfaction
P0101	0:55	Success	0	5
P0102	1:10	Success	0	5
P0103	1:08	Success	0	5
P0104	0:58	Success	0	4
P0105	1:38	Success	0	4
P0106	0:54	Success	0	5
P0107	1:39	Success	0	4
P0108	1:19	Success	0	5
P0109	0:47	Success	0	5
P0110	1:08	Success	1	5

Expected Time on Task	2:00	(SD)
Average Time on Task	1:10	0:17
Average Task Satisfaction	4.70	0.46
Average #Path Deviations	0.10	0.30
Optimal Number of Steps		4
Percent Success	100%	

Participant Number	Task 15: Access Predictive Decision Support Information			
	Task Time	Outcome	# Path Deviations	Task Satisfaction
P0101	0:19	Success	0	5
P0102	0:21	Success	0	5
P0103	0:22	Success	1	4
P0104	0:26	Success	0	5
P0105	0:42	Success	2	3
P0106	0:31	Success	0	4
P0107	0:51	Success	1	4
P0108	0:29	Success	0	5
P0109	0:41	Success	0	5
P0110	0:44	Success	0	5

Expected Time on Task	0:30	(SD)
Average Time on Task	0:33	0:11
Average Task Satisfaction	4.50	0.67
Average #Path Deviations	0.40	0.66
Optimal Number of Steps		2
Percent Success	100%	

Discussion of Findings

In general, the participants performed well and felt satisfied with InSync. A few of the participants struggled initially with some portions of a few tasks but in general most were able to successfully complete many of the tasks with little or no difficulty. Participants were mostly able to perform all tasks successfully on their own with no assistance or external documentation. The participant average performance rate was high, as were the overall participant satisfaction rates. The Insync EMR/PM system appears to be a usable EHR.

Effectiveness

Of the fifteen (15) tasks presented, a large majority of the tasks were successfully completed by all the participants. Overall of participants, the mean successful task completion rate was very high with an overall average rate of ninety-four (94) percent indicating that in general the participants had little or no difficulty completing the tasks.

The amount of prior experience with EHR systems was related to successful task performance; participants with more prior experience were more likely to successfully complete tasks quicker than those less prior experience.

Efficiency

Participants who successfully completed tasks generally completed those tasks within an acceptable time. Some tasks were completed more quickly than the calculated optimal time, while several tasks took slightly longer than expected. The tasks that took the longest required the participants to navigate to a particular unfamiliar portion of a page, interact with a workflow, locate and select specific actions. Those tasks may be performed more quickly with a minor update to the information architecture or the user experience.

Some participants made errors when attempting to navigate toward solving their assigned tasks. These errors may be associated with those participants not being familiar with and not understanding the presented information architecture of the Insync EMR/PM system. As noted above, prior experience with EHR systems was related to successful task completion. Similarly, experience and practice with the given system may have positive effects with regard to user efficiency.

Satisfaction

Participants were satisfied with the Insync EMR/PM system; ratings on the SUS (mean = 78 out of a possible 100) demonstrated a high-normal level of satisfaction with the system.

Individual task satisfaction ratings were related to individual user performance. Those participants who were able to successfully complete tasks were also more likely to rank those tasks as satisfying, while those participants who did poorly or were not able to complete a task ranked those tasks as less satisfying. Overall however, the high participant satisfaction with Insync EMR/PM was expected given the high-performance data.

Summary of Major Findings

This evaluation demonstrated that the Insync EMR/PM system is a usable system with a relatively short learning curve. Participants with no experience using the Insync EMR/PM system before the study experienced little initial difficulty understanding the navigation and information architecture. Participants with more experience were able to solve most tasks without difficulty or error.

Risk Analysis

The following table presents a prioritized list of tasks prioritized by the risk of error as observed during the testing.

Table 5. Risk Analysis

Task	Percent Complete	Risk Status
Task 1: Updating Gender Identity and Triggering Transgender/Non-binary Best Practices Alert	100%	None
Task 2: Providing Feedback on Gender Identity Update	100%	None
Task 3: Viewing Feedback	100%	None
Task 4: Adding Medication Nicotine Replacement and Triggering Smoking Cessation Review	90%	Low
Task 5: Entering Diagnoses and Triggering Schizophrenia and Pregnancy Risk Alerts	90%	Low
Task 6: Modifying Clinical Support Information for Pregnancy-related Risk Assessment	100%	None
Task 7: Entering Lab Results and Triggering Pre-diabetes Alert	60%	Moderate
Task 8: Entering Vital Signs and Triggering Hypertension Alert	100%	None
Task 9: Incorporating an Allergy and Triggering Allergy-Related Alert	90%	Low
Task 10: Adding RXs and Triggering Drug/Drug Alert	100%	None
Task 11: Entering an Embedded Device and Triggering Device-Related Alert	90%	Low
Task 12: Completing a Scheduled Appointment and Triggering Abuse Prevention Alert	90%	Low
Task 13: Enabling Predictive Decision Support	100%	None
Task 14: Record and update source attributes for PDSI	100%	None
Task 15: Access Predictive Decision Support Information	100%	None

Areas for Improvement

The following is a partial list of potential areas for improvement. Making these and other minor enhancements will improve the overall user experience of the Insync EMR/PM system and increase the effectiveness, efficiency, and satisfaction for both experienced and novice Insync EMR/PM users

1. Nested Scrolling

Nested scrolling structures caused confusion and difficulty in navigation, as users struggled to locate specific content within multiple layers of scrollable areas. This was particularly problematic on smaller screens or with limited viewport sizes.

Suggestion:

- **Simplify Layouts:** Avoid embedding scrollable sections within other scrollable sections. Opt for a single-scroll interface where possible.

2. Unsorted Lists

Unsorted lists made it difficult for users to find items quickly, resulting in frustration and inefficiency. This was especially evident in lists with numerous entries or varied categories.

Suggestion:

- **Sort Alphabetically or Categorically:** Arrange lists in a logical order (e.g., alphabetically, by relevance, or by category).

3 . Reliance on Small and Unclear Icons

Problem:

Small, ambiguous icons led to misinterpretation and hindered usability. Users often could not decipher the icons' meanings without additional context or labels.

Suggestions:

- **Add Text Labels:** Supplement icons with descriptive text to clarify their function.
- **Ensure Accessibility:** Design icons with sufficient size and contrast to meet accessibility standards (e.g., WCAG guidelines).
- **Consistent Iconography:** Use universally recognized and consistent icon designs across the interface.

Use of NISTIR 7741 in Safety-Enhanced Design

Insync EMR/PM has been following a custom User Centered Design process during EHR development that closely matches with the NISTIR 7741 standard. This demonstrates how our internal process is aligned with the principles summarized in NISTIR 7741. This process is utilized throughout our EHR development for all criteria/feature sets

The usability evaluation conducted for this project adhered to the guidelines outlined in NISTIR 7741: NIST Guide to the Processes Approach for Improving the Usability of Electronic Health Records, a comprehensive framework for validating the usability and safety of electronic health record (EHR) systems. This report emphasizes processes to identify and mitigate usability issues that could compromise patient safety. Its principles were applied across all phases of the design and development process to ensure usability and safety standards were met, aligning the project with both industry and federal requirements for safety-enhanced design. Citation: National Institute of Standards and Technology (NIST). (2010). NIST Guide to the Processes Approach for Improving the Usability of Electronic Health Records (NISTIR 7741). Available at: <https://www.nist.gov/publications/nist-guide-processes-approach-improving-usability-electronic-health-records>.

Appendices

Appendix A: Recruiting Screener

Are you male or female?

Have you participated in a focus group or usability test in the past 6 months?

Do you, or does anyone in your home work in marketing research, usability research, and/or web design?

Do you, or does anyone in your home, have a commercial or research interest in an electronic health record software or consulting company?

Which of the following best describes your age?

20-29, 30-39, 40-49, 50-59, 60-69, 70-79, 80-89, 90-99, 100 and older.

Which of the following best describes your education level?

1. No high school diploma
2. High school graduate, diploma or the equivalent
3. Some college credit, no degree
4. Trade technical vocational training
5. Associate degree
6. Bachelor's degree
7. Master's degree
8. Doctorate degree (e.g., MD, DNP, DMD, PhD)

Do you require any assistive technologies to use a computer?

Please describe your medical or nursing credentials

What is your current job title?

How long have you held this position? (number of years):

What type of facility do you work in and what is your role there?

How are medical records handled at your (main) workplace?

____All Paper ____Some Paper/Some Electronic ____All Electronic

How many EHRs do you use or have you worked with?

How many years have you used an electronic health record?

How many years have you used the Insync EMR/PM system?

About how many hours per week do you spend using a computer?

What computer platform(s) do you usually use?

In the last month, about how often have you used an electronic health record?

_____ Did not use last month

____ Every day

_____ A few times a week.

Appendix B: Informed Consent Form

Brainstorm Ergonomics would like to thank you for participating in this study. The purpose of this study is to evaluate an electronic health records system. If you decide to participate, you will be asked to perform several tasks using the prototype and give your feedback. The study will last about 60 minutes.

Agreement

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

I understand and agree that the purpose of this study is to make software applications more useful and usable in the future.

I understand and agree that the data collected from this study may be shared outside of Brainstorm Ergonomics. I understand and agree that data confidentiality is assured, because only de-identified data – i.e., identification numbers not names – will be used in analysis and reporting of the results.

I agree to immediately raise any concerns or areas of discomfort with the study administrator. I understand that I can leave at any time.

Please check one of the following:

YES, I have read the above statement and agree to be a participant.

NO, I choose not to participate in this study.

Signature: _____ **Date** _____

Appendix C: Participant Guide

Overview:

In this test, you will evaluate a new Clinical Support System that provides alerts based on patient data. For each task, you will first activate a specific Clinical Support Intervention, then perform actions to trigger an alert.

For these scenarios, you are Dr. Vickie Alexander, working with a patient named "Paige Turner." Your goal is to complete each task as instructed.

The test administrator may assist by helping you navigate towards the necessary screens after each task.

Task 1: Updating Gender Identity and Triggering Transgender/Nonbinary Best Practices Alert

In this task, as well as many of the others, you will first be performing an administrative task of enabling an alert, followed by entering specific data that will trigger that specific alert

Step 1: From the Clinical Decision Support Intervention page in the administrative settings, scroll down to the “***Transgender and Nonbinary Best Practices***” rule and ensure that “**Vickie Alexander**” is selected in the “Users Associated with the Intervention” field, so that it will trigger an alert.

Make sure that the system is updated to reflect this and any other possible changes

Step 2: From the Patient information page, update Paige’s gender identity to “**Genderqueer, neither exclusively male nor female**,” in the system and select **Save**.

The system will trigger an alert related to “***Transgender and Nonbinary Best Practices***”.

Task 2: Providing Feedback on Gender Identity Update

After updating the patient's gender identity, Dr. Alexander will provide feedback on the Decision Support alert triggered in Task 1.

Step 1: Reflect on the “Gender Identity: Transgender and Nonbinary Best Practices” alert displaying from the previous task.

Now, provide quick feedback on the relevance, clarity, and usefulness of the information provided.

Example of feedback you might give is: “**The alert was helpful**”

Once you have entered your feedback, select **Reviewed** for the alert to close

The task is complete once you have entered your custom feedback

Task 3: Viewing Feedback

Dr. Alexander will now review the feedback provided on the *Transgender and Nonbinary Best Practices* alert from the previous task

From the Clinical Decision Support Intervention Feedback in Administration section

Locate and review the feedback you have just entered regarding the *Transgender and Nonbinary Best Practices* alert.

Once you have read the feedback, acknowledge that you have seen it by pointing to the feedback with your mouse.

Task 4: Adding Medication Nicotine Replacement and Triggering Smoking Cessation Review

Paige Turner is interested in quitting smoking and has purchased Nicorette gum. Dr. Alexander will add *Nicorette 2mg Chewing Gum* to the patient's medication list to assist in tracking her smoking cessation journey.

First you be performing an administrative task of enabling an alert, followed by entering specific data that will trigger that specific alert

Step 1: From the Clinical Decision Support Intervention page in the administrative settings, scroll down to the "**Medications: Smoking Cessation Review**" rule and ensure that "**Vickie Alexander**" is selected in the "Users Associated with the Intervention" field, so that it will trigger an alert.

Make sure that the system is updated to reflect this and any other possible changes

Step 2:

From the patient's facesheet add Medication for *Nicorette 2 mg gum*

The system will trigger an alert related to "**Medications: Smoking Cessation Review**" when you exit the medication entry page.

Task 5: Entering Diagnoses and Triggering Schizophrenia and Pregnancy Risk Alerts

Dr. Alexander is diagnosing the patient with two conditions: is diagnosing Paige with two conditions: *Schizophrenia (F20.0)* and *Alcohol abuse (F10.10)*. These conditions will trigger related Decision Support alerts.

First you be performing an administrative task of enabling an alert, followed by entering specific data that will trigger that specific alert

Step 1: From the Clinical Decision Support Intervention page in the administrative settings, scroll down to the “**Diagnosis: Schizophrenia Information**” and “**Pregnancy Risks Due to Alcohol Abuse**” rules and ensure that “**Vickie Alexander**” is selected in the “Users Associated with the Intervention” field, so that it will trigger an alert.

Step 2: From the patient’s facesheet From the patient’s facesheet Enter the diagnosis for “**Schizophrenia (F20.20)**.”

The system will trigger a *Schizophrenia Information* alert.

Step 3: From the patient’s facesheet Enter the diagnosis for “**Alcohol abuse (F10.10)**.”

This will trigger an alert related to evaluating *Pregnancy risks due to alcohol abuse*

Verbally acknowledge that you have seen both.

Task 6: Modifying Clinical Support Information for Pregnancy-Related Risk Assessment

This is an administrative task, where you will be updating a clinical support rule:

From the Clinical Decision Support Intervention page in the administrative settings, scroll down to the “*Pregnancy risks due to alcohol abuse*” rule and update the following information:

- Bibliographic Citation: “*Int J Ment Health Addict. 2023; 21(2): 1220–1239*”
- Developer: “*Springer Nature*”
- Funding Source: “*Academic Review*”

Once you have entered this data into the Clinical Support system, save the update and verbally acknowledge that you have saved the information.

Task 7: Entering Lab Results and Triggering Prediabetes Alert

The patient has had her blood glucose levels tested, and you will now enter the lab result into her medical record. The result indicates an elevated glucose level of *100 mg/dL*.

First you be performing an administrative task of enabling an alert, followed by entering specific data that will trigger that specific alert

Step 1: From the Clinical Decision Support Intervention page in the administrative settings, scroll down to the “**Lab Results: Prediabetes Glucose Lab Result**” rule and ensure that “**Vickie Alexander**” is selected in the “Users Associated with the Intervention” field, so that it will trigger an alert.

Step 2: From the “Encounter in progress—Plan and Visit Codes section enter the lab result into the system, by navigating to the add Lab results page and recording the abnormal glucose level.

Select “<*Glucose Tolerance Test*>” as the test and enter her results as

- **Observation Identifier:** GTT
- **Result Value:** 100
- **Units:** 1
- Select **Add**

The system will trigger an alert related to “ *Prediabetes Glucose Lab Result*.”

Verbally acknowledge that you have seen the alert

Task 8: Entering Vital Signs and Triggering Hypertension Alert

Dr. Alexander measures the patient's resting blood pressure and records a reading of *140/80* in her medical profile.

First you be performing an administrative task of enabling an alert, followed by entering specific data that will trigger that specific alert

Step 1: From the Clinical Decision Support Intervention page in the administrative settings, scroll down to the "***Vital Signs: Possible Hypertension***" rule and ensure that "**Vickie Alexander:**" is selected in the "Users Associated with the Intervention" field, so that it will trigger an alert.

Step 2: From the Vitals section of the patient FaceSheet, record Paige's blood pressure in her *medical profile*.

: Enter a "***BP Systolic/Diastolic of 140/80***" and then save the information into her record

This action will trigger an alert related to "***Possible hypertension***."

Verbally acknowledge that you have seen the alert

Task 9: Incorporating an Allergy and Triggering Allergy-Related Alert

Dr. Alexander is seeing a patient for a routine appointment. The patient reports that they were recently seen at Neighborhood Physicians Practice and that they sent over some documentation about a new allergy to all Penicillin antibiotics. The medical records department has uploaded this information to the document management section of Paige's records.

First you be performing an administrative task of enabling an alert, followed by entering specific data that will trigger that specific alert

Step 1: From the Clinical Decision Support Intervention page in the administrative settings, scroll down to the "**Allergies: Penicillin Allergy Info**" rule and ensure that "**Vickie Alexander**:" is selected in the "Users Associated with the Intervention" field, so that it will trigger an alert.

Step 2: From the Medical Reconciliation section, Locate the allergy details of the clinical summary (Continuity of Care - CCD) attachment

Step 3: Add/merge the Penicillin allergy from the summary to Paige's Final Reconciled List of allergies and save it

The system will now display a *Penicillins* allergy alert

Verbally acknowledge that you have seen the information.

Task 10: Prescribing Prescription and Triggering Drug/Drug Interaction Alert

Dr. Alexander is entering medications for his patient

Step 1: You will enter a prescription for: “**Amoxicillin 250mg Oral Capsule**”

Step 2: Begin to enter a prescription for: “**Amoxicillin 250mg Oral Capsule**” and select it once it populates.

The system will trigger an alert warning of a *Drug/Drug interaction*.

Task 11: Entering an Embedded Device and Triggering Device-Related Alert

The patient has recently had a *Cochlear Nucleus Hybrid L24 cochlear implant* inserted, and Dr. Alexander needs to record the device in her medical record.

First you be performing an administrative task of enabling an alert, followed by entering specific data that will trigger that specific alert

Step 1: From the Clinical Decision Support Intervention page in the administrative settings, scroll down to the “**Device: Cochlear Nucleus Hybrid L24 cochlear implant**” rule and ensure that “**Vickie Alexander**” is selected in the “Users Associated with the Intervention” field, so that it will trigger an alert.

Step 2: From the History/Medical History section of the encounter, enter the cochlear implant device information into the patient’s record, including the UDI number

Once you begin entering the UDI number, you will see it populate,

Enter the following: **00643169007222** for UDI

(For your convenience, the UDI number will be copied into the clipboard)

The system will now trigger an alert providing relevant information about the device

Verbally acknowledge that you have seen the information.

Task 12: Completing a Scheduled Appointment and Triggering Abuse Prevention Alert

Dr. Alexander is seeing a patient for a Preventative Medicine Counseling visit.

First you be performing an administrative task of enabling an alert, followed by entering specific data that will trigger that specific alert

Step 1: From the Clinical Decision Support Intervention page in the administrative settings, scroll down to the “**Procedure: Abuse Prevention**” rule and ensure that “**Vickie Alexander**: is selected in the “Users Associated with the Intervention” field, so that it will trigger an alert.

Step 2: From the Plan/Visit Codes section of the encounter in progress, Locate and select the PREVENT MED COUNSEL7RISK FACTOR SPX- 15MIN (99401). item

The system will trigger an alert related to *Abuse Prevention*.

Verbally acknowledge that you have seen the information.

Task 13: Enabling Predictive Decision Support

This is an administrative task, where you will be updating a Predictive Decision Support rule:

From the Predictive Decision Support Interventions administration screen search for an inactive rule named: “**predictive decisioning**” in the smart search

and select it to enable it

The system will prompt you to confirm activation of this record, select **YES** to proceed.

Verbally acknowledge when you are done

Task 14: Record and update source attributes for PDSI

This is an administrative task, where you will be updating a Predictive Decision Support rule:

Step 1: From the “Predictive Decision Support Interventions” page, locate the section titled: “***Intended use of the intervention***”

and update the text to

“Calculates the risk of having a future heart attack, stroke, or other major heart disease in the next 10 years, in patients without Diabetes Mellitus and without established cardiovascular disease who are between 45 and 80 years of age.”

Locate the section titled: “***Additional Source Attributes***”

And modify the tests so that it contains:

“All information is for demonstration purposes only. No endorsement is implied by Qualifacts, nor any discrimination against similar brands, products or services not mentioned. No warranties are provided regarding the accuracy of any information related to this example.”

Make sure the updates have been recorded and tell us when you are done.

Task 15: Access Predictive Decision Support Information

Dr. Alexander will now access the Predictive Decision Support Information and view the source attributes that you have just entered

Step 1: Navigate to the **Predictive Decision Support Interventions *In Tools*** and select once it appears

Step 2: Select the **URL** link to launch the specific **Predictive Decision Support Intervention**. This will take you to the intervention's detailed page

Once you have read the *source attribute* information, acknowledge that you have seen it by pointing to it with your mouse.

Appendix D: System Usability Scale Questionnaire

	Strongly disagree				Strongly agree
1. I think that I would like to use this system frequently	<input type="checkbox"/>				
	1	2	3	4	5
2. I found the system unnecessarily complex	<input type="checkbox"/>				
	1	2	3	4	5
3. I thought the system was easy to use	<input type="checkbox"/>				
	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	<input type="checkbox"/>				
	1	2	3	4	5
5. I found the various functions in this system were well integrated	<input type="checkbox"/>				
	1	2	3	4	5
6. I thought there was too much inconsistency in this system	<input type="checkbox"/>				
	1	2	3	4	5
7. I would imagine that most people would learn to use this system very quickly	<input type="checkbox"/>				
	1	2	3	4	5
8. I found the system very cumbersome to use	<input type="checkbox"/>				
	1	2	3	4	5
9. I felt very confident using the system	<input type="checkbox"/>				
	1	2	3	4	5
10. I needed to learn a lot of things before I could get going with this system	<input type="checkbox"/>				
	1	2	3	4	5