



ELECTRONIC HEALTH RECORD USABILITY TESTING

Helios V2.0 December 30, 2019

EHR Usability Test Report of Helios V 2.0

Report based on ISO/IEC 25062:2006 Common Industry Format for Usability Test Reports - Report uses the NISTIR 7741 Standard American Medical Solutions, Inc. Helios V 2.0

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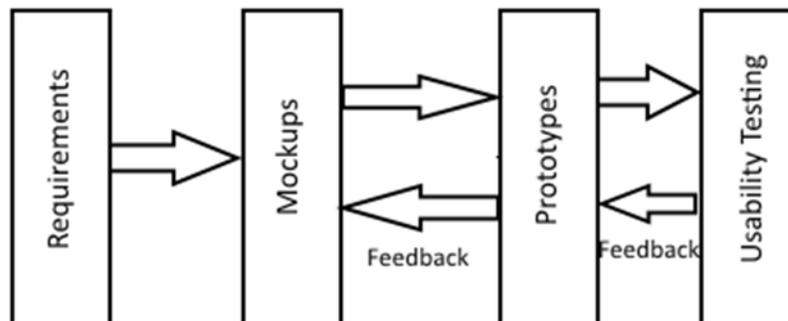
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EXECUTIVE SUMMARY

A usability test of American Medical Solutions, Inc – Helios V2.0 was conducted on December 19th 2019 in the main Conference Room at the corporate offices of American Medical Solutions, Inc, by the staff of American Medical Solutions, Inc. The purpose of this test was to test and validate the usability of the current user interface, and provide evidence of usability in the EHR Under Test (EHRUT). During the usability test, 11 participants representing healthcare professionals and administrative staff matching the target demographic criteria served as participants and used the EHRUT in simulated, but representative tasks.

AMS states that we are using an adjusted version of standard NISTIR7741 as UCD methodology, the process is outlined on the image below.



The image above demonstrates the following workflow:

- Collection and documentation of the requirements are catalogued based on the needs, requirements and certifications standards of our clients.
- Based on these requirements, we create mock-ups, which must be approved by all the parties involved in the project.
- Once the mock-ups are approved, we create prototypes that are presented to our clients for final approval.
- The prototypes are presented to a selected group of users to collect and measure feedback.
- As the product matures, users are consulted for feedback providing various types of information.

This study collected performance data on 41 tasks typically conducted on an EHR:

Find information in Patient Summary screen
Use patient chart to find lab results
Record demographics for the patient
View patient Demographics
Edit patient demographics
Check vital signs
Record Medication Order
Change Medication Order
Access Medication Order
Record Laboratory Order
Change Laboratory Order
Access Laboratory Order
Record Radiology Order
Change Radiology Order
Access Radiology Order
Create drug-drug and drug allergy interventions prior to CPOE completion
Adjustment of severity level of drug-drug interventions
Record Medication List

Change Medication List
 Access Medication List
 Record Medication Allergy list
 Change Medication Allergy list
 Access Medication Allergy list
 Record the patient's problem list
 View the patient's problem list
 Edit the patient's problem list
 Problem List Interventions with respect to clinical decision support
 Medication List Interventions with respect to clinical decision support
 Medication Allergy List Interventions with respect to clinical decision support
 Demographic Interventions with respect to clinical decision support
 Lab Tests and Results Interventions with respect to clinical decision support
 Vital Signs Interventions with respect to clinical decision support
 Identify User Diagnostic and Therapeutic Reference Information with respect to clinical decision support
 Configuration of CDS interventions by user with respect to clinical decision support
 Create prescriptions
 Reconcile patient's active medication list with another source
 Reconcile patient's active problem list with another source
 Reconcile patient's active medication allergy list with another source
 Utilize the Implantable Device List to record and view
 Utilize the E-Prescribe functionality to record a medication
 Utilize the E-Prescribe functionality to change a medication order
 Utilize the E-Prescribe functionality to refill a medication as a refill request

During the 120 Minute one-on-one usability test, each participant was greeted by the administrator and asked to review and sign an informed consent/release form (included in Appendix 3); they were instructed that they could withdraw at any time. Participants had prior experience with the EHR and a basic training manual was provided 1 week prior to the test. The administrator introduced the test, and instructed participants to complete a series of tasks (given one at a time) using the EHRUT. During the testing, the administrator timed the test and, along with the data logger recorded user performance data on paper and electronically. The administrator did not give the participant assistance in how to complete the task.

Participant screens, head shots and audio were recorded for subsequent analysis. The following types of data were collected for each participant:

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

All participant data was de-identified – no correspondence could be made from the identity of the participant to the data collected. Following the conclusion of the testing, participants were asked to complete a post-test questionnaire and were not compensated for their time. Various recommended metrics, in accordance with the examples set forth in the NIST Guide to the Processes Approach for Improving the Usability of Electronic Health Records, were used to evaluate the usability of the EHRUT. Following is a summary of the performance and rating data collected on the EHRUT.

INTRODUCTION

The EHRUT tested for this study was American Medical Solution's - Helios V 2.0. Designed to present medical information to healthcare providers in ambulatory non specialty setting, the EHRUT consists of a practice management with clinical documentation. 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 deviations, duration of task completion and success, were captured during the usability testing.

METHOD

PARTICIPANTS

A total of 11 participants were tested on the EHRUT(s). Participants in the test were general practice users. Participants were recruited by American Medical Solutions, personnel and were not for their time. In addition, participants had no direct connection to the development of or organization producing the EHRUT(s).

Participants were not from the testing or supplier organization. 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; an example of a screener is provided in Appendix [1].

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

	Part ID	Gender	Age	Education	Occupation/role	Professional Experience	Computer Experience	Product Experience	Assistive Technology Needs
1	P1	Female	30-39	Some College	Admin Staff	24 months	120+ Months	24 Months	No
2	P2	Female	40-49	Bachelors	RN	18 months	120+ Months	12 Months	No
3	P3	Female	30-39	Bachelors	Physician	14 Months	60 months	24 Months	No
4	P4	Female	60-69	High School	Admin Staff	24 Months	120+ Months	12 Months	No
5	P5	Female	70-79	High School	Admin Staff	60 Months	120+ Months	24 Months	No
6	P6	Male	50-59	High School	Admin Staff	60 Months	120+ Months	12 Months	No
7	P7	Female	50-59	High School	Admin Staff	14 Months	120+ Months	12 Months	No
8	P8	Female	20-29	Some College	RN	4 Months	60 Months	4 Months	No
9	P9	Female	20-29	Bachelors	Admin Staff	9 Months	60 Months	9 Months	No
10	P10	Male	20-29	Some College	Admin Staff	8 Months	60 Months	8 Months	No
11	P11	Female	20-29	Bachelors	Admin Staff	12 months	12 Months	24 Months	No

11 participants (matching the demographics in the section on Participants) were recruited and 11 participated in the usability test.

Participants were scheduled for 60-minute sessions with 15-minute sessions in between each session for debrief by the administrator(s) and data logger(s), and to reset systems to proper test conditions. A spreadsheet was used to keep track of the participant schedule, and included each participant's demographic characteristics as provided by the recruiting firm.

STUDY DESIGN

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

During the usability test, participants interacted with 1 EHR. All except 1 participant used the system in the same location, and was provided with the same instructions. The lone participant utilized Skype voice and screen share and was provided the same instructions as the others. The system was evaluated for effectiveness, efficiency and satisfaction as defined by measures collected and analyzed for each participant:

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

Additional information about the various measures can be found in Section 3.9 on Usability Metrics.

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:

Find information in Patient Summary screen
 Use patient chart to find lab results
 Record demographics for the patient
 View patient Demographics
 Edit patient demographics
 Check vital signs
 Record Medication Order
 Change Medication Order
 Access Medication Order
 Record Laboratory Order
 Change Laboratory Order
 Access Laboratory Order
 Record Radiology Order
 Change Radiology Order
 Access Radiology Order
 Create drug-drug and drug allergy interventions prior to CPOE completion
 Adjustment of severity level of drug-drug interventions
 Record Medication List
 Change medication list
 Access Medication List
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 Utilize the E-Prescribe functionality to change a medication order
 Utilize the E-Prescribe functionality to refill a medication as a refill request

Tasks were selected based on their frequency of use, criticality of function, and those that may be most troublesome for users. Tasks should always be constructed in light of the study objectives.

PROCEDURES

Upon arrival, participants were greeted; their identity was verified and matched with a name on the participant schedule. Participants were then assigned a participant ID. Each participant reviewed and signed an informed consent and release form (See Appendix 3). A representative from the test team witnessed the participant's signature. To ensure that the test ran smoothly, two staff members participated in this test, the usability administrator and the data logger. The usability testing staff conducting the test was experienced usability practitioners with 20+ years of experience, bachelor of science degree, and experienced within the administration, design and usability of Helios. The administrator moderated the session including administering instructions and tasks. The administrator also monitored task times, obtained post-task rating data, and took notes on participant comments. A second person served as the data logger and took notes on task success, path deviations, number and type of errors, and comments. Participants were instructed to perform the tasks (see specific instructions below):

As quickly as possible making as few errors and deviations as possible.

Without assistance; administrators were allowed to give immaterial guidance and clarification on tasks, but not instructions on use.

Without using a think aloud technique.

For each task, the participants were given a written copy of the task. Task timing began once the administrator finished reading the question. The task time was stopped once the participant indicated they had successfully completed the task. Scoring is discussed below in Section 3.9.

Following the session, the administrator gave the participant the post-test questionnaire (e.g., the System Usability Scale, see Appendix 5) 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

The test facility included a waiting area and a quiet testing room with a table, computer for the participant, and recording computer for the administrator. Only the participant and administrator were in the test room. All observers and the data logger worked from a separate room where they could see the participant's screen and face shot, and listen to the audio of the session. To ensure that the environment was comfortable for users, noise levels were kept to a minimum with the ambient temperature within a normal range. All of the safety instruction and evacuation procedures were valid, in place, and visible to the participants.

TEST ENVIRONMENT

The EHRUT would be typically be used in a healthcare office or facility. In this instance, the testing was conducted in the corporate offices specifically the conference room. For testing, the computer used a Dell running Windows 10 professional. The participants used a mouse and keyboard when interacting with the EHRUT.

A 17" screen, with size resolution 1920 x 1080, standard RGB color settings was utilized for testing. The application was set up by American Medical Solutions, Inc. according to the vendor's documentation describing the system set-up and preparation. The application itself was running on a Windows 10 computer Chrome Browser using a test database on a LAN connection. Technically, the system performance (i.e., response time) was representative to what actual users would experience in a field implementation. Additionally, participants were instructed not to change any of the default system settings (such as control of font size).

TEST FORMS AND TOOLS

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

Informed Consent

Moderator's Guide

Post-test Questionnaire

Examples of these documents can be found in Appendices 3-5 respectively. The Moderator's Guide was devised so as to be able to capture required data.

The participant's interaction with the EHRUT was captured and recorded digitally with screen capture software running on the test machine. A web camera recorded each participant's facial expressions synced with the screen capture, and verbal comments were recorded with a microphone. The test sessions were electronically transmitted to a nearby observation room where the data logger observed the test session.

PARTICIPANT INSTRUCTIONS

The administrator reads the following instructions aloud to each participant (also see the full moderator's guide in Appendix [B4]):

Thank you for participating in this study. Your input is very important. Our session today will last about 60 minutes. During that time, you will use an instance of an electronic health record. I will ask you to complete a few tasks using this system and answer some questions. You should complete the tasks as quickly as possible making as few errors as possible. Please try to complete the tasks on your own following the instructions very closely. Please note that we are not testing you we are testing the system, therefore if you have difficulty all this means is that something needs to be

improved in the system. I will be here in case you need specific help, but I am not able to instruct you or provide help in how to use the application.

Overall, we are interested in how easy (or how difficult) this system is to use, what in it would be useful to you, and how we could improve it. I did not have any involvement in its creation, so please be honest with your opinions. All of the information that you provide will be kept confidential and your name will not be associated with your comments at any time. Should you feel it necessary you are able to withdraw at any time during the testing.

Following the procedural instructions, participants were shown the EHR and as their first task, were given time 15 minutes to explore the system and make comments. Once this task was complete, the administrator gave the following instructions:

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

Participants were then given 40 tasks to complete. Tasks are listed in the moderator’s guide in Appendix [B4].

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:

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

DATA SCORING

The following table (Table [1]) details how tasks were scored, errors evaluated, and the time data analyzed.

Measures	Rationale and Scoring
<p>Effectiveness: Task Success</p>	<p>A task was counted as a “Success” if the participant was able to achieve the correct outcome, without assistance, within the time allotted on a per task basis.</p> <p>The total number of successes were calculated for each task and then divided by the total number of times that task was attempted. The results are provided as a percentage.</p> <p>Task times were recorded for successes. Observed task times divided by the optimal time for each task is a measure of optimal efficiency.</p> <p>Optimal task performance time, as benchmarked by expert performance under realistic conditions, is recorded when constructing tasks. Target task times used for task times in the Moderator’s Guide must be operationally defined by taking multiple measures of optimal performance and multiplying by some factor 1.25 that allows some time buffer because the participants are presumably not trained to expert performance. Thus, if expert, optimal performance on a task was 30 seconds then allotted task time performance was 37.5 seconds. This ratio should be aggregated across tasks and reported with mean and variance scores.</p>
<p>Effectiveness: Task Failures</p>	<p>If the participant abandoned the task, did not reach the correct answer or performed it incorrectly, or reached the end of the allotted time before successful completion, the task was counted as an “Failures.” No task times were taken for errors.</p> <p>The total number of errors was calculated for each task and then divided by the total number of times that task was attempted. Not all deviations would be counted as errors. This should also be expressed as the mean number of failed tasks per participant.</p> <p>On a qualitative level, an enumeration of errors and error types should be collected.</p>
<p>Efficiency: Task Deviations</p>	<p>The participant’s path (i.e., steps) through the application was recorded. Deviations occur if the participant, for example, went to a wrong screen, clicked on an incorrect menu item, followed an incorrect link, or interacted incorrectly with an on-screen control. This path was compared to the optimal path. The number of steps in the observed path is divided by the number of optimal steps to provide a ratio of path deviation.</p>
<p>Efficiency: Task Time</p>	<p>Each task was timed from when the administrator said “Begin” until the participant said, “Done.” If he or she failed to say “Done,” the time was stopped when the participant stopped performing the task. Only task times for tasks that were successfully completed were included in the average task time analysis. Average time per task was calculated for each task. Variance measures (standard deviation and standard error) were also calculated.</p>

<p>Satisfaction: Task Rating</p>	<p>Participant’s subjective impression of the ease of use of the application was measured by administering both a simple post-task question as well as a post-session questionnaire. After each task, the participant was asked to rate “Overall, this task was:” on a scale of 1 (Very Difficult) to 5 (Very Easy). These data are averaged across participants.¹²</p> <p>Common convention is that average ratings for systems judged easy to use should be 3.3 or above.</p> <p>To measure participants’ confidence in and likeability of the [EHRUT] overall, the testing team administered the System Usability Scale (SUS) post-test questionnaire. Questions included, “I think I would like to use this system frequently,” “I thought the system was easy to use,” and “I would imagine that most people would learn to use this system very quickly.” See full System Usability Score questionnaire in Appendix 5.¹³</p>
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Table [1]. Details of how observed data were scored.

RESULTS

DATA ANALYSIS AND REPORTING

The results of the usability test were calculated according to the methods specified in the Usability Metrics section above. Participants who failed to follow session and task instructions had their data excluded from the analyses.

The usability testing results for the EHRUT are detailed below.

Measure Task	N #	Task Success		Path Steps		Task Time		Errors		Task Rating 5= Easy	
		Mean	SD	Observed	Optimal	Mean	(SD)	Mean	SD	Mean	(SD)
Find item on patient summary	1	1	0	3	2	0:04	8.94	0	0	5	0
Use patient chart to find lab results	2	1	0	3	3	0:08	20.78	0	0	5	0
Record demographics for the patient	3	1	0	4	4	0:05	6.81	0	0	5	0
View patient Demographics	4	1	0	8	6	0:05	7.74	0	0	5	0
Edit patient demographics	5	1	0	6	6	0:11	13.26	0	0	5	0
Check vital signs	6	1	0	5	5	0:15	6.58	0	0	5	0
Record Medication Order	7	1	0	3	3	0:20	21.90	0	0	5	0
Change Medication Order	8	1	0	5	4	0:18	4.05	0	0	5	0
Access Medication Order	9	1	0	3	3	0:11	3.14	0	0	5	0
Record Laboratory Order	10	1	0	8	4	0:42	14.37	1.00	3.16	2.45	2.58
Change Laboratory Order	11	1	0	5	3	1:10	35.49	2.00	7.74	2.81	2.14
Access Laboratory Order	12	1	0	3	3	0:11	9.38	0	0	4	2.82
Record Radiology Order	13	1	0	7	5	1:15	36.74	1.00	2.82	2.63	2.59
Change Radiology Order	14	1	0	6	3	1.05	34.20	1.00	3.16	2.63	3.46
Access Radiology Order	15	1	0	4	4	0:32	21.16	0	0	5	0
Create drug-drug and drug allergy interventions prior to CPOE completion	16	1	0	1	1	0:03	1.67	0	0	5	0
Adjustment of severity level of drug-drug interventions	17	0.63	3.60	5	3	2:15	102.23	3.00	3.46	3.63	4.87
Record Medication List	18	1	0	5	4	1:18	24.97	0	0	4.09	3.44
Change Medication List	19	1	0	4	4	1:04	27.71	0	0	5	0
Access MedicationList	20	1	0	4	4	0:11	4.69	0	0	5	0
Record Medication Allergy List	21	1	0	4	4	0:18	16.97	0	0	5	0
Change Medication Allergy List	22	1	0	4	4	0:08	11.31	0	0	5	0
Access Medication Allergy List	23	1	0	3	3	0:05	8.94	0	0	5	0
Record patient's	24	.72	5.75	5	3	0:29	11.91	1.27	2.80	3.09	1.68

problem list											
View the patient's problem list	25	1	0	4	4	0:12	9.79	0	0	5	0
Edit the patient's problem list	26	.55	2.93	7	4	0:42	9.16	2.00	2.82	2.81	3.20
Problem List Interventions with respect to clinical decision support	27	.55	2.93	9	5	1:18	29.15	2.00	3.46	2.09	1.38
Medication List Interventions with respect to clinical decision support	28	.72	5.75	8	5	1:22	12.80	2.18	5.84	1.09	.99
Medication Allergy List Interventions with respect to clinical decision support	29	1	0	4	3	1:08	11.69	0	0	4.54	4.63
Demographic Interventions with respect to clinical decision support	30	1	0	9	4	0:53	20.59	0	0	1.09	.99
Lab Tests and Results Interventions with respect to clinical decision support	31	72	5.75	8	4	0:45	26.83	2.00	3.46	2.45	3.40
Vital Signs Interventions with respect to clinical decision support	32	91	5.82	6	5	0:30	7.74	1.18	3.01	4.72	3.21
Identify User Diagnostic and Therapeutic Reference Information with respect to clinical decision support	33	91	5.82	7	5	1:12	29.39	1.54	2.70	2.45	2.59
Configuration of CDS interventions by user with respect to clinical decision support Create prescriptions	34	72	5.75	7	5	2:56	84.16	3.82	8.20	2.81	2.14
Reconcile patient's active medication list with another source	35	72	5.75	9	5	0:42	44.89	3.00	7.74	3.36	2.92
Reconcile patient's active problem list with another source	36	72	5.75	7	5	0:50	30.00	3.00	8.12	3.36	2.92
Reconcile patient's active medication allergy list with another source	37	1	0	7	5	0:57	32.03	2.72	8.45	3.46	2.93
Utilize the Implantable Device List to record and view	38	1	0	5	4	0:28	7.48	0	0	4.27	4.22
Utilize the E-	39	1	0	6	5	1:10	16.73	0	0	4.72	3.21

Prescribe functionality to record a medication											
Utilize the E- Prescribe functionality to change a medication order	40	1	0	5	5	0:18	6.00	0	0	4.81	2.80
Utilize the E- Prescribe functionality to refill a medication as a refill request	41	1	0	4	4	0:12	12.96	0	0	5	0

The results from the System Usability Scale scored the subjective satisfaction with the system based on performance with these tasks to be: 79.

DISCUSSION OF THE FINDINGS

The overall findings showed areas in need of a better laid out user interface with respect to configuration and overall usability. The results were realistic in the user’s experiences and overall provided great feedback on areas of improvement and areas where the EHR exceeded expectations.

EFFECTIVENESS

The effectiveness of the EHRUT was good based on the findings. The overall success rate of the main actions was good and users were able to effectively accomplish all standard tasks. The use and effectiveness of the non-standard tasks usually done sparingly and by more senior administrators, such as adjustment of settings, configurations and actions related to usability reporting were more difficult. Almost all tasks were accomplished with a few users unable to complete the more advanced configuration and adjustment tasks.

EFFICIENCY

For most tasks related to everyday process, the efficiency rating was scored above 4.0. The tasks where advanced administrative functions had to be accomplished were scored much lower indicating there are inefficiencies within the adjustment and setup processes.

SATISFACTION

The overall satisfaction level was high for users. Responses of ease of use and intuitive were commonly expressed even for tasks where the users exhibited deviations. The complex nature of EHR systems most satisfaction responses are based on low expectations. Helios exceeded expectations in most areas where the satisfaction score reached 3.3 and above. For the 40 tasks observed a score of 3.3 or higher was given 70% of the time.

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

Major findings

After investigation, meaningful tasks that center around the management of the patient were deemed easier and less difficult for the users to accomplish. Tasks involving patient demographics, clinical documentation scored above 4 on satisfaction and had minimal deviations and errors. For tasks where users had to adjust or edit items, the response time was much quicker due to the main part of the data already being entered. Users tended to like tasks where automation or prompting was done for them. Some users had better responses to tasks where settings were setup with their preferences making statements “I don’t have it setup like this” prompted follow up questions about design and improvements for customization after the test was conducted.

Areas for improvement

Tasks where the users were asked to adjust settings or conduct actions where the task would be done rarely provided challenges. Reporting, changing configurations, CDS actions, and reconciliation were all tasks that scored low and gave the users the most frustrations. Fortunately, these tasks do not affect all users being they are in very specific areas of the file and are not done by all users. Administration users who do not normally conduct CDS actions voiced frustration and made the most errors and deviations. These same administration users had greater success and higher favorability scores when working in areas managing patients, their main task and skill set.

APPENDICES

The following appendices include supplemental data for this usability test report. Following is a list of the appendices provided:

- 1: Sample Recruiting screener
- 2: Participant demographics
- 3: Non-Disclosure Agreement (NDA) and Informed Consent Form
- 4: Example Moderator's Guide
- 5: System Usability Scale Questionnaire

Appendix 1: RECRUITING SCREENER

Recruiting Script for Recruiting Firm

Hello, my name is, calling from *American Medical Solutions, Inc.* We

are recruiting individuals to participate in a usability study for an electronic health record. We would like to ask you a few questions to see if you qualify and if you would like to participate. This should only take a few minutes of your time. This is strictly for research purposes. If you are interested and qualify for the study, you will be paid to participate. Can I ask you a few questions?

[If not obvious] Are you male or female?

Have you participated in a focus group or usability test in the past 24 months? [If yes, Terminate]

Do you, or does anyone in your home, work in marketing research, usability research, web design or other software related testing or design? [If yes, Terminate]

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

Which of the following best describes your age? [>18, 20-29, 30-39, 40-49, 50-59, 60-69, 70-79, 80<]

Which of the following best describes your race or ethnic group? [e.g., Caucasian, Asian, Black/African-American, Latino/a or Hispanic, other, prefer not to answer]

Do you require any assistive technologies to use a computer? [if so, please describe]

Professional Demographics

What is your current position and title? (Must be healthcare provider)

RN: Specialty _____

Physician: Specialty _____

Resident: Specialty _____

Administrative Staff _____

Other [Terminate]

How long have you held this position in months?

Describe your work location (or affiliation) and environment?

Which of the following describes your highest level of education? [e.g., high school, some college, college graduate (BS, BA etc), college graduate (RN, BSN), postgraduate (MD/PhD), other (explain)]

Computer Expertise

Besides reading email, what professional activities do you do on the computer? [e.g., access EHR, research; reading news; shopping/banking; digital pictures; programming/word processing, etc.] [If no computer use at all, Terminate]

About how many hours per week do you spend on the computer? [1 to 10, 11-20, 21-30, 31-40, 40+]

What computer platform do you usually use? [e.g., Mac, Windows, etc.]

What Internet browser(s) do you usually use? [e.g., Firefox, IE, Chrome, etc.]

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

How many years have you used an electronic health record? [Convert to months. If not sure, estimate]

How many EHRs do you use or are you familiar with?

How does your work environment patient records?

On paper

Some paper, some electronic

All electronic

Contact Information *If the person matches your qualifications, ask*

Those are all the questions I have for you. Your background matches the people we're looking for.

Would you be able to participate on December 19th 2020? [If so collect contact information]

May I get your contact information?

Name of participant:

Work name:

Address:

City, State, Zip:

Daytime phone number:

Evening phone number:

Alternate [cell] phone number:

Email address:

Before your session starts, we will ask you to sign a release form allowing us to videotape your session. The videotape will only be used internally for further study if needed. Will you consent to be videotaped?

This study will take place at American Medical Solutions, Inc. corporate offices at 2222 W. Parkside Ln. #114 Phoenix, AZ. 85027. I will confirm your appointment a couple of days before your session and provide you with directions to our office. We have the following times available. Please let me know what works for you? [if none work, offer alternative contact method such as Skype or AnyDesk]

Appendix 2: PARTICIPANT DEMOGRAPHICS

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

Gender

Men	2
Women	9
Total(participants)	11

Occupation/Role

RN/BSN	2
Physician	1
Admin Staff	8
Total(participants)	11

Years of Professional Experience

Years' experience	20.5 accumulatively
Facility Use of EHR	
All paper	0
Some paper, some electronic	1
All electronic	10
Total(participants)	11

*The full participant breakdown (de-identified) of the participants can be found in **Section 3- Participants***

Appendix 3: NON-DISCLOSURE AGREEMENT AND INFORMED CONSENT FORM

Non-Disclosure Agreement

THIS AGREEMENT is entered into as of December 19th 2019, between _____ (“the Participant”) and the testing organization American Medical Solutions, Inc. located at 2222 W. Parkside Ln. #114, Phoenix, AZ. 85027

The Participant acknowledges his or her voluntary participation in today’s usability study may bring the Participant into possession of Confidential Information. The term "Confidential Information" means all technical and commercial information of a proprietary or confidential nature which is disclosed by *Test Company*, or otherwise acquired by the Participant, in the course of today’s study.

By way of illustration, but not limitation, Confidential Information includes trade secrets, processes, formulae, data, know-how, products, designs, drawings, computer aided design files and other computer files, computer software, ideas, improvements, inventions, training methods and materials, marketing techniques, plans, strategies, budgets, financial information, or forecasts.

Any information the Participant acquires relating to this product during this study is confidential and proprietary to *Test Company* and is being disclosed solely for the purposes of the Participant’s participation in today’s usability study. By signing this form, the Participant acknowledges that s/he will not receive monetary compensation for feedback and will not disclose this confidential information obtained today to anyone else or any other organizations.

Participant’s printed name: _____

Signature: _____ Date: ____

Informed Consent

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

Agreement

I understand and agree that as a voluntary participant in the present study conducted by American Medical Solutions, Inc. I am free to withdraw consent or discontinue participation at any time. I understand and agree to participate in the study conducted and videotaped by the American Medical Solutions, Inc.

I understand and consent to the use and release of the videotape by American Medical Solutions, Inc. I understand that the information and videotape is for research purposes only and that my name and image will not be used for any purpose other than research. I relinquish any rights to the videotape and understand the videotape may be copied and used by American Medical Solutions, Inc. without further permission.

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

I understand and agree that the data collected from this study may be shared with outside of American Medical Solutions, Inc. and American Medical Solutions, Inc.'s client. I understand and agree that data confidentiality is assured, because only de-identified data – i.e., identification numbers not names – will be used in analysis and reporting of the results.

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

Please check one of the following:

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

NO, I choose not to participate in this study.

Signature: _____ Date: _____

Appendix 4: MODERATOR'S GUIDE

EHRUT Usability Test

Moderator's Guide

Administrator ____

Data Logger ____

Date ____ **Time** ____

Participant # ____

Location _____

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 *EZVid*
- Start voice recording with Windows Voice Recorder

Prior to each task:

- Reset application to starting point for next task

After each participant:

- End session recordings with *EZVid*
- End voice recording with Windows Voice Recorder
- Save output files under participant ID

After all testing

- Back up all video and data files to main server D:\\Certification\\recordings
-

Orientation (5 minutes)

Thank you for participating in this study. Our session today will last **60 minutes**. During that time, you will take a look at an electronic health record system.

I will ask you to complete a few tasks using this system and answer some questions. We are interested in how easy (or how difficult) this system is to use, what in it would be useful to you, and how we could improve it. You will be asked to complete these tasks on your own trying to do them as quickly as possible with the fewest possible errors or deviations. Do not do anything more than asked. If you get lost or have difficulty, I cannot answer help you with anything to do with the system itself. Please save your detailed comments until the end of a task or the end of the session as a whole when we can discuss freely.

I did not have any involvement in its creation, so please be honest with your opinions.

The product you will be using today is a web application named Helios V2.0. It is a product already in production. Some of the data may not make sense as it is placeholder data.

We are recording the audio and screenshots of our session today. All of the information that you provide will be kept confidential and your name will not be associated with your comments at any time.

Do you have any questions or concerns?

Preliminary Questions (X minutes)

What is your job title / appointment?

How long have you been working in this role? What are some of your main responsibilities?
Tell me about your experience with electronic health records.

Task 1: First Impressions (30 Seconds)

Yes No

This is the application you will be working with. Have you heard of it? If so, tell me what you know about it.

Show test participant the EHRUT.

Please don't click on anything just yet. What do you notice? What are you able to do here? Please be specific.

Notes/Comments:

Task 2: Patient Summary Screen (10 Seconds)

Take the participant to the starting point for the task.

Before going into the exam room and you want to review *Patient's* chief complaint, history, and vitals. Find this information in the patient summary view patient screen.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Enter Patient Name> Patient History

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____
Show participant written scale: "Very Difficult" (1) to "Very Easy" (5)

Administrator / Notetaker Comments:

Comments:

Task 3: Record Demographics for the patient (30 Seconds)

Take the participant to the starting point for the task.

Before scheduling the patient, you may want to collect demographic data. Enter patient demographic data

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Patients> Demographics> New Record Button

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Notetaker Comments:

Comments:

Task 4: View Patient Demographic Data (15 Seconds)

Take the participant to the starting point for the task.

When the patient arrives, you may want to review the demographic data. Review the patient demographic data.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Patients> Patient Demographics> Enter Patient Name> Select Patient

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Notetaker Comments:

Comments:

Task 5: Edit patient demographic data (60 Seconds)

Take the participant to the starting point for the task.

When the patient demographic data is verified, there may be changes. Edit the demographic data with 2 data elements.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Patients> Patient Demographics> Enter Patient Name> Select Patient> Make Changes> Save

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Notetaker Comments:

Comments:

Task 6: Patient vital signs (5 Seconds)

Take the participant to the starting point for the task.

When reviewing a chart, you may want to review patient vital signs. Check the patient's vital signs for today's encounter.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Open encounter link>Vitals Tab> New record> Enter Data> Save

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Notetaker Comments:

Comments:

Task 7: Record Medication Order (120 Seconds)

Take the participant to the starting point for the task.

For proper care you may want to enter a medication order. Enter the order for any drug at with any signature.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: New Record> Enter Data> Save

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____
Show participant written scale: "Very Difficult" (1) to "Very Easy" (5)

Administrator / Notetaker Comments:

Comments:

Task 8: Change Medication Order (30 Seconds)

Take the participant to the starting point for the task.

At some point you may want to change a medication order. Change any existing medication order with any element in the Rx Signature.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Patient Medication Selection> Click on Data Element> Enter Data> Save

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator/Notetaker Comments:

Comments:

Task 9: Access Medication Order (10 Seconds)

Take the participant to the starting point for the task.

When a patient calls and requests medication information, you will need to access their medication information. Access “test Patient” medications.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Patients> Patient Medication> Select Patient

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator/Notetaker Comments:

Comments:

Task 10: Record Laboratory Order (120 Seconds)

Take the participant to the starting point for the task.

There may be a need to order a lab for a patient. Order a LabCorp Lab for Patient Test.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Enter Patient Search> Select Patient> New Record> Enter Data> Save

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Notetaker Comments:

Comments:

Task 11: Change Laboratory Order (30 Seconds)

Take the participant to the starting point for the task.

There may be a time when a lab order needs to be corrected. Change Patient Test's lab order to a different test code.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Select Order> Make Data Entry> Save

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Notetaker Comments:

Comments:

Task 12: Access Laboratory Order (15 Seconds)

Take the participant to the starting point for the task.

When requested that patient may need information about a previous lab order. Access a lab order for “Test Patient”

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Labs> Lab Orders> Search for The Patient> Click Order

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____
Show participant written scale: “Very Difficult” (1) to “Very Easy” (5)

Administrator / Notetaker Comments:

Comments:

Task 13: Record Radiology Order (120 Seconds)

Take the participant to the starting point for the task.

There may be a need to order a lab for a patient. Order a Radiology test for Patient Test.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Enter Patient Search> Select Patient> New Record> Enter Data> Save

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator/Notetaker Comments:

Comments:

Task 14: Change Radiology Order (30 Seconds)

Take the participant to the starting point for the task.

There may be a time when a lab order needs to be corrected. Change Patient Test's radiology order to a different test code.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Select Order> Make Data Entry> Save

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator/Notetaker Comments:

Comments:

Task 15: Access Radiology Order (15 Seconds)

Take the participant to the starting point for the task.

When requested that patient may need information about a previous lab order. Access a radiology order for “Test Patient”

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Labs> Lab Orders> Search for The Patient> Click Order

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Notetaker Comments:

Comments:

Task 16: Create drug-drug and drug allergy interventions prior to COPE completion (5 Seconds)

Take the participant to the starting point for the task.

It is important to make sure there are no interactions between a drug being prescribed and another drug or allergy. Conduct a review of a drug to see if there is an interaction.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Save

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator/Notetaker Comments:

Comments:

Task 17: Adjustment of severity level of drug-drug interventions (10 Seconds)

Take the participant to the starting point for the task.

Some interactions do not need to be noted and an adjustment should be made to only reflect a higher level of interactions with regard to a drug-drug relationship. Change any interaction level 1 level.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Click Funnel Icon> Change Level> Click Save

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator/Notetaker Comments:

Comments:

Task 18: Record Medication List (120 Seconds)

Take the participant to the starting point for the task.

Before seeing the patient, you may be able to add the patient's medication list. Enter any patient and add a few medications simulating a medication list.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Patient Medication> New Record> Enter Data> Click Save and Add to Current Meds List

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator/Notetaker Comments:

Comments:

Task 19: Change Medication List (20 Seconds)

Take the participant to the starting point for the task.

At some point you may want to change a medication list. Change any existing medication order with any element in the Rx Signature.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Patient Medication Selection> Click on Data Element> Enter Data> Save

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator/Notetaker Comments:

Comments:

Task 20: Access Medication List (10 Seconds)

Take the participant to the starting point for the task.

Before seeing the patient, there may be a need to access and review their medication list. Access Patient Test's medication list.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Patients> Patient Medication> Enter Patient Name> Select Patient

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____
Show participant written scale: "Very Difficult" (1) to "Very Easy" (5)

Administrator/Notetaker Comments:

Comments:

Task 21: Record Medication Allergy (25 Seconds)

Take the participant to the starting point for the task.

In order to effectively see a patient and provide w=quality care, you will need to record the patient's allergies. Record a patient allergy.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Click on ALE Tab> New Record> Enter Data> Save

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator/Notetaker Comments:

Comments:

Task 22: Change Medication Allergy List (30 Seconds)

Take the participant to the starting point for the task.

Sometimes there may be a mistake made when recording patient's allergies. Change a patient allergy list to any other allergy.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Click on ALE Tab> Click on Date of Allergy Entry> Enter Data> Save

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator/Notetaker Comments:

Comments:

Task 23: Access Medication Allergy List (10 Seconds)

Take the participant to the starting point for the task.

When providing care to the patient, you should review the patient's allergy list. Access the patient's allergy list.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Search for the patient> Click on Encounter Date> Click ALE Tab

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator / Notetaker Comments:

Comments:

Task 24: Record the patient's problem list. (180 Seconds)

Take the participant to the starting point for the task.

Before going into the exam room and you want to add to the *Patient's* problem list Find this information in the patient encounters and add a problem.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Click Problems Tab> Click New Record> Enter Data> Save

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator/Notetaker Comments:

Comments:

Task 25: View the patient's problem list (15 Seconds)

Take the participant to the starting point for the task.

Before going into the exam room and you want to review *Patient's* problem list. Find this information in the patient encounter page.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Click Problems Tab

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____
Show participant written scale: "Very Difficult" (1) to "Very Easy" (5)

Administrator/Notetaker Comments:

Comments:

Task 26: Edit the Patient's Problem List (120 Seconds)

Take the participant to the starting point for the task.

You may need to edit the patient's problem list due to a resolution or effort in entry. Fine the problem list in the encounters and edit 1 entry to a different problem.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Click Problems Tab> Right Click on an existing problem and remove> Enter Data> Save

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator/Notetaker Comments:

Comments:

Task 27: Conduct Problem List Interventions Respect to Clinical Decision Support (120 Seconds)

Take the participant to the starting point for the task.

A need for CDS may occur with regard to the patient's problem list. Conduct a CDS action after entering a patient problem.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Click Problems Tab> Click New Record> Enter Data> Save> CDS i button

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator/Notetaker Comments:

Comments:

Task 28: Conduct Medication Intervention with Respect to Clinical Decision Support (30 Seconds)

Take the participant to the starting point for the task.

A need for CDS may occur with regard to the patient's medication list. Conduct a CDS action after entering a patient medication.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Enter Medication Window> Click New Record> Enter Data> Save> CDS i button

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator/Notetaker Comments:

Comments:

Task 29: Medication Allergy List Interventions with Respect to Clinical Decision Support (30 Seconds)

Take the participant to the starting point for the task.

A need for CDS may occur with regard to the patient's medication allergy. Conduct a CDS action after entering a patient allergy.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Click ALE tab> Enter Allergy> view popup

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator/Notetaker Comments:

Comments:

Task 30: Demographic Interventions with Respect to Clinical Decision Support (35 Seconds)

Take the participant to the starting point for the task.

A need for CDS may occur with regard to the patient's demographic information. Conduct a CDS action after entering a patient demographic data for Test Patient.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Encounters> New Record> Enter Patient Name> View Auto Pop-up

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator/Notetaker Comments:

Comments:

Task 31: Lab Test and Results Intervention with respect to clinical decision support (60 Seconds)

Take the participant to the starting point for the task.

A need for CDS may occur with regard to the patient's lab tests and results. Conduct a CDS action after entering and resulting a patient lab test and result.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Lab Orders> Manual Process> Copy paste HL7 Data> View Pop-up

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator/Notetaker Comments:

Comments:

Task 32: Vital Signs Interventions with respect to Clinical Decision Support. (20 Seconds)

Take the participant to the starting point for the task.

Clinical decision support may be utilized when seeing a patient. Enter vitals and view clinical decision support.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Open encounter link>Vitals Tab> New record> Enter Data> Save

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____
Show participant written scale: "Very Difficult" (1) to "Very Easy" (5)

Administrator / Notetaker Comments:

Comments:

Task 33: Identify User Diagnostic and Therapeutic Reference Information with Respect to Clinical Decision Support. (20 Seconds)

Take the participant to the starting point for the task.

While seeing a patient, Clinical Decision Support may be utilized. While in an encounter, Identify Diagnostic and therapeutic information and discover and clinical decision support material.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Encounters> Open Encounters> Click on the date> Click summary> Click “i” button

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____
Show participant written scale: “Very Difficult” (1) to “Very Easy” (5)

Administrator / Notetaker Comments:

Comments:

Task 34: Configure CDS interventions be user with respect to Clinical Decision Support for prescriptions (45 Seconds)
Take the participant to the starting point for the task.

Clinical decision support interventions may need to be configured. Configure the CDS for prescriptions.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Encounters> Clinical Decision Support> New Record> Enter Data> Save

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____
Show participant written scale: "Very Difficult" (1) to "Very Easy" (5)

Administrator / Notetaker Comments:

Comments:

Task 35: Reconcile patient's active medication list with another source (120 Seconds)

Take the participant to the starting point for the task.

Patients sometimes present with a current medication list. This medication list should be reconciled with their current chart. Conduct a reconciliation with the patient's active medication list.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Meds> Reconciliation button> "Choose File on the bottom"> Upload File> Save

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____
Show participant written scale: "Very Difficult" (1) to "Very Easy" (5)

Administrator/Notetaker Comments:

Comments:

Task 36: Reconcile patient's active problem list with another source. (120 Seconds)

Take the participant to the starting point for the task.

Patients sometimes present with a current problem list. This problem list should be reconciled with their current chart. Conduct a reconciliation with the patient's active problem list.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Click on the "Problems" tab> Click "Reconciliation"> "Choose File on the bottom"> Upload> Save

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____
Show participant written scale: "Very Difficult" (1) to "Very Easy" (5)

Administrator / Notetaker Comments:

Comments:

Task 37: Reconcile patient's active medication allergy list with another source (120 Seconds)

Take the participant to the starting point for the task.

Patients sometimes present with a current medication allergy list. This medication allergy list should be reconciled with their current chart. Conduct a reconciliation with the patient's active medication allergy list.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Click on the Allergies> "Reconciliation" button> "Choose File on the bottom"> Upload> Save.

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____
Show participant written scale: "Very Difficult" (1) to "Very Easy" (5)

Administrator/Notetaker Comments:

Comments:

Task 38: Utilize the implantable Device List to Record and View (40 Seconds)

Take the participant to the starting point for the task.

Tracking information with regard to implantable devices can be valuable. Patient test has an implantable device. Use the implantable device list to record any implantable device.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Click "Patient Implantable Devices"> "New Record"> Select the proper information> Save

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____
Show participant written scale: "Very Difficult" (1) to "Very Easy" (5)

Administrator / Notetaker Comments:

Comments:

Task 39: Utilize the E-Prescribe functionality to Record a Medication (60 Seconds)

Take the participant to the starting point for the task.

While seeing a patient, the E-Prescribe tool can be useful. Prescribe a medication using the E-Prescribe tool.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Patient> Medications> New Record> Enter Data> Complete RX

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator/Notetaker Comments:

Comments:

Task 40: Utilize the E-Prescribe functionality to change a Medication (30 Seconds)

Take the participant to the starting point for the task.

Sometimes medications need to be changed. Use the E-Prescribe tool to change a patient's medication. Select any patient and any medication and change 1 thing on the signature of medication.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Patient> Medications> Click existing record> Change Data> Complete RX

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____

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

Administrator/Notetaker Comments:

Comments:

Task 41: Utilize the E-Prescribe functionality to refill a Medication as a refill request. (30 Seconds)

Take the participant to the starting point for the task.

Refills are triggered by the pharmacy and will send a refill request through the system. Conduct a refill request.

Success:

- Easily completed
- Completed with difficulty or help: Describe below
- Not completed

Comments:

Task Time: _____ Seconds

Optimal Path: Click Rx Icon> Click View> Select refill> Save

- Correct
- Minor Deviations/Cycles: Describe Below
- Major Deviations/Cycles: Describe Below

Comments:

Observed Errors and Verbalizations:

Comments:

Rating:

Overall, this task was: _____
Show participant written scale: "Very Difficult" (1) to "Very Easy" (5)

Administrator / Notetaker Comments:

Comments:

Final Questions (5 Minutes)

What was your overall impression of this system?

What aspects of the system did you like most?

What aspects of the system did you like least?

Were there any features that you were surprised to see?

What features did you expect to encounter but did not see? That is, is there anything that is missing in this application?

Compare this system to other systems you have used.

Would you recommend this system to your colleagues?

Administer the SUS

Appendix 5: SYSTEM USABILITY SCALE QUESTIONNAIRE

Strongly Strongly
disagree agree

I think that I would like to use this system frequently

1	2	3	4	5

I found the system unnecessarily complex

1	2	3	4	5

I thought the system was easy to use

1	2	3	4	5

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

1	2	3	4	5

I found the various functions in this system were well integrated

1	2	3	4	5

I thought there was too much inconsistency in this system

1	2	3	4	5

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

1	2	3	4	5

I found the system very cumbersome to use

1	2	3	4	5

I felt very confident using the system.

1	2	3	4	5

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

1	2	3	4	5

