



**EHR Usability Test Report of EyeMD EMR, Version 2**

*Report based on NISTIR 7742*

<b>Company Name:</b>	<b>EyeMD EMR Healthcare Systems, Inc.</b>
<b>Product/Version Tested:</b>	EyeMD EMR, Version 2.0
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## EXECUTIVE SUMMARY

A usability test of EyeMD EMR, Version 2, an Ambulatory medical record software, was conducted between April 5<sup>th</sup> and April 15<sup>th</sup>, 2019 at the corporate offices of EyeMD EMR Healthcare Systems. The purpose of this testing 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 individuals matching the target demographic criteria served as participants and used the EHRUT in simulated, but representative tasks.

This study collected performance data on 50 tasks typically conducted on an EHR:

- Task 1: First Impressions
- Task 2: CPOE – Record Medication Order
- Task 3: CPOE – Change Medication Order
- Task 4: CPOE – Display Changed Medication Order
- Task 5: CPOE – Record Laboratory Order
- Task 6: CPOE – Change Laboratory Order
- Task 7: CPOE – Display Changed Laboratory Order
- Task 8: CPOE – Record Imaging Order
- Task 9: CPOE – Change Imaging Order
- Task 10: CPOE – Display Changed Imaging Order
- Task 11: Trigger Drug-Drug Interaction Prior to CPOE Completion
- Task 12: Trigger Drug-Allergy Interaction
- Task 13: Adjust Severity Level of Displayed Drug-Drug Interaction
- Task 14: Demographics – Record Patient Information
- Task 15: Demographics – Change Patient Information
- Task 16: Demographics – Display Changed Patient Information
- Task 17: Record Problem List
- Task 18: Change a Problem on the Problem List
- Task 19: Display the Current Problem List
- Task 20: Display the Historical Problem List
- Task 21: Record Medication to Medication List
- Task 22: Change Medication on Medication List
- Task 23: Display the Active Medication List

- Task 24: Display the Historical Medication List
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- Task 29: Clinical Decision Support: Add & Trigger a Problem List Interventions
- Task 30: Clinical Decision Support: Add & Trigger a Medication List Intervention
- Task 31: Clinical Decision Support: Add & Trigger a Medication Allergy List Intervention
- Task 32: Clinical Decision Support: Add & Trigger a Demographics Intervention
- Task 33: Clinical Decision Support: Add & Trigger a Lab Tests and Results Intervention
- Task 34: Clinical Decision Support: Add & Trigger a Vital Signs Intervention
- Task 35: Clinical Decision Support: Add & Trigger an Intervention for 2 elements
- Task 36: Clinical Decision Support: View Intervention/Resource Information using Infobutton for Problem List
- Task 37: Clinical Decision Support: View Intervention/Resource Information using Infobutton for Medication List
- Task 38: Clinical Decision Support: View Intervention/Resource Information using Infobutton for Demographics
- Task 39: Clinical Decision Support: Reconcile Patient's Active Problem List with Another Source Triggering an Intervention
- Task 40: Clinical Decision Support: Reconcile Patient's Active Medication List with Another Source Triggering an Intervention
- Task 41: Clinical Decision Support: Reconcile Patient's Active Medication Allergy List with Another Source Triggering an Intervention
- Task 42: Clinical Decision Support: Identify User Diagnostic and Therapeutic Reference Information
- Task 43: Clinical Information Reconciliation & Incorporation – Incorporate an external CCDA
- Task 44: Clinical Information Reconciliation & Incorporation – Generate a Reconciled CCDA
- Task 45: Create a New Prescription Order
- Task 46: Change a Prescription Order
- Task 47: Cancel a Prescription Order
- Task 48: Refill a Prescription Order
- Task 49: Receive fill status notification on a Prescription Order
- Task 50: Request and Receive Medication History Information

During the two-hour, one-on-one usability test, each participant was greeted by the administrator and asked to review and sign an informed consent/release form

(sample included in Appendix 3); 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 recorded user performance data on paper and electronically. The administrator did not give the participant assistance in how to complete the task.

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

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

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

	<b>N</b>	<b>Task Success</b>	<b>Path Deviation</b>	<b>Task Time</b>		<b>Errors</b>	<b>Task Ratings (1= Very Easy)</b>
<b>Task</b>	<b>#</b>	<b>Mean (SD)</b>	<b>Deviations (Observed/Optimal)</b>	<b>Mean (SD) in seconds</b>	<b>Deviations (Observed/Optimal)</b>	<b>Mean (SD)</b>	<b>Mean (SD)</b>
<b>2</b>	10	90.08	6.1/6.0	33.65	33.65/19.45	0	1
<b>3</b>	10	100.00	4.1/4.0	23.64	23.64/14.94	0	1
<b>4</b>	10	100.00	1.0/1.0	7.51	7.51/5.82	0	1.6
<b>5</b>	10	100.00	7.0/7.0	41.7	41.7/25.93	0	1.1
<b>6</b>	10	95.00	4.2/4.0	27.27	27.27/19.11	0	1.2
<b>7</b>	10	100.00	1.0/1.0	7.86	7.86/5.24	0	1
<b>8</b>	10	100.00	6.0/6.0	27.26	27.62/27.26	0	1
<b>9</b>	10	95.00	4./4.0	20.61	20.61/15.97	0	1.1
<b>10</b>	10	90.00	1.0/1.0	6.54	6.54/4.98	0.2	1
<b>11</b>	9	90.00	12.0/12.0	50.18	50.18/39.5	0.6	1.2
<b>12</b>	10	99.17	12.0/12.0	54.92	54.92/37.01	0.1	1.3
<b>13</b>	8	80.00	5.3/5.0	43.41	43.41/22.32	0.2	1.4
<b>14</b>	10	100.00	5.0/5.0	88.37	88.37/73.58	0	1.2
<b>15</b>	10	96.00	5.2/5.0	67.01	67.01/48.67	0.2	1.1
<b>16</b>	10	100.00	4.0/4.0	20.07	20.07/9.56	0	1
<b>17</b>	10	99.17	12.1/12.0	75.56	75.56/46.73	0	1.1
<b>18</b>	10	95.00	2.2/2.0	11.77	11.77/6.89	0	1.1
<b>19</b>	10	100.00	1.0/1.0	6.70	6.7/4.31	0	1
<b>20</b>	9	85.00	2.4/2.0	13.28	13.28/6.67	0.2	1
<b>21</b>	10	98.46	13.2/13.0	68.48	68.48/48.52	0.1	1
<b>22</b>	10	97.78	9.2/9.0	51.18	51.18/33.85	0	1
<b>23</b>	10	90.00	1.2/1.0	11.80	11.8/3.79	0	1
<b>24</b>	10	100.00	3.0/3.0	14.13	14.13/9.64	0	1
<b>25</b>	10	100.00	10.0/10.0	58.11	58.11/33.07	0	1
<b>26</b>	10	100.00	5.0/5.0	29.80	29.8/22.21	0	1.1

<b>27</b>	10	100.00	1.0/1.0	5.99	5.99/3.42	0	1
<b>28</b>	10	100.00	2.0/2.0	12.13	12.13/5.68	0	1
<b>29</b>	10	100.00	12.0/12.0	77.63	77.63/50.87	0	1.4
<b>30</b>	10	100.00	9.0/9.0	64.36	64.36/59.69	0	1.3
<b>31</b>	9	86.65	10.5/10.0	86.65	86.65/51.23	0.2	1.5
<b>32</b>	10	100.00	9.0/9.0	68.30	68.3/51.18	0	1.3
<b>33</b>	10	96.36	9.4/9.0	134.17	134.17/126.47	0.2	1.8
<b>34</b>	10	100.00	9.0/9.0	71.11	71.11/57.49	0	1.3
<b>35</b>	10	100.00	9.0/9.0	55.48	55.48/41.83	0	1.2
<b>36</b>	10	100.00	2.0/2.0	13.45	13.45/8.27	0	1
<b>37</b>	10	100.00	2.0/2.0	10.15	10.15/7.79	0	1
<b>38</b>	10	100.00	2.0/2.0	16.08	16.08/11.99	0	1
<b>39</b>	10	100.00	7.0/7.0	25.07	25.07/16.42	0	1
<b>40</b>	10	100.00	7.0/7.0	18.24	18.24/13.67	0	1
<b>41</b>	10	100.00	7.0/7.0	18.59	18.59/15.75	0	1
<b>42</b>	10	100.00	1.0/1.0	9.05	9.05/4.7	0	1
<b>43</b>	10	97.78	7.2/7.0	22.72	22.72/19.13	0	1
<b>44</b>	10	100.00	5.0/5.0	40.74	40.74/32.24	0	1.1
<b>45</b>	10	100.00	11.0/11.0	53.85	53.85/42.19	0	1
<b>46</b>	9	96.00	5.2/5.0	39.44	39.44/17.55	0.2	1
<b>47</b>	10	98.00	5.1/5.0	32.52	32.52/18.31	0	1.2
<b>48</b>	10	100.00	6.0/6.0	36.71	36.71/28.72	0	1
<b>49</b>	10	100.00	2.0/2.0	13.62	13.62/10.2	0	1
<b>50</b>	10	100.00	7.0/7.0	43.73	43.73/34.29	0	1.1

N= Number of participants who successfully completed the task

The results from the System Usability Scale scored the subjective satisfaction with the system based on performance with these tasks to be: 98.25.<sup>1</sup>

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

- **Major findings**
- The test participants overall were pleased with the functionality and use of the system. On questionnaires, the participants indicated how user-friendly the system was, and that even though they might not have performed as well as they hoped, they thought it would be easy to implement and learn.
- In contrast to previous Usability Tests, all participants expressed a general approval and affinity for the appearance of the software. They all felt that the appearance has been modernized from the previous platform.
- Most participants either experienced difficulty with the e-prescribing interface or expressed frustration with some aspect of the e-prescribing interface. In the end, the functionality is appropriate, however the steps required to complete the tasks are more tedious and confusing than the other tasks in the system. This is a third-party system that we integrate with, so customization is not possible.
- A majority of participants expressed their surprise at the medication reconciliation feature. They were impressed with the amount of data they could review and consolidate in a few steps.
- All users indicated that this version of EyeMD EMR was more user-friendly and efficient than the previous version, and all participants agreed that they would recommend this system to their colleagues.
- **Areas for improvement**
- The interface with EyeMD EMR and the e-prescribing vendor could be re-evaluated for flow improvements. Use of the e-prescribing platform is the most tedious out of the tasks.
- Evaluate the possibility of increasing font size in some areas of the software. A few participants indicated that they had some trouble reading the smaller font size.

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



## INTRODUCTION

The EHRUT tested for this study was EyeMD EMR, Version 2.0, an Ambulatory medical record software. Designed to present medical information to healthcare providers in Ophthalmology clinics, the EHRUT consists of a clinical documentation and imaging system that promotes efficiency and clinical relevancy to the ophthalmology specialty. The intended users include ophthalmologists and optometrists, and all staff necessary to run the clinical aspect of a medical practice. The usability testing attempted to represent realistic exercises and conditions.

The purpose of this study was to test and validate the usability of the current user interface, and provide evidence of usability in the EHR Under Test (EHRUT). To this end, measures of effectiveness, efficiency and user satisfaction, such as time to complete tasks, number of errors and path deviations, were captured during the usability testing.

## METHOD

### PARTICIPANTS

A total of 10 participants were tested on the EHRUT(s). Participants in the test all came from an ophthalmology or optometry clinic, and have a variety of job descriptions, all using EHRUT on a daily basis. Participants had no direct connection to the development of or organization producing the EHRUT(s). Participants were not from the testing or supplier organization. Participants were given the opportunity to have the same orientation and level of training as the actual end users would have received.

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

Part #	Gender	Age	Education	Occupation/Role	Professional Experience (Years)	Computer Experience (Years)	Product Experience (Years)	Assistive Technology
1	F	43	College	Certified Ophthalmic Assistant	22	30	7	None
2	M	38	College	EMR Manager	11	21	3	None
3	F	41	College	EMR Coordinator	20	20	3	None
4	F	41	Some College	Clinical Manager	19	20	7	None
5	F	46	College	Clinical Manager	25	20	6	None
6	F	47	Some College	Certified Ophthalmic Assistant	20	15	3	None
7	F	63	College	Clinical Manager	35	30	5	None
8	M	42	College	Technician	7	25	3	None
9	F	35	College	Administration	12	15	9	None
10	M	39	Some College	Information Technology	17	32	8	None

Over 50 participants (matching the demographics in the section on Participants) were recruited and 10 participated in the usability test. Participants were scheduled for two-hour sessions. A spreadsheet was used to keep track of the participant schedule and included each participant's demographic characteristics.

## 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 EyeMD EMR. Each participant 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

- Path deviations
- Participant's verbalizations (Comments)
- Participant's satisfaction ratings of the system

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

## TASKS

Tasks were selected based on their inclusion in the 2015 Certified Health IT requirements. A number of tasks were constructed that would be realistic and representative of the kinds of activities a user might do with this EHR.

A risk level of High, Moderate, or Low was assigned to each task and is recorded in the table below. Tasks, if performed incorrectly, had the potential to result in patient harm were deemed high risk, while tasks that had little or no chance of resulting in patient harm were deemed low risk. High risk items were prioritized in terms of development changes as a result of success and/or failure during testing.

Task	Description	Risk
2	CPOE - Record Medication Order	High
3	CPOE - Change Medication Order	High
4	CPOE - Display Changed Medication Order	Moderate
5	CPOE - Record Laboratory Order	Moderate
6	CPOE - Change Laboratory Order	Moderate
7	CPOE - Display Changed Laboratory Order	Low
8	CPOE - Record Imaging Order	Moderate
9	CPOE - Change Imaging Order	Moderate
10	CPOE - Display Changed Imaging Order	Low
11	Trigger Drug-Drug Interaction Prior to CPOE Completion	High
12	Trigger Drug-Allergy Interaction	High
13	Adjust Severity Level of Displayed Drug-Drug Interaction	Moderate
14	Demographics - Record Patient Information	Moderate
15	Demographics - Change Patient Information	Moderate
16	Demographics - Display Changed Patient Information	Moderate
17	Record Problem List	High

18	Change a Problem on the Problem List	High
19	Display the Current Problem List	High
20	Display the Historical Problem List	Moderate
21	Record Medication to Medication List	High
22	Change Medication on Medication List	High
23	Display the Active Medication List	High
24	Display the Historical Medication List	Moderate
25	Record Medication Allergy List	High
26	Change Medication Allergy List	High
27	Display Active Medication Allergy List	High
28	Display Historical Medication Allergy List	High
29	Clinical Decision Support: Add & Trigger a Problem List Intervention	Moderate
30	Clinical Decision Support: Add & Trigger a Medication List Intervention	High
31	Clinical Decision Support: Add & Trigger a Medication Allergy List Intervention	High
32	Clinical Decision Support: Add & Trigger a Demographics Intervention	Moderate
33	Clinical Decision Support: Add & Trigger a Lab Test and Results Intervention	Moderate
34	Clinical Decision Support: Add & Trigger a Vital Signs Intervention	High
35	Clinical Decision Support: Add & Trigger an Intervention for 2 Elements	High
36	Clinical Decision Support: View Intervention/Resource Information using Infobutton for Problem List	Low
37	Clinical Decision Support: View Intervention/Resource Information using Infobutton for Medication List	Low
38	Clinical Decision Support: View Intervention/Resource Information using Infobutton for Demographics	Low
39	Clinical Decision Support: Reconcile Patient's Active Problem List with Another Source Triggering an Intervention	High
40	Clinical Decision Support: Reconcile Patient's Active Medication List with Another Source Triggering an Intervention	High
41	Clinical Decision Support: Reconcile Patient's Active Medication Allergy List with Another Source Triggering an Intervention	High
42	Clinical Decision Support: Identify User Diagnostic and Therapeutic Reference Information	Low
43	Clinical Information Reconciliation & Incorporation - Incorporate an external CCDA	High
44	Clinical Information Reconciliation & Incorporation - Generate a Reconciled CCDA	Moderate
45	Create a New Prescription Order	High
46	Change a Prescription Order	High
47	Cancel a Subscription Order	Moderate
48	Refill a Prescription Order	Moderate
49	Receive fill status notification on a Prescription Order	Moderate
50	Request and Receive Medication History Information	Moderate

## 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 form (See Appendix 2). A representative from the test team witnessed the participant's signature.

To ensure that the test ran smoothly, one staff member participated in this test, the usability administrator/data logger. The usability testing staff member who conducted the test had 16 years of experience in the medical industry, including healthcare IT, and EMR implementation and training.

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, task success, path deviations, and number and type of errors.

Participants were instructed to perform the tasks (see specific instructions below):

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

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

Without using a think aloud technique.

Task timing began once the administrator finished reading the question. The task time was stopped once the participant indicated they had successfully completed the task. Scoring is discussed below in Section 3.9.

Following the session, the administrator gave the participant the post-test questionnaire (e.g., the System Usability Scale, see Appendix 4), and thanked each individual for their participation.

Participants' demographic information, task success rate, time on task, errors, deviations, verbal responses, and post-test questionnaire were recorded into a spreadsheet.

## TEST LOCATION

The test facility included a waiting area and a quiet testing room with a table, computer for the participant, and moderator's guide and paper for the administrator. Only the participant and administrator participated in the test.

To ensure that the environment was comfortable for users, noise levels were kept to a minimum with the ambient temperature within a normal range. All of the safety instruction and evacuation procedures were valid, in place, and visible to the participants.

## TEST ENVIRONMENT

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

The application was set up by the vendor according to the vendor's documentation describing the system set-up and preparation. The application itself was running on an SQL using a test database on a local instance. 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:

1. Informed Consent
2. Moderator's Guide
3. Post-test Questionnaire

Examples of these documents can be found in Appendices 2-4 respectively. The

Moderator's Guide was devised so as to be able to capture required data.

The participant's interaction with the EHRUT was captured and recorded digitally with screen capture software running on the test machine. A web camera recorded each participant's facial expressions, synced with the screen capture, and verbal comments were recorded with a microphone.

## PARTICIPANT INSTRUCTIONS

The administrator reads the following instructions aloud to the participant (also see the full moderator's guide in Appendix 3:

*"Thank you for participating in this study. Your input is very important. Our session today will last about 2 hours. During that time, you will use an instance of an electronic health record. I will ask you to complete a few tasks using this system and answer some questions. You should complete the tasks as quickly as possible making as few errors as possible. Please try to complete the tasks on your own following the instructions very closely. Please note that we are not testing you, we are testing the system. Therefore, if you have difficulty, all this means is that something needs to be improved in the system. I will be here in case you need specific help, but I am not able to instruct you or provide help in how to use the application.*

*Overall, we are interested in how easy (or how difficult) this system is to use, what in it would be useful to you, and how we could improve it. I did not have any involvement in its development, so please be honest with your opinions. All of the information that you will*

*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.*

*The product you will be using today is an early release of our 2015 Certification version of EyeMD EMR. 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?*

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

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

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

Participants were then given 50 tasks to complete. Tasks are listed in the moderator's guide in Appendix 3.

## 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 EyeMD EMR by measuring participant success rates and errors
2. Efficiency of EyeMD EMR by measuring the average task time and path deviations



3. Satisfaction with EyeMD EMR by measuring ease of use ratings

**DATA SCORING**

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

Measures	Rationale and Scoring
<p><b>Effectiveness:</b> Task Success</p>	<p>A task was counted as a "Success" if the participant was able to achieve the correct outcome, without assistance, within the time allotted on a per task basis.</p> <p>The total number of successes were calculated for each task and then divided by the total number of times that task was attempted. The results are provided as a percentage.</p> <p>Task times were recorded for successes. Observed task times divided by the optimal time for each task is a measure of optimal efficiency.</p> <p>Optimal task performance time, as benchmarked by expert performance under realistic conditions, is recorded when constructing tasks. Target task times used for task times in the Moderator's Guide must be operationally defined by taking multiple measures of optimal performance and multiplying by a factor of 2 that allows some time buffer because the participants are presumably not trained to expert performance. Thus, if expert, optimal performance on a task was 5 seconds then allotted task time performance was 10 seconds. This ratio should be aggregated across tasks and reported with mean and variance scores.</p>
<p><b>Efficiency:</b> Task Deviations &amp; Task Failures</p>	<p>The participant's path (i.e., steps) through the application was recorded. Deviations occur if the participant, for example, went to a wrong screen, clicked on an incorrect menu item, followed an incorrect link, or interacted incorrectly with an on-screen control. This path was compared to the optimal path. The number of steps in the observed path is divided by the number of optimal steps to provide a ratio of path deviation.</p> <p>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 a "Failure". The total number of errors was calculated for each task. Not all deviations would be counted as errors. On a qualitative level, an enumeration of errors and error types should be collected. In the results, N= the total number of successful completions out of 10 participants.</p>

<p><b>Efficiency:</b></p> <p>Task Time</p>	<p>Each task was timed from when the administrator said "Begin" until the participant said, "Done." If he or she failed to say "Done," the time was stopped when the participant stopped performing the task. Only task times for tasks that were successfully completed were included in the average task time analysis. Average time per task was calculated for each task. Variance measures (standard deviation and standard error) were also calculated.</p>
<p><b>Satisfaction:</b></p> <p>Task Rating</p>	<p>Participant's subjective impression of the ease of use of the application was measured by administering both a simple post-task question as well as a post-session questionnaire. After each task, the participant was asked to rate "Overall, this task was:" on a scale of 1 (Very Difficult) to 5 (Very Easy). These data are averaged across participants.</p> <p>Common convention is that average ratings for systems judged easy to use should be 3.3 or above.</p> <p>To measure participants' confidence in and likeability of EyeMD EMR 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 4.</p>

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 Table [x]). The results should be seen in light of the objectives and goals outlined in Section 3.2 Study Design. The data should yield actionable results that, if corrected, yield material, positive impact on user performance.

Task	N	Task Success	Path Deviation	Task Time		Errors	Task Ratings (1=Very Easy)
		Mean (SD)	Deviations (Observed/Optimal)	Mean (SD) in seconds	Deviations (Observed/Optimal)	Mean (SD)	Mean (SD)
2	10	90.08	6.1/6.0	33.65	33.65/19.45	0	1
3	10	100.00	4.1/4.0	23.64	23.64/14.94	0	1
4	10	100.00	1.0/1.0	7.51	7.51/5.82	0	1.6
5	10	100.00	7.0/7.0	41.7	41.7/25.93	0	1.1
6	10	95.00	4.2/4.0	27.27	27.27/19.11	0	1.2
7	10	100.00	1.0/1.0	7.86	7.86/5.24	0	1
8	10	100.00	6.0/6.0	27.26	27.62/27.26	0	1
9	10	95.00	4./4.0	20.61	20.61/15.97	0	1.1
10	10	90.00	1.0/1.0	6.54	6.54/4.98	0.2	1
11	9	90.00	12.0/12.0	50.18	50.18/39.5	0.6	1.2
12	10	99.17	12.0/12.0	54.92	54.92/37.01	0.1	1.3
13	8	80.00	5.3/5.0	43.41	43.41/22.32	0.2	1.4
14	10	100.00	5.0/5.0	88.37	88.37/73.58	0	1.2
15	10	96.00	5.2/5.0	67.01	67.01/48.67	0.2	1.1
16	10	100.00	4.0/4.0	20.07	20.07/9.56	0	1
17	10	99.17	12.1/12.0	75.56	75.56/46.73	0	1.1
18	10	95.00	2.2/2.0	11.77	11.77/6.89	0	1.1
19	10	100.00	1.0/1.0	6.70	6.7/4.31	0	1
20	9	85.00	2.4/2.0	13.28	13.28/6.67	0.2	1
21	10	98.46	13.2/13.0	68.48	68.48/48.52	0.1	1
22	10	97.78	9.2/9.0	51.18	51.18/33.85	0	1
23	10	90.00	1.2/1.0	11.80	11.8/3.79	0	1
24	10	100.00	3.0/3.0	14.13	14.13/9.64	0	1

25	10	100.00	10.0/10.0	58.11	58.11/33.07	0	1
26	10	100.00	5.0/5.0	29.80	29.8/22.21	0	1.1
27	10	100.00	1.0/1.0	5.99	5.99/3.42	0	1
28	10	100.00	2.0/2.0	12.13	12.13/5.68	0	1
29	10	100.00	12.0/12.0	77.63	77.63/50.87	0	1.4
30	10	100.00	9.0/9.0	64.36	64.36/59.69	0	1.3
31	9	86.65	10.5/10.0	86.65	86.65/51.23	0.2	1.5
32	10	100.00	9.0/9.0	68.30	68.3/51.18	0	1.3
33	10	96.36	9.4/9.0	134.17	134.17/126.47	0.2	1.8
34	10	100.00	9.0/9.0	71.11	71.11/57.49	0	1.3
35	10	100.00	9.0/9.0	55.48	55.48/41.83	0	1.2
36	10	100.00	2.0/2.0	13.45	13.45/8.27	0	1
37	10	100.00	2.0/2.0	10.15	10.15/7.79	0	1
38	10	100.00	2.0/2.0	16.08	16.08/11.99	0	1
39	10	100.00	7.0/7.0	25.07	25.07/16.42	0	1
40	10	100.00	7.0/7.0	18.24	18.24/13.67	0	1
41	10	100.00	7.0/7.0	18.59	18.59/15.75	0	1
42	10	100.00	1.0/1.0	9.05	9.05/4.7	0	1
43	10	97.78	7.2/7.0	22.72	22.72/19.13	0	1
44	10	100.00	5.0/5.0	40.74	40.74/32.24	0	1.1
45	10	100.00	11.0/11.0	53.85	53.85/42.19	0	1
46	9	96.00	5.2/5.0	39.44	39.44/17.55	0.2	1
47	10	98.00	5.1/5.0	32.52	32.52/18.31	0	1.2
48	10	100.00	6.0/6.0	36.71	36.71/28.72	0	1
49	10	100.00	2.0/2.0	13.62	13.62/10.2	0	1
50	10	100.00	7.0/7.0	43.73	43.73/34.29	0	1.1

N= Number of participants who successfully completed the task

The results from the SUS (System Usability Scale) scored the subjective satisfaction with the system based on performance with these tasks to be: 98.25. Broadly interpreted, scores under 60 represent systems with poor usability; scores over 80 would be considered above average.<sup>15</sup>

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<sup>15</sup> See Tullis, T. & Albert, W. (2008). Measuring the User Experience. Burlington, MA: Morgan Kaufman (p. 149).

## DISCUSSION OF THE FINDINGS

### **EFFECTIVENESS**

In the cases where sub-optimal paths were taken and the task completed, the expected results were still obtained. By not following optimal paths, the standard deviations did increase, and some test participants exceeded the allotted time for those tasks.

Errors or inability to complete a task mainly resulted from portions of a system where an individual user does not operate on a daily basis. For example, an administrator was not able to complete a prescription change, whereas an ophthalmic technician was not able to adjust severity levels of an alert, as this is not something they are generally familiar with. In addition, there was an internet connectivity issue that caused the user to not complete Task 11, Drug-Drug Interaction, due to connectivity to a 3<sup>rd</sup> party.

### **EFFICIENCY**

Based on the data, only 6 of 500 individual tasks were not completed within the time allotted. The test participants who were experienced in the clinical aspect of the practice achieved better times and completed more tasks via the optimal path than the test participants who have only front desk and billing experience. All test participants achieved better times on tasks that were similar in scope, and achieved using the same path. On each successive task, more participants completed the task using the optimal paths, and completed the task in a shorter period of time.

### **SATISFACTION**

Based on the task rating and SUS results data, all users found the system to be easy to use. In many cases, even though the test participant took a sub-optimal path to achieve the result, they still indicated the difficulty of the task was easy.

### **MAJOR FINDINGS**

The test participants overall were pleased with the functionality and use of the system. On questionnaires, the participants indicated how user-friendly the system was, and that even though they might not have performed as well as they hoped, they thought it would be easy to implement and learn.

In contrast to previous Usability Tests, all participants expressed a general approval and affinity for the appearance of the software. They all felt that the appearance has been modernized from the previous platform.

Most participants either experienced difficulty with the e-prescribing interface or expressed frustration with some aspect of the e-prescribing interface. In the end, the functionality is appropriate, however the steps required to complete the tasks are more tedious and confusing than the other tasks in the system. This is a third-party system that we integrate with, so customization is not possible.

A majority of participants expressed their surprise at the medication reconciliation feature. They were impressed with the amount of data they could review and consolidate in a few steps.

All users indicated that this version of EyeMD EMR was more user-friendly and efficient than the previous version, and all participants agreed that they would recommend this system to their colleagues.

### **AREAS FOR IMPROVEMENT**

The interface with EyeMD EMR and the e-prescribing vendor could be re-evaluated for flow improvements. Use of the e-prescribing platform is the most tedious out of the tasks.

Evaluate the possibility of increasing font size in some areas of the software. A few participants indicated that they had some trouble reading the smaller font size.

The following table shows the measures where users experienced errors.

<b>Task</b>	<b>Description</b>	<b>Risk</b>
<b>10</b>	CPOE - Display Changed Imaging Order	Low
<b>11</b>	Trigger Drug-Drug Interaction Prior to CPOE Completion	High
<b>12</b>	Trigger Drug-Allergy Interaction	High
<b>13</b>	Adjust Severity Level of Displayed Drug-Drug Interaction	Moderate
<b>15</b>	Demographics - Change Patient Information	Moderate
<b>20</b>	Display the Historical Problem List	Moderate
<b>21</b>	Record Medication to Medication List	High
<b>31</b>	Clinical Decision Support: Add & Trigger a Medication Allergy List Intervention	High
<b>33</b>	Clinical Decision Support: Add & Trigger a Lab Test and Results Intervention	Moderate
<b>46</b>	Change a Prescription Order	High

This study identified a few high-risk usability issues that have been addressed by our development team. For Tasks 11, 12, and 46, all tasks were related to an integration with a 3<sup>rd</sup> party e-prescribing system. As previously indicated, the interface with the e-prescribing vendor is being evaluated, and vendor is currently working on improving their User-Interface. This is of utmost importance, as contraindications between medications and allergies carries with it a high level of urgency for patient safety.

The other consistent errors or deviations occurred in areas of the system that are not widely used, for example, lab orders. The system it utilized exclusively in Ophthalmology and optometry practices, so order and interpretation of lab results are not widely used. As a result, most people tested on lab results struggled.

## APPENDICES

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

Appendix 1: Participant demographics

Appendix 2: Informed Consent Form

Appendix 3: Example Moderator's Guide

Appendix 4: System Usability Scale Questionnaire



Appendix 1: PARTICIPANT DEMOGRAPHICS

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

**Gender**

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Men	3
Women	7
Total (participants)	10

**Occupation/Role**

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Certified Ophthalmic Assistant	2
EMR Implementation Staff	2
Admin Staff	4
Technical Staff	2
Total (participants)	10

**Years of Experience**

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All electronic	10
Total (participants)	10

Appendix 2: INFORMED CONSENT FORM

EyeMD EMR Healthcare Systems, Inc. would like to thank you for participating in this study. The purpose of this study is to evaluate an electronic health record 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 2 hours.

Agreement

I understand and agree that as a voluntary participant in this study conducted by EyeMD EMR Healthcare Systems, Inc. I am free to withdraw consent or discontinue participation at any time. I understand and agree to participate in the study conducted and recorded by EyeMD EMR Healthcare Systems.

I understand and consent to the use and release of the recording by EyeMD EMR Healthcare Systems. I understand that the information and recording is for research and certification purposes only and that my name and image will not be used for any other purpose. I relinquish any rights to the recording and understand that the recording may be copied and used by EyeMD EMR Healthcare Systems without further permission.

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

I understand and agree that the data collected from this study may be shared outside EyeMD EMR Healthcare Systems. 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 or discontinue the study at any time.

**Demographic Information Required:**

Gender: \_\_\_\_\_ Male                      \_\_\_\_\_ Female

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

Education: \_\_\_\_\_

Occupation: \_\_\_\_\_

Professional experience (years): \_\_\_\_\_

Computer experience (years): \_\_\_\_\_

Product experience (years): \_\_\_\_\_

**Please check one of the following:**

- YES**, I have read the above and agree to be a participant in this study.
- NO**, I choose not to participate in this study.

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

## Appendix 3: EXAMPLE MODERATOR'S GUIDE

**Moderator's Guide****EHRUT Usability Test – Moderator's Guide**Software: EyeMD EMR Version 2.0

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 (10 minutes):**

*"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 a few tasks using this system and answer some questions. You should complete the tasks as quickly as possible making as few errors as possible. Please try to complete the tasks on your own following the instructions very closely. Please note that we are not testing you, we are testing the system. Therefore, if you have difficulty, all this means is that something needs to be improved in the system. I will be here in case you need specific help, but I am not able to instruct you or provide help in how to use the application.*

Overall, we are interested in how easy (or how difficult) this system is to use, what in it would be useful to you, and how we could improve it. I did not have any involvement in its development, so please be honest with your opinions. All of the information that you will 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.

The product you will be using today is an early release of our 2015 Certification version of EyeMD EMR. 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?

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

### **Task 1: First Impressions**

This is the application you will be working with. Please don't click anything just yet. What do you notice? What are you able to do here? Please be specific.

Notes/Comments:

### **Task 2: CPOE – Record Medication Order**

Take participant to the starting point for the task – patient: Usability, Test

After interviewing the patient, the provider would like you to ORDER the following medication for the current date and time:

Drug: Travatan Z

Indication: Elevated intra-ocular pressure associated with primary open angle glaucoma

Dose: 1 drop (gtt)

Route: in each eye (OU)

Frequency: every night

Order this medication now.

#### **Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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---

Task Time: \_\_\_\_\_ Seconds

Optimal Path: Select double down arrow above Eye Meds – Type Medication – Select Medication – enter dose – Select Add med - close Eye Meds Screen

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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### **Task 3: CPOE – Change Medication Order**

*Take participant to the starting point for the task – patient: Usability, Test*

After interviewing the patient, the provider would like you to CHANGE the order for Travatan Z

Current Route: in each eye (OU) CHANGE to right eye (OD)

Current Frequency: every night CHANGE to as needed (PRN)

Order this medication now.

#### **Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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---

Task Time: \_\_\_\_\_ Seconds

Optimal Path: Double-click prescribed med – change dose – Select edit med - close Eye Meds Screen

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 4: CPOE – Display Changed Medication Order**

*Take participant to the starting point for the task – patient: Usability, Test*

The provider would like you to ACCESS the order for Travatan Z (View details):

Locate this medication order and review the details.

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

---

---

Task Time: \_\_\_\_\_ Seconds

Optimal Path: Hover over medication listed in Eye Meds

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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---

**Task 5: CPOE – Record Laboratory Order**

*Take participant to the starting point for the task – patient: Usability, Test*

The provider would like you to ORDER the following lab order:

Order: CBC w/diff

Indication: Primary Open Angle Glaucoma

When: ASAP

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

---

---

Task Time: \_\_\_\_\_ Seconds

Optimal Path: Select double down arrow above staff orders – Select Lab – Select lab order – Next - indicate timing – select active diagnosis – save

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 6: CPOE – Change Laboratory Order**

*Take participant to the starting point for the task – patient: Usability, Test*

The provider would like you to CHANGE the lab order of CBC w/diff:

Current Indication: Primary Open Angle Glaucoma CHANGE to Astigmatism

Current timing: ASAP CHANGE to 2 weeks

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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---

Task Time: \_\_\_\_\_ Seconds

Optimal Path: Double click on order –indicate timing – select active diagnosis – save

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 7: CPOE – Display Changed Laboratory Order**

*Take participant to the starting point for the task – patient: Usability, Test*

The provider would like you to ACCESS the laboratory order for CBC w/diff.

Locate this laboratory order and review the details.

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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---

Task Time: \_\_\_\_\_ Seconds

Optimal Path: Hover over lab order

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 8: CPOE – Record Imaging Order**

*Take participant to the starting point for the task – patient: Usability, Test*

The provider would like you to ORDER the following radiology order:

Order: Fundus Photo

Indication: Primary Open Angle Glaucoma

When: Next Visit

Order this radiology order now.

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

---

---

Task Time: \_\_\_\_\_ Seconds

Optimal Path: Select double down arrow above staff orders – Select Diagnostic Test – Select test order – indicate timing – select active diagnosis – save

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 9: CPOE – Change Imaging Order**

*Take participant to the starting point for the task – patient: Usability, Test*

The provider would like you to CHANGE the following radiology order: Fundus Photo

Current indication: Primary Open angle glaucoma CHANGE to Corneal Guttata

Current timing: Next visit to ASAP

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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---

Task Time: \_\_\_\_\_ Seconds

Optimal Path: Double click on staff orders – select active diagnosis – select timing - close order screen

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 10: CPOE – Display Changed Imaging Order**

*Take participant to the starting point for the task – patient: Usability, Test*

The provider would like you to ACCESS the radiology order for Fundus Photo.

Locate this radiology order and review the details.

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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---

Task Time: \_\_\_\_\_ Seconds

Optimal Path: Hover over imaging order

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 11: Trigger Drug-Drug Interaction Prior to CPOE Completion**

Take participant to the starting point for the task, confirm warfarin is already prescribed – patient: Usability, Test 2

The provider would like you to place a MEDICATION ORDER, but it is a medication with drug-drug interactions. Place the following order to get the warning.

Medication: Ciproflaxin 250 mg tablet

Dose: 1 tab

Frequency: twice a day (bid)

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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---

Task Time: \_\_\_\_\_ Seconds

Optimal Path: Select double drop-down arrow above Eye Meds – Type Medication – Select Medication – enter dose – Select Add med - close Eye Meds Screen – Select Send E-RX – Click Select – Click Review/Prescribe - view alert – close screen

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 12: Trigger Drug-Allergy Interaction**

*Test Administrator ensure Penicillin is listed as allergy –Take the participant to the starting point for the task-patient: Usability, Test 2.*

The provider would like you to place a MEDICATION ORDER, but it is a medication with drug-allergy interactions. Place the following order to get the warning.

Medication: Penicillin V potassium 250 mg tablet

Dose: 1 tab

Frequency: once a day (qd)

Dispense: 1 bottle

Refill: 0

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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---

Task Time: \_\_\_\_\_ Seconds

Optimal Path: Select double drop-down arrow above Eye Meds – Type Medication – Select Medication – enter dose – Select Add med - close Eye Meds Screen – Select Send E-RX – Click Select – Click Review/Prescribe - view alert – close screen

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 13: Adjust Severity Level of Displayed Drug-Drug Interaction**

*Test Administrator change Warning Levels and ensure Penicillin is listed as allergy –Take the participant to the starting point for the task-patient: Usability, Test 2.*

The provider would like you to place a MEDICATION ORDER, but it is a medication with drug-drug and drug-allergy interactions. Send the following order to get a different set of intervention warnings.

Medication: Ciproflaxin 250 mg tablet

Dose: 1 tab

Frequency: twice a day (bid)

Dispense: 1 bottle

Refill: 0

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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---

Task Time: \_\_\_\_\_ Seconds

Optimal Path: Select Send E-RX – Click Select – Click Review/Prescribe - view alert – close screen

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 14: Demographics – Record Patient Information**

*Take participant to the starting point for the task – Add new patient*

Enter the following demographic data:

Patient Name: Usability, Test 3

Date of Birth: October 14, 1961

Gender at Birth: Male

Preferred Language: English

Race: White

Ethnicity: Hispanic or Latino

Sexual Orientation: Straight or heterosexual

Gender Identity: Male

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

---

---

Task Time: \_\_\_\_\_ Seconds

Optimal Path: Type in patient last name in filter – click new patient – enter demographics – click create patient.

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 15: Demographics – Change Patient Information**

*Take participant to the starting point for the task –patient: Usability, Test 3.*

Change the following demographic data:

Date of Birth: October 12, 1961

Gender at Birth: Female

Preferred Language: Spanish

Race: Asian

Ethnicity: Not Hispanic or Latino

Sexual Orientation: Bisexual

Gender Identity: Female

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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---

Task Time: \_\_\_\_\_ Seconds

Optimal Path: Type in patient last name in filter – select patient – click edit patient – update demographics – click update patient.

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 16: Demographics – Display Changed Patient Information**

Take participant to the starting point for the task –patient: Usability, Test 3.

Have the participant display the changed patient demographic information.

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

---

---

Task Time: \_\_\_\_\_ Seconds

Optimal Path: Type in patient last name in filter – select patient – click edit patient – click cancel.

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 17: Record Problem List**

Take the participant to the starting point for the task - patient: Usability, Test 3.

The provider would like you to record/create a LIST of problems. Enter the following problems/conditions for the patient:

Condition: Rheumatoid Arthritis

Start Date: April 2002

Condition: Primary Open Angle Glaucoma

Start Date: Today's Visit

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

---

---

Task Time: \_\_\_\_\_ Seconds

Optimal Path: Select Fast Diagnosis – select first diagnosis – add details – select priority – Select Fast Diagnosis – select second diagnosis – add details – select priority – select diagnosis with prior onset date – click edit – change onset date - save

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 18: Change a Problem on the Problem List**

Take the participant to the starting point for the task - patient: Usability, Test 3.

Please change a current problem. Update the following problems/conditions for the patient:

Condition: Rheumatoid Arthritis

Mark Resolved on today's visit

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

---

---

Task Time: \_\_\_\_\_ Seconds

Optimal Path: Select diagnosis from active list – click resolve

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 19: Display the Current Problem List**

Take the participant to the starting point for the task - patient: Usability, Test 3.

Please display the current Problem List

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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---

Task Time: \_\_\_\_\_ Seconds

Optimal Path: Locate diagnosis on same screen

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 20: Display the Historical Problem List**

Take the participant to the starting point for the task - patient: Usability, Test 3.

Please display the historical Problem List.

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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---

Task Time: \_\_\_\_\_ Seconds

Optimal Path: Visit History – Diagnosis History

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 21: Record Medication to Medication List**

Take the participant to the starting point for the task - patient: Usability, Test 3.

The provider would like you to record/create a LIST of medications the patient takes at home. Enter the following medications on the patient's list:

Systemic Drug: Claritin-D 24 hour

Eye Drug: Vigamox Eye Drops

Dose: 10 mg – 240mg extended release

Dose: 0.5%

Frequency: Once a day

Frequency: Every Morning, both eyes

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

---

---

Task Time: \_\_\_\_\_ Seconds

Optimal Path: Select double drop-down arrow above Current Systemic Meds – Type Medication – Select Medication – enter dose – Select Add med - close systemic Meds Screen – Select double drop-down arrow above Current eye Meds – type medication – select medication – enter dose – select add med – close eye meds

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 22: Change Medication on Medication List**

Take the participant to the starting point for the task - patient: Usability, Test 3.

The provider would like you to CHANGE a medication the patient has. Enter the following changes to the patient's medication list:

Systemic Drug: Claritin-D 24 hour

Dose: 10 mg – 240mg extended release

CHANGE Frequency to BID

**Add** the following drug:

Drug: Methotrexate sodium

Dose: 2.5 mg tablet

Frequency: Once a day

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

---

---

Task Time: \_\_\_\_\_ Seconds

Optimal Path: Select double drop-down arrow above Current Systemic Meds – Select Medication – edit frequency - Select Edit med -- type medication – select medication – enter dose – select add med – close systemic meds

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 23: Display the Active Medication List**

Take the participant to the starting point for the task - patient: Usability, Test 3.

Please access and display the patient's current medication list (View Details):

Access the patient's medication list now.

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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Task Time: \_\_\_\_\_ Seconds

Optimal Path: Locate medications on screen or Select Visit Summary

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 24: Display the Historical Medication List**

Take the participant to the starting point for the task - patient: Usability, Test 3.

Please access and display the patient's historical medication list.

Access the patient's historical medication list now.

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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---

Task Time: \_\_\_\_\_ Seconds

Optimal Path: Visit history – RX Medication History – medication history check box

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 25: Record Medication Allergy List**

Take the participant to the starting point for the task - patient: Usability, Test 3.

Please record/create a LIST of medication ALLERGIES the patient has. Enter the following allergies to the patient's medication/allergy list:

Allergy: Fluorescein

Allergy: Peanut

Reaction: Nausea

Reaction: Hives

Severity: Severe

Severity: Mild

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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Task Time: \_\_\_\_\_ Seconds

Optimal Path: Select double drop-down arrow next to Allergies – Type Allergy – Select allergy – enter reaction and severity – Select Add allergy - type allergy – select allergy – enter reaction and severity – select add allergy – close

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 26: Change Medication Allergy List**

Take the participant to the starting point for the task - patient: Usability, Test 3.

The provider would like you to CHANGE a medication allergy the patient has. Enter the following changes to the patient's medication/allergy list:

Allergy: Fluorescein

Allergy: Peanut

**Change Reaction to:** Dizziness

Reaction: Hives

Severity: Severe

**Severity:** Severe

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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Task Time: \_\_\_\_\_ Seconds

Optimal Path: Select double drop-down arrow next to Allergies – Select allergy – edit -Select Edit Allergy -- close

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 27: Display Active Medication Allergy List**

Take the participant to the starting point for the task - patient: Usability, Test 3.

Please access and display the patient's active medication allergy list

Access the patient's medication allergy list now.

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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Task Time: \_\_\_\_\_ Seconds

Optimal Path: Locate allergies on screen or Select Visit Summary

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 28: Display Historical Medication Allergy List**

*Take the participant to the starting point for the task - patient: Usability, Test 3.*

Please access and display the patient's historical medication allergy list

Access the patient's historical allergy list now.

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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Task Time: \_\_\_\_\_ Seconds

Optimal Path: Visit history – RX Medication History

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 29: Clinical Decision Support: Add & Trigger a Problem List Interventions**

Take the participant to the starting point for the task. Use patient Usability, Test 5.

Please setup an alert with clinical reference for Primary Open Angle Glaucoma.

Please add a problem to the patient’s Historical Problem List. (Purpose: to trigger a Problem List Intervention Alert).

Add the following problem to the patient’s chart:

Indication/Diagnosis: Primary Open Angle Glaucoma H40.11

Add this alert to the settings and add the problem to trigger the alert.

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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---

Task Time: \_\_\_\_\_ Seconds

Optimal Path: Hamburger menu – options – customizations – alerts – add – type alert text – enter problem – save – close – double arrow drop-down above ocular history – select diagnosis - close

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 30: Clinical Decision Support: Add & Trigger a Medication List Intervention**

Take the participant to the starting point for the task - patient: Usability, Test 5.

Please setup an alert with clinical reference for Vigamox.

Please add a medication to the patient's chart (Purpose: to trigger a Medication List Intervention Alert). In Medication Order Entry, order the following medication:

Medication: Vigamox

Add an alert to the settings and order this medication now

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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---

Task Time: \_\_\_\_\_ Seconds

Optimal Path: Hamburger menu – options – customizations – alerts – add – type alert text – enter medication – save - close

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 31: Clinical Decision Support: Add & Trigger a Medication Allergy List Intervention**

Take the participant to the starting point for the task - patient: Usability, Test 5.

Please setup an alert with clinical reference for a penicillin allergy.

Please add allergy to penicillin to the patient's chart (Purpose: to trigger a Medication Allergy List Intervention Alert). In Allergy list, enter the following Medication allergy:

Medication Allergy: Penicillin

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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---

Task Time: \_\_\_\_\_ Seconds

Optimal Path: Hamburger menu – options – customizations – alerts – add – type alert text – enter medication allergy – save - close

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 32: Clinical Decision Support: Add & Trigger a Demographics Intervention**

Take the participant to the starting point for the task - patient: Usability, Test 5.

Please setup an alert with clinical reference for age greater than 50.

The patient indicates their Date of Birth is 1/1/1968. Update date of birth in patient demographic screen. (Purpose: to trigger a Demographics Intervention Alert). In Date of Birth, enter the following date:

Date of Birth: 01/01/1968

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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---

Task Time: \_\_\_\_\_ Seconds

Optimal Path: Hamburger menu – options – customizations – alerts – add – type alert text – enter minimum age – save – close update

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 33: Clinical Decision Support: Add & Trigger a Lab Tests and Results Intervention**

Take the participant to the starting point for the task - patient: Usability, Test 5.

Please setup an alert with clinical reference for White Blood Cell Count above 10.8

The doctor is finished seeing a patient and now they can leave. During the visit a lab result returned abnormally high. Open the patient's chart to begin the checkout process. (Purpose: to trigger a Lab Result Intervention Alert)

Add Lab result to order from 3/5/2019 – CBC

Test: White Blood Cell Count

Result Value: 12.0

Range: 3.8 – 10.8

Result Flag: Above High Normal

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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Task Time: \_\_\_\_\_ Seconds

Optimal Path: Hamburger menu – options – customizations – alerts – add – type alert text – enter lab test result – save - close

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 34: Clinical Decision Support: Add & Trigger a Vital Signs Intervention**

Take the participant to the starting point for the task - patient: Usability, Test 5.

Please setup an alert with clinical reference for Max Systolic Blood pressure over 140.

During a routine blood pressure check, record the patient's vitals for your blood pressure reading. (Purpose: to trigger a Vital Sign Intervention Alert). In the Vitals Screen, records the following blood pressure reading:

Systolic: 157

Diastolic: 102

Record this vital entry now.

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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---

Task Time: \_\_\_\_\_ Seconds

Optimal Path: Hamburger menu – options – customizations – alerts – add – type alert text – enter vital sign – save - close

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 35: Clinical Decision Support: Add & Trigger an Intervention for 2 elements**

*Take the participant to the starting point for the task - Options.*

Please setup an alert with clinical reference for Systolic Blood pressure over 120 and active diagnosis of Primary Open Angle Glaucoma H40.11.

Open patient Usability, Test 5. (Purpose: to trigger a Combination Intervention Alert). Confirm an additional alert popped up indicating CDS alert.

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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Task Time: \_\_\_\_\_ Seconds

Optimal Path: Hamburger menu – options – customizations – alerts – add – type alert text – enter vital sign and diagnosis alert – save - close

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 36: Clinical Decision Support: View Intervention/Resource Information using Infobutton for Problem List**

*Take the participant to the starting point for the task - Usability, Test 6*

Please review resource information regarding cataracts for patient Usability, Test 6 using the info button.

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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---

Task Time: \_\_\_\_\_ Seconds

Optimal Path: Select diagnosis – click blue Infobutton

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 37: Clinical Decision Support: View Intervention/Resource Information using Infobutton for Medication List**

*Take the participant to the starting point for the task - Usability, Test 6*

Please review resource information regarding brimonidine 0.15% eye drops for patient Usability, Test 6 using the info button.

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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Task Time: \_\_\_\_\_ Seconds

Optimal Path: Hover over med – click blue Infobutton

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 38: Clinical Decision Support: View Intervention/Resource Information using Infobutton for Demographics**

*Take the participant to the starting point for the task - Usability, Test 6*

Please review resource information regarding the patient's race for patient Usability, Test 6 using the info button.

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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Task Time: \_\_\_\_\_ Seconds

Optimal Path: Click Edit Patient – Click blue Infobutton

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 39: Clinical Decision Support: Reconcile Patient’s Active Problem List with Another Source Triggering an Intervention**

*Take the participant to the starting point for the task – patient: Usability, Test 6*

On the following patient, reconcile the problem list with an outside source, triggering a Clinical Decision Support Intervention

Open Patient: Usability, Test 6

Outside Source: CCDA: Problems from External Source

Apply the reconciliation

Reconcile the information now.

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

---

---

Task Time: \_\_\_\_\_ Seconds

Optimal Path: Open patient chart – Patient Documents – Select CCDA – Import Content – Select Last Visit – Apply - Ok

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 40: Clinical Decision Support: Reconcile Patient's Active Medication List with Another Source Triggering an Intervention**

*Take the participant to the starting point for the task – patient: Usability, Test 6*

On the following patient, reconcile the active medication list with an outside source, triggering a Clinical Decision Support Intervention

Open Patient: Usability, Test 6

Outside Source: - CCDA: Medications from External Source

Apply the reconciliation

Reconcile the information now.

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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---

Task Time: \_\_\_\_\_ Seconds

Optimal Path: Open patient chart – Patient Documents – Select CCDA – Import Content – Select Last Visit – Apply - Ok

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 41: Clinical Decision Support: Reconcile Patient's Active Medication Allergy List with Another Source Triggering an Intervention**

Take the participant to the starting point for the task – patient: Usability, Test 6

On the following patient, reconcile the active medication allergy list with an outside source, triggering a Clinical Decision Support Intervention

Open Patient: Usability, Test 6

Outside Source: - CCDA: Allergies from External Source

Apply the reconciliation

Reconcile the information now.

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

---

---

Task Time: \_\_\_\_\_ Seconds

Optimal Path: Open patient chart – Patient Documents – Select CCDA – Import Content – Select Last Visit – Apply - Ok

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 42: Clinical Decision Support: Identify User Diagnostic and Therapeutic Reference Information**

*Take the participant to the starting point for the task – Usability, Test 6*

Upon entering a chart, the provider was prompted with an alert. The provider would like to view the references for this alert. (Purpose: to open and view an Intervention Alert's references as a provider). open and review the diagnostic and therapeutic reference information for an alert.

Review the reference information now.

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

---

Task Time: \_\_\_\_\_ Seconds

Optimal Path: Hover over CDS alert and optionally double click to view more.

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 43: Clinical Information Reconciliation & Incorporation – Incorporate an external CCDA**

Take the participant to the starting point for the task – Patient: Usability, Test 7

Practice has received a CCDA from another practice, and needs to Import the medications, medication allergies, and problems from the CCDA into the EMR system and perform a reconciliation.

Please import and reconcile the CCDA for patient *Usability, Test 7*

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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Task Time: \_\_\_\_\_ Seconds

Optimal Path: Open patient chart – Patient Documents – Select CCDA – Import Content – Select Last Visit – Apply - Ok

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 44: Clinical Information Reconciliation & Incorporation – Generate a Reconciled CCDA**

*Must be logged in as physician, Take the participant to the starting point for the task – patient from Task 43: Usability, Test 7*

Practice needs to generate a reconciled CCDA to send to a sub-specialist for an emergency visit. To do so, practice needs to export a new CCDA with reconciled information from the previous task.

Please generate a reconciled CCDA for patient *Usability, Test 7*.

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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Task Time: \_\_\_\_\_ Seconds

Optimal Path: Chart Printing – Select Visit – Output: Printer – Reason: Referral - Ok

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 45: Create a New Prescription Order**

Take the participant to the starting point for the task - patient: Usability, Test 8.

The provider would like to ORDER an ELECTRONIC PRESCRIPTION for the patient. Order the following medication:

Drug: Pataday 0.2 % eye drops

Frequency: 1 drop (gtt) once in the morning (QAM)

Dispense: 1 bottle

Refills: 0

Order this medication now.

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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Task Time: \_\_\_\_\_ Seconds

Optimal Path: Select double drop-down arrow above Eye Meds – Type Medication – Select Medication – enter dose – Select Add med - close Eye Meds Screen – Click Send E-rx – Click Select – Click Transmit / Prescribe -Transmit Rx - Close

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 46: Change a Prescription Order**

Take the participant to the starting point for the task - patient: Usability, Test 8.

The provider would like to change the dosage for an ELECTRONIC PRESCRIPTION for the patient. Change the following medication:

Drug: Pataday 0.2 % eye drops

**Change Frequency:** 1 drop (gtt) twice a day (BID)

Dispense: 1 bottle

Refills: 0

Change this medication now.

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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Task Time: \_\_\_\_\_ Seconds

Optimal Path: Double click medication – change frequency – Select edit med - close Eye Meds Screen - Close

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 47: Cancel a Prescription Order**

Take the participant to the starting point for the task - patient: Usability, Test 8.

The provider would like to cancel an ELECTRONIC PRESCRIPTION for the patient. Cancel the following medication:

Drug: Pataday 0.2 % eye drops

Frequency: 1 drop (gtt) twice a day (bid)

Cancel this medication now.

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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Task Time: \_\_\_\_\_ Seconds

Optimal Path: Double click medication – change sig to discontinue – Select edit med - close Eye Meds Screen - Close

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 48: Refill a Prescription Order**

Take the participant to the starting point for the task - patient: Test, Patient

The provider would like to refill an ELECTRONIC PRESCRIPTION for the patient. Refill the following medication:

Drug: Lumigan 0.01% Eye Drops

Frequency: 1 gtt both eyes 2 times a day

Refill this medication now.

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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Task Time: \_\_\_\_\_ Seconds

Optimal Path: Click Rx Refill button – Click Respond on refill order – Click yes to confirm patient – Select location - Click Accept - Close

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 49: Receive fill status notification on a Prescription Order**

Take the participant to the starting point for the task - patient: Usability, Test 9.

The provider would like to see if an ELECTRONIC PRESCRIPTION was filled for a particular patient. Check the status on the following medication:

Drug: Pataday 0.2 % eye drops

Frequency: 1 drop (gtt) twice a day (bid)

Check on the status of this medication now.

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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Task Time: \_\_\_\_\_ Seconds

Optimal Path: Hover over med – E-Rx Detail

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Task 50: Request and Receive Medication History Information**

Take the participant to the starting point for the task - patient: Paltrow, Bruce K.

This patient is a new patient to the practice, and the provider would like to know if they are currently on any other medications. Please request and receive medication history information for patient Paltrow, Bruce K.

Please request and receive this information now.

**Success:**

- Easily completed
- Completed with difficulty or help; Describe in Comments:
- Not completed

Comments:

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Task Time: \_\_\_\_\_ Seconds

Optimal Path: Click Med Reconciliation – Click Med Entry – Select Fill History – Click Request Prescription History – Select All – Add to Current Meds - Close

- Correct
- Minor deviations/cycles: Describe below
- Major deviations: Describe below

Comments:

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Observed Errors and Verbalizations:

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Rating: Overall this task was: \_\_\_\_ (1 – Very Easy, 5 – Very difficult)

Administrator/Note-take Comments:

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**Final Questions (10 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 regard to the tested functionality?

Compare this to other systems you have used.

Would you recommend this system to your colleagues?

## Appendix 4: SYSTEM USABILITY SCALE QUESTIONNAIRE

**5.5 System Usability Scale Questionnaire (10 Minutes)**

Rate 1-5 with 1 being Strongly Disagree and 5 being Strongly Agree

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

Additional Comments:

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