



eDerm Systems
Version 2.7

Contact: George Cain (gcain@edermssystem.com)

For public release:

eDerm Systems LLC attests that the usability standard/process and usability report submitted for the certification of eDerm Systems version 2.7 is accurate and complete per the requirements of the ONC criterion 170.314(g)(3).

Signature _____

Printed Name: Andrew Queen

Title:

Company Name: eDerm Systems LLC

Date 11/18/16



eDerm Systems
Version 2.7

Contact: George Cain (gcain@edermssystem.com)

eDerm Systems LLC employs a homegrown NIST-7741 style of User Centered Design. The process used throughout for design, development, implementation and maintenance phases of the eDerm Systems version 2.7.

Signature _____

Printed Name: Andrew Queen

Title:

Company Name: eDerm Systems LLC

Date 11/18/16



EHR Usability Test Report of eDerm Systems; Version 2.7

eDerm Systems version 2.7

Date of Usability Test Completion: 11/16/2016

Date of Report: 11/18/2016

Report Prepared By: George Cain/Wayne Singer

Contact Person: George Cain

Phone Number: 561-499-6900

Email Address: gcain@eDermSystems.com

Mailing Address: 902 Clint Moore Road, Suite 226 / Boca Raton, FL 33487



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1. Executive Summary

A usability test of eDerm Systems ver. 2.7 was conducted on 11/16/2016 via GoToMeeting sessions. The purpose of this testing was to test and validate the usability of the current user interface, newly implemented tasks and features, and provide evidence of usability in the EHR Usability Test (EHRUT). During the usability test, five healthcare professionals matching the target demographic criteria served as participants and used the EHRUT in simulated, but representative tasks.

This study collected performance data on 29 tasks conducted on an EHR:

- CPOE (314.a.18) Record Medication Order
- CPOE (314.a.18) Change Medication Order
- CPOE (314.a.18) Access Medication Order
- CPOE (314.a.19) Record Laboratory Order
- CPOE (314.a.19) Change Laboratory Order
- CPOE (314.a.19) Access Laboratory Order
- Drug-Drug, Drug-Allergy (314.a.2) Create Interventions Prior to CPOE Completion
- Drug-Drug, Drug-Allergy (314.a.2) Adjustment of Intervention Severity
- Medication List (314.a.6) Record Medication List
- Medication List (314.a.6) Change Medication List
- Medication List (314.a.6) Access Medication List
- Medication Allergy List (314.a.7) Record Allergy List
- Medication Allergy List (314.a.7) Change Allergy List
- Medication Allergy List (314.a.7) Access Allergy List
- Clinical Decision Support (314.a.8) Problem List Interventions
- Clinical Decision Support (314.a.8) Medication List Interventions
- Clinical Decision Support (314.a.8) Medication Allergy List Interventions
- Clinical Decision Support (314.a.8) Demographics Interventions
- Clinical Decision Support (314.a.8) Lab Test and Results Interventions
- Clinical Decision Support (314.a.8) Vital Signs Interventions
- Clinical Decision Support (314.a.8) Identify User Diagnostic and Therapeutic Reference Information
- Clinical Decision Support (314.a.8) Configuration of CDS Interventions by User (Admin Function)
- E- Prescribing (314.b.3) Create Prescriptions
- Clinical Information Reconciliation (314.b.4) Reconcile Patient's Active Medication List with Another Source
- Clinical Information Reconciliation (314.b.4) Reconcile Patient's Active Problem List with Another Source
- Clinical Information Reconciliation (314.b.4) Reconcile Patient's Active Medication Allergy List with Another Source

During the 60-minute one-on-one usability test, each participant was greeted by the administrator and asked to review and sign an informed consent/release form (included in Appendix 5.4); they were instructed that they could withdraw at any time. Some Participants did have prior experience with other electronic health record systems, and with the EHR being tested. Training sessions lasting 1 hours, using existing technical documents used for real end user training, were conducted prior to testing.

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 data logger manually timed 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 were recorded for subsequent analysis. The following types of data were collected for each participant:

- Time to complete the tasks
- Number and types of errors
- Number of tasks successfully completed within the allotted time without assistance
- 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 thanked 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 (NISTIR 7741)*, were used to evaluate the usability of the EHRUT. A summary of the performance and rating data collected on the EHRUT is found in Section 4.1, Data Analysis and Reporting.

The results from the System Usability Scale scored the subjective satisfaction with the system based on performance with these tasks to be: 75 (Detailed in Section 4.1, Data Analysis and Reporting).

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

Major findings:

Participants were overall very pleased with the new version or product. Each stated appreciation for all the work that has gone into the new certified version, although ease of use was an overall theme for what they were looking for.

All participants verbally expressed a slight frustration with all the new data that was now required to collect and the extra screens that were displayed to complete the task. We agreed and assured them future versions we be easier to use with less screens, thanks for their feedback.

A few participants commented and expressed a concern over the time it takes to work with bot a PC and an iPad user interface. The desire is to do everything on one item.

For all the tasks tested requiring the participant to enter, change or retrieve data, all of these tasks rated were rated as “easy to do” for all participants.

Areas for improvement:

Comments from participants indicate the Medication List could be easier to remove the duplicate medications.

All of the participants requested the patient name on the Reconciliation screen to be fixed and to be visual as they scroll down to assess the options. Currently the name disappears and they scroll down the column. This will be addressed during the next R&D development cycle.

2. Introduction

The EHR tested for this study was eDerm Systems version 2.7, designed for Dermatology medical clinics. The application is a Modular Electronic Health Record for the Ambulatory setting only. The software is designed to the 2014 Edition of certification objectives for the Ambulatory setting. The usability testing attempted to represent realistic exercises and conditions with actual users of the EHR. (See Section 5)

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 Usability Test (EHRUT). To this end, measures of effectiveness, efficiency and user satisfaction, such as time on task, deviations from optimal path, and errors were captured during the usability testing.

3. Method

3.1 PARTICIPANTS

A total of 5 participants, that were representative of our user base, were tested on the EHRUT. Intended users of the EHR are Dermatology focused clinicians. Participants in the test were across the field of Dermatology. Participants were recruited from the current user base and were thanked for their time. In addition, participants had no direct connection to the development of, or organization producing the EHRUT. Participants were not from the testing or supplier organization. Participants were given the opportunity to have the same orientation and level of training as they were as original end users.

For the test purposes, end-user characteristics were identified and translated into a recruitment screener used to solicit potential participants; the recruiting screener is provided in Appendix 5.1.

Recruited participants had a mix of backgrounds and demographic characteristics conforming to the recruitment screener. The following is a table (Table 3.1) containing a high-level overview of participants by gender, occupation and years of experience. A detailed summary of participant characteristics, including demographics, professional experience, computing experience and user needs for assistive technology is found in Appendix 5.2, Participant Demographics. Participant names were replaced with Participant IDs so that an individual's data cannot be tied back to individual identities.

Participant Demographics Overview

Table 3.1

Gender	
Male:	1
Female:	4
Total:	5
Occupation/Role	
RN/BSN/MA:	4
Physician:	1
Years of Experience	
Years of Experience:	
Facility Use of EHR:	44
All Paper:	10
Some Paper/EHR	15
All Electronic:	19

Participant Experience

Part ID	Gender	Age	Education	Occupation /Role	Professional Experience	Computer Experience	Product Experience	Assistive Technology Needs
User 1	Male	40 to 59	M.D.	Physician	25 years	Windows	9 years	No
User 2	Female	23 to 39	Some College	Medical Assistant	10 years	Windows	2 years	No
User 3	Female	40 to 59	Some College	Medical Assistant	20 years	Mac	9 years	No
User 4	Female	40 to 59	Some College	Medical Assistant	13 years	Windows, Mac	9 years	No
User 5	Female	40 to 59	Some College	Medical Assistant	35 years	Mac. Windows	7 years	No

Five participants matching the demographics in the section on Participants were recruited and five participated in the usability test. No participants failed to show for the study.

Participants were scheduled for 60 minute sessions and debriefed by the administrator and data logger. A CRM was used to keep track of the participant schedule, and included each participant's demographic characteristics as provided by the recruiting screen.

3.2 STUDY DESIGN

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

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

- Number of tasks successfully completed within the allotted time without assistance
- Time to complete the tasks
- Number and types of errors
- 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.

3.3 TASKS

A number of tasks were constructed that would be realistic and representative of the kinds of activities a user might perform with this EHR and **force-ranked based on the risk** as to the potential to cause patient harm if not completed correctly, including:

- Drug-Drug, Drug-Allergy (314.a.2) Create Interventions Prior to CPOE Completion
- Drug-Drug, Drug-Allergy (314.a.2) Adjustment of Intervention Severity
- CPOE (314.a.18) Record Medication Order
- CPOE (314.a.18) Change Medication Order
- CPOE (314.a.18) Access Medication Order
- CPOE (314.a.19) Record Laboratory Order
- CPOE (314.a.19) Change Laboratory Order
- CPOE (314.a.19) Access Laboratory Order
- Medication Allergy List (314.a.7) Record Allergy List
- Medication Allergy List (314.a.7) Change Allergy List
- Medication Allergy List (314.a.7) Access Allergy List
- E- Prescribing (314.b.3) Create/Change Prescriptions
- Clinical Decision Support (314.a.8) Problem List Interventions
- Clinical Decision Support (314.a.8) Medication List Interventions
- Clinical Decision Support (314.a.8) Medication Allergy List Interventions
- Clinical Decision Support (314.a.8) Demographics Interventions
- Clinical Decision Support (314.a.8) Lab Test and Results Interventions
- Clinical Decision Support (314.a.8) Vital Signs Interventions
- Clinical Decision Support (314.a.8) Identify User Diagnostic and Therapeutic Reference Information
- Clinical Decision Support (314.a.8) Configuration of CDS Interventions by User (Admin Function)
- Clinical Information Reconciliation (314.b.4) Reconcile Patient's Active Medication List with Another Source
- Clinical Information Reconciliation (314.b.4) Reconcile Patient's Active Problem List with Another Source
- Clinical Information Reconciliation (314.b.4) Reconcile Patient's Active Medication Allergy List with Another Source
- Medication List (314.a.6) Record Medication List
- Medication List (314.a.6) Change Medication List
- Medication List (314.a.6) Access Medication List

Tasks were selected based on their inclusion in 2014 Edition Certification requirements, frequency of use, criticality of function, and those that may be most troublesome for users.

3.4 PROCEDURES

Upon start, 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 received and signed an informed consent and release form (See Appendix 5.4). A representative from the test team verified the participant's signature.

To ensure that the test ran smoothly, two staff members participated in this test, the usability administrator and the data logger. The usability testing staff who conducted the test were experienced Information Technology and Health Information Specialists with over 25 years of experience, backgrounds in healthcare, health information technology and clinical EHR training, implementation and support.

The administrator moderated the session including administering instructions and tasks. The administrator also obtained post-task rating data, and took notes on participant comments. A second person served as the data logger and monitored task times, took notes on task success, path deviations, number and type of errors, and comments.

Participants were instructed to perform the tasks (see specific instructions below in section 3.8 Participant Instructions):

- As quickly as possible making as few errors and deviations as possible.
- Without assistance; administrators were allowed to give immaterial guidance and clarification on tasks, but not instructions on use.
- Without using a think aloud technique.

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

Following the session, the administrator gave the participant the post-test questionnaire (the System Usability Scale, see Appendix 5.6), compensated them for their time, 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.

Participants were thanked for their time. No compensation was required or provided.

3.5 TEST LOCATION

The test facility included a computer and iPad for the participant for access, and moderator's guide and paper for the administrator. Only the participant and administrator were included in the test. The data logger worked from a separate room where they could see the participant's screen remotely, and listen to the audio of the session. To ensure that the environment was comfortable for users, noise levels were kept to a minimum. All of the safety instructions and evacuation procedures were current and in place.

3.6 TEST ENVIRONMENT

The EHR would typically be used in a healthcare office or facility. In this instance, the testing was conducted in a conference room with remote access. For testing, the participants used their personal PC's and iPad that are used to access the production application.

The application was set according to internal documentation describing the system set-up and preparation. The application itself was running on the same version as tested for certification, and using a training database. Technically, the system performance 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.

3.7 TEST FORMS AND TOOLS

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

1. Moderator's Guide
2. Post-test Questionnaire
3. Non-Disclosure Agreement – Not Required
4. Informed Consent – Not Required

Examples of these documents can be found in Appendices 5.3-5.7 respectively. The Moderator's Guide was devised so as to be able to capture required data.

The participant's interaction with the EHRUT was observed and documented via a GoToMeeting session with each participant. Verbal comments were documented. The test sessions were observed by the data logger who documented the test session.

3.8 PARTICIPANT INSTRUCTIONS

The administrator reads the following instructions aloud to each participant (also see the full moderator's guide in Appendix 5.5):

Thank you for participating in this study. Your input is very important. Our session today will last about 60 minutes. During that time you will use an instance of an electronic health record. I will ask you to complete 30 tasks using this system and answer some

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

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

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

Following the procedural instructions, participants were shown the EHR and were given ten minutes to explore the system and make comments. Once this initial overview was complete, the administrator asked five preliminary questions and began the testing. Participants were then given 30 tasks to complete. Tasks are listed in the moderator’s guide in Appendix 5.5.

3.9 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 eDerm Systems ver. 2.7, by measuring participant success rates and errors
2. Efficiency of eDerm Systems ver. 2.7, by measuring the average task time and path deviations
3. Satisfaction with eDerm Systems ver. 2.7, by measuring ease of use ratings

3.10 DATA SCORING

The following table (Table 3.2) details how tasks were scored, errors evaluated, and the time data analyzed.

Data Scoring Metrics

Table 3.2

<i>MEASURES</i>	<i>Rationale and Scoring</i>
Effectiveness: Task Success	<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 2.5 that allows some time buffer because the participants are not trained to expert performance. Thus, if expert, optimal performance on a task was 20 seconds then allotted task time performance was $[20 * 2.5]$ 50 seconds. This ratio is aggregated across tasks and reported with mean and variance scores.</p>
Effectiveness: Task Failures	<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.” No task times were taken for errors.</p> <p>The total number of errors was calculated for each task and then divided by the total number of times that task was attempted. Not all deviations would be counted as errors. This is also expressed as the mean number of failed tasks per participant.</p> <p>On a qualitative level, an enumeration of errors and error types are collected.</p>
Effectiveness: Task Deviations	<p>The participant’s path (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. Task deviations are reported. Optimal paths (procedural steps) are recorded when constructing tasks.</p>
Efficiency: Task Time	<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.</p> <p>Average time per task was calculated for each task. Variance measures (standard deviation and standard error) were also calculated.</p>
Satisfaction: Task Rating	<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 5 (Very Easy) to 1 (Very Difficult). 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 the EHR overall, the testing team administered the System Usability Scale (SUS) post-test questionnaire. Questions included, “I think I would like to use this system frequently,” “I thought the system was easy to use,” and “I would imagine that most people would learn to use this system very quickly.” See full System Usability Score questionnaire in Appendix 5.6.</p>

4. Results

4.1 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.

Data collection and interpretation of the results were successful for all participants. Directions for each task are detailed in Appendix 5.5, Moderators Guide.

The usability testing results for the EHRUT are detailed below (see Table 4.1). 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.

Summary of Performance and Rating Data Collected on the EHRUT

Table 4.1

#	Task	Total	Success	Percentage
	Drug-Drug, Drug Allergy (a)(2)			
1	Drug-Drug Interaction	5	5	100%
2	Adjust Severity Level of Drug-Drug Interventions	5	5	100%
	CPOE (a)(18) - Medication			
3	Record a Medication Order	5	5	100%
4	Change Medication Order	5	5	100%
5	Access Medication Order	5	5	100%
	CPOE (a)(19) - Laboratory			
6	Record Lab Order	5	5	100%
7	Change Lab Order	5	5	100%
8	Access Lab Order	5	5	100%
	Medication Allergies			
9	Record Medication Allergies List	5	5	100%
10	Change Medication Allergies List	5	5	100%
11	Access Medication Allergies List	5	5	100%
	e-Rx (b)(3)			
12	Record Electronic Prescription Order	5	5	100%
	CDS (a)(8)			
13	Problem List Interventions	5	5	100%
14	Medication List Interventions	5	5	100%
15	Medication Allergy List Interventions	5	5	100%
16	Demographics Interventions	5	5	100%
17	Lab Test and Results Interventions	5	5	100%
18	Vital Signs Interventions	5	5	100%
19	Identify User Diagnostic & Therapeutic Reference Information	5	5	100%
20	Configuration of CDS Interventions By User	5	5	100%
	Clinical Reconciliation (b)(4)			
21	Reconcile Patients Active Problem List with Another Source	5	5	100%
22	Reconcile Patients Active Medication Allergy List with Another Source	5	5	100%
23	Reconcile Patients Active Medication List with Another Source	5	5	100%

Medication List (a)(6)

24	Record Medication List	5	5	100%
25	Change Medication List	5	5	100%
26	Access Medication List	5	5	100%

Summary of Performance and Rating Data Collected on the EHRUT

Table 4.2

Task	Task Success	Path Deviation	Task Time		Errors	Task Ratings 5=Easy
	Mean (SD)	Deviations (Observed /Optimal)	Mean (SD)	Deviations (Observed / Optimal)	Mean (SD)	Mean (SD)
1. Create Interventions Prior to CPOE Completion	1 / 0	0 / 5	20.25 / 9.50	0 / 30	0 / 0	5 / 0
2. Adjustment of Intervention Severity	1 / 0	0 / 5	26 / 5.50	0 / 50	0 / 0	5 / 0
3. Record Medication Order	1 / 0	0 / 5	32.65 / 4.08	0 / 70	0 / 0	5 / 0
4. Change Medication Order	1 / 0	0 / 5	20.45 / 12.13	0 / 85	0 / 0	5 / 0
5. Access Medication Order	1 / 0	0 / 5	15.13 / 6.48	0 / 30	0 / 0	5 / 0
6. Record Laboratory Order	1 / 0	0 / 5	34.32 / 15.21	0 / 60	0 / 0	5 / 0
7. Change Laboratory Order	1 / 0	0 / 5	35 / 4.28	0 / 75	0 / 0	5 / 0
8. Access Laboratory Order	1 / 0	0 / 5	8.33 / 1.50	0 / 20	0 / 0	5 / 0
9. Record Allergy List	1 / 0	0 / 5	54.31 / 8.39	0 / 160	0 / 0	4.33 / 0.58
10. Change Allergy List	1 / 0	0 / 5	59.21 / 20.98	0 / 108	0 / 0	5 / 0
11. Access Allergy List	1 / 0	0 / 0	4 / 1	0 / 20	0 / 0	5 / 0
12. Create Electronic Prescriptions	1 / 0	0 / 11	64.58 / 10.6	0 / 145	0 / 0	4.33 / 0.58
13. Problem List Interventions	1 / 0	0 / 6	40.33 / 21.96	0 / 60	0 / 0	4.33 / 0.58
14. Medication List Interventions	1 / 0	0 / 5	22.51 / 3.23	0 / 60	0 / 0	5 / 0
15. Medication Allergy List Interventions	1 / 0	0 / 5	4.12 / 2.11	0 / 10	0 / 0	5 / 0
16. Demographics Interventions	1 / 0	0 / 5	4 / 2.73	0 / 10	0 / 0	5 / 0
17. Lab Test and Results Interventions	1 / 0	0 / 5	7.61 / 1.12	0 / 10	0 / 0	5 / 0
18. Vital Signs Interventions	1 / 0	0 / 5	25 / 11.32	0 / 35	0 / 0	5 / 0
19. Identify User Diagnostic and Therapeutic Reference Information	1 / 0	0 / 5	10.34 / 1.18	0 / 25	0 / 0	5 / 0
20. Configuration of CDS Interventions by User (Admin Function)	1 / 0	0 / 5	10 / 1.65	0 / 25	0 / 0	5 / 0
21. Reconcile Patient's Active Medication List with Another Source	1 / 0	0 / 8	48.22 / 14.12	0 / 120	0 / 0	5 / 0
22. Reconcile Patient's Active Problem List with Another Source	1 / 0	0 / 8	20.38 / 4.20	0 / 120	0 / 0	5 / 0
23. Reconcile Patient's Active Medication Allergy List with Another Source	1 / 0	10 / 9	26 / 8.37	0 / 120	0 / 0	5 / 0

24. Record Medication List	1 / 0	0 / 11	66.66 / 6.41	0 / 148	0 / 0	5 / 0
25. Change Medication List	1 / 0	10 / 14	40 / 9.56	0 / 85	0.33 / 0.58	5 / 0
26. Access Medication List	1 / 0	6 / 3	16.45 / 16.28	35 / 20	0 / 0	5 / 0

The results from the SUS (System Usability Scale, found in Appendix 5.6) scored the subjective satisfaction with the system based on performance with these tasks to be: 75 (mean score).

The results from the SUS (System Usability Scale, found in Appendix 5.6) scored the subjective satisfaction with the system based on performance with these tasks to be: 75 (mean score).

4.2 Discussion of the Findings

All participants rated 23 of the 26 tasks as ‘Easy’. Below are details of all tasks which were not completed, or contained path deviations, or technical issues.

Tasks 1-26 were easily completed by all participants; one had a path deviation with the same completed result.

Tasks 9, 12 and 13 had a minor path deviation by one participant, the new feature of the Medication Allergy List, e-Prescribing entry and Problem List intervention of the program allowed the user to take an alternate path with the same result, just a slower time to complete.

Task 13 was challenging for all participants as this was complex and new. Participants all gave similar feedback that this should be easier to complete. Documentation was done and new training materials will be developed to assist actual users with a better understanding of the process and an easier navigation through the process.

4.3 Effectiveness

While a software program is functional, successfully performing more complex required tasks needs some improvement in future versions.

Overall of the 26 individual tasks tested, 26 tasks tested successfully, resulting in a 100% success rate across all participants. Path deviations, one across the 26 individual tasks, were minor, all of which ultimately display the same information to the user. The documented path deviation were minor, and no failure to perform the task.

4.4 Efficiency

Based upon observations of task times and deviations, of the 26 instances of successful tasks, 26 were completed within the estimated optimal task performance time. Times were benchmarked by expert performance under realistic conditions, and multiplied by a 2.5 second time buffer to allow for the fact the participants in this study are not expert users. Of the 26 successfully completed tasks, 10 tasks were completed in less than half of the estimated optimal performance time.

4.5 Satisfaction

Participants were asked to rate each task individually on a scale of 5= Very Easy to 1= Very Difficult. Collectively, 23 of 26 tasks were rated with a “5= Very Easy” by 4 of the 5 participants. One participant rated Task 9, 12 and 13 with a 4, still weighted towards the “Easy” to complete.

The System Usability Scale Questionnaire, as interpreted referencing Jeff Sauro; Measuring Usability, Quantitative Usability, Statistics & Six Sigma, indicates this application is relatively user friendly and intuitive in most areas tested. All participants expressed the application was easy to learn and easy to use, with the exception of reconciling records.

4.6 Major Findings

Participants were overall very pleased with the product. Participants agreed the importance of having current problems, vitals, allergies and medication lists prominent on the main EHR screen. Participants stated the application seemed to have a nice work flow with easy to understand icons, it seemed easy to learn and easy to use.

4.7 Areas for Improvement

While having access to other data like reconciling, all participants felt the process to getting the data and the speed in which the data was displayed could be improved in future versions. Since there are so many new processes providers and users alike will need more training on how the data should work, and where it comes from for each user operating the system. Overall the participants liked the data coming in our going out, it just needs to be simplified if possible.

5. Appendices

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We are recruiting individuals to participate in a usability study for an electronic health record. We would like to ask you a few questions to gather participation information. This should only take a few minutes of your time. This is strictly for research purposes. You will be paid to participate in Training and Testing.

Please answer the following questions:

1. Are you male or female? Male _____ Female _____
2. Have you participated in a focus group or usability test in the past 6 months? Yes _____ No _____
3. Do you, or does anyone in your home, work in marketing research, usability research, web design, or other computer work? Yes _____ No _____
4. Do you, or does anyone in your home, have a commercial or research interest in an electronic health record software or consulting company? Yes _____ No _____
5. Which of the following best describes your age?
 23 to 39 _____ 40 to 59 _____ 60 to 74 _____ 75 or older _____
6. Which of the following best describes your race or ethnic group?
 Caucasian _____ Asian _____ Black/African American _____ Latino/a or Hispanic _____ Other _____
7. Do you require any assistive technologies to use a computer? Yes _____ No _____
 If Yes, Please Describe: _____

Professional Demographics:

8. What is your current position and title? (Must be healthcare related)
 _____RN: Specialty _____
 _____Physician: Specialty _____
 _____Resident: Specialty _____
 _____Administrative Staff
 _____Other Medical: Specialty _____
9. How long have you held this position? _____
10. Describe your work location (or affiliation) and environment? [e.g., private practice, health system, government clinic, etc.] _____
11. Which of the following describes your highest level of education?
 High School/GED _____ Some College _____ College Graduate (RN/BSN) _____ Postgraduate (MD/PhD) _____
 Other: Please Describe: _____

Computer Expertise:

- 12. Besides reading email, what professional activities do you do on the computer?
 Access EHR_____Research_____ News_____ Shopping/Banking_____ Digital Pictures _____
 Programming_____ Microsoft Office Products _____
- 13. About how many hours per week do you spend on the computer?
 0 to 10_____11 to 25_____26 or More _____
- 14. What computer platform do you usually use? [e.g., Mac, Windows, etc.]

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

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

- 17. How many years have you used an electronic health record? _____
- 18. How many EHRs do you use or are you familiar with? _____
- 19. How does your work environment record/retrieve patient records?
 On Paper_____Some Paper/Some Electronic_____All Electronic _____

Contact Information:

Name _____ of _____ participant: _____
 _____ Address: _____
 _____ City: _____ State: _____ Zip: _____ Daytime _____ phone: _____
 _____ Evening Phone: _____ Cell phone: _____
 Email address: _____

This study will take place at your office via a remote GoToMeeting session.

5.2. Participant Demographics

Participant High Level Overview

Gender	
Male:	0
Female:	0
Total:	0
Occupation/Role	
RN/BSN:	0
Physician:	0
Admin Staff:	0
Years of Experience	
Years Experience:	0
Facility Use of EHR:	0
All Paper:	0
Some Paper/Some Electronic:	0
All Electronic:	0

Participant Demographics Collection Form

	Part ID	Gender	Age	Education	Occupation / Role	Professional Experience	Computer Experience	Product Experience	Assistive Technology Needs
1	001	M	23-39	Graduate	OM	9.5 YRS	EXPERT		NA
2	002	F	40-59	Graduate	MD	10+ YRS	EXPERT		NA
3	003	M	40-59	Graduate	MD	10+ YRS	EXPERT		NA
4	004	M	40-59	Graduate	MD	10+ YRS	MODERATE		NA
5	005	M	40-59	Graduate	MD/ I hD	10+ YRS	MODERATE		NA
6									
7									
8									
9									
10									

5.3. Non-Disclosure Agreement

Non-Disclosure Agreement *Note: Not Required for this Study*

THIS AGREEMENT is entered into as of _____, 2016, between _____ (“the Participant”) and the testing organization *eDerm Systems*.

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

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

Any information the Participant acquires relating to this product during this study is confidential and proprietary to *eDerm Systems* and is being disclosed solely for the purposes of the Participant’s participation in today’s usability study.

By signing this form the Participant acknowledges that she or he will receive monetary compensation for feedback and will not disclose this confidential information obtained today to anyone else or any other organizations.

Participant’s printed name: _____

Signature: _____ **Date:** _____

5.4. Informed Consent

Informed Consent *Note: Not Required for this Study*

EHR Name would like to thank you for participating in this study. The purpose of this study is to evaluate an electronic health records system. If you decide to participate, you will be asked to perform several tasks using the prototype and give your feedback. The study will last about 60 minutes. At the conclusion of the test, you will be compensated for your time.

Participant Agreement

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

I understand and consent to the use and release of the videotape by eDerm Systems. I understand that the information and videotape is for research purposes only and that my name and image will not be used for any purpose other than research. I relinquish any rights to the screen recording and understand the screen recording may be copied and used by eDerm Systems without further permission or compensation.

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

I understand and agree that the data collected from this study may be shared with outside affiliates and certification bodies of eDerm 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 at any time.

Please check one of the following:

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

NO, I choose not to participate in this study.

Signature: _____ **Date:** _____

5.5.Moderator's Guide and Orientation

Usability Test Moderator's Guide

Administrator: _____

Data Logger: _____

Date: _____ **Time of Testing:** _____

Participant #: _____ **Test Patient:** _____ **Login:** _____

Location: Via a GoToMeeting Session (remote access)

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 (if desired)

Prior to each task:

- Reset application to starting point for next task

After each participant:

- Thank them

Orientation (10 minutes)

Thank you for participating in this study. Your input is very important. Our session today will last about 60 minutes. During that time you will use an instance of an electronic health record. I will ask you to complete 30 tasks using this system and answer some questions. You should complete the tasks as quickly as possible making as few errors as possible. Please try to complete the tasks on your own following the instructions very closely. Please note that we are not testing you we are testing the system, therefore if you have difficulty all this means is that something needs to be improved in the system. I will be here in case you need specific help, but I am not able to instruct you or provide help in how to use the application.

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

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

The product you will be using today is eDerm Systems version 2.7; an electronic medical records system. Some of the data you will see in patient electronic charts may not make sense as it is placeholder (sample) data.

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

Do you have any questions or concerns?

Preliminary Questions (10 minutes)

What is your job title / appointment? _____

How long have you been working in this role? _____

What are some of your main responsibilities? _____

Tell me about your experience with electronic health records:

This is the application you will be working with. Have you heard of it? Yes ____ No _____

If so, tell me what you know about it: _____

Show test participant the EHR Usability Test.

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

Computerized Provider Order Entry (314.a.18)

5.1 **Task 1: Record Medication Order**

(70 Seconds)

Take the participant to the starting point for the task- patient: Usability, Test 1

After interviewing the patient, the provider would like you to ORDER the following medication:

Drug: Triamcinolone Topical
Indication: Eczema
Dose: 2 Oz Tube
Route: Topical
Frequency: Apply a thin film to effected area BID
Duration: 30 days
Order this medication now.

Success:

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

Comments: _____

Task Time: _____ Seconds

Optimal Path: Medication Screen—Add Medication Button—Search Triamcinolone—Select Medication—Select Indication—(Details Default into Screen)—Process Med Button—Close Order Screen

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

Comments: _____

Observed Errors and Verbalizations: _____

Rating:

Overall, this task was: _____

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

Administrator / Note-taker Comments: _____

Computerized Provider Order Entry (314.a.18)

5.2 **Task 2: Change Medication Order**

(85 Seconds)

Take the participant to the starting point for the task- patient: Usability, Test 1

The provider would like you to CHANGE the order for Triamcinolone: from 2 Oz tube to 6 Oz

tube:

Current Dose: Apply a thin film to effected area BID.

Change to: Apply a thin film to effected area TID

Make the change to this dose now.

Success:

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

Comments: _____

Task Time: _____ Seconds

Optimal Path: *Medication Screen—Double-click to Open Drug Order Edit Screen—Dosage Dropdown—Save Medication Button—Close Medications Screen*

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

Comments: _____

Observed Errors and Verbalizations: _____

Rating:

Overall, this task was: _____

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

Administrator / Note-taker Comments: _____

Computerized Provider Order Entry (314.a.18)

5.3 **Task 3: Access Medication Order**

(30 Seconds)

Take the participant to the starting point for the task- patient: Usability, Test 1

The provider would like you to ACCESS the order for Triamcinolone (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: *Chart Summary Tab—Medications/Immunizations Tab—Select Medication—View Details*

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

Comments: _____

Observed Errors and Verbalizations: _____

Rating:

Overall, this task was: _____

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

Administrator / Note-taker Comments: _____

5.4 **Task 4: Record Laboratory Order**

(105 Seconds)

Take the participant to the starting point for the task- patient: Usability, Test 1

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

Order: HCT (Hematocrit)

Indication: Dehydration

for the current date and time. Order this laboratory order now.

Success:

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

Comments: _____

Task Time: _____ Seconds

Optimal Path: Order Entry Screen Button—Enter New Orders Tab—Search ‘Hema’—Select Order—Select Indication—Process Orders Button—Close Order Screen

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

Comments: _____

Observed Errors and Verbalizations: _____

Rating:

Overall, this task was: _____

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

Administrator / Note-taker Comments: _____

Computerized Provider Order Entry (314.a.19)

5.5 **Task 5: Change Laboratory Order**

(125 Seconds)

Take the participant to the starting point for the task- patient: Usability, Test 1

The provider would like you to CHANGE the following Laboratory order:

Current Order: Hematocrit
Indication: Dehydration

Change to: Hematocrit and Hemoglobin
Indication: Dehydration

Make the change to this order now.

Success:

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

Comments: _____

Task Time: _____ Seconds

Optimal Path: Order Entry Screen Button—Current Orders Tab—Double Click Open Order—Discontinue Button—Reason Dropdown—Discontinue Order Button—Enter New Orders Tab—Search ‘Hema’—Select Order—Select Indication—Process Orders Button—Close Order Screen

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

Comments: _____

Observed Errors and Verbalizations: _____

Rating:

Overall, this task was: _____

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

Administrator / Note-taker Comments: _____

Computerized Provider Order Entry (314.a.19)

5.6 **Task 6: Access Laboratory Order**

(30 Seconds)

Take the participant to the starting point for the task- patient: Usability, Test 1

The provider would like you to ACCESS the laboratory order for Hematocrit and Hemoglobin (View Details):

Locate this laboratory order and review the details.

Success:

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

Comments: _____

Task Time: _____ Seconds

Optimal Path: *Chart Summary Tab—Orders Tab—Double Click Order—View Details*

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

Comments: _____

Observed Errors and Verbalizations: _____

Rating:

Overall, this task was: _____

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

Administrator / Note-taker Comments: _____

Drug-Drug, Drug-Allergy Interactions (314.a.2)

5.7 **Task 7: Create Interventions Prior to CPOE Completion** (30 Seconds)

Take the participant to the starting point for the task- patient: Interactions, Drug

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

Drug: Warfarin 3mg

Indication: Pulmonary embolism, chronic

for the current date and time. Order this medication now.

Success:

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

Comments: _____

Task Time: _____ Seconds

Optimal Path: Medication Screen—Add Medication Button—Search “War”—Select Indication—Select Medication—Warning Screen—Close Order Screen

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

Comments: _____

Observed Errors and Verbalizations: _____

Rating:

Overall, this task was: _____

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

Administrator / Note-taker Comments: _____

Drug-Drug, Drug-Allergy Interactions (314.a.2)

5.8 **Task 8: Adjust Severity Level of Drug-Drug Interventions** (50 Seconds)

Test Administrator change Warning Levels- Take the participant to the starting point for the task- patient: Interactions, Drug

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

Drug: Warfarin 3mg

Indication: Pulmonary embolism, chronic for the current date and time. Order this medication now.

Success:

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

Comments: _____

Task Time: _____ Seconds

Optimal Path: Medication Screen—Add Medication Button—Search ‘War’—Select Indication—Select Medication—Warning Screen—Close Order Screen

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

Comments: _____

Observed Errors and Verbalizations: _____

Medication List (314.a.6)

5.9 **Task 9: Record Medication List**

(148 Seconds)

Take the participant to the starting point for the task- patient: Interactions, Drug

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 medication list:

Reason for Reconciliation: Inpatient Admission

Drug: Flonase	Drug: Lasix
Dose: 1 Spray	Dose: 40 mg
Frequency: Once a day	Frequency: Once a day

Success:

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

Comments: _____

Task Time: _____ Seconds

Optimal Path: *Medication Screen—Reconcile Medications Button—Add OP Medication Button—Search Medication—Select Medication—Dose Dropdown—Frequency Dropdown—Exit Button—Reason for Reconciliation Button—Save Button—Close Medication Screen*

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

Comments: _____

Observed Errors and Verbalizations: _____

Medication List (314.a.6)

5.10 **Task 10: Change Medication List**

(85 Seconds)

Take the participant to the starting point for the task- patient: *Interactions, Drug*

The provider would like you to change the dose of a medication on the patient’s medication list, and add an additional medication. Make the following changes to the patient’s medication list:

Drug: Lasix	Add Drug: Cipro 500 mg oral tablet
Change Dose to: 20 mg	Dose: 500 mg
Frequency: Once a day	Frequency: Once a day

Success:

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

Comments: _____

Task Time: _____ Seconds

Optimal Path: *Medication Screen—Reconcile Medications Button—Select Dose Field—Make Change--Add OP Medication Button—Search Medication—Select Medication—Dose Dropdown—Frequency Dropdown—Exit Button—Reason for Reconciliation Button—Save Button—Close Medication Screen*

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

Comments: _____

Observed Errors and Verbalizations: _____

Medication List (314.a.6)

5.11 **Task 11: Access Medication List**

(20 Seconds)

Take the participant to the starting point for the task- patient: Interactions, Drug

The provider would like you to ACCESS the patient’s 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: _____

Task Time: _____ Seconds

Optimal Path: *Medication Screen—Reconcile Medications Button—Close Medication Screen*

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

Comments: _____

Observed Errors and Verbalizations: _____

Rating:

Overall, this task was: _____

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

Administrator / Note-taker Comments: _____

Medication List (314.a.6)
Allergy List (314.a.7)

5.12 **Task 12: Record Medication Allergy List**

(160 Seconds)

Take the participant to the starting point for the task- patient: Interactions, Drug

The provider would like you to record/create a LIST of medication ALLERGIES the patient has. Enter the following allergies to the patient’s medication allergy list:

Allergy:	Penicillin	Allergy:	Sulfa Drugs (Category)
Reaction:	Hives	Reaction:	Skin Rash
Severity:	Severe	Severity:	Moderate

Success:

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

Comments: _____

Task Time: _____ Seconds

Optimal Path: Review Allergies Button—Add Med/Drug Class Allergy Button—Search “allergy name”—Select Allergy—Select Reaction—Select Severity Dropdown—Add Allergy and Search Button (X3)—Add Allergy and Close Button Button—Close Allergy Screen

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

Comments: _____

Observed Errors and Verbalizations: _____

Rating:

Overall, this task was: _____

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

Administrator / Note-taker Comments: _____

Medication Allergy List (314.a.7)

5.13 **Task 13: Change Medication Allergy List**

(108 Seconds)

Take the participant to the starting point for the task- patient: Interactions, Drug

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:	Sulfa Drugs (Category)	ADD Allergy:	Morphine
Change Reaction To:	Hives/Welts	Reaction:	Anaphylaxis
Severity:	Moderate	Severity:	Severe

Success:

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

Comments: _____

Task Time: _____ Seconds

Optimal Path: Review Allergies Button—Select Allergy—(Right-Click) Edit—Select Reaction—Select Severity—Modify Button—Add Med/Drug Class Allergy Button—Search “allergy name”—Select Allergy—Select Reaction—Select Severity Dropdown—Add Allergy and Close Button Button—Close Allergy Screen

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

Comments: _____

Observed Errors and Verbalizations: _____

Rating:

Overall, this task was: _____

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

Administrator / Note-taker Comments: _____

Medication Allergy List (314.a.7)

5.14 **Task 14: Access Medication Allergy List**

(20 Seconds)

Take the participant to the starting point for the task- patient: Interactions, Drug

The provider would like you to ACCESS the patient’s medication allergy list (View Details):

Access the patient’s medication allergy list now.

Success:

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

Comments: _____

Task Time: _____ Seconds

Optimal Path: *Review Allergies Button—Close Allergy Screen*

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

Comments: _____

Observed Errors and Verbalizations: _____

Rating:

Overall, this task was: _____

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

Administrator / Note-taker Comments: _____

Electronic Prescribing (314.b.3)

5.15 **Task 15: Record Electronic Prescription Order**

(145 Seconds)

Take the participant to the starting point for the task- patient: Order, Prescription

After interviewing the patient, the provider would like you to ORDER an ELECTRONIC PRESCRIPTION for the patient. Order the following medication:

Indication: Atrial Fibrillation
Drug: Digoxin 125 mcg (0.125mg) Oral Tablet
Dose: 0.125 mg
Route: Orally
Frequency: once a day
Dispense: 30 tabs
Refills: 4

Order this medication now.

Success:

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

Comments: _____

Task Time: _____ Seconds

Optimal Path: Medication Screen—Add Medication Button—Search Digoxin—Select Medication—Select Indication—(Details Default into Screen)—Process Rx Button—Enter PIN—Select Medication—Transmit E- Prescription Button—Exit Button—Close Medication Order Screen

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

Comments: _____

Observed Errors and Verbalizations: _____

Rating:

Overall, this task was: _____

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

Administrator / Note-taker Comments: _____

5.16 **Task 16: Problem List Interventions**

(60 Seconds)

Take the participant to the starting point for the task

After interviewing the patient, the provider would like you to ADD a problem to the patient’s Clinical Problem List. (Purpose: to trigger a Problem List Intervention Alert). Add the following problem to the patient’s chart:

Patient: America, Captain
Indication: Heart Attack (ICD-10 Code I21.3) Add this problem now.

Success:

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

Comments: _____

Task Time: _____ Seconds

Optimal Path: *Add/Edit Problem List Button—Find Snomed Button—Search ‘Heart Attack’—Select Problem—(Details Default into Screen)—Add to Active List Button—Close Problem List Screen*

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

Comments: _____

Observed Errors and Verbalizations: _____

Rating:

Overall, this task was: _____

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

Administrator / Note-taker Comments: _____

Clinical Decision Support (314.a.8)

5.17 **Task 17: Medication List Interventions**

(60 Seconds)

Take the participant to the starting point for the task

The provider has prescribed Warfarin for the patient. (Purpose: to trigger a Medication List Intervention Alert).
In Medication Order Entry, order the following medication:

Patient: Gordon, Flash

Medication: Warfarin 5mg Oral Tab

Order this medication now.

Success:

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

Comments: _____

Task Time: _____ Seconds

Optimal Path: Medication Screen—Add Medication Button—Search ‘Warf’—Select Medication—Select Indication—(Details Default into Screen)—Select Source to ‘Formulary’—Process Med Button—Close Order Screen

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

Comments: _____

Observed Errors and Verbalizations: _____

Rating:

Overall, this task was: _____

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

Administrator / Note-taker Comments: _____

5.18 **Task 18: Medication Allergy List Interventions**

(10 Seconds)

Take the participant to the starting point for the task

The provider is getting ready to see a patient. Open the patient chart to begin triage charting. (Purpose: to trigger a Medication Allergy List Intervention Alert).

Patient: Kent, Clark S.
Open the patient's chart now.

Success:

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

Comments: _____

Task Time: _____ Seconds

Optimal Path: *Open Patient Chart—Close Alert*

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

Comments: _____

Observed Errors and Verbalizations: _____

Rating:

Overall, this task was: _____

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

Administrator / Note-taker Comments: _____

5.19 **Task 19: Demographics Interventions**

(10 Seconds)

Take the participant to the starting point for the task

The provider is getting ready to see a patient. Open the patient’s chart to begin filling out information on the chart. (Purpose: to trigger a Demographics Intervention Alert).

Open Patient: Boop, Betty
Open the patient’s chart now.

Success:

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

Comments: _____

Task Time: _____ Seconds

Optimal Path: *Open Patient Chart—Close Alert*

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

Comments: _____

Observed Errors and Verbalizations: _____

Rating:

Overall, this task was: _____

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

Administrator / Note-taker Comments: _____

5.20 **Task 20: Lab Tests and Results Interventions**

(10 Seconds)

Take the participant to the starting point for the task

The provider is finished seeing a patient and now they can be discharged. During the visit a lab result returned abnormally high. Open the patient’s chart to begin the discharge process. (Purpose: to trigger a Lab Result Intervention Alert).

Open Patient: Arrow, Green

Open the patient’s chart and Begin the discharge process.

Success:

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

Comments: _____

Task Time: _____ Seconds

Optimal Path: *Open Patient Chart—Discharge Screen—Close Alert*

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

Comments: _____

Observed Errors and Verbalizations: _____

Rating:

Overall, this task was: _____

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

Administrator / Note-taker Comments: _____

5.21 **Task 21: Vital Signs Interventions**

(35 Seconds)

Take the participant to the starting point for the task

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

Patient: Lane, Lois
Systolic: 145
Diastolic: 55
Record this vital entry now.

Success:

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

Comments: _____

Task Time: _____ Seconds

Optimal Path: *Vital Signs Button—Enter Systolic BP—Enter Diastolic BP—Record Vital Signs Button—Close Alert—Close Vital Signs Screen*

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

Comments: _____

Observed Errors and Verbalizations: _____

Rating:

Overall, this task was: _____

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

Administrator / Note-taker Comments: _____

Clinical Decision Support (314.a.8)

5.22 **Task 22: Identify User Diagnostic and Therapeutic Reference Information**

(25 Seconds)

Take the participant to the starting point for the task

As a *Provider* performing rounds, you notice an order to review medications for a patient, which came from an alert. You would like to view the references for this Vital Sign alert. (Purpose: to open and view an Intervention Alert’s references as a provider). On the following patient, open and review the diagnostic and therapeutic reference information for the vitals intervention alert.

Open Patient: Lane, Lois

Open this patient’s chart, Open the Alert, and review the reference information now.

Success:

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

Comments: _____

Task Time: _____ Seconds

Optimal Path: *Open Patient Chart—Open Alerts—Double-Click the Alert—Show References Button—Cancel Button*

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

Comments: _____

Observed Errors and Verbalizations: _____

Rating:

Overall, this task was: _____

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

Administrator / Note-taker Comments: _____

5.23 **Task 23: Configuration of CDS Interventions by User (Admin Function)**

(25 Seconds)

Test Administrator change references configuration from provider to 'all' (for Vitals Intervention)

Take the participant to the starting point for the task

As a *Nurse* performing rounds, you notice an order to review medications for a patient, which came from an alert. You would like to view the references for this Vital Sign alert. (Purpose: to open and view an Intervention Alert's references, as a nurse). On the following patient, open and review the diagnostic and therapeutic reference information for the vitals intervention alert.

Open Patient: Lane, Lois

Open this patient's chart, Open the Alert, and review the reference information now.

Success:

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

Comments: _____

Task Time: _____ Seconds

Optimal Path: *Open Patient Chart—Open Alerts—Double-Click the Alert—Show References Button—Cancel Button*

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

Comments: _____

Observed Errors and Verbalizations: _____

Rating:

Overall, this task was: _____

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

Administrator / Note-taker Comments: _____

Clinical Decision Support (314.b.4)

5.24 **Task 24: Reconcile Patient’s Active Medication List with Another Source**

Take the participant to the starting point for the task

(120 Seconds)

On the following patient, open the clinical reconciliation screen and Reconcile the Medication list with an outside source.

Open Patient: Xavier, Professor

Update: existing Lasix Information from outside document

Add: Allopurinol to current list from outside document

Add: Debrox to current list from outside document

Remove: NitroStat 0.4mg from the current list

Apply the Reconciliation

Reconcile the patient’s medications with an outside source now.

Success:

Easily completed

Completed with difficulty or help; Describe in Comments:

Not completed

Comments: _____

Task Time: _____ Seconds

Optimal Path: *Open Patient Chart—Clinical Reconciliation Button—Select Medications—Select CCD Document—Select Desired Meds—Deselect Undesired Meds—Apply Reconciliation Button—Close Screen*

Correct

Minor Deviations / Cycles :: Describe below

Major Deviations :: Describe below

Comments: _____

Observed Errors and Verbalizations: _____

Rating:

Overall, this task was: _____

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

Administrator / Note-taker Comments: _____

Clinical Decision Support (314.b.4)

5.25 **Task 25: Reconcile Patient’s Active Problem List with Another Source**
(120 Seconds)

Take the participant to the starting point for the task

On the following patient, open the clinical reconciliation screen and Reconcile the Problem list with an outside source.

Open Patient: Xavier, Professor

Add: Benign Hypertension to current list from outside document

Remove: Contaminated Simple Laceration (Open Wound) of Chin from the current list.

Apply the Reconciliation

Reconcile the patient’s problem list with an outside source now.

Success:

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

Comments: _____

Task Time: _____ Seconds

Optimal Path: *Open Patient Chart—Clinical Reconciliation Button—Select Problems—Select CCD Document—Select Desired Problems—Deselect Undesired Problems—Apply Reconciliation Button—Close Screen*

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

Comments: _____

Observed Errors and Verbalizations: _____

Rating:

Overall, this task was: _____

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

Administrator / Note-taker Comments: _____

Clinical Decision Support (314.b.4)

5.26 **Task 26: Reconcile Patient’s Active Medication Allergy List with Another Source**
(120 Seconds)

Take the participant to the starting point for the task

On the following patient, open the clinical reconciliation screen and Reconcile the Allergy list with an outside source.

Open Patient: Xavier, Professor
Add: Acarbose to current list from outside document
Add: Budesonide to current list from outside document
Remove: Sulfa Drugs from the current list.
Apply the Reconciliation

Reconcile the patient’s allergies with an outside source now.

Success:

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

Comments: _____

Task Time: _____ Seconds

Optimal Path: *Open Patient Chart—Clinical Reconciliation Button—Select Allergies—Select CCD Document—Select Desired Allergies—Deselect Undesired Allergies—Apply Reconciliation Button—Close Screen*

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

Comments: _____

Observed Errors and Verbalizations: _____

Rating:

Overall, this task was: _____

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

Administrator / Note-taker Comments: _____

6. System Usability Scale Questionnaire and Final Questions

Final Questions (20 Minutes)

What was your overall impression of this system? _____

What aspects of the system did you like most? _____

What aspects of the system did you like least? _____

Were there any features that you were surprised to see? _____

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

Compare this system to other systems you have used. _____

Would you recommend this system to your colleagues? _____

SYSTEM USABILITY SCALE QUESTIONNAIRE

Rate 1-5: Strongly Agree to Strongly Disagree

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

7. Incentive Receipt and Acknowledgement

Acknowledgement of Receipt *Note: Not Required for this Study*

I hereby acknowledge receipt of a _____ for my participation in a research study run By eDerm Systems.

Printed Name: _____

Address: _____

Participant Signature: _____

Date: _____

Usability Researcher: _____

Signature of Usability Researcher: _____

Date: _____

Witness: _____

Witness Signature: _____

Date: _____