

EHR Usability Test Report of digiChart 9.6

Report based on ISO/IEC 25062:2006 Common Industry Format for Usability Test Reports
digiChart 9.6

Date of Usability Test: 01/08/2018 – 01/22/2018

Date of Report: 01/23/2018

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EXECUTIVE SUMMARY

A usability test of digiChart 9.6 OBGYN was conducted between January 8th and January 22nd via WebEx Remote Sessions or by on-site visits by members of the digiChart product team. The purpose of this test was to provide evidence of usability in the EHR Under Test (EHRUT) and identify areas for incremental usability improvement.

20 participants (7 providers and 13 clinical support staff) matching the digiChart product’s target demographic criteria contributed in the usability test, using the EHR in simulated but representative tasks.

During the 60-minute one-on-one usability sessions, each participant was greeted by the administrator and asked to review and sign a non-disclosure/consent form (see [Appendix 2](#)). Participants were instructed that they could withdraw at any time. All participants had prior experience with the EHR, but had never used certain parts of the system, due to new development.

The administrator introduced the test and instructed participants to complete a series of tasks (presented randomly one at a time) using the EHR and recorded user performance data. The administrator did not give the participant assistance in how to complete the task (and if it became necessary, that task was marked as failed).

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

1. 170.315(a)(1) Computerized provider order entry – medications
2. 170.315(a)(2) Computerized provider order entry – laboratory
3. 170.315(a)(3) Computerized provider order entry – diagnostic imaging
4. 170.315(a)(4) Drug-drug, drug-allergy interaction checks
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

Each participant’s interactions with the EHR were recorded for subsequent analysis. The following types of data were collected:

- 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 tasks and system

All participant data was de-identified to avoid linking the identity of the participant to the data collected. Following the conclusion of the testing, participants were asked to complete a post-test questionnaire.

Performance Data

Various recommended metrics, in accordance with the examples set forth in the NIST Guide to the Processes Approach for Improving the Usability of Electronic Health Records, were used to evaluate the usability of the EHR. The following is a summary of the performance and rating data collected on the EHR.

Providers

Measure Task	N	Task Successes	Path Deviation	Task Time		Errors	Task Ratings (5=Easy)
	#	Mean (SD)	Deviations (Observed / Optimal)	Mean (SD)	Deviations (Observed / Optimal)	Me e	Mean (SD)
60 seconds = 1							
Record Medication Order (13 Seconds)	10	100%	6/6	11.29	71/25 284%	0	0.4
Change Medication Order (10 Seconds)	10	90%	6/6	15.84	42/10 420%	0	0.63
Access Medication Order (10 Seconds)	10	90%	2/2	48.83	33/10 330%	0	0.63
Record Laboratory Order (10 Seconds)	10	100%	6/6	14.62	50/10 500%	0	0.47
Change Laboratory Order (38 Seconds)	10	100%	5/5	13.46	36/38 95%	0	0.67
Access Laboratory Order (11 Seconds)	10	90%	4/4	49.94	31/11 282%	0	0.31
Record Radiology Order (14 Seconds)	10	90%	6/6	22.55	62/14 443%	0	0.87
Change Radiology Order (90 Seconds)	10	90%	5/5	8.92	34/90 38%	0	0.42
Access Radiology Order (90 Seconds)	10	90%	4/4	11.04	31/90 34%	0	1.07
CPOE Drug-Drug Interaction (120 Seconds)	10	80%	8/8	4.92	62/80 78%	0	1.32

CPOE Drug-Allergy Interaction (120 Seconds)	10	100%	8/8	68.61	134/80 168%	0	1.2
Adjust Severity Level of a drug-drug interaction (120 Seconds)	10	90%	12/12	38.42	95/100 95%	0	0.57
Record a problem list (120 Seconds)	10	90%	7/7	40.88	66/38 174%	0	0.66
Change a problem on the problem list (120 Seconds)	10	90%	8/8	23.70	47/48 98%	0	1.23
Display the Active Problem List (120 Seconds)	10	80%	2/2	17.27	42/20 210%	0	0.43
Display the Historical Problem List (120 Seconds)	10	70%	3/3	6.82	28/25 112%	0	1.12
Record a Medication to the medication list (120 Seconds)	10	100%	9/9	24.91	83/70 119%	0	0.67
Change a Medication to the medication list (120 Seconds)	10	100%	11/11	26.67	123/60 205%	0	1.2
Display the active medication list (120 Seconds)	10	100%	2/2	12.18	33/20 165%	0	0.40
Display the historical medication list (120 Seconds)	10	80%	3/3	17.02	37/24 154%	0	0.64
Incorporate a CCDA and conduct reconciliation of information with information currently in patients record (120 Seconds)	10	10%	14/14	0	149/120 124%	0	0
Generate a new CCDA with reconciled data (120 Seconds) No one could complete task	10	0%	N/A	N/A	N/A	0	N/A
Create a new prescription (120 Seconds)	10	80%	13/13	32.69	121/70 172%	0	0.66

Change a prescription (120 Seconds)	10	40%	7/6	29.58	100/60 167%	0	0.83
Cancel prescription (120 Seconds)	10	50%	8/8	34.37	61/40 153%	0	0.49
Refill prescription (120 Seconds)	10	50%	7/7	43.61	78/42 186	0	1.47
Receive fill status notification (120 Seconds)	10	50%	7/7	11.38	48/30 160%	0	0.40
Request and receive medication history information (120 Seconds)	10	30%	8/8	11.90	50/50 100%	0	0

The System Usability Scale was used to score participants' subjective satisfaction based on their overall experience with the EHR. The overall score was 80.

¹ See Tullis, T. & Albert, W. (2008). *Measuring the User Experience*. Burlington, MA: Morgan Kaufman (p. 149). Broadly interpreted, scores under 60 represent systems with poor usability; scores over 80 would be considered above average.

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

Major findings

- Incorporating and generating CCD files regarding the application was initially poorly implemented. This is a great opportunity to introduce this topic into a form of continued education regarding application functionality.

Additional issues:

- Parameters are needed to instruct the end user on how to properly complete certain electronic prescription tasks to ensure that users utilize this functionality. Areas of focus of this future initiative include how to fulfill change requests, fill status notifications and how to utilize the medication history information tool.

Areas for improvement

- Having an all electronic prescribing items in one area of the application would reduce provider workflow.

Risks and Likelihood of Re-Occurrence

- The potential risks with not being able to properly work incoming CCD files do include the possibility of not reviewing a full incorporated medical record. In order to reduce the likelihood of re-occurrence, we will providing continuing education in the future to our customers regarding the proper usage of CCD files. We will also be implementing continuing education regarding the newly implemented electronic prescription tasks.

Clinical Support Staff

Task	Measure	N	Task Success	Path Deviation	Task Time		Errors	Task Ratings (5=Easy)
		#	Mean (SD)	Deviations (Observed / Optimal)	Mean (SD)	Deviations (Observed / Optimal)	Mean (SD)	Mean (SD)
	60 seconds = 1							
	Record Medication Allergy List (120 Seconds)	10	100%	8/8	25.24	64/45 142%	0	0.30
	Change Medication Allergy List (120 Seconds)	10	100%	8/8	17.49	54/35 154%	0	0.42
	Access Medication Allergy List (120 Seconds)	10	90%	2/2	13.92	29/25 116%	0	0
	Record a patient's demographics (120 Seconds)	10	70%	4/4	46.20	127/120 105%	0	1.28
	Change a patient's demographics (120 Seconds)	10	70%	5/5	48.29	140/100 140%	0	1.67
	Display a patient's changed demographics (120 Seconds)	10	80%	3/3	9.69	25/16 156%	0	0
	Record a medication allergy (120 Seconds)	10	100%	8/8	24.91	51/40 128%	0	0.60
	Change a medication allergy (120 Seconds)	10	100%	8/8	26.67	49/30 163%	0	0.66
	Display the active medication allergy list (120 Seconds)	10	100%	2/2	12.18	25/20 125%	0	0
	Display the historical medication allergy list (120 Seconds)	10	70%	6/6	17.02	32/30 106%	0	0.76
	Add CDSR – Problem List (120 Seconds)	10	20%	16/16	25	125/110 113%	0	2
	Add CDSR – Medication List (120 Seconds)	10	20%	17/17	14	114/110 103%	0	0.5
	Add CDSR – Medication Allergy List (120 Seconds)	10	30%	14/14	41.35	133/110 121%	0	0
	Add CDSR – At least one demographic (120 Seconds)	10	30%	14/14	8.99	61/110 55%	0	0.94

Add CDSR – Laboratory Test (120 Seconds)	10	30%	16/16	19.61	88/110 80%	0	1.25
Add CDSR – Vital Signs (120 Seconds)	10	30%	15/15	15.11	78/110 71%	0	1.25
Add CDSR – Combination of at least 2 of the elements above (120 Seconds)	10	30%	17/17	10.21	100/110 90%	0	1.25
Trigger CDSR for Medication List (120 Seconds)	10	10%	10/10	0	53/60 88%	0	N/A
View the intervention/resource info using the info button standard for data elements in the problem list, meds list and demographics (120 Seconds)	10	20%	17/17	111.5	198/120 165%	0	1.5
Trigger the CDS interventions/resources based on data elements in the problem list, medication allergy list by incorporating patient information from a Transition of Care/Referral Summary (120 Seconds) No one could complete	10	0%	N/A	0	N/A	0	N/A
Access the following attributes for a triggered CDS interventions: bibliographic citation, developer, funding source, release/revision date (120 seconds)	10	100%	4/4	18.42	32/16 200%	0	1.2
Record UDI (120 Seconds)	10	80%	7/7	87.47	159/85 187%	0	1.41
Change the UDI status (120 Seconds)	10	70%	7/7	68.87	134/50 268%	0	1.28
Access UDI, device description, identifiers and attributes (120 seconds)	10	40%	4/4	10.99	26/30 87%	0	0

The System Usability Scale was used to score participants' subjective satisfaction with the system based on their overall experience with the EHR. The overall score was 67.

² See Tullis, T. & Albert, W. (2008). Measuring the User Experience. Burlington, MA: Morgan Kaufman (p. 149). Broadly interpreted, scores under 60 represent systems with poor usability; scores over 80 would be considered above average.

In addition to the performance data, we recorded the following qualitative observations.

Major Findings

Major findings include:

- Clinical Decision Support Rules are not utilized on a daily basis. Because of this, users forget the workflow.
- Transitions of Care are not widely utilized at this time. This area of the application will be utilized as more providers begin electronically sending TOCs.

Areas for Improvement

- The Clinical Decision Support Module could benefit from adding functionality to reduce clicks. The module could also be given a more modern look and feel.

Risks and Likelihood of Re-Occurrence

- The biggest risk associated with the findings from this portion of the study are as follows:
 - Clinical Decision Support Rules
 - These are designed to promote additional alerts to important medical issues. Not utilizing these could potentially affect the care of individual patients who may be due for specific tests such as mammograms.
 - In order to reduce the likelihood of reoccurrence, digiChart will be implementing a series of educational webinars. Utilization of Clinical Decision Support Rules will be included as a subject for these webinars.
 - Transitions of Care
 - Not knowing how to incorporate an incoming Transition of Care can adversely affect how a patient is treated based off of an opinion of an outside practitioner.
 - As mentioned above, educational webinars will be implemented in order to reduce the likelihood of reoccurrence. The reconciliation process of incoming Transitions of Care will be included in these series of webinars.

INTRODUCTION

The EHRUT(s) tested for this study was digiChart 9.6 OB-GYN EHR, which is an electronic health record (EHR) system offering comprehensive clinical documentation, workflow, and Meaningful Use compliance reporting in the OBGYN practice.

The usability testing attempted to represent realistic exercises and conditions. The purpose of this study was to test and validate the usability of the current user interface, and provide evidence of usability in the EHR Under Test (EHRUT). To this end, measures of effectiveness, efficiency and user satisfaction, such as time to complete a given tasks, errors made, and deviation from the tested task were captured during the usability testing.

METHOD

PARTICIPANTS

A total of 20 participants were tested on the EHRUT(s). Participants in the test were involved in OBGYN practices, and their roles included Physician, Billing, MA, and Nurse. Participants were recruited by digiChart. In addition, participants had no direct connection to the development of or organization producing the EHRUT(s). Participants were not from the testing or supplier organization. Participants were given the opportunity to have the same orientation and level of training as the actual end users would have received.

For the test purposes, end-user characteristics were identified and translated into a recruitment screener used to solicit potential participants from a list of current digiChart customers. The screener is listed in the appendix.

Providers

The following table summarizes the characteristics of the providers who participated in the usability test, including demographics, professional experience, computing experience, and use of assistive technology. Participant names were replaced with Participant IDs so that data cannot be tied back to identities.

	Part ID	Gender	Age	Education	Occupation	Professional Experience	Computer Experience	Product Experience	Assistive Technologies
1	11	F	30-39	Doctorate	Physician	4-6 years	20-29 years	4-6 years	N
2	12	M	60-69	Doctorate	Physician	40-49 years	10-19 years	4-6 years	N
3	13	F	40-49	Master Degree	Nurse Practitioner	7-9 years	1-3 years	Less than 1 year	N
4	6	F	18-29	Master Degree	Nurse Practitioner	1-3 years	4-6 years	Less than 1 year	N
5	18	F	40-49	Doctorate	Physician	10-19 years	10-19 years	7-9 years	N

6	1	F	40-49	Doctorate	Physician	10-19 years	10-19 years	7-9 years	N
7	20	M	40-49	Doctorate	Physician	10-19 years	10-19 years	10 or more years	Y

Participants were scheduled for 60-minute sessions. A minimum of 60 minutes was reserved between each session for debrief by the administrator and data logger and to reset systems to proper test conditions. A spreadsheet was used to track the participant schedule.

Clinical Support Staff

The following table summarizes the characteristics of the Clinical Support Staff who participated in the usability test, including demographics, professional experience, computing experience, and use of assistive technology. Participant names were replaced with Participant IDs so that data cannot be tied back to identities.

	Part ID	Gender	Age	Education	Occupation	Professional Experience	Computer Experience	Product Experience	Assistive Technologies
1	23	F	30-39	Technical Certification	LPN	4-6 years	20-29 years	Less than 1 year	N
2	22	F	18-29	Bachelor degree	MA	1-3 years	7-9 years	Less than 1 year	N
3	15	F	50-59	Other: LPN	LPN	10-19 years	30-39 years	1-3 years	N
4	3	F	30-39	High School	Office Administrator	1-3 years	20-29 years	1-3 years	N
5	4	F	40-49	Technical Certification	MA	10-19 years	10-19 years	1-3 years	N
6	5	F	40-49	Associate Degree	MA	10-19 years	4-6 years	4-6 years	N
7	17	F	30-39	Bachelor's Degree	RN	10-19 years	10-19 years	10 or more years	N
8	14	F	30-39	Some college, no degree	MA	1-3 years	20-29 years	1-3 years	N

9	7	F	30-39	Technical certification	MA	7-9 years	4-6 years	1-3 years	N
10	8	F	18-29	Associate	LPN	4-6 years	4-6 years	Less than 1 year	N
11	2	F	30-39	Bachelor Degree	RN	1-3 years	10-19 years	Less than 1 year	N
12	9	F	18-29	Some college, no degree	Receptionist, MA	1-3 years	4-6 years	1-3 years	N
13	16	F	40-49	Some college, no degree	MA	10-19 years	20-29 years	4-6 years	N

Participants were scheduled for 60-minute sessions. A minimum of 60 minutes was reserved between each session for debrief by the administrator and data logger and to reset systems to proper test conditions. A spreadsheet was used to track the participant schedule.

STUDY DESIGN

Overall, the objective of this test was to measure how well the application performed with regard to effectiveness, efficiency, and user satisfaction; to identify areas for improvement; and to recommend improvements. Additionally, the data from this test will serve as a baseline for future tests and for comparison with updated versions of the EHR and/or other EHRs. In short, this testing serves as a means to benchmark current usability and to identify areas where improvements can be made.

All participants were given the same orientation instructions and remote testing environment to access the EHR. Two task sets were defined—one for providers and one for clinical support staff. All participants used the same test data. The EHR was evaluated using the following measures:

- 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 tasks and system

Additional information about the various measures can be found in the [Usability Metrics](#) section of this document.

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: (Highlighted Yellow = Provider, Highlighted Green = Front Desk/Nurse)

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. Record Medication-Allergy List
11. Change Medication-Allergy List
12. Access Medication- Allergy List
13. Using CPOE, trigger a drug-drug interaction by entering a new medication order
14. Using CPOE, trigger a drug-allergy interaction by entering a new medication order
15. Adjust the severity level of a displayed drug-drug interaction
16. Record a patient's preferred language, date of birth, birth sex, race, ethnicity, sexual orientation, gender identity
17. Change the patient's preferred language, date of birth, birth sex, race, ethnicity, sexual orientation, gender identity
18. Display the patient's changed preferred language, date of birth, birth sex, race, ethnicity, sexual orientation, gender identity
19. Record a problem to the problem list
20. Change a problem on the problem list
21. Display the active problem list
22. Display the historical problem list
23. Record a medication to the medication list
24. Change a medication on the medication list
25. Display the active medication list
26. Display the historical medication list
27. Record a medication allergy
28. Change a medication allergy
29. Display the active medication allergy list
30. Display the historical medication allergy list
31. Add a CDS intervention and/or reference resource for each of the required elements
 - o Problem list
 - o Medication list
 - o Medication Allergy List
 - o At least one Demographic
 - o Laboratory Test
 - o Vital Signs
 - o And a combination of at least 2 of the elements listed above
32. Trigger the CDS interventions/resources added using the applicable data elements from each of the required elements

33. View the intervention/resource information using the Infobutton standard for data elements in the problem list, medication list, and demographics
34. Trigger the CDS interventions/resources based on data elements in the problem list, medication list, and medication allergy list by incorporating patient information from a transition of care/referral summary
35. Access the following attributes for one of the triggered CDS interventions/resources: bibliographic citation, developer, funding source, release/revision date
36. Record UDI
37. Change UDI Status
38. Access UDI, device description, identifiers, and attributes
39. Incorporate a CCDA and conduct reconciliation of the medications, medication allergies, and problems in the CCDA with the information currently in the patient's record
40. Generate a new CCDA with reconciled data
41. Create new prescription
42. Change prescription (dosage or duration)
43. Cancel prescription
44. Refill prescription
45. Receive fill status notification
46. Request and receive medication history information

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

PROCEDURES

Upon arrival, participants were greeted and their identity was verified with the participant schedule. Participants were then assigned a participant ID.³ Each participant digitally signed an informed consent form. See [Appendix 2: Informed Consent Form](#) for an example of the form.

The test was conducted by two staff members, the administrator, and the data logger.

The administrator moderated the session, delivered initial instructions, and took notes on participant comments, path deviations, and errors. The data logger also took notes on task success, path deviations, errors, and comments. The administrator led participants through the tasks. The data logger recorded task times, post-task rating data, post-test satisfaction data, and demographic data.

Participants were instructed to perform the tasks (see the [Participant Instructions](#) below):

- As quickly as possible making as few errors and deviations as possible
- Without assistance
- Without commenting until they had completed each task (if possible)

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.

Following the session, the administrator gave the participant the post-test questionnaire (Appendix 4), 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.

Test Location

Most tests were conducted remotely, with each individual at their own location. 5 tests were conducted in person via an on-site visit. Only the participant, administrator, and data logger were present.

Test Environment

The EHR typically is used in a clinical setting. Tests were conducted remotely, using the administrator's computer to run WebEx. Participants used their own PCs during studies. (Please note that the 5 tests that were conducted on-site used the same computer as the other participants did via WebEx sessions.) They were given control of the administrator's computer to access the application during the session, but used their own mouse, keyboard, and display.

Additionally, participants were also asked to close any applications other than the WebEx session.

The administrator's computer is a Dell Latitude E7450 with an Intel® Core™ i5-5300U Processor, 8 GB RAM, running Windows 10 Enterprise. The display resolution was set to 1920 x 1080. This computer ran WebEx screen sharing and Internet Explorer 11 at 150% zoom level.

Test Forms and Tools

During the usability test, the administrator presented various documents, including:

1. Informed Consent
2. Participant Demographic Questionnaire
3. Tasks
4. System Usability Scale Questionnaire

Examples of these documents can be found in [Appendix 2: Informed Consent Form](#), [Appendix 3: Example Moderator's Guide](#), [Appendix 4: System Usability Scale Questionnaire](#), and [Appendix 5: Tasks](#). Moderator's Guide

was designed to be easy for the data logger.

Participant Instructions

Thank you for joining us today; we really appreciate your time. I'm <Name>; I work on the Harris CareTracker product team. I also have <Name> on the line, they'll be helping take notes and recording times.

Before we begin, I'd like to take a moment to describe the study we're conducting. We're collecting feedback on CareTracker.

We're going to ask you to perform a series of tasks. You should know that the tasks were created to be independent of each other and some may sound redundant. You will be asked to complete these tasks on your own, trying to do them as quickly as possible with the fewest possible errors or deviations. Please do not do anything more than the task asks.

You are not being tested on your ability to complete the tasks. We're evaluating how intuitive the product is to use, so just do your best to complete them as you typically would. Feel free speak candidly, however, please save your comments until the end of a task, or the end of the session as a whole, when we can then discuss them freely.

We'd ask that you please read the task information aloud, so we can follow along.

I'm going to share my screen with you in the WebEx. You'll be using CareTracker on my computer, but I'll give you control of my computer's mouse and keyboard for the duration of the study. Because we can't always control the bandwidth between our two locations, you may notice a tiny lag or latency when you're in control of the mouse and keyboard. However, we don't anticipate this will affect your ability to use the product.

Before I do that, please quit or close any other applications that are currently running on your computer (email and Instant Messaging), with the exception of your browser and WebEx. Also, please set any mobile devices to silent during the study.

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 the EHR (digiChart) by measuring participant success rates and errors
2. Efficiency of the EHR by measuring the average task time and path deviations
3. Satisfaction with the EHR by measuring ease-of-use ratings

Data Scoring

The following table details how the testing team scored the tasks, evaluated the errors, and analyzed the time data.⁴

Measures	Rationale and Scoring
Effectiveness: Task Success	<p>A task was counted as a “Success” if the participant was able to achieve the correct outcome, without assistance, within the time allotted.</p> <p>The total number of successes were calculated for each task, and then the results were divided by the total number of times that task was attempted. The 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, the task was counted as a “Failure.” No task times were taken for errors⁵.</p> <p>The total number of errors was calculated for each task, and the results were divided by the total number of times the task was attempted. This was also expressed as the mean number of failed tasks per participant.</p>

<p>Efficiency:</p> <p>Task Deviations</p>	<p>The participant's path (i.e., steps) through the application was recorded. Deviations occurred if the participant went to a wrong screen, clicked an incorrect menu item, followed an incorrect link, or interacted incorrectly with an on-screen control. Each participant's path was compared to the optimal path. The number of steps in the observed path was divided by the number of optimal steps to provide a ratio of path deviation.</p> <p>Deviations were defined as:</p> <ul style="list-style-type: none"> • Task Recognition: failure to recognize task or completion of a different task • Data Entry: failure to enter complete data or entry of incorrect data • Task Completion: failure to take final steps required to complete the task
<p>Efficiency:</p> <p>Task Time</p>	<p>Each task was timed from when the test administer said "begin" to when the participant said "complete". Only completion times for successfully completed tasks were included in the "average task time analysis." Average times per task and variance measures (standard deviation and standard error) were calculated for each task.</p> <p>Optimal task performance time was benchmarked by expert performance when constructing the tasks. Target task times were operationally defined by taking</p>

⁴ See Tullis, T. & Albert, W. (2008). Measuring the User Experience. Burlington, MA: Morgan Kaufman. Also, see www.measuringusability.com.

⁵ Errors were operationally defined by the UX team prior to testing.

	<p>multiple measures of optimal performance and multiplying by a factor (1.25) that allows a time buffer because the participants are using the EHR without their normal customizations. Thus, if expert optimal performance on a task was 100 seconds, then allotted task time performance would be 125 seconds. This ratio was aggregated across all the tasks and reported with mean and variance scores.</p>
<p>Satisfaction:</p> <p>Task Rating</p>	<p>Participant's subjective impression of the ease-of-use of the application was measured by administering a post-task question and a post-session questionnaire.</p> <p>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.⁶ Common convention is that average ratings for systems judged easy to use should be 3.3 or above.</p> <p>To measure participants' confidence in and satisfaction with the EHR overall, the testing team administered the System Usability Scale (SUS) post-test questionnaire. Questions included, "I think I would like to use this system frequently", "I thought the system was easy to use," and "I would imagine that most people would learn to use this system very quickly." See Appendix 4: System Usability Scale Questionnaire for a complete list of SUS questions.⁷</p>

⁶See Tedesco and Tullis (2006) for a comparison of post-task ratings for usability tests. Tedesco, D. & Tullis, T. (2006) A comparison of methods for eliciting post-task subjective ratings in usability testing. Usability Professionals association Conference, June 12 – 16, Broomfield, CO.

⁷The SUS survey yields a single number that represents a composite measure of the overall perceived usability of the system. SUS scores have a range of 0 to 100 and the score is a relative benchmark that is used against other iterations of the system.

Risk Calculation with Tasks

Prior to interpreting the risk factor amongst all presented tasks, the tasks from this study were placed in order to describe what task poses a bigger risk than others. The list of tasks by risk level are as follows:

1. Add a CDS intervention and/or reference resource for each of the required elements
 - Problem list
 - Medication list
 - Medication Allergy List
 - At least one Demographic
 - Laboratory Test
 - Vital Signs
 - And a combination of at least 2 of the elements listed above
2. Trigger the CDS interventions/resources added using the applicable data elements from each of the required elements
3. Trigger the CDS interventions/resources based on data elements in the problem list, medication list, and medication allergy list by incorporating patient information from a transition of care/referral summary
4. Cancel prescription
5. Using CPOE, trigger a drug-drug interaction by entering a new medication order
6. Using CPOE, trigger a drug-allergy interaction by entering a new medication order
7. Using CPOE, trigger a drug-allergy interaction by entering a new medication order
8. Adjust the severity level of a displayed drug-drug interaction
9. Adjust the severity level of a displayed drug-drug interaction
10. Incorporate a CCDA and conduct reconciliation of the medications, medication allergies, and problems in the CCDA with the information currently in the patient's record
11. View the intervention/resource information using the Info button standard for data elements in the problem list, medication list, and demographics
12. Change Medication-Allergy List
13. Change a medication allergy
14. Change prescription (dosage or duration)
15. Change Medication Order
16. Change Laboratory Order
17. Change a problem on the problem list
18. Change Radiology/imaging Order
19. Change a medication on the medication list
20. Change the patient's preferred language, date of birth, birth sex, race, ethnicity, sexual orientation, gender identity
21. Change UDI Status

22. Refill prescription
23. Create new prescription
24. Record Medication Order
25. Record Medication-Allergy List
26. Record Laboratory Order
27. Record Radiology/imaging Order
28. Record a problem to the problem list
29. Record a medication to the medication list
30. Record a medication allergy
31. Record UDI
32. Record a patient's preferred language, date of birth, birth sex, race, ethnicity, sexual orientation, gender identity
33. Generate a new CCDA with reconciled data
34. Access Medication Order
35. Access Laboratory Order
36. Access Radiology/imaging Order
37. Access Medication- Allergy List
38. Access UDI, device description, identifiers, and attributes
39. Request and receive medication history information
40. Display the patient's changed preferred language, date of birth, birth sex, race, ethnicity, sexual orientation, gender identity
41. Display the active problem list
42. Display the historical problem list
43. Display the active medication list
44. Display the historical medication list
45. Display the active medication allergy list
46. Display the historical medication allergy list
47. Receive fill status notification
48. Access the following attributes for one of the triggered CDS interventions/resources: bibliographic citation, developer, funding source, release/revision date

Following the interpretation of the data, the task list was changed to reflect certain risk prone areas. In this study, we found that certain tasks pose more of a risk than others.

Reasons that an item could pose more of a risk:

- Important areas of the application have not been utilized on a consistent basis, thus causing the user to not to fully understand the action in question
- User error
- Workflow that is not followed in a detail oriented manner (i.e. working too fast and attention to detail is overlooked)
- Bad workflow (i.e. having multiple patient charts open at once which could cause charting errors)
- Poor implementation of prior changes to the application (i.e. not reviewing prior release notes)

During this study, the following tasks were identified as particularly troublesome due to the reasons outlined above:

1. Add a CDS intervention and/or reference resource for each of the required elements
 - Problem list
 - Medication list
 - Medication Allergy List
 - At least one Demographic
 - Laboratory Test
 - Vital Signs
 - And a combination of at least 2 of the elements listed above
2. Trigger the CDS interventions/resources based on data elements in the problem list, medication list, and medication allergy list by incorporating patient information from a transition of care/referral summary
3. Incorporate a CCDA and conduct reconciliation of the medications, medication allergies, and problems in the CCDA with the information currently in the patient's record
4. Trigger the CDS interventions/resources added using the applicable data elements from each of the required elements

The consequences of these items could potentially result in having incorrect information in patient charts. In order to combat this, the Product Team at digiChart will be working with the digiChart Implementation and Training Team to roll out re-occurring training events that will focus on the above items as well as other important aspects of the application. This initiative will be pivotal in the continuing education efforts of digiChart.

Following these 4 items, the tasks that involved changing a patient record were the next tasks that posed the greatest risk. The risk level is always going to be elevated when altering data that was previously entered within a patient chart and signed off by a medical professional. The items referenced are as follows

- Change Medication-Allergy List
- Change a medication allergy
- Change prescription (dosage or duration)
- Change Medication Order
- Change Laboratory Order
- Change a problem on the problem list
- Change Radiology/imaging Order
- Change a medication on the medication list
- Change the patient's preferred language, date of birth, birth sex, race, ethnicity, sexual orientation, gender identity
- Change UDI Status

The next items that were determined to be the next most vulnerable were items that are being recorded in a patient chart.

These items are susceptible due to human error. The items in question for this list are as follows:

- Create new prescription
- Record Medication Order
- Record Medication-Allergy List
- Record Laboratory Order
- Record Radiology/imaging Order
- Record a problem to the problem list
- Record a medication to the medication list
- Record a medication allergy
- Record UDI
- Record a patient's preferred language, date of birth, birth sex, race, ethnicity, sexual orientation, gender identity
- Generate a new CCDA with reconciled data

The remainder of the tasks are less at risk because no changes are being made to the chart value in question.

These items include the following tasks:

- Access Medication Order
- Access Laboratory Order
- Access Radiology/imaging Order
- Access Medication- Allergy List
- Access UDI, device description, identifiers, and attributes
- Request and receive medication history information
- Display the patient's changed preferred language, date of birth, birth sex, race, ethnicity, sexual orientation, gender identity
- Display the active problem list
- Display the historical problem list
- Display the active medication list
- Display the historical medication list
- Display the active medication allergy list
- Display the historical medication allergy list
- Receive fill status notification
- Access the following attributes for one of the triggered CDS interventions/resources: bibliographic citation, developer, funding source, release/revision date

Appendices

Appendix 1: Participant Demographics

Demographics Questionnaire

1. Gender

- Female
- Male

2. Age

- 18-29 years
- 30-39 years
- 40-49 years
- 50-59 years
- 60-69 years
- 70 or more years

3. What is the highest degree or level of school you have completed?

- High School, GED, or equivalent
 - Some college, no degree
 - Technical certification
 - Associate degree
 - Bachelor degree
 - Master degree
 - Professional degree
 - Doctorate degree
 - Other: (please specify)
-

4. What title best describes your current occupation?

- Emergency Medical Technician
 - Health Information System Administrator
 - Nurse Practitioner
 - Office Administrator
 - Pharmacist
 - Physician
 - Physician's Assistant
 - Psychologist, Counselor, or Social Worker
 - Registered Nurse
 - Other: (please specify)
-

5. How long have you held your current title?

- Less than 1 year

- 1-3 years
- 4-6 years
- 7-9 years
- 10-19 years
- 20-29 years
- 30-39 years
- 40-49 years
- 50 or more years

6. How long have you used a computer in a professional workplace?

- Less than 1 year
- 1-3 years
- 4-6 years
- 7-9 years
- 10-19 years
- 20-29 years
- 30-39 years
- 40-49 years
- 50 or more years

7. How long have you used CareTracker?

- Less than 1 year
- 1-3 years
- 4-6 years
- 7-9 years
- 10 or more years

8. Do you use assistive technology; such as an enhanced visual display, physically adapted pointing device, or text-to-speech engine; in the workplace?

- Yes
- No

If yes, please describe _____

Appendix 2: Informed Consent Form

I agree to participate in this study conducted by Harris CareTracker.

I understand Harris digiChart will record my participation for later review. By signing/acknowledging this form, I give Harris digiChart permission to use the data gathered and my comments for the purposes of evaluating the product in the study and showing the results of these evaluations, combined with other participants, to the product team. Harris digiChart will not include my name or any identifying characteristics in the results.

Any information I acquire about the product in the study is confidential and proprietary and is being disclosed only so that I can participate in the evaluation. By signing this form, I agree not to talk about this product to anyone. I may only tell others that I helped to evaluate the software. I understand that if I disclose my health information in my comments, I have disclosed it voluntarily, and Harris digiChart may use it anonymously for research and evaluation purposes only.

I understand that I can stop participating in this study at any time. I agree to raise any concerns or areas of discomfort with the study moderator.

Name (print): _____

Signature: _____

Date: _____

Appendix 3: Example Moderators Guide

Thank you for joining us today; we really appreciate your time. I'm [Insert Name Here]; I work on the Harris digiChart product team. I also have [Insert their Name here] on the line, she'll be helping take notes and recording times.

Before we begin, I'd like to take a moment to describe the study we're conducting. We're collecting feedback on digiChart.

We're going to ask you to perform a series of tasks. You should know that the tasks were created to be independent of each other and some may sound redundant. You will be asked to complete these tasks on your own, trying to do them as quickly as possible with the fewest possible errors or deviations. Please do not do anything more than the task asks.

You are not being tested on your ability to complete the tasks. We're evaluating how intuitive the product is to use, so just do your best to complete them as you typically would. Feel free speak candidly, however, please save your comments until the end of a task, or the end of the session as a whole, when we can then discuss them freely.

We'd ask that you please read the task information aloud, so we can follow along.

I'm going to share my screen with you in the WebEx. You'll be using digiChart on my computer, but I'll give you control of my computer's mouse and keyboard for the duration of the study. Because we can't always control the bandwidth between our two locations, you may notice a tiny lag or latency when you're in control of the mouse and keyboard. However, we don't anticipate this will affect your ability to use the product.

Before I do that, please quit or close any other applications that are currently running on your computer (email and Instant Messaging), with the exception of your browser and WebEx. Also, please set any mobile devices to silent during the study.

Orientation (1 minute)

Your input is very important. Our session today will last about 60 minutes. During that time you will be using Harris digiChart. Please be honest with your opinions, any feedback 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.

Before we get started, do you have any questions?

Prior to testing

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

Prior to each participant:

- Reset application
- Start session recordings with tool

Prior to each task:

- Reset application to starting point for next task

After each participant:

- End session recordings with tool

After all testing

- Back up all video and data files

Appendix 4: System Usability Scale Questionnaire

In 1996, Brooke published a “low-cost usability scale that can be used for global assessments of systems usability” known as the System Usability Scale or SUS.¹⁶ Lewis and Sauro (2009) and others have elaborated on the SUS over the years. Computation of the SUS score can be found in Brooke’s paper, at <http://www.usabilitynet.org/trump/documents/Suschapt.doc> or in Tullis and Albert (2008).

System Usability Scale Questionnaire

Please answer these questions based on your overall experience today with Harris

CareTracker.

	Strongly Disagree 1	2	3	4	Strongly Agree 5
I think that I would like to use this product frequently.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I find this product to be simple.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think this product is easy to use.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can use this product without the support of a technical person.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I find the various functions in this product to be well integrated.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think there is a lot of consistency in this product.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would imagine that most people would learn to use this product very quickly.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I find this product to be very intuitive.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel very confident using this product.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can use this product without having to learn anything new.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

¹⁶ Brooke, J.: SUS: A “quick and dirty” usability scale. In: Jordan, P. W., Thomas, B., Weerdmeester, B. A., McClelland (eds.) *Usability Evaluation in Industry* pp. 189--194. Taylor & Francis, London, UK (1996). SUS is copyrighted to Digital Equipment Corporation, 1986.

Lewis, J R & Sauro, J. (2009) "The Factor Structure of the System Usability Scale." in *Proceedings of the Human Computer Interaction International Conference (HCII 2009), San Diego CA, USA*

Appendix 5: Tasks

Task 1: Record Medication Order (25 Seconds)

Patient Dawn Hopkins is presenting as a patient and you need to prescribe a medication. You do not have to fulfill this request, just simply place the order

Task: Enter the following data for the medication order.

- Medication: Flagyl 500 mg tablet
- Frequency: Twice daily
- Quantity: 30
- Refills: 0

When you feel you're done with the task, alert the test administrator by saying “complete”.

Correct Paths (Optimal in Bold)

1. Search Patient from Schedule
2. Select MDM
3. Select Rx tab
4. Search for select medication
5. Enter the details
6. Click Save

Successful Completion Criteria: Click “Save” with all data points completed above

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 2: Change Medication Order (10 Seconds)

Using the previous patient, Dawn Hopkins, you want to change the medication order.

Task: Change the following data for the medication order.

- New Medication: Flagyl 500 mg tablet
- Frequency: Once daily
- Quantity: 15
- Refills: 0

When you feel you're done with the task, alert the test administrator by saying “complete”.

Correct Paths (Optimal in Bold)

5. Select Patient from Schedule
6. Select MDM
7. Select the Flagyl medication order
8. Change the frequency from Twice daily to once daily
9. Change the quantity from 30 to 15
10. Click Save

Successful Completion Criteria: Click “Save” with all data points completed above

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 3: Access Medication Order (10 Seconds)

Using the previous patient, Dawn Hopkins, you want to access a medication order to show that what the current status is.

Task: Access the patients medication orders

- New Medication: Flagyl 250 mg tablet
- Frequency: Once daily
- Quantity: 15
- Refills: 0

When you feel you're done with the task, alert the test administrator by saying "complete".

Correct Paths (Optimal in Bold)

1. Select Patient
2. Select Summary Page

Successful Completion Criteria: Show that the quantity was 15

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 4: Record Laboratory Order (10 seconds)

Patient Amy Anderson is presenting as a patient and you need to order a Complete Blood Count (CBC) lab test for her diagnosis of Anemia. You do not have to fulfill this request, just simply place the order

Task: Enter the following data for the lab order.

- Lab Test: CBC w/o diff
- Procedure Category: Lab Test
- Medical Facility: PathGroup
- Order Date: Today's Date
- Days to Process: 7

When you feel you're done with the task, alert the test administrator by saying "complete".

Correct Paths (Optimal in Bold)

1. **Search Patient from Schedule**
2. **Select MDM**
3. **Select Proc tab**
4. **Search for CBC w/o diff**
5. **Click and drag it to attach it to the diagnosis**
6. **Click Save**

Successful Completion Criteria: Click "Save" with all data points completed above

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 5: Change Laboratory Order (38 seconds)

Using Amy Anderson’s record from the above task, the provider decides to change the Laboratory order from a PathGroup to Quest.

Task: Change the following data for the lab order.

- Lab Test: CBC w/o
- Procedure Category: Lab Test
- Medical Facility: Quest
- Order Date: Today’s Date
- Days to Process: 7

When you feel you're done with the task, alert the test administrator by saying “complete”.

Correct Paths (Optimal in Bold)

Search Patient from Schedule

1. **Select Patient from Schedule**
2. **Select MDM**
3. **Select the CBC w/o diff**
4. **Change the Medical Facility from PathGroup to Quest**
5. **Click Save**

Successful Completion Criteria: Click “Save” with all data points completed above

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 6: Access Laboratory Order (11 Seconds)

You want to access a Laboratory order in Pt. Amy Anderson's chart to show that what the current status is.

Task: Access the patients lab orders

- Lab Test: CBC w/o
- Status: Pending

When you feel you're done with the task, alert the test administrator by saying "complete".

Correct Paths (Optimal in Bold)

1. **Select Patient**
2. **Select Summary Page**
3. **Scroll down to Labs/Radiology section**
4. **Show the Status is showing as Pending**

Successful Completion Criteria: Show that the status was pending

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 7: Record Radiology/Imaging Order (14 Seconds)

Patient Jill Rendine is presenting as a patient with unspecified abdominal pain. You need to order an Ultrasound of the Abdomen limited radiology order. You do not have to fulfill this request, just simply place the order

Task: Enter the following data for the radiology order.

- Radiology Order: U/S Abdomen Limited (Outside)
- Procedure Category: Radiology
- Medical Facility: Community Radiology Center
- Order Date: Today's Date
- Days to Process: 7

When you feel you're done with the task, alert the test administrator by saying "complete".

Correct Paths (Optimal in Bold)

1. **Search Patient from Schedule**
2. **Select MDM**
3. **Select Proc tab**
4. **Search for U/S Abdomen Limited**
5. **Click and drag it to attach it to the diagnosis**
6. **Click Save**

Successful Completion Criteria: Click "Save" with all data points completed above

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 8: Change Radiology/Imaging Order (90 seconds)

Using Jill Rendine’s record from the above task, the provider decides to change the Radiology order from a Community Radiology Center to Community Health Hospital.

Task: Change the following data for the radiology order.

- Radiology Test: U/S Abdomen Limited (Outside)
- Procedure Category: Radiology
- Medical Facility: Community Health Hospital
- Order Date: Today’s Date
- Days to Process: 7

When you feel you're done with the task, alert the test administrator by saying “complete”.

Correct Paths (Optimal in Bold)

Search Patient from Schedule

1. **Select Patient from Schedule**
2. **Select MDM**
3. **Select the**
4. **Change the Medical Facility from Community Radiology Center to Community Health Hospital**
5. **Click Save**

Successful Completion Criteria: Click “Save” with all data points completed above

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 9: Access Radiology/Imaging Order (90 seconds)

You want to access a Radiology order in Pt Jill Rendine's record to show that what the current status is.

Task: Access the patients radiology orders

- Lab Test: CBC w/o
- Status: Pending

When you feel you're done with the task, alert the test administrator by saying "complete".

Correct Paths (Optimal in Bold)

1. **Select Patient**
2. **Select Summary Page**
3. **Scroll down to Labs/Radiology section**
4. **Show the Status is showing as Pending**

Successful Completion Criteria: Show that the status was pending

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 10: Record Medication-Allergy List (45 Seconds)

Patient Annie Adams is presenting as a patient. During triage, she tells the nurse that she is allergic to Codeine.

Task: Enter the following data for the Medication Allergy.

- Allergy: Codeine
- Symptom: Skin Rash
- Severity: Mild

When you feel you're done with the task, alert the test administrator by saying “complete”.

Correct Paths (Optimal in Bold)

1. **Select Patient from Schedule**
2. **Select Encounters**
3. **Select Medical Check-in**
4. **Select + Add/Edit Allergies link**
5. **Search for and/or Select Codeine**
6. **Select Skin Rash as the Symptom**
7. **Select Severity as Mild**
8. **Click Add button**

Successful Completion Criteria: Click “Add” with all data points completed above

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 11: Change Medication-Allergy List (35 Seconds)

Patient Annie Adams is presenting as a patient. During triage, she tells the nurse that she is allergic to Codeine, but that it causes skin rash and hives.

Task: Change the following data for the Medication Allergy.

- Allergy: Codeine
- Symptom: Skin Rash, Hives
- Severity: Mild

When you feel you're done with the task, alert the test administrator by saying “complete”.

Correct Paths (Optimal in Bold)

1. **Select Patient from Schedule**
2. **Select Encounters**
3. **Select Medical Check-in**
4. **Select + Add/Edit Allergies link**
5. **Click the symptoms hyperlink at the top**
6. **Select Hives to go with the Skin Rash symptom**
7. **Click Ok button**
8. **Click Ok on the popup to refresh the page**

OR

1. Select Patient from Schedule
2. Select Encounters
3. Select Medical Check-in
4. Select + Add/Edit Allergies link
5. Click the Red X next to the already documented allergy
6. Search for and/or Select Codeine
7. Select Skin Rash and Hives as the Symptoms
8. Select Severity as Mild
9. Click Add button

Successful Completion Criteria: Click “Ok” with all data points completed above with page refresh

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 12: Access Medication-Allergy List (25 Seconds)

The User needs to access the patient, Annie Adams, allergy list.

Task: Access the following data for the Medication Allergy.

- Allergy: Codeine
- Symptom: Skin Rash, Hives
- Severity: Mild

When you feel you're done with the task, alert the test administrator by saying "complete".

Correct Paths (Optimal in Bold)

- 1. Select Patient from Schedule**
- 2. Click the + symbol to expand the Codeine Allergy on the Patient Info Bar**

OR

1. Select Patient from Schedule
2. Select Encounters
3. Select Medical Check-in
4. Scroll down to Allergies section

Successful Completion Criteria: Show the symptoms of Hives & Skin Rash for the allergy codeine.

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 13: Using CPOE, trigger drug-drug interaction by entering a new medication order (80 Seconds)

The provider decides to order an additional medication for a previously documented patient, Dawn Hopkins. However, they receive a drug-drug interaction.

Task: Trigger a drug-drug interaction when adding a new medication order.

- Current Medication: Flagyl 500 mg tablet
- New Medication Ordered: Warfarin Sodium 10 mg tablet
- New Medication Dose: 1
- New Medication Frequency: BID
- New Medication Quantity: 30
- New Medication Refill: 0

When you feel you're done with the task, alert the test administrator by saying "complete".

Correct Paths (Optimal in Bold)

1. **Select Patient from Schedule**
2. **Select Encounters**
3. **Select MDM**
4. **Select the Rx tab**
5. **Search for and select Warfarin 10 mg tablet**
6. **Fill out the details of the medication order**
7. **Click Save**
8. **Interaction pop-up will come up**

Successful Completion Criteria: Drug-drug interaction pop-up comes up.

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 14: Using CPOE, trigger drug-allergy interaction by entering a new medication order (80 Seconds)

The provider decides to order a medication for a previously documented patient, Annie Adams. However, they receive a drug-allergy interaction.

Task: Trigger a drug-allergy interaction when adding a new medication order.

- Current Allergy Documented: Codeine
- New Medication Ordered: Tylenol-Codeine #2 300-15mg tablet
- New Medication Dose: 1
- New Medication Frequency: BID
- New Medication Quantity: 30
- New Medication Refill: 0

When you feel you're done with the task, alert the test administrator by saying “complete”.

Correct Paths (Optimal in Bold)

1. **Select Patient from Schedule**
2. **Select Encounters**
3. **Select MDM**
4. **Select the Rx tab**
5. **Search for and select Tylenol-Codeine #2 300-15mg tablet**
6. **Fill out the details of the medication order**
7. **Click Save**
8. **Interaction pop-up will come up**

Successful Completion Criteria: Drug-allergy interaction pop-up comes up.

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 15: Adjust the severity level of a displayed drug-drug interaction (100 Seconds)

The provider decides to lower the severity level of a displayed drug-drug interaction for patient, Brandi Bones.

Task: Lower the severity level of a drug-drug interaction.

- First Medication Ordered: Clopidogrel 300 mg tablet
 - First Medication Dose: 1
 - First Medication Frequency: Daily
 - First Medication Quantity: 30
 - First Medication Refill: 0
- Second Medication Ordered: Warfarin Sodium 10 mg tablet
 - Second Medication Dose: 1
 - Second Medication Frequency: BID
 - Second Medication Quantity: 30
 - Second Medication Refill: 0

When you feel you're done with the task, alert the test administrator by saying “complete”.

Correct Paths (Optimal in Bold)

1. **Select Patient from Schedule**
2. **Select Encounters**
3. **Select MDM**
4. **Select the Rx tab**
5. **Search for and select Warfarin 10 mg tablet**
6. **Fill out the details of the medication order**
7. **Click Save**
8. **Interaction pop-up will come up**
9. **Enter the password**
10. **Select the Reason for Override**
11. **Put a checkmark in the checkbox next to ‘Lower the severity level of applicable drug to drug contraindications above.’**
12. **Click Ok**

Successful Completion Criteria: Click “Ok” with all data points completed above

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 16: Record a patient's demographics (120 Seconds)

The User needs to create a new patient and record the demographics for patient, Cynthia Croyle.

Task: Record the patient's demographics.

- Preferred Language: English
- Date of Birth: 10/01/1980
- Birth Sex: Female
- Race: White
- Ethnicity: Not Hispanic or Latino
- Sexual Orientation: Straight or Heterosexual
- Gender Identity: Identifies as a Female

When you feel you're done with the task, alert the test administrator by saying "complete".

Correct Paths (Optimal in Bold)

1. **Select Options**
2. **Select Add Patient**
3. **Enter in the demographics**
4. **Click Update Patient**

Successful Completion Criteria: Demographics last updated field will show current date & time with username.

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 17: Change a patient's demographics (100 Seconds)

The User needs to update the demographics for previously used patient, Cynthia Croyle.

Task: Update the patient's demographics.

- Preferred Language: Spanish
- Date of Birth: 01/01/1980
- Birth Sex: Male
- Race: Native Hawaiian or Other Pacific Islander
- Sexual Orientation: Bisexual
- Gender Identity: Transgender Male/Trans Man/Female-to-male

When you feel you're done with the task, alert the test administrator by saying "complete".

Correct Paths (Optimal in Bold)

1. **Select for or Select patient from schedule**
2. **Click Pt.Demographics hyperlink**
3. **Click Go to Demographics button**
4. **Update the demographics**
5. **Click Update Patient**

Or

1. Select for or Select patient from schedule
2. Click Patient Info button
3. Select View/Edit Demographics
4. Update the Demographics
5. Click Update Patient

Successful Completion Criteria: Demographics last updated field will show current date & time with username.

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 18: Display a patient’s changed demographics (16 Seconds)

The User needs to view the updated demographics for previously used patient, Cynthia Croyle.

Task: Display the patient’s demographics.

When you feel you're done with the task, alert the test administrator by saying “complete”.

Correct Paths (Optimal in Bold)

- 1. **Select for or Select patient from schedule**
- 2. **Click Pt.Demographics hyperlink**
- 3. **Click Go to Demographics button**

Or

- 1. Select for or Select patient from schedule
- 2. Click Patient Info button
- 3. Select View/Edit Demographics

Successful Completion Criteria: Demographics last updated field will show current date & time with username.

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant’s comments	Participant’s satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 19: Record a problem to the problem list (38 Seconds)

Patient Abigail Bennett is presenting as a patient with a problem of acquired hypothyroidism.

Task: Enter the following data.

- Problem: Acquired hypothyroidism

When you feel you're done with the task, alert the test administrator by saying "complete".

Correct Paths (Optimal in Bold)

1. **Search Patient from Schedule**
2. **Select MDM**
3. **Select Dx tab**
4. **Search for Acquired Hypothyroidism**
5. **Click and drag it to attach the diagnosis to the visit**
6. **Click the Add to Problem List checkbox**
7. **Click Save**

Successful Completion Criteria: Click "Save" with all data points completed above

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 20: Change a problem on the problem list (48 Seconds)

You need to change the problem for previous used patient, Abigail Bennett, from Acquired Hypothyroidism to Severe Hypothyroidism

Task: Change the following data for the problemr.

- Previous Problem: Acquired hypothyroidism
- New Problem: Severe hypothyroidism

When you feel you're done with the task, alert the test administrator by saying “complete”.

Correct Paths (Optimal in Bold)

1. **Search for or Select Patient from Schedule**
2. **Click the Red X on the Patient Info Bar under Problems next to the previous problem**
3. **Select MDM**
4. **Select Dx tab**
5. **Search for Severe Hypothyroidism**
6. **Click and drag it to attach the diagnosis to the visit**
7. **Click the Add to Problem List checkbox**
8. **Click Save**

Or

1. Search for or Select Patient from Schedule
2. Select Summary
3. Click the Red X next to the Problem under the Problems section
4. Select MDM
5. Select Dx tab
6. Search for Severe Hypothyroidism
7. Click and drag it to attach the diagnosis to the visit
8. Click the Add to Problem List checkbox
9. Click Save

Successful Completion Criteria: Click “Save” with all data points completed above

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 21: Display the Active Problem List (20 Seconds)

User needs to display the active problem list for patient, Abigail Bennett.

Task: View the Problem list for the patient.

When you feel you're done with the task, alert the test administrator by saying "complete".

Correct Paths (Optimal in Bold)

1. Search for or Select Patient from Schedule
2. Click Summary

Or

1. Search for or Select Patient from Schedule
2. Look at the Patient Info Bar under the Clinical section at Problems

Successful Completion Criteria: Viewing the problems list

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 22: Display the historical problem list (25 Seconds)

User needs to display the historical problem list for patient, Abigail Bennett.

Task: View the Problem list for the patient.

When you feel you're done with the task, alert the test administrator by saying "complete".

Correct Paths (Optimal in Bold)

1. **Search for or Select Patient from Schedule**
2. **Click Summary**
3. **Select the 'All' radio button next to Problem List section**

Successful Completion Criteria: Viewing all (Active and Inactive) of the patient's problems

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 23: Record a medication to the medication list (70 Seconds)

Patient Maggie Bennett is presenting as a patient. During triage, she tells the nurse that takes Simvastatin

Task: Enter the following data for the Patient reported medication.

- Medication: Simvastatin
- Dose: 1
- Frequency: BID

When you feel you're done with the task, alert the test administrator by saying "complete".

Correct Paths (Optimal in Bold)

1. **Search for or Select Patient from Schedule**
2. **Select Encounters**
3. **Select Medical Check-in**
4. **Select + Add/Edit Medications link**
5. **Search for Simvastatin**
6. **Select Simvastatin and drag it across to attach to visit**
7. **Enter dose**
8. **Enter Frequency**
9. **Click Save**

Successful Completion Criteria: Click "Save" with all data points completed above

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 24: Change a medication on the medication list (60 Seconds)

Patient Maggie Bennett tells the nurse that it is not Simvastatin that she takes. She actually takes Omeprazole.

Task: Enter the following data for the Patient reported medication.

- Old Medication: Simvastatin
- New Medication: Omeprazole
- Dose: 1
- Frequency: BID

When you feel you're done with the task, alert the test administrator by saying “complete”.

Correct Paths (Optimal in Bold)

1. **Search for or Select Patient from Schedule**
2. **Select Encounters**
3. **Select Medical Check-in**
4. **Select + Add/Edit Medications link**
5. **Click the Current Medications tab**
6. **Click the Stop sign symbol next to Simvastatin**
7. **Search for Omeprazole**
8. **Select Omeprazole and drag it across to attach to visit**
9. **Enter dose**
10. **Enter Frequency**
11. **Click Save**

Successful Completion Criteria: Click “Save” with all data points completed above

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 25: Display the active medication list (20 Seconds)

User needs to display the active medication list for patient, Maggie Bennett.

Task: View the Medication list for the patient.

When you feel you're done with the task, alert the test administrator by saying "complete".

Correct Paths (Optimal in Bold)

1. **Search for or Select Patient from Schedule**
2. **Click Summary**

Or

1. Search for or Select Patient from Schedule
2. Look at the Patient Info Bar under the Clinical section at Medications

Successful Completion Criteria: Viewing the active medication list

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 26: Display the historical medication list (24 Seconds)

User needs to display the historical medication list for patient, Abigail Bennett.

Task: View the Problem list for the patient.

When you feel you're done with the task, alert the test administrator by saying "complete".

Correct Paths (Optimal in Bold)

1. **Search for or Select Patient from Schedule**
2. **Click Summary**
3. **Select the 'All' in the dropdown next to Medications section**

Successful Completion Criteria: Viewing all (Active and Inactive) of the patient's medications

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 27: Record a medication allergy (40 Seconds)

Patient Betty Baldwin is presenting as a patient. During triage, she tells the nurse that she is allergic to Bactrim.

Task: Enter the following data for the Medication Allergy.

- Allergy: Bactrim
- Symptom: Hives
- Severity: Moderate

When you feel you're done with the task, alert the test administrator by saying "complete".

Correct Paths (Optimal in Bold)

1. **Select Patient from Schedule**
2. **Select Encounters**
3. **Select Medical Check-in**
4. **Select + Add/Edit Allergies link**
5. **Search for and/or Select Bactrim**
6. **Select Skin Rash as the Symptom**
7. **Select Severity as Mild**
8. **Click Add button**

Successful Completion Criteria: Click "Add" with all data points completed above

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 28: Change a medication allergy (30 Seconds)

Patient Betty Baldwin is presenting as a patient. During triage, she tells the nurse that she is allergic to Codeine, but that it causes skin rash and hives and is a mild allergy.

Task: Change the following data for the Medication Allergy.

- Allergy: Bactrim
- Symptom: Skin Rash, Hives
- Severity: Mild

When you feel you're done with the task, alert the test administrator by saying “complete”.

Correct Paths (Optimal in Bold)

1. **Select Patient from Schedule**
2. **Select Encounters**
3. **Select Medical Check-in**
4. **Select + Add/Edit Allergies link**
5. **Click the symptoms hyperlink at the top**
6. **Select Hives to go with the Skin Rash symptom**
7. **Click Ok button**
8. **Click Ok on the popup to refresh the page**

OR

1. Select Patient from Schedule
2. Select Encounters
3. Select Medical Check-in
4. Select + Add/Edit Allergies link
5. Click the Red X next to the already documented allergy
6. Search for and/or Select Codeine
7. Select Skin Rash and Hives as the Symptoms
8. Select Severity as Mild
9. Click Add button

Successful Completion Criteria: Click “Ok” with all data points completed above with page refresh

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 29: Display the active medication allergy list (20 Seconds)

The User needs to access the patient, Betty Baldwin, active allergy list.

Task: Access the following data for the Medication Allergy.

- Allergy: Codeine
- Symptom: Skin Rash, Hives
- Severity: Mild

When you feel you're done with the task, alert the test administrator by saying "complete".

Correct Paths (Optimal in Bold)

- 1. Select Patient from Schedule**
- 2. Click the + symbol to expand the Codeine Allergy on the Patient Info Bar**

OR

1. Select Patient from Schedule
2. Select Encounters
3. Select Medical Check-in
4. Scroll down to Allergies section

Successful Completion Criteria: Show the symptoms of Hives & Skin Rash for the allergy codeine.

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 30: Display the historical medication allergy list (30 Seconds)

The User needs to access the patient, Betty Baldwin, historical allergy list.

Task: Access the patients Historical Medication Allergy list.

When you feel you're done with the task, alert the test administrator by saying "complete".

Correct Paths (Optimal in Bold)

1. **Search for or Select Patient from Schedule**
2. **Select Encounters**
3. **Select Medical Check-in**
4. **Scroll down to Allergies section**
5. **Click the + Add/Edit Allergies hyperlink**
6. **Change the Radio button at the top from Active to All**

Successful Completion Criteria: Show the symptoms of Hives & Skin Rash for the allergy codeine.

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 31: Add a Clinical Decision Support intervention and/or reference resource for each of the required elements (110 Seconds)

Task 31-1: CDS – Problem List (110 Seconds)

The User needs to add a Clinical Decision Support rule for patients with specific problem.

Task: Add Clinical Decision Support rule for the problem, Severe Hypothyroidism.

- Rule Name: Hypothyroidism
- Message: Hypothyroidism
- Rule Condition: Problem

Correct Paths (Optimal in Bold)

1. **Click Options**
2. **Click Sys Admin Functions**
3. **Select Edit Clinical Alerts**
4. **Enter Rule Name**
5. **Enter Message**
6. **Select Clinical Decision Support radio button**
7. **Select the checkbox next to Link Externally**
8. **Select the Role over the users for the rule to be assigned to**
9. **Click the >> button to move those roles to the Assigned category**
10. **Select Problem List as the Rule Condition**
11. **Click Add Problem... button**
12. **Search hypothyroidism**
13. **Click Search button**
14. **Select the checkbox next to Severe Hypothyroidism**
15. **Click Add Selected Items button**
16. **Click Save Rule**

Successful Completion Criteria: Clinical Rule Successfully Saved message comes up at the top of the screen.

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 31-2: CDS – Medication List (110 Seconds)

The User needs to add a Clinical Decision Support rule for patients with specific medication.

Task: Add Clinical Decision Support rule for the medication, Flagyl 250mg.

- Rule Name: Flagyl
- Message: Flagyl
- Rule Condition: Medication
- Medication: Severe Hypothyroidism

Correct Paths (Optimal in Bold)

1. Click Options
2. Click Sys Admin Functions
3. Select Edit Clinical Alerts
4. Enter Rule Name
5. Enter Message
6. Select Clinical Decision Support radio button
7. Select the checkbox next to Link Externally
8. Select the Role over the users for the rule to be assigned to
9. Click the >> button to move those roles to the Assigned category
10. Select Medication as the Rule Condition
11. Click Add Medication... button
12. Search Flagyl
13. Click Search button
14. Select the checkbox next to Flagyl 250 mg tablet
15. Select 'Any of the following medications has been fulfilled' in the dropdown
16. Click Add Selected Items button
17. Click Save Rule

Successful Completion Criteria: Clinical Rule Successfully Saved message comes up at the top of the screen.

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 31-3: CDS – Medication Allergy List (110 Seconds)

The User needs to add a Clinical Decision Support rule for patients with specific medication allergy.

Task: Add Clinical Decision Support rule for the medication allergy, Bactrim.

- Rule Name: Bactrim Allergy
- Message: Bactrim Allergy
- Rule Condition: Medication Allergy List
- Medication: Bactrim

Correct Paths (Optimal in Bold)

1. **Click Options**
2. **Click Sys Admin Functions**
3. **Select Edit Clinical Alerts**
4. **Enter Rule Name**
5. **Enter Message**
6. **Select Clinical Decision Support radio button**
7. **Select the checkbox next to Link Externally**
8. **Select the Role over the users for the rule to be assigned to**
9. **Click the >> button to move those roles to the Assigned category**
10. **Select Medication Allergy as the Rule Condition**
11. **Click Add Allergy... button**
12. **Select Bactrim or Search for it**
13. **Click Add**
14. **Click Save Rule**

Successful Completion Criteria: Clinical Rule Successfully Saved message comes up at the top of the screen.

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 31-4: CDS – At least one demographic (110 Seconds)

The User needs to add a Clinical Decision Support rule for patients with specific demographic, Age.

Task: Add Clinical Decision Support rule for all patients over 40.

- Rule Name: Age
- Message: Age over 40
- Rule Condition: Age
- Conditions: Over; 40; Year(s)

Correct Paths (Optimal in Bold)

1. **Click Options**
2. **Click Sys Admin Functions**
3. **Select Edit Clinical Alerts**
4. **Enter Rule Name**
5. **Enter Message**
6. **Select Clinical Decision Support radio button**
7. **Select the checkbox next to Link Externally**
8. **Select the Role over the users for the rule to be assigned to**
9. **Click the >> button to move those roles to the Assigned category**
10. **Select Age as the Rule Condition**
11. **Select the Over in the first dropdown**
12. **Type 40 in the second box**
13. **Select Year(s) in the third dropdown**
14. **Click Save Rule**

Successful Completion Criteria: Clinical Rule Successfully Saved message comes up at the top of the screen.

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 31-5: CDS – Laboratory Test (110 Seconds)

The User needs to add a Clinical Decision Support rule for patients with specific lab test ordered, CBC wo diff.

Task: Add Clinical Decision Support rule for the lab test, CBC wo diff.

- Rule Name: CBC
- Message: CBC
- Rule Condition: Procedure
- Procedure: CBC wo diff

Correct Paths (Optimal in Bold)

1. **Click Options**
2. **Click Sys Admin Functions**
3. **Select Edit Clinical Alerts**
4. **Enter Rule Name**
5. **Enter Message**
6. **Select Clinical Decision Support radio button**
7. **Select the checkbox next to Link Externally**
8. **Select the Role over the users for the rule to be assigned to**
9. **Click the >> button to move those roles to the Assigned category**
10. **Select Procedure as the Rule Condition**
11. **Click Add Procedure... button**
12. **Search for CBC**
13. **Select CBC wo diff**
14. **Click Add Selected Items**
15. **Select 'Any of the following procedures has been ordered' in the dropdown**
16. **Click Save Rule**

Successful Completion Criteria: Clinical Rule Successfully Saved message comes up at the top of the screen.

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 31-6: CDS – Vital Signs (110 Seconds)

The User needs to add a Clinical Decision Support rule for patients with specific vital sign, All patients with BMI greater than 30.

Task: Add Clinical Decision Support rule for the lab test, CBC wo diff.

- Rule Name: BMI over 30
- Message: BMI over 30
- Rule Condition: Vital Signs
- Vitals: BMI > 30

Correct Paths (Optimal in Bold)

1. **Click Options**
2. **Click Sys Admin Functions**
3. **Select Edit Clinical Alerts**
4. **Enter Rule Name**
5. **Enter Message**
6. **Select Clinical Decision Support radio button**
7. **Select the checkbox next to Link Externally**
8. **Select the Role over the users for the rule to be assigned to**
9. **Click the >> button to move those roles to the Assigned category**
10. **Select Vital Signs as the Rule Condition**
11. **Click Add Vital Sign... button**
12. **Select BMI in the first dropdown**
13. **Select > (greater than) in the second dropdown**
14. **Type 30 in the free text box**
15. **Click Save Rule**

Successful Completion Criteria: Clinical Rule Successfully Saved message comes up at the top of the screen.

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 31-7: CDS – Combination of at least 2 of the elements above (110 Seconds)

The User needs to add a Clinical Decision Support rule for patients with two elements; specific vital sign, All patients with BMI greater than 30, and Birth Sex = Female.

Task: Add Clinical Decision Support rule for patients with BMI greater than 30, and Birth Sex = Female.

- Rule Name: Two Elements
- Message: Two Elements
- Rule Condition: Vital Signs and Birth Sex
- Vital Sign: BMI > 30
- Birth Sex: Female

Correct Paths (Optimal in Bold)

1. **Click Options**
2. **Click Sys Admin Functions**
3. **Select Edit Clinical Alerts**
4. **Enter Rule Name**
5. **Enter Message**
6. **Select Clinical Decision Support radio button**
7. **Select the checkbox next to Link Externally**
8. **Select the Role over the users for the rule to be assigned to**
9. **Click the >> button to move those roles to the Assigned category**
10. **Select Vital Signs as the Rule Condition**
11. **Click Add Vital Sign... button**
12. **Select BMI in the first dropdown**
13. **Select > (greater than) in the second dropdown**
14. **Type 30 in the free text box**
15. **Select Birth Sex from the Rule Condition dropdown**
16. **Select Female in the Birth Sex dropdown**
17. **Click Save Rule**

Successful Completion Criteria: Clinical Rule Successfully Saved message comes up at the top of the screen.

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 32: Trigger the CDS interventions/resources added using the applicable data elements from each of the required elements (60 Seconds)

The User needs to trigger a Clinical Decision Support rule for Medication Ordered.

Task: Trigger Clinical Decision Support rule for the medication ordered, Flagyl 250mg.

Correct Paths (Optimal in Bold)

- 1. Search for or select patient from schedule**
- 2. Select MDM**
- 3. Click Rx tab**
- 4. Search for Flagyl**
- 5. Select Flagyl 250mg tablet**
- 6. Select it and drag it across and attach it to the visit**
- 7. Fill in the required fields**
- 8. Click Save**
- 9. Click the Refresh button on the Patient Info Bar**
- 10. The clinical rule should appear under the Clinical Decision Support section on Patient Info Bar**

Successful Completion Criteria: Clinical Decision Support message appears on the Patient Info bar

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 33: View the intervention/resource information using the Info button standard for data elements in the problem list, medication list, and demographics (120 Seconds)
 The User needs to view the Clinical Decision Support Info Button for Medication Ordered, Problem list, and demographics data for a patient.

Task: View the intervention Clinical Decision Support rule for the medication ordered, problem list, and demographics data.

Correct Paths (Optimal in Bold)

1. **Search for or select patient from schedule**
2. **Ensure that the patient is older than 40 years of age by looking at the Patient Info Bar**
3. **Select MDM**
4. **Click Rx tab**
5. **Search for Flagyl**
6. **Select Flagyl 250mg tablet**
7. **Select it and drag it across and attach it to the visit**
8. **Fill in the required fields**
9. **Click Save**
10. **Select Dx tab**
11. **Search for Severe Hypothyroidism**
12. **Click and drag it to attach the diagnosis to the visit**
13. **Click the Add to Problem List checkbox**
14. **Click Save**
15. **Click the Refresh button on the Patient Info Bar**
16. **The clinical rule should appear under the Clinical Decision Support section of Clinical**
17. **Click the 'I' button next to each of the Clinical Decision Support rules**

Successful Completion Criteria: MedLine Plus should launch with the information related to each of the rules.

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 34: Trigger the CDS interventions/resources based on data elements in the problem list, medication list, and medication allergy list by incorporating patient information from a Transition of Care/Referral Summary (120 *Seconds*)

The User needs to trigger the Clinical Decision Support Info Button for Medication Ordered, Problem list, and medication allergy for a patient that has received a TOC/Referral Summary.

Task: Trigger the intervention Clinical Decision Support rule for the medication ordered, problem list, and medication allergy through Incorporating information from a TOC/Referral Summary.

Correct Paths (Optimal in Bold)

1. **Search for or select patient from schedule**
2. **Click the Tasks button on the Patient Info Bar**
3. **Expand the Incoming TOC section**
4. **Select the most recent task for 'Incoming Direct Message'**
5. **Search for patient**
6. **Select Patient**
7. **Attach Patient**
8. **Click Reconcile**
9. **Select the Problems, Allergies, and Medications to reconcile**
10. **Select the Practice Location**
11. **Click Accept**
12. **Click Accept on the popup with the full details**
13. **Click Complete in MDM**
14. **Click the Refresh button on the Patient Info Bar**
15. **The clinical rules should appear under the Clinical Decision Support section of Clinical**
16. **Click the 'I' button next to each of the Clinical Decision Support Rules**

Successful Completion Criteria: MedLine Plus should launch with the information related to each of the rules.

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 35: Access the following attributes for one of the triggered CDS interventions/resources: bibliographic citation, developer, funding source, release/revision date (16 Seconds)

The User needs to access the bibliographic citation, developer, funding source, and release/revision date for a Clinical Decision Support rule.

Task: View the bibliographic citation, developer, funding source, and release/revision date for a Clinical Decision Support rule

Correct Paths (Optimal in Bold)

1. **Click Options**
2. **Click Sys Admin Functions**
3. **Click Edit Clinical Alerts**
4. **Click the Create New Rule button**

Successful Completion Criteria: Viewing the required information at the bottom of creating a rule.

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 36: Record UDI (85 Seconds)

Patient Joanne Redwine has arthroscopic surgery to repair his torn meniscus and the surgeon adds the inserted devices into Joanne’s knee to his medical record.

Task: Add the following polyester suture into Joanne’s record, mark it “Active”.

- **DI Number: (01)10884521062856(11)141231(17)150707(10)A213B1(21)1234**
- **Version or Model: 88863380-82**
- **Manufactured Date: 2014-12-31**
- **Expiration Date: 2015-07-07**
- **Lot Number: A213B1**
- **Serial: 1234**
- Brand Name: Ti-Cron
- Company Name: Covidien LP
- Issuing Agency: GS1
- Device Count: 1
- Device Description: Coated Braided Polyester

Correct Paths (**Optimal in Bold**)

1. **Select Patient from schedule**
2. **Click Encounters**
3. **Select Medical Check-In**
4. **Click the + Add/Edit Implantable Devices hyperlink**
5. **Type in the Device Identifier**
6. **Click Search**
7. **Click Ok**

Successful Completion Criteria: Device information is visible.

Task Result:

Participant ID	Time to complete	# and type of	Path Deviation	Participant’s comments	Participant’s satisfaction ratings of the system (Very

Task 37: Change the UDI status (50 Seconds)

Patient Joanne Redwine informs the nurse that her polyester suture has failed.

Task: Change the status of polyester suture into Joanne's record to failed.

- **DI Number: (01)10884521062856(11)141231(17)150707(10)A213B1(21)1234**
- **Version or Model: 88863380-82**
- **Manufactured Date: 2014-12-31**
- **Expiration Date: 2015-07-07**
- **Lot Number: A213B1**
- **Serial: 1234**
- Brand Name: Ti-Cron
- Company Name: Covidien LP
- Issuing Agency: GS1
- Device Count: 1
- Device Description: Coated Braided Polyester

Correct Paths (**Optimal in Bold**)

1. **Select Patient from schedule**
2. **Click Encounters**
3. **Select Medical Check-In**
4. **Click the + Add/Edit Implantable Devices hyperlink**
5. **Put a checkmark in the box next to Polyester Suture**
6. **In the dropdown at the top of the screen, select Failed**
7. **Click Change Status hyperlink at the top of the page.**

Successful Completion Criteria: Device information is visible with a status of failed.

Task Result:

Participant ID	Time to complete	# and type of	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very

Task 38: Access UDI, device description, identifiers, and attributes (30 Seconds)
The provider wants to view the Implantable device information for Patient Joanne Redwine.

Task: View the Device Information for patient Joanne Redwine

- **DI Number: (01)10884521062856(11)141231(17)150707(10)A213B1(21)1234**
- **Version or Model: 88863380-82**
- **Manufactured Date: 2014-12-31**
- **Expiration Date: 2015-07-07**
- **Lot Number: A213B1**
- **Serial: 1234**
- Brand Name: Ti-Cron
- Company Name: Covidien LP
- Issuing Agency: GS1
- Device Count: 1
- Device Description: Coated Braided Polyester

Correct Paths (**Optimal in Bold**)

1. **Select Patient from schedule**
2. **Click Encounters**
3. **Select Medical Check-In**
4. **Click the + Add/Edit Implantable Devices hyperlink**

Successful Completion Criteria: Device information is visible.

Task Result:

Participant ID	Time to complete	# and type of	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very

Task 39: Incorporate a CCDA and conduct reconciliation of medications, medication allergies, and problems in the CCDA with the information currently in the patient's record (120 Seconds)

The doctor receives a CCDA for Susan Turner from where she saw another provider. The doctor needs to reconcile the Medications, allergies, and problems.

Task: Reconcile problems, medications, and allergies from a CCDA for patient Susan Turner with what is in the chart.

- Patient: Susan Turner

Correct Paths (Optimal in Bold)

1. **Click the Tasks button on the Patient Info Bar**
2. **Expand the Incoming TOC section**
3. **Select the most recent task for 'Incoming Direct Message'**
4. **Search for patient**
5. **Select Patient**
6. **Attach Patient**
7. **Click Reconcile**
8. **Select the Problems, Allergies, and Medications to reconcile**
9. **Select the Practice Location**
10. **Click Accept**
11. **Click Accept on the popup with the full details**
12. **Click Complete in MDM**
13. **Click Summary**
14. **Click Refresh on the Patient Info Bar**

Successful Completion Criteria: On the summary page, the user should see the newly incorporated Problems and Medications, and should see the allergies on the Patient Info Bar.

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 40: Generate a new CCDA with reconciled data (100 Seconds)

The user needs to generate a new CCDA with recently reconciled data.

Task: Generate a new CCDA for the previously used patient, Susan Turner.

Correct Paths (Optimal in Bold)

1. Click Reports
2. Click Meaningful Use
3. Click Data Portability
4. Enter Beginning Date
5. Enter Ending Date
6. Click Add Provider
7. Select Provider or Choose Check All
8. Click Ok
9. Click Add locations
10. Select Location or Choose Check All
11. Click Add Patient
12. Search for patient
13. Select Patient by putting checkmark in box next to name
14. Click Ok
15. Click Export button
16. Click Tasks on Info Bar
17. Refresh until a new task under data portability appears

Successful Completion Criteria: Task will appear under data portability section

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 41: Create new prescription (70 Seconds)

Patient Heather Bennett is presenting as a patient and you need to prescribe a medication and send through e-prescribe.

Task: Enter the following data for the medication order.

- Medication: Lisinopril 10 mg tablet
- Frequency: Twice daily
- Quantity: 30
- Refills: 0
- Pharmacy: Mail Order Pharmacy 10.6MU NOCS

When you feel you're done with the task, alert the test administrator by saying “complete”.

Correct Paths (Optimal in Bold)

1. Search Patient from Schedule
2. Select MDM button
3. Select Rx tab
4. Search for and select medication
5. Click and drag to attach to the visit
6. Enter the details
7. Click Save
8. Click the clock symbol to fulfill prescription
9. Select Delivery Method as eRx to Pharmacy
10. Click Fulfill
11. Search for Pharmacy or Select Pharmacy favorites
12. Select Pharmacy
13. Click Send

Successful Completion Criteria: Click “Send” with all data points completed above. The clock in MDM has an arrow through it showing it is sending.

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 42: Change prescription (dosage or duration) (60 Seconds)

Provider receives a Change request from the pharmacy for patient Felicia Flounders, the provider chooses to accept the change request

Task: Provider receives a change request

- Medication Prescribed: Zestril 20 mg tablet
- Medication Requested: Lisinopril 20 mg tablet

When you feel you're done with the task, alert the test administrator by saying “complete”.

Correct Paths (Optimal in Bold)

1. Select Global
2. Select Comm Mgmt
3. Select the task related to the patient
4. Detail open about the change request
5. Enter password
6. Click Accept

Successful Completion Criteria: Click “Accept” with all data points completed above.

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 43: Cancel Prescription (40 Seconds)

Provider chooses to cancel a prescription for patient Heather Bennett

Task: Provider receives a change request

- Medication Cancelled: Lisinopril 10 mg tablet

When you feel you're done with the task, alert the test administrator by saying "complete".

Correct Paths (Optimal in Bold)

1. Search Patient from Schedule
2. Select MDM button
3. Select medication attached to visit
4. Click Current Medications tab
5. Click Stop sign next to medication
6. Select Stop Reason
7. Select Effectiveness
8. Click Save

Successful Completion Criteria: Click "Save" with all data points completed above.

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 44: Refill Prescription (36 Seconds)

Provider receives a refill request from the pharmacy for patient, the provider chooses to accept the refill request

Task: Provider receives a refill request and chooses to accept it

When you feel you're done with the task, alert the test administrator by saying "complete".

Correct Paths (Optimal in Bold)

1. Select Global
2. Select Comm Mgmt
3. Select the task related to the patient
4. Click Approve Button
5. Select Sign Off
6. Enter Password
7. Click Ok

Successful Completion Criteria: Click "Ok" with all data points completed above.

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 45: Receive fill status notification (30 Seconds)

Provider receives fill status notification.

Task: Provider receives a fill status notification.

When you feel you're done with the task, alert the test administrator by saying “complete”.

Correct Paths (Optimal in Bold)

1. Select Global
2. Select Comm Mgmt
3. Select the task related to the patient
4. Click Approve Button
5. Select Sign Off
6. Enter Password
7. Click Ok

Successful Completion Criteria: Click “Ok” with all data points completed above.

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Task 46: Request and receive medication history information (50 Seconds)

Provider requests and receives the medication history information

Task: Provider requests and receives the medication history information for patient John Yosemite.

- **Patient:** John Yosemite

When you feel you're done with the task, alert the test administrator by saying "complete".

Correct Paths (Optimal in Bold)

8. Select patient from schedule
9. Select MDM
- 10. Select the Rx tab**
- 11. Select Rx Claims History**
12. Select the patient consent level
13. Click Save
14. Click Refresh button
15. Rx history will appear

Successful Completion Criteria: Patient's Rx claims history will appear

Task Result:

Participant ID	Time to complete task	# and type of error(s)	Path Deviation	Participant's comments	Participant's satisfaction ratings of the system (Very Easy(1) to Very Difficult(5))

Appendix 7: Sample Recruiting Screening Process

Initiate phone call to current Harris digiChart user:

Hello, I am calling from Harris digiChart. We are recruiting individuals to participate in a usability study for our electronic health record. We would like to follow up by sending you an email that contains a few questions to see if you would be available to participate. This should only take a few minutes of your time. May I send you the email?

If yes, send user below email:

Thanks for speaking with me. My direct # is 123-456-7890. Here is a little more info on the testing:

We would like to have you participate in a usability testing process for Meaningful Use using the Harris digiChart application. The test is for us to evaluate the users' usability of Harris digiChart. There are no "right" or "wrong" answers. Overall, we are interested in how easy (or difficult) this system is to use and how we can improve it.

We would like to do this testing at your convenience over a WebEx or in our Providence, RI office if you are local. We believe the testing should take no more than 45 minutes, but we are allowing 60-75 minutes just in case. We will be recording the process, and you, via WebEx as we step through a detailed usability test. I will be facilitating the testing and providing instructions on each step we need you to complete. All of your feedback will be confidential and not associated with any comments you make. I will ask you to perform the tasks, giving explicit instructions. I will not be able to assist you by answering questions or directing you of where to access the information. Again, the goal is to record how our users are using the Harris digiChart application.

Are you willing to participate in this testing with us? Please let me know if you have any further questions.