EHR Usability Test Report of Practice Expert v 2018

Report based on NISTIR 7742 Customized Common Industry Format Template for Electronic Health Record Usability Testing

Practice Expert version 2018

Dates of Usability Test: June 29 – July 13, 2018

Date of Report: November 1, 2018

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EXECUTIVE SUMMARY

A usability test of **Practice Expert Version 2018, Ambulatory EHR** was conducted in Newport Beach, CA by California Medical Systems between June 29 and July 13, 2018. The purpose of this test was to test and validate the usability of the current user interface, and provide evidence of usability in the EHR Under Test (EHRUT).

During the usability test, ten (10) healthcare providers matching the target demographic criteria served as participants and used the EHRUT in simulated, but representative tasks. This study collected performance data on 30 tasks typically conducted on an EHR.

During the 90 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 One); they were instructed that they could withdraw at any time. Participants had prior experience with the EHR. The administrator introduced the test, and instructed participants to complete a series of tasks (given one at a time) using the EHRUT. During the testing, the administrator timed the test and, along with the data logger recorded user performance data on paper. The administrator did not give the participant assistance in how to complete the task. The recommendation is that all participants be given the opportunity to complete training similar to what a real end user would receive prior to participating in the usability test. Questions were answered after if asked.

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 and questions

- Participant's satisfaction ratings of the system using a Likert Scale

A risk number (from 1-10, with 10 being most at risk) was related to each task in order to evaluate how much risk is associated with a particular task if performed incorrectly. After the test a reassessment was done and a risk number (from 1-10, with 10 being most at risk) was given to each task with hindsight.

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.

Measure / Task	Risk #		Task Success	Path Deviation	Task Time	Task Time	Task Ratings (5=Easy)
	(Prior/ After)	# of tasks	Mean (%)	Deviation (Observed /Optimal)	Average	Deviations (Observed/ Optimal)	Average
CPOE Medications	7/7	3	94	(3/4)	55	(3/3)	5
CPOE Laboratory	3/3	3	90	(3/4)	61	(3/3)	4
CPOE Radiology (Imaging)	2/2	3	94	(2/3)	228	(4/5)	4
Drug-Drug Drug-Allergy Interaction Checks	6/7	2	91	(2/2)	79	(2/5)	3
Demog – Create New Pat (w/ pref. lang., dob, birth sex, race, ethnicity, sex orientation, gender id)	1/2	1	89	(0/1)	43	(2/2)	5
Demographics – Edit (w/ pref. lang., dob, birth sex, race, ethnicity, sex orientation, gender id)	1/1	1	91	(1/1)	29	(1/1)	5
Add to Problem List	2/4	1	88	(0/1)	78	(1/1)	5
View Problem List (Problem History)	2/2	1	91	(0/1)	24	(2/2)	5

Edit Problem List	2/2	1	91	(1/1)	44	(1/1)	5
Medication List	4/5	1	92	(0/1)	199	(1/1)	5
View Medication List (Medication History)	2/2	1	92	(1/1)	297	(2/2)	5
Edit Medication List	1/2	1	98	(0/1)	187	(1/1)	5
Medication Allergy List	7/7	1	92	(1/1)	89	(1/1)	4
View Med Allergy List (Medication Allergy Hist.)	2/2	1	88	(1/1)	45	(1/1)	4
Edit Med Allergy List	7/7	1	98	(1/2)	93	(1/1)	4
Clinical Information Reconciliation (meds, problem, med allergy)	3/3	3	85	(4/9)	146	(4/9)	2
Clinical Information (Generate CCDA After Reconcile Data)	3/3	1	82	(2/3)	132	(1/3)	2
Record Implantable Device List	2/2	1	98	(1/1)	75	(1/1)	5
Access Implantable Device List	2/2	1	98	(1/1)	35	(1/1)	5
Edit Implantable Device List (incl. status)	2/2	1	98	(1/1)	42	(0/1)	5
Configure CDS	5/7	1	88	(1/3)	238	(2/3)	2
Configure CDS (problem list)	5/7	1	88	(1/3)	215	(2/3)	2
Configure CDS (medication list)	5/7	1	88	(1/3)	220	(2/3)	2
Configure CDS (medication allergy list)	5/7	1	88	(1/3)	220	(2/3)	2
Configure CDS (vital signs)	5/7	1	88	(1/3)	232	(2/3)	2
Configure CDS (demographics)	5/7	1	88	(1/3)	190	(2/3)	2
Configure CDS (labs)	5/7	1	86	(1/3)	215	(2/3)	2
Configure CDS (combo)	5/7	1	82	(1/3)	242	(2/3)	2
Trigger CDS	5/6	1	90	(1/2)	90	(2/2)	2

Trigger CDS (problem list)	5/6	1	92	(1/2)	75	(2/2)	2
Trigger CDS (medication list)	5/6	1	92	(1/2)	80	(2/2)	2
Trigger CDS (medication allergy list)	5/6	1	92	(1/2)	82	(2/2)	2
Trigger CDS (vital signs)	5/6	1	88	(1/2)	75	(2/2)	2
Trigger CDS (demographics)	5/6	1	88	(1/2)	60	(2/2)	2
Trigger CDS (labs)	5/6	1	88	(1/2)	95	(2/2)	2
Trigger CDS (combo)	5/6	1	90	(1/2)	105	(2/2)	2
Locate and View Resources (InfoButton)	1/1	1	80	(2/2)	33	(0/1)	3
Locate and View Resources (citation, etc.)	1/1	1	86	(2/2)	36	(0/1)	3
Transition of Care w/ Trigger (all)	3/4	1	80	(2/2)	263	(1/1)	2
Generate CCDA w/ Reconciled Data	3/4	1	82	(2/3)	132	(1/3)	4
Create New E-Rx	6/7	1	97	(1/1)	65	(1/1)	4
Send New E-Rx to Pharmacy	5/5	1	88	(1/1)	25	(1/1)	4
Approve or Deny Refill	5/5	1	96	(1/1)	17	(1/1)	4
Change Prescription, Receive Fill Status	5/7	1	88	(1/3)	48	(2/3)	4
Cancel Prescription	2/4	1	88	(1/1)	16	(1/1)	4
Obtain Med History for Patient	3/3	1	94	(1/1)	21	(1/1)	4

Major findings

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

- Generally the package was well received.
- Some users lamented about missing paper charts still.
- Areas for improvement were received (as noted below) although nothing major appeared.

Areas for improvement

The following were identified as area for improvement for Practice Expert version 2018:

- Although we had simplified the options on the left hand side, some users wanted a more visual way to distinguish the different type of options. Some recommendations were bolder colors and/or separators.
- The Assessment Search for ICD-10 was thought to be cumbersome by multiple participants. They mentioned that the search was slow and not too user friendly.
- One user mentioned that they would love to be able to scan or take a picture of an Implantable Device serial number as it was way too long to type in.
- Multiple users mentioned that they would love to be able to use an EHR on a tablet, such as an iPad.
- Multiple users asked if the EHR could be used on Apple Macs.
- Some of the screens were not as uniform as the testers would have liked.

INTRODUCTION

The EHRUT tested for this study was **Practice Expert Version 2018, Ambulatory EHR**. Designed to present medical information to healthcare providers in small to medium size practices, the EHRUT consists of the EHR that is used for charting medical visits, communication to and from patients, orders and labs, electronic prescription writing, managing patients' medical history, documenting implantable devices, and in many ways replicate what can be done with a paper medical chart. The usability testing attempted to represent realistic exercises and conditions.

The intended users for this software are physicians and medical providers of small to medium size medical offices.

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, were captured during the usability testing, such as:

- Number of tasks completed successfully without assistance.
- Time required to complete tasks.
- Deviations from ideal route.
- User comments
- User ratings of the EHR
- Any errors encountered

METHOD

PARTICIPANTS

A total of 10 participants were tested on the EHRUT(s). Participants in the test were people who worked in clinical setting such as physicians, medical coders, office managers etc., from clinics that are familiar with Practice Expert but had not necessarily used it. Participants were recruited by California Medical Systems. 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.

Recruited participants had a mix of backgrounds and demographic characteristics. The following is a table of participants by characteristics, including demographics, professional experience, computer experience, and product experience. Participant names were replaced with Participant IDs so that an individual's data cannot be tied back to individual identities.

The participants matched the intended users as being providers in small to medium sized medical offices.

ID	Gender	Age	Education	Role	Pro Exp.	Comp Exp.	Prod Exp.	Asst. Tech.
PE1	Female	30-39	Bachelor's Degree	M.A.	60	240	18	No
PE2	Female	30-39	Master's Degree	R.N.	48	240	48	No
PE3	Male	40-49	Doctorate degree (e.g., MD, DNP, DMD, PhD)	Dr.	156	240	30	No
PE4	Female	20-29	High school graduate, diploma or the equivalent (for example: GED)	Coder	30	120	18	No
PE5	Male	40-49	Some college credit, no degree	M.A.	240	180	48	No
PE6	Male	30-39	Trade/technical/vocational training	M.A.	132	144	48	No
PE7	Male	20-29	Some college credit, no degree	Office Mgr	96	156	36	No

PE8	Female	50-59	Doctorate degree (e.g., MD, DNP, DMD, PhD)	Dr.	312	204	12	No
PE9	Female	30-39	Some college credit, no degree	Coder	192	216	48	No
PE10	Male	50-59	Doctorate degree (e.g., MD, DNP, DMD, PhD)	Dr.	288	240	36	No

Ten (10) participants (matching the demographics in the section on Participants) were recruited and Ten (10) participated in the usability test. No participants failed to show for the study. Participants were scheduled for Ten 90 minute sessions with 30-45 minutes allotted for debrief by the administrator(s) and data logger(s). Most tests were not back to back so there was plenty of time to reset systems to proper test conditions. The test was conducted over a period of two weeks to allow for the schedules of the participants.

STUDY DESIGN

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

During the usability test, participants interacted with one EHR system. Each participant used the system in the same location, and was provided with the same instructions. The system was evaluated for effectiveness, efficiency and satisfaction as defined by measures collected and analyzed for each participant:

- Number of tasks successfully completed within the allotted time without assistance
- Time to complete the tasks

- Number and types of errors
- Questions asked
- Path deviations
- Participant's verbalizations (comments)
- Participant's satisfaction ratings of the system

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 the following types of tasks. Each type of task had one or more tasks associated.

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

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 One). A representative from the test team witnessed the participant's signature.

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. This was usually in the form of the user asking specific questions.

For each task, the participants were given a written copy of the task. Task timing began once the administrator finished reading the task. 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 (see Appendix Five), and thanked each individual for their participation.

TEST LOCATION

The test facility was a conference room with a table and computer for the participant. The participant, administrator and data logger were in the test room. 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 small to medium healthcare offices or facilities. In this instance, the testing was conducted in the California Medical Systems' Conference Room. For testing, a desktop computer running Windows 7 was utilized. There was both a wireless keyboard and mouse. There was a monitor for the user to view the EHRUT on, running at 1600 x 1200 resolution, and an additional projection screen displaying what was occurring on the desktop monitor for the administrator and data logger to view.

The application was set up by California Medical Systems according to the vendor's documentation describing the system set-up and preparation. The application itself was running on a Windows platform 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 (Appendix One)
- Non-Disclosure Agreement (Appendix Two)
- Post-Test Questionnaire (Appendix Three)
- Incentive Receipt and Acknowledgement Form (Appendix Four)

The participant's interaction with the EHRUT was captured and recorded digitally with screen capture software running on the test machine.

PARTICIPANT INSTRUCTIONS

The administrator reads the following instructions aloud to the each participant:

Thank you for participating in this study. Your input is very important. Our session today will last about 90 minutes. During that time you will use an instance of an electronic health record. I will ask you to complete some 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. 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 introduced to the hardware (keyboard, mouse, monitor, etc.)

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 will ask you your impressions about the task once you are done.

Participants were then given 30 tasks to complete.

USABILITY METRICS

According to the *NIST Guide to the Processes Approach for Improving the Usability of Electronic Health Records*, EHRs should support a process that provides a high level of usability for all users. The goal is for users to interact with the system effectively, efficiently, and with an acceptable level of satisfaction. To this end, metrics for effectiveness, efficiency, and user satisfaction were captured during the usability testing. The goals of the test were to assess:

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

DATA SCORING

MEASURES	RATIONALE AND SCORING
Effectiveness: Task Success	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. 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. Task times were recorded for successes. Observed task times divided by the optimal time for each task is a measure of optimal efficiency. Optimal task performance time, as benchmarked by expert performance under realistic conditions, is recorded when constructing tasks. Target task times used for task times in the Moderator's Guide must be operationally defined by taking multiple measures of optimal performance and multiplying by some factor [e.g., 1.25] that allows some time buffer because the participants are presumably not trained to expert performance. Thus, if expert, optimal performance on a task was [x] seconds then allotted task time performance was [x * 1.25] seconds. This ratio should be aggregated across tasks and reported

	with mean and variance scores
Effectiveness: Task Failures	If the participant abandoned the task, did not reach the correct answer or performed it incorrectly, or reached the end of the allotted time before successful completion, the task was counted as "Failures." No task times were taken for errors. 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. On a qualitative level, an enumeration of errors and error types should be collected.
Efficiency: Task Deviations	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. It is strongly recommended that task deviations be reported. Optimal paths (i.e., procedural steps) should be recorded when constructing tasks.
Efficiency: Task Time	Each task was timed from when the administrator said "Begin" until the participant said, "Done." If he or she failed to say "Done," the time was stopped when the participant stopped performing the task. Only task times for tasks that were successfully completed were included in the average task time analysis. Average time per task was calculated for each task. Variance measures (standard deviation and standard error) were also calculated.
Satisfaction: Task Rating	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. Common convention is that average ratings for systems judged easy to use should be 3.3 or above.

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

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 in accompanying Safety-Enhanced Design Checklist.

Test Results were analyzed and we noticed that the lack of uniformity between screens (also noticed in areas for improvement) increased the likelihood for errors. For instance some screens require you to hit 'save' and others did not. If a user did not hit 'save' that data was not recorded into the system and taken into account. This was mostly a concern when it came to Clinical Decision Support (CDS). If a user expected parameters of a rule to be saved and it was not, that could cause the provider to believe that they are checking for something, when in effect they are not. We also noticed depending how the end user arrived at the intended screen. Potential portions of the program that could have great adverse consequences, E-Rx and Medication Allergy were especially paid attention to. We originally thought there was a greater likelihood of an error here than we observed.

Discussion of the Findings

EFFECTIVENESS

The users were very successful and had minimal errors. Minimal questions were asked during the assigned tasks, although some of the same of the questions were the same between participants which tells us that these are areas for improvement.

EFFICIENCY

The administrator of the test did notice some path deviation and some hesitation as some users attempted to think how they should proceed. The lack of uniform design between screens did provide some momentary confusion as users attempted to gather their bearings.

SATISFACTION

In general all participants thought that the application was easy to use and were satisfied with the application.

MAJOR FINDINGS

- Generally the package was well received.
- Some users lamented about missing paper charts still.
- Areas for improvement were received (as noted below) although nothing major appeared.

AREAS FOR IMPROVEMENT

The following were identified as area for improvement for Practice Expert version 2018:

- Although we had simplified the options on the left hand side, some users wanted a more visual way to distinguish the different type of options. Some recommendations were bolder colors and/or separators.
- The Assessment Search for ICD-10 was thought to be cumbersome by multiple participants. They mentioned that the search was slow and not too user friendly.
- One user mentioned that they would love to be able to scan or take a picture of an Implantable Device serial number as it was way too long to type in.
- Multiple users mentioned that they would love to be able to use an EHR on a tablet, such as an iPad.
- Multiple users asked if the EHR could be used on Apple Macs.
- Some of the screens were not as uniform as the testers would have liked.

Appendix 1: SAMPLE RECRUITING SCREENER

The purpose of a screener to ensure that the participants selected represent the target user population as closely as possible. (Portions of this sample screener are taken from www.usability.gov/templates/index.html#Usability and adapted for use.)

Recruiting Script for Recruiting Firm

Hello, my name is_____, calling from *California Medical Systems.* 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 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.

May I ask you a few questions?

1. [If not obvious] Are you male or female? [Recruit a mix of participants]
2. Have you participated in a focus group or usability test in the past *12* months? [If yes, Terminate]

3. Do you, or does anyone in your home, work in marketing research, usability research, web design […etc.]? [If yes, Terminate]

4. 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]

5. Which of the following best describes your age? [23 to 39; 40 to 59; 60 - to 74; 75 and older] [Recruit Mix]

6. Which of the following best describes your race or ethnic group? [e.g., Caucasian, Asian, Black/African-American, Latino/a or Hispanic, etc.]

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

Professional Demographics *Customize this to reflect your EHR's primary audience*

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

 RN: Specialty

□ Physician: Specialty _

□ Resident: Specialty

□ Administrative Staff: Type _

□ Other [Terminate]

Professional Demographics *Customize this to reflect your EHR's primary audience*

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

□ RN: Specialty

□ Physician: Specialty _

□ Resident: Specialty

□ Administrative Staff

□ Other [Terminate]

9. How long have you held this position?

10. Describe your work location (or affiliation) and environment? (Recruit according to the intended users of the application) [e.g., private practice, health system, government clinic, etc.]

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

Computer Expertise *Customize this to reflect what you know about your EHR's audience*

12. 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]

13. About how many hours per week do you spend on the computer? [Recruit according to the demographics of the intended users, e.g., 0 to 10, 11 to 25, 26+ hours per week]

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

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

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

17. How many years have you used an electronic health record?

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

19. How does your work environment patient records? [Recruit according to the demographics of the intended users]

□ 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. [If you are paying participants or offering some form of compensation, mention] For your participation, you will be paid [amount].

Would you be able to participate on [date, time]? [If so collect contact information]

May I get your contact information?

□ Name of participant:

□ Address:

□ City, State, Zip:

□ Daytime phone number:

□ Evening phone number:

□ Alternate [cell] phone number:

□ Email address:

Appendix Two: PARTICIPANT DEMOGRAPHICS

The report should contain a breakdown of the key participant demographics. A representative list is shown below.

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

Gender

Men [5]

Women	[5]
Total (participants)	[10]

Occupation/Role

RN/Clinical	[4]
Physician	[3]
Admin Staff	[3]
Total (participants)	[10]

Years of Experience

Years Pro experience	[129.5]
Facility Use of EHR	
All paper	[2]
Some paper, some electronic	[6]
All electronic	[2]
Total (participants)	[10]

Appendix Three: INFORMED CONSENT AND NON-DISCLOSURE AGREEMENT

California Medical Systems
567 San Nicolas Dr., Ste. 280
Newport Beach, CA 92656
P: 949/719-6767
F: 949/719-6771

Informed Consent

California Medical Systems 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 *180* minutes.

Agreement
I understand and agree that as a voluntary participant in the present study conducted by *California Medical Systems* I am free to withdraw consent or discontinue participation at any time. I understand and agree to participate in the study conducted by the *California Medical Systems*.

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 *California Medical Systems* and *California Medical Systems'* clients. 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: _____

California Medical Systems
567 San Nicolas Dr., Ste. 280
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F: 949/719-6771

Non-Disclosure Agreement

THIS AGREEMENT is entered into as of _____, _____, between _____ ("the Participant") and the testing organization *California Medical Systems* located at *567 San Nicolas Dr., Ste. 280, Newport Beach, CA 92656.*

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 *California Medical Systems,* 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 *California Medical Systems* 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 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: _____

Appendix Four: EXAMPLE MODERATOR's GUIDE

Only three tasks are presented here for illustration.

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 *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

Orientation (*X* minutes)

Thank you for participating in this study. Our session today will last ***XX* 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 *describe the state of the application, i.e., production version, early prototype, etc*. 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 (*XXX Seconds*)

This is the application you will be working with. Have you heard of it? ____Yes ____No
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 (*XXX 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.

Success:

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

Comments:

Task Time:_____Seconds

Optimal Path: *Screen A → Screen B → Drop Down B[1] → "OK" Button → Screen X...*

- ☐ Correct
- ☐ Minor Deviations / Cycles :: Describe below
- ☐ Major Deviations :: Describe below

Comments:

Observed Errors and Verbalizations:
Comments:

Rating:

Overall, this task was: _____

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

Administrator / Notetaker Comments:

Task 3: Find Lab Results (*XXX Seconds*)

Take the participant to the starting point for the task.

On her last visit, you sent *Patient* to get a colonscopy. Locate these results and review the notes from the specialist.

Success:

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

Comments:

Task Time:_____Seconds

Optimal Path: *Screen A → Screen B → Drop Down B[1] → "OK" Button → Screen X...*

- ☐ Correct
- ☐ Minor Deviations / Cycles :: Describe below
- ☐ Major Deviations :: Describe below

Comments:

Observed Errors and Verbalizations:
Comments:

Rating:

Overall, this task was: _____

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

Administrator / Notetaker Comments:

Task 4: Prescribe medication (*XXX Seconds*)

Take the participant to the starting point for the task. Ensure that this patient has a drug-drug and a drug-food allergy to the drug chosen. This will put force the participant to find other drugs and use other elements of the application.

After examining *Patient,* you have decided to put this patient on a statin – *drug name*. Check for any interactions and place an order for this medication.

Success:

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

Comments:

Task Time:_____Seconds

Optimal Path: *Screen A → Screen B → Drop Down B[1] → "OK" Button → Screen X...*

- ☐ Correct
- ☐ Minor Deviations / Cycles :: Describe below
- ☐ Major Deviations :: Describe below

Comments:

Observed Errors and Verbalizations:
Comments:

Rating:

Overall, this task was: _____

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

Administrator / Notetaker Comments:

Final Questions (*X 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 Five: SYSTEM USABILITY SCALE QUESTIONNAIRE

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Newport Beach, CA 92656
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Post-Test Questionnaire

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

Strongly Agree *Strongly Disagree*

2. I found the system unnecessarily complex

Strongly Agree *Strongly Disagree*

3. I thought the system was easy to use

Strongly Agree *Strongly Disagree*

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

Strongly Agree *Strongly Disagree*

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

Strongly Agree *Strongly Disagree*

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

Strongly Agree *Strongly Disagree*

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

Strongly Agree *Strongly Disagree*

8 .I found the system very cumbersome to use

Strongly Agree *Strongly Disagree*

9. I felt very confident using the system

Strongly Agree *Strongly Disagree*

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

Strongly Agree *Strongly Disagree*

Appendix Six: INCENTIVE RECEIPT AND ACKNOWLEDGEMENT FORM

Acknowledgement of Receipt

I hereby acknowledge receipt of *$ _* for my participation in a research study run by *California Medical Systems*

Printed Name: _____

Address: _____

_____

Signature: _____ Date: _____

Usability Researcher: _____

Signature of Usability Researcher: _____

Date: _____

Witness: _____

Witness Signature: _____

Date: _____