



## **EHR Usability Test Report of ONLI Orthopedics v1**

# EHR Usability Test Report of ONLI Orthopedics v1

*Report based on ISO/IEC 25062:2006 Common Industry Format for Usability Test Reports*

ONLI Orthopedics v1

Date of Usability Test: 4/11/2026-4/12/2026  
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## Contents

EHR Usability Test Report of ONLI Orthopedics v1 ..... 1

EXECUTIVE SUMMARY ..... 2

INTRODUCTION ..... 5

METHOD ..... 5

RESULTS ..... 14

APPENDICES ..... 17

    Informed Consent ..... 22

    Moderator’s Guide ..... 23

## EXECUTIVE SUMMARY

The usability test of ONLI Orthopedics v1 was conducted between the dates of April 11 through April 12, 2026. The testing was performed remotely by Gillam Compliance and Consulting Associates (GCCA). The purpose of this test was to test and validate the usability of the current user interface and provide evidence of usability in the EHR ONLI Orthopedics v1.

During the usability test, 10 healthcare providers matching the target demographic criteria served as participants and used ONLI Orthopedics v1 in simulated, but representative tasks. This study collected performance data on 16 tasks typically conducted on an EHR:

- Record a new medication order. a1
- Access (view) an existing medication order. a1
- Change (modify) an existing medication order. a1
- Include a reason for medication order. a1
- Record a new patient with complete demographic data. a5
- Access (view) an existing patient demographic record. a5
- Change (modify) patient demographic data. a5
- Record a UDI and validate parsed information. a14
- Access all UDIs recorded for a patient. a14
- Change the status of a recorded UDI. a14
- Select and Activate an Evidence-Based Decision Support Intervention. b11
- Select and Activate a Predictive Decision Support Intervention. b11
- Verify DSI Fires After Transition-of-Care Data Incorporation. b11
- Provide Electronic Feedback on a DSI and Export Feedback Data. b11
- Access Source Attributes for an Evidence-Based DSI. b11
- Modify Source Attributes for an Evidence-Based DSI. b11

During the 60 minute one-on-one usability test, each participant was greeted by the administrator and asked to review and sign an informed consent/release form (included in Appendix 3); they were instructed that they could withdraw at any time. 6 participants had prior experience with the EHR and 4 participants had no prior experience with the EHR. The administrator introduced the test, and instructed participants to complete a series of tasks (given one at a time) using the ONLI Orthopedics v1 EHR. During the testing, the administrator timed the test and recorded user performance data on paper and electronically. The administrator did not give the participant assistance in how to

complete the task. The participant screens, head shots, and audio were recorded for subsequent analysis.

The following types of data were collected for each participant:

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

All participant data was de-identified – no correspondence could be made from the identity of the participant to the data collected. Following the conclusion of the testing, participants were asked to complete a post-test questionnaire. Various recommended metrics, in accordance with the examples set forth in the *NIST Guide to the Processes Approach for Improving the Usability of Electronic Health Records and ISO 9241-210*, were used to evaluate the usability of ONLI Orthopedics v1. The user-centered design (UCD) process utilized was ISO 9241-210 and consistent with NISTIR 7741. It outlines a User-Centered Design (UCD) framework to ensure EHR systems are efficient, effective, and satisfying, mitigating clinical errors and reducing provider burnout. The formal publications of the industry and federal standards can be located at <https://www.nist.gov/publications/nistir-7741-nist-guide-processes-approach-improving-usability-electronic-health-records> and <https://www.iso.org/standard/77520.html>. Following is a summary of the performance and rating data collected on ONLI Orthopedics v1.

| Task Identifier | Task Description                                                        | Task Success - Mean (%) | Task Success - Standard Deviation (%) | Task Path Deviation Observed # | Task Path Deviation Optimal # | Task Time - Mean (seconds) | Task Time - Standard Deviation (seconds) | Task Time Deviation Observed Seconds | Task Time Deviation Optimal Seconds | Task Errors Mean(%) | Task Errors - Standard Deviation (%) | Task Rating - Scale Type | Task Rating | Task Rating - Standard Deviation | UCD Process Selected |
|-----------------|-------------------------------------------------------------------------|-------------------------|---------------------------------------|--------------------------------|-------------------------------|----------------------------|------------------------------------------|--------------------------------------|-------------------------------------|---------------------|--------------------------------------|--------------------------|-------------|----------------------------------|----------------------|
| 1               | A1 Record a New Medication Order                                        | 100                     | 0                                     | 1                              | 11                            | 45                         | 15                                       | 0                                    | 60                                  | 0                   | 0                                    | Likert                   | 5           | 0                                | ISO 9241-210         |
| 2               | A1 Access (View) an Existing Medication Order                           | 100                     | 0                                     | 0                              | 4                             | 11                         | 0                                        | 0                                    | 15                                  | 0                   | 0                                    | Likert                   | 5           | 0                                | ISO 9241-210         |
| 3               | A1 Change (Modify) an Existing Medication Order                         | 100                     | 0                                     | 0                              | 6                             | 30                         | 0                                        | 0                                    | 45                                  | 0                   | 0                                    | Likert                   | 5           | 0                                | ISO 9241-210         |
| 4               | A1 Include a Reason for Order                                           | 100                     | 0                                     | 0                              | 5                             | 30                         | 0                                        | 0                                    | 45                                  | 0                   | 0                                    | Likert                   | 4           | 0                                | ISO 9241-210         |
| 5               | A5 Record a New Patient with Complete Demographic Data                  | 100                     | 0                                     | 0                              | 14                            | 129                        | 0                                        | 0                                    | 180                                 | 0                   | 0                                    | Likert                   | 5           | 0                                | ISO 9241-210         |
| 6               | A5 Access (View) an Existing Patient Demographic Record                 | 100                     | 0                                     | 0                              | 5                             | 22                         | 0                                        | 0                                    | 30                                  | 0                   | 0                                    | Likert                   | 5           | 0                                | ISO 9241-210         |
| 7               | A5 Change (Modify) Patient Demographic Data                             | 100                     | 0                                     | 0                              | 5                             | 146                        | 0                                        | 0                                    | 180                                 | 0                   | 0                                    | Likert                   | 5           | 0                                | ISO 9241-210         |
| 8               | A14 Record a UDI and Validate Parsed Information                        | 100                     | 0                                     | 0                              | 7                             | 105                        | 0                                        | 0                                    | 180                                 | 0                   | 0                                    | Likert                   | 4           | 1                                | ISO 9241-210         |
| 9               | A14 Access All UDIs Recorded for a Patient                              | 100                     | 0                                     | 0                              | 3                             | 22                         | 0                                        | 0                                    | 30                                  | 0                   | 0                                    | Likert                   | 5           | 0                                | ISO 9241-210         |
| 10              | A14 Change the Status of a Recorded UDI                                 | 100                     | 0                                     | 0                              | 5                             | 75                         | 0                                        | 0                                    | 180                                 | 0                   | 0                                    | Likert                   | 5           | 0                                | ISO 9241-210         |
| 11              | B11 Select and Activate an Evidence-Based Decision Support Intervention | 100                     | 0                                     | 0                              | 9                             | 343                        | 0                                        | 0                                    | 480                                 | 0                   | 0                                    | Likert                   | 3.5         | 1.5                              | ISO 9241-210         |
| 12              | B11 Select and Activate a Predictive Decision Support Intervention.     | 100                     | 0                                     | 0                              | 8                             | 285                        | 0                                        | 0                                    | 480                                 | 0                   | 0                                    | Likert                   | 3.5         | 1.5                              | ISO 9241-210         |
| 13              | B11 Verify DSI Fires After Transition-of-Care Data Incorporation        | 100                     | 0                                     | 0                              | 13                            | 261                        | 0                                        | 0                                    | 300                                 | 0                   | 0                                    | Likert                   | 5           | 0                                | ISO 9241-210         |
| 14              | B11 Provide Electronic Feedback on a DSI and Export Feedback Data.      | 100                     | 0                                     | 0                              | 11                            | 330                        | 0                                        | 0                                    | 480                                 | 0                   | 0                                    | Likert                   | 3           | 2                                | ISO 9241-210         |
| 15              | B11 Access Source Attributes for an Evidence-Based DSI.                 | 100                     | 0                                     | 0                              | 7                             | 295                        | 0                                        | 0                                    | 480                                 | 0                   | 0                                    | Likert                   | 4           | 1                                | ISO 9241-210         |
| 16              | B11 Modify Source Attributes for an Evidence-Based DSI.                 | 100                     | 0                                     | 0                              | 8                             | 276                        | 0                                        | 0                                    | 300                                 | 0                   | 0                                    | Likert                   | 4           | 1                                | ISO 9241-210         |

The results from the System Usability Scale scored the subjective satisfaction with the system based on performance with these tasks to be: 85- above average.

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

- Major findings
  - No major findings
- Areas for improvement
  - Recommended color coded completion tabs as a system section was completed.

## INTRODUCTION

The EHRUT tested for this study was ONLI Orthopedics v1. Designed to present medical information to healthcare providers in Orthopedic Practices. ONLI Orthopedics v1 consists of a simple platform for orthopedic clinicians and coordinators. Orthopedic-native documentation, surgery tracking and OR scheduling, e-prescribing, e-fax, and PMP integration to keep care moving. The usability testing attempted to represent realistic exercises and conditions for the orthopedic practice specialty.

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 (ONLI Orthopedics v1). To this end, measures of effectiveness, efficiency and user satisfaction, such time on task, deviation from suggested path, and errors were captured during the usability testing.

## METHOD

### PARTICIPANTS

A total of 10 participants were tested on ONLI Orthopedics v1. Participants included in the test were physicians, physician assistants, physical therapist, surgeons, and nurse practitioners. Participants had no direct connection with the development of or the organization producing ONLI Orthopedics v1. Participants were not from the testing or supplier organization. Participants were given the opportunity to have the same orientation and level of training as the actual end users would have received. Recruited participants had a mix of backgrounds and demographic characteristics. The following is a table of participants by characteristics, including demographics, professional experience, computing experience and user needs for assistive technology. Participant names were replaced with Participant IDs so that an individual's data cannot be tied back to individual identities.

| Identifier | Gender | Age   | Education                                  | Occupation/Role            | Professional Experience | Computer Experience | Product Experience | Assistive Technology Needs |
|------------|--------|-------|--------------------------------------------|----------------------------|-------------------------|---------------------|--------------------|----------------------------|
| 1          | Male   | 40-49 | Doctorate degree (e.g., MD, DNP, DMD, PhD) | Physician                  | 120                     | 264                 | 0                  | None                       |
| 2          | Male   | 40-49 | Doctorate degree (e.g., MD, DNP, DMD, PhD) | Physician                  | 240                     | 264                 | 12                 | None                       |
| 3          | Male   | 30-39 | Doctorate degree (e.g., MD, DNP, DMD, PhD) | Doctor of Physical Therapy | 45                      | 300                 | 1                  | None                       |
| 4          | Female | 30-39 | Doctorate degree (e.g., MD, DNP, DMD, PhD) | Nurse Practitioner         | 24                      | 312                 | 1                  | None                       |
| 5          | Male   | 70-79 | Doctorate degree (e.g., MD, DNP, DMD, PhD) | Physician                  | 600                     | 20                  | 0                  | None                       |
| 6          | Male   | 40-49 | Associate degree                           | Office Manager             | 120                     | 432                 | 12                 | None                       |
| 7          | Male   | 50-59 | Doctorate degree (e.g., MD, DNP, DMD, PhD) | Physician                  | 60                      | 624                 | 0                  | None                       |
| 8          | Female | 20-29 | Master's degree                            | Physician Assistant        | 18                      | 288                 | 1                  | None                       |
| 9          | Male   | 20-29 | Master's degree                            | Physician Assistant        | 48                      | 250                 | 1                  | None                       |
| 10         | Female | 20-29 | Master's degree                            | Physician Assistant        | 10                      | 216                 | 0                  | None                       |

10 participants were recruited and all participated in the usability test. No participants failed to show for the study. Participants were scheduled for 60 minute sessions with 45 minutes in between each session for debrief by the administrator and to reset systems to proper test conditions. A spreadsheet was used to keep track of the participant schedule and included each participant's demographic characteristics.

## STUDY DESIGN

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

During the usability test, participants interacted only with ONLI Orthopedics v1. Each participant used the system in the same location and were provided with the same instructions. The system was evaluated for effectiveness, efficiency and satisfaction as defined by measures collected and analyzed for each participant:

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

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

## TASKS

A number of tasks were constructed that would be realistic and representative of the kinds of activities a user might complete using ONLI Orthopedics v1, including:

1. Record a new medication order.
2. Access (view) an existing medication order.
3. Change (modify) an existing medication order.
4. Include a reason for medication order.
5. Record a new patient with complete demographic data.
6. Access (view) an existing patient demographic record.
7. Change (modify) patient demographic data.
8. Record a UDI and validate parsed information.
9. Access all UDIs recorded for a patient.
10. Change the status of a recorded UDI.
11. Select and Activate an Evidence-Based Decision Support Intervention.
12. Select and Activate a Predictive Decision Support Intervention.
13. Verify DSI Fires After Transition-of-Care Data Incorporation
14. Provide Electronic Feedback on a DSI and Export Feedback Data.
15. Access Source Attributes for an Evidence-Based DSI.
16. Modify Source Attributes for an Evidence-Based DSI.

Tasks were selected based on their frequency of use, criticality of function, and those that may be most troublesome for users. Tasks should always be constructed in light of the study objectives.

## PROCEDURES

Upon arrival, participants were greeted; their identity was verified and matched with a name on the participant schedule. Participants were then assigned a participant ID. Each participant reviewed and signed an informed consent and release form (See Appendix 3). A representative from the test team witnessed the participant's signature.

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

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

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

- Without assistance; administrators were allowed to give immaterial guidance and clarification on tasks, but not instructions on use.
- Without using a think aloud technique.

For each task, the participants were given a written copy of the task.

Task timing began once the administrator finished reading the question.

The task time was stopped once the participant indicated they had successfully completed the task. Scoring is discussed below in Section 3.9.

Following the session, the administrator gave the participant the post-test questionnaire (e.g., the Likert Scale, see Appendix 5) and thanked each individual for their participation.

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

Participants were thanked for their time and not compensated.

## TEST LOCATION

The tests were conducted via Microsoft Teams with screenshare, audit, and video recording in the location that the participant would complete these tasks daily. ONLI Orthopedics v1 was accessed via Google Chrome version 147. Only the participant and administrator were in the test room.

## TEST ENVIRONMENT

The ONLI Orthopedics v1 platform would be typically be used in a healthcare office or facility.

In this instance, the testing was conducted in the participants work offices. For testing, the computer used Windows desktop running Windows 11.

The participants used mouse and keyboard when interacting with the ONLI Orthopedics v1. The Windows desktop used a 17 inch screen with 1920x1080 resolution.

## TEST FORMS AND TOOLS

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

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

Examples of these documents can be found in Appendices 3-5 respectively. The Moderator's Guide was devised so as to be able to capture the required data.

The participant's interaction with the ONLI Orthopedics v1 was captured and recorded digitally with screen capture software running on the test machine. A web camera recorded each participant's facial expressions synced with the screen capture, and verbal comments were recorded with a microphone.

## PARTICIPANT INSTRUCTIONS

The administrator reads the following instructions aloud to the each participant (also see the full moderator's guide in Appendix [B4]):

*Thank you for participating in this study. Our session today will last 60 minutes. During that time you will take a look at an electronic health record system. I will ask you to complete a few tasks using this system and answer some questions. 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. You will be asked to complete these tasks on your own trying to do them as quickly as possible with the fewest possible errors or deviations. Do not do anything more than asked. If you get lost or have difficulty, I cannot answer or help you with anything to do with the system itself. Please save your detailed comments until the end of a task or the end of the session as a whole when we can discuss freely. I did not have any involvement in its creation, so please be honest with your opinions. The product you will be using today is ONLI Orthopedics v1, an electronic health record designed to accommodate the busy orthopedic clinician providing*

*streamlined functionality allowing quick and efficient clinical documentation. We are recording the audio and video of our session today. All of the information that you provide will be kept confidential and your name will not be associated with your comments at any time.*

*Do you have any questions or concerns?*

Following the procedural instructions, participants were shown ONLI Orthopedics v1 and as their first task, were given time (2 minutes) to explore the system and make comments. Once this task was completed, the administrator gave the following instructions:

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

Participants were then given 16 tasks to complete. Tasks are listed in the moderator's guide in Appendix [B4].

## USABILITY METRICS

According to the *NIST Guide to the Processes Approach for Improving the Usability of Electronic Health Records*, EHRs should support a process that provides a high level of usability for all users. The goal is for users to interact with the system effectively, efficiently, and with an acceptable level of satisfaction. The user-centered design (UCD) process utilized was ISO 9241-210 and consistent with NISTIR 7741. It outlines a User-Centered Design (UCD) framework to ensure EHR systems are efficient, effective, and satisfying, mitigating clinical errors and reducing provider burnout. The formal publications of the industry and federal standards can be located at <https://www.nist.gov/publications/nistir-7741-nist-guide-processes-approach-improving-usability-electronic-health-records> and <https://www.iso.org/standard/77520.html>. To this end, metrics for effectiveness, efficiency and user satisfaction were captured during the usability testing. The goals of the test were to assess:

1. Effectiveness of ONLI Orthopedics v1 by measuring participant success rates and errors
2. Efficiency of ONLI Orthopedics v1 by measuring the average task time and path deviations

## 3. Satisfaction with ONLI Orthopedics v1 by measuring ease of use ratings

**DATA SCORING**

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

| Measures                                   | Rationale and Scoring                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Effectiveness:</b><br><br>Task Success  | <p>A task was counted as a “Success” if the participant was able to achieve the correct outcome, without assistance, within the time allotted on a per task basis.</p> <p>The total number of successes were calculated for each task and then divided by the total number of times that task was attempted. The results are provided as a percentage.</p> <p>Task times were recorded for successes. Observed task times divided by the optimal time for each task is a measure of optimal efficiency.</p> <p>Optimal task performance time, as benchmarked by expert performance under realistic conditions, is recorded when constructing tasks. Target task times used for task times in the Moderator’s Guide must be operationally defined by taking multiple measures of optimal performance and multiplying by some factor [e.g., 1.25] that allows some time buffer because the participants are presumably not trained to expert performance. Thus, if expert, optimal performance on a task was [x] seconds then allotted task time performance was [x * 1.25] seconds. This ratio should be aggregated across tasks and reported with mean and variance scores.</p> |
| <b>Effectiveness:</b><br><br>Task Failures | <p>If the participant abandoned the task, did not reach the correct answer or performed it incorrectly, or reached the end of the allotted time before successful completion, the task was counted as an “Failures.” No task times were taken for errors.</p> <p>The total number of errors was calculated for each task and then divided by the total number of times that task was attempted. Not all deviations would be counted as errors. This should also be expressed as the mean number of failed tasks per participant.</p> <p>On a qualitative level, an enumeration of errors and error types should be collected.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Efficiency:</b><br><br>Task Deviations  | <p>The participant’s path (i.e., steps) through the application was recorded. Deviations occur if the participant, for example, went to a wrong screen, clicked on an incorrect menu item, followed an incorrect link, or interacted incorrectly with an on-screen control. This path was compared to the optimal path. The number of steps in the observed path is divided by the number of optimal steps to provide a ratio of path deviation.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

|                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                     | It is strongly recommended that task deviations be reported. Optimal paths (i.e., procedural steps) should be recorded when constructing tasks.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Efficiency:</b><br>Task Time     | Each task was timed from when the administrator said “Begin” until the participant said, “Done.” If he or she failed to say “Done,” the time was stopped when the participant stopped performing the task. Only task times for tasks that were successfully completed were included in the average task time analysis. Average time per task was calculated for each task. Variance measures (standard deviation and standard error) were also calculated.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Satisfaction:</b><br>Task Rating | <p>Participant’s subjective impression of the ease of use of the application was measured by administering both a simple post-task question as well as a post-session questionnaire. After each task, the participant was asked to rate “Overall, this task was:” on a scale of 1 (Very Difficult) to 5 (Very Easy). These data are averaged across participants.</p> <p>Common convention is that average ratings for systems judged easy to use should be 3.3 or above.</p> <p>To measure participants’ confidence in and likeability of the ONLI Orthopedics v1 overall, the testing team administered the System Usability Scale (SUS) post-test questionnaire with Likert scoring. Questions included, “I think I would like to use this system frequently,” “I thought the system was easy to use,” and “I would imagine that most people would learn to use this system very quickly.” See full System Usability Score questionnaire in Appendix 5.</p> |

**Table A. Details of how observed data were scored.**

## RESULTS

### DATA ANALYSIS AND REPORTING

The results of the usability test were calculated according to the methods specified in the Usability Metrics section above. There were no participants who failed to follow session and task instructions to have their data excluded from the reporting.

The usability testing results for the ONLI ORTHOPEDICS V1 are detailed below (see Table B). The results should be seen in light of the objectives and goals outlined in Section 3.2 Study Design. The data should yield actionable results that, if corrected, yield material, positive impact on user performance.

| Task Identifier | Task Description                                                        | Task Success - Mean (%) | Task Success - Standard Deviation (%) | Task Path Deviation Observed # | Task Path Deviation Optimal # | Task Time - Mean (seconds) | Task Time - Standard Deviation (seconds) | Task Time Deviation Observed Seconds | Task Time Deviation Optimal Seconds | Task Errors Mean(%) | Task Errors - Standard Deviation (%) | Task Rating - Scale Type | Task Rating | Task Rating - Standard Deviation | UCD Process Selected |
|-----------------|-------------------------------------------------------------------------|-------------------------|---------------------------------------|--------------------------------|-------------------------------|----------------------------|------------------------------------------|--------------------------------------|-------------------------------------|---------------------|--------------------------------------|--------------------------|-------------|----------------------------------|----------------------|
| 1               | A1 Record a New Medication Order                                        | 100                     | 0                                     | 1                              | 11                            | 45                         | 15                                       | 0                                    | 60                                  | 0                   | 0                                    | Likert                   | 5           | 0                                | ISO 9241-210         |
| 2               | A1 Access (View) an Existing Medication Order                           | 100                     | 0                                     | 0                              | 4                             | 11                         | 0                                        | 0                                    | 15                                  | 0                   | 0                                    | Likert                   | 5           | 0                                | ISO 9241-210         |
| 3               | A1 Change (Modify) an Existing Medication Order                         | 100                     | 0                                     | 0                              | 6                             | 30                         | 0                                        | 0                                    | 45                                  | 0                   | 0                                    | Likert                   | 5           | 0                                | ISO 9241-210         |
| 4               | A1 Include a Reason for Order                                           | 100                     | 0                                     | 0                              | 5                             | 30                         | 0                                        | 0                                    | 45                                  | 0                   | 0                                    | Likert                   | 4           | 0                                | ISO 9241-210         |
| 5               | A5 Record a New Patient with Complete Demographic Data                  | 100                     | 0                                     | 0                              | 14                            | 129                        | 0                                        | 0                                    | 180                                 | 0                   | 0                                    | Likert                   | 5           | 0                                | ISO 9241-210         |
| 6               | A5 Access (View) an Existing Patient Demographic Record                 | 100                     | 0                                     | 0                              | 5                             | 22                         | 0                                        | 0                                    | 30                                  | 0                   | 0                                    | Likert                   | 5           | 0                                | ISO 9241-210         |
| 7               | A5 Change (Modify) Patient Demographic Data                             | 100                     | 0                                     | 0                              | 5                             | 146                        | 0                                        | 0                                    | 180                                 | 0                   | 0                                    | Likert                   | 5           | 0                                | ISO 9241-210         |
| 8               | A14 Record a UDI and Validate Parsed Information                        | 100                     | 0                                     | 0                              | 7                             | 105                        | 0                                        | 0                                    | 180                                 | 0                   | 0                                    | Likert                   | 4           | 1                                | ISO 9241-210         |
| 9               | A14 Access All UDIs Recorded for a Patient                              | 100                     | 0                                     | 0                              | 3                             | 22                         | 0                                        | 0                                    | 30                                  | 0                   | 0                                    | Likert                   | 5           | 0                                | ISO 9241-210         |
| 10              | A14 Change the Status of a Recorded UDI                                 | 100                     | 0                                     | 0                              | 5                             | 75                         | 0                                        | 0                                    | 180                                 | 0                   | 0                                    | Likert                   | 5           | 0                                | ISO 9241-210         |
| 11              | B11 Select and Activate an Evidence-Based Decision Support Intervention | 100                     | 0                                     | 0                              | 9                             | 343                        | 0                                        | 0                                    | 480                                 | 0                   | 0                                    | Likert                   | 3.5         | 1.5                              | ISO 9241-210         |
| 12              | B11 Select and Activate a Predictive Decision Support Intervention.     | 100                     | 0                                     | 0                              | 8                             | 285                        | 0                                        | 0                                    | 480                                 | 0                   | 0                                    | Likert                   | 3.5         | 1.5                              | ISO 9241-210         |
| 13              | B11 Verify DSI Fires After Transition-of-Care Data Incorporation        | 100                     | 0                                     | 0                              | 13                            | 261                        | 0                                        | 0                                    | 300                                 | 0                   | 0                                    | Likert                   | 5           | 0                                | ISO 9241-210         |
| 14              | B11 Provide Electronic Feedback on a DSI and Export Feedback Data.      | 100                     | 0                                     | 0                              | 11                            | 330                        | 0                                        | 0                                    | 480                                 | 0                   | 0                                    | Likert                   | 3           | 2                                | ISO 9241-210         |
| 15              | B11 Access Source Attributes for an Evidence-Based DSI.                 | 100                     | 0                                     | 0                              | 7                             | 295                        | 0                                        | 0                                    | 480                                 | 0                   | 0                                    | Likert                   | 4           | 1                                | ISO 9241-210         |
| 16              | B11 Modify Source Attributes for an Evidence-Based DSI.                 | 100                     | 0                                     | 0                              | 8                             | 276                        | 0                                        | 0                                    | 300                                 | 0                   | 0                                    | Likert                   | 4           | 1                                | ISO 9241-210         |

The results from the System Usability Scale scored the subjective satisfaction with the system based on performance with these tasks to be 85. Broadly interpreted, scores under 60 represent systems with poor usability; scores over 80 would be considered above average.

## DISCUSSION OF THE FINDINGS

Overall, the ONLI Orthopedics v1 was noted to be easy to use with common sense clinical functionality. Participants noted the time to complete creating new patients, ordering medications, and updating device implants to be faster and easier than expected with an EHR.

## EFFECTIVENESS

The effectiveness of ONLI Orthopedics v1 was positive overall. There were minor deviations noted during documentation pathways as there are multiple ways to complete a task. The minor deviations added an extra 4 clicks maximum for a given task. All tasks were successfully completed.

## **EFFICIENCY**

The efficiency of ONLI Orthopedics v1 was positive overall. Task time had a maximum deviation of 15 seconds, which is still well under comparable EHR system documentation times. Participants that had minor task deviation were noted to have efficiency deviations.

## **SATISFACTION**

The results from the System Usability Scale scored the subjective satisfaction with the system based on performance with these tasks to be 85, which is considered above average. It was noted that during the testing for b11 criteria, the need to change from clinician to administrator account was cumbersome and decreased the overall satisfaction score.

## **MAJOR FINDINGS**

No major findings were identified during testing.

## **AREAS FOR IMPROVEMENT**

Participant noted that while searching for medications they would like to see the most frequently used medication and dosage in a “recommended” section for ease of searching. The need to change from clinician to administrator account for administrative tasks was cumbersome.

## **APPENDICES**

Following is a list of the appendices provided:

- 1: Participant Screener Script
- 2: Participant demographics
- 3: Informed Consent Form
- 4: Moderator's Guide
- 5: System Usability Scale Questionnaire

## Appendix 1: PARTICIPANT SCREENER

The purpose of the screener is to ensure that the participants selected represent the target user population as closely as possible. (Portions of this sample screener are taken from [www.usability.gov/templates/index.html#Usability](http://www.usability.gov/templates/index.html#Usability) and adapted for use.)

### Participant Screener Script

We are requesting individuals to participate in a usability study for an electronic health record. We would like to ask you a few questions to see if you qualify and if would like to volunteer to participate. This should only take a few minutes of your time. This is strictly for research purposes. Can I ask you a few questions?

*Customize this by dropping or adding questions so that it reflects your EHR's primary audience*

1. Are you male or female?
2. Have you participated in a focus group or usability test in the past 12 months? [If yes, Terminate]
3. Do you, or does anyone in your home, work in marketing research, usability research, web design ? [If yes, Terminate]
4. Do you, or does anyone in your home, have a commercial or research interest in an electronic health record software or consulting company? [If yes, Terminate]
5. Which of the following best describes your age? [23 to 39; 40 to 59; 60 - to 74; 75 and older] [Recruit Mix]
6. Which of the following best describes your race or ethnic group? [e.g., Caucasian, Asian, Black/African-American, Latino/a or Hispanic, etc.]
7. Do you require any assistive technologies to use a computer? [if so, please describe]

### Professional Demographics *Customize this to reflect your EHR's primary audience*

8. What is your current position and title? (Must be healthcare provider)
  - ☐ RN: Specialty \_\_\_\_\_
  - ☐ Physician: Specialty \_\_\_\_\_
  - ☐ Resident: Specialty \_\_\_\_\_
  - ☐ Administrative Staff
  - ☐ Other [Terminate]

9. How long have you held this position?
10. Describe your work location (or affiliation) and environment? (Recruit according to the intended users of the application) [e.g., private practice, health system, government clinic, etc.]
11. Which of the following describes your highest level of education? [e.g., high school graduate/GED, some college, college graduate (RN, BSN), postgraduate (MD/PhD), other (explain)]

**Computer Expertise** *Customize this to reflect what you know about your EHR's audience*

12. Besides reading email, what professional activities do you do on the computer? [e.g., access EHR, research; reading news; shopping/banking; digital pictures; programming/word processing, etc.] [If no computer use at all, Terminate]
13. About how many hours per week do you spend on the computer? [Recruit according to the demographics of the intended users, e.g., 0 to 10, 11 to 25, 26+ hours per week]
14. What computer platform do you usually use? [e.g., Mac, Windows, etc.]
15. What Internet browser(s) do you usually use? [e.g., Firefox, IE, AOL, etc.]
16. In the last month, how often have you used an electronic health record?
17. How many years have you used an electronic health record?
18. How many EHRs do you use or are you familiar with?
19. How does your work environment patient records? [Recruit according to the demographics of the intended users]
  - ☐ On paper
  - ☐ Some paper, some electronic
  - ☐ All electronic

**Contact Information** *If the person matches your qualifications, ask*

Those are all the questions I have for you. Your background matches the users we're looking for.

Would you be able to participate on [date, time]? [If so collect contact information]

**May I get your contact information?**

- Name of participant:
- Address:
- City, State, Zip:
- Daytime phone number:
- Evening phone number:
- Alternate [cell] phone number:
- Email address:

Before your session starts, we will ask you to sign a release form allowing us to videotape your session. The videotape will only be used internally for further study if needed. Will you consent to be videotaped?

This study will take place via Microsoft Teams. I will confirm your appointment a couple of days before your session and provide you with directions on how to join the session.

## Appendix 2: PARTICIPANT DEMOGRAPHICS

*The report contains a breakdown of the key participant demographics. A representative list is shown below.*

Following is a complete overview of the participants in this study.

| Participant Identifier | Participant Gender | Participant Age | Participant Education                      | Participant Occupation/Role | Participant Professional Experience | Participant Computer Experience | Participant Product Experience | Participant Assistive Technology Needs |
|------------------------|--------------------|-----------------|--------------------------------------------|-----------------------------|-------------------------------------|---------------------------------|--------------------------------|----------------------------------------|
| 1                      | Male               | 40-49           | Doctorate degree (e.g., MD, DNP, DMD, PhD) | Physician                   | 120                                 | 264                             | 0                              | None                                   |
| 2                      | Male               | 40-49           | Doctorate degree (e.g., MD, DNP, DMD, PhD) | Physician                   | 240                                 | 264                             | 12                             | None                                   |
| 3                      | Male               | 30-39           | Doctorate degree (e.g., MD, DNP, DMD, PhD) | Doctor of Physical Therapy  | 45                                  | 300                             | 1                              | None                                   |
| 4                      | Female             | 30-39           | Doctorate degree (e.g., MD, DNP, DMD, PhD) | Nurse Practitioner          | 24                                  | 312                             | 1                              | None                                   |
| 5                      | Male               | 70-79           | Doctorate degree (e.g., MD, DNP, DMD, PhD) | Physician                   | 600                                 | 20                              | 0                              | None                                   |
| 6                      | Male               | 40-49           | Associate degree                           | Office Manager              | 120                                 | 432                             | 12                             | None                                   |
| 7                      | Male               | 50-59           | Doctorate degree (e.g., MD, DNP, DMD, PhD) | Physician                   | 60                                  | 624                             | 0                              | None                                   |
| 8                      | Female             | 20-29           | Master's degree                            | Physician Assistant         | 18                                  | 288                             | 1                              | None                                   |
| 9                      | Male               | 20-29           | Master's degree                            | Physician Assistant         | 48                                  | 250                             | 1                              | None                                   |
| 10                     | Female             | 20-29           | Master's degree                            | Physician Assistant         | 10                                  | 216                             | 0                              | None                                   |

## Appendix 3: INFORMED CONSENT FORM

**Informed Consent****Informed Consent**

ONLI Orthopedics v1 and GCCA would like to thank you for participating in this study. The purpose of this study is to evaluate an electronic health records system. If you decide to participate, you will be asked to perform several tasks using the non-production environment and give your feedback. The study will last about 60 minutes.

**Agreement**

I understand and agree that as a voluntary participant in the present study conducted by ONLI Orthopedics v1 and GCCA. I am free to withdraw consent or discontinue participation at any time. I understand and agree to participate in the study conducted and recorded by GCCA.

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

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

I understand and agree that the data collected from this study may be shared with outside of GCCA and GCCA's client ONLI Orthopedics v1. I understand and agree that data confidentiality is assured, because only de-identified data – i.e., identification numbers not names – will be used in analysis and reporting of the results.

I agree to immediately raise any concerns or areas of discomfort with the study administrator. I understand that I can leave at any time.

**Please check one of the following:**

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

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

**Date:**

## Appendix 4: MODERATOR'S GUIDE

***ONLI Orthopedics v1 Usability Test***  
**Moderator's Guide**

Administrator \_\_\_\_\_

Date \_\_\_\_\_ Time \_\_\_\_\_

Participant # \_\_\_\_\_

Location \_\_\_\_\_

**Prior to testing**

- Confirm schedule with Participants
- Ensure ONLI ORTHOPEDICS V1 lab environment is running properly
- Ensure lab and data recording equipment is running properly

**Prior to each participant:**

- Reset application
- Start session recordings with *tool*

**Prior to each task:**

- Reset application to starting point for next task

**After each participant:**

- End session recordings with *tool*

**After all testing**

- Back up all video and data files

### **Orientation (\_\_\_ minutes)**

Thank you for participating in this study. Our session today will last 60 minutes. During that time you will take a look at an electronic health record system.

I will ask you to complete a few tasks using this system and answer some questions. 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. You will be asked to complete these tasks on your own trying to do them as quickly as possible with the fewest possible errors or deviations. Do not do anything more than asked. If you get lost or have difficulty, I cannot answer or help you with anything to do with the system itself. Please save your detailed comments until the end of a task or the end of the session as a whole when we can discuss freely. I did not have any involvement in its creation, so please be honest with your opinions.

The product you will be using today is ONLI Orthopedics v1, an electronic health record designed to accommodate the busy orthopedic clinician providing streamlined functionality allowing quick and efficient clinical documentation. We are recording the audio and video of our session today. All of the information that you provide will be kept confidential and your name will not be associated with your comments at any time.

Do you have any questions or concerns?

### **Log In and First Impressions (\_\_\_\_Seconds)**

#### Landing Page for Physician Dashboard

Please use the credentials provided to log into the provided link.

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

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

Comments/Notes:

### **Task 1: A1-T1 — Record a New Medication Order**

#### **§170.315(a)(1)(i) — Record medication orders [SHALL]**

Place a new medication order from start to finish. Please order Lisinopril 10mg tablet, oral, once daily, start date 4/10/2026, sign the order. Verify the "orders screen" now lists "lisinopril 10mg- oral- once daily- Active" in the active orders.

#### *Optimal Path:*

*Use the patient search and click the target patient name in search results to open the patient chart.- Click the "Prescriptions" tab in the left navigation panel.- Click the "New Prescription" button in the top-left of the screen.- In the "Search medications" field, type "Lisinopril" and press Enter. -Click "Lisinopril 10 mg tablet" from the search results list.- In the "Dose" field, confirm "10 mg" is selected. -In the "Route" dropdown, select "Oral". -In the "Frequency" dropdown, select "Once daily". -In the "Start Date" field, select today's date.- Click the "Create & Sign Order" button in the bottom-right of the order form. -Verify the Orders screen now lists "Lisinopril 10 mg — Oral — Once daily — Active" in the Active Orders section.*

#### *Minor Deviation:*

*Participant types "lisin" in Step 4, sees no results, clears the field, and types "Lisinopril" on the second attempt.*

*Participant clicks "Lisinopril 5 mg" first, notices the wrong dose, clicks Back, and re-selects "Lisinopril 10 mg".*

*Participant clicks "Create & Sign Order" in Step 10 but the system displays a red validation banner: "Route is required." Participant selects "Oral" and clicks "Sign Order" again.*

### **Task 2: A1-T2 — Access (View) an Existing Medication Order**

#### **§170.315(a)(1)(i) — Access medication orders [SHALL]**

Please access and view the medication record "Lisinopril 10mg" that was created in the last step. Please read the entirety of the order out loud for the administrator.

#### *Optimal Path:*

*From the patient chart, click the "Prescriptions" tab.- Locate "Lisinopril 10 mg" in the Prescriptions list.-*

*Click the Lisinopril prescription order row to open the prescriptions detail screen.- Confirm the detail panel shows Medication name, Dose, Route, Frequency, Start Date, Ordering Provider, and Order Status.*

*Minor Deviation:*

*Participant clicks a different medication row first, reads the wrong order, then clicks the correct Lisinopril row.*

### **Task 3: A1-T3 — Change (Modify) an Existing Medication Order**

#### **§170.315(a)(1)(i) — Change medication orders [SHALL]**

**The participant must modify an order parameter and save the updated order. The change must be visible in the Active Orders list after saving.**

Please change (modify) the existing order of Lisinopril 10mg to Lisinopril 20mg.

*Optimal Path:*

*From the patient chart, click the "Prescriptions" tab.- Click the "Lisinopril 10 mg" order row to open the order detail panel.- Click the "Edit Order" button at the top of the detail panel.- In the "Dose" field, clear "10 mg" and type "20 mg".- Click "Save & Sign Order" to save the change.- Verify the Active Orders list now shows "Lisinopril 20 mg".*

*Minor Deviation:*

*Participant clicks "Edit Order" but also changes the Frequency field even though only the Dose field was required.*

*Participant types "20mg" without a space. They realized that no medication results were returned, then they corrected the entry and got the correct results.*

### **Task 4: A1-T4 — Include a Reason for Order**

#### **§170.315(a)(1)(ii) — Include a "Reason for Order" field [SHOULD — include only if this feature is implemented in your system]**

Please modify the Lisinopril 20mg order to include the "reason for order" I10 (Essential (primary) hypertension).

*Optimal Path:*

*During the new medication order workflow (same steps as A1-T1 Steps 1–9), locate the " Primary diagnosis Code " field below the Note to pharmacist field in the order form.- Type " I10". (Essential (primary) hypertension)- Click "Save & Sign Order".- Open the order detail panel for the signed order and confirm the reason for order is displayed with the final order.*

*Minor Deviation:*

*Participant scrolls past the Reason for Order field without noticing it. Facilitator asks: "Have you completed all the fields?" Participant scrolls back and completes it.*

*Participant types "HTN" or selects the wrong diagnosis first, then corrects it before final save.*

### **Task 5: §170.315(a)(5) — Clinical: Demographics**

#### **A5-T1 — Record a New Patient with Complete Demographic Data**

#### **§170.315(a)(5)(i)(A-E) — Record patient demographic data [SHALL]**

All 10 required demographic elements must be entered: Race, Ethnicity, Preferred Language, Sex, Sex Parameter for Clinical Use, Sexual Orientation, Gender Identity, Name to Use, Pronouns, and Date of Birth. Please add a new patient with the following demographics:

Name: Jane Doe

Name to use: Jay

DOB: 04/15/1985

Sex: Female

Sex Parameter for Clinical Use: Female sex for clinical use

Sexual Orientation: Heterosexual or straight

Gender Identity: Female

Pronouns: She/Her/Hers

Race: White

Ethnicity: Not Hispanic or Latino

Preferred language: English

When complete, please save and verify that the profile page displays all data as entered.

**Optimal Path:**

Click "Patients", then "Add New Patient" link in the top navigation bar. -In the "Last Name" field, type "Doe". In the "First Name" field, type "Jane". - In the "Name to Use" field, type "Jay".- In the "Date of Birth" field, type "04/15/1985".- In the "Sex" dropdown, select "Female".- In the "Sex Parameter for Clinical Use" dropdown, select "Female sex for clinical use".- In the "Sexual Orientation" dropdown, select "Heterosexual or straight".- In the "Gender Identity" dropdown, select "Female".- In the "Pronouns" dropdown, select "She/Her/Hers".- In the "Race" multi-select field, check "White".- In the "Ethnicity" dropdown, select "Not Hispanic or Latino".- In the "Preferred Language" dropdown, select "English".- Click "Save" at the bottom of the form.- Verify the patient profile page opens and displays all 10 demographic fields with the values entered above.

**Minor Deviation:**

Participant enters fields in a different order, such as entering Date of Birth before Name to Use.

Participant cannot locate the "Pronouns" field because it is in a collapsed "Additional Demographics" accordion section. Participant expands the section and completes the field.

Participant selects "Unknown" for Sexual Orientation.

Participant clicks "Save Patient" without entering Pronouns, then re-opens the record and adds Pronouns without facilitator prompting.

**Task 6: A5-T2 Access (View) an Existing Patient Demographic Record**

**§170.315(a)(5)(i)(A-E) — Access patient demographic data [SHALL — "access" is assumed per SED Guide]**

**The participant must open the full demographic profile and confirm all 10 required fields are visible.**

Please access (view) Jane Doe's chart and review the completed list of all 10 demographics entered in the previous task.

**Optimal Path:**

Locate the patient search box at the top left corner of the page

In the patient search box, type "Doe, Jane" and press Enter.

Click the "Doe, Jane" result to open the patient chart.

Click the "Demographics" tab in the left navigation panel.

Confirm the Demographics screen shows all 10 required fields.

**Minor Deviation:**

Participant opens the patient chart but clicks the "Summary" tab instead of "Demographics," then self-corrects.

**Task 7: A5-T3 — Change (Modify) Patient Demographic Data**

**§170.315(a)(5)(i)(A-E) — Change patient demographic data [SHALL]**

**The participant must update at least two demographic fields and save the changes.**

Please change (modify) Jane Doe's demographic fields of Preferred Language from English to Spanish and the pronouns from She/Her/Hers to They/Them/Theirs. Save the record and verify the demographics screen shows the updated information.

**Optimal Path:**

Open the "Doe, Jane" patient chart and click the "Demographics" tab.

In the "Preferred Language" dropdown, change "English" to "Spanish".

In the "Pronouns" dropdown, change "She/Her/Hers" to "They/Them/Theirs".

Click "Save" at the bottom of the form.

Verify the Demographics screen now shows Preferred Language = Spanish and Pronouns = They/Them/Theirs.

**Minor Deviation:**

Participant changes only one field and clicks Save, then re-opens Edit Demographics and changes the second field.

**Task 8: §170.315(a)(14) — Implantable Device List**

A14-T1 — Record a UDI and Validate Parsed Information

§170.315(a)(14)(i-ii) — Record UDI and validate parsed information [SHALL]

The system must auto-parse the UDI into sub-fields. The participant enters only the UDI string — not individual sub-fields.

Please go to the “New Device/Implant” screen- type the UDI

“(01)00643169007226(17)260101(10)LOT2024A(21)SN00123456.” And select “parse UDI” Verify that the Implants page now lists the entry with the UDI string and device description.

*Optimal Path:*

*Open the patient chart and click the "Implants" tab in the left navigation panel.*

*Click "+ New Device/Implant".*

*In the "UDI" field, type the full UDI string:*

*(01)00643169007226(17)260101(10)LOT2024A(21)SN00123456.*

*Click "Parse UDI." The system processes the string.*

*Verify the following parsed fields are auto-populated below the UDI entry field: Device Identifier, Lot / Batch Number, Serial Number, Expiration Date, and Manufacture Date if encoded.*

*Click "Save" to add the record to the patient's device list.*

*Verify the Devices tab now lists the entry with the UDI string and device description.*

*Minor Deviation:*

*Participant types the UDI with an extra space or lowercase letter. System returns "Invalid UDI format."*

*Participant corrects the entry and clicks Parse UDI again.*

*The Manufacture Date field is blank after parsing because the test UDI does not encode a manufacture date. Participant pauses to confirm this is expected.*

*Participant cannot find the "Implants" tab and clicks through other chart tabs before locating it.*

#### **Task 9: Task A14-T3 — Access All UDIs Recorded for a Patient**

§170.315(a)(14)(vi) — Access all Unique Device Identifiers recorded for a patient [SHOULD]

The participant must view all four required categories: (1) the UDI itself, (2) device description, (3) all identifiers associated with the UDI, and (4) all attributes associated with the UDI.

Please open the patient record and select the Implant device that was created in the previous step.

Confirm that the Unique Device identifier (UDI) string, device description, identifiers, and device attributes (status and any retrieved terminology values) are listed. Please read the screen to the administrator.

*Optimal Path:*

*From the patient chart, click the "Implants" tab.*

*Click the device record added in Task A14-T1.*

*Confirm the device detail panel displays the UDI string, device description, identifiers, and device attributes such as status and any retrieved terminology values.*

*Minor Deviation:*

*Participant reads the list summary but does not click into the device detail panel until realizing more detail is needed.*

*Participant must scroll within the device detail panel to see the Attributes section.*

#### **Task 10: A14-T4 — Change the Status of a Recorded UDI**

§170.315(a)(14)(vi) — Change the status of a Unique Device Identifier recorded for a patient [SHALL]

**The participant must change the device status and save the change. The updated status must be visible in the device list.**

Please open the patient record and select the Implant device that was created in a previous step. Change the status of the implant device to “removed” and save the record. Verify that the implants tab now shows the device as “removed”.

*Optimal Path:*

*From the patient chart, click the "Implants" tab.*

*Click the device record added in Task A14-T1 to open the device detail panel.*

*In the "Status" dropdown, select "Removed".*

*Click "Save".*

*Verify the Implants tab now shows the device with Status = "Removed".*

**Minor Deviation:**

*Participant selects "Inactive" from the status dropdown, then changes it to "Removed" before confirming.*

**Task 11: §170.315(b)(11) — Decision Support Interventions****B11-T1 — Select and Activate an Evidence-Based Decision Support Intervention****§170.315(b)(11)(iii)(A)(1-8) — Enable limited users to select evidence-based DSIs [SHALL]**

**The DSI must use at least one of the required data types. The activating user must be a user with DSI configuration authority, not a general clinical end user.**

Please log into the admin account provided. Go to the settings menu and select Evidence Based DSI tab. Select "adult smoking status missing" and confirm the trigger shows a supported data type. Please enable the checkbox to activate. Log back in as the clinical user; Open Jane Doe's record verify that a CDS alert banner appears displaying the "adult smoking status missing" intervention.

*Optimal Path: Log in as an admin.*

*Click "Settings" in the top navigation bar.*

*Click "Decision Support Interventions" in the Settings menu.*

*Click the "Evidence-Based DSI" tab.*

*Locate the intervention titled "Adult Smoking Status Missing" in the list and confirm its trigger shows a supported data type.*

*Click the Enabled checkbox next to "Adult Smoking Status Missing" to change it from "Inactive" to "Active".*

*Log out of the admin account. Log in as the clinical user*

*Open a patient chart with missing tobacco use information and aged 18+.*

*Confirm a CDS alert banner appears displaying the "Adult Smoking Status Missing" intervention.*

**Minor Deviation:**

*Participant clicks the wrong toggle first, deactivates it, and then activates the correct DSI.*

*Participant cannot find "Decision Support Interventions" in the Settings menu and clicks "Decision Support Feedback" first by mistake.*

**Task 12: B11-T2 — Select and Activate a Predictive Decision Support Intervention****§170.315(b)(11)(iii)(B) — Enable limited users to select Predictive DSIs [SHALL]**

**Predictive DSIs generate predictions, classifications, recommendations, evaluations, or analyses. They are distinct from evidence-based DSIs.**

Please log into the admin account provided. Go to the settings menu and select "Decision support interventions". Select "Predictive DSI" tab. Enable the "High Cardiovascular Disease Risk Alert". Log back in as the clinical user; Open Jane Doe's record and select "risk scores". Confirm "high cardiovascular disease risk alert" is displayed.

*Optimal Path:*

*Log in as an Admin".*

*Click "Settings" → "Decision Support Interventions".*

*Click the "Predictive DSI" tab.*

*Locate the intervention titled "High Cardiovascular Disease Risk Alert" in the list.*

*Click the enabled checkbox next to "High Cardiovascular Disease Risk Alert" to set it to "Active".*

*Log out. Log in as clinical user.*

*Open a patient chart and click the "Risk Scores" widget or equivalent patient-summary tile.*

*Confirm the "High Cardiovascular Disease Risk Alert" is displayed for the patient.*

**Minor Deviation:**

*Participant clicks the "Evidence-Based DSI" tab first, reads the label, then switches to the "Predictive DSI" tab.*

*The Risk Alert displays "Insufficient data" for the test patient because a required prerequisite data element is missing.*

**Task 13: b11-T4 — Verify DSI Fires After Transition-of-Care Data Incorporation****§170.315(b)(11)(ii)(B) — Enable DSIs when patient data incorporated from a transition-of-care/referral summary [SHALL]**

**PRE-TEST SETUP REQUIRED: Patient record must be staged in two states. State 1: patient has NO**

**penicillin allergy — confirm no allergy alert fires. State 2: after incorporating a CCD that adds penicillin allergy — confirm the DSI alert fires when prescribing amoxicillin. The system does not need to fire the alert at the moment of CCD import — only that behavior differs across the two states.**

Please navigate to "Test, Patient B". Review and confirm that Penicillin allergy is NOT currently listed in the patient record. Once confirmed, please add a new prescription for "Amoxicillin 500mg oral tablet. Confirm that no drug allergy CDS alert appears. Do NOT complete the order, just cancel out of the screen. Navigate to the Documents section for this patient and import the following CCD file-

"JohnDoe\_404\_PenicillinAllergy.xml" from the desktop. Please upload and review. Confirm the incoming document lists "Allergy: Penicillin- Severe", accept all changes, and incorporate into the patient's record. Now, please add a new prescription for "Amoxicillin 500mg oral tablet" confirm that a drug allergy CDS alert banner appears stating "Patient has documented Penicillin allergy. Amoxicillin is a penicillin-class antibiotic." Do NOT complete the order, cancel out of the screen.

*Optimal Path:*

*[STATE 1 — Before incorporation] Open the test patient chart "Test, Patient B".*

*Navigate to the patient's Allergies section and confirm that Penicillin allergy is not currently listed in the patient record.*

*Click "Prescriptions" → "+ New Prescription". Search for "Amoxicillin 500 mg oral tablet" and select it.*

*Confirm NO drug-allergy CDS alert appears. Click Cancel (do not place the order).*

*Click the "Documents" tab in the left navigation panel.*

*Click "Import CCD".*

*Click "Browse" and select the pre-staged file "JohnDoe\_404\_PenicillinAllergy.xml" from the Desktop.*

*Click "Upload and Review".*

*On the Reconciliation screen, confirm the incoming document lists "Allergy: Penicillin — Severe". Click "Accept All Changes".*

*Click "Incorporate into Patient Record".*

*[STATE 2 — After incorporation] Click "Prescriptions" → "+ New Prescription". Search for " Amoxicillin 500 mg oral tablet" and select it.*

*Confirm a drug-allergy CDS alert banner now appears: "Patient has documented Penicillin allergy. Amoxicillin is a penicillin-class antibiotic."*

*Click Cancel to dismiss the order without placing it.*

*Minor Deviation:*

*Participant cannot locate "Import CCD" in the Documents tab and clicks "Upload Document" first, which is the wrong function. Participant navigates back and selects "Import CCD".*

*On the Reconciliation screen (Step 7), participant clicks "Incorporate into Patient Record" without reviewing the incoming allergy entry first.*

**Task 14: B11-T5 — Provide Electronic Feedback on a DSI and Export Feedback Data**

**§170.315(b)(11)(ii)(C) — Enable users to provide electronic feedback on evidence-based DSIs; make data available for export in computable format [SHALL]**

**Feedback must capture at minimum the intervention, action taken, user feedback (if any), user, date, and location. Real-time and post-hoc feedback workflows are both acceptable.**

Please select Jane Doe's record and Acknowledge the CDS alert banner with a comment of "Patient already on Lisinopril- Reminder acknowledged". Confirm that the system displays a green confirmation message of data saved successfully. Log out of clinical user, log in as admin. Select "Feedback Report" and export Feedback Data. Confirm the CSV file was downloaded and contains columns for Intervention, Action Taken, User Feedback, User, Date, and Location.

*Optimal Path:*

*Log in as a Provider and open a patient chart with missing tobacco use information and aged 18+ to trigger the " Adult Smoking Status Missing " CDS alert.*

*In the CDS alert banner, click the "Acknowledge" button.*

*In the "Comments" field, type "Patient already on Lisinopril — reminder acknowledged."*

Click "Submit".

Confirm the system displays a green confirmation message that the data was saved successfully

Log out. Log in as Admin

Click "Settings" → "Decision Support Feedback" then select "Feedback Report" tab.

Click "Export Feedback Data".

Confirm a CSV file is downloaded and contains columns for Intervention, Action Taken, User Feedback, User, Date, and Location.

Minor Deviation:

Participant selects "Not Applicable" action instead of the "Acknowledge".

#### **Task 15: B11-T6 — Access Source Attributes for an Evidence-Based DSI**

**§170.315(b)(11)(iv)(A)(1-13) + §170.315(b)(11)(v)(A)(1) — Access source attributes for evidence-based DSIs [SHALL]**

**Participant must view plain-language descriptions of all source attributes. Data-element usage disclosures only need to be shown when the DSI uses that element.**

Please select "settings" in the admin account. Access "adult smoking status missing" Read and confirm the citation and provenance fields are displayed with content: Bibliographic Citation, Developer of the intervention, funding source, and release/revision date. Go to "data element usage" section and verify the disclosure status of Race, Ethnicity, Language, Sexual Orientation, Gender Identity, Sex, DOB, SDOH Data, and health Status Assessment Data. Confirm each element not used is marked as "not used or n/a".

Optimal Path:

Log in as Admin.

Click "Settings" → "Decision Support Interventions" then select "Evidence-Based DSI" tab.

Click "Adult Smoking Status Missing" to open the intervention settings.

Click the "Source Attributes" tab.

Read and confirm the citation/provenance fields are displayed with content: Bibliographic Citation, Developer of the Intervention, Funding Source, and Release / Revision Date.

Scroll to the "Data Element Usage" section and read the disclosure status of Race, Ethnicity, Language, Sexual Orientation, Gender Identity, Sex, Date of Birth, SDOH Data, and Health Status Assessment Data. Confirm each element used by this DSI shows an appropriate disclosure and that unused elements are marked "Not used," "Not applicable," or otherwise not disclosed.

Minor Deviation:

Participant cannot locate the "Source Attributes" tab and requires one facilitator prompt.

#### **Task 16: B11-T7 — Modify Source Attributes for an Evidence-Based DSI**

**§170.315(b)(11)(v)(B)(1) — Record, change, and access source attributes for evidence-based DSIs [SHALL]**

**The authorized user must be able to edit and save at least one source attribute field. Access is implied with the ability to change.**

While logged in as admin, Under the "Adult Smoking Status Missing" select "source attributes". Modify (Change) the revision date to 4/10/2026. Change the bibliographic citation field to add "updated reference: AHA 2023 Hypertension Guidelines" to the end of the existing text. Save the record. Verify the Source attributes tab now displays the updated revision date and updated bibliographic citation text.

Optimal Path:

Log in as Admin.

Click "Settings" → "Decision Support Interventions" then select "Evidence-Based DSI" tab.

Click "Adult Smoking Status Missing" → "Source Attributes" tab.

In the "Revision Date" field, update the date to today's date.

In the "Bibliographic Citation" field, add "; Updated reference: AHA 2023 Hypertension Guidelines" to the end of the existing text.

Click "Save Source Attributes".

Confirm the Source Attributes tab now displays the updated Revision Date and updated Bibliographic Citation text.

Minor Deviation:

*Participant updates only the Revision Date, saves, then re-opens the editor and adds the Bibliographic Citation update.*

**Final Questions (\_\_ Minutes)**

What was your overall impression of this system?

What aspects of the system did you like most?

What aspects of the system did you like least?

Were there any features that you were surprised to see?

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

Compare this system to other EHR systems you have used.

Would you recommend this system to your colleagues?

*Administer the SUS*

## Appendix 5: SYSTEM USABILITY SCALE QUESTIONNAIRE

In 1996, Brooke published a “low-cost usability scale that can be used for global assessments of systems usability” known as the *System Usability Scale* or *SUS*.<sup>16</sup> Lewis and Sauro (2009) and others have elaborated on the SUS over the years. Computation of the SUS score can be found in Brooke’s paper, in at <http://www.usabilitynet.org/trump/documents/Suschapt.doc> or in Tullis and Albert (2008).

|                                                                                              | Strongly<br>disagree                                                                                                                                                                                                                                  |  |  |  | Strongly<br>agree |
|----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|-------------------|
| 1. I think that I would like to use this system frequently                                   | <div style="display: flex; border: 1px solid black; height: 20px; margin-bottom: 5px;"></div> <div style="display: flex; justify-content: space-between; width: 100%;"> <span>1</span><span>2</span><span>3</span><span>4</span><span>5</span> </div> |  |  |  |                   |
| 2. I found the system unnecessarily complex                                                  | <div style="display: flex; border: 1px solid black; height: 20px; margin-bottom: 5px;"></div> <div style="display: flex; justify-content: space-between; width: 100%;"> <span>1</span><span>2</span><span>3</span><span>4</span><span>5</span> </div> |  |  |  |                   |
| 3. I thought the system was easy to use                                                      | <div style="display: flex; border: 1px solid black; height: 20px; margin-bottom: 5px;"></div> <div style="display: flex; justify-content: space-between; width: 100%;"> <span>1</span><span>2</span><span>3</span><span>4</span><span>5</span> </div> |  |  |  |                   |
| 4. I think that I would need the support of a technical person to be able to use this system | <div style="display: flex; border: 1px solid black; height: 20px; margin-bottom: 5px;"></div> <div style="display: flex; justify-content: space-between; width: 100%;"> <span>1</span><span>2</span><span>3</span><span>4</span><span>5</span> </div> |  |  |  |                   |
| 5. I found the various functions in this system were well integrated                         | <div style="display: flex; border: 1px solid black; height: 20px; margin-bottom: 5px;"></div> <div style="display: flex; justify-content: space-between; width: 100%;"> <span>1</span><span>2</span><span>3</span><span>4</span><span>5</span> </div> |  |  |  |                   |
| 6. I thought there was too much inconsistency in this system                                 | <div style="display: flex; border: 1px solid black; height: 20px; margin-bottom: 5px;"></div> <div style="display: flex; justify-content: space-between; width: 100%;"> <span>1</span><span>2</span><span>3</span><span>4</span><span>5</span> </div> |  |  |  |                   |
| 7. I would imagine that most people would learn to use this system very quickly              | <div style="display: flex; border: 1px solid black; height: 20px; margin-bottom: 5px;"></div> <div style="display: flex; justify-content: space-between; width: 100%;"> <span>1</span><span>2</span><span>3</span><span>4</span><span>5</span> </div> |  |  |  |                   |
| 8. I found the system very cumbersome to use                                                 | <div style="display: flex; border: 1px solid black; height: 20px; margin-bottom: 5px;"></div> <div style="display: flex; justify-content: space-between; width: 100%;"> <span>1</span><span>2</span><span>3</span><span>4</span><span>5</span> </div> |  |  |  |                   |
| 9. I felt very confident using the system                                                    | <div style="display: flex; border: 1px solid black; height: 20px; margin-bottom: 5px;"></div> <div style="display: flex; justify-content: space-between; width: 100%;"> <span>1</span><span>2</span><span>3</span><span>4</span><span>5</span> </div> |  |  |  |                   |
| 10. I needed to learn a lot of things before I could get going with this system              | <div style="display: flex; border: 1px solid black; height: 20px; margin-bottom: 5px;"></div> <div style="display: flex; justify-content: space-between; width: 100%;"> <span>1</span><span>2</span><span>3</span><span>4</span><span>5</span> </div> |  |  |  |                   |

We have reached the end of our study. Thank you for your time and feedback. As a reminder, your identity will not be associated with these comments and scores. Are there any final things that you would like to relay?

Thank you.