

# EHR Usability Test Report of Office Ally's EHR 24/7 System Version 3.9.2

Report based on *NISTIR 7741 NIST Guide to the Processes Approach for Improving the Usability of Electronic Health Records, November 2010*, and reported in *NISTIR 7742 Customized Common Industry Format Template for Electronic Health Record Usability Testing, November 2010*.

|                               |  |
|-------------------------------|--|
| <b>EHR Under Test:</b>        | Office Ally EHR 24/7™ Version 3.9.2  |
| <b>Usability Test Period:</b> | January 1 to December 8, 2017  |
| <b>Date of Report:</b>        | December 12, 2017  |
| <b>Report Prepared By:</b>    | Office Ally, Inc.<br>Chere Jensen, Senior Project Administrator<br>360-975-7000, x6103<br><a href="mailto:chere.jensen@officeally.com">chere.jensen@officeally.com</a>   |
| <b>Office Locations:</b>      | 1300 SE Cardinal Court, Ste. 190<br>Vancouver, WA 98683<br><br>8415 Datapoint Drive<br>San Antonio, TX 92614<br><br>2515 McCabe Way, Ste. 300<br>Irvine, CA 92614<br><br>We are a web-based EHR, found at <a href="http://www.officeally.com">www.officeally.com</a> |

## Contents

|  |    |
|--|----|
| Executive Summary .....  | 4  |
| Introduction.....  | 6  |
| Method .....   | 6  |
| Participants.....  | 6  |
| Study Design .....   | 8  |
| Tasks .....  | 9  |
| Procedures.....  | 11 |
| Test Location.....   | 11 |
| Test Environment .....   | 12 |
| Test Forms and Tools.....  | 12 |
| Participant Instructions .....                                   | 12 |
| Usability Metrics.....   | 13 |
| Data Scoring.....  | 13 |
| Results .....  | 14 |
| Data Analysis and Reporting.....                                 | 14 |
| Summary of the Findings.....                                     | 17 |
| Appendices .....   | 22 |
| Appendix 1: MODERATOR GUIDE – Introduction and Demographics..... | 22 |
| Appendix 2: MODERATOR GUIDE SAMPLE- Medication Allergy List..... | 24 |
| Appendix 3: TASK SCRIPTS.....                                    | 29 |
| 170.315 (a)(1) CPOE Medication: .....                            | 29 |
| 170.315 (a)(2) CPOE Laboratory: .....                            | 29 |
| 170.315 (a)(3) CPOE Radiology:.....                              | 30 |
| 170.315 (a)(4) Drug-Drug/Drug-Allergy Interaction .....          | 31 |
| 170.315 (a)(5) Demographics .....                                | 31 |
| 170.315 (a)(6) Problem List .....                                | 33 |
| 170.315 (a)(7) Medication List.....                              | 34 |

---

|   |    |
|---|----|
| 170.315 (a)(8) Medication Allergy List.....                     | 35 |
| 170.315 (a)(9) Clinical decision Support.....                   | 36 |
| 170.315 (a)(14) Implantable Device List.....                    | 38 |
| 170.315 (b)(2) Clinical Information Reconciliation.....         | 39 |
| 170.315 (b)(3) Electronic Prescribing.....                      | 40 |
| Appendix 4: MODERATOR GUIDE- SUS Questionnaire and Closing..... | 42 |
| Appendix 5: MODERATOR GUIDE- Data Collection and Scoring.....   | 43 |
| Appendix 6: MODERATOR GUIDE- Criticalness Survey.....           | 45 |

## Executive Summary

A Usability Test of Office Ally's complete EHR 24/7, version 3.9.2 system was conducted between January 1, 2017 and December 8, 2017. The test was done online from our office locations in San Antonio, TX and Vancouver, WA by trained Office Ally staff, which connected to the participant's own computer.

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, 35 healthcare workers matching the target demographic criteria served as participants, and used the EHRUT in simulated, but representative tasks. Our target demographic was the typical Office Ally user. This study collected performance data on one or more of the following task categories, typically conducted in conjunction with the requirements set forth in ONC's 2015 Final Rule Standard 170.315.g.3- Safety Enhanced Design:<sup>1</sup>

- ◆ Computerized Provider Order Entry – Medication
- ◆ Computerized Provider Order Entry – Laboratory
- ◆ Computerized Provider Order Entry – Diagnostic Imaging
- ◆ Drug-Drug & Drug-Allergy Interaction
- ◆ Electronic Prescribing
- ◆ Medication Allergy List
- ◆ Medication List
- ◆ Clinical Decision Support
- ◆ Clinical Information Reconciliation
- ◆ Demographics
- ◆ Problem List
- ◆ Implantable Devices

The modules were sorted into 1 hour sessions, some modules were tested individually, and others had two modules tested during the 1 hour session. Each participant was greeted by the test administrator and given a brief overview of what to expect; they were instructed that they could withdraw at any time. Participants represented a sample of both experienced and novice Office Ally EHR users. All participants had gone through the standard Office Ally online training sessions previously. The administrator introduced the test, and instructed participants to complete a series of tasks (given one at a time) using the EHRUT. During the testing, the administrator timed the test and recorded user performance data and click counts. Assistance was generally not allowed. However, if an administrator gave assistance to the user, this was noted under the Efficiency section of data sheet.

The following types of data were collected for each participant:

- ◆ Task Efficiency
- ◆ Time to complete the tasks
- ◆ Number of clicks to complete the task
- ◆ Task Effectiveness
- ◆ Task Satisfaction
- ◆ Participant's verbalizations

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

<sup>1</sup> This certification criterion is from 45 CFR Part 170 Subpart C of the Health Information Technology: 2015 Edition Health Information (Health IT) Certification Criteria, 2015 Edition Base Electronic Health Record (EHR) Definition, and ONC Health IT Certification Program Modifications. .

and were compensated with a free month of Office Ally's EHR service (a \$29.95 value) for their time. Data was collected and metrics calculated as proposed in the *NISTIR 7741 NIST Guide to the Processes Approach for Improving the Usability of Electronic Health Records, November 2010*.

As a post-test questionnaire, the System Usability Scale (SUS) was given to all the participants at the end of the study. This allowed for an overall satisfaction score comparable to other EHRs. **The overall mean score of the SUS was 70.** This is over the 60 point mark for poor usability, and below the 80 point mark for high usability.<sup>2</sup> This shows there is room for improvement in the usability of our system. Comments about Office Ally's system overall were also gathered here.

## Major Findings

One major finding that comes out of this study is the need to do more of these studies, and develop more in-depth procedures and analysis.

The areas that will need the greatest re-evaluations are the Computer Provider Order Entry (CPOE) and Clinical Decision Support functions. Assistance was sometimes needed for these areas and was reflected in the Task Efficiency section having a lower score. These areas were not commonly used by the participants therefore they were not as familiar with the workflow. For the CPOE areas, it was suggested to make the laboratory and diagnostic imaging sections more user friendly and easier to understand. For the Clinical Decision Support area, it was suggested to make the ability to both check and resolve the clinical decision be in a user friendly area such as a pop-up when saving a note as opposed to clicking a button to check for the alerts. More analysis needs to be done to see where these improvements need to take place within the system.

The biggest revelation was how ineffective the Clinical Decision Support function was at first attempt by a participant. The task had one of the worst effectiveness and efficiency ratings. Since the obvious risks involved are high for ordering laboratory and diagnostic images, a user, ideally, should have a better grasp of how and why the orders are being generated. Office Ally currently addresses the issue by a great training staff, but educating the users on how the orders are created and submitted may be beneficial. Many users requested to have a technician reach out to them to set up an appointment for further training on the area.

The Drug-Drug & Drug-Allergy Interactions functions results are very encouraging. In the 2014 Usability Study, this was one of the areas that had the lowest scores. After working on updating these areas to be more user friendly it is now one of the top scoring areas of the study. Overall user commented that it was easy to find when prescribing a medication. Some did suggest making the alert a pop-up after entering the medication which would draw more attention to the interaction alert as opposed to possibly overlooking the interaction alert in the current workflow.

The findings overall show Office Ally's EHR does what it is supposed to do; that is to present and store medical information to healthcare providers in an ambulatory setting. However, there is room for improvement.

## Areas for Improvement

1. The CPOE function needs improvement, especially in the change/edit functions for the laboratory and diagnostic imaging.
2. Allow for more flexibility for specialists; for instance, make the Progress Note have the ability to be more OB/GYN specific.
3. Add the ability to e-prescribe in other locations in EHR to streamline the ordering process.
4. When adding problems using SNOMED codes, have a separate listing of SNOMED codes to replace the hiding location under the ICD-10 section.

Majority of the satisfaction scores range from mediocre to good. Further analysis is needed on how to make the features with the low scores more user-friendly.

<sup>2</sup> See Tullis, T. & Albert, W. (2008). *Measuring the User Experience*. Burlington, MA: Morgan Kaufman (p. 149). Broadly interpreted, scores under 60 represent systems with poor usability; scores over 80 would be considered above average.

## Introduction

The EHRUT for this study was Office Ally's EHR 24/7, version 3.9.2. Designed to present medical information to healthcare providers in an ambulatory setting, the EHRUT consists of a complete Electronic Health Record (EHR) system. The usability testing attempted to represent realistic exercises and conditions.

The purpose of this study was to test and validate the usability of the current user interface, and provide evidence of usability in the EHRUT, to meet the guidelines as set forth by ONC's 2015 Final Rule Standard 170.315.g.3 – Safety Enhanced Design. To this end, measures of efficiency, effectiveness, and user satisfaction were captured during the usability testing for the following task modules:

- ◆ Computerized provider order entry (CPOE) § 170.315(a)(1),(2),(3)
- ◆ Drug-Drug & Drug-Allergy Interaction § 170.315(a)(4)
- ◆ Demographics § 170.315(a)(5)
- ◆ Problem List § 170.315(a)(6)
- ◆ Medication List § 170.315(a)(7)
- ◆ Medication Allergy List § 170.315(a)(8)
- ◆ Clinical Decision Support § 170.315(a)(9)
- ◆ Implantable Device List § 170.315(a)(14)
- ◆ Clinical Information Reconciliation § 170.315(b)(2)
- ◆ Electronic Prescribing § 170.315(b)(3)

Each of these modules were tested according to their ONC Final Rule Standard, referenced by their § 170.315(x)(y) certification criteria.<sup>3</sup>

## Method

### Participants

A total of 35 people participated in the EHRUT. Participants in the test were typical Office Ally EHR 24/7 users, with an average of 4.5 years' experience using Office Ally. Some were novice users, and some were experienced users. All participants had previous orientations and trainings on the Office Ally EHR program, which all Office Ally users have the opportunity to receive. Office Ally posted a pop-up regarding the Usability Study with a contact email and phone number to reach out to if they were interested. Also at the end of trainings users were also asked if they would like to participate in the study. Of those who responded that they were interested, the participants were directly contacted and were scheduled for a test date. Following the completion of a EHRUT 1 hour study, the participant was compensated with one month free usage of Office Ally's EHR 24/7; a \$29.95 value.

Participants tended to be middle-age to older; with a majority age range between 40-59, and almost everyone felt they were at least moderate computer users. This means all participants felt they were relatively comfortable with computers, if not experts. Majority of participants had an occupation of being a provider and most were the gender of female. The studies were open to providers in any specialty, nurse staff, or office staff.

Participant names were replaced with Participant IDs, so that an individual's data cannot be tied back to individual identities. A total of 46 participants accepted invitations to participate. Of these, 35 actually tested the system, 1 was a no show (unavailable at the scheduled time) and 11 did not complete the test or provide enough information for the purpose of this study.

<sup>3</sup> This certification criterion is from the 2015 Edition Health Information Technology (Health IT) Certification Criteria, 2015 Edition Base Electronic Health Record (EHR) Definition, and ONC Health IT Certification Program Modifications, Final Rule issued by the Department of Health and Human Services (HHS) on October 16, 2015.

Participants had no direct connection to the development of, or organization producing any of Office Ally's functions. Participants were not from the testing or supplier organization. **Table 1** displays the demographic description of the participants.

**Table 1: Participant Demographics**

| ID   | Sex | Age Range | Education                      | Occupation/Role             | Professional Experience (Years) | Computer Experience (Years) | Electronic Health Record Experience (Years) | Office Ally EHR 24/7 Experience (Years) | Assistive Technology for test? |
|------|-----|-----------|--------------------------------|-----------------------------|---------------------------------|-----------------------------|---|---|--------------------------------|
| PCLR | F   | 50-59     | Doctorate degree               | MD                          | 34                              | 12                          | 5   | 5                                       | No                             |
| FCGR | M   | 40-49     | Doctorate degree               | MD                          | 10.5                            | 13                          | 13  | 4.5                                     | No                             |
| FCTL | F   | 50-59     | Associate degree               | Certified Medical Assistant | 36                              | 27                          | 15  | 7                                       | No                             |
| FCCH | F   | 50-59     | Doctorate degree               | MD                          | 29                              | 32                          | 6   | 6                                       | No                             |
| CJLO | F   | 60-69     | Master's Degree                | Nurse Practitioner          | 18                              | 12                          | 15  | 12                                      | No                             |
| CJES | F   | 20-29     | High school graduate           | Administrative Assistant    | 18                              | 5                           | 2   | 18                                      | No                             |
| CJJB | F   | 50-59     | Master's Degree                | Psychiatrist                | 2                               | 12                          | 15  | 6                                       | No                             |
| CJMD | F   | 40-49     | Doctorate degree               | Registered Dietician        | 22                              | 22                          | 10  | 3                                       | No                             |
| CJCK | F   | 50-59     | Doctorate degree               | Nurse Practitioner          | 6                               | 15                          | 4   | 4                                       | No                             |
| CJLQ | F   | 40-49     | Some college credit, no degree | Office Manager              | 13                              | 12                          | 7   | 7                                       | No                             |
| CJLR | F   | 50-59     | Doctorate degree               | MD                          | 34                              | 12                          | 5   | 5                                       | No                             |
| CJDS | F   | 70-79     | Doctorate degree               | DC                          | 21                              | 5                           | 1   | 1                                       | No                             |
| CJSW | F   | 30-39     | Master's Degree                | Chief Strategic Officer     | 1                               | 12                          | 9   | 6                                       | No                             |
| CJNP | F   | 20-29     | High school graduate           | Medical Assistant           | 10                              | 15                          | 4   | 1                                       | No                             |
| CJNA | F   | 50-59     | Associate degree               | Office Manager              | 37                              | 25                          | 7   | 7                                       | No                             |
| CJVM | F   | 50-59     | Associate degree               | Office Manager              | 16                              | 25                          | 8   | 5                                       | No                             |
| CJKC | F   | 20-29     | Some college credit, no degree | Receptionist                | 7                               | 4                           | 7   | 7                                       | No                             |
| CJCH | F   | 20-29     | Bachelor's Degree              | Medical Assistant           | 11                              | 10                          | 6   | 1                                       | No                             |
| RCET | M   | 60-69     | Doctorate degree               | MD                          | 37                              | 30                          | 5   | 5                                       | No                             |
| CJDR | F   | 60-69     | Master's Degree                | Business Manager            | 12                              | 30                          | 4   | 4                                       | No                             |
| CJNS | F   | 20-29     | Bachelor's Degree              | Assistant Manager           | 10                              | 15                          | 6   | 6                                       | No                             |

|      |   |       |                                |                             |      |    |    |   |    |
|------|---|-------|--------------------------------|-----------------------------|------|----|----|---|----|
| CJBB | M | 40-49 | Doctorate degree               | MD                          | 16   | 12 | 5  | 5 | No |
| CJTT | F | 20-29 | Some college credit, no degree | Medical Assistant           | 3    | 10 | 5  | 4 | No |
| BSMS | F | 40-49 | Bachelor's Degree              | Office Manager              | 6    | 10 | 6  | 6 | No |
| BSTL | F | 50-59 | Associate degree               | Certified Medical Assistant | 7    | 30 | 15 | 7 | No |
| PCET | M | 60-69 | Doctorate degree               | MD                          | 37   | 15 | 5  | 5 | No |
| PCSC | F | 40-49 | Doctorate degree               | MD                          | 19   | 12 | 7  | 7 | No |
| CJSB | F | 40-49 | Doctorate degree               | DC                          | 12.5 | 15 | 3  | 3 | No |
| PCSU | M | 50-59 | Doctorate degree               | MD                          | 16   | 35 | 7  | 7 | No |
| PCHI | F | 40-49 | Doctorate degree               | MD                          | 14.5 | 12 | 3  | 3 | No |
| PCMB | F | 50-59 | Some college credit, no degree | Office Manager              | 30   | 30 | 5  | 5 | No |
| BSLO | F | 60-69 | Master's Degree                | Nurse Practitioner          | 16   | 16 | 10 | 5 | No |
| CJBC | F | 40-49 | Doctorate degree               | CAO                         | 5    | 15 | 5  | 5 | No |
| PCJJ | M | 50-59 | Doctorate degree               | MD                          | 16   | 35 | 7  | 7 | No |
| CJAT | F | 40-49 | Doctorate degree               | MD                          | 18   | 15 | 7  | 7 | No |

## Study Design

The process was based on the *NISTIR 7741 NIST Guide to the Processes Approach for Improving the Usability of Electronic Health Records, November 2010* by Robert M. Schumacher and Svetlana Z. Lowry. Overall, the objective of this test was to uncover areas where the application performed well; that is, efficiently, effectively, and with a high degree of satisfaction; and areas where the application failed to meet the needs of the participants. The data from these tests 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.

Participants were scheduled for one 60 minute session and had the ability to schedule studies for additional sections if they were interested. All tests were kept within the overall time allowed, typically 60 minutes. An excel document, online and accessible to all test administrators, was used to keep track of the participants scheduled and task modules that were completed.

During the usability test, participants interacted with only Office Ally's EHR. Each participant used the system by connecting with a test administrator via JoinMe, and was provided with the same instructions. The system was evaluated for efficiency, effectiveness, and satisfaction, as defined by measures collected and analyzed for each participant:

- ◆ Time to complete the tasks
- ◆ Number of clicks to complete the tasks
- ◆ If the task was completed and without assistance

- ◆ Types of errors and/or path deviations
- ◆ Participant's satisfaction ratings of the system
- ◆ Participant's verbalizations

At the end of the test session, the participant was also asked to respond to generalized statements on Office Ally's EHR usability using the SUS scale, see **Appendix 4: Moderator Guide- SUS Questionnaire and Closing**. Additional information about the various measures can be found below on Usability Metrics. A sample can be viewed in **Appendix 2: Moderator Guide Sample- Medication Allergy List**. Task scripts read to the participants for each module can be found in **Appendix 3: Task Scripts**. Data collected from the test can be found in **Appendix 5: Moderator Guide- Data Collection and Scoring**.

## 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:

1. Record/Change/Access a medication order using CPOE.
2. Record/Change/Access a laboratory order using CPOE.
3. Record/Change/Access a radiology order using CPOE.
4. Find and update/add/change a medication in a medication list.
5. Access a patient's historical and current medication list.
6. Find and update/add/change a medication in a medication list.
7. Access a patient's historical and current medication allergy list.
8. Create and trigger a drug-drug and drug-allergy interaction.
9. Add a CDS alert for problem and demographic data.
10. Add a CDS alert for demographic data.
11. Add a CDS alert for vitals data.
12. Add a CDS alert for lab results data.
13. Add a CDS alert for medication list data.
14. Add a CDS alert for medication allergy list data.
15. Add a CDS alert problem list data.
16. Add a CDS alert LOINC list data.
17. Trigger the CDS alerts.
18. View/Access the Diagnostic and Therapeutic Reference Information resource links.
19. Resolve the CDS alerts
20. Use the e-Prescribe module and create a prescription.
21. Use the e-Prescribe module to change prescription.
22. Use the e-Prescribe module to cancel prescription.
23. Use the e-Prescribe module to refill a prescription.
24. Use the e-Prescribe module receive a fill status notification.
25. Use the e-Prescribe module to request and receive medication history information.
26. Reconcile medication lists with the new reconciliation wizard.
27. Reconcile medication allergy lists with the new reconciliation wizard.
28. Reconcile problem lists with the new reconciliation wizard.
29. Generate a CCD with the reconciled information.
30. Record/Change/Access a patient's demographic information.
31. Record/Edit a patient's Problem List.
32. Access a patient's historical and current Problem List.
33. Locate the new Implantable Device section.
34. Add/Change/Access Implantable Device.

To perform the Drug-Drug & Drug-Allergy Interaction functions as well as e-Prescribe within Office Ally's EHR system, a provider must use Office Ally's e-Prescribing feature activated. Task scripts read to the participants for each step can be found in **Appendix 3: Task Scripts**.

A summary of the prioritization of tasks is shown in **Table 2: Criticalness Survey**, also shown in **Appendix 6: Moderator Guide- Criticalness Survey**. The first question of the SUS Survey was responded in reverse scoring by the experts, therefore 1 should be considered the least used and 12 should be considered the most used function. For example, Demographics was identified as being the most used function and Implantable Devices was identified as

being the least used function.

The module where the experts felt the most risk of error was the Implantable Device module, and the Demographics module as second. The Implantable Device section is new to Office Ally and the participants do not utilize this feature so it was new to them causing the error risk.

The Demographic section was scored with a higher risk and was ranked one of the most used functions in EHR. The high risk associated to the Demographic section is due to higher typing errors because it is a highly utilized function.

**Table 2: Criticalness Survey**

**User tasks are prioritized in accordance with risk associated with user errors.**

Experts polled 27

**Prioritize in order of most used function, where 1 is the most used and 12 is the least used.**

|                           |       |
|---------------------------|-------|
| Implantable Device List   | 1.63  |
| Clinical Reconciliation   | 3.15  |
| Clinical Decision Support | 3.30  |
| CPOE – Diagnostic Imaging | 6.07  |
| Drug-Drug/Drug Allergy    | 6.56  |
| CPOE - Laboratory         | 6.89  |
| Medication Allergy List   | 7.26  |
| CPOE – Medications        | 7.63  |
| Medication List           | 8.07  |
| e-Prescribing             | 8.30  |
| Problem List              | 8.56  |
| Demographics              | 10.59 |

**Prioritize the order of functions that have the highest risk of severe patient safety errors, where 1 is the highest and 12 is the lowest risk.**

|                           |      |
|---------------------------|------|
| Implantable Device List   | 3.04 |
| Demographics              | 4.33 |
| Clinical Reconciliation   | 4.81 |
| Clinical Decision Support | 5.59 |
| Problem List              | 5.89 |
| CPOE – Diagnostic Imaging | 6.48 |
| Medication List           | 7.00 |
| CPOE – Laboratory         | 7.26 |
| Medication Allergy List   | 7.70 |
| Drug-Drug/Drug Allergy    | 8.41 |
| e-Prescribing             | 8.70 |
| CPOE – Medications        | 8.78 |

**Prioritize the order of functions that you see our users committing the most errors, where 1 is the function that has the most errors and 12 is the function with the least amount of errors.**

|                           |       |
|---------------------------|-------|
| Implantable Device List   | 1.63  |
| Clinical Reconciliation   | 3.15  |
| Clinical Decision Support | 3.3   |
| CPOE – Diagnostic Imaging | 6.07  |
| Drug-Drug/Drug Allergy    | 6.56  |
| CPOE - Laboratory         | 6.89  |
| Medication Allergy List   | 7.26  |
| CPOE – Medications        | 7.63  |
| Medication List           | 8.07  |
| e-Prescribing             | 8.30  |
| Problem List              | 8.56  |
| Demographics              | 10.59 |

## Procedures

### Online Procedures

Upon reaching the participant over the phone, their identity was verified and matched with the name of the participant scheduled. The participant went to the JoinMe website where they were provided a code by the test administrator which allowed them to view the test administrator's screen. A test account was setup and the participant was given mouse control and the instructions on the test.

The participants were typically asked to respond to the Introduction/Demographics section, a Module section, and the Closing section. Prior to the study, each participant was emailed a Key Data Points file associated with the study, to act as a reference to assist the participant on the test patient information being used.

### Example Key Data Point File

| KEY DATA POINTS- <i>Allergy List</i>                 |   |  |                         |              |
|--|---|--|-------------------------|--------------|
| A. <b>Patient:</b> Alice Alleman,                    | a. DOB 12/12/1990                           | b. She has two previous encounters with allergies listed |                         |              |
| B. <b>Medication Allergies to add:</b> Carbamazepine | a. Reaction: Skin Rash                      | b. Date Recorded: Today                                  | c. Encounter #3 (Today) |              |
| C. <b>Changes:</b>                                   | a. Inactivate Sulfasalazine                 | b. Change Penicillin V to Penicillin G                   | i. Reaction: Dizziness  |              |
|  | c. Inactivate Carbamazepine and add Codeine | i. Reaction: Skin Rash                                   |                         |              |
| D. 1= Very Difficult                                 | 2= Difficult                                | 3= Average   | 4= Easy                 | 5= Very Easy |

The participant was often asked if there were any enhancements or changes they would recommend making to the workflows. At the end of the tests the participant was also asked if there was anything else they wanted to comment on in regards to EHR as a whole. After the tasks were complete, the participant was asked to complete the SUS Survey in the Closing section.

All these procedures are detailed in the Moderator's Guide, and were available to the test administrators at all times. After the sections were completed, and the participant had no more comments, he/she was thanked, told his/her account would be credited by the billing department for the incentive, and logged off of the JoinMe program.

### Test Location

The testing was conducted by a test administrator in one of two Office Ally locations in Washington or Texas, where they setup a test account and had a participant access the account via the JoinMe application. Here the participant had the ability to have mouse control and conduct the test while the test administrator recorded the times and clicks it took to conduct the test steps.

The exact location of the participant was not noted, but it was assumed it was a typical location that was comfortable for the participant, and where he/she did most of their daily work with the EHR program. This test procedure is very familiar to most of the participants, as Office Ally has extensive trainings for our programs utilizing videos, technical training and customer service assistance.

## Test Environment

The EHRUT would typically be used in a healthcare office or facility. Online testing participants used their own computers, as Office Ally is a web-based program. It is assumed, since the participants were able to access their accounts, that they were meeting the basic minimum system requirements to use an online program. Office Ally is not setup for mobile devices, but will work in both Windows and Apple environments. It is assumed most participants used the standard desktop and mouse, or laptop and track pad setup.

Technically, the system performance (i.e., response time) was representative to what actual users would experience in a field implementation. Issues of web performance are always a concern to us, and test administrators were instructed to note any problems, if any, during the test. No extraordinary performance issues were noted; a couple participants commented the mouse was delayed with using the JoinMe program.

## Test Forms and Tools

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

1. Moderator's Guide
2. Introduction & Demographic section
3. The test module(s) sections
4. Post-test (SUS) questionnaire and Closing section
5. Test Administrators' timer
6. Test Administrators' click counter
7. JoinMe account for the test administrator
8. Key Data Points notes file for the participant

The scripts, instructions, and worksheets can be found in the Moderators Guide. The Moderator's Guide was devised so as to be able to capture the required data.

## Participant Instructions

### Introduction Script

The administrator reads the following introductory instructions aloud to each participant (also see **Appendix 1: The Moderator's Guide- Introduction & Demographics**):

*Thank you for participating in this study. Your input is very important. Our total session today will last anywhere from 30 to 60 minutes. During that time you will use an instance of the Office Ally EHR 24/7 electronic health record. 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. Please be honest with your opinions. All of the information that you provide will be kept confidential and your name will not be associated with your comments at any time. This study here will also be publically posted in time on CMS's EHR Certification website. We realize you are helping us; should you feel it necessary, you are able to withdraw at any time during the testing for any reason.*

*First, I need to setup a two way interaction session using JoinMe, a smaller, light weight secure application from JoinMe, the program we generally use for tech training and support.*

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

*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 will ask you your impressions about the task once you are done.*

*During these tasks I may take your comments and refocusing them to the task on hand, but when all the tasks are complete, ALL comments and questions can be taken regarding ANY part of Office Ally’s functions.*

*Any questions so far?*

*For this first part of the study, we need to gather some non-identifying demographic data.*

Demographics were collected next. Participants were then given various tasks to complete depending on the module they were assigned. All task scripts can be found in **Appendix 3: Task Scripts**. For a full sample of the Moderators guide see **Appendix 2: Moderator Guide Sample- Medication Allergy List**.

## Usability Metrics

According to the *NISTIR 7741 NIST Guide to the Processes Approach for Improving the Usability of Electronic Health Records, November 2010*, EHRs should support a process that provides a high level of usability for all users. The goal is for participants to interact with the system efficiently, effectively, and with an acceptable level of satisfaction. To this end, metrics for efficiency, effectiveness, and participant satisfaction were captured during the usability testing.

The goals of the test were to assess:

1. Efficiency of Office Ally 24/7 by measuring the average task time and path efficiency
2. Effectiveness of Office Ally 24/7 by measuring participant success rates
3. Satisfaction with Office Ally 24/7 by measuring ease of use ratings

## Data Scoring

Details of how data was collected for tasks, how tasks were scored, how errors were evaluated, and how the time data was analyzed can be found in **Appendix 4: Moderator Guide- Data Collection and Scoring**. A general summary follows.

### Efficiency: Task Time

The start and stop times for each step of the study were recorded. The total completion time between the start and stop times were also recorded and used as part of the efficiency section.

### Efficiency: Task Deviations

Best paths (i.e., procedural steps) were recorded when constructing tasks. These paths were noted on the test administrator’s Moderator’s Guide, with their scripts and notes sheets. The test administrators were instructed to note any wide deviations off the optimal path.

After the task was done or stopped, the test administrator was asked to rate the participant’s choice of paths. The administrator rated the efficiency of the participant’s paths using a five point scale with the following:

- 1 = Could not complete
- 2 = Timed out, but would have got there eventually with more time or guidance
- 3 = Got there eventually within the time but with many wrong paths and corrections
- 4 = Completed within time but with different paths

5 = Completed without major deviations

An average across participant scores was calculated for each task.

### Effectiveness: Task Success

A task was counted as a "Success" if the participant was able to achieve the correct outcome, without assistance, within the time allotted on a per task basis. The total number of successes 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, tasks completed over tasks attempted.

### Satisfaction: Task Rating

The 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.

#### Post-Task Rating

For the post-task measurement, after each task, the participant was asked, "How would you rate the [task] on a five point scale where, 1 is very difficult, 3 is average, and 5 is very easy?" These data points are averaged across participants. Common convention is that average ratings for systems judged easy to use should be 3.3 or above.

#### Post-Session Rating

For the post-session measurement, participants' confidence in, and likeability of, Office Ally's EHR 24/7 overall were tested by the administrators, using the System Usability Scale (SUS) post-test questionnaire. Questions included;

- ◆ "I think I would like to use this system frequently."
- ◆ "I thought the system was easy to use."
- ◆ "I would imagine that most people would learn to use this system very quickly."

These kinds of statements were rated on a five point scale, where 1 is strongly disagree, and 5 is strongly agree. See the full System Usability Score questionnaire in **Appendix 3: Moderator Guide- SUS Questionnaire and Closing**. See **Appendix 4: Moderator Guide- Data Collection and Scoring** for weighted scoring details of the SUS questionnaire.

## Results

### Data Analysis and Reporting

The results of the usability test were calculated according to the methods specified in the Usability Metrics section above. The usability testing results for the EHRUT are detailed below in **Table 3: Results**. The results should be seen in light of the objectives and goals outlined in the Study Design section. The data should yield actionable results that, if corrected, give a positive impact on user performance. This study now has become a workable baseline to refer to during further studies.

**Table 3: Results**

| CPOE Medication (See Appendix 3) |            |              |                |            |              |                |            |              |
|----------------------------------|------------|--------------|----------------|------------|--------------|----------------|------------|--------------|
| Record                           |            |              | Change         |            |              | Access         |            |              |
| Efficient Path                   | Completion | Satisfaction | Efficient Path | Completion | Satisfaction | Efficient Path | Completion | Satisfaction |
| 4.0                              | 100.00     | 4.0          | 3.5            | 70%        | 3.6          | 3.9            | 80%        | 3.6          |

| CPOE Laboratory (See Appendix 3) |            |              |                |            |              |                |            |              |
|----------------------------------|------------|--------------|----------------|------------|--------------|----------------|------------|--------------|
| Record                           |            |              | Change         |            |              | Access         |            |              |
| Efficient Path                   | Completion | Satisfaction | Efficient Path | Completion | Satisfaction | Efficient Path | Completion | Satisfaction |
| 3.5                              | 70%        | 3.1          | 3.4            | 60%        | 3.2          | 3.6            | 70%        | 3.6          |

| CPOE Radiology/Imaging (See Appendix 3) |            |              |                |            |              |                |            |              |
|---|------------|--------------|----------------|------------|--------------|----------------|------------|--------------|
| Record                                  |            |              | Change         |            |              | Access         |            |              |
| Efficient Path                          | Completion | Satisfaction | Efficient Path | Completion | Satisfaction | Efficient Path | Completion | Satisfaction |
| 3.6                                     | 80%        | 3.4          | 3.4            | 70%        | 4.0          | 3.6            | 70%        | 4.0          |

| Drug-Drug/Drug-Allergy (Appendix 4) |            |              |                                 |            |              |
|-------------------------------------|------------|--------------|---------------------------------|------------|--------------|
| Create Drug-Drug Interaction        |            |              | Create Drug-Allergy Interaction |            |              |
| Efficient Path                      | Completion | Satisfaction | Efficient Path                  | Completion | Satisfaction |
| 3.5                                 | 100%       | 4.9          | 5.0                             | 100%       | 5.0          |

| Medication List (Appendix 5) |            |              |                        |            |              |                        |            |              |
|------------------------------|------------|--------------|------------------------|------------|--------------|------------------------|------------|--------------|
| Record Medication List       |            |              | Change Medication List |            |              | Access Medication List |            |              |
| Efficient Path               | Completion | Satisfaction | Efficient Path         | Completion | Satisfaction | Efficient Path         | Completion | Satisfaction |
| 5.0                          | 100%       | 4.5          | 4.0                    | 90%        | 3.5          | 4.4                    | 90%        | 4.1          |

| Medication Allergy List (Appendix 6) |            |              |                                |            |              |                                |            |              |
|--------------------------------------|------------|--------------|--------------------------------|------------|--------------|--------------------------------|------------|--------------|
| Record Medication Allergy List       |            |              | Change Medication Allergy List |            |              | Access Medication Allergy List |            |              |
| Efficient Path                       | Completion | Satisfaction | Efficient Path                 | Completion | Satisfaction | Efficient Path                 | Completion | Satisfaction |
| 4.1                                  | 90%        | 4.4          | 4.0                            | 90%        | 3.7          | 3.8                            | 80%        | 3.9          |

| Clinical Decision Support (Appendix 7) |            |              |                      |            |              |
|--|------------|--------------|----------------------|------------|--------------|
| Activate Standard Alerts               |            |              | Create Custom Alerts |            |              |
| Efficient Path                         | Completion | Satisfaction | Efficient Path       | Completion | Satisfaction |
| 4.5                                    | 100%       | 4.2          | 4.9                  | 100%       | 4.2          |

| Generate Alerts |            |              | Access Reference Information/Resolve Alerts |            |              |
|-----------------|------------|--------------|---|------------|--------------|
| Efficient Path  | Completion | Satisfaction | Efficient Path                              | Completion | Satisfaction |
| 4.5             | 90%        | 4.0          | 4.4   | 90%        | 3.6          |

| e-Prescribe (Appendix 8) |            |              |                       |            |              |                       |            |              |
|--------------------------|------------|--------------|-----------------------|------------|--------------|-----------------------|------------|--------------|
| Create a Prescription    |            |              | Refill a Prescription |            |              | Change a Prescription |            |              |
| Efficient Path           | Completion | Satisfaction | Efficient Path        | Completion | Satisfaction | Efficient Path        | Completion | Satisfaction |
| 4.6                      | 100%       | 4.6          | 4.9                   | 100%       | 4.3          | 4.7                   | 90%        | 4.6          |

| Cancel a Prescription |            |              | Receive a Fill Status |            |              | Request and Receive Medication History |            |              |
|-----------------------|------------|--------------|-----------------------|------------|--------------|--|------------|--------------|
| Efficient Path        | Completion | Satisfaction | Efficient Path        | Completion | Satisfaction | Efficient Path                         | Completion | Satisfaction |
| 4.4                   | 80%        | 4.1          | 5.0                   | 100%       | 4.3          | 4.1                                    | 70%        | 3.7          |

| Clinical Reconciliation (Appendix 9) |            |              |                                   |            |              |
|--------------------------------------|------------|--------------|-----------------------------------|------------|--------------|
| Reconcile Medication List            |            |              | Reconcile Medication Allergy List |            |              |
| Efficient Path                       | Completion | Satisfaction | Efficient Path                    | Completion | Satisfaction |
| 4.3                                  | 100%       | 3.7          | 4.8                               | 100%       | 4.6          |

| Reconcile Problem List |            |              | Generate CCD   |            |              |
|------------------------|------------|--------------|----------------|------------|--------------|
| Efficient Path         | Completion | Satisfaction | Efficient Path | Completion | Satisfaction |
| 4.9                    | 100%       | 4.6          | 4.6            | 100%       | 4.4          |

| Demographics (Appendix 10) |            |              |                     |            |              |                     |            |              |
|----------------------------|------------|--------------|---------------------|------------|--------------|---------------------|------------|--------------|
| Record Demographics        |            |              | Change Demographics |            |              | Access Demographics |            |              |
| Efficient Path             | Completion | Satisfaction | Efficient Path      | Completion | Satisfaction | Efficient Path      | Completion | Satisfaction |
| 4.7                        | 100%       | 4.4          | 4.8                 | 100%       | 4.2          | 4.7                 | 100%       | 4.6          |

| Problem List (Appendix 11) |            |              |                     |            |              |
|----------------------------|------------|--------------|---------------------|------------|--------------|
| Record Problem List        |            |              | Change Problem List |            |              |
| Efficient Path             | Completion | Satisfaction | Efficient Path      | Completion | Satisfaction |
| 4.5                        | 100%       | 3.1          | 4.7                 | 100%       | 3.9          |

| Access Active Problem List |            |              | Access Problem List History |            |              |
|----------------------------|------------|--------------|-----------------------------|------------|--------------|
| Efficient Path             | Completion | Satisfaction | Efficient Path              | Completion | Satisfaction |
| 5.0                        | 100%       | 4.5          | 5.0                         | 100%       | 4.4          |

| Implantable Device (Appendix 12) |            |              |                        |            |              |                       |            |              |
|----------------------------------|------------|--------------|------------------------|------------|--------------|-----------------------|------------|--------------|
| Locate Implantable Device        |            |              | Add Implantable Device |            |              | Add Additional Device |            |              |
| Efficient Path                   | Completion | Satisfaction | Efficient Path         | Completion | Satisfaction | Efficient Path        | Completion | Satisfaction |
| 4.2                              | 90%        | 3.3          | 4.5                    | 90%        | 3.9          | 4.6                   | 90%        | 4.3          |

| Change Implantable Device |            |              | Access Implantable Device List |            |              |
|---------------------------|------------|--------------|--------------------------------|------------|--------------|
| Efficient Path            | Completion | Satisfaction | Efficient Path                 | Completion | Satisfaction |
| 3.9                       | 70%        | 3.8          | 3.9                            | 70%        | 3.8          |

The results from the SUS (System Usability Scale) scored the subjective satisfaction with the system based on performance with these tasks to be: 70. The individual SUS scores were balanced between high and low scores, giving an average score to Office Ally's EHR system.

### Comments from Participants

1. For the Medication List tasks:
  - a. "Make the search a little smarter, able to pick words out."
  - b. "It would be nice to have the ability to use e-Prescribe from the Medication List section instead of going into a note every time."
2. For the DDI/DAI tasks:
  - a. "It should be a popup that is a warning instead of a page so easily overlooked"
  - b. " There needs to be a more prominent way to display the interactions"
3. Overall Comments:
  - a. "Radiology and Laboratory orders need to be easier to understand."
  - b. "The adding additional line items to the laboratory orders needs to be more direct and easier to understand"
  - c. When adding SNOMED codes to the Problem List there should be a selection specifically for the SNOMED codes as opposed to going into the ICD-10 section to find it

- d. “A lot of physicians, we have to print out and fax separately. There are EHR systems out there that allow faxing inside the EHR.”
- e. “It would be easier if we were able to attach multiple pharmacies to a specific person so when we prescribed a medication all of the pharmacies would come up for that patient”
- f. “We would be willing to pay more if we were able to customize the program for our company”

## Summary of the Findings

### CPOE Findings

For CPOE, the participants were asked to record, change, and access Medication Orders, Lab Orders, and Radiology Orders. For efficient path utilization, the administrators gave an average score of 3.57 for the tasks; the participants finished the tasks but with issues. The participants did not use the most ideal paths but got to the end goal eventually. Lab orders and radiology orders is a function that most participants do not utilize in the Office Ally EHR. This may have caused the most deviations from paths because of its unfamiliarity, which impacted the efficiency score. That cannot be ascertained from these results, as the record score was not broken down enough to capture that, but may explain the low laboratory and radiology satisfaction score.

In terms of effectiveness, the medications orders were always finished. Lab and radiology orders gave some people problems likely due to their inexperience with the feature. Labs and radiology orders have similar workflows although some participants were able to order labs; they were unable to complete the radiology. This could be due to the participant becoming tired after trying to order the lab that they did not want to attempt to complete a radiology order as well per comments from the participants. It was commented on that it was also difficult to do edits (the change task) on the medications screen. Satisfaction for the most part was below average, and difficult.

| <i>CPOE - Medications</i> |                           |               |
|---------------------------|---------------------------|---------------|
| Effectiveness             | Task Successes            | <b>83.33%</b> |
|                           | Task Failures             | <b>16.67%</b> |
|                           | Task Time (Minutes)       | <b>3.83</b>   |
|                           | Task Performance Clicks   | <b>22</b>     |
|                           | Average Task Efficiency   | <b>3.80</b>   |
|                           | Average Task Satisfaction | <b>3.73</b>   |

| <i>CPOE - Laboratory</i> |                           |               |
|--------------------------|---------------------------|---------------|
| Effectiveness            | Task Successes            | <b>66.67%</b> |
|                          | Task Failures             | <b>33.33%</b> |
|                          | Task Time (Minutes)       | <b>2.90</b>   |
|                          | Task Performance Clicks   | <b>17</b>     |
|                          | Average Task Efficiency   | <b>3.50</b>   |
|                          | Average Task Satisfaction | <b>3.30</b>   |

| <i>CPOE - Radiology</i> |                           |               |
|-------------------------|---------------------------|---------------|
| Effectiveness           | Task Successes            | <b>73.33%</b> |
|                         | Task Failures             | <b>26.67%</b> |
|                         | Task Time (Minutes)       | <b>1.9</b>    |
|                         | Task Performance Clicks   | <b>13</b>     |
|                         | Average Task Efficiency   | <b>3.53</b>   |
|                         | Average Task Satisfaction | <b>3.80</b>   |

### Drug-Drug & Drug- Allergy Interaction Findings

Office Ally’s e-Prescription feature for the DDI and DAI module is integrated in EHR and also used for the e-

Prescribe module. Office Ally created an internal e-prescribe feature which has positively impacted both the efficiency and satisfaction scores since the 2014 certification. The Drug-Drug and Drug-Allergy Interactions are part of the e-Prescribe workflow and are generated including the severity if an interaction is found. For this workflow participants had a satisfaction rating of 4.95 which is one of the highest scoring areas. Some participants suggested alternative methods of displaying interactions, but the overall feedback was positive.

| <i>Drug-Drug &amp; Drug-Allergy Interactions</i> |                           |                |
|--|---------------------------|----------------|
| <b>Effectiveness</b>                             | Task Successes            | <b>100.00%</b> |
|  | Task Failures             | <b>0.00%</b>   |
|  | Task Time (Minutes)       | <b>2.85</b>    |
|  | Task Performance Clicks   | <b>16</b>      |
|  | Average Task Efficiency   | <b>5.00</b>    |
|  | Average Task Satisfaction | <b>4.95</b>    |

### Medication Findings

Recording and changing Medications had a high success rate and low failure rate. A few comments were made regarding the suggestion to be able to prescribe medications while in the medication list. This was also mentioned while testing the e-Prescribe feature. The main challenge for participants was locating where the Medication List was located. With efficient path factor of 4.43, this showed the participants eventually were able to locate the Medication List feature and successfully complete the test. Positive feedback from the participants was displayed as the satisfaction score was 4.0.

| <i>Medication List</i> |                           |               |
|------------------------|---------------------------|---------------|
| <b>Effectiveness</b>   | Task Successes            | <b>93.33%</b> |
|                        | Task Failures             | <b>6.67%</b>  |
|                        | Task Time (Minutes)       | <b>4.93</b>   |
|                        | Task Performance Clicks   | <b>30</b>     |
|                        | Average Task Efficiency   | <b>4.43</b>   |
|                        | Average Task Satisfaction | <b>4.00</b>   |

### Medication Allergies Findings

Similar to the Medication List task, recording the Medication Allergy scored well in satisfaction but a little lower in the efficiency section. This suggests while it works, it could be better enhanced for our users. The overall consensus from the participants is that they would like the medication allergies to be displayed more prominently such as a pop-up so providers are alerted before they continue. Task failures were due to participants not being able to locate the Medication Allergy List since they do not utilize the feature. Those who were able to complete the study found it easy to add and edit medication allergies hence the satisfaction score averaged 4.

| <i>Medication Allergy List</i> |                           |               |
|--------------------------------|---------------------------|---------------|
| <b>Effectiveness</b>           | Task Successes            | <b>86.67%</b> |
|                                | Task Failures             | <b>13.33%</b> |
|                                | Task Time (Minutes)       | <b>3.30</b>   |
|                                | Task Performance Clicks   | <b>26</b>     |
|                                | Average Task Efficiency   | <b>3.97</b>   |
|                                | Average Task Satisfaction | <b>4.00</b>   |

### Clinical Decision Support Findings

As suggested by the low score in the Criticalness Survey, the Clinical Decision functions is not a highly utilized feature of Office Ally. This module had many tasks to accomplish, including activating alerts for Medications, Medication Allergies, Problems, Lab Results, Vitals, Procedures, Demographic data, as well as resolving the alerts. The satisfaction of this initial setup section was lower than expected, with an average score of 3.2. This result could be due to participants not being familiar with the CDS section in EHR. Once the participants located the feature, the feedback regarding creating the alerts was positive. The overall feedback from the participants was that they suggested having the location of checking clinical alerts to be displayed in a different manor such as a popup.

| <i>Clinical Decision Support</i> |                           |               |
|----------------------------------|---------------------------|---------------|
| <b>Effectiveness</b>             | Task Successes            | <b>95.00%</b> |
|                                  | Task Failures             | <b>5.00%</b>  |
|                                  | Task Time (Minutes)       | <b>6.78</b>   |
|                                  | Task Performance Clicks   | <b>40</b>     |
|                                  | Average Task Efficiency   | <b>3.66</b>   |
|                                  | Average Task Satisfaction | <b>3.20</b>   |

## E-Prescription Findings

Like the DDI/DAI test, e-Prescribing relies on Office Ally's e-Prescribe module. Most of the participants for this study were familiar with the e-prescribe, a couple were novice on how to use the feature. E-Prescribe had a high efficiency rating at 4.75. Most participants, including novice users were able to prescribe and renew a prescription easily. The satisfaction level was also high at 4.45. Most participants overall stated e-Prescribe is an easy feature to use. Some of the suggestions participants provided was for Office Ally to look into adding the ability to e-Prescribe from the medication tab as opposed to only in a note. It was also suggested that we look into the ability to save pharmacies in the demographic data that matches up when e-prescribing. Overall the feedback for this test was positive.

| <i>e-Prescribing</i> |                           |               |
|----------------------|---------------------------|---------------|
| <b>Effectiveness</b> | Task Successes            | <b>90.00%</b> |
|                      | Task Failures             | <b>10.00%</b> |
|                      | Task Time (Minutes)       | <b>3.78</b>   |
|                      | Task Performance Clicks   | <b>22</b>     |
|                      | Average Task Efficiency   | <b>4.62</b>   |
|                      | Average Task Satisfaction | <b>4.27</b>   |

## Clinical Reconciliation Findings

Another module that had significant enhancements for Meaningful Use 2015 was Clinical Reconciliation. It is important to note for testing some participants needed the screen to be enlarged; therefore the monitor zoom was up to 150% in some cases. This led to participants locating the Direct Message inbox easier since it was located at the beginning of the desktop tab. This is why the success rate is higher with an efficiency score of 4.67 than we expected. The satisfaction score was high at 4.33 as well. This was likely partially due to the ease of locating the feature when the screen was enlarged. Most participants mentioned it was a very easy feature to use once they realized where the direct inbox was located. A few participants were interested in looking further into the feature and direct messaging with a technician at another time. The primary negative comment was the difficulty for some of the participants to locate the inbox; especially if they did not have the screen zoomed in. The results for these reconciliation tasks were extremely strong and positive for all three categories of efficiency, effectiveness and satisfaction.

| <i>Clinical Information Reconciliation</i> |                           |                |
|--|---------------------------|----------------|
| <b>Effectiveness</b>                       | Task Successes            | <b>100.00%</b> |
|  | Task Failures             | <b>0.00%</b>   |
|  | Task Time (Minutes)       | <b>3.13</b>    |
|  | Task Performance Clicks   | <b>12</b>      |
|  | Average Task Efficiency   | <b>4.70</b>    |
|  | Average Task Satisfaction | <b>4.35</b>    |

## Implantable Device Findings

The Implantable Devices section of EHR is one of the newest features. The participants were first asked to locate the Implantable Device section of EHR. This was the most time consuming portion of the study. Once participants found the location they were asked if there was a different location in EHR that they would recommend it to be at. Most participants once they either found the location or gave up and were shown, noted where the feature is currently makes sense. Adding and accessing the Implantable Devices were tested fairly easy which shows in the efficiency section scoring 4.32. The satisfaction section scored fair at 3.86. Participants stated it was easy to navigate and use, but since they would not use the feature themselves, they did not have additional suggestions for changes.

| <b>Implantable Device List</b> |                           |               |
|--------------------------------|---------------------------|---------------|
| <b>Effectiveness</b>           | Task Successes            | <b>86.00%</b> |
|                                | Task Failures             | <b>14.00%</b> |
|                                | Task Time (Minutes)       | <b>10.86</b>  |
|                                | Task Performance Clicks   | <b>2</b>      |
|                                | Average Task Efficiency   | <b>4.32</b>   |
|                                | Average Task Satisfaction | <b>3.86</b>   |

### Demographic Findings

The Demographics test was expected to have high ratings for effectiveness, efficiency and satisfaction since it is one of the most commonly used sections of EHR which is proven from the Criticalness Survey. This test did rank as one of the highest in efficiency and satisfaction, scoring 4.4 in satisfaction and 4.73 in efficiency. Most participants did not have any additional suggestions to make, but it was suggested by a couple participants to make the multi select feature for some of the selections different. Most participants ended up having two languages, for example, selected after creating the demographics and then editing. Once the participant went to the accessing information step, they realized their mistake with the double selection and went back to correct the following patient demographic sections before moving to the access step. Since the demographic information is constantly utilized the participants did not have other comments or suggestions of change to the feature.

| <b>Demographics</b>  |                           |                |
|----------------------|---------------------------|----------------|
| <b>Effectiveness</b> | Task Successes            | <b>100.00%</b> |
|                      | Task Failures             | <b>0.00%</b>   |
|                      | Task Time (Minutes)       | <b>5.90</b>    |
|                      | Task Performance Clicks   | <b>54</b>      |
|                      | Average Task Efficiency   | <b>4.73</b>    |
|                      | Average Task Satisfaction | <b>4.40</b>    |

### Problem List Findings

The Problem list section scored well for effectiveness, and efficiency. It is a common feature almost all participants were familiar with. There was 100% success and the efficiency scored 4.8. The task satisfaction section scored lower than expected at 3.95. This was likely due to utilizing SNOMED codes for this section of the test. None of the participants were familiar with SNOMED codes and were not sure if they were going to the right place to add the information. The common suggestions for this test was that we should have a separate selection when using SNOMED codes as opposed to the participants going into the ICD-10 section to locate the SNOMED code lookup.

| <b>Problem List</b>  |                           |                |
|----------------------|---------------------------|----------------|
| <b>Effectiveness</b> | Task Successes            | <b>100.00%</b> |
|                      | Task Failures             | <b>0.00%</b>   |
|                      | Task Time (Minutes)       | <b>4.00</b>    |
|                      | Task Performance Clicks   | <b>25</b>      |
|                      | Average Task Efficiency   | <b>4.80</b>    |
|                      | Average Task Satisfaction | <b>3.95</b>    |

Table 5: Task Details

| Task Description                        | Number of Testers | Task Success % | Path Deviation (obs./optimal) | Mean Optimal Task Time in Sec. (SD) | Mean Deviation Task Time (Obs./Optimal) | Errors (SD) | Task Ratings (SD) |
|---|-------------------|----------------|-------------------------------|-------------------------------------|---|-------------|-------------------|
| a.1 CPOE Medication                     | 10                | 83.3           | 25/18                         | 193 (148.5)                         | 100/75                                  | 23.3 (4.4)  | 3.73 (3)          |
| a.2 CPOE Laboratory                     | 10                | 66.6           | 20/11                         | 174 (154.4)                         | 110/65                                  | 30 (26.3)   | 3.3 (1.6)         |
| a.3 CPOE Radiology                      | 10                | 73.3           | 18/8                          | 235 (103)                           | 110/65                                  | 29.3 (15.2) | 3.8 (1.4)         |
| a.4 DD-DAI                              | 10                | 100            | 20/15                         | 288 (71.5)                          | 120/90                                  | 0 (0)       | 5 (0)             |
| a.5 Demographics                        | 10                | 100            | 33/26                         | 394 (156.7)                         | 340/150                                 | 5.3(4.6)    | 4.4 (0.7)         |
| a.6 Problem List                        | 10                | 100            | 23/16                         | 205.2 (73.96)                       | 144/60                                  | 7 (1.5)     | 4.1 (0.8)         |
| a.7 Medication List                     | 10                | 93.3           | 30/20                         | 296 (153.9)                         | 555/330                                 | 4 (2.7)     | 4 (1.2)           |
| a.8 Medication Allergy List             | 10                | 86.6           | 20/15                         | 198 (91.6)                          | 130/90                                  | 13.3 (3.3)  | 4 (1.4)           |
| a.9 Clinical Decision Support           | 10                | 95             | 21/13                         | 406.5 (171.3)                       | 270/150                                 | 16.3 (3.7)  | 4 (1.1)           |
| a.14 Implantable Device List            | 10                | 86.0           | 4/3                           | 117.6 (56.6)                        | 90/60                                   | 17 (3.2)    | 3.9 (1.3)         |
| b.2 Clinical Information Reconciliation | 10                | 100            | 5/3                           | 187.5 (114.5)                       | 29/19                                   | 4.8 (2.2)   | 4.4 (0.8)         |
| b.3 Electronic Prescribing              | 10                | 90             | 95/12                         | 227 (113.4)                         | 79/60                                   | 7.6 (21.6)  | 4.3 (0.9)         |

## Appendices

### Appendix 1: MODERATOR GUIDE – Introduction and Demographics

#### Introduction Script

To be read by the test administrator to the participant at the beginning of the session.

*Thank you for participating in this study. Your input is very important. Our total session today will last anywhere from 30 to 60 minutes. During that time you will use an instance of the Office Ally EHR 24/7 electronic health record. 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. Please be honest with your opinions. All of the information that you provide will be kept confidential and your name will not be associated with your comments at any time. This study here will also be publically posted in time on CMS's EHR Certification website. We realize you are helping us; should you feel it necessary, you are able to withdraw at any time during the testing for any reason.*

*First, I need to setup a two way interaction session using JoinMe, a smaller, light weight secure application from LogMeIn, the program we generally use for tech training and support. I will ask you to complete a few tasks using this system and answer some questions. You should complete the tasks as quickly as possible making as few errors as possible. Please try to complete the tasks on your own following the instructions very closely. Please note that we are not testing you, we are testing the system, therefore, if you have difficulty all this means is that something needs to be improved in the system. I will be here in case you need specific help, but I may not be able to instruct you or provide help in how to use the application.*

*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 will ask you your impressions about the task once you are done.*

*During these tasks I may take your comments and refocusing them to the task on hand, but when all the tasks are complete, ALL comments and questions can be taken regarding ANY part of Office Ally's functions.*

*Any questions so far?*

*For this first part of the study, we need to gather some non-identifying demographic data.*

Go to the Demographics Worksheet page.

#### Demographics

All the blanks need to be filled. Where possible, use numeric codes to facilitate data collection. If cannot use a code, or feel a code is inappropriate, then write in a response. Use N/A (not available) only if no other options are available. Capture any pertinent comments and/or questions in the notes section.

1. Test Date:
2. Test Time: (now)
3. Test Administrator: You
4. Location of tester: TX-In house or WA-In house
5. State of participant: where the participant works
6. Gender
7. Age
8. Education
9. Occupation/Role: the role of the participant. use the codes, Provider, PA/Nurse, Administrator, Medical Assistant
10. Specialty: if applicable (like OB/GYN), write in
11. Years of Practice Experience
12. Years of Computer Experience
13. Years of Office Ally EHR 24/7 Experience:

14. Does the participant need Assistive Technology? (example = "VoiceOver" assistance, a yes/no response)  
 15. NOTES: (e.g. internet speed issues, browser name, using a tablet, language, not normal working environment)

## DEMOGRAPHICS WORKSHEET

**Test date:** \_\_\_\_\_

**Test time started:** \_\_\_\_\_

**Test Administrator:** \_\_\_\_\_

**Location of tester:** \_\_\_\_\_

**State of participant:** \_\_\_\_\_

**Gender:** \_\_\_\_\_

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

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

*No high school degree*

*High school graduate, diploma or the equivalent (for example: GED)*

*Some college credit, no degree*

*Trade/technical/vocational training*

*Associate degree*

*Bachelor's degree*

*Master's degree*

*Doctorate degree (e.g., MD, DNP, DMD, PhD)*

**Occupation/Role:** \_\_\_\_\_

*(like MD, PA, RN, Office Manager)*

**Specialty:** \_\_\_\_\_

*(like OB/Gyn, Pediatrics, Chiropractor)*

**Years/Months in Practice:** \_\_\_\_\_

**Years/Months of Computer Experience:** \_\_\_\_\_

**Years/Months of Electronic Health Record Experience:** \_\_\_\_\_

**Years/Months of Office Ally EHR 24/7 Experience:** \_\_\_\_\_

**Participant needs Assistive Technology for this test?:** \_\_\_\_\_

*(if yes, we will have to reschedule this test to accommodate if we can)*

**Participant knows how to use our eRx modules?:**            *yes*                    *no*

*(you may need to gauge this)*

Test administrator notes: If a user does not feel comfortable with or does not prescribe medications in the office workflow (common for Office Managers and Medical Assistants, you may need to pick a more "friendly" module that the participant can utilize, like the Problem List or the Implantable Devices modules instead of the CPOE, or DDI modules.

**NOTES:** *(e.g. internet speed issues, using a tablet, language, not normal working environment, Firefox)*

## Appendix 2: MODERATOR GUIDE SAMPLE- Medication Allergy List

### Pretest Setup

This data has already been entered into the EHRUT prior to the participant accessing it. This task assumes the participant is already logged into EHR and will start at the Desktop tab.

#### In EHR System:

**Provider 1:** Mark R, MD

#### Demographics Page:

**Patient:** Alice Alleman  
**DOB:** 12/12/1990  
**Gender:** Female  
**Race:** White  
**Ethnicity:** Not Hispanic or Latino  
**Address:** 123 Main Street, Santa Ana, CA 92704  
**Phone:** 714-322-1580

#### Progress Note:

**Encounters:**

- 1) Sulfasalazine: Reaction: shortness of breath, Date Recorded: Same as encounter date
- 2) Penicillin, Reaction: Dizziness, Date Recorded: Same as encounter date

#### Key data for user.

- A. Patient: Alice Yellen, DOB: 12/12/1990, she has two previous encounters with allergies listed
- B. Medication allergies to add:
  - a. Carbamazepine, Reaction: Skin rash, Date Recorded: Today, Encounter #2 (Today)
- C. Changes
  - a. Inactivate Sulfasalazine
  - b. Change Penicillin to Amoxicillin, Reaction: Dizziness, Date Recorded: Today
  - c. Inactivate Carbamazepine
  - d. Add Codeine, Reaction: Skin Rash
- D. 1 = very difficult    2 = difficult    3 = average    4 = easy    5 = very easy

### Task 1: Record Allergies for the Allergy List

Make sure patient is on the Desktop tab in EHR.

*We are looking at recording allergies in our system. For the first task, I would like you to record an allergy and its reaction for a patient. Our test patient is Alice Yellen, date of birth, December 12, 1990. She has had two previous encounters where allergies were listed. Here is a data sheet for reference.*

*The allergy to list is for Carbamazepine which gives her a skin rash. Feel free to refer to the data sheet for reference.*

*Again, remember we are NOT TESTING YOU, we are testing the system. Click on the desktop tab. This will be your starting point. Any questions?*

If not, set ClickCounter to zero....

*Okay, Ready, begin.*

This is the Efficiency section:

Time begun: \_\_\_\_\_

Number of clicks before start: \_\_\_\_\_

Time done: \_\_\_\_\_

Number of clicks when task complete: \_\_\_\_\_

Notes:

**Best path** (*subjective*)

Click on the Patient Charts Tab>Under Patient List, type in "Yellen", click on search>Click on Alice Yellen>Hover over the Medications drop down, select Allergy List

- A. Click on the Add New button>Click on the second ellipse button>type in 'Carbama'>Click select for Carbamazepine>Click the Add button
- B. Click Edit on the Carbamazepine row >In the reaction box, choose 'Rash'>In Reaction Date enter current date>click Update

Notes on the participant's path to complete the task. Note deviations and errors:

When done, (don't forget end time)...

Rate the **efficiency** of the participant's paths used (circle one).

1 = Could not complete at all

2 = Gave up but would have got there eventually with more time or guidance

3 = Got there eventually within the time but with many wrong paths and corrections

4 = Completed within time but with different paths

5 = Completed without major deviations

**This is the Effectiveness section:**

The medication allergy order task was completed successfully?:    Yes                      No

**This is the Satisfaction section:**

*Thank you testing that. I have a one more question regarding the task.*

*How would you rate the ability to add allergies to the Medication Allergy List on a five point scale where 1 is very difficult, 3 is average, and 5 is very easy?*

*1 = Very difficult      2 = Difficult              3 = Average              4 = Easy              5 = Very easy*

*Do you have any other questions, comments or suggestions related to this task?*

If not...

*Let's move on to the next step.*

**Task 2: Changes to the Allergies List**

Make sure participant is on the Desktop tab in EHR.

*For the second task, I would like you to make changes to the Medication Allergy List. These all can be done for the same patient and encounters as before.*

*First, the Sulfasalazine allergy should be made inactive. Next, change Penicillin to Amoxicillin with a reaction of dizziness. And lastly, inactivate Carbamazepine and add Codeine which causes a skin rash. Please refer to the chart for reference.*

*Again, remember we are NOT TESTING YOU, we are testing the system. Click on the desktop tab. This will be your starting point. Any questions?*

If no, set ClickCounter to zero...

*Okay, ready, begin.*

This is the Efficiency section:

Time begun: \_\_\_\_\_

Number of clicks before start: \_\_\_\_\_

Time done: \_\_\_\_\_

Number of clicks when task complete: \_\_\_\_\_

Notes:

**Best Path** (*subjective*):

Click on the Patient Charts Tab>Recent Charts dropdown>Click on Alice Yellen>Under > Hover over the Medications drop down, select Allergy List

- a. Click Edit on the Sulfasalazine row >In the status box, choose 'Inactive'>click okay through the popup>click Update
- b. Click Delete on the Penicillin row> Click on the Add New button>Click on the second ellipse button>type in 'Amoxic'>select Amoxicillin >Click the Add button> Click Edit on Amoxicillin row >In the reaction box, choose 'Dizziness'>In Reaction Date enter current date>click Update
- c. Click Edit on the Carbamazepine row >In the status box, choose 'Inactive'>click okay through the popup>click Update
- d. Click on the Add New button>Click on the second ellipse button>type in 'Codeine'>select Codeine>Click the Add button> Click Edit on Codeine row >In the reaction box, choose 'Rash'>In Reaction Date enter current date>click Update

Notes on the participant's path to complete the task. Note deviations and errors:

When done, (don't forget end time)...

Rate the **efficiency** of the participant's paths used (circle one).

1 = Could not complete at all

2 = Gave up but would have got there eventually with more time or guidance

3 = Got there eventually within the time but with many wrong paths and corrections

4 = Completed within time but with different paths

5 = Completed without major deviations

**This is the Effectiveness section:**

The medication allergy order task was completed successfully?:    Yes                      No

**This is the Satisfaction section:**

*Thank you testing that. I have a one more question regarding the task.*

*How would you rate the ability to add allergies to the Medication Allergy List on a five point scale where 1 is very difficult, 3 is average, and 5 is very easy?*

*1 = Very difficult      2 = Difficult      3 = Average      4 = Easy      5 = Very easy*

*Do you have any other questions, comments or suggestions related to this task?*

If not...

*Let's move on to the next step.*

**Task 3: Access Allergies on the Allergy List**

Make sure participant is on the Desktop tab in EHR.

*For the last task, we are looking at how easy it is to access all that you just did. Using the same patient, I'd like you to access your allergies list for Alice Alleman.*

*Again, remember, we are NOT TESTING YOU, we are testing the system. Click on the Desktop tab. This will be your starting point.*

*Any questions?*

*Okay, ready, begin.*

This is the Efficiency section:

Time begun: \_\_\_\_\_ Number of clicks before start: \_\_\_\_\_

Time done: \_\_\_\_\_ Number of clicks when task complete: \_\_\_\_\_

Notes:

**Best Path** (subjective):

Click on the Patient Charts Tab>Recent Charts dropdown>Click on Alice Yellen>Click on Summary>>Change Status to All>scroll through Allergy History.

Notes on the participant's path to complete the task. Note deviations and errors:

When done, (don't forget end time)...

Rate the **efficiency** of the participant's paths used (circle one)

1 = Could not complete at all

2 = Gave up but would have got there eventually with more time or guidance

3 = Got there eventually within the time but with many wrong paths and corrections

4 = Completed within time but with different paths

5 = Completed without major deviations.

**This is the Effectiveness section:**

The medication allergy order task was completed successfully?:    Yes                      No

**This is the Satisfaction section:**

*Thank you testing that. I have a one more question regarding the task.*

*How would you rate the ability to add allergies to the Medication Allergy List on a five point scale where 1 is very difficult, 3 is average, and 5 is very easy?*

*1 = Very difficult      2 = Difficult              3 = Average              4 = Easy              5 = Very easy*

*Do you have any other questions, comments or suggestions related to this task?*

If not...

*Let's move on to the next step.*

Post-test cleanup:

1. Delete encounters for Alice Yellen
2. Setup two new encounters with parameters found in Pretest Setup. Don't forget to change the Date Recorded box.

## Appendix 3: TASK SCRIPTS

### 170.315 (a)(1) CPOE Medication:

#### **Task 1: Record Medication Orders**

*For the first task, we are looking at the CPOE functions of our system. I would like you to record medication orders for the patient Michael Jones, date of birth Sept 19, 1975. It should be noted from a previous encounter, he still is suffering from Essential (primary) hypertension as well. For the medications, you should create an encounter, adding the I10 Hypertension code and order through our online e-Prescription system. The medications AND their instructions need to be added. And don't worry; our test system is not "live" so nothing will really be sent out. The drugs to add are Amoxicillin, Amantadine HCl, and Tylenol. Our pharmacy is CA Pharmacy 10.6MU at 65432 Cabernet Turn.*

Medications to add:

- Amoxicillin 500 MG, 1 capsule by mouth every 6 hours, 12 count, Refill 0
- Amantadine HCl 100 MG Oral Capsule, 1 capsule by mouth daily for 30 days, Refill 0
- Tylenol Extra Strength 500 MG Oral Tablet, 1 tablet by mouth as needed for 10 days, 30 count, Refill 1

#### **Best path (subjective):**

Click on the Patient Charts Tab>Under Patient List, type in "jones", click on search>Click on Michael Jones> Click Progress Notes>create a note with Custom SOAP Layout1 > Scroll down to the Prescribed Medications Section>Click on Online e-Prescription

- A. In the search window, type in Amoxicillin >Click Search> Select Amoxicillin 500 MG Oral Capsule >enter the following sig information: 1 tablet by mouth, every 6 hours, 12 count, Capsule >Click Update
- B. In the search window, type in Amantadine> Click Search> Select Amantadine HCl 100 MG Oral Capsule> Select the following sig information: 1 capsule by mouth daily for 30 days, Capsule> Click Update
- C. In the search window, type in Tylenol >Click Search> Click on Tylenol Extra Strength 500 MG Oral Tablet > Select the following sig information: 1 tablet by mouth as needed for 10 days, 30 count, Tablet, Refill 1 > Click Update

Click on Process Medication(s)>Click on Proceed to Review Page>Click Submit Medications> Click Update

#### **Task 2: Change Medication Orders.**

*For the next task, we are looking at how easy it is to make changes to what you just did, using the same patient. I'd like you to change the Tylenol order instructions to one tablet twice daily for 3 days.*

#### **Best path (subjective):**

Click on the Patient Charts Tab> Click on Michael Jones> Click on Medications> Click on Medication List> Click Edit for Tylenol> change status to Inactive>Click update> Click Progress Notes> Click System SOAP>Scroll down to the Prescribed Medications Section>Click on Online e-Prescription>

- a. In the search window, type in Tylenol >Click Search> Click on Tylenol Extra Strength 500 MG Oral Tablet > Select the following sig information: 1 tablet by mouth twice daily for 3 days, #6, Tablet > Click Update

Click on Process Medication(s)>Click on Proceed to Review Page>Click Submit Medications

#### **Task 3: Access Medication Orders.**

*For the next task, we are looking at how easy it is to access the medication list to view what you just did using the same patient.*

#### **Best path (subjective):**

Click on the Patient Charts Tab>Recent Charts dropdown>Click on Michael Jones>View the summary page>scroll through Medications

### 170.315 (a)(2) CPOE Laboratory:

#### **Task 1: Record Laboratory Orders**

*For the first task, we are looking at the CPOE functions of our system. I would like you to record laboratory orders. This can be done for the patient Michael Jones, date of birth Sept 19, 1975. For the labs, I would like you to order a Creatinine 24H Urine Panel, and a HDL Cholesterol test from LabCorp. For the Guarantor Information you can just use the Copy from Insured function. And please use the Print and Submit buttons.*

**Best path (subjective):**

Click on the Patient Charts Tab>Under Patient List, type in "jones", click on search>Click on Michael Jones> Click Progress Notes/Add System Progress Notes/System SOAP>Scroll down to Lab/Radiology Orders>Hover over Add New Order> Click Laboratory Order> Next to Lab Name, select LabCorp.

- a. At Line 1 of Test Order, Click on the second box with the ellipses> In the blank box to the right of 'Starts with' type, 'Creatinine'> Click on Search> Select Creatinine, 24-Hour Urine panel> Click Add Line Item
- b. At Line 2 of Test Order, Click on the second box with the ellipses> In the blank box to the right of 'Starts with' type, HDL>Click on Search> Select HDL Cholesterol> Add a 1 to the Diagnosis Pointer Box>Click Print and submit

Click the update button at the bottom of the page.

**Task 2: Change Laboratory Orders**

*For the next task, we are looking at how easy it is to make changes to what you just did using the same patient. I would like you to change the laboratory tests from HDL Cholesterol test to a LDL Cholesterol test. Please refer to the data sheet for more details that will help you.*

**Best path (subjective):**

Click on Orders> Click View Labs/Radiology Orders>click the edit icon for LabCorp.>click the second ellipse box for the HDL Cholesterol > Type LDL> Click on Search> Select LDL Cholesterol (Direct) > Click Update

**Task 3: Access Laboratory Orders**

*For the next task, we are looking at how easy it is to access the laboratory order list to view what you just did using the same patient.*

**Best path (subjective):**

Click on the Patient Charts Tab>Recent Charts dropdown>Click on Michael Jones>Hover over Orders> Click View Lab / Radiology Orders

**170.315 (a)(3) CPOE Radiology:**

**Task 1: Record Radiology Orders**

*For the first task, we are looking at the CPOE functions of our system. I would like you to record radiology/imaging orders for the patient Michael Jones, date of birth Sept 19, 1975. For the Radiology/Imaging section, I would like you to order a Radiologic examination of a 2 View X-ray from My Rad Lab.*

**Best path (subjective):**

Hover over Add New Order> Select Radiology/Other Order>Select My Rad Lab from Rad/Img Facility Name>Click OK through popup >scroll to the Order Information section>

- a. At Line 1 of Test Code, Click on the second box with the ellipses> select X-ray - 2 view X-ray> Click Update and submit

Click the update button at the bottom or top of note.

**Task 2: Change Radiology Orders**

*For the next task, we are looking at how easy it is to make changes to what you just did using the same patient. For the Radiology/Imaging section, I would like you to change the 2 View X-ray to a 3 view X-ray.*

**Best path (subjective):**

Click on Orders> Click View Labs/Radiology Orders>Click the edit icon for My Rad Lab> click the ellipse box for the 2 View X-ray > Select 3 View X-ray > Click Update

**Task 3: Access Radiology Orders**

*For the next task, we are looking at how easy it is to access the radiology order list to view what you just did using the same patient.*

**Best path (subjective):**

Click on the Patient Charts Tab>Recent Charts dropdown>Click on Michael Jones>Hover over Orders> Click View Lab / Radiology Orders

**170.315 (a)(4) Drug-Drug/Drug-Allergy Interaction****Task 1: Create a drug-drug interaction**

*For the first task, I would like you to create a drug-drug interaction. You will use David Yosh and attempt to prescribe online Tekturna HCT 300-25 with the default sig, and cause an interaction ... Stop the ordering upon receiving the intervention.*

**Best path (subjective):**

1. Click on the Patient Charts Tab>Search for 'Yosh'> Select David Yosh>Go to Progress Notes >System SOAP.
2. Scroll down to Prescribed Medications> Click on the Online e-Prescription button>
3. Enter " Tekturna " in the drug search box, hit enter> Select Tekturna HCT 300-25 MG Oral Tablet, keeping the default sig> Click Update
4. Click Process Medications> Note - DDI check comes back with Moderate results> Click Back> Click the "X" to remove Tekturna from the Pending Medication list> Click Close
5. Click Patient Charts tab

**Task 2: Create a drug-allergy interaction**

*For the second task, I would like you to create a drug-allergy interaction. You will use David Yosh again and attempt to prescribe online Amoxicillin 250 mg cap. Stop the ordering upon receiving the intervention.*

**Best path (subjective):**

1. Click on the Patient Charts Tab>Search for 'Yosh'> Select David Yosh>Go to Progress Notes >System SOAP.
2. Scroll down to Prescribed Medications>Click on the Online e-Prescription button>
3. Enter "Amoxicillin" in the drug search box, hit enter>Select Amoxicillin 500 MG Oral Tablet, keeping the default sig> Click Update
4. Click Process Medications> Note - DAI check comes back with Allergy result> Click Back> Click Close
5. Click Patient Charts tab

**170.315 (a)(5) Demographics****Task 1: Adding Demographic data**

*Because of the industry's push to start incorporating behavioral health data, the Office Ally EHR has some new data capture points and we would like your opinions on it. For the first task, we would like you to add three new patients and some of their related information. The information will be taken off this Data Points reference sheet which you can refer to at any time. And for this task we are only adding information not changing it yet.*

*Please enter as much as you can; some data is detailed and you may have to select a wider category to add in to. Do not worry about data you do not have like phone numbers and addresses. Keep in mind your normal day to day workflows and the questions you would generally ask the patients.*

### Best path (subjective):

1) Click on the Patient Charts Tab > Click on the Add New Patient link > Add data from Data Points sheet for patient One Demographic > click the Add Patient button when finished.

**First Name:** One  
**Last Name:** Patient  
**Date of Birth:** 03/30/1977  
**Sex:** Female  
**Preferred Language:** English  
**Race:** Samoan  
**Ethnicity:** Not Hispanic or Latino  
**Sexual Orientation:** Lesbian, gay or homosexual  
**Gender Identity:** Identifies as Female

2) Click on the Add New Patient link > Add data from Data Points sheet for patient Two Demographic > click the Add Patient button when finished.

**First Name:** Two  
**Last Name:** Patient  
**Date of Birth:** 08/31/1938  
**Sex:** Male  
**Preferred Language:** French  
**Race:** White  
**Ethnicity:** Not Hispanic or Latino  
**Sexual Orientation:** Straight or heterosexual  
**Gender Identity:** Identifies as Male

3) Click on the Add New Patient link > Add data from Data Points sheet for patient Three Demographic > click the Add Patient button when finished.

**First Name:** Three  
**Last Name:** Patient  
**Date of Birth:** 04/07/1980  
**Sex:** Female  
**Race:** Declined to Disclose  
**Ethnicity:** Declined to Disclose  
**Preferred Language:** Declined to Disclose  
**Sexual Orientation:** Choose not to Disclose  
**Gender Identity:** Choose not to Disclose

## Task 2: Changing Demographic data

*Now we are looking at changing the data for the patients you just entered. You will use the data at the bottom of the Data Points reference sheet to change each of patient's data. Please enter as much as you can; some data is detailed and you may have to select a wider category to add in to. Do not worry about data you do not have, such as phone numbers and addresses. Again, keep in mind your normal day to day workflows and the questions you would generally ask the patients.*

### Best path (subjective):

#### Change:

1) Click on the Patient Charts Tab > In the Search For box, type "demo" > Click Search > Select the Edit Dem pencil icon next to **One Demographic** > change the data > Click update

**Date of Birth:** 09/17/1954  
**Sex:** Male  
**Race:** Declined to Disclose  
**Ethnicity:** Declined to Disclose  
**Preferred Language:** Declined to Disclose  
**Sexual Orientation:** Don't Know  
**Gender Identity:** Genderqueer, neither exclusively male nor female

2) Click on the Patient Charts Tab > In the Search For box, type "demo" > Click Search > Select the Edit Dem pencil icon next to **Two Demographic** > change the data > Click update

**Date of Birth:** 03/15/1982  
**Sex:** Female  
**Preferred Language:** English

|                            |                                  |
|----------------------------|----------------------------------|
| <b>Race:</b>               | <b>Black or African American</b> |
| <b>Ethnicity:</b>          | <b>Not Hispanic or Latino</b>    |
| <b>Sexual Orientation:</b> | <b>Bisexual</b>                  |
| <b>Gender Identity:</b>    | <b>Male to Female/ Trans</b>     |

3) Click on the Patient Charts Tab > In the Search For box, type "demo" > Click Search> Select the Edit Dem pencil icon next to **Three Demographic** > change the data > Click update

|                            |  |
|----------------------------|--|
| <b>Date of Birth:</b>      | <b>05/24/1964</b>                      |
| <b>Sex:</b>                | <b>Male</b>                            |
| <b>Preferred Language:</b> | <b>Chinese</b>                         |
| <b>Race:</b>               | <b>Chinese</b>                         |
| <b>Ethnicity:</b>          | <b>Not Hispanic or Latino</b>          |
| <b>Sexual Orientation:</b> | <b>Something else, please describe</b> |
| <b>Gender Identity:</b>    | <b>Identifies as Male</b>              |

### **Task 3: Accessing Demographic data**

*Now we are looking at accessing the data for the patients you just entered. Please find and view the data for the three patients you just worked on.*

#### **Best path (subjective):**

- 1) Click on the Patient Charts Tab > In the Search For box, type "demo" > Click Search> Click the Edit Dem pencil icon next to **One Patient** > view the data > click cancel.
- 2) In the Search For box, type "demo" > Click Search> Click the Edit Dem pencil icon next to **Two Patient** > view the data > click cancel.
- 3) In the Search For box, type "demo" >Click Search> Click the Edit Dem pencil icon next to **Three Patient** > view the data > click cancel.

### **170.315 (a)(6) Problem List**

#### **Task 1: Record the Problem List**

*For the first task, we are looking at recording the Problem List functions of our system. I would like you to record problems utilizing SNOMED codes. These all can be done for your patient John Smith, date of birth Sept 19, 1975.*

*For these problems we are focusing on the entry processes. The problems to add are: Acquired Hypothyroidism, Chronic Rejection of Renal Transplant, and Diabetes Mellitus Type 2. Please add them as separate problems, not as a group of problems. This will help with later tasks. Please refer to the data sheet for more details that will help you.*

#### **Best path (subjective):**

**For Problem 1:** Click on the Patient Charts Tab>Under Patient List, type in "Smith", click search>Click on John Smith > Hover over Progress Notes> Click on Problem List>Hover over Add New, click Add ICD-10 Codes>Click on SNOMED in blue>Change the 1st dropdown box to Code>Change the second dropdown box to Starts With>Type 111566002 Snomed code>Click on Search>Click Select for 111566002, Acquired Hypothyroidism (disorder) Snomed code>Click Update

**For Problem 2:** Click on the Patient Charts Tab>Under Patient List, type in "Smith", click on search>Click on John Smith > Hover over Progress Notes> Click on Problem List>Hover over Add New, click Add ICD-10 Codes>Click on SNOMED in blue>Change the 1st dropdown box to Code>Change the second dropdown box to Starts With>Type 236578006 Snomed code>Click on Search>Click Select for 236578006, Chronic Rejection of Renal Transplant (disorder) Snomed code>Click Update

**For Problem 3:** Click on the Patient Charts Tab>Under Patient List, type in "Smith", click on search>Click on John Smith > Hover over Progress Notes> Click on Problem List>Hover over Add New, click Add ICD-10 Codes>Click on SNOMED in blue>Change the 1st dropdown box to Code>Change the second dropdown box to Starts With>Type 44054006 Snomed code>Click on Search>Click Select for 44054006, Diabetes Mellitus Type 2 (disorder) Snomed code>Click Update

#### **Task 2: Change the Problem List**

*For the next task, we are looking at how easy it is to make changes to what you just did, using the same*

*patient. I'd like you to edit the problem list and: RESOLVE Diabetes Mellitus Type 2 (disorder); INACTIVATE Acquired Hypothyroidism (disorder); and ADD Severe Hypothyroidism (disorder). Please refer to the data sheet for more details that will help you.*

**Best path (subjective):**

For **Problem 1**: Click on the Patient Charts Tab>Under Patient List, type in "Smith", click on search>Click on John Smith > Hover over Progress Notes> Click on Problem List>Click EDIT for SNOMED CT: 44054006 Diabetes mellitus type 2 (disorder)> In the Status Dropdown, select RESOLVED> In the pop-up, select the radio button next for "Update the status for only this occurrence">Click Confirm>Next to Date Resolved, click the calendar icon>Click the date resolved on the calendar>Click Update

For **Problem 2**: Click on the Patient Charts Tab>Under Patient List, type in "Smith", click on search>Click on John Smith > Hover over Progress Notes> Click on Problem List>Click EDIT for Click Edit for: SNOMED code: 111566002 Acquired hypothyroidism (disorder) > In the Status Dropdown>In the Status Dropdown, select Inactive> In the pop-up, select the radio button next for Update the status for only this occurrence> Click Confirm>Click Update

For **Problem 3**: Click on the Patient Charts Tab>Under Patient List, type in "Smith", click on search>Click on John Smith > Hover over Progress Notes> Click on Problem List>Hover over Add New, click Add ICD-10 Codes>Click on SNOMED in blue>Change the 1st dropdown box to Code>Change the second dropdown box to Starts With>Type 83986005 Snomed code>Click on Search>Click Select for SNOMED code: 83986005Severe hypothyroidism (disorder) Snomed code>Click Update

**Task 3: Access Active Problem List**

*For the next task, we are looking at how easy it is to access the active problem list, using the same patient. I'd like you to access the active problem list, you made today.*

**Best path (subjective):**

Click on the Patient Charts Tab>Recent Charts dropdown>Click on John Smith >Hover over Progress Notes> Click on Problem List> In the Display Filter Section, Change status to Active> Change Code Type to Snomed Code>Problems that should be displayed: SNOMED CT: 236578006 Chronic rejection of renal transplant (disorder) and SNOMED CT: 83986005 Severe hypothyroidism (disorder)

**Task 4: Access Problem List history**

*For the next task, we are looking at how easy it is to access the problem list history, using the same patient. I'd like you to access the problem list history you made today.*

**Best path (subjective):**

Click on the Patient Charts Tab>Recent Charts dropdown>Click on John Smith >Hover over Progress Notes> Click on Problem List> In the Display Filter Section, Change status to All> Change Code Type to Snomed Code>all problems entered are displayed

**170.315 (a)(7) Medication List**

**Task 1: Record Orders for the Medications List**

*We are looking at the recording of medication in our system. For the first task, I would like you to record orders for Medications. These all can be done for the patient Mike Quinn, date of birth, May 12, 1955. Here is a data sheet for reference.*

*For the medications, you should order through our online e-Prescription system. The medications AND their instructions need to be added. And don't worry; our test system is not "live" so nothing will really be sent out. The drugs to add are Amoxicillin and Lisinopril. You will use the Pharmacy named CA Pharmacy 10.6MU - 65432 Cabernet Turn. Feel free to refer to the data sheet for more details.*

**Best path (subjective):**

Click on the Patient Charts Tab>Under Patient List, type in "Quinn"> click on search>Click on Mike Quinn> Click on Progress Notes >System SOAP >Scroll down to the Prescribed Medications Section>Click on Online e-Prescribe>

- A. Click in Medication Search field and type: Amoxicillin> Click on Select next to Amoxicillin 500 MG Oral Capsule >Click on Frequency drop down select every 12 hours > Click Update

- B. Click in the Medication Search field and type: Lisinopril>Click Search> Click Select next to "Lisinopril 20 MG Oral Tablet "> Change Amount to "3">Click on Save Rx> Click in Additional Directions field type: for 30 days> Click in Dispense Amount and enter 100>Click in Refills and enter 1> Click Update

Click Process Medications> Click on Proceed to Review page> If not already selected, in Pharmacy Information section, click the Pharmacy dropdown> CA Pharmacy 10.6 MU - 65432 Cabernet Turn> Click Submit Medication(s)> Click Close> Click Close> Back in the progress note, scroll down to bottom of note>click Update

## **Task 2: Changes to the Medication List**

*For the second task, I would like you to make changes on the Medications List. These all can be done for same patient and encounters as before. First, the use of Lisinopril should be discontinued. Then, Tylenol should be changed to 20 units once daily.*

### **Best path (subjective):**

Click on the Patient Charts Tab>Recent Charts dropdown>Click on Mike Quinn> Click on Medications>Click Medication List>

- a. Click Edit for Lisinopril>Change status to "Inactive">Click update.
- b. Click Edit for Tylenol>Change status to "Inactive">Click update.

Click on the Patient Charts Tab>Recent Charts dropdown>Click on Mike Quinn>Under Progress Notes/Encounters, select Edit Note on the last encounter used above>Scroll down to the Prescribed Medications Section>Click on Online e-Prescription>

- a. Click in the Medication Search field and type: Tylenol>Select Tylenol Extra Strength 500 MG Oral Tablet> one tablet twice daily for 3 days>Click Update

Click Process Medications> Click on Proceed to Review page> If not already selected, in Pharmacy Information section, click the Pharmacy dropdown> CA Pharmacy 10.6 MU - 65432 Cabernet Turn> Click Submit Medication(s)> Click Close> Click Close> Back in the progress note, scroll down to bottom of note>click Update

## **Task 3: Access active and historical medications on the Medication List**

*For the next task, we are looking at how easy it is to access the active and historical medications that you just did using the same patient. I'd like you to access the active and historical medication list for Mike Quinn.*

### **Best path (subjective):**

Click on the Patient Charts Tab>Recent Charts dropdown>Click on Mike Quinn>Hover over Medications>Click medication list>Select Status "All" to display both active and historical meds

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

### **Task 1: Record allergies for the Allergies List**

*We are looking at recording allergies in our system. For the first task, I would like you to record an allergy and its reaction for a patient. Our test patient is Alice Yellen, date of birth, December 12, 1990. She has had two previous encounters where allergies were listed. Here is a data sheet for reference. The allergy to list is for Carbamazepine which gives her a skin rash.*

### **Best path (subjective):**

Click on the Patient Charts Tab>Under Patient List, type in "yellen", click on search>Click on Alice Yellen> Hover over the Medications drop down, select Allergy List

- A. Click on the Add New button>Click on the second ellipse button>type in 'carbama'>Click select for Carbamazepine>Click the Add button
- B. Click Edit on the Carbamazepine row >In the reaction box, choose 'Rash'>In Reaction Date enter current date>click Update

**Task 2: Changes to the Allergies List**

*For the second task, I would like you to make changes to the Medication Allergy List. These all can be done for the same patient and encounters as before. First, the Sulfasalazine allergy should be made inactive. Next, change Penicillin to Amoxicillin with a reaction of dizziness. And lastly, inactivate Carbamazepine and add Codeine which causes a skin rash. Please refer to the chart for reference.*

**Best path (subjective):**

*Click on the Patient Charts Tab>Recent Charts dropdown>Click on Alice Yellen>Under > Hover over the Medications drop down, select Allergy List*

- a. Click Edit on the Sulfasalazine row >In the status box, choose 'Inactive'>click okay through the popup>click Update*
- b. Click Delete on the Penicillin row> Click on the Add New button>Click on the second ellipse button>type in 'Amoxic'>select Amoxicillin >Click the Add button> Click Edit on Amoxicillin row >In the reaction box, choose 'Dizziness'>In Reaction Date enter current date>click Update*
- c. Click Edit on the Carbamazepine row >In the status box, choose 'Inactive'>click okay through the popup>click Update*
- d. Click on the Add New button>Click on the second ellipse button>type in 'Codeine'>select Codeine>Click the Add button> Click Edit on Codeine row >In the reaction box, choose 'Rash'>In Reaction Date enter current date>click Update*

**Task 3: Access active and historical allergies on the Allergies List**

*For the next task, we are looking at how easy it is to access the active and historical allergies that you just did using the same patient. I'd like you to access your allergies list for Alice Yellen.*

**Best path (subjective):**

*Click on the Patient Charts Tab>Recent Charts dropdown>Click on Mike Quinn>Hover over Medications>Click allergy list>Select Status "All" to display both active and historical allergies*

**170.315 (a)(9) Clinical decision Support****Task 1: Activate a Standard Clinical Decision Support Intervention**

*We are looking at the Clinical Decision Support feature in our system. For this first task, with the patient Clara Clinical, I would like you to activate a Standard Clinical Alert for Influenza Immunization for Patients > 50. Please refer to the data sheet for more details that will help you.*

**Best path (subjective):**

*Click Manage Office tab>Click Clinical Alert> Checkmark 'Influenza Immunization for Patients > 50' >Update*

**Task 2: Create Custom Clinical Decision Support Interventions**

*Next, we will be looking at the Custom Clinical Alerts in our system. For this task, I would like you to create six Custom Clinical Alerts. Please refer to the data sheet for more details that will help you.*

CDS to Add:

- 1) (Problem) I10: Essential (primary) hypertension**
- 2) (Vitals and Demographics)- Sex: Female, Age: Over 18, Height: Less than 70in, Weight: Greater than 180lbs**
- 3) (Allergy) Amoxicillin**
- 4) (Medication) Singulair 4 MG Oral Packet**
- 5) (CPT Procedure) 70460CT head/brain w/ contrast material**

## 6) (LOINC) 73832-8 Adult depression screening assessment

### Best path (subjective):

1) Go to the Manage Office tab > Click Clinical Alerts> Click Create Alert >Write 'Allergy' for Name> Hover over Add Allergy> Select System Defined List>Type 'Amoxicillin' in the Search box> Click Search> Click Select for **Amoxicillin**>Click Close>Click Update

2) Click Create Alert >Write 'Problem' for Name> Hover over Add Diagnosis Code> Select System Defined ICD-10 List>Type 'I10' in the Search box> Click Search> Click Select for **I10 Essential (primary) hypertension**> Click Close>Click Update

3) Click Create Alert >Write 'Vitals' for Name>Change Sex to On>Change dropdown next to Sex to Female>Change Patient Age to On>Change the first dropdown to **Over**>Write **18** in the second box>Under Vitals change dropdown for Height to **less than** > write **70** in the empty box> change dropdown for Weight to **greater than** and write **180** in the empty box > Click Update

4) Click Create Alert >Write 'Medication' for Name>Hover over Add Medication> Click System Defined List> Write Singulair in search box> Click Select for **Singulair 4 MG Oral Packet** > Click Update

5) Click Create Alert >Write 'Procedure' for Name>Hover over Add Procedure Code>Click User Defined List>Type 70460 in the search box> Click Search> Click Select for **70460 CT head/brain w/ contrast material**> Click Update

6) Click Create Alert >Write 'LOINC' for Name>Hover over Add LOINC Code>Click System Defined List> Change search drop down to LOINC No.> Type 73832-8 in the search box> Click Search> Click Select for **73832-8 Adult depression screening assessment**> Click Update

### Task 3: Create Encounter to Generate Clinical Decision Support Interventions.

*For this third task, I would like you to add an encounter flagging clinical alerts. For these Clinical Alerts we are focusing on the creation of a Progress Note which flags the clinical alerts. Please refer to the data sheet for more details that will help you.*

### Best path (subjective):

Click on the Patient Charts Tab>Under Patient List, type in "Clinical"> click on search>Click on Open Chart for Clara Clinical> Click on Progress Notes >System SOAP>Under Allergies, click Allergy Search/Select>Write Amoxicillin in the search bar>Click Search>Click select for amoxicillin>

Under Current Medications Click Drug Search/Select> Type Singulair in the search box>Click Search>Select Singulair 4 MG Oral Packet>Close

Click Close>Scroll to Vital Signs, for height write 68> for weight write 195lbs>Scroll to ICD-10, write I10 in A(1)> click description box: Essential (primary) hypertension>Scroll to the bottom of the note, click Check Clinical Decisions.

Type I10 under A91) in ICD-10 Code Section> Click Essential (primary) Hypertension

Under CPT> Click the ... button and type 70460 in the search box> click Search> Click Select for 70460 CT head/brain w/ contrast material>Apply

### Task 4: Access the Reference Information and Resolve Clinical Alert Notifications.

*For this fourth task, I would like you to access the reference information for two clinical alert notifications and resolve the remaining clinical alerts for Clara Clinical. For these Clinical Alerts we are focusing on the accessing the reference information and resolving the clinical alerts.*

### Best path (subjective):

Click Additional Information for Amoxicillin >Click Amoxicillin in blue> Click the red X to close window>

Click Additional Information for Hypertension >Click Pubmed.gov in blue> Click the red X to close window>

Under the vitals and demographics click the dropdown for Resolution>Select Resolved> Click Resolve>

Under Medication click the dropdown for Resolution>Select Declined: Patient Reason>Click Resolve>Click Close>Click Update

Under Procedure click the dropdown for Resolution>Select Declined: Patient Reason>Click Resolve>Click Close>Click Update

Under Influenza Immunization for Patients > 50 click the dropdown for Resolution>Select Declined: Patient Reason>Click Resolve>Click Close>Click Update

Under LOINC click the dropdown for Resolution>Select Declined: Patient Reason>Click Resolve>Click Close>Click Update

### 170.315 (a)(14) Implantable Device List

#### **Task 1: Find where the Implantable Device list is.**

*We have a new function within the Office Ally EHR capturing Implantable Devices and we would like your opinions on it. For the first task, we were wondering where you would go to find an Implantable Device list. Don't worry if you can't, we will show for the next task, but take a few minutes to see if where we have it is where you would expect it to be. Keep in mind your normal day to day workflows and the questions you would ask patients.*

*This task is open ended so just let us know if you cannot find it. Also keep in mind where you would like it to be and/or where you would expect it to be. We will use the patient Impy Lantable.*

#### **Best path (subjective):**

Click on the Patient Charts Tab>Under Patient List, type in "Lan", click on search > Click on Open Chart for Impy Lantable > Hover over the Others dropdown> Click on Implantable Devices under the Chart Information section

#### **Task 2: Add a device to the Implantable Device list. Make sure patient is on the Desktop tab screen in the EHR.**

*Now, we would like you to add a polyester suture using Impy Lantable as your patient.*

#### **Best path (subjective):**

Click on the Patient Charts Tab>Under Patient List, type in "Lan", click on search > Click on Open Chart for Impy Lantable > Hover over the Others dropdown > Click on Implantable Devices under the Chart Information section > Click on Add Implantable Devices > Add the UDI # (01)10884521062856(11)141231(17)150707(10)A213B1(21)1234 for the suture > Click the Validate button > Click the Add button

#### **Task 3: Add another device to the Implantable Device list**

*Still using Impy Lantable as your patient, now we would like to add another device, a Trabexus bone graft.*

#### **Best path (subjective):**

Click on the Patient Charts Tab>Under Patient List, type in "Lan", click on search > Click on Open Chart for Impy Lantable > Hover over the Others dropdown > Click on Implantable Devices under the Chart Information section > Click on Add Implantable Devices > Add the UDI # =/W4146EB0010T0475=.000025=A99971312345600=>014032=}013032&.10000000000000XYZ123 for the bone graft > Click the Validate button > Click the Add button

#### **Task 4: Changes to the Implantable Device list.**

*Still using Impy Lantable as your patient, now we would like you to edit one of the devices. We would like you to inactivate the Polyester Suture with the reason being error, wrong patient.*

#### **Best path (subjective):**

Click on the Patient Charts Tab>Under Patient List, type in "Lan", click on search > Click on Open Chart for Impy Lantable > Hover over the Others dropdown > Click on Implantable Devices under the Chart Information section > Click the edit icon next to the Polyester Suture device > Change Status to Inactive> Add Reason/Comment: Error, Wrong patient > Update

#### **Task 5: Access the entire Implantable Device list**

*Still using Impy Lantable as your patient, now we would like access all of the devices associated with her*

account, both Active and Inactive.

**Best path (subjective):**

Click on the Patient Charts Tab>Under Patient List, type in "Lan", click on search > Click on Open Chart for Impy Lantable > Hover over the Others dropdown > Click on Implantable Devices under the Chart Information section > Change the Display Filter Status dropdown to "All".

### 170.315 (b)(2) Clinical Information Reconciliation

**Task 1: Reconcile a patient's active medication list with another source**

*For the first task, I would like you to reconcile a patient's active medication list. The patient's name is James Reconciliation1; he was referred to you by Dr. Smokey. Dr Smokey sent a direct message with the Transition of Care (TOC) document. It is stored in your Direct Message inbox in the email titled 1 reconciliation test. He has no recorded medications in the system, and you will reconcile the xml message for all medications.*

**Best path (subjective):**

1. Click on the Desktop Tab> Click on "Inbox" under Direct> Click on 1 reconciliation test email> Click Attach for the XML > Click OK> Click **Attach & Reconcile** > Checkmark white box to the left of Medication to select all>Next

**Task 2: Reconcile a patient's active medication allergy list with another source**

*For the second task, I would like you to reconcile the patient's active medication allergy list. We will use the same data set as before. There are no recorded allergies in the system for James Reconciliation1. You will add the three medication allergies from the same uploaded document.*

**Best path (subjective):**

Click on the checkbox to the right of Allergy to select all allergies > Click Next

**Task 3: Reconcile a patient's active problem list with another source.**

*For the third task, I would like you to reconcile a patient's problem list. We will use the same data set as before. There are no problems recorded in the system for James Reconciliation1, and you will add the two problems from the same uploaded document as before.*

**Best path (subjective):**

1. Click on the checkbox to the right of Problems to select all problems > Click Next> Click Next>Click Finish

**Task 4: Generate a new CCDA with reconciled data**

*For the fourth task, I would like you to Export Clinical information to generate a CCDA with the reconciled data. We will use the same patient James Reconciliation1.*

**Best path (subjective):**

1. Click on the Patient Charts Tab>Under Patient List, type in "Recon ", click on search>Click on Open Chart for James Reconciliation1>Hover over Others>Click Export Clinical Information
2. Change Document type to CCD>Click Generate

## 170.315 (b)(3) Electronic Prescribing

### **Task 1: Create online prescriptions**

*For this task, we are focusing on the online prescription functions of our system. I would like you to create the 2 prescriptions for Lipitor and Amoxicillin for Felicia Flounders using the data list. Here is a data list for reference.*

*We'd like you to send the prescriptions online electronically and they can all be for the same patient, Felicia Flounders. The pharmacy is CA Pharmacy. It is a test environment, not live, so you do not have to worry about anything really being sent.*

#### **Best path (subjective):**

Click on the Patient Charts Tab>Under Patient List, type in "Flounders ", click on search>Click on Open Chart for Felicia Flounders> Click Progress Notes>System SOAP> Scroll down to the Prescribed Medications Section>Click on Online e-Prescription>

- A. In the search window, type in 'Lipitor'> Click Search> Select Lipitor 10 MG Oral Tablet> Enter the following sig information: 1 tablet by mouth, Daily, #30, Tablet,1 Refill> Click Update
- B. In the search window, type in 'Amoxicillin'> Click Search> Select Amoxicillin 250 MG/5ML Oral Suspension Reconstituted > Enter the following sig information: Take 5ml by mouth every 12 hours., Dispense Amount 50 Milliliter, 5 days' supply> Click Update

Click on Process Medications>Click on Proceed to Review Page>Select the Pharmacy Information: CA Pharmacy 10.6MU – 65432 Cabernet Turn >Click Submit Medications> Click Close> Click Close

Click the update button at the bottom or the top of the progress note.

### **Task 2: Approve an electronic medication request**

*For this task, we are focusing on the online prescription renewal function of our system also for Felicia Flounders. I would like you to approve the renewal request using the data list here.*

*We'd like you to approve the Pataday prescription renewal request online electronically. The pharmacy is CA Pharmacy 10.6MU – 65432 Cabernet Turn. It is a test environment, not live, so you do not have to worry about anything really being sent.*

#### **Best path (subjective):**

Click on the OA-Rx Renewals icon at the top of the webpage>Click on Felicia Flounders >Click Select to match name> Click Approve> Click OK>Click the update button at the bottom or the top of the progress note.

### **Task 3: Cancel a prescription**

*For this task, we are focusing on the online prescription cancel function of our system for Felicia Flounders. I would like you to cancel the prescription Singulair 10 MG Oral Tablet using the data list here.*

*We'd like you to cancel the Singulair prescription request online electronically.*

#### **Best path (subjective):**

Click on the Patient Charts Tab>Under Patient List, type in "Flounders ", click on search>Click on Open Chart for Felicia Flounders> Click Progress Notes>System SOAP> Scroll down to the Prescribed Medications Section>Click on Online e-Prescription>

- a. Click on Singulair 10 MG Oral Tablet in blue> click red Cancel Rx icon> click Cancel Rx on next window> you now see under Transmission History type says cancel> click close> click close again> save note
- b. Go to OARX tab> Click Pharmacy Response> note cancellation notice

### **Task 4: Change a prescription (Pharmacy Requests)**

*For this task, we are focusing on the online prescription change function of our system for Felicia*

*Flounders. The CA Pharmacy submitted a request to change from Lisinopril 20 MG Tablet to Zestril 20 MG Tablet a prescription. We'd like you to approve the Zestril 20 MG Tablet change request sent electronically from the CA Pharmacy. It is a test environment, not live, so you do not have to worry about anything really being sent.*

**Best path (subjective):**

Click on the OA-Rx Requests icon at the top of the webpage> Click Approve/Deny> Click close> Click Approve> Click OK>Click the update button at the bottom or the top of the progress note.

**Task 5: Receive fill status notification**

*For this next task, we are focusing on viewing the online prescription fill status function of our system for the patient Ci Li. The CA Pharmacy sent a fill status response to you electronically for the patient Ci Li notifying you the prescription was filled and picked up. We would like you to view the Pharmacy's response in EHR.*

**Best path (subjective):**

Click on the OA-Rx Requests icon at the top of the webpage>Click on Pharmacy Responses>Click on "View" for Ci Li.

**Task 6: Request and receive medication history information**

*For this task, we are focusing on the online medication history function of our system for David Thrower. I would like you to import his medication history for the past 2 years. We'd like you to request and receive medication history information online electronically.*

**Best path (subjective):**

Click on the Patient Charts Tab>Under Patient List, type in "Thrower ", click on search>Click on Open Chart for David Thrower > Click Progress Notes>System SOAP> Scroll down to the Prescribed Medications Section>Click on Online e-Prescription>

- A. Under Patient Consent Drug History Request> select Yes
- B. Click Drug History>change history to 2 yrs> Click Retrieve Prescription History> check the box for AMITRIPTYLINE/CHLORDIAZEPOXIDE ORAL TABLET 25-10MG>click Imort Record(s)>click close

Hover over Medications> Select Medication List> change type to C Current Med History

## Appendix 4: MODERATOR GUIDE- SUS Questionnaire and Closing

### System Usability Scale (SUS)

This part of the study is to get a general feel of the “satisfaction” a user has with the overall use of the Office Ally EHR 24/7 system. It uses a common industry scale as suggested by the *NISTIR 7741 guide*.

In 1996, Brooke published a "low-cost usability scale that be used for global assessments of systems usability," known as the System Usability Scale or SUS<sup>4</sup>. Lewis and Sauro (2009) and others have elaborated on the SUS over the years<sup>5</sup>. Computation of the SUS score can be found in Brooke's paper, in <http://www.usabilitynet.org/trump/documents/Suschapt.doc> or in Tullis and Albert (2008)<sup>6</sup>.

The SUS is generally used after the respondent has had an opportunity to use the system being evaluated, but before any debriefing or discussion takes place. Respondents should be asked to record their immediate response to each item, rather than thinking about items for a long time.

All items should be checked. If a respondent feels that they cannot respond to a particular item, they should mark the center point (#3) of the scale.

### Survey Worksheet

Circle one response for each statement read.

*Now I'd like to get your opinion on Office Ally's EHR in general. All are based on a five point scale, where 1 is, "You strongly disagree with the statement," to 5 where, "You strongly agree with the statement." Do not dwell too long on a statement, and give us your initial impression. No opinion or "can't respond" would rate a 3 on the scale.*

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

Comments:

Test time ended: \_\_\_\_\_

*That is all we have for you today. The Office Ally team is very appreciative of your help in making our system better. Thank you!*

<sup>4</sup> Brooke, J.: SUS: A “quick and dirty” usability scale. In: Jordan, P.W., Thomas, B., Weerdmeester, B.A., McClelland (eds.) *Usability Evaluation in Industry* pp. 189-194. Taylor & Francis, London, UK (1996). SUS is copyright to Digital Equipment Corporation, 1986.

<sup>5</sup> Lewis, JR & Sauro, J. (2009) “The Factor Structure Of The System Usability Scale.” in *Proceedings of the Human Computer Interaction International Conference (HCII 2009), San Diego CA, USA*

<sup>6</sup> See Tullis, T. & Albert, W. (2008). *Measuring the User Experience*. Burlington, MA: Morgan Kaufman (p. 149). Broadly interpreted, scores under 60 represent systems with poor usability; scores over 80 would be considered above average.

## Appendix 5: MODERATOR GUIDE- Data Collection and Scoring

Table 6: Demographic Calculations

| Data  | Format | Parameter     | Notes  | Calculation type |
|---|--------|---------------|--|------------------|
| Participant ID                              | number | unique number | Use your first 2 initials, participants first 2 initials. This is only a unique control identifier so as to keep track of the paperwork  | none, a control  |
| Sex   | text   | M or F        | *There were zero Unknown participants  | frequency        |
| Age Range                                   | text   | years         |  | mean age         |
| Education                                   | text   | text          |  | frequency        |
| Occupation/Role                             | text   | text          |  | frequency        |
| Professional Experience (Years)             | number | years         |  | mean years       |
| Computer Experience (Years)                 | number | years         | Use the codes, Never used = 0, light user (>5 years' experience, not confident with computers)=1, moderate user(5-10 years' experience, comfortable with computers)=2, heavy user (10+ years, very familiar with computers) = 3) | mean years       |
| Electronic Health Record Experience (Years) | number | years         |  | mean years       |
| Office Ally EHR 24/7 Experience (Years)     | number | years         |  | mean years       |
| Assistive Technology for test?              | text   | text          |  | frequency        |

Table 7: Task Calculations

| Data                | Format | Parameters | Notes   | Calculation type | Equation notes                           |
|---------------------|--------|------------|---|------------------|--|
| Average Task Time   | number | time       | How long it takes to complete a task  | mean             | average time per task                    |
| Average # of Clicks | number | none       | How many clicks it takes to complete a task   | mean             | average clicks per task                  |
| Path Efficiency     | number | 1 to 5     | Tester rates the efficiency of the participant's paths used using 5 point scale where: 1 = could not complete, 2 = timed out but would have got there eventually with more time or guidance, 3 = got there eventually within the time but with many wrong paths and corrections, 4 = completed within time but with different paths, 5 = completed without major deviations | mean number      |  |
| Task Success        | text   | y or n     |   | percentage       | total successes/total task attempted     |
| Task Failure        | text   | y or n     |   | percentage       | total # of failures/total task attempted |
| Task Deviation      | number | number     |   | percentage       |  |
| Satisfaction        | number | 1 to 5     | Likert scale a five point scale where 1 is very difficult, 3 is average, and 5 is very easy   | mean number      |  |
| Comments/Notes      | text   | none       |   | n/a              |  |

Table 8: SUS Calculations

| Data   | Format | Parameters | Notes   | Calculation type | Equation notes |
|--|--------|------------|---|------------------|----------------|
| 1. I think that I would like to use this System frequently | number | 1 to 5     | measured on a five point agreement scale, where a 1 is strongly disagreement with that statement to 5 strongly agreeing with that statement | custom           | scale minus 1  |
| 2. I found the system unnecessarily complex                | number | 1 to 5     | measured on a five point agreement scale, where a 1 is strongly disagreement with that statement to 5 strongly agreeing with that statement | custom           | 5 - scale      |

|   |        |        |   |                                       |               |
|---|--------|--------|---|---------------------------------------|---------------|
| <b>3. I thought the system was easy to use</b>  | number | 1 to 5 | measured on a five point agreement scale, where a 1 is strongly disagreement with that statement to 5 strongly agreeing with that statement | custom                                | scale minus 1 |
| <b>4. I think that I would need the support of a technical person to be able to use this system</b>   | number | 1 to 5 | measured on a five point agreement scale, where a 1 is strongly disagreement with that statement to 5 strongly agreeing with that statement | custom                                | 5 - scale     |
| <b>5. I found the various functions in this system were well integrated</b>   | number | 1 to 5 | measured on a five point agreement scale, where a 1 is strongly disagreement with that statement to 5 strongly agreeing with that statement | custom                                | scale minus 1 |
| <b>6. I thought there was too much inconsistency in this system</b>   | number | 1 to 5 | measured on a five point agreement scale, where a 1 is strongly disagreement with that statement to 5 strongly agreeing with that statement | custom                                | 5 - scale     |
| <b>7. I would imagine that most people would learn to use this system very quickly</b>  | number | 1 to 5 | measured on a five point agreement scale, where a 1 is strongly disagreement with that statement to 5 strongly agreeing with that statement | custom                                | scale minus 1 |
| <b>8. I found the system very cumbersome to use</b>   | number | 1 to 5 | measured on a five point agreement scale, where a 1 is strongly disagreement with that statement to 5 strongly agreeing with that statement | custom                                | 5 - scale     |
| <b>9. I felt very confident using the system</b>  | number | 1 to 5 | measured on a five point agreement scale, where a 1 is strongly disagreement with that statement to 5 strongly agreeing with that statement | custom                                | scale minus 1 |
| <b>10. I needed to learn a lot of things before I could get going with this system</b>  | number | 1 to 5 | measured on a five point agreement scale, where a 1 is strongly disagreement with that statement to 5 strongly agreeing with that statement | custom                                | 5 - scale     |
|   |        |        |   | System usability = (sum of above)*2.5 |               |
| <b>Comments/Notes</b>   | text   | none   |   | n/a                                   |               |
| <p><b>Calculation Notes:</b> SUS yields a single number representing a composite measure of the overall usability of the system being studied. Note that scores for individual items are not meaningful on their own.</p> <p>To calculate the SUS score, first sum the score contributions from each item. Each item's score contribution will range from 0 to 4. For items 1,3,5,7,and 9 the score contribution is the scale position minus 1. For items 2,4,6,8 and 10, the contribution is 5 minus the scale position. Multiply the sum of the scores by 2.5 to obtain the overall value of SU.</p> <p><b>SUS scores have a range of 0 to 100.1</b></p> <p>1Brooke, J.: SUS: A "quick and dirty" usability scale. In: Jordan, P. W., Thomas, B., Weerdmeester, B. A., McClelland (eds.) Usability Evaluation in Industry pp. 189--194. Taylor &amp; Francis, London, UK (1996). SUS is copyright to Digital Equipment Corporation, 1986.</p> |        |        |   |                                       |               |

## Appendix 6: MODERATOR GUIDE- Criticalness Survey

The following is a survey of certain Office Ally EHR functions that are required for 2015 certification. Office Ally utilized Survey Monkey to send out the surveys. Below are examples of the questions asked on Survey Monkey. For question 1, priority scores are in reverse from the remaining questions.

- A. Please prioritize in order of OA's least used function (1) to the most used function (12).
  - a. 1= Least used
  - b. 12 = Most used
  
- B. Prioritize in accordance of risk associated with user errors where:
  - a. 1= Most risk of a user making a serious error
  - b. 10= Least risk of a user making a serious error
  
- C. Prioritize the order of functions that you see our users committing the most errors. 1 is the function that has the most errors and 12 is the function with the least amount of errors.
  - a. 1= Most risk of a user making a serious error
  - b. 10= Least risk of a user making a serious error

|  | Function Use | User Error Risk | User Errors |
|--|--------------|-----------------|-------------|
| Computerized Provider Order Entry - Medication         | _____        | _____           | _____       |
| Computerized Provider Order Entry - Laboratory         | _____        | _____           | _____       |
| Computerized Provider Order Entry – Diagnostic Imaging | _____        | _____           | _____       |
| Drug-Drug & Drug-Allergy Interaction                   | _____        | _____           | _____       |
| Electronic Prescribing                                 | _____        | _____           | _____       |
| Medication Allergy List                                | _____        | _____           | _____       |
| Medication List  | _____        | _____           | _____       |
| Clinical Decision Support                              | _____        | _____           | _____       |
| Clinical Information Reconciliation                    | _____        | _____           | _____       |
| Demographics   | _____        | _____           | _____       |
| Problem List   | _____        | _____           | _____       |
| Implantable Devices                                    | _____        | _____           | _____       |