

InPracSys EHR User Centered Design Study

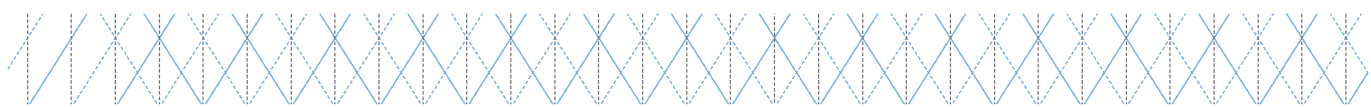
Report based on ISO/IEC 25062:2006 Common Industry Format for Usability Test Reports

InPracSys EHR V9

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EXECUTIVE SUMMARY

A User Experience and User Centered Design Study (UE-UCD) for InPracSys EHR V9 was conducted at 2 locations in, Barrington and Palos Heights, IL. The purpose of UCD was to test and validate the usability of the EHR and provide evidence of usability in the EHR Under Test (EHRUT). During the study, 20 healthcare providers and other EHR users consisting of a random sampling of participants to closely represent tasks used when using the actual product.

The study participants were not paid for their participation however light snacks were provided. The participants have asked to remain anonymous so as not to be seen and endorsing the SUT.

The study was modelled after other specialty EHRs and use the common industry format used by other HIT developers of similar products based on the ISO/IEC 25062:2006 standard.

The study collected performance data on the tasks conducted when documenting patients in the EHR as the staff move the patient through appointments, check in, nurse and doctor visit, prescription if any along with other orders and finally through check out and re-appointment. The objective of the event was to validate that the EHRUT meets the requirements outlined in 170 315(a)(1 to 9 and 14) and 170 315(b)(2 and 3). The objective of the event was to go through data capture for the patients in the EHRUT keeping the user in their known workflow.

OBJECTIVES

Two main objectives for the UCD around which the study was designed were:

- i. The main objective of the event was to validate that EHRUT meets the requirements outlined in 170 315(a)(1 to 9 and 14) and 170 315(b)(2 and 3) following guidelines from NISTIR 7741 Guide to Process Approach for improving usability of EHRs and NISTIR 7742 for Electronic Health Record Usability testing.
- ii. Second but no less important was the objective of user experience. Critical to the success of the software is that it not only can achieve specific goals but is intuitive and user friendly and helps with the flow of the patient through the clinic.

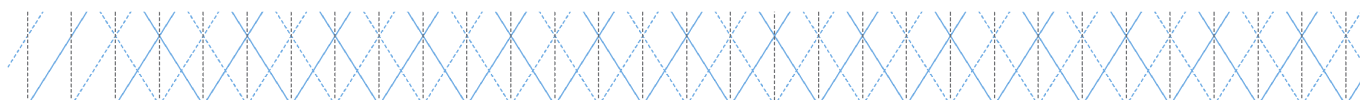
Participants had prior experience with the EHR and very little training was needed to bring them up to speed with newer functionality. The administrator introduced UCD and instructed participants to complete a series of tasks (identified above) using the EHRUT. During the procedure, the administrator timed the process and collected performance data results both electronically and on paper which was later transcribed.

Participant user sessions were documented and analyzed following the procedure. The following data was collected for each participant:

- Task needed to be done
- Tasks successfully completed
- Time to complete any given task
- Number and types of errors
- Deviations
- Ease of use
- User satisfaction

All participant data was de-identified, and no correspondence could be made from the identity of the participant to the data collected. A HIPAA compliant system was used throughout testing. Following the conclusion of the study, participants were asked to complete a post-test questionnaire. 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. Summary of the results of testing are produced in the SED document being submitted along with this document.

The UCD process used in the design and development of the above twelve 2015 Edition certification criteria was based on NISTIR 7742. Various recommended metrics were used to evaluate the usability of the EHRUT. Use was in accordance with the examples set forth in the *NIST Guide to the Processes*



Approach for Improving the Usability of Electronic Health Records.

METHODOLOGY

PARTICIPANTS

A total of 20 participants tested on the EHRUT. Participants in the test were a mix of health clinic room and procedural area for RNs and auditors. Participants had no direct connection to the development of or the organization producing the EHRUT(s). Participants were given the same orientation and had a good familiarity and level of experience with the product, Appendix 1 has the table of participants by characteristics. Participant names were replaced with Participant IDs so that an individual's data cannot be tied back to individual identities. Twenty participants (matching the demographics in the section on Participants) participated in the study. Participants were scheduled for various types of cases; each debriefed by the administrator. A spreadsheet was used to keep track of the participants schedule and included each participant's demographic characteristics.

STUDY DESIGN

Overall, the objective of UCD was to uncover areas where the application performed well, was able to complete specific tasks, efficiency and user "friendliness" and satisfaction. The study was also meant to surface weaker areas of the software that could use improvement and a way to inform the company for keeping up with the changing landscape of medicine for e.g. incorporating data, and to assist with pharmacotherapy based on the genetic makeup of the patients. This study will be used as a baseline for future surveys and such studies.

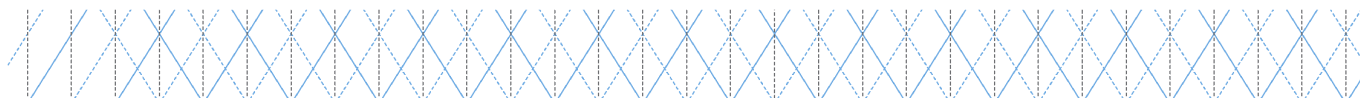
The system was evaluated for effectiveness, efficiency and satisfaction as defined by measures collected and analyzed for each participant:

- Task needed to be done
- Tasks successfully completed
- Time to complete any given task
- Number and types of errors
- Deviations
- Ease of use
- User satisfaction

TASKS

Tasks were constructed that would be realistic and mimic the exact activities a user would engage in within the software. They were also designed to cover all aspects of the 12 measures the EHRUT was being evaluated for.

§170.315(a)(1) Computerized Provider Order Entry-Medications	Access Medication Orders
	Record and Change Medication Orders
§170.315(a)(2) Computerized Provider Order Entry-Laboratory	Access Laboratory Orders
	Record a New Laboratory Order
§170.315(a)(3) Computerized Provider Order Entry-diagnostic imaging	Record a New Diagnostic Imaging Order
	Access Diagnostic Imaging Orders
§170.315(a)(4) Drug-drug, drug-allergy interaction checks for CPOE	Adjust Severity Level of Interactions
	Perform a Drug Interaction Check
	Review a Drug-Drug, Drug-Allergy Interaction Alert
§170.315(a)(5) Demographics	Change Demographics
	Access and Record Demographics
§170.315(a)(6) Problem List	Access Problem List
	Change an Existing Problem
	Record a New Problem



§170.315(a)(7) Medication List	Access Full Medications List
	Access Active Medications List
	Change an Existing Medication
§170.315(a)(8) Medication Allergy List	Access Active Medication Allergies
	Record a New Medication Allergy
	Access Full Medication Allergy List
	Change an Existing Medication Allergy
§170.315(a)(9) Clinical decision support (CDS)	Process a CDS Intervention
	Access and Enable CDS Interventions
	Locate Reference Information for a CDS Intervention
	Check for Clinical Alerts Generated by Reconciled Medications
§170.315(a)(14) Implantable device list	Change an Existing Implantable Device
	Access Implantable Device List
	Record a New Implantable Device
§170.315(b)(2) Clinical information reconciliation and incorporation	Access C-CDA Document
	Reconcile Data from C-CDA
	Import Data from C-CDA into Chart
§170.315(b)(3) Electronic prescribing	Request and receive prescription history information electronically
	Check the fill status of an electronic prescription
	Process an electronic Rx change request from the pharmacy
	Send an electronic prescription cancellation to the pharmacy
	Process an electronic Rx request from the pharmacy
	Create a new electronic prescription

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

PROCEDURES

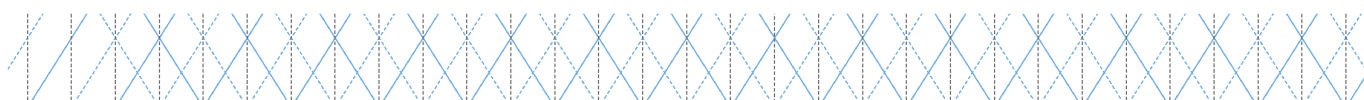
Upon arrival, participants were greeted; their identity was verified and matched with a name on the participant schedule. Participants were then assigned a participant ID. The administrator moderated the session including administering instructions and tasks. The administrator also monitored task times, obtained post-task rating data, and took notes on participant comments. 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 not allowed to give material guidance and only offer clarification on tasks, but not instructions on software use.
- Provide feedback immediately on completion of the task covering experience, ease of use, accuracy, number of clicks, UI design etc.

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. Following the session, the administrator gave the participant the post-test questionnaire (e.g., the System Usability Scale, (see Appendix 6), and thanked the 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 was performed in a clinic setting. Only the participant and administrator were at the station during testing. The



environment was comfortable for users with noise levels kept to a minimum.

Location	Session	Interval Between Sessions
Barrington IL	60 minutes (2)	15-minutes
Palos Heights IL	45 minutes (2)	15-minutes

TEST ENVIRONMENT

The EHRUT is used in a healthcare clinic or procedure area. In this instance, the testing was conducted in a clinic room. For testing, a run of the mil windows desktop was setup that was used by all testers. The EHRUT used a 22" monitor with the resolution set to 1920x1080 with an attached scanner. The application did not need any setup as the software run at the servers over the internet. The application composes a complete URL using a secure web browser. Technically, the system performance (i.e., response time) was representative to what actual users would experience in any clinic room. Additionally, participants were instructed not to change any of the default system settings (such as control of font size, browser view size etc).

PARTICIPANT INSTRUCTIONS

The administrator reads the following instructions aloud to the participant (Moderator's guide can be reviewed in the Appendix). Participants were then given tasks pertaining to their role in the clinic. Tasks are listed under the Task section.

Thank you for participating in InPracSys EHR Unit Testing. Your input is very important. During the test, you will use an instance of the InPracSys electronic health record (EHR). 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 and my colleague will be here in case you need specific help, but we are 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 was involved in its formation, so please be honest with your opinions. All of the information provided will be used to improve the application and is 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.

USABILITY METRICS

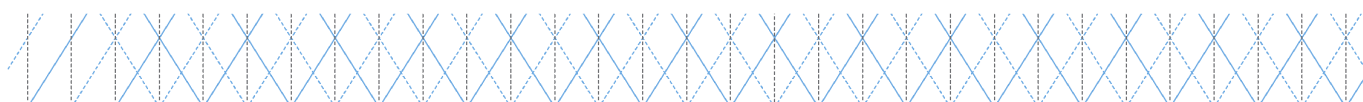
According to the *NIST Guide to the Processes Approach for Improving the Usability of Electronic Health Records*, EHRs should support processes that provide a high level of usability for all users. The goal is for users to interact with the system effectively, efficiently, and with an acceptable level 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

RESULT BASIS

The following table details how tasks were defined as successful, efficient and use experience. Adapted from NISTIR-7742 https://www.nist.gov/sites/default/files/documents/itl/hit/Guide_Final_Publication_Version.pdf

Measures	Rationale and Scoring
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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. Task times were documented for successes.
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 an “Failures.”
Task Deviations	The participant’s path (i.e., steps) through the application was documented. 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.
Task Time	Each task was timed from when the administrator said “Begin” until the participant stopped performing the task.
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. A Likert scale was used to score this and the results are produced in the SED document.

RESULTS

DATA ANALYSIS AND REPORTING

The results of the usability test were calculated according to the methods specified in the Usability Metrics section above. If participants failed to follow session and task instructions the data would have been excluded from the analyses. Testing was performed in a live environment testing irregularities or issues that would have affected data collection were mitigated. The survey yields a single number that represents a composite measure of the overall perceived usability of the system.

The usability testing results for the EHRUT are detailed below. The results should be seen in light of the objectives and goals outlined in Section of the Study Design. The data should yield actionable results that, if corrected, yield material, positive impact on user performance.

EFFECTIVENESS	EHR is effective at improving the workflow of implant documentation. The application was shown to decrease documentation time on a per patient basis.
EFFICIENCY	The application proved it could prevent errors and produce high quality data. EHR adds efficiency by parsing data elements at the point of data entry producing alerts as needed and help with the workflow and patient flow through the clinic. Workflow was significantly increased increasing the efficiency of the clinic.
SATISFACTION	Overall the users were extremely satisfied with the product tested.
MAJOR FINDINGS	Participants found EHR very easy to use and most confirmed that their jobs were made easier and quicker by using the EHR.
AREAS FOR IMPROVEMENT	Participants requested additional help features. Participants requested additional and timely training, genetic data and paring genetic information with pharmacology offering precision treatment based on the genetic makeup of the patient.

MAJOR FINDINGS



- All participants indicated that they used the system daily for entering and retrieving patient data
- Most participants noted a preference for issuing prescriptions from the Prescription Orders screen and were pleased to see formulary drug and drug interaction presented in a clear and easy to understand screen.
- The diagnosis list was greatly appreciated as users could not only see all the standard ICD codes but also see a more friendly description and were able to search for old diagnosis of the patients.
- Several participants liked that sending a cancellation to the pharmacy was made easy because the option is selected by default whenever a prescription is discontinued or voided.
- Several participants liked the ability to do eligibility verification
- Fill status from the pharmacy was appreciated by almost all users

AREAS OF IMPROVEMENT

- Automate the option in Orders for clinicians to view the prescription history from a patient's pharmacy benefit manager (PBM).
- Improve and simplify the detailed view of the prescriptions, making it easier to locate the details for a specific prescription, or some other workflow. As stated by a participant, "A search from the PBM would be very helpful."
- Ensure that clinicians and their assistants have quicker accessibility to training for new features in the software.

OVERALL RESULTS

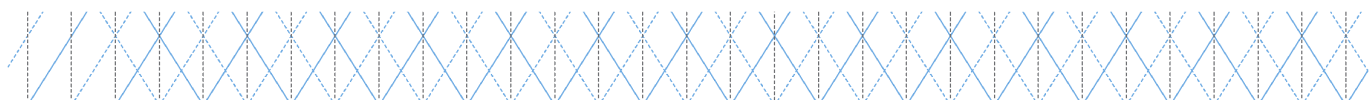
- In addition to the specific findings and areas for improvement in specific features, several overall areas for improvement surfaced throughout the study.
- Participants identified opportunities for improving several common workflows. This feedback was directed mostly at streamlining and optimizing problem list and clinical intervention workflows. Additional feedback identified opportunities to make refinements to the user interface, reduce click counts, and enhance efficiency for clinicians.
- Participants were excited about the new features that improve their communication with pharmacies, referring physicians, and patients. The results from the SUS (System Usability Scale) scored the subjective satisfaction with the system based on performance with these tasks to be about 90.00. Broadly interpreted, scores under 60 represent systems with poor usability; scores over 80 would be considered above average.

Through the user-centered design and usability testing processes, opportunities to refine and enhance the user experience were identified. Some of these enhancements have been prioritized for implementation in upcoming release cycles. Still others will be revisited in more depth with the users/clients in future studies.

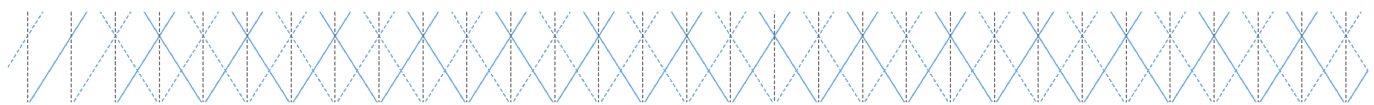
APPENDICES

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

1. Example Participant Demographics



2. Example Moderator's Guide
3. Example Informed Consent
4. Example Orientation and Preliminary Question
5. Example Tasks
6. Example System Usability Scale Questionnaire

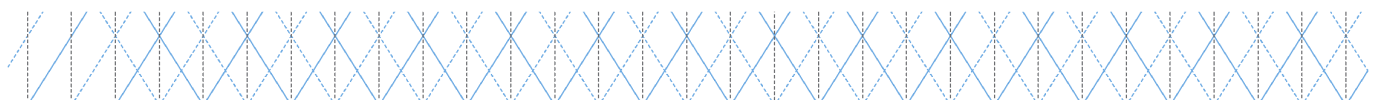


Appendix 1: Participant Demographics

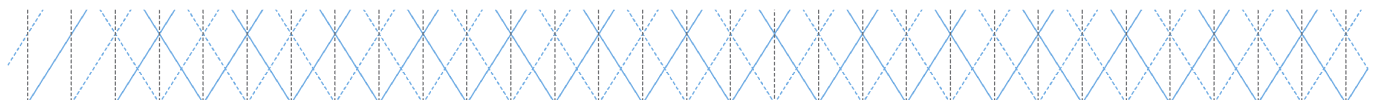
The report contains a breakdown of the key participant demographics. A representative list shown below is followed by the overview of the participants in the study.

The full participant breakdown (de-identified) follows:

Participant ID	Gender	Age	Education Level	Role	Professional Experience (months)	Overall Computer experience	Experience with InPracSys EHR (months)	Assistive Technology needs
1	Female	30-39	Associate degree	LPN	132	240	90	No
2	Female	40-49	Associate degree	Medical Assistant	252	300	21	No
3	Female	50-59	Bachelor's degree	Medical Assistant	336	360	48	No
4	Female	30-39	Trade/technical/vocational training	Medical Assistant	108	240	84	No
5	Female	40-49	Associate degree	Nurse	252	120	78	No
6	Female	50-59	Associate degree	Nurse	432	120	78	No
7	Female	40-49	Associate degree	Nurse	240	240	96	No
8	Female	40-49	Bachelor's degree	Nurse	252	240	24	No
9	Female	50-59	Bachelor's degree	Nurse	360	360	24	No
10	Female	60-69	Master's degree	Nurse Practitioner	420	240	132	No
11	Female	40-49	Master's degree	Nurse Practitioner	216	240	79	No
12	Female	40-49	Master's degree	Nurse Practitioner	300	240	84	No
13	Female	40-49	Doctorate degree (e.g., MD, DNP, DMD, PhD)	Physician	204	360	24	No
14	Male	60-69	Doctorate degree (e.g., MD, DNP, DMD, PhD)	Physician	396	360	48	No
15	Male	30-39	Doctorate degree (e.g., MD, DNP, DMD, PhD)	Physician	132	372	72	No
16	Male	60-69	Doctorate degree (e.g., MD, DNP, DMD, PhD)	Physician	420	360	72	No



17	Male	40-49	Doctorate degree (e.g., MD, DNP, DMD, PhD)	Physician	228	120	78	No
18	Female	50-59	Doctorate degree (e.g., MD, DNP, DMD, PhD)	Physician	300	360	80	No
19	Female	30-39	Master's degree	Physician Assistant	120	300	78	No
20	Female	60-69	Bachelor's degree	RN	444	264	72	No



Appendix 2: Example Moderator's Guide

EHRUT Usability Test

Moderator's Template

Administrator _____

Data Assistant _____

Date _____ **Time** _____

Participant# _____

Location _____

Prior to testing

- Confirm schedule with participant
- Ensure workstation equipment and scanning device is running properly
- Ensure EHRUT production environment is running properly
- Ensure primary EHR and test patient chart opens

Prior to each participant:

- Reset application by logging out so a new participant can start afresh.

Prior to each task:

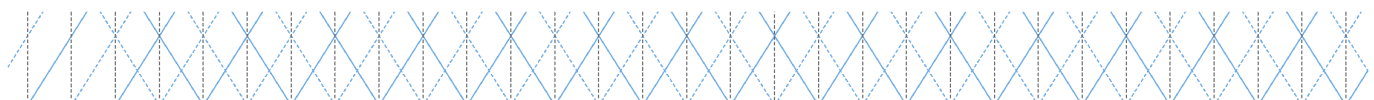
- Verify application opens and participant can log in

After each participant:

- End session, log off patient chart, close her, check data and completion/failure of task

After all testing

- Get feedback, ensure time and experience is captured form the participant.



Appendix 3: Example Informed Consent

InPracSys EHR would like to thank you for participating in the UES. The purpose of this test is to evaluate the capabilities of EHR and to give your feedback. The session will take approximately 45 minutes to 1 hour with a 15 minute break. Your identity will be kept confidential and your answers will not be associated to your comments verbal or otherwise.

Agreement

I understand and agree that as a participant in the study, I am free to withdraw consent or discontinue participation at any time. I understand and agree to participate in the UCD conducted.

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 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.

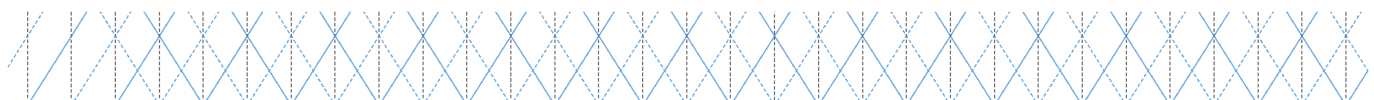
I agree to immediately raise any concerns or areas of discomfort with the study administrator. I understand that I can request to stop UCD at any time.

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: Example Orientation and Preliminary Question

Orientation (5 minutes)

Thank you for participating in the study.

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; unless you call time. 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 design this system and it is imperative for you to be honest with your opinions.

The product you will be using today is InPracSys EHR V9, and we have been live in testing with this application in other facilities.

As it is routine in this environment, we record all EHR data entries in a screen capturing tool. The system is HIPAA compliant. All of the information that you provide is kept confidential and your name will not be associated with your comments at any time.

Do you have any questions or concerns?

Preliminary Questions (3 minutes)

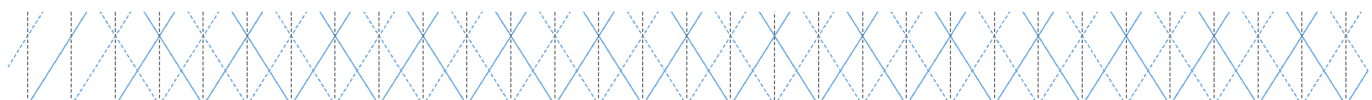
What is your job title / appointment?

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?

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

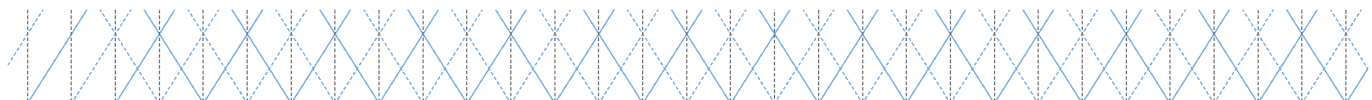
Notes / Comments:



Appendix 5: Example Tasks

Tasks are designed to cover measures the EHR in question is being certified for. The tasks cover the following measures

- §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 for CPOE
- §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 (CDS)
- §170.315(a)(14) Implantable device list
- §170.315(b)(2) Clinical information reconciliation and incorporation
- §170.315(b)(3) Electronic prescribing



Appendix 6: SUMMATIVE TESTING METRICS

Summative usability testing report per NISTIR 7742 Standard:

The metrics captured during the summative testing of each user task performed in (g)(3)(iv)(C) of this section include:

- Task Success (%)
- Task Failures (%)
- Task Standard Deviations of Task Performance Time (%)
- Task Performance Time
- User Satisfaction Rating (Scale with 1 as very difficult and 5 as very easy)

§170.315(a)(1) Computerized Provider Order Entry-Medications

Task Scores		N		Task Success		Task Time (Sec)		Path Deviation		Errors	
Task	#	#	Mean	(SD)	Mean	(SD)	Deviations (Observed/Optimal)	(SD)	Mean	(SD)	
Access Medication Orders	a1.1	10	0.95	0.16	31	13	0.86	0.36	0.15	0.47	
Record and Change Medication Orders	a1.2	10	1	0	15	12	1.00	0.00	0.6	0.7	

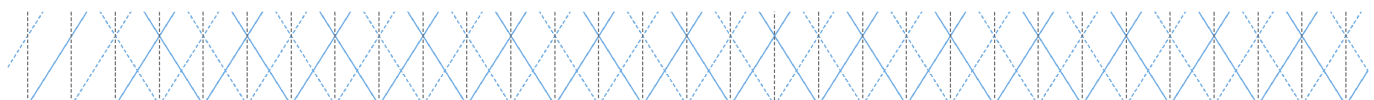
Task Scenario Ratings	Mean	(SD)
Task Group Familiarity Ratings (5=very familiar)	4.65	0.55
Task Group Satisfaction Ratings (5=very easy)	4.5	0.53

§170.315(a)(2) Computerized Provider Order Entry-Laboratory

Task Scores		N		Task Success		Task Time (Sec)		Path Deviation		Errors	
Task	#	#	Mean	(SD)	Mean	(SD)	Deviations (Observed/Optimal)	(SD)	Mean	(SD)	
Access Laboratory Orders	a2.1	10	0.95	0.16	31	13	0.86	0.36	0.15	0.47	
Record a New Laboratory Order	a2.2	10	1.00	0.00	8	2	1.00	0.00	0.10	0.32	

Task Scenario Ratings	Mean	(SD)
Task Group Familiarity Ratings (5=very familiar)	4.65	0.55
Task Group Satisfaction Ratings (5=very easy)	4.5	0.53

Criteria 170.315(a){3} CPOE- Diagnostic Imaging



Task Scores		N	Task Success		Task Time (Sec)		Path Deviation		Errors	
Task	#		Mean	(SD)	Mean	(SD)	Deviations (Observed/Optimal)	(SD)	Mean	(SD)
Record a New Diagnostic Imaging Order	a3.1	10	1.00	0.00	15	7	2.00	1.00	0.6	0.52
Access Diagnostic Imaging Orders	a3.2	10	0.95	0.16	31	13	0.86	0.36	0.15	0.47

Task Scenario Ratings	Mean	(SD)
Task Group Familiarity Ratings (5=very familiar)	4.65	0.55
Task Group Satisfaction Ratings (5=very easy)	4.5	0.53

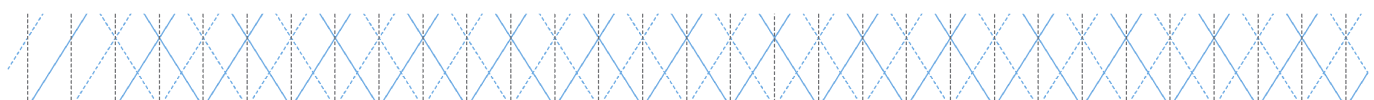
§170.315(a)(4) Drug-drug, drug-allergy interaction checks for CPOE

Task Scores		N	Task Success		Task Time (Sec)		Path Deviation		Errors	
Task	#		Mean	(SD)	Mean	(SD)	Deviations (Observed/Optimal)	(SD)	Mean	(SD)
Adjust Severity Level of Interactions	a4.1	10	0.85	0.24	54	39	1.20	0.54	1.55	1.26
Perform a Drug Interaction Check	a4.2	10	1.00	0.00	37	6	1.00	0.46	0.4	0.52
Review a Drug-Drug, Drug-Allergy Interaction Alert	a4.3	10	1.00	0.00	37	6	1.00	0.46	0.00	0.00

Task Scenario Ratings	Mean	(SD)
Task Group Familiarity Ratings (5=very familiar)	4.65	0.55
Task Group Satisfaction Ratings (5=very easy)	4.1	1.29

§170.315(a)(5) Demographics

Task Scores		N	Task Success		Task Time (Sec)		Path Deviation		Errors	
Task	#		Mean	(SD)	Mean	(SD)	Deviations	(SD)	Mean	(SD)



							(Observed/ Optimal)			
Change Demographics	a5.1	10	0.70	0.26	25	15	1.25	0.56	2.3	0.95
Access and Record Demographics	a5.2	10	1.00	0.00	7	6	1.00	0.46	0.10	0.32

Task Scenario Ratings	Mean	(SD)
Task Group Familiarity Ratings (5=very familiar)	4.65	0.55
Task Group Satisfaction Ratings (5=very easy)	4.8	0.42

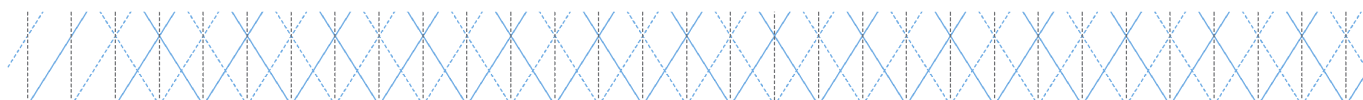
§170.315(a)(6) Problem list

Task Scores		N	Task Success		Task Time (Sec)		Path Deviation		Errors	
Task	#	#	Mean	(SD)	Mean	(SD)	Deviations (Observed/ Optimal)	(SD)	Mean	(SD)
Access Problem List	a6.1	10	1.00	0.00	9	3	1.50	0.70	0.30	0.48
Change an Existing Problem	a6.2	10	0.90	0.32	14	4	1.00	0.46	0.20	0.42
Record a New Problem	a6.3	10	0.90	0.32	12	8	3.00	1.00	1.30	0.82

Task Scenario Ratings	Mean	(SD)
Task Group Familiarity Ratings (5=very familiar)	4.65	0.55
Task Group Satisfaction Ratings (5=very easy)	4.40	0.70

§170.315(a)(7) Medication list

Task Scores		N	Task Success		Task Time (Sec)		Path Deviation		Errors	
Task	#	#	Mean	(SD)	Mean	(SD)	Deviations (Observed/ Optimal)	(SD)	Mean	(SD)



Access Full Medications List	a7.1	10	1.00	0.00	8	2	1.00	0.46	0.30	0.48
Access Active Medications List	a7.2	10	1.00	0.00	5	0	1.00	0.46	0.00	0.00
Change an Existing Medication	a7.3	10	1.00	0.00	20	5	1.00	0.46	0.00	0.00

Task Scenario Ratings	Mean	(SD)
Task Group Familiarity Ratings (5=very familiar)	4.65	0.55
Task Group Satisfaction Ratings (5=very easy)	4.9	0.32

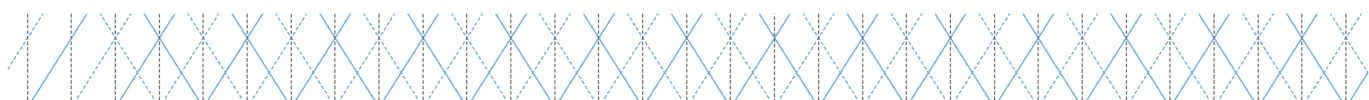
§170.315(a)(8) Medication allergy list

Task Scores		N	Task Success		Task Time (Sec)		Path Deviation		Errors	
Task	#		Mean	(SD)	Mean	(SD)	Deviations (Observed/Optimal)	(SD)	Mean	(SD)
Access Active Medication Allergies	a8.1	10	1.00	0.00	5	1	1.00	0.46	0.10	0.32
Record a New Medication Allergy	a8.2	10	1.00	0.00	26	6	1.00	0.46	0.40	0.52
Access Full Medication Allergy List	a8.3	10	1.00	0.00	13	11	1.00	0.46	0.60	0.97
Change an Existing Medication Allergy	a8.4	10	1.00	0.00	7	2	1.00	0.46	0.20	0.42

Task Scenario Ratings	Mean	(SD)
Task Group Familiarity Ratings (5=very familiar)	4.65	0.55
Task Group Satisfaction Ratings (5=very easy)	4.8	0.42

§170.315(a)(9) Clinical decision support (CDS)

Task Scores		N	Task Success		Task Time (Sec)		Path Deviation		Errors	
Task	#		Mean	(SD)	Mean	(SD)	Deviations (Observed/Optimal)	(SD)	Mean	(SD)
Process a CDS Intervention	a9.1	10	0.80	0.26	28	5	1.25	0.56	0.90	0.57



Access and Enable CDS Interventions	a9.2	10	0.80	0.26	28	5	1.25	0.56	0.90	0.57
Locate Reference Information for a CDS Intervention	a9.3	10	0.85	0.24	16	13	2.00	1.00	1.00	1.03
Check for Clinical Alerts Generated by Reconciled Medications	a9.4	10	0.50	0.33	34	20	2.00	1.00	2.05	1.09

Task Scenario Ratings	Mean	(SD)
Task Group Familiarity Ratings (5=very familiar)	4.65	0.55
Task Group Satisfaction Ratings (5=very easy)	4.7	0.48

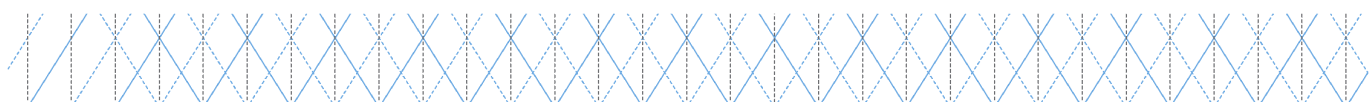
§170.315(a)(14) Implantable device list

Task Scores		N	Task Success		Task Time (Sec)		Path Deviation		Errors	
Task	#	#	Mean	(SD)	Mean	(SD)	Deviations (Observed/Optimal)	(SD)	Mean	(SD)
Change an Existing Implantable Device	a14.1	10	0.85	0.24	12	5	1.00	0.46	0.25	0.35
Access Implantable Device List	a14.2	10	1.00	0	6	2	1.00	0.46	0.00	0
Record a New Implantable Device	a14.3	10	0.90	0.21	31	5	1.25	0.56	0.70	0.63

Task Scenario Ratings	Mean	(SD)
Task Group Familiarity Ratings (5=very familiar)	4.65	0.55
Task Group Satisfaction Ratings (5=very easy)	4.3	0.82

§170.315(b)(2) Clinical information reconciliation and incorporation

Task Scores		N	Task Success		Task Time (Sec)		Path Deviation		Errors	
Task	#	#	Mean	(SD)	Mean	(SD)	Deviations (Observed/Optimal)	(SD)	Mean	(SD)
Access C-CDA Document	b2.1	10	0.90	0.21	11	8	1.00	0.46	0.95	1.01
Reconcile Data from C-CDA	b2.2	10	0.80	0.26	60	24	1.00	0.46	0.95	0.72



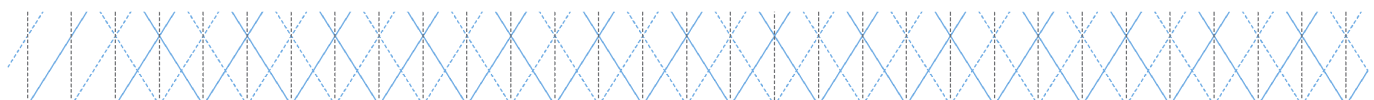
Import Data from C-CDA into Chart	b2.3	10	1.00	0	8	2	1.00	0.46	0.00	0
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Task Scenario Ratings	Mean	(SD)
Task Group Familiarity Ratings (5=very familiar)	4.65	0.55
Task Group Satisfaction Ratings (5=very easy)	3.8	0.63

§170.315(b)(3) Electronic prescribing

Task Scores	#	N	Task Success		Task Time (Sec)		Path Deviation		Errors	
			Mean	(SD)	Mean	(SD)	Deviations (Observed/Optimal)	(SD)	Mean	(SD)
Request and receive prescription history information electronically	b3.1	10	0.90	0.21	40	16	1.5	0.7	0.90	0.52
Check the fill status of an electronic prescription	b3.2	10	0.90	0.21	19	7	1.5	0.7	0.90	0.52
Process an electronic Rx change request from the pharmacy	b3.3	10	1.00	0	10	2	1.00	0.46	0.00	0
Send an electronic prescription cancellation to the pharmacy	b3.4	10	1.00	0	16	6	1.00	0.46	0.00	0
Process an electronic Rx request from the pharmacy	b3.5	10	1.00	0	24	7	0.80	0.34	0.00	0
Create a new electronic prescription	b3.6	10	1.00	0	18	6	1.00	0.46	0.00	0

Task Scenario Ratings	Mean	(SD)
Task Group Familiarity Ratings (5=very familiar)	4.65	0.55
Task Group Satisfaction Ratings (5=very easy)	4.3	0.82



Appendix 7: SYSTEM USABILITY SCALE QUESTIONNAIRE

		Strongly Disagree			Strongly Agree	
		1	2	3	4	5
1	I think that I would like to use this system					
2	I found the system unnecessarily complex					
3	I thought the system was easy to use					
4	I think that I would need the support of a technical person to be able to use this system					
5	I found the various functions in this system were well integrated					
6	I thought there was too much inconsistency in this system					
7	I would imagine that most people would learn to use this system very quickly					
8	I found the system very cumbersome to use					
9	I felt very confident using the system					
10	I needed to learn a lot of things before I could get going with this system					
11	I think that there is a lot to understand about scanning documents or other data entry from labs					
12	Prescriptions were a snap					

