GeeseMed EHR 7.0.0.

2015 Edition Health IT Certification Usability Test Report

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

Product:	GeeseMed EHR Version 7.0.0
Dates of Previous Usability Test:	December 16 AND 19 2017
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Executive Summary

A usability test of GeeseMed EHR 7.0.0, an Ambulatory EHR, was conducted on Dec.16 and 19 2017, remotely. The purpose of this test was to test and validate the usability of the current user interface
The purpose of these studies was to test and validate the usability of the current user interfaces and expected functionality of the EHR in order to elicit insights that would be utilized in the design, development, and maintenance of the EHR system , and provide evidence of usability in the EHR under Test (EHRUT).
During the usability test, 10 health care providers matching the target demographic criteria served as participants and used the EHRUT in simulated, but representative tasks.

This study collected performance data on 6 tasks typically conducted on an EHR:

- Add and edit demographic data
- Add and edit Problem List
- Interact with CDS recommendations
- Add, edit and remove implantable device data
- Work with ePrescribe: Add, update, order, cancel, approve medications, Discontinue medications, understand Drug interaction alerts, review drug formulary and history
- Reconcile specific clinical information (medications, problems, allergies) based on the information provided.

During the 30 minute, one on one usability tests, each participant was greeted by the test administrator, briefed on the testing protocols, and instructed that they could withdraw at any time. The test administrator introduced the test and instructed participants to complete the expected tasks. During the testing, the test administrator timed the tasks and recorded user performance data electronically. The administrator did not assist participants during the test. Most of the participants had prior experience with the software. The administrator introduced the test, and instructed participants to complete a series of tasks (given one at a time) using the EHRUT.

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

Following the test, all participants completed the System Usability Scale (SUS) Questionnaire. All participant data was de-identified.

Table 1: Usability Test Result Summary provides a summary of the findings from the study.

Table 1: Usability Test Result Summary

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Criterion	Task Success	Path deviations (observed/ optimal)	Task time (seconds)	Errors	Task ratings 1-5 1 = very easy	Task efficiency 1-5 1 = very efficient
315.a.1 CPOE: Record, Change and access Medication Order	Mean: 1	0/0	Mean: 114	Mean: 0	Mean: 1.1	Mean: 1.2
	SD: 0		SD: 21	SD: 0	SD: 0.3	SD: 0.4
315.a.2 CPOE: Record, Change and access Laboratory Order	Mean: 0.9	2/3	Mean: 142	Mean: 0.5	Mean: 1.4	Mean: 1.3
	SD: 0.3		SD: 24	SD: 0.7	SD: 0.7	SD: 0.5
315.a.3 CPOE: Record, change and access radiology orders	Mean: 1	5/5	Mean: 110	Mean: 0.2	Mean: 1.2	Mean: 1.2
	SD: 0		SD: 13	SD: 0.4	SD: 0.5	SD: 0.4
315.a.4 Drug-drug, drug-allergy interactions checks	Mean: 1	0/0	Mean: 81.8	Mean: 0	Mean: 1.1	Mean: 1.1
	SD: 0		SD: 14	SD: 0	SD: 0.3	SD: 0.3
315.a.4 Drug-drug, drug-allergy interactions- Adjust severity Level	Mean: 0.8	0/1	Mean: 120	Mean: 0.25	Mean: 1.3	Mean: 1.3
	SD: 0.4		SD: 8	SD: 0.4	SD: 0.5	SD: 0.7
315.a.5:Demographic: Enter / Change Sexual Orientation AND Gender Identity	Mean: 1	0/0	Mean: 118	Mean: 0	Mean: 1.2	Mean: 1.7
	SD: 0		SD: 14	SD: 0	SD: 0.4	SD: 0.82
315.a.6:Problem List: Enter / Change Problem	Mean: 0.9	2/3	Mean: 61	Mean: 0.4	Mean: 1.4	Mean: 1.6
	SD: 0		SD: 8.7	SD: 0.5	SD: 0.7	SD: 0.8
315.a.7 Medication List: Record, Access, and view medication list	Mean:1	3/5	Mean: 111	Mean: 0.4	Mean: 1.2	Mean: 1.2
	SD: 0		SD: 13	Mean: 0.6	SD: 0.4	SD: 0.4
315.a.8 Medication Allergy List: Record, Access, and view	Mean: 0.9	3/2	Mean: 97	Mean: 0.2	Mean: 1.2	Mean: 1.5
	SD: 0.3		SD: 10	SD: 0.4	SD: 0.4	SD: 0.7
315.a.9: Clinical Decision Support – Interventions	Mean: 1	2/3	Mean: 116	Mean: 0	Mean: 2	Mean: 2.1
	SD: 0		SD: 29	SD: 0	SD: 1.1	SD: 1.2
315.a.9: Clinical Decision Support – Configuration	Mean: 0.7	5/7	Mean: 99	Mean: 0.28	Mean: 1.4	Mean: 1.5
	SD: 0.4		SD: 11	SD: 0.4	SD: 0.7	SD: 1.1
315.a.14 : Implantable Device List	Mean: 0.8	4/5	Mean: 121	Mean: 0.5	Mean: 0.7	Mean: 1.4
	SD: 0.4		SD: 10	SD: 0.4	SD: 0.7	SD: 0.5
315.b.2:Clinical Information Reconciliation	Mean:0.8	3/5	Mean:175	Mean: 0.3	Mean:1.75	Mean:1.75
	SD:0.4		SD:15	SD: 0.5	SD:1	SD:0.7
315.b.3: Electronic Prescribing	Mean: 1	0/2	Mean: 74	Mean: 0	Mean: 1.2	Mean: 1.5
	SD: 0		SD: 15	SD: 0	SD: 0.4	SD: 0.7

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Introduction

GeeseMed EHR allows clinicians in ambulatory outpatient practices to record and manage patient charts, as well as the ability to order medications, laboratory tests, and radiology tests. It also lets them perform a variety of other clinical and practice-management functions such as maintaining medication lists, recording immunizations, maintaining lists of drug allergies, and scheduling patient appointments.

The purpose of this study was to meet the Safety-Enhanced design requirements for 2014 ONC EHR certification and to collect data for our ongoing usability program. Overall, we measured effectiveness, efficiency, and user satisfaction.

Participants

A total of 10 participants were tested on the EHR. Participants in the test were individuals that work within an ambulatory healthcare environment. Participants were contacted by GeeseMed Software staff to participate in the study. In addition, participants had no direct connection to the development of the EHR. Participants were not from (employed, related or associated in any way) GeeseMed Software. All participants had less than five minutes of instruction prior to the test; and were given basic instructions to follow. Those instructions are available to any user to access in our system documentation.

The following is a table of participants by characteristics, including demographics, user role, and product experience. Participant names were replaced with Participant IDs so that an individual's data cannot be tied back to individual identities.

Part ID	Gender	Age	Education	Role/Title	Professional Experience (yrs.)	EHR Experience (yrs.)	Experience with GeeseMed (yrs.)	Assistive Tech Needs
N001	Female	40 to 49	Doctorate degree	Physician	14	11	3	None
N002	Male	20 to 29	Associate degree	Clinical Administrator	7	5	2	None
N003	Female	40 to 49	Doctorate degree	Family Practice	17	5	1	None
N004	Male	30 to 39	Doctorate degree	Physician	8	6	3	None
N005	Female	40 to 49	Doctorate degree	Doctor	15	11	5	None
N006	Male	30 to 39	Doctorate degree	MD	12	10	6	None
N007	Female	30 to 39	Master's degree	Practice Administrator	7	7	6	None
N008	Male	20 to 29	Bachelor's degree	Office Manager	4	5	3	None
N009	Male	60 to 69	Doctorate degree	Physician	35	10	3	None
N010	Female	40 to 49	High school graduate	NP	17	8	6	None

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.

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Usability Metrics

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
- Task ratings: Ease and efficiency
- Time to complete the tasks
- Number and types of errors
- Path deviations
- Ease of use rating
- Efficiency rating
- Participant's verbalizations (comments)
- Participant's satisfaction ratings of the system

Task

We constructed the following representative tasks to exercise the EHR functionality for each feature specified by the ONC. The individual tasks that each participant completed during the usability test are listed below with each larger EHR feature. For each of the specific usability tests that occurred, the test administrator provided sample test data for each participant to use when completing the tasks as listed, for example, specific medications to enter into the patient chart. For the purposes of this report, that test data has been omitted.

As part of the task construction, tasks were prioritized in accordance with the risk associated with use errors. A risk scale of 1-5 (1 = least risk and 5 = most risk) was used to account for the patient's safety of performing each of these tasks. The risk rating for each task is list at the end in parenthesis.

1. **170.315(a)(1) Computerized provider order entry – medication orders**
    a. Enter a medication order for a patient from the medication (Rx) list (1)
    b. change a medication order (2)
    c. Access changed medication order (3)
2. **170.315(a)(2) Computerized provider order entry – laboratory orders**
    a. Enter a laboratory order for a patient (1)
    b. Change a laboratory order (2)
    c. Access changed laboratory order (3)
3. **170.315(a)(3) Computerized provider order entry – radiology orders**
    a. Enter an imaging order for a patient (1)
    b. Change an imaging order (3)
    c. Access changed imaging order (3)
4. **170.315(a)(4) Drug-drug, drug-allergy interaction checks**
    a. Trigger drug-to-drug interaction by entering a new medication order (1)
    b. Trigger drug-to-allergy interaction by entering a new medication order (1)
    c. Update the alert settings so that, for all users, only severe alerts are displayed for both drug-drug alerts and drug-allergy alerts. – adjust severity level (4)
5. **170.315(a)(5) Demographic**
    a. Add multiple race(s) and ethnicity(ies) (2)
    b. Add single race and ethnicity (1)
    c. Add Gender Identity & Sexual Orientation (2)
    d. Change Gender Identity & Sexual Orientation (3)

6. **170.315(a)(6) Problem List**
    a. Add Problem (1)
    b. Edit Problem (1)
    c. Access Active Problem List (3)
    d. Access Historical Problem List (3)
7. **170.315(a)(7) Medication list**
    a. Add a medication to the patient's Rx List (2)
    b. Change a medication recorded on patient's Rx list (1)
    c. View active medication list (3)
    d. View historical medication list (3)
8. **170.315(a)(8) Medication allergy list**
    a. Add a medication allergy to the patient's allergy list (2)
    b. Access and change a medication allergy (2)
9. **170.315(a)(14) Implantable Device List**
    a. Searching for Implantable Device (3)
    b. Adding Implantable Device (2)
    c. Viewing recorded Implantable Device (2)
    d. Editing Implantable Device (3)
10. **170.315(a)(9) Clinical decision support – intervention and configuration**
    a. Access clinical decision support interventions in the patient chart (2)
    b. Identify diagnostic and therapeutic reference information (2)
    c. Configure clinical decision support interventions(4)
11. **170.315(b)(3) Electronic prescribing**
    a. Create new prescription (2)
    b. Change a prescription (3)
    c. Cancel prescription (1)
    d. Refill prescription (2)
    e. Request and view patient medication history (3)
12. **170.315(b)(2) Clinical information reconciliation**
    a. Incorporate a C-CDA document and perform reconciliation of the medications, Problems and medication allergies of CCDA with the information recorded for the patient (4)

Procedure

To prepare for each session, the test administrator oriented the test observers who would assist with data logging as needed. In addition, the testing lab was set up to ensure that all data would be captured and the remote access to the test participant was successful, secure, and stable. This included connecting the computer to the shared display so that the administrator could view the action, connecting the shared video and audio that would allow access to viewing and hearing the information from the test participant, and ensuring that the test participant had the correct access information prior to the session. Once the session time began and the test participant joined the session remotely, the test administer verified the identity of the participant prior to beginning the tasks.

The test administrator moderated the session, including providing instructions to the test participants and reading through the task list prior to beginning the session. The administrator also monitored tasks times, obtained post-task rating data, and took notes that would assist with evaluating the session at the conclusion of the test. Following the session, the administrator gave each participant the post-test System Usability Scale Questionnaire (Appendix 3) and thanked each individual for their participation.

Test Location

The usability tests conducted as a part of this study were conducted remotely from a lab at GeeseMed office in Clarksville, Indian using a controlled testing environment with representative but fictitious patient records. The remote tests were conducted using stable and reliable screen share technology and independent and reliable teleconferencing systems. Since GeeseMed is a completely web-based EHR system, the EHR users who comprised our test participant group were comfortable with accessing the system using their computers and as a result, the remote testing provided an opportunity to observe the tests is a realistic scenario. Additional information on the test environment can be found below.

Test Environment

To ensure a realistic environment, participants were asked to interact with the system using their own computers and the networks they normally use to access the EHR system. Participants were given access to the remote screen share session and teleconference dial-in information. The test administrator and other assistants were able to view the test participant's computer screen and hear the participant's comments via these mechanisms to ensure that data was captured in real time during the course of the test.

Test Forms and Tools

During the usability test, various documents and instruments were used, including a Moderator's Guide (Appendix 2) and a post-test questionnaire (Appendix 3). The Moderator's Guide was devised so as to be able to capture required data and to follow along with the tasks that each participant was asked to complete during the test. Following each task we asked participants to the ease of use and efficiency, and to explain their rationale, as described in the Moderator's Guide. At the conclusion of the session, participants were also asked to complete a post-test questionnaire, which was based on the standard System Usability Scale.

Participant Instructions

In order to accurately capture the participant's background, we asked the participant to provide the following demographic and experiential information required for the study prior to scheduling the testing session: specialty, role in their medical practices, years in healthcare, time using the GeeseMed EHR, and any assistive technical needs they may have, if applicable.

At the beginning of each testing session, the test administrator asked each participant about their expectations during the test, managing them as needed. We also used this time to explain the goals for the session, emphasizing the participant's role, urging them to comment without concern for our feelings. The test administrator also reviewed the agenda for the session with the participant prior to beginning the tasks.

In describing the task scenarios, the test administrator explained that the participant was going to be asked to complete a series of tasks:

As quickly and efficiently as possible,
Without help from the administrator, and
Without discussion, but that the participant could comment as they felt necessary.

The participant was then asked to sign into the EHR testing system and complete each task, while the test administrator recorded their time to completion, errors, and deviations from the optimal path. Any comments that the participant shared during the tasks were also recorded.

After each task the participant was asked to rate the ease of use for the task and the task efficient on a Like scale from 1 to 5 where 1 represented "very easy" and "very efficient" respectively, and 5 represented "very difficult" and "very inefficient," respectively. At the conclusion of the complete usability test, the participants were also asked to complete the SUS questionnaire (reflecting on all tasks).

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Usability Metrics

The information below provides information on how each of the tasks were scored, how the errors evaluated, and how the time-on-task data was analyzed.

Measure	*Scoring*
Effectiveness: Task Success	We recorded a task as a success if the participant was able to achieve the correct outcome without assistance. To calculate the total number of successes we divided number of tasks attempted by the number of participants. The results are reported as a percentage. We recorded task times for successes only.
Effectiveness: Task Failures	If the participant abandoned the task, did not reach the correct result, performed it incorrectly, or gave up, we recorded the task as a failure. We did not record task times for failures in this report.
Efficiency: Task Deviations	We recorded the participant's path (i.e., steps) through the application. Deviations included, for example, navigating to the wrong screen, choosing an incorrect menu item, or interacting incorrectly with an on-screen control. We compared this path to the optimal path.
Efficiency: Task Time	We timed each task from the moment the administrator said "Begin" until the participant said, "Done." If the participant failed to say "Done," we stopped the time when the participant stopped performing the task. Only times for tasks that were successfully completed were included in the average task time analysis. Average time per task was calculated for each task.
Satisfaction: Task Rating	After each task, we asked the participant to rate the task ease of use on a scale of 1 to 5, where 1 was Very Easy and 5 was Very Difficult. We averaged the ratings across participants. We also asked participants to rate task efficiency on a scale of 1 to 5, where 1 was Very Efficient and 5 was Very Inefficient. In addition, we asked participants to complete the SUS.

Results

Data Analysis and Reporting

The results of the usability test were calculated according to the methods specified in the Usability Metrics section above. There were several participants that did not follow the test instructions closely and therefore the results for those participants do not reflect the ideally conducted usability test. Test participants who did not follow the task instructions have their results excluded from this report.

315.a.1 CPOE: Record a Medication Order

User	*Task success*	*Path deviations*	*Task time (seconds)*	*Errors*	*Task ratings 1 -5 1 = very easy*	*Task efficiency 1 -5 1 = very efficient*
1	Y	0	142	0	1	1
2	Y	0	110	0	1	1
3	Y	0	150	0	2	2
4	Y	0	76	0	1	1

5	Y	0	101	0	1	2
6	Y	0	123	0	1	1
7	Y	0	105	0	1	1
8	Y	0	98	0	1	1
9	Y	0	115	0	1	1
10	Y	0	121	0	1	1
	Mean: 1		Mean: 114	Mean: 0	Mean: 1.1	Mean: 1.2
	SD: 0		SD: 21	SD: 0	SD: 0.3	SD: 0.4

315.a.2 CPOE: Record, Access, and Change a Laboratory Order

User	*Task success*	*Path deviations*	*Task time (seconds)*	*Errors*	*Task ratings 1 -5 1 = very easy*	*Task efficiency 1 -5 1 = very efficient*
1	Y	2	127	0	2	2
2	Y	1	172	0	1	1
3	Y	3	180	2	3	2
4	Y	0	168	1	2	2
5	N					
6	Y	0	129	0	1	1
7	Y	0	137	1	1	1
8	Y	0	124	0	1	1
9	Y	0	118	0	1	1
10	Y	0	125	1	1	1
	Mean: 0.9		Mean: 142	Mean: 0.5	Mean: 1.4	Mean: 1.3
	SD: 0.3		SD: 24	SD: 0.7	SD: 0.7	SD: 0.5

315.a.3 CPOE: Record, change and access radiology orders

User	*Task success*	*Path deviations*	*Task time (seconds)*	*Errors*	*Task ratings 1 -5 1 = very easy*	*Task efficiency 1 -5 1 = very efficient*
1	Y	0	95	0	2	1
2	Y	0	101	0	1	1
3	Y	2	111	0	2	2
4	Y	1	99	0	2	2
5	Y	0	118	0	1	1
6	Y	0	124	0	1	1
7	Y	1	129	1	2	1
8	Y	0	98	0	1	1
9	Y	0	127	1	1	1
10	Y	0	103	0	1	1
	Mean: 1		Mean: 110	Mean: 0.2	Mean: 1.4	Mean: 1.2
	SD: 0		SD: 13	SD: 0.4	SD: 0.5	SD: 0.4

315.a.4 Drug-drug, drug-allergy interactions checks

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User	Task success	Path deviations	Task time (seconds)	Errors	Task ratings 1 -5 1 = very easy	Task efficiency 1 -5 1 = very efficient
1	Y	0	67	0	1	1
2	Y	0	65	0	1	1
3	Y	0	90	0	1	1
4	Y	0	60	0	1	1
5	Y	0	87	0	1	1
6	Y	0	98	0	2	2
7	Y	0	79	0	1	1
8	Y	0	99	0	1	1
9	Y	0	95	0	1	1
10	Y	0	78	0	1	1
	Mean: 1		Mean: 81.8	Mean: 0	Mean: 1.1	Mean: 1.1
	SD: 0		SD: 14	SD: 0	SD: 0.3	SD: 0.3

315.a.4 Drug-drug, drug-allergy interactions Adjust severity Level

User	Task success	Path deviations	Task time (seconds)	Errors	Task ratings 1 -5 1 = very easy	Task efficiency 1 -5 1 = very efficient
1	Y	0	110	0	2	1
2	N					
3	Y	0	120	0	1	1
4	Y	0	124	0	1	1
5	Y	0	132	1	2	3
6	Y	0	128	0	1	1
7	Y	0	117	0	1	1
8	Y	0	121	1	2	2
9	Y	0	109	0	1	1
10	N					
	Mean: 0.8		Mean: 120	Mean: 0.25	Mean: 1.3	Mean: 1.3
	SD: 0.4		SD: 8.0	SD: 04	SD: 0.5	SD: 0.7

315.a.5 Add Demographic

User	Task success	Path deviations	Task time (seconds)	Errors	Task ratings 1 -5 1 = very easy	Task efficiency 1 -5 1 = very efficient
1	Y	0	120	0	1	1
2	Y	0	110	0	1	1
3	Y	0	150	0	2	2
4	Y	0	106	0	1	1
5	Y	0	101	0	1	2
6	Y	0	123	0	1	3
7	Y	0	125	0	2	3
8	Y	0	108	0	1	2

9	Y	0	115	0	1	1
10	Y	0	122	0	1	1
	Mean: 1		Mean: 118	Mean: 0	Mean: 1.2	Mean: 1.7
	SD: 0		SD: 14	SD: 0	SD: 0.4	SD: 0.82

315.a.6 Problem List

User	Task success	Path deviations	Task time (seconds)	Errors	Task ratings 1 -5 1 = very easy	Task efficiency 1 -5 1 = very efficient
1	N					
2	Y	0	50	0	3	1
3	Y	0	60	1	1	3
4	Y	1	66	0	2	1
5	Y	0	68	1	1	1
6	Y	0	72	0	1	3
7	Y	0	55	0	1	1
8	Y	0	59	0	1	1
9	Y	1	70	1	2	2
10	Y	0	48	1	1	1
	Mean: 0.9		Mean: 61	Mean: 0.4	Mean: 1.4	Mean: 1.6
	SD: 0.3		SD: 8.7	SD: 0.5	SD: 0.7	SD: 0.8

315.a.7 Medication List: Record, Access, and view medication list of patient

User	Task success	Path deviations	Task time (seconds)	Errors	Task ratings 1 -5 1 = very easy	Task efficiency 1 -5 1 = very efficient
1	Y	0	110	0	1	not rated
2	Y	0	95	0	1	1
3	Y	0	117	0	1	1
4	Y	2	128	1	2	2
5	Y	0	105	0	1	1
6	Y	0	99	0	1	1
7	Y	1	132	2	2	2
8	Y	0	123	1	1	1
9	Y	0	103	0	1	1
10	Y	0	101	0	1	1
	Mean: 1		Mean: 111	Mean: 0.4	Mean: 1.2	Mean: 1.2
	SD: 0		SD: 13	SD: 0.6	SD: 0.4	SD: 0.4

315.a.8 Medication Allergy List: Record, Access, and view medication Allergy List of patient

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User	Task success	Path deviations	Task time (seconds)	Errors	Task ratings 1 -5 1 = very easy	Task efficiency 1 -5 1 = very efficient
1	Y	0	88	0	1	1
2	Y	1	98	0	1	2
3	Y	0	95	0	1	not rated
4	Y	0	90	0	1	1
5	N					
6	Y	1	110	1	2	2
7	Y	0	101	1	1	1
8	Y	0	87	0	1	1
9	Y	0	91	0	1	1
10	Y	1	115	0	2	3
	Mean: 0.9		Mean: 97	Mean: 0.2	Mean: 1.2	Mean: 1.5
	SD: 0.3		SD: 10	SD: 0.4	SD: 0.4	SD: 0.7

315.a.9 Clinical Decision Support – Interventions

User	Task success	Path deviations	Task time (seconds)	Errors	Task ratings 1 -5 1 = very easy	Task efficiency 1 -5 1 = very efficient
1	Y	0	90	0	1	1
2	Y	1	116	0	3	3
3	Y	0	98	0	2	2
4	Y	0	192	0	not rated	not rated
5	Y	1	97	0	1	1
6	Y	0	104	0	4	4
7	Y	0	120	0	2	2
8	Y	0	109	0	1	1
9	Y	0	122	0	3	4
10	Y	0	111	0	1	1
	Mean: 1		Mean: 116	Mean: 0	Mean: 2	Mean: 2.1
	SD: 0		SD: 29	SD: 0	SD: 1.1	SD: 1.2

315.a.9 Clinical Decision Support – Configuration

User	Task success	Path deviations	Task time (seconds)	Errors	Task ratings 1 -5 1 = very easy	Task efficiency 1 -5 1 = very efficient
1	Y	1	87	0	1	1
2	Y	2	88	1	1	1
3	N					
4	Y	1	105	0	3	4
5	N					
6	Y	1	116	0	1	1

7	Y	0	90	1	2	2
8	Y	0	98	0	1	1
9	Y	0	110	0	1	1
10	N					
	Mean: 0.7		Mean: 99	Mean: 0.28	Mean: 1.4	Mean: 1.5
	SD: 0.4		SD: 11	SD: 0.4	SD: 0.7	SD: 1.1

315.a.14 Implantable Device List

User	*Task success*	*Path deviations*	*Task time (seconds)*	*Errors*	*Task ratings 1 -5 1 = very easy*	*Task efficiency 1 -5 1 = very efficient*
1	Y	1	127	0	DNR	DNR
2	Y	1	110	0	1	2
3	Y	2	135	0	1	1
4	Y	0	115	1	2	1
5	N					
6	Y	0	106	1	1	2
7	Y	0	126	0	0	1
8	Y	0	122	0	0	1
9	N					
10	Y	0	130	0	0	2
	Mean: 0.8		Mean: 121	Mean: 0.5	Mean: 0.7	Mean: 1.4
	SD: 0.42		SD: 10	SD: 0.4	SD: 0.7	SD: 0.5

315.b.3 Electronic Prescribing

User	*Task success*	*Path deviations*	*Task time (seconds)*	*Errors*	*Task ratings 1 -5 1 = very easy*	*Task efficiency 1 -5 1 = very efficient*
1	Y	0	49	0	2	2
2	Y	0	60	0	1	1
3	Y	0	90	0	1	1
4	Y	0	85	0	1	1
5	Y	0	55	0	2	3
6	Y	0	90	0	1	2
7	Y	0	86	0	1	1
8	Y	0	78	0	1	1
9	Y	0	69	0	1	2
10	Y	0	82	0	1	1
	Mean: 1		Mean: 74	Mean: 0	Mean: 1.2	Mean: 1.5
	SD: 0		SD:15	SD: 0	SD: 0.4	SD: 0.7

315.b.2 Clinical Information Reconciliation

User	Task success	Path deviations	Task time (seconds)	Errors	Task ratings 1 -5 1 = very easy	Task efficiency 1 -5 1 = very efficient
1	Y	0	190	0	1	2
2	Y	0	160	0	2	2
3	Y	0	166	1	4	3
4	N					
5	Y	1	199	0	2	2
6	N					
7	Y	1	156	1	1	2
8	Y	0	189	0	1	1
9	Y	1	165	1	2	1
10	Y	0	178	0	1	1
	Mean: 0.8		Mean: 175	Mean: 0.3	Mean: 1.75	Mean: 1.75
	SD: 0.4		SD: 15	SD: 0.5	SD: 1	SD: 0.7

Effectiveness

In most cases, participants completed the tasks effectively as evidenced by their task completion rates. Error rates were low, though there were some path deviations. There was a key distinction in the task effectiveness rates between EHR features that have been in the product for a short amount of time versus product features that are relatively new. For example, the Clinical information reconciliation feature has only been available in the GeeseMed EHR since start-2014, while the drug-drug and drug-allergy interaction checks have been available since mid-2011. Not unexpectedly, the task rating for Clinical information reconciliation tasks are much lower than the task ratings for drug-drug and drug-allergy interaction alerts.

Efficiency

Based on the results of this usability study, efficiency is an area where GeeseMed can improve the user experience. The efficiency ratings outlined in the results tables above were impacted by many of the users commenting throughout the course of the study, even though they were asked to complete the tasks as efficiently as possible and that comments would be gathered at the conclusion of the test. While the impact of the continued conversation was taken into account across all tasks, there was also overall conclusions drawn that task efficiency can improve over time since users rated EHR features that have been available for a longer period time as more efficient than tasks that utilized EHR features that are relatively new.

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Overall, users expressed they were satisfied with GeeseMed EHR features tested during this study. Based on comments from the participants following the studies, it was clear that the level of satisfaction with the GeeseMed EHR was commensurate with their overall satisfaction with using electronic health records in general.

Major Findings and Areas for Improvement

No critical use errors were identified or observed as part of this usability task.
There were some areas where they wanted some improvements, e.g. they wanted to see "reduce clicks" in the new system and Consider a screen design that optimizes visual scanning for frequently used fields and optimizes visual scanning of options within drop drown user interface elements.

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Appendix 1: Moderator's Guide

Session Introduction

To kick off the session with the participant:

- Ask the participant about their expectations, managing them as needed
- Explain our goals for the session, emphasizing the participant's role
- Review the agenda

Participant Background

Ask the participant to provide the following demographic and experiential information required for the study:

- Specialty
- Role
- Years in healthcare
- Time using GeeseMed
- Assistive Tech needs

Sign In

- Provide the test credentials to the participant to verify they are able to log in remotely.

Scenario 1: Order, change and access a Medication

- User instructions: Record **Lisinopril 20mg** (Hydrochlorothiazide) *medication order for a patient*
  Change SIG for above Medication Order
  Access changed medication order into patient medication list

Task outcome:
Completion:
Time on task:
Ease rating:
Efficiency rating:

Scenario 2: Order, change and access a Lab Order

User Instructions: *Enter a lab order. HBA1C*
Open lab order you have just created. Add Diagnosis code and save it.
Access updated lab order

Task outcome:
Completion:
Time on task:
Ease rating:
Efficiency rating:

Scenario 3: Order, change and access Radiology Order

User Instructions: Enter a Radiology Order X-ray PA and LATERAL VIEWS.
Open radiology order you have just created. Add Diagnosis code and save it
Access updated radiology order

Task outcome:
Completion:
Time on task:

Ease rating:
Efficiency rating:

Scenario 4: Enter, Change and access Medication Allergy List

User instructions: Add **Penicillin G** allergy to current allergy list.
Open above allergy record and add HIVES into reaction list
Access/view current allergy list

Task outcome:
Completion:
Time on task:
Ease rating:
Efficiency rating:

Scenario 4: Drug-Drug, Drug-Allergy Interaction Checks

User instructions: *Order* **Amoxicillin 500mg**
System will populate Drug-to-Allergy contradiction information window.
Order: **Darbepoetin Alfa 0.5 MG/ML**
System will populate Drug-to-Drug contradiction information window.

Task outcome:
Completion:
Time on task:
Ease rating:
Efficiency rating:

Scenario 5: Drug-Drug, Drug-Allergy adjust severity settings

User instructions: Set severity settings to major and minor by checking checkbox
Task outcome:
Completion:
Time on task:
Ease rating:
Efficiency rating:

Scenario 6: Record Demographic.

User instructions: *Select Patient and Go to Patient Registration screen.*

1. *Add multiple race(s) and ethnicity (ies).*
2. *Add single race and ethnicity.*
3. *Add Gender Identity & Sexual Orientation*
4. *Update Gender Identity & Sexual Orientation*

Task outcome:
Completion:
Time on task:
Ease rating:
Efficiency rating:

Scenario 7: Record, Change and access Problem List

User Instructions: *Add Essential Hypertension (ICD10: I10) into Patient Problem list, Edit Problem and access Active Problem List*

Task outcome:
Completion:
Time on task:
Ease rating:

Efficiency rating:

Scenario 8: Record, Change and access Medication List

User Instructions: *Add two medications to the patient's medication list; update a medication from the Medication list; view a medication*

Task outcome:
Completion:
Time on task:
Ease rating:
Efficiency rating:

Scenario 9: Clinical Decision Support – Configuration

User instructions: *Change your Clinical Decision Support settings.*

Task outcome:
Completion:
Time on task:
Ease rating:
Efficiency rating:

Scenario 10: Clinical Decision Support – Interventions

User instructions: *Create patient encounter to view the clinical decision support interventions alert.*

Task outcome:
Completion:
Time on task:
Ease rating:
Efficiency rating:

Scenario 11: Electronic Prescribing

User Instructions: *Prescribe the following medication using electronic prescribing.*

1. *Add Atorvastatin (Lipitor) 20 mg tablet by mouth once daily (QD); disp. 30*
2. *View active medication list of patient*
3. *Display Lipitor Medication Information using the Medline Info-button*

Task outcome:
Completion:
Time on task:
Ease rating:
Efficiency rating:

Scenario 12: Implantable Device List

User Instructions: *Search Implantable device. Add implantable device. Create patient chart to view recorded entry of Implantable device into patient chart.*

Task outcome:
Completion:
Time on task:
Ease rating:
Efficiency rating:

Scenario 13: Clinical Information Reconciliation

User Instructions: *Access the CCD Document. Click on Reconcile button. Reconcile medication, problem and allergy list*

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and click save button to add final list into patient chart.

Task outcome:

Completion:

Time on task:

Ease rating:

Efficiency rating:

Appendix 2: System Usability Scale

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

GeeseMed EHR 7.1.34

§170.315(b)(11) Decision Support Interventions

Product:	GeeseMed EHR Version 7.1.34
Date of (b)(11) DSI Usability Test:	November 11, 2024 – November 13, 2024
Date of Report:	November 26, 2024
Report Prepared By:	MDOfficeManager LLC. 1410 S Clark Blvd, Suite#2200 Clarksville, IN 47129

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Executive Summary

A usability test of GeeseMed EHR 7.1.34, was conducted between Nov.1 and Nov.5 2024, remotely. The purpose of this test was to test and validate the usability of the changes incorporated as part of the b(11) criteria, and provide evidence of usability in GeeseMed. During the usability test, 10 health care users matching the target demographic criteria served as participants and used the GeeseMed EHR 7.1.34 in simulated, but representative DSI-related tasks.

This study collected performance data on 6 tasks typically conducted on an EHR:

b11.1	At the point of creating the DSI, check if the admin could access the below listed source attributes Bibliographic Information Developer Name Funding Source Source Parameters/attributes used (ex: use of DOB for Age, race, ethnicity, language, sexual orientation, gender identity)
b11.2	At the point of creating the DSI, check if the admin could Add the below listed source attributes: Biblio Reference Author Funding Source DOB Race Ethnicity Language Sexual orientation Gender identity
b11.3	At the point of creating the DSI, check if the admin could Modify the below listed source attributes: Biblio Reference Author Funding Source DOB Race Ethnicity Language Sexual orientation Gender identity
b11.4	Check if the user has the ability to view the source attributes when he see the DSI alert
b11.5	Check if the user could submit his feedback on the triggered DSI
b11.6	Check if the admin could export the feedback recorded by the user

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During the 30 minute, one on one usability tests, each participant was greeted by the test administrator and informed that they could withdraw at any time. The administrator introduced the test, and instructed participants to complete a series of tasks (given one at a time) using the GeeseMed. During the testing, the test administrator timed the tasks and recorded user performance data electronically. The administrator did not assist participants during the test. Most of the participants had prior experience with the software.

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

Following the test, all participants completed the System Usability Scale (SUS) Questionnaire. All participant data was de-identified.

Table 1: Usability Test Result Summary provides a summary of the findings from the test.

Table 1: Usability Test Result Summary

Criterion	N # 	Task Success	Path deviations (observed/ optimal)	Task time (seconds)	Time deviations (observed/ optimal)	Errors	Task ratings 1-5 5 = very easy
Check Admin user can access source attributes	10	Mean: 100	0/0	Mean:14	Mean:3	Mean: 0	Mean: 4.9
		SD: 0		SD:3.3	SD:14	SD: 0	SD: 0.3
Check Admin user can add source attributes	10	Mean: 100	0/1	Mean: 46.1	Mean:15	Mean: 0	Mean:4.8
		SD: 0		SD:14.8	SD:47	SD: 0	SD:0.4
Check Admin user can modify source attributes	10	Mean:100	0/0	Mean:41.6	Mean:11	Mean: 0	Mean:4.7
		SD: 0		SD:10.6	SD:42	SD: 0	SD:0.4
Check provider can see view source attributes of triggered DSI	10	Mean:100	0/0	Mean:96.4	Mean:11	Mean: 0	Mean:4.7
		SD: 0		SD:10.4	SD:90	SD: 0	SD:0.4
Check provider can record and submit feedback on the triggered DSI	10	Mean:100	2/3	Mean:106.1	Mean:18	Mean: 0	Mean:4.7
		SD: 0		SD:17.5	SD:100	SD: 0	SD:0.4
Check if admin user can export recorded feedback	10	Mean:100	1/2	Mean:100.5	Mean:9	Mean: 0	Mean:4.9
		SD: 0		SD:8.9	SD:95	SD: 0	SD:0.3

Introduction

GeeseMed EHR allows clinicians in ambulatory outpatient practices to record and manage patient charts, as well as the ability to order medications, laboratory tests, and radiology tests. It also lets them perform a variety of other clinical and practice-management functions such as maintaining medication lists, recording immunizations, maintaining lists of drug allergies, and scheduling patient appointments.

The purpose of this study was to test and validate the usability of the user interface and provide evidence of user centered design methodologies to support certification according to functionality outlined in criterion §170.315(g)(3) Safety Enhanced Design for criterion §170.315(b)(11) Decision Support Intervention.

Participants

A total of 10 participants were tested on the EHR. Participants in the test were individuals that work within an ambulatory healthcare environment. Participants were contacted by GeeseMed Software staff to participate in the study. In addition, participants had no direct connection to the development of the EHR. Participants were not from (employed, related or associated in any way) GeeseMed Software. All participants had less than five minutes of instruction prior to the test; and were given basic instructions to follow. Those instructions are available to any user to access in our system documentation.

The following is a table of participants by characteristics, including demographics, user role, and product experience. Participant names were replaced with Participant IDs so that an individual's data cannot be tied back to individual identities.

Part ID	Gender	Age	Education	Role/Title	Professional Experience (months)	EHR Experience (months)	Experience with GeeseMed (months)	Assistive Tech Needs
N011	Male	30 to 39	Doctorate degree	Physician	72	36	24	None
N012	Male	20 to 29	Associate degree	Clinical Administrator	96	48	24	None
N013	Female	40 to 49	High school /Diploma	NP	120	72	24	None
N014	Male	30 to 39	Doctorate degree	Physician	96	72	36	None
N015	Female	40 to 49	High school grade/Diploma	ARNP	120	72	48	None
N016	Female	30 to 39	Doctorate Degree	Physician	108	72	48	None
N017	Female	30 to 39	Master's degree	Practice Administrator	84	84	60	None
N018	Male	20 to 29	Bachelor's degree	Office Manager	60	60	24	None
N019	Male	50 to 59	Doctorate degree	Physician	180	120	36	None
N020	Female	40 to 49	High school graduate	NP	108	84	36	None

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.

GeeseMed

Usability Metrics

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
- Task ratings: Ease and efficiency
- Time to complete the tasks
- Number and types of errors
- Path deviations
- Ease of use rating
- Efficiency rating
- Participant's verbalizations (comments)
- Participant's satisfaction ratings of the system

Task

Six tasks were constructed that would be realistic and representative of the kinds of activities a clinical user might do with this EHR that also represented a functionality gap between what was already tested for criterion 170.315(a)(9) Clinical Decision Support and the new criterion 170.315(b)(11) Decision Support Intervention, including:

As part of the task construction, tasks were prioritized in accordance with the risk associated with use errors. A risk scale of 1-5 (1 = least risk and 5 = most risk) was used to account for the patient's safety of performing each of these tasks. The risk rating for each task is list at the end in parenthesis.

1. **170.315(B)(11) Access DSI Rules info.**
    b. Login as Administrator
    c. Navigate to DSI Rule screen and select Evidence based rule
    d. All configured rule list will be populated in tabular form with source details and type of rule
    e. User will be able to see all attribute details
2. **170.315(B)(11) Add new DSI rule**
    a. Login as Administrator
    b. Navigate to DSI Rule screen
    c. Click on Create New Rule button
    d. User is able to add the data in all the fields, including "Bibliographic Information", "Developer Name", "Funding Source" etc…
    e. Select "Age" from Demographic rule conditions list
    f. Click on Save Rule button
3. **170.315(B)(11) Modify existing DSI rule**
    a. Login as Administrator
    b. Navigate to DSI Rule screen
    c. All configured rule list will be populated in tabular form with source details and type of rule
    d. From rules list, click on "Edit" link of DSI rule
    e. Make the necessary changes and save
    f. User should be able to save the data successfully
4. **170.315(B)(11) DSI alert at patient chart**
    a. Login as Provider
    b. Select Patient and navigate to patient chart screen

c. Click on red triangle " i " mark icon to view DSI information
d. Provider should be able to see the DSI source attributes information in plain language

5. **170.315(B)(11) Provide feedback on DSI**
   a. Login as Provider
   b. Select Patient and navigate to patient chart screen
   c. Click on red triangle " i " mark icon to view DSI information
   d. Click on "Feedback" link of DSI rule
   e. Record feedback and click on save
   f. Provider should be able to submit

6. **170.315(B)(11) Export feedback**
   a. Login as Administrator
   b. Navigate to DSI Rule screen
   c. Click on "Export Feedback" button
   d. An excel should be downloaded with complete details of feedback

Procedure

To prepare for each session, the test administrator oriented the test observers who would assist with data logging as needed. In addition, the testing lab was set up to ensure that all data would be captured and the remote access to the test participant was successful, secure, and stable. This included connecting the computer to the shared display so that the administrator could view the action, connecting the shared video and audio that would allow access to viewing and hearing the information from the test participant, and ensuring that the test participant had the correct access information prior to the session. Once the session time began and the test participant joined the session remotely, the test administer verified the identity of the participant prior to beginning the tasks.

The test administrator moderated the session, including providing instructions to the test participants and reading through the task list prior to beginning the session. The administrator also monitored tasks times, obtained post-task rating data, and took notes that would assist with evaluating the session at the conclusion of the test. Following the session, the administrator gave each participant the post-test System Usability Scale Questionnaire (Appendix 4) and thanked each individual for their participation.

Test Location

The usability tests conducted as a part of this study were conducted remotely from a lab at GeeseMed office in Clarksville, Indiana using a controlled testing environment with representative but fictitious patient records. The remote tests were conducted using stable and reliable screen share technology and independent and reliable teleconferencing systems. Since GeeseMed is a completely web-based EHR system, the EHR users who comprised our test participant group were comfortable with accessing the system using their computers and as a result, the remote testing provided an opportunity to observe the tests is a realistic scenario. Additional information on the test environment can be found below.

Test Environment

To ensure a realistic environment, participants were asked to interact with the system using their own computers and the networks they normally use to access the EHR system. Participants were given access to the remote screen share session and teleconference dial-in information. The test administrator and other assistants were able to view the test participant's computer screen and hear the participant's comments via these mechanisms to ensure that data was captured in real time during the course of the test.

Test Forms and Tools

During the usability test, various documents and instruments were used, including a Moderator's Guide (Appendix 1) and a post-test questionnaire (Appendix 2). The Moderator's Guide was devised so as to be able to capture required data and to follow along with the tasks that each participant was asked to complete during the test. Following each task we asked participants to the ease of use and efficiency, and to explain their rationale, as described in the Moderator's Guide. At the conclusion of the session, participants were also asked to complete a post-test questionnaire, which was based on the standard System Usability Scale.

Participant Instructions

In order to accurately capture the participant's background, we asked the participant to provide the following demographic and experiential information required for the study prior to scheduling the testing session: specialty, role in their medical practices, years in healthcare, time using the GeeseMed EHR, and any assistive technical needs they may have, if applicable.

At the beginning of each testing session, the test administrator asked each participant about their expectations during the test, managing them as needed. We also used this time to explain the goals for the session, emphasizing the participant's role, urging them to comment without concern for our feelings. The test administrator also reviewed the agenda for the session with the participant prior to beginning the tasks.

In describing the task scenarios, the test administrator explained that the participant was going to be asked to complete a series of tasks:

As quickly and efficiently as possible,
Without help from the administrator, and
Without discussion, but that the participant could comment as they felt necessary.

The participant was then asked to sign into the EHR testing system and complete each task, while the test administrator recorded their time to completion, errors, and deviations from the optimal path. Any comments that the participant shared during the tasks were also recorded.

After each task the participant was asked to rate the ease of use for the task and the task efficient on a Like scale from 1 to 5 where 1 represented "very easy" and "very efficient" respectively, and 5 represented "very difficult" and "very inefficient," respectively. At the conclusion of the complete usability test, the participants were also asked to complete the SUS questionnaire (reflecting on all tasks).

Usability Metrics

The information below provides information on how each of the tasks were scored, how the errors evaluated, and how the time-on-task data was analyzed.

Measure	***Scoring***
Effectiveness: Task Success	We recorded a task as a success if the participant was able to achieve the correct outcome without assistance. To calculate the total number of successes we divided number of tasks attempted by the number of participants. The results are reported as a percentage. We recorded task times for successes only.
Effectiveness: Task Failures	If the participant abandoned the task, did not reach the correct result, performed it incorrectly, or gave up, we recorded the task as a failure. We did not record task times for failures in this report.

Efficiency: Task Deviations	We recorded the participant's path (i.e., steps) through the application. Deviations included, for example, navigating to the wrong screen, choosing an incorrect menu item, or interacting incorrectly with an on-screen control. We compared this path to the optimal path.
Efficiency: Task Time	We timed each task from the moment the administrator said "Begin" until the participant said, "Done." If the participant failed to say "Done," we stopped the time when the participant stopped performing the task. Only times for tasks that were successfully completed were included in the average task time analysis. Average time per task was calculated for each task.
Satisfaction: Task Rating	After each task, we asked the participant to rate the task ease of use on a scale of 1 to 5, where 1 was Very Easy and 5 was Very Difficult. We averaged the ratings across participants. We also asked participants to rate task efficiency on a scale of 1 to 5, where 1 was Very Efficient and 5 was Very Inefficient. In addition, we asked participants to complete the SUS.

Results

Data Analysis and Reporting

The results of the usability test were calculated according to the methods specified in the Usability Metrics section above. There were several participants that did not follow the test instructions closely and therefore the results for those participants do not reflect the ideally conducted usability test. Test participants who did not follow the task instructions have their results excluded from this report.

315.170 B.11 Decision Support Intervention

Criterion	N # 10	Task Success	Path deviations (observed/ optimal)	Task time (seconds)	Time deviations (observed/ optimal)	Errors	Task ratings 1-5 5 = very easy
Check Admin user can access source attributes		Mean: 100	0/0	Mean:14	Mean:3	Mean: 0	Mean: 4.9
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Check Admin user can modify source attributes	10	Mean:100	0/0	Mean:41.6	Mean:11	Mean: 0	Mean:4.7
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Check provider can see view source attributes of triggered DSI	10	Mean:100	0/0	Mean:96.4	Mean:11	Mean: 0	Mean:4.7
		SD: 0		SD:10.4	SD:90	SD: 0	SD:0.4
Check provider can record and submit feedback on the triggered DSI	10	Mean:100	2/3	Mean:106.1	Mean:18	Mean: 0	Mean:4.7
		SD: 0		SD:17.5	SD:100	SD: 0	SD:0.4

Check if admin user can export recorded feedback	10	Mean:100	1/2	Mean:100.5	Mean:9	Mean: 0	Mean:4.9
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Effectiveness

In most cases, participants completed the tasks effectively as evidenced by their task completion rates. Error rates were low, though there were some path deviations. There was a key distinction in the task effectiveness rates between EHR features that have been in the product for a short amount of time versus product features that are relatively new. For example, the Clinical information reconciliation feature has only been available in the GeeseMed EHR since start-2014, while the drug-drug and drug-allergy interaction checks have been available since mid-2011. Not unexpectedly, the task rating for Clinical information reconciliation tasks are much lower than the task ratings for drug-drug and drug-allergy interaction alerts.

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Based on the results of this usability study, efficiency is an area where GeeseMed can improve the user experience. The efficiency ratings outlined in the results tables above were impacted by many of the users commenting throughout the course of the study, even though they were asked to complete the tasks as efficiently as possible and that comments would be gathered at the conclusion of the test. While the impact of the continued conversation was taken into account across all tasks, there was also overall conclusions drawn that task efficiency can improve over time since users rated EHR features that have been available for a longer period time as more efficient than tasks that utilized EHR features that are relatively new.

Satisfaction

Overall, users expressed they were satisfied with GeeseMed EHR features tested during this study. Based on comments from the participants following the studies, it was clear that the level of satisfaction with the GeeseMed EHR was commensurate with their overall satisfaction with using electronic health records in general.

Major Findings and Areas for Improvement

No critical use errors were identified or observed as part of this usability task.
There were some areas where they wanted some improvements, e.g. they wanted to see "reduce clicks" in the new system and Consider a screen design that optimizes visual scanning for frequently used fields and optimizes visual scanning of options within drop drown user interface elements.

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Session Introduction

To kick off the session with the participant:

- Ask the participant about their expectations, managing them as needed
- Explain our goals for the session, emphasizing the participant's role
- Review the agenda

Participant Background

Ask the participant to provide the following demographic and experiential information required for the study:

- Specialty
- Role

- Years in healthcare
- Time using GeeseMed
- Assistive Tech needs

Sign In

- Provide the test credentials to the participant to verify they are able to log in remotely.

Scenario 1: Access DSI source attributes

- User instructions: Login as Administrator
  Click Admin menu → DSI Rules
  Check DSI source attributes are easily visible or not

Task outcome:
Completion:
Time on task:
Ease rating:
Efficiency rating:

Scenario 2: Add new DSI rule

User Instructions: Login as Administrator
Click Admin menu → DSI rules
Click on Create New Rule button
Enter rule name: Mammogram, enter "Bibliographic Information", "Developer Name", "Funding source" attributes
Select Age from condition list and enter 40
Select Gender from condition list and enter Female

Task outcome:
Completion:
Time on task:
Ease rating:
Efficiency rating:

Scenario 3: Modify source attribute of existing DSI rule

User Instructions: Login as Administrator
Click Admin menu → DSI rules
From rules list, click on "Edit" link of Mammogram rule
Modify source attribute

Task outcome:
Completion:
Time on task:
Ease rating:
Efficiency rating:

Scenario 4: DSI alert at patient chart

User instructions: Login as Provider
Click on patient search and select "Barbara moor" patient
Click on patient chart button
Click on red triangle " i " mark icon – System would pop-up DSI rule screen with all info.

Task outcome:
Completion:

Time on task:
Ease rating:
Efficiency rating:

Scenario 5: Provide feedback on DSI

User instructions: Login as Provider
Click on patient search and select "Barbara moor" patient
Click on patient chart button
Click on red triangle " i " mark icon – System would pop-up DSI rule screen
Click on "Feedback" link and write feedback in box
Click on Submit button

Task outcome:
Completion:
Time on task:
Ease rating:
Efficiency rating:

Scenario 6: Export feedback

User Instructions: Login as Administrator
Click Admin menu → DSI rules
Click on "Export Feedback" button
An excel should be downloaded with complete details of feedback

Task outcome:
Completion:
Time on task:
Ease rating:
Efficiency rating:

GeeseMed

Appendix 2: System Usability Scale

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