



# USABILITY TEST REPORT

MEDHOST EDIS 2017 R1

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

MEDHOST EDIS

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## TABLE OF CONTENTS

<b>Executive Summary</b> .....	<b>3</b>
<b>Introduction</b> .....	<b>6</b>
<b>Method</b> .....	<b>6</b>
Participants.....	6
Study Design.....	7
Tasks.....	8
Procedures .....	8
Test Locations.....	9
Test Environment .....	9
Test Forms and Tools .....	10
Participant Instructions .....	10
Usability Metrics.....	11
Data Scoring .....	11
<b>Results</b> .....	<b>12</b>
Data Analysis and Reporting .....	12
<b>Discussion</b> .....	<b>15</b>
Effectiveness .....	15
Efficiency .....	15
Satisfaction.....	15
Major Findings.....	15
Areas for Improvement.....	15
<b>Appendices</b> .....	<b>16</b>
Appendix 1: Consent Form.....	16
Appendix 2: Moderators Guide.....	17

## EXECUTIVE SUMMARY

A usability test of MEDHOST EDIS 2017R1 was conducted on Oct 27<sup>th</sup>, 28<sup>th</sup>, and Nov 1st by MEDHOST. The purpose of this test was to test and validate the usability of the current user interface, and provide evidence of usability in the EHR Under Test (EHRUT). During the usability test, 10 healthcare providers matching the target demographic criteria served as participants and used the EHRUT in simulated, but representative, tasks.

The criteria tested were:

- §170.315 (a)(1) CPOE – Medications
- §170.315 (a)(2) CPOE – Laboratory
- §170.315 (a)(3) CPOE – Diagnostic Imaging
- §170.315 (a)(4) Drug-drug, Drug-Allergy Interaction Checks
- §170.315 (a)(7) Medication List
- §170.315 (a)(8) Medication Allergy List
- §170.315 (b)(3) ePrescribe

This study collected performance data on 11 tasks typically conducted on an EHR:

1. Identifying the patient's allergies
2. Adding an allergy
3. Ordering a lab
4. Cancelling a previously ordered lab
5. Ordering a diagnostic image
6. Cancelling a previously ordered diagnostic image
7. Ordering a medication
8. Changing a previously ordered medication
9. ePrescribing a medication
10. Reviewing the patient medication list
11. Reviewing the medication alerts

During the 40-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 1); 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(s), recorded user performance data on paper and electronically. The administrator did not give the participant assistance in how to complete the task.

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 workflows
- Number of clicks to complete the workflows

- 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. 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.

*Table 1: Summary of Task Performance and Rating Data*

Task Identifier	Task Success - Mean (%)	Task Success - Std Dev (%)	Task Path Dev - Obs #	Task Errors Mean(%)	Task Errors - Std Dev (%)	Task Rating - Scale Type	Task Rating	Task Rating - Std Dev
1	100	0	0	0	0	Likert	4.6	1.0
2	100	0	0	0	0	Likert	4.3	0.9
3	100	0	0	0	0	Likert	4.2	1.3
4	100	0	0	0	0	Likert	3.7	1.5
5	100	0	0	0	0	Likert	4.2	1.3
6	100	0	0	0	0	Likert	3.8	1.4
7	100	0	0	0	0	Likert	4.3	0.8
8	100	0	0	0	0	Likert	3.7	1.2
9	100	0	0	0	0	Likert	4.4	0.8
10	100	0	0	0	0	Likert	4.6	0.7
11	100	0	0	0	0	Likert	4.4	0.7

Table 2: Summary of Workflow Performance and Rating Data

	Task Success - Mean (%)	Task Success - Std Dev (%)	Task Path Dev - Obs #	Task Time - Mean (sec)	Task Time - Std Dev (sec)	Number of Clicks - Mean	Number of Clicks-Std Dev	Task Errors Mean(%)	Task Errors - Std Dev (%)
§170.315 (a)(1) CPOE – medications	100	0	0	64.7	25.1	19.7	8.8	0	0
§170.315 (a)(2) CPOE – laboratory	100	0	0	66.5	23.1	21.7	2.1	0	0
§170.315 (a)(3) CPOE – diagnostic imaging	100	0	0	29.5	12.2	9.8	2.4	0	0
§170.315 (a)(4) Drug-drug, Drug-allergy interaction checks	100	0	0	25.4	11.7	7.2	1.2	0	0
§170.315 (a)(7) Medication List	100	0	0	25.4	11.7	7.2	1.2	0	0
§170.315 (a)(8) Medication Allergy List	100	0	0	50.4	40.9	11.5	7.2	0	0
§170.315 (b)(3) ePrescribe	100	0	0	33.5	6.8	9.4	1.8	0	0

The results from the System Usability Scale scored the subjective satisfaction with the system based on performance with these tasks to be: 81 with a standard deviation of 14.

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

- Major findings:
  - All of the assigned tasks were completed quickly and successfully.
  - The participants did not experience any significant points where confusion or dissatisfaction prevented them from completing the processes being tested.
  - There were generally very few verbal or written comments from the participants.
- Areas for improvement:
  - Would like to be able to verify the drug-drug, drug-allergy interaction alert
  - Would like to see the reaction displayed in the drug-drug, drug-allergy interaction alert
  - Too many clicks (feedback from several users)
  - In quick clicks [in order entry] the entire order cannot be seen leading to a lack of visibility of important ordering information until the order is selected
  - Need more clarity on which part of the alert is the allergy or home medication as opposed to the item being ordered
  - In order entry the system goes to search mode rather than quick select, resulting in more clicks

## INTRODUCTION

The EHRUT tested for this study was MEDHOST EDIS 2017 R1, designed to present medical information to healthcare providers in Emergency Departments. 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 the time and number of clicks required to complete a workflow, were captured during the usability testing.

## METHOD

### Participants

A total of 10 participants were tested on the EHRUT. Participants in the test were ER Physicians, Physician's Assistants, and Nurse Practitioners, as well as an ED Director. Participants had no direct connection to the development of or organization producing the EHRUT. 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.

Participants had a mix of backgrounds and demographic characteristics. The table below depicts 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.

Ten participants were recruited, and 10 participated in the usability test. No participants failed to show for the study.

Participants were scheduled for 45-minute sessions with 15 minutes in between each session for a debriefing by the administrator and to reset systems to proper test conditions. A spreadsheet was used to keep track of the participant schedule.

Table 3: Participant Characteristics

ID	Gender	Age	Education	Occupation/ Role	Professional Experience	Computer Experience (months)	Product Experience (months)	Assistive Technology
e1	Female	47	Bachelor's	RN	Director Emergency Department	120	24	No
e2	Male	42	Doctor	Physician	Emergency Medicine	300	48	No
e3	Male	47	Doctor	Physician	Emergency Medicine	420	60	No
e4	Male	34	Doctor	Physician	Emergency Medicine	336	60	No
e5	Male	29	Doctor	Physician	Emergency Medicine	180	24	No
e6	Male	30	Master's	Physician Assistant	Emergency Medicine	180	38	No
e7	Female	44	Doctor	Physician	Emergency Medicine	396	96	No
e8	Female	44	Master's	Nurse Practitioner	Emergency Medicine	180	102	No
e9	Female	34	Master's	Physician Assistant	Emergency Medicine	336	72	No
e10	Female	41	Master's	Physician Assistant	Emergency Medicine	360	144	No

## Study Design

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

During the usability test, participants interacted with one EHR. Each participant used the system in the same configuration and similar locations 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 registration workflow
- Number of clicks required to complete the registration workflow
- Number and types of errors
- 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. The script was divided into sections to reflect the measures being tested, and tasks were assigned to create a workflow representative of each measure:

### §170.315 (a)(8) Medication Allergy List

1. Identifying the patient's allergies
2. Adding an allergy

### §170.315 (a)(2) CPOE – laboratory

3. Ordering a lab
4. Cancelling a previously ordered lab

### §170.315 (a)(3) CPOE – diagnostic imaging

5. Ordering a diagnostic image
6. Cancelling a previously ordered diagnostic image

### §170.315 (a)(1) CPOE – medications

7. Ordering a medication
8. Changing a previously ordered medication

### §170.315 (b)(3) ePrescribe

9. ePrescribing a medication

### §170.315 (a)(4) Drug-drug, Drug-allergy interaction checks and §170.315 (a)(7) Medication List

10. Reviewing the patient medication list
11. Reviewing the medication alerts

Because the workflow to access the drug-drug, drug allergy interaction checks involves accessing the medication list, the workflows to test these items separately would have been repetitive therefore, were combined so as to only have the user complete the workflow once. Additionally, the workflow for changing a previously ordered medication includes cancelling the medication and placing an order for the new medication, covering cancelling and changing workflows in one scenario.

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

## Procedures

Upon arrival, participants were greeted; 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 1). A representative from the test team witnessed the participant's signature.

The usability testing staff conducting the test were nurses with extensive experience in the Emergency Department and with the MEDHOST EDIS product and an experienced usability practitioner with degrees in Computer Science and Public Administration.

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:

- 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.)

Following the session, the administrator gave the participant the post-test questionnaires (see Appendix 2) 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 Locations

The test facilities included a quiet testing room with a table, computer for the participant, and recording computer for the administrator. 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 typically be used in a healthcare facility. In this instance, the testing was conducted in a conference room at two separate hospitals. The participants used a mouse, keyboard, and secondary monitor attached to a laptop when interacting with the EHRUT.

The application was set up by the MEDHOST according to the vendor's documentation describing the system set-up and preparation. The application itself was running over a Citrix tunnel using a usability environment based on the training database. Technically, the system performance had a slight bit of lag time due to the remote (Citrix) connection but was generally 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:

- Informed Consent
- Moderator's Guide
- Post-test Questionnaire
- Click Counter software
- Free Stopwatch timer

Examples of these documents can be found in Appendices 1 and 2. The Moderator's Guide was devised to capture required data.

## Participant Instructions

The administrator reads the following instructions aloud to each participant:

*Thank you for agreeing to participate in the EDIS usability testing. During this testing I will read a script with set tasks that you are asked to complete as quickly as possible. At specific points during this process I will be asking you to start and stop a click-counter and I will be starting and stopping a timer. I will then record the results as part of the study. At the end of the testing you will be asked to provide your feedback on the areas that were covered during testing and your experience with the product overall.*

*The goal of this session is to obtain information regarding the usability of the system, not to evaluate your skills as a user of the system, as we look for opportunities for improvement. I have not had any involvement with the development of this system, and therefore will not be offended by your honest evaluation. Your feedback will be kept confidential, and your name will not be associated with your comments and feedback.*

*Please note that you are going to be testing in an environment created specifically for this event, not the environment that you use in your facility, so orders, order sets, and options may not match what you are accustomed to. Additionally, we are connected to a server at MEDHOST via a Citrix tunnel over the hospital's guest network. While we have made every effort to eliminate as much lag time as possible there may be some slowness due to the necessity of this setup.*

*To start, I will ask that you fill out a brief questionnaire with some basic demographic information, then we will get started with the test script.*

Participants were then given 11 tasks to complete. Tasks are listed in the moderator's guide in Appendix 2.

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

## Data Scoring

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

*Table 4: Rationale and Scoring*

Measures	Rationale and Scoring
<b>Effectiveness: Task Success</b>	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 was 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.
<b>Effectiveness: Task Failures</b>	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. 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 were counted as errors.
<b>Efficiency: Task Deviations</b>	The participant’s path through the application were observed. Deviations occurred 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 was divided by the number of optimal steps to provide a ratio of path deviation.
<b>Efficiency: Workflow Time</b>	The workflow 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 tasks. Only times for workflows that were successfully completed were included in the time analysis. Average time was calculated for the workflow. Variance measures (standard deviation and standard error) were also calculated.

**Satisfaction:  
Task Rating**

Participant's subjective impression regarding the ease of use of the application was measured by administering a post-session questionnaire. For each task, the participant was asked to rate each task on a scale of 1 (Difficult) to 5 (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 MEDHOST Enterprise 2017 R1 Inpatient Registration Module 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
- I would imagine that most people would learn to use this system very quickly

See full System Usability Score questionnaire in Appendix 2.

## 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 (see Tables 5 and 6). The results should be seen in light of the objectives and goals outlined in the Study Design section. The data should yield actionable results that, if corrected, yield material, positive impact on user performance.

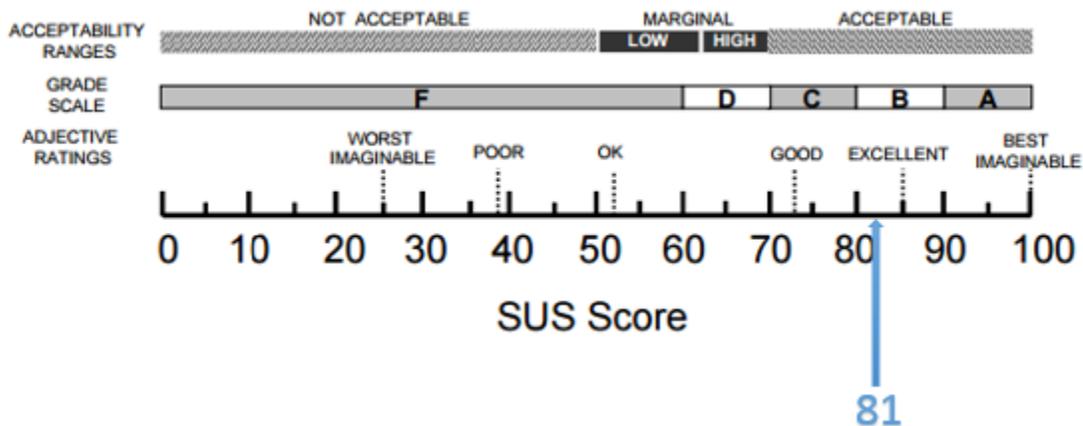
Table 5: Summary of Task Performance and Rating Data

Task Identifier	Task Success - Mean (%)	Task Success - Std Dev (%)	Task Path Dev - Obs #	Task Errors Mean(%)	Task Errors - Std Dev (%)	Task Rating - Scale Type	Task Rating	Task Rating - Std Dev
§170.315 (a)(8) Medication Allergy List								
1	100	0	0	0	0	Likert	4.6	1.0
2	100	0	0	0	0	Likert	4.3	0.9
§170.315 (a)(2) CPOE – laboratory								
3	100	0	0	0	0	Likert	4.2	1.3
4	100	0	0	0	0	Likert	3.7	1.5
§170.315 (a)(3) CPOE – diagnostic imaging								
5	100	0	0	0	0	Likert	4.2	1.3
6	100	0	0	0	0	Likert	3.8	1.4
§170.315 (a)(1) CPOE – medications								
7	100	0	0	0	0	Likert	4.3	0.8
8	100	0	0	0	0	Likert	3.7	1.2
§170.315 (b)(3) ePrescribe								
9	100	0	0	0	0	Likert	4.4	0.8
§170.315 (a)(4) Drug-drug, Drug-allergy interaction checks and §170.315 (a)(7) Medication List								
10	100	0	0	0	0	Likert	4.6	0.7
11	100	0	0	0	0	Likert	4.4	0.7

Table 6: Summary of Workflow Performance and Rating Data

	Task Success - Mean (%)	Task Success - Std Dev (%)	Task Path Dev - Obs #	Task Time - Mean (sec)	Task Time - Std Dev (sec)	Number of Clicks - Mean	Number of Clicks-Std Dev	Task Errors Mean(%)	Task Errors - Std Dev (%)
§170.315 (a)(1) CPOE – medications	100	0	0	64.7	25.1	19.7	8.8	0	0
§170.315 (a)(2) CPOE – laboratory	100	0	0	66.5	23.1	21.7	2.1	0	0
§170.315 (a)(3) CPOE – diagnostic imaging	100	0	0	29.5	12.2	9.8	2.4	0	0
§170.315 (a)(4) Drug-drug, Drug-allergy interaction checks	100	0	0	25.4	11.7	7.2	1.2	0	0
§170.315 (a)(7) Medication List	100	0	0	25.4	11.7	7.2	1.2	0	0
§170.315 (a)(8) Medication Allergy List	100	0	0	50.4	40.9	11.5	7.2	0	0
§170.315 (b)(3) ePrescribe	100	0	0	33.5	6.8	9.4	1.8	0	0

The results from the SUS (System Usability Scale) scored the subjective satisfaction with the system based on performance with these tasks to be: 81 with a standard deviation of 14. Broadly interpreted, scores under 60 represent systems with poor usability; scores over 80 would be considered above average.



## DISCUSSION

### Effectiveness

Based on the successes experienced by the test participants, as well as the lack of failures or task deviations, the MEDHOST EDIS system is an effective way for providers to document patient information and enter orders relevant to an emergency department encounter.

### Efficiency

Based on the task time and lack of deviations, the system offers an efficient way for providers to document patient information and enter orders in the emergency department.

### Satisfaction

Based on the above average task ratings and SUS data, users were satisfied with the EHRUT. Users also expressed their satisfaction with the system performance and found that the new, updated pharmacy alert was much better.

### Major Findings

All of the assigned tasks were completed quickly and successfully. The participants did not experience any significant points where confusion or dissatisfaction prevented them from completing the processes being tested. There were generally very few verbal or written comments from the participants.

### Areas for Improvement

Participants identified several areas which will be reviewed for potential improvements to the user interface and workflow. These are:

- Would like to be able to verify the drug-drug, drug-allergy interaction alert
- Would like to see the reaction displayed in the drug-drug, drug-allergy interaction alert
- Too many clicks (feedback from several users)
- In quick clicks [in order entry] the entire order cannot be seen leading to a lack of visibility of important ordering information until the order is selected
- Need more clarity on which part of the alert displays the allergy or home medication as opposed to the item being ordered
- In order entry, the system goes to search mode rather than quick select, resulting in more clicks

Despite these challenges, all of the testers were able to complete the usability study without issues, and there were no major issues identified with the design and functionality.

## APPENDICES

### Appendix 1: Consent Form

#### Informed Consent

MEDHOST 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 40 minutes.

#### Agreement:

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

I understand that the information is for research purposes only and that my name will not be used for any purpose other than research. I understand and agree that the purpose of this study is to make software applications more useful and usable in the future.

I understand and agree that the data collected from this study may be shared outside of MEDHOST and MEDHOST's 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: \_\_\_\_\_

Printed Name: \_\_\_\_\_

## Appendix 2: Moderators Guide



# USABILITY TESTING

## Moderator Guide 2017 R1

EDIS



## TABLE OF CONTENTS

<b>Overview .....</b>	<b>19</b>
<b>Usability Metrics.....</b>	<b>19</b>
<b>Preparation Instructions.....</b>	<b>20</b>
<b>Communication to Participants .....</b>	<b>21</b>
<b>Participant Information.....</b>	<b>22</b>
<b>Patient Demographics.....</b>	<b>23</b>
Objective: .....	23
Test Script:.....	23
Updating Allergies .....	23
CPOE: Labs.....	24
CPOE: Radiology .....	24
CPOE: Medications.....	25
Update on the patient condition: .....	25
ePrescribe:.....	25
Medication List and Screening Messages: .....	26
<b>Feedback .....</b>	<b>27</b>
Experience .....	27
Usability Testing Survey .....	28

## OVERVIEW

As part of the CMS EHR Incentive program, the ONC (Office of the National Coordinator) requires that select software functionality certified under the 2015 certification guidelines be subjected to formal usability testing. The following software functions are required to have usability testing and formal results reported to the ONC for certification.

- §170.315 (a)(1) CPOE – medications
- §170.315 (a)(2) CPOE – laboratory
- §170.315 (a)(3) CPOE – diagnostic imaging
- §170.315 (a)(4) Drug-drug, Drug-allergy interaction checks
- §170.315 (a)(7) Medication List
- §170.315 (a)(8) Medication Allergy List
- §170.315 (b)(3) ePrescribe

This guide assists in collecting demographics of the individuals who are participating in the usability testing. The guide also provides simple scripts for the tester to execute. Script execution times and other navigational mouse clicks will be recorded allowing for further analysis of the effectiveness and efficiency of the user software user interface.

## USABILITY METRICS

The NIST “Approach for Improving the Usability of Electronic Health Records” guide calls for EHRs to support a high level of usability for all users. Usability is defined as providing a user experience that is effective, efficient and has an acceptable level of user satisfaction. To this end, metrics that measure effectiveness, efficiency and user satisfaction will be captured during the usability test. The metrics are defined as:

1. Effectiveness of the EHR Under Test by measuring participant success rates and errors
2. Efficiency of the EHR Under Test by measuring the average task time and path deviations
3. Satisfaction with the EHR Under Test by measuring ease of use ratings

## PREPARATION INSTRUCTIONS

Confirm test patients with the names listed below are available in EDIS:

XXXX

Confirm the following information is already entered for the patient XXXX:

- Female
- DOB 8/2/1979
- Chief Complaint: Headache
- History of: Hypertension, headaches
- Allergic to: Penicillin
- Home Med list:
  - Metoprolol 25mg daily
  - Imitrex 50mg PRN pain – ran out last month
- Pharmacy: CA Pharmacy Store 10.6
- Orders:
  - CPK & CKMB
  - Troponin
  - Abdominal CT
  - Benadryl 50mg PO
- Vital Signs
  - BP: 160/90
  - HR: 110
  - O2: 97%
  - R: 20
  - Temp: 99 F
  - Weight: 170
  - Height: 5' 2"
  - Pain: 10/10

Login to MEDHOST EDIS as physician XXXX on the MU2 environment via Citrix. Select the test patient XXXX. This physician should already be assigned as the attending.

## COMMUNICATION TO PARTICIPANTS

Thank you for agreeing to participate in the EDIS usability testing. During this testing I will read a script with set tasks that you are asked to complete as quickly as possible. At specific points during this process I will be asking you to start and stop a click-counter and I will be starting and stopping a timer. I will then record the results as part of the study. At the end of the testing you will be asked to provide your feedback on the areas that were covered during testing and your experience with the product overall.

The goal of this session is to obtain information regarding the usability of the system, not to evaluate your skills as a user of the system, as we look for opportunities for improvement. I have not had any involvement with the development of this system, and therefore will not be offended by your honest evaluation. Your feedback will be kept confidential and your name will not be associated with your comments and feedback.

Please note that you are going to be testing in an environment created specifically for this event, not the environment that you use in your facility, so orders, order sets, and options may not match what you are accustomed to. Additionally, we are connected to a server at MEDHOST via a Citrix tunnel over the hospital's guest network. While we have made every effort to eliminate as much lag time as possible there may be some slowness due to the necessity of this setup.

To start, I will ask that you fill out a brief questionnaire with some basic demographic information, then we will get started with the test script.

## PARTICIPANT INFORMATION

Name: \_\_\_\_\_

E-mail address: \_\_\_\_\_

Phone Number: \_\_\_\_\_

Associated hospital/agency: \_\_\_\_\_

Gender:  Male  
 Female

Age: \_\_\_\_\_

Computer Experience: \_\_\_\_\_ Years \_\_\_\_\_ Months

Do you require assistive  Yes  
technology?  No

Highest level of education:  No high school degree  
 High school graduate, diploma or the equivalent  
 Some college credit, no degree  
 Trade/technical/vocational training  
 Associate degree  
 Bachelor's degree  
 Master's degree  
 Doctorate degree

Current position/title:  RN: Specialty \_\_\_\_\_  
 Physician: Specialty \_\_\_\_\_  
 Resident: Specialty \_\_\_\_\_  
 Registrar  
 System Analyst  
 Other: \_\_\_\_\_

Experience with MEDHOST: \_\_\_\_\_ Years \_\_\_\_\_ Months

## PATIENT DEMOGRAPHICS

### Objective:

To evaluate the process of placing orders on a patient, evaluating allergies and medications, and ePrescribing discharge medications in the Emergency Department in terms of the user experience.

### Test Script:

#### Patient History:

- 37 year old female complaining of a headache for 2 days. Complains of “Stabbing Pain” which she rates as 10/10, nothing helps and she is nauseous from the pain.
- Vital Signs:
  - BP: 160/90
  - HR: 110
  - O2: 97%
  - R: 20
  - Temp: 99 F
  - Pain: 10/10
- Her home medications are:
  - Metoprolol 25mg daily
  - Imitrex 50mg PRN pain – ran out last month

#### Updating Allergies

##### **START TIMING**

##### **START CLICK COUNTER**

- You review the documented allergies with patient:
- Confirm that she is allergic to penicillin
- Patient states that she is also allergic to toradol, add to allergy list.

##### **STOP TIMING**

##### **STOP CLICK COUNTER**

Time to complete tasks: \_\_\_\_\_ Number of mouse clicks: \_\_\_\_\_

Administrator Observations:

**Navigate to the order section.**

CPOE: Labs

**START TIMING**

**START CLICK COUNTER**

After evaluating the patient, you order labs:

- Add:
  - CBC with Differential
  - BMP
  - Urinalysis
  - Pregnancy Test
- Cancel the orders for CPK+CKMB and Troponin with a reason of wrong patient

**STOP TIMING**

**STOP CLICK COUNTER**

Time to complete tasks: \_\_\_\_\_ Number of mouse clicks: \_\_\_\_\_

Administrator Observations:

CPOE: Radiology

**START TIMING**

**START CLICK COUNTER**

After evaluating the patient, you order:

- Head CT without Contrast
- Cancel the order for an Abdominal CT with a reason of wrong patient

**STOP TIMING**

**STOP CLICK COUNTER**

Time to complete tasks: \_\_\_\_\_ Number of mouse clicks: \_\_\_\_\_

Administrator Observations:

CPOE: Medications

**START TIMING**

**START CLICK COUNTER**

After evaluating the patient, you order:

- Change Benadryl 50mg PO to Benadryl 25mg IV, once
- Compazine (prochlorperazine) 10mg IVP
- Normal Saline 1000mL bolus

**STOP TIMING**

**STOP CLICK COUNTER**

Time to complete tasks: \_\_\_\_\_ Number of mouse clicks: \_\_\_\_\_

Administrator Observations:

Update on the patient condition:

- Labs and CT return normal. 2<sup>nd</sup> set of VS:
- HR: 80
- BP: 140/80
- O2: 99% on RA
- R: 16
- Pain 3/10, she says this is tolerable.

ePrescribe:

Now we are ready to discharge the patient, sending her home with some prescriptions. She states that she ran out of her Metoprolol 2 days ago and has not had Imitrex for 'a while'.

Navigate to Prescriptions.

**START TIMING**

**START CLICK COUNTER**

- Prescribe:
  - Imitrex 50mg PO PRN pain every 4 hours, 12 tabs
  - Metoprolol 25mg PO take 1 tablet 2 times a day with a meal. 20 tablets
- Complete the ePrescribe orders

**STOP TIMING**

**STOP CLICK COUNTER**

Time to complete tasks: \_\_\_\_\_ Number of mouse clicks: \_\_\_\_\_

Administrator Observations:

Medication List and Screening Messages:

We would also like your feedback on the presentation of the medication list and the screening messages that are provided around drug interactions. We are going to return to our test patient and order one more medication to trigger these messages.

**START TIMING**

**START CLICK COUNTER**

- Review the list of medications that have already been ordered
- Order Amoxicillin 500 mg PO once
- Review screening message
- Cancel medication

**STOP TIMING**

**STOP CLICK COUNTER**

Time to complete tasks: \_\_\_\_\_ Number of mouse clicks: \_\_\_\_\_

Administrator Observations:

## FEEDBACK

### Experience

Rate your experience:      1 = Difficult   3 = Neutral   5 = Easy	1	2	3	4	5
1. Identifying the patient's allergies					
2. Adding an allergy					
3. Ordering a lab					
4. Cancelling a previously ordered lab					
5. Ordering a diagnostic image					
6. Cancelling a previously ordered diagnostic image					
7. Ordering a medication					
8. Changing a previously ordered medication					
9. ePrescribing a medication					
10. Reviewing the patient medication list					
11. Reviewing the medication alerts					
Comments (likes, dislikes, surprises, suggestions)					

## Usability Testing Survey

The following industry standard questionnaire uses the System Usability Scale to evaluate the user experience with the EHR technology.

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