



## ATG EHR Safety-Enhanced Design Usability Report

---

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

### Product

---

## ATG EHR 10

Dates of Usability Tests:	August 3 – August 10, 2017
Date of Report:	August 16, 2017
Last Revised:	October 2, 2021
Report Prepared By:	<a href="#">Advanced Technologies Group, LLC</a> 1601 48 <sup>th</sup> St, STE 220 West Des Moines, IA 50266

## Executive Summary

---

A usability test of ATG EHR version 10 was conducted August 3 – August 10, 2017 by Advanced Technologies Group, LLC QA team via web conferencing sessions with test participants. Testers #4 and #6 were tested on August 3, 2017. Testers #2 and #8 were tested on August 7, 2017. Tester #9 was tested on August 9, 2017. Testers #1, #3, #5, #7, #10 were tested on August 10, 2017. The purpose of this study was to test and validate the usability of the current user interface, and provide evidence of usability in the EHR Under Test (EHRUT). During the usability test, ten healthcare providers matching the target demographic criteria served as participants and used the EHRUT in simulated, but representative tasks.

The study collected performance data on 24 tasks in the following eleven areas, typically conducted on an EHR:

- CPOE – medications
- CPOE – laboratory
- CPOE – diagnostic imaging
- Drug-drug, drug-allergy interaction checks
- Demographics
- Problem list
- Medication list
- Medication allergy list

During the 60-minute usability test, each participant was greeted by the administrator. Most of the participants had prior experience with the EHR in some of the categories tested above. The administrator introduced the test and instructed participants to complete a series of tasks (given one at a time) using the EHRUT. During the testing, the administrator timed the test and, along with the data logger, recorded user performance data on paper. The administrator did not give the participant assistance in how to complete the task.

The following types of data were collected for each participant:

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

All participant data was de-identified – no correspondence could be made from the identity of the participant to the data collected. Following the conclusion of the testing, participants were asked to complete a post-test questionnaire. Various recommended metrics, in accordance with the examples set forth in the *NIST Guide to the Processes Approach for Improving the Usability of Electronic Health*

Records, were used to evaluate the usability of the EHRUT. (Following is a summary of the performance and rating data collected on the EHRUT)

## Introduction

---

The EHRUT tested for this study was ATG EHR version 10. Designed to document medical information for healthcare providers in correctional institutions, the EHRUT consists of everyday workflow wizards for physicians, psychiatrists, dentists, nurses, and psychologists. The usability testing attempted to represent realistic exercises and conditions.

The purpose of this study was to test and validate the usability of the current user interface, and provide evidence of usability of EHR Under Test (EHRUT). To this end, measures of effectiveness, efficiency and user satisfaction, as described later, were captured during the usability testing.

## Method

---

### Participants

A total of 10 participants were tested on the EHRUT. Participants in the test were clinical professionals with EHR experience. Participants were recruited by Advanced Technologies Group, LLC. Participants were given the opportunity to have the same orientation and level of training as the actual end users would have received.

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

Part ID	Gender	Age	Education	Occupation	Professional Experience	Computer Experience	Product Experience	Assistive Technology Needs
1	F	49	Bachelor of Science in Clinical Lab Science	Medical Technologist	30 years	25 years	10 years	None
2	F	54	BA, Health Information Management (RHIA)	Medical Records	33 years	33 years	9 years	None
3	M	46	Master's Nursing Education	RN / Nurse Informatics	25 years	25 years	8 years	None

4	M	47	Bachelor Science in Pharmacy	RPh	25 years	10 years	10 years	None
5	F	40	AD RN	RN	20 years	6 years	8 years	None
6	F	53	Bachelor of Science	Pharmacist	30 years	30 years	10 years	None
7	F	57	Bachelor of Science	RN	36 years	20 years	16 years	None
8	M	59	B.A. Journalism and B.S.N. Nursing	Nurse/ Health Informatics Specialist	22 years	21 years	11 years	None
9	F	43	Bachelors in Healthcare Admin with Health Information Emphasis	Chief, Health Information	23 years	23 years	11 years	None
10	M	46	BS in Medical Technology	Health Informatics Specialist	21 years	11 years	11 years	None

A total of 10 participants were recruited and 10 participated in the usability test. Participants were scheduled for one 60 minute session for testing and posttest debrief by the administrator and data loggers.

### 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 the EHR. Each participant used the system from the same setup of a remote workstation accessed using an online meeting session, 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 Usability Metrics.

## Tasks

A number of tasks were constructed that would be realistic and representative of the kinds of activities a user might do with this EHR, including:

- CPOE -- medications
  - Record Medication Order
  - Change Medication Order
  - Access Medication Order
- CPOE -- laboratory
  - Record Lab Order
  - Change Lab Order
  - Access Lab Order
- CPOE -- diagnostic imaging
  - Record Radiology Order
  - Change Radiology Order
  - Access Radiology Order
- Drug-drug, drug-allergy interaction checks
  - Create drug-drug interaction
  - Create drug-allergy interaction
  - Adjust the severity level of drug-drug interaction
- Demographics
  - Record demographics : race, ethnicity, preferred language, sex, sexual orientation, gender identity, date of birth
  - Change to decline information: race, ethnicity, sexual orientation, gender identity
  - Access demographic data
- Problem List
  - Record Problem List
  - Change Problem List
  - Access Problem List
- Medication List
  - Record Medication List
  - Change Medication List
  - Access Medication List
- Medication Allergy List
  - Record Medication Allergy List
  - Change Medication Allergy List
  - Access Medication Allergy List

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

## Procedures

Upon connection to the online meeting tool participants were greeted; their identity was verified and matched with a name on the participant schedule. Participants were then assigned a participant ID.

The administrator moderated the session including administering instructions and tasks. The administrator also monitored task times, obtained post-task rating data, and took notes on participant comments.

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

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

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

Following the session, the administrator gave the participant the final questions (see Appendix 4) and post-test System Usability Scale questionnaire (see Appendix 5), and thanked each individual for their participation.

## Test Location

All participants were tested over a remote conferencing session.

The participant was requested in advance to select a location with minimal distractions and a computer that could connect to the internet via a web conferencing session. The administrator and the participants were the only ones on the call.

## Test Environment

The EHRUT would be typically used in a healthcare office in a correctional institution. In this instance, the testing was conducted over the web conferencing session. The participants used a keyboard and mouse when interacting with the EHRUT. The participants were able to complete the tasks by using the administrator's session since an un-released version was used.

The ATG EHR 10 application was running in a test environment accessed using a web conferencing session. Technically, the system performance (i.e., response time) was representative to what actual users would experience in a field implementation. Additionally, participants were instructed not to change any of the default system settings (such as control of font size).

## Test Forms and Tools

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

1. Moderator's Guide (Appendix 2)
2. Participant Task Instructions (Appendix 3)
3. Final Questions (Appendix 4)
4. Usability Scale Questionnaire (Appendix 5)

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

## Participant Instructions

The administrator reads the following instructions aloud to each participant (also see the full moderator's guide in Appendix 1):

*Thank you for participating in this study. Our session today will last about 60 minutes. During that time you will use an instance of ATG EHR, specifically focusing on functionality required for Meaningful Use Certification. Most tasks will be familiar to you based on how you use the system on a daily basis. I will ask you to complete a few tasks using this system and answer some questions. Please try to complete the tasks on your own following the instructions very closely. 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. All of the information that 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.*

Following the procedural instructions, participants were shown the EHR, the administrator gave the participant control of the keyboard and mouse on their workstation, and then the administrator gave the following instructions:

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

Participants were then given 24 tasks to complete. Tasks are listed in the moderator's guide, participant task instructions in Appendix 2.

## Usability Metrics

According to the NIST Guide to the Processes Approach for Improving the Usability of Electronic Health Records, EHRs should support a process that provides a high level of usability for all users. The goal is for users to interact with the system effectively, efficiently, and with an acceptable level of satisfaction. To this end, metrics for effectiveness, efficiency and user satisfaction were captured during the usability testing. The goals of the test were to assess:

1. Effectiveness of ATG EHR version 10 by measuring participant success rates and errors
2. Efficiency of ATG EHR version 10 by measuring the average task time and path deviations
3. Satisfaction with ATG EHR version 10 by measuring ease of use ratings

## Data Scoring

---

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

Measures	Rationale and Scoring
<b>Effectiveness: Task Success</b>	<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 some factor [e.g., 1.25] that allows some time buffer because the participants are presumably not trained to expert performance. Thus, if expert, optimal performance on a task was [x] seconds then allotted task time performance was [x * 1.25] seconds. This ratio should be aggregated across tasks and reported with mean and variance scores.</p>
<b>Effectiveness: Task Failures</b>	<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 should also be expressed as the mean number of failed tasks per participant.</p> <p>On a qualitative level, an enumeration of errors and error types should be collected.</p>
<b>Efficiency: Task Deviations</b>	<p>The participant’s path (i.e., steps) through the application was recorded. Deviations occur if the participant, for example, went to a wrong screen, clicked on an incorrect menu item, followed an incorrect link, or interacted incorrectly with an on-screen control. This path was compared to the optimal path. The task deviations were rated on the scale of 1 = no deviations, 2 = minor deviations, 3= major deviations.</p>
<b>Efficiency: Task Time</b>	<p>Each task was timed from when the administrator said “Begin” until the participant said, “Done.” If he or she failed to say “Done,” the time was stopped when the participant stopped performing the task. Only task times for tasks that were successfully completed were included in the average task time analysis. Average time per task was calculated for each task.</p>
<b>Satisfaction: Task Rating</b>	<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, a Likert Scale was used for each</p>



participant to rate the task. They were asked “Overall, this task was:” on a scale of 1 (Very Difficult) to 5 (Very Easy). These data are averaged across participants.

Common convention is that average ratings for systems judged easy to use should be 3.3 or above.

To measure participants’ confidence in and likeability of ATG EHR version 10 overall, the testing team administered the System Usability Scale (SUS) post-test questionnaire. Questions included, “I think I would like to use the 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.

## Results

### Data Analysis and Reporting

The results of the usability test were calculated according to the methods specified in the Usability Metrics section above. Participants who failed to follow session and task instructions had their data excluded from the analyses.

The usability testing results for the EHRUT are detailed below. The results should be seen in light of the objectives and goals outlined in Study Design section.

#### Computerized Provider Order Entry -- Medications

		Task Success	Path Deviation	Task Time (in seconds)		Errors	Task Ratings
Tasks		Mean (%) (SD)	Deviations (Observed /Optimal)	Mean (SD)	Deviations (Observed/ Optimal)	Mean(%) (SD)	Mean (SD)
1	Record Medication Order	100 (0)	6/6	40 (14)	10 (40/30)	0 (0)	4.7 (0.9)
2	Change Medication Order	100 (0)	2/2	14 (13)	3 (14/11)	0 (0)	5 (0)
3	Access Medication Order	100 (0)	2/2	6 (2)	2 (6/4)	0 (0)	5 (0)

#### Computerized Provider Order Entry -- Laboratory

		Task Success	Path Deviation	Task Time (in seconds)		Errors	Task Ratings
Tasks		Mean(%) (SD)	Deviations (Observed /Optimal)	Mean (SD)	Deviations (Observed/ Optimal)	Mean(%) (SD)	Mean (SD)
4	Record Laboratory Order	100 (0)	5/5	48 (11)	10 (48/38)	0 (0)	4.9 (0.3)
5	Change Laboratory Order	100 (0)	3/3	17 (9)	2 (17/15)	0 (0)	4.8 (0.6)
6	Access Laboratory Order	100 (0)	2/2	7 (2)	3 (7/4)	0 (0)	5 (0)

#### Computerized Provider Order Entry -- Diagnostic Imaging

		Task Success	Path Deviation	Task Time (in seconds)		Errors	Task Ratings
Tasks		Mean(%) (SD)	Deviations (Observed /Optimal)	Mean (SD)	Deviations (Observed/ Optimal)	Mean(%) (SD)	Mean (SD)
7	Record Radiology Order	100 (0)	3/3	38 (10)	3 (38/35)	0 (0)	5 (0)
8	Change Radiology Order	100 (0)	3/3	12 (3)	-3 (12/15)	0 (0)	5 (0)
9	Access Radiology Order	100 (0)	2/2	7 (2)	2 (7/5)	0 (0)	5 (0)

#### Drug-drug, drug-allergy interaction checks

		Task Success	Path Deviation	Task Time (in seconds)		Errors	Task Ratings
Tasks		Mean(%) (SD)	Deviations (Observed/Optimal)	Mean (SD)	Deviations (Observed/Optimal)	Mean(%) (SD)	Mean (SD)

10	Create drug-drug interaction	100 (0)	3/3	13 (4)	-1 (13/14)	0 (0)	5 (0)
11	Create drug-allergy interaction	100 (0)	3/3	14 (4)	1 (14/13)	0 (0)	5 (0)
12	Adjust severity level of drug-drug interaction	100 (0)	2/2	9 (5)	2 (9/7)	0 (0)	4.8 (0.6)

### Demographics

		Task Success	Path Deviation	Task Time (in seconds)		Errors	Task Ratings
Tasks		Mean(%)(SD)	Deviations (Observed/Optimal)	Mean (SD)	Deviations (Observed/Optimal)	Mean(%)(SD)	Mean (SD)
13	Record demographics	100 (0)	9/9	70 (22)	10 (70/60)	0 (0)	4.5 (0.8)
14	Change demographics	100 (0)	6/5	27 (9)	7 (27/20)	0 (0)	4.2 (1)
15	Access demographics	100 (0)	2/2	4 (1)	1 (4/3)	0 (0)	5 (0)

### Problem List

		Task Success	Path Deviation	Task Time (in seconds)		Errors	Task Ratings
Tasks		Mean(%)(SD)	Deviations (Observed/Optimal)	Mean (SD)	Deviations (Observed/Optimal)	Mean(%)(SD)	Mean (SD)
16	Record Problem List	100 (0)	5/5	54 (19)	19 (54/35)	0 (0)	4.7 (0.7)
17	Change Problem List	100 (0)	3/3	9 (3)	1 (9/8)	0 (0)	4.9 (0.3)
18	Access Problem List	100 (0)	2/2	3 (1)	0 (3/3)	0 (0)	5 (0)

### Medication List

		Task Success	Path Deviation	Task Time (in seconds)		Errors	Task Ratings
Tasks		Mean(%) (SD)	Deviations (Observed /Optimal)	Mean (SD)	Deviations (Observed/ Optimal)	Mean(%) (SD)	Mean (SD)
19	Record Medication List	100 (0)	6/6	52 (19)	17 (52/35)	0 (0)	4.6 (0.8)
20	Change Medication List	100 (0)	4/4	18 (5)	5 (18/13)	0 (0)	4.6 (0.8)
21	Access Medication List	100 (0)	2/2	6 (1)	1 (6/5)	0 (0)	5 (0)

### Medication Allergy List

		Task Success	Path Deviation	Task Time (in seconds)		Errors	Task Ratings
Tasks		Mean(%) (SD)	Deviations (Observed/ Optimal)	Mean (SD)	Deviations (Observed/ Optimal)	Mean(%) (SD)	Mean (SD)
22	Record Medication Allergy List	100 (0)	5/5	39 (16)	17 (39/22)	0 (0)	4.8 (0.4)
23	Change Medication Allergy List	100 (0)	11/11	62 (18)	12 (62/50)	0 (0)	4.9 (0.3)
24	Access Medication Allergy List	100 (0)	3/3	5 (4)	1 (5/4)	0 (0)	5 (0)

The results from the SUS (System Usability Scale) scored the subjective satisfaction with the system based on performance with these tasks to be: 94.5. Broadly interpreted, scores under 60 represent systems with poor usability; scores over 80 would be considered above average.

## Discussion of the Findings

### Effectiveness

All tasks were performed with a 100% success rate. Seven of the tasks had more than one minor path deviations. The deviations were such a small number that these are not reflected in the observed number of steps since no decimals are allowed. The deviations were primarily due to

training and some web conferencing connection issues. The deviations came in tasks that the testers were less familiar with. The tasks have been identified to review the training plans.

### Efficiency

Optimal times can vary widely depending on the user's environment, workload and clinical situation at hand. For this test, the task times chosen were considered as optimal in a quiet, unhurried, unpressured environment. We expected observed times would be less than double the optimal time. While there were a few instances when a user exceeded double the optimal time the mean for all tasks were less than double the optimal time. As users become more familiar with the task and the system, actual times drop significantly as have been witnessed in production implementations. We plan to review the tasks with the high standard deviations to determine the reasons some users were able to use the system more efficiently than others.

### Satisfaction

Participant satisfaction was rated extremely high. All tasks scored a 5 to 4.5 mean rating with the majority of tasks at 5 (Very Easy).

To measure participants' confidence in and likeability of ATG EHR version 10 overall, the testing team administered the System Usability Scale (SUS) post-test questionnaire (See Appendix 5). The results from the SUS scored the subjective satisfaction with the system based on performance with these tasks to be: 94.5. Broadly interpreted, scores under 60 represent systems with poor usability; scores over 80 would be considered above average.

### Major Findings

Overall the participants were able to maneuver through the EHRUT and easily perform the 24 tasks. The participants found the system well organized and intuitive. The participants felt the system compared very favorably to other systems they have used and seen. The biggest take away was that even with experienced users and a very intuitive UI, time to complete a given task can vary widely.

### Areas For Improvement

The only area for improvement identified during the EHRUT was to make the External Meds work consistently with other screens in the EHR. Currently the Update and Add buttons for External Meds are at the bottom of the screen in the command section. We will work to make this screen more consistent and move the Add button next to the grid and put the Update button in the grid

## Appendices

---

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

1. Patient Demographics
2. Example Moderator's Guide
3. Participant Task Instructions
4. Final Questions
5. Usability Scale Questionnaire

## Appendix 1

### Participant Demographics

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

#### Gender

Men	4
Woman	6
Total (participants)	10

#### Occupation/Role

Health Information Technologist	4
Medical Records	1
RN/ Nurse Informatics	3
RPh	2
Total (participants)	10

#### Years of Experience

Facility Use of EHR All Paper	0
Some paper, some electronic	10
All electronic	0
Total (participants)	10

## Appendix 2

### Moderator's Guide

#### Prior to testing

Confirm schedule with participants

Ensure test environment is up and running

#### Prior to each participant

Reset application

Prepare timing devices and task documentation sheets

#### Prior to starting testing

Verify the participant's identity to ensure it is the participant on the schedule

Verify the participant can log into the remote session

Check the participant has printed the usability tests

#### Prior to each task

Direct user to starting point of task

Check the participant has the correct usability test in front of them

Rest timer

#### Orientation (5 minutes)

Thank you for participating in this study. Our session today will last about 60 minutes. During that time you will use an instance of ATG EHR version 10, specifically focusing on functionality required for Meaningful Use Certification. Most tasks will be familiar with how you use the system on a daily basis. I will ask you to complete a few tasks using this system and answer some questions. Please try to complete the tasks on your own following the instructions very closely. 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. All of the information that 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.

Following the procedural instructions, participants were shown the EHR, the administrator gave the participant control of the keyboard and mouse on their workstation, and then the administrator gave the following instructions:



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

### Task Documentation

Before each task take control of the session and direct the application to the starting point for the new task. Let the participant know which task you will be starting and make sure their task instructions are at the correct place. The moderator will read the scenario out loud and then start the timer. When the participant is finished they will say “done”. The moderator will then fill in the Usability Task sheet for that particular task.

The moderator will fill in the following information:

Success: easily completed, completed with difficulty or help, not completed

Participant comments about the task

Task Time in seconds

How the task was completed: optimal path used, minor deviations, major deviations

Ask the participant a rating for the task: very easy, easy, average, difficult, very difficult

Administrator comments

### Appendix 3

#### Participant Task Instructions

1	Record Medication Orders -- <i>Add medication order</i> <i>Ibuprofen</i> <i>800mg</i> <i>Orally</i> <i>Daily</i> <i>30 days</i> <i>Low back pain, lumbago</i>
2	Change Medication Orders – <i>Update medication order for Ibuprofen 800mg</i> <i>Daily → -Two Times a Day</i>
3	Access Medication Orders – <i>view the Ibuprofen medication order in the completed note</i>
4	Record Lab Orders – <i>Add lab order</i> <i>Chemistry, C, <b>Cholesterol in HDL – 2085-9</b></i> <i><b>Routine</b></i> <i><b>One Time</b></i> <i><b>Test Date + 1 day</b></i>
5	Change Lab Orders – <i>Update lab order</i> <i>Cholesterol in HDL → <b>Chemistry, C, Cholesterol in LDL – 2089-1</b></i>

6	Access Medication Orders – <i>view Cholesterol in LDL order in the completed note</i>
7	Record Radiology Orders – <i>add radiology order</i> <i>CT, Abdomen/Pelvis, <b>Abdomen</b></i> <i><b>Specific Reason: pain in abdomen</b></i> <i><b>Routine</b></i> <i><b>Test Date + 1 day</b></i>
8	Change Radiology Orders – <i>update radiology order</i> <i>Abdomen → <b>Abdomen/Pelvis Stone Protocol</b></i>
9	Access Radiology Orders – <i>view Abdomen/Pelvis Stone Protocol radiology order in the completed note</i>
10	Drug-drug Interactions – <i>add medication order for <b>Warfarin</b></i> – a major drug-drug interaction shows (currently has Ibuprofen as a medication)
11	Drug-allergy Interactions – <i>add medication order for <b>Amoxicillin Capsule</b></i> – a major drug-allergy interaction shows (currently has Penicillin V as allergy)
12	Adjust drug-drug interactions – <i>change severity filter in medication order to only show major</i>
13	Record Demographics – <i>Add Demographics</i> <b>Race: White</b> <b>Ethnicity: Non-Hispanic Latino</b> <b>Preferred Language: English</b> <b>Sex: M</b> <b>Sexual Orientation: Heterosexual</b> <b>Gender Identity: M</b> <b>Date of Birth: 01/02/1983</b>
14	Change Demographics – <i>Change Demographics</i> <b>Race: Decline to Specify</b> <b>Ethnicity: Decline to Specify</b> <b>Sexual Orientation: Decline</b> <b>Gender Identity: Decline</b>
15	Access Demographics -- <i>view demographics for patient</i>
16	Record Problem List – <i>Add Problem</i> <b>Coronary artery disease</b> <b>Chronic</b> <b>Test Date</b> <b>Current</b>
17	Change Problem List – <i>Update Coronary artery disease</i> <b>Status: Current → Status: Resolved</b>
18	Access Problem List – <i>view offender's current problems</i>
19	Record Medication List – <i>Add Medication</i> <b>Lisinopril 2.5mg tab</b> <b>Test Date</b> <b>Commissary – Self-Reported</b> <b>Test Date + 30 days</b> <b>Daily by mouth until gone</b>
20	Change Medication List – <i>Update Lisinopril 2.5mg stop date \</i>

	<b>Test Date + 30 days → Test Date + 60 days</b>
21	Access Medication List – <i>view offender’s current medications</i>
22	Record Medication Allergy – <i>Add &amp; Save</i> <b>Penicillin G Benzathine</b> <b>Anaphylaxis</b> <b>Major</b>
23	Change Medication Allergy – Remove <b>Penicillin G Benzathine</b> reason: <b>wrong allergy selected</b> Add <b>Penciclovir</b> <b>Anaphylaxis</b> <b>Major</b>
24	Access Medication Allergies – <i>view offender’s current allergies</i>

Send Final Questions (Appendix 4) and Usability Scale Questionnaire (Appendix 5) to participant

#### Appendix 4 Final Questions

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?

Appendix 5

Usability Scale Questionnaire

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