



9/12/2019

Writepad 10.0 - Customized Common Industry Format Template for Electronic Health Record Usability Testing A User-Centered Design (UCD) Activity



UCD Document
ADDISON HEALTH SYSTEMS INC.

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1. Executive Summary

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| Product Name : Writepad 10.0. |
| Owner name: - Addison Health Systems Inc. |
| Test Date : - May 1 st 2019 to through September 7 th 2019 |
| Report Prepared : - September 7 th 2019 till September 9 ^h 2019 |
| Test conducted: - Remotely (with help of screen share tool called gotomeeting) |
| Test was conducted by support department of Addison Health systems. |
| Contact Person is Greg Winterkamp Email : - Gwinterkamp@writepad.com Phone number :- 9723927778 |

Total 10 participants were participated for the test. Few members had knowledge of the EHR, and to those who did not, we have given some basic knowledge and then started the test. Participants were from different backgrounds, e.g. hospital staff, providers, professional testers. Participants' names are not disclosed so that data collected and user cannot be linked.

Participants information is collected before beginning of the test by administrator.

AHS conducted this usability test to validate effectiveness and efficiency of the following Tasks:

- (a)(1) Computerized Provider Order Entry (CPOE) – medications
- (a)(2) CPOE – laboratory
- (a)(3) CPOE – diagnostic imaging
- (a)(5) Demographics
- (a)(6) Problem List
- (a)(7) Medication List
- (a)(8) Medication Allergy List
- (a)(9) Clinical Decision Support
- (a)(14) Implantable Device List
- (b)(2) Clinical Information Reconciliation and Incorporation

Each measure is broken into 3 sections:

1. Task Instructions
2. Test Report
3. Data Analysis and Reporting

Report details can be seen in section 5.

2. Introduction

AHS is the developer of the WritePad Electronic Health Record (EHR) system. With over 18,000 users daily generating more than 40 million patient notes per year our clients know that they are working with the best on the market.

AHS is a client driven organization. We understand that our success is dictated by satisfied and referring clinics. This company was founded on the promise of providing health professionals the latest in electronic documentation technology while creating the structure for excellent customer support and service.

AHS conducted this usability test to validate effectiveness and efficiency of WritePad software. First we defined the data scoring method and collected the data for each Task.

The following types of data were collected for each participant for each measure for each Task:

- 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

Participants' were asked for satisfaction rating after each task.

Intended Users of the software: -

Chiropractors and their support staff like Physiotherapy, admin person, front desk person.

Pain Management clinics and their support staff like Physiotherapy, Admin person, front desk person.

3. Method

3.1 Participants

10 participants were tested on all Task. Participants' details are presented in the table below.

| ID | Gender | Age | Education | Role | Professional Experience | Computer Experience | Product Experience | Assistive Technology Needs |
|----|--------|-------|------------------|-----------|-------------------------|---------------------|--------------------|----------------------------|
| P1 | F | 50-59 | Doctorate degree | Physician | 210 | 330 | 182 | No |
| P2 | M | 40-49 | Doctorate degree | Physician | 187 | 260 | 145 | No |
| P3 | F | 30-39 | Doctorate Degree | Physician | 120 | 264 | 90 | No |
| P4 | F | 60-69 | Doctorate degree | Physician | 404 | 300 | 176 | No |
| P5 | M | 40-49 | Doctorate degree | Physician | 252 | 310 | 204 | No |

| | | | | | | | | |
|-----|---|-------|-------------------|-----------|----|-----|----|----|
| P6 | M | 20-29 | Bachelor's degree | UI Tester | 60 | 92 | 0 | No |
| P7 | M | 20-29 | Bachelor's Degree | UI Tester | 55 | 84 | 1 | No |
| P8 | M | 30-39 | Bachelor's Degree | UI Tester | 82 | 132 | 12 | No |
| P9 | F | 30-39 | Bachelor's Degree | UI Tester | 58 | 118 | 0 | No |
| P10 | F | 20-29 | Bachelor's degree | UI Tester | 49 | 84 | 0 | No |

3.2 Task

All tasks were designed based on the 2015 Edition Health IT Certification criteria. Each task is divided into Task's based on the certification requirement. Participant has to go through each Task and administrator will collect the data accordingly.

§170.315(a)(1) Computerized provider order entry – medications

Enable a user to record, change, and access medication orders.

Task 1: Order Medications

Task 2: Change Orders for Medications

§170.315(a)(2) Computerized provider order entry – Laboratory

Enable a user to record, change, and access Laboratory orders.

Task 1: Order Lab

Task 2: Change Orders for Lab

§170.315(a)(3) Computerized provider order entry – Diagnostic Imaging

Enable a user to record, change, and access Diagnostic orders.

Task 1: Order Lab

Task 2: Change Orders for Lab

§170.315(a)(5) Demographics - Clinical

Task 1: Access patient demographic data and *Enter the following information into the patient's file:*

- *Name*
- *Date of Birth:*
- *Race: Declined to provide*
- *Ethnicity: Declined to provide*
- *Language:*
- *Sex:*

- *Sexual Orientation: Declined to provide*
- *Gender Identity: Declined to provide*
- *Preferred Language: Declined to provide*
- *Attending Provider:*

Task 2: Please select the Patient and change the following information into the patient's file:

- *Name*
- *Date of Birth:*
- *Race: Declined to provide*
- *Ethnicity: Declined to provide*
- *Language:*
- *Sex:*
- *Sexual Orientation: Declined to provide*
- *Gender Identity: Declined to provide*
- *Preferred Language: Declined to provide*

§170.315(a)(6) Problem List

Enable a user to record, change, and access a patient's active problem list: Ambulatory setting only. Over multiple encounters in accordance with, at a minimum, the version of the standard specified in § 170.207(a)(4).

Task 1: Add a patient's active problem list:

Task 2: Change patient active problem List

Task 3: Patient revisit and next encounter add

§170.315 (a)(7) Medication list

Enable a user to record, change, and access a patient's active medication list as well as medication history. Over multiple encounters.

Task 1: Add a patient's active medication list:

Task 2: Change patient active medication List

Task 3: Patient revisit add new medication

§170.315(a)(8) Medication Allergy List

Enable a user to record, change, and access a patient's active medication allergy list as well as medication allergy history: Ambulatory setting. Over multiple encounters.

Task 1: Add a patient's active allergy list:

Task 2: Change patient active allergy List

Task 3: Patient revisit add allergy in next encounter

§170.315(a)(9) Clinical Decision Support

Tasks 1 – Configure CDS rule

Tasks 2 –CDS security.

Tasks 3 – Event based Triggers

§170.315(a)(14) Implantable Device List

Record Unique Device Identifiers associated with a patient’s Implantable Devices. Record, change, and access Implantable orders. Parse the following identifiers from a Unique Device Identifier and obtain information.

Task 1: Add a New Implant and Access and obtain implant information

Task 2: Update Status of Implant

§170.315(b)(2) Clinical Information Reconciliation and Incorporation (CIRI)

- Task1 : Reconcile Allergies
- Task 2 : Reconcile Medications
- Task3 : Reconcile Problems

3.3 Test Environment

| |
|---|
| All tests were conducted remotely. Administrator has conducted tests from AHS office and all data was collected manually on the paper or laptop. |
| Tool used: Gotomeeting for remote sessions. |
| Computer type - desktop |
| OS: Windows 10 |
| All participants interacted using a keyboard and a mouse when interacting with the application. Control of the administrator PC was given to the participants for each session. |
| Remote session’s participants utilized their own machines with different screen sizes. |
| Set up of the environment was completed by the AHS support team. AHS team has created a test application (database) setup for participants. |
| Connection – Administrator has used the computer connected to LAN network from AHS office. |

3.4 Usability Metrics

We have measured the Effectiveness, Efficiency and Satisfaction with WritePad EHR to understand the level of usability for the EHR. Each term is defined in following way.

- **Effectiveness** in usability is defined as the degree to which an interface facilitates users in accomplishing their tasks and goals. In general, effectiveness looks at the number of participants who can complete a task in

a reasonable amount of time. EHR is evaluated by participant’s achievement rates (pass, fail) and mistakes.

- **Efficiency** is measured by the length of time required to complete a task. Efficiency of WritePad EHR evaluated participant path deviations, task time and task click paths. This will tell us how to design screen for performance improvements.
- **Satisfaction** is defined by a set of subjective measures regarding a user’s perception of usability and evaluation. Satisfaction is evaluated by star rating which will tell the overall evaluation for each task and Task.

4. Data Scoring Narratives

The following table (see Table 3) details how tasks were scored, errors evaluated, and the time data analyzed.

| Measures | Rationale and Scoring |
|---|--|
| <p>Effectiveness:</p> <p>Task Success</p> | <p>A task is 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 are 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>The standard deviation for each percent success was a calculated.</p> |
| <p>Effectiveness:</p> <p>Task Failures</p> | <p>If the participant abandons the task, does not reach the correct answer or performs it incorrectly, or reaches the end of the allotted time before successful completion, the task is counted as a —Failure. No task times are taken for errors.</p> <p>8/14</p> <p>The total number of errors is 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> |

| | |
|--|--|
| <p>Efficiency:</p> <p>Task Deviations</p> | <p>The participant’s path (i.e., steps) through the application is recorded. Deviations occur if the participant, for example, visits an incorrect screen, clicks on an incorrect menu item, follows an incorrect link, or interacts incorrectly with an on-screen control. This path is 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. Deviations do not necessarily mean failure – simply a less efficient method through the interface. Optimal paths (i.e., procedural steps) should be recorded when constructing tasks.</p> |
| <p>Efficiency:</p> <p>Task Time</p> | <p>Each task is timed from when the administrator said —Begin until the participant says —Done. If he or she fails to say —Done, the time is stopped when the participant stopped performing the task. Only task times for tasks that are successfully completed are included in the average task time analysis. Average time per task is calculated for each task. Variance measures (standard deviation and standard error) are also calculated.</p> <p>Task times are 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 100 seconds then allotted task time performance would be 125 seconds. This ratio should be aggregated across tasks and reported with mean and variance scores.</p> |
| <p>Satisfaction:</p> <p>Task Rating</p> | <p>Participant’s subjective impression of the ease of use of the application is measured by administering both a simple post-task question as well as a post-session questionnaire. After each task, the participant is 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>To measure participants ‘confidence in and likeability of the application overall, the testing team used administer the System Usability Scale (SUS) post-test questionnaire. Questions include, “I think I would like to use this system frequently”, “ thought the system was easy to use”.</p> |

5. Results

Results §170.315(a)(1) Computerized Provider Order Entry (CPOE) – Medications

| | |
|---------------|---|
| Measure Title | §170.315(a)(1) Computerized provider order entry – medications (i) Enable a user to record, change, and access medication orders. |
| Tasks | <p>To successfully complete the task, participants were required to complete each of the following subtasks.</p> <p>Task 1: Order Medications</p> <p>Task 1:</p> <ul style="list-style-type: none"> • Access Medication orders screen to place a medication order • Order IBUPROFEN 800MG, 1/2 tablet oral, twice a day <p>Task 2: Change Orders for Medications</p> <ul style="list-style-type: none"> • Access Medication orders screen to change order • Change IBUPROFEN 600MG, once a day. |

| Measure | N | Task Success | Path Deviation | Task Time | | Errors | Task Ratings 5=Easy |
|---|----|--------------|---------------------------------|------------|---------------------------------|-----------|------------------------|
| | | | | Mean (SD) | Deviation (Observed / Optimal) | | |
| Task | # | Percent (%) | Deviations (Observed / Optimal) | Mean (SD) | Deviations (Observed / Optimal) | Mean (SD) | Mean (SD) |
| Task 1 Access orders to place a medication Order Order IBUPROFEN 800MG, 1/2 tablet oral, twice a day | 10 | 80% | 28.4/18 | 280 (69.0) | 280/150 | 20% (3.8) | 3.9 (0.7) |

| | | | | | | | |
|---|----|-----|---------|---------------|---------|--------------|--------------|
| Task2 Access medication orders to change an order Change IBUPROFEN 600MG, once a day | 10 | 80% | 22.4/14 | 220 (41.4) | 220/120 | 20% (3.8) | 3.7 (0.8) |
|---|----|-----|---------|---------------|---------|--------------|--------------|

Data Analysis and Reporting

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|---|
| <p>§ Effectiveness – Accessing medication order and placing a medication order was completed by 80% of the users. 20% users failed to add proper SIG. For Task 2, 80% users were able to edit existing drug and other 20% failed to change the existing drug because they needed to select the existing drug, remove it and then add a new one.</p> |
| <p>§ Efficiency – No critical issues were observed. Task time and number of clicks vary for each participant. We have observed few points where we can improve the performance.</p> <ol style="list-style-type: none"> 1. Most people while adding SIG, clicked the “+” sign instead of select button. 2. People were searching in ‘Favorite’ list instead of ‘Total Search’ list. They did not select the ‘Total Search’ tab on the top. |
| <p>§ Satisfaction – Satisfaction levels were rated at the system level and at a Task level. Participant’s have rated the Task which included these tasks on the scale of 1 (very difficult) to 5 (very easy) Task 1: Mean is 3.9 Task 2: Mean is 3.7</p> |
| <p>§ Major Findings – Performance of adding and editing the medication order fell below the 80% success criterion. The reason behind this is discussed in Effectiveness and Efficiency sections above. The improvement to be done is discussed below.</p> |
| <p>§ Areas for Improvement – To select the SIG, we need to introduce a drop-down instead of a select button. Edit/delete button on the same row of record will make more sense than selecting record and then hitting edit button.</p> |

Results: §170.315(a)(2) Computerized Provider Order Entry (CPOE) – Laboratory

| | |
|---------------|---|
| Measure Title | §170.315(a)(2) Computerized provider order entry – Laboratory Enable a user to record, change, and access Laboratory orders. |
| Tasks | To successfully complete the clinical task, participants were required to complete each of the following subtasks Task 1: Order Lab Access orders to place a laboratory order Orders Laboratory Test: CBC WO diff Bld (hemograma and plate count) Task 2: Change Orders for Lab Access orders to change a Laboratory Test order Change Laboratory Test to : Diabetes status |

| Measure | N | Task Success | Path Deviation | Task Time | | Errors | Task Ratings 5=Easy |
|---|----|--------------|---------------------------------|------------|---------------------------------|-----------|------------------------|
| | | | | Mean (SD) | Deviations (Observed / Optimal) | | |
| Task | # | Percent (%) | Deviations (Observed / Optimal) | Mean (SD) | Deviations (Observed / Optimal) | Mean (SD) | Mean (SD) |
| Task 1 Access orders to place a laboratory order Orders Laboratory Test: CBC WO diff Bld (hemograma and plate count) | 10 | 80% | 21/16 | 245 (41.6) | 245/155 | 20% (3.8) | 4.1 (1.0) |

| | | | | | | | |
|---|----|-----|-------|---------------|---------|--------------|--------------|
| Task2 | | | | | | | |
| Access orders to change a laboratory order Change Laboratory Test to : Diabetes status | 10 | 70% | 24/17 | 185 (42.3) | 185/135 | 30% (4.4) | 3.7 (0.8) |

Data Analysis and Reporting

| |
|---|
| <p>§ Effectiveness – Accessing lab order and placing a lab order was completed by 80% of the users. 20% users failed to add lab order. They didn't select lab name or didn't get the concept. Root reason is that they have no prior knowledge of lab order. For Task 2, 70% users were able to edit existing lab and other 30% failed to change the existing lab order because they needed to select the existing lab test, remove it and then add a new one which they found confusing. Also participants got confused between cancel order and edit order.</p> |
| <p>§ Efficiency - No critical issues were observed. Task time and number of clicks vary for each participant. We have observed few points where we can improve the performance.</p> <ul style="list-style-type: none"> • Default search by LONIC code will help to reduce task time and number of clicks instead of default name search. • Grid for lab name should be bigger. Complete name should be visible. • 'Order Type' field should be more prompt. |
| <p>§ Satisfaction – Satisfaction levels were rated at the system level and at a Task level. Participant's have rated the Task which included these tasks on the scale of 1 (very difficult) to 5 (very easy) Task 1 : Mean is 4.1 Task 2 : Mean is 3.7</p> |
| <p>§ Major Findings – Performance of adding and editing the lab order fell below the 80% success criterion. The reason behind this is discussed in Effectiveness and Efficiency sections above. The improvement to be done is discussed below.</p> |
| <p>§ Areas for Improvement –</p> <ul style="list-style-type: none"> • Default search by LONIC code will help to reduce task time and number of clicks instead of default name search. • Grid for lab name should be bigger. Complete name should be visible. • 'Order Type' field should be more prompt. • If lab name is not present, then they need to leave the page and add lab details on 2nd screen and then come back to the order screen. We can provide Add Lab facility on the same screen. |

Results: §170.315(a)(3) Computerized Provider Order Entry (CPOE) – Diagnostic Imaging

| | |
|---------------|--|
| Measure Title | §170.315(a)(3) Computerized provider order entry – Diagnostic Imaging (ii) Enable a user to record, change, and access Diagnostic orders. |
| Tasks | To successfully complete the clinical task, participants were required to complete each of the following subtasks. Please select the Patient Test IMA Task 1: Order Lab Access orders to place a diagnostic order Orders XR Chest 2 Views Task 2: Change Orders for Lab Access order to change a diagnostic imaging order Change XR Chest 2 Views to XR wrist |

| Measure | N | Task Success | Path Deviation | Task Time | | Errors | Task Ratings 5=Easy |
|---|----|--------------|--------------------------------|-------------------|--------------------------------|--------------|------------------------|
| | | | | Mean (SD) Seconds | Deviation (Observed / Optimal) | | |
| Task | # | Percent (%) | Deviation (Observed / Optimal) | Mean (SD) Seconds | Deviation (Observed / Optimal) | Mean (SD) | Mean (SD) |
| Task 1 Access orders to place a diagnostic order Orders XR Chest 2 Views | 10 | 100% 80% | 20/16 | 190 (21.4) | 190/155 | 20% (3.8) | 4.1 (0.7) |
| Task 2 Access order to change a diagnostic imaging order Change XR Chest 2 Views to XR wrist | 10 | 100% 70% | 22/17 | 165 (18.3) | 165/135 | 30% (4.4) | 3.7 (1.3) |

Data Analysis and Reporting

§ Effectiveness –

Accessing diagnostics imaging order and placing a diagnostics imaging order was completed by 80% of the users. 20% users failed to add diagnostics imaging order. They didn't select diagnostics imaging test name or didn't get the concept. Root reason is that they have no prior knowledge of diagnostics imaging order.

For Task 2, 70% users were able to edit existing diagnostics imaging order and other 30% failed to change the existing diagnostics imaging order because they needed to select the existing diagnostics imaging test, remove it and then add a new one which they found confusing. Also, participants got confused between cancel order and edit order.

§ Efficiency – No critical issues were observed. Task time and number of clicks vary for each participant. We have observed few points where we can improve the performance.

- Default search by LONIC code will help to reduce task time and number of clicks instead of default name search.
- Grid for test name should be bigger. Complete name should be visible.
- 'Order Type' field should be more prompt.

§ Satisfaction – Satisfaction levels were rated at the system level and at a Task level.

Participant's have rated the Task which included these tasks on 1 (very difficult) to 5 (very easy) scale

Task 1 : Mean is 4.1

Task 2 : Mean is 3.7

§ Major Findings –

Performance of adding and editing the diagnostics imaging order fell below the 80% success criterion. The reason behind this is discussed in Effectiveness and Efficiency sections above. The improvement to be done is discussed below.

§ Areas for Improvement –

- Default search by LONIC code will help to reduce task time and number of clicks instead of default name search.
- Grid for test name should be bigger. Complete name should be visible.
- 'Order Type' field should be more prompt.
- If facility name is not present, then they need to leave the page and add the facility details on 2nd screen and then come back to the order screen. We can provide Add diagnostics imaging facility on the same screen.

Results: §170.315(a)(5) Demographics - Clinical

| | |
|--------------------------|---|
| <p>Measure Title</p> | <p>170.315(a)(5) Demographics</p> <p>(i) Enable a user to record, change, and access patient demographic data including race, ethnicity, preferred language, sex, sexual orientation, gender identity, and date of birth.</p> <p>(A) Race and ethnicity.</p> <p>(1) Enable each one of a patient’s races to be recorded in accordance with, at a minimum, the standard specified in § 170.207(f)(2) and whether a patient declines to specify race.</p> <p>(2) Enable each one of a patient’s ethnicities to be recorded in accordance with, at a minimum, the standard specified in § 170.207(f)(2) and whether a patient declines to specify ethnicity.</p> <p>(3) Aggregate each one of the patient’s races and ethnicities recorded in accordance with paragraphs (a)(5)(i)(A)(1) and (2) of this section to the categories in the standard specified in § 170.207(f)(1).</p> <p>(B) Preferred language. Enable preferred language to be recorded in accordance with the standard specified in § 170.207(g)(2) and whether a patient declines to specify a preferred language.</p> <p>(C) Sex. Enable sex to be recorded in accordance with the standard specified in § 170.207(n)(1).</p> <p>(D) Sexual orientation. Enable sexual orientation to be recorded in accordance with the standard specified in § 170.207(o)(1) and whether a patient declines to specify sexual orientation.</p> <p>(E) Gender identity. Enable gender identity to be recorded in accordance with the standard specified in § 170.207(o)(2) and whether a patient declines to specify gender identity.</p> |
| <p>Task Instructions</p> | <p><i>Task:</i></p> <p>Task 1</p> <p>Access patient demographic data and <i>Enter the following information into the patient’s file:</i></p> <p><i>Name - Test IMA</i></p> <ul style="list-style-type: none"> • <i>Date of Birth: 13/ 8/ 1991</i> • <i>Race: Declined to provide</i> • <i>Ethnicity: Declined to provide</i> • <i>Language: English</i> • <i>Sex: Female</i> • <i>Sexual Orientation: Declined to provide</i> • <i>Gender Identity: Declined to provide</i> |

- *Preferred Language: Declined to provide*
- *Attending Provider: Asample*

Task 2

Please select the Patient Test IMA

Change the following information into the patient's file:

- *Date of Birth: 1/17/ 1990*
- *Race: White*
- *Ethnicity: Hispanic or Latino*
- *Preferred Language: English*
- *Sex: Male*
- *Sexual Orientation: Don't know*
- *Gender Identity: Genderqueer, neither exclusively male nor female*

| Measure | N | Task Success | Path Deviation | Task Time | | Errors | Task Ratings 5=Easy |
|---|----|--------------|------------------------------------|---------------|------------------------------------|-----------|------------------------|
| | # | % | Deviations (Observed / Optimal) | Mean (SD) Sec | Deviations (Observed / Optimal) | Mean (SD) | Mean (SD) |
| Task 1 Access to enter patient demographic data Enter patient's date of birth Enter patient's race Enter patient's ethnicity Enter patient's language as preferred language Enter patient's sex Enter patient's sexual orientation Enter patient's gender identity | 10 | 60% | 28/20 | 220 (53.5) | 220/165 | 40% | 4.4 (0.7) |
| Task 2 Access to change patient demographic | 10 | 60% | 21/16 | 145 (17.8) | 145/110 | 40% (4.8) | 4.0 (0.9) |

| | | | | | | | |
|-------------------------------------|--|--|--|--|--|--|--|
| data | | | | | | | |
| Change patient's DOB | | | | | | | |
| Change patient's race | | | | | | | |
| Change patient's ethnicity | | | | | | | |
| Change patient's language | | | | | | | |
| Change patient's sex | | | | | | | |
| Change patient's sexual orientation | | | | | | | |
| Change patient's gender identity | | | | | | | |

Data Analysis and Reporting

| |
|--|
| <p>§ Effectiveness – Performance of the subtasks in Task 1 for adding demographic information fell below the 90% of the success rate for: Enter patient's date of birth, Enter patient's race, Enter patient's ethnicity. Performance of the subtasks in Task 2 for modifying demographic information fell below the 90% of the success rate for: Change patient's race, Change patient's ethnicity. The only critical error we found is while selecting ethnicity and race because participant must deselect existing race and ethnicity and then select the new one.</p> |
| <p>§ Efficiency – Some participants did not see the checkbox for enabling the birthdate and it's taking time for participant to select old date. This is mostly because they don't know where to click for year from the date control. As there is too much information on one form so grouping of the information will help to reduce the time for finding the correct information.</p> |
| <p>§ Satisfaction – Satisfaction levels were rated at the system level and at a Task level. Participant's have rated the Task which included these tasks on the scale of 1 (very difficult) to 5 (very easy). Task 1 : Mean is 4.2 Task 2 : Mean is 4.0</p> |

§ Major Findings – Performance of the subtasks in Task 1 for adding demographic information fell below the 90% of the success rate for: Enter patient’s date of birth, Enter patient’s race, Enter patient’s ethnicity.

Performance of the subtasks in Task 2 for modifying demographic information fell below the 90% of the success rate for: Change patient’s race, Change patient’s ethnicity.

The only critical error we found is while selecting ethnicity and race because participant must deselect existing race and ethnicity and then select the new one.

§ Areas for Improvement –

- Selecting race and ethnicity should be list box with checkbox so that user will know that they need to uncheck to deselect it.
- Date of birth checkbox should be more prompt, users are not able to find it easily.
- Preferred language list is too long, some users recommended that most frequently used languages should be at the top.

Results: §170.315(a)(6) Problem List

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| Measure Title | Enable a user to record, change, and access a patient's active problem list: Ambulatory setting only. Over multiple encounters in accordance with, at a minimum, the version of the standard specified in § 170.207(a)(4). |
| Tasks | <p>To successfully complete the clinical task, participants were required to complete each of the following subtasks</p> <p>Task 1: Add a patient's active problem list: Add new problem Hypertension.</p> <p>Task 2: Change patient active problem List Access active problem List Change problem to <i>pain in right knee</i> and status as Resolved.</p> <p>Task 3: Patient revisit and next encounter add Strat new encounter Access active problem List. Add new problem Headache.</p> |

| Task | Measure | N | Task Success | Path Deviation | Task Time | | Errors | Task Ratings |
|------|---------|---|--------------|---------------------------------|------------------|-----------------------|-----------|--------------|
| | | # | Percent (%) | Deviations (Observed / Optimal) | Mean (SD) Second | Deviations (Observed) | Mean (SD) | Mean (SD) |
| | | | | | | | | 5=Easy |

| | | | | s | ed / Optimal) | | |
|---|----|------|--------|------------|---------------|-----------|-----------|
| Task 1 Access Problem List screen <i>Add hypertension as problem list</i> | 10 | 100% | 12.1/8 | 185 (14.6) | 185/120 | 0% (0) | 4.3 (0.6) |
| Task 2 Access active problem List <i>Change hypertension to pain in right knee and status as Resolved.</i> | 10 | 70% | 14/9 | 140 (16.7) | 140/100 | 30% (4.4) | 3.6 (0.9) |
| Task 3 Strat new encounter <i>Access active problem List. Add new problem Headache.</i> | 10 | 80% | 11/10 | 165 (14) | 165/120 | 20% (3.8) | 3.9 (0.9) |

Data Analysis and Reporting

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| <p>§ Effectiveness – For Task 1, all participants were able to navigate to the problem screen and able to add problem details. For Task 2, 70% participants were able to modify the existing problems. The remaining 30% users were not able to locate the remove button. For Task 3, 80% participants were able to start new encounter and add problem details. Only one non-critical error was that participants were confused while selecting the status of the problem.</p> |
| <p>§ Efficiency – No critical errors were observed. Few non-critical errors observed are described above.</p> |
| <p>§ Satisfaction levels were rated at the system level and at a Task level.</p> |

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| <p>Participant's have rated the Task which included these tasks on the scale of 1 (very difficult) to 5 (very easy).</p> <p>Task 1 : Mean is 4.3</p> <p>Task 2 : Mean is 3.6</p> <p>Task 3 : Mean is 3.9</p> |
| <p>§ Major Findings – For Task 1, all participants were able to navigate to the problem screen and able to add problem details.</p> <p>For Task 2, 70% participants were able to modify the existing problems.</p> <p>For Task 3, 80% participants were able to start new encounter and add problem details.</p> <p>Only one non-critical error was that participants were confused while selecting the status of the problem.</p> <p>Participants are not able to find the Remove button easily.</p> |
| <p>§ Areas for Improvement –</p> <ul style="list-style-type: none"> • The combo-box of the status for the problem should be more visible. Participants were typing status manually instead of selecting it. • Add and remove options should be in the same row of the problem. |

Results: §170.315(a)(7) Medication List

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|---------------|---|
| Measure Title | <p>§ 170.315 (a)(7) Medication list.</p> <p>Enable a user to record, change, and access a patient's active medication list as well as medication history:(i) Ambulatory setting. Over multiple encounters.</p> |
| Tasks | <p>To successfully complete the clinical task, participants were required to complete each of the following subtasks</p> <p>Task 1: Add a patient's active medication list: Access orders to place a medication Order Zinc Injection 1MG/ML</p> <p>Task 2: Change patient active medication List Access orders to place a medication Change Order to Zincate capsules 220Mg</p> <p>Task 3: Patient revisit add new medication <i>Start new encounter</i> Access active Medication List. Add new medication Nifedipine 10 MG Oral Capsule</p> |

| Measure | N | Task Success | Path Deviation | Task Time | Errors | Task Ratings 5=Easy |
|---------|---|--------------|----------------|-----------|--------|------------------------|
|---------|---|--------------|----------------|-----------|--------|------------------------|

| Task | # | Percent (%) | Deviations (Observed / Optimal) | Mean (SD) Seconds | Deviations (Observed / Optimal) | Mean (SD) | Mean (SD) |
|--|----|-------------|---------------------------------|-------------------|---------------------------------|-----------|-----------|
| Task 1 Access orders to place a medication Order Zinc Injection 1MG/ML | 10 | 100% | 28.4/18 | 279 (64.6) | 279/150 | 0% (0) | 3.9 (0.7) |
| Task 2 Access orders to place a medication Change Order to Zincate capsules 220Mg | 10 | 80% | 22.4/14 | 228 (51.3) | 228/120 | 20% (3.8) | 3.7 (0.8) |
| Task 3 Start New encounter Access active Medication List. Add new medication Nifedipine 10 MG Oral Capsule | 10 | 80% | 28.4/18 | 274 (60.8) | 274/160 | 20% (3.8) | 3.7 (0.8) |

Data Analysis and Reporting

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| <p>§ Effectiveness –</p> <p>For Task 1, Accessing medication list and adding a medication was completed by 80% of the users. 20% users failed to add proper SIG.</p> <p>For Task 2, 80% users were able to edit existing drug while other 20% failed to change the existing drug because they needed to select the existing drug, remove it and then add a new one which was confusing for them.</p> <p>For Task 3, 80% participants were able to start new encounter and add medication details.</p> |
| <p>§ Efficiency –</p> <p>No critical issues were observed. Task time and number of clicks vary for each participant. We have observed few points where we can improve the performance.</p> <ol style="list-style-type: none"> 1. Most people while adding SIG, clicked the “+” sign instead of select button. 2. People were searching in ‘Favorite’ list instead of ‘Total Search’ list. They did not select the ‘Total Search’ tab on the top. |
| <p>§ Satisfaction – Satisfaction levels were rated at the system level and at a Task level.</p> |

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| <p>Participants have rated the Task which included these tasks on the scale of 1 (very difficult) to 5 (very easy)</p> <p>Task 1: Mean is 3.9</p> <p>Task 2: Mean is 3.7</p> <p>Task 3: Mean is 3.7</p> |
| <p>§ Major Findings –</p> <p>Performance of adding and editing the medication fell below the 80% success criterion. 80% participants were able to start new encounter and add medication details while the remaining 20% failed to do this. The reason behind this is discussed in Effectiveness and Efficiency sections above. The improvement to be done is discussed below.</p> |
| <p>§ Areas for Improvement –</p> <ul style="list-style-type: none"> • To select the SIG, we need to introduce a drop-down instead of a select button. • Edit/delete button on the same row of record will make more sense than selecting record and then hitting edit button. |

Results: §170.315(a)(8) Medication Allergy List

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| Measure Title | <p>Enable a user to record, change, and access a patient's active medication allergy list as well as medication allergy history:</p> <p>(i) Ambulatory setting. Over multiple encounters.</p> |
| Tasks | <p>To successfully complete the clinical task, participants were required to complete each of the following subtasks</p> <p>Task 1: Add a patient's active allergy list: Access allergy list add allergy for Dust</p> <p>Task 2: Change patient active allergy List Access allergy List change dust allergy to Penicillin.</p> <p>Task 3: Patient revisit add ibuprofen as allergy in next encounter. Start New encounter Access active allergy List. Add new allergy ibuprofen.</p> |

| Measure | N | Task Success | Path Deviation | Task Time | | Errors | Task Ratings 5=Easy |
|---|----|--------------|------------------------------------|-------------------------|------------------------------------|--------------|------------------------|
| | # | Percent (%) | Deviations (Observed / Optimal) | Mean (SD) Seconds | Deviations (Observed / Optimal) | Mean (SD) | Mean (SD) |
| Task 1 Access place to for allergy list add allergy for Dust | 10 | 100% | 16.7/12 | 164 (19.6) | 164/120 | 0% (0) | 4.4 (0.7) |
| Task 2 Access allergy List change dust allergy to Penicillin. | 10 | 70% | 20.1/14 | 189 (38.9) | 189/135 | 30% (4.4) | 3.9 (0.7) |
| Task 3 Start New encounter Access active allergy List. Add new allergy ibuprofen . | 10 | 80% | 17.5/14 | 147 (21.3) | 147/110 | 20% (3.8) | 3.9 (0.8) |

Data Analysis and Reporting

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| <p>§ Effectiveness – Accessing allergy list and adding allergy was completed by all users. 30% users fail to change the existing allergy because they need to select the existing allergy, remove it and then add a new one as on allergy screen there is no edit button. 20% users failed to start new encounter and added allergy in same encounter instead of new one.</p> |
| <p>§ Efficiency – No critical errors were observed. Task time and number of clicks vary for each participant. We have observed few points where we can improve the performance.</p> <ul style="list-style-type: none"> Edit/delete button on the same row of record will make more sense than selecting record and then hitting edit button. |

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| <ul style="list-style-type: none"> In the add allergy screen, on set date, reaction and status is missing. Right now, user must add allergy and to add above info they must enter data in row directly. It should be on same screen where they are adding allergy. |
| <p>§ Satisfaction levels were rated at the system level and at a Task level. Participant's have rated the Task which included these tasks on scale 1 (very difficult) to 5 (very easy).</p> <p>Task 1 : Mean is 4.4 Task 2 : Mean is 3.9 Task 3 : Mean is 3.9</p> |
| <p>§ Major Findings – Performance of editing allergy fell below the 70% success criterion. 30% users failed to start new encounter and added allergy in same encounter instead of new encounter.</p> |
| <p>§ Areas for Improvement –</p> <ul style="list-style-type: none"> We should add delete/edit buttons in same row of record. Status of the allergy should be more prompt. In the add allergy screen, on set date, reaction and status is missing. Right now, user must add allergy and to add above info they must enter data in row directly. It should be on same screen where they are adding allergy. |

Results: §170.315(a)(9) Clinical Decision Support

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| Measure Title | <p>(i) CDS intervention interaction. Interventions provided to a user must occur when a user is interacting with technology.</p> <p>(ii) CDS configuration.</p> <p>(A) Enable interventions and reference resources specified in paragraphs (a)(9)(iii) and (iv) of this section to be configured by a limited set of identified users (e.g., system administrator) based on a user's role.</p> <p>(B) Enable interventions:</p> <p>(1) Based on the following data:</p> <p>(i) Problem list;</p> <p>(ii) Medication list; (iii) Medication allergy list;</p> <p>(iv) At least one demographic specified in paragraph (a)(5)(i) of this section;</p> <p>(v) Laboratory tests; and (vi) Vital signs.</p> <p>(2) When a patient's medications, medication allergies, and problems are incorporated from a transition of care/referral summary received and pursuant to paragraph (b)(2)(iii)(D) of this section.</p> <p>(iii) Evidence-based decision support interventions. Enable a limited set of identified users to select (i.e., activate) electronic CDS interventions (in</p> |
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| | <p>addition to drug-drug and drug-allergy contraindication checking) based on each one and at least one combination of the data referenced in paragraphs (a)(9)(ii)(B)(1)(i) through (vi) of this section. (iv)Linked referential CDS.</p> <p>(A) Identify for a user diagnostic and therapeutic reference information in accordance at least one of the following standards and implementation specifications:</p> <p>(1) The standard and implementation specifications specified in § 170.204(b)(3).</p> <p>(2) The standard and implementation specifications specified in § 170.204(b)(4).</p> <p>(B) For paragraph (a)(9)(iv)(A) of this section, technology must be able to identify for a user diagnostic or therapeutic reference information based on each one and at least one combination of the data referenced in paragraphs (a)(9)(ii)(B)(1)(i), (ii), and (iv) of this section.</p> <p>(v) Source attributes. Enable a user to review the attributes as indicated for all CDS resources:</p> <p>(A) For evidence-based decision support interventions under paragraph (a)(9)(iii) of this section:</p> <p>(1) Bibliographic citation of the intervention (clinical research/guideline);</p> <p>(2) Developer of the intervention (translation from clinical research/guideline);</p> <p>(3) Funding source of the intervention development technical implementation; and</p> <p>(4) Release and, if applicable, revision date(s) of the intervention or reference source.</p> |
| <p>Tasks</p> | <p>To successfully complete the clinical task, participants were required to complete each of the following subtasks.</p> <p>Tasks 1 – enable CDS rule for Allergy – Aspirin Medication – IBUPROFEN Problem List – Hypertension Vital Signs- Blood Pressure more than 150 Demographics - Language - English Lab test - CBC WO diff Bld</p> <p>Tasks 2 –CDS security. Try to configure alert by a limited set of identified users.</p> |

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| | <p>Tasks 3 – Event based Triggers</p> <p>User should get an CDS</p> <p>Add new patient problem - Hypertension</p> <p>Order the following medication - Promethazine, Penicillin</p> <p>Add new Allergy - Aspirin</p> <p>Add new vital Signs – BP more than 150</p> <p>Specific Demographics – Language Spanish</p> <p>Access linked referential decision support – try to access the referenced information for that CDS rule.</p> |
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| Task | Measure | N | Task Success | Path Deviation | Task Time | | Errors | Task Ratings 5=Easy |
|------|---------|---|--------------|----------------------------------|---------------|----------------------------------|-----------|------------------------|
| | | # | Mean (SD) | Deviation s (Observed / Optimal) | Mean (SD) Sec | Deviation s (Observed / Optimal) | Mean (SD) | Mean (SD) |
| | | | | | | | | |

| | | | | | | | |
|--|------------------|--------------------|----------------|-----------------------|----------------|----------------------|----------------------|
| <p>Task 1</p> <p>Enable CDS rule for Allergy – Aspirin Enable CDS rule for Medication – IBUPROFEN Enable CDS rule for Problem List – Hypertension Enable CDS rule for Vital Signs- Blood Pressure more than 150 Enable CDS rule for Demographics – Language - English Enable CDS rule for Lab test - CBC WO diff Bld</p> | <p>10</p> | <p>100%</p> | <p>45.5/33</p> | <p>167 (21.3)</p> | <p>167/115</p> | <p>0% (0)</p> | <p>3.4 (0.8)</p> |
| <p>Task 2</p> <p>Limit access to alert history to a set of identified users (Providers) Turn on/off alerts for the clinical decision support by identified users. - Medication Show that unidentified users can not alter the alert</p> | <p>10</p> | <p>50%</p> | <p>8/6</p> | <p>55 (14.7)</p> | <p>55/25</p> | <p>50% (4.9)</p> | <p>3.2 (1.2)</p> |

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|---|------------------|------------|--------------|-----------------------|----------------|----------------------|----------------------|
| <p>Task 3 View alert on the 1: Add new patient problem Hypertension Task 2: Order the following medication - Promethazine, Penicillin Task 3: Add new Allergy - Aspirin Task 4: Add new vital Signs – BP more than 150 Task 6: Specific Demographics – Language Spanish Access the referenced information for that CDS rule.</p> | <p>10</p> | <p>60%</p> | <p>17/10</p> | <p>340 (69.6)</p> | <p>340/220</p> | <p>40% (4.8)</p> | <p>3.2 (1.2)</p> |
|---|------------------|------------|--------------|-----------------------|----------------|----------------------|----------------------|

Data Analysis and Reporting

As this concept was new to few of the participants, we had to provide initial knowledge about this test, what is the purpose of it and give them a little bit idea of the screen. After that, the test was conducted.

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| <p>§ Effectiveness – For Task 1, all the participants were able to turn the alert ON/OFF. For Task 2 only 50% of the people were able to perform the task that unidentified user can not alter alert. This is because they have to logout of the system and log back in as a different user. And they were not familiar with this concept. For Task 3, 80% people were able to produce alert. Some people didn’t know how to add Blood pressure in vital sign screen. But after admin’s help they were able to produce that alert too. For Task 4, Most of the people didn’t know the concept of referenced info. 60% were able to get to the info once they knew the concept of it. Some found the instructions unclear.</p> |
| <p>§ Efficiency – No critical errors were found. Task time and number of clicks vary for each participant.</p> <ul style="list-style-type: none"> • The only issue with this module is that most people were not familiar with concept. • Right now, the reference information is displayed only on the screen where alert is added. It should also be there where alert pops up. That will save lot of time for people if they want to see the referenced info after alert pop up. |

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| <p>§ Satisfaction - levels were rated at the system level and at a Task level. Participants have rated the Task which included these tasks on the scale of 1 (very difficult) to 5 (very easy) Task 1 : Mean is 3.4 Task 2 : Mean is 3.2 Task 3 : Mean is 3.2</p> |
| <p>§ Major Findings – For Task 2 only 50% of the people were able to show that unidentified user can not alter alert. This is because they have to logout of the system and log back in as a different user. And they were not familiar with this concept. Root cause was misinterpreted instructions and newer concept. For Task 3, 80% people were able to produce alert.</p> |
| <p>§ Areas for Improvement –</p> <ul style="list-style-type: none"> • The reference information is displayed only on the screen where alert is added. It should also be there where alert pops up. That will save lot of time for people if they want to see the referenced info after alert pop up. • We need to run training program so that people will get familiar with the concept. • Alert pop should be show on the screen where user is adding data not when user leaves to note screen. This will save lot of time. |

Results: §170.315(a)(14) Implantable Device List

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| Measure Title | Record Unique Device Identifiers associated with a patient’s Implantable Devices. Record, change, and access Implantable orders. Parse the following identifiers from a Unique Device Identifier and obtain information. |
| Tasks | <p>To successfully complete the clinical task, participants were required to complete each of the following subtasks</p> <p>Task 1: Add a New Implant and Access and obtain implant information (We expect patient to know UDI and product details) Goto the Implantable Device List for that Patient. Add New Implant Cardiac Pacemaker Status: Active Implant ID - (01)00643169007222(17)160128(21)BLC200461H 1.2 parse that info and show to the patient.</p> <p>Task 2: Update Status of Implant</p> |

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| | <p>Goto the Implantable Device List for that Patient. Find Cardiac Pacemaker and change status to InActive</p> |
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| Measure Task | N | Task Success | Path Deviation | Task Time | | Errors | Task Ratings 5=Easy |
|---|----|--------------|------------------------------------|------------------|------------------------------------|--------------|------------------------|
| | # | % | Deviations (Observed / Optimal) | Mean (SD) Sec | Deviations (Observed / Optimal) | % | Mean (SD) |
| Task 1: Goto the Implantable Device List for that Patient Add a New Implant and Access Cardiac Pacemaker. parse that info and save. | 10 | 60% | 21/15 | 22 (41.2) | 220/145 | 40% (4.8) | 4.0 (1) |
| Task 2: Goto the Implantable Device List for that Patient. Find Cardiac Pacemaker and change status to InActive | 10 | 100% | 14/10 | 115 (25.9) | 115/90 | 0% (0) | 4.6 (0.4) |

Data Analysis and Reporting

As this concept was new to lot of participants, we have to provide initial knowledge about this test, what is purpose of it and give them a little bit idea where they can find UDI number for device.

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| <p>§ Effectiveness – 60 % participants were able to add new device as active. Participants were able to add and parse UDI number but most of the people didn't add status as active. May be its because they didn't follow the instructions, or they think when they add device it will added by default as active.</p> <p>But in Task 2 when it's just changing the status all the users could do it. It was completed by all the participants.</p> |
| <p>§ Efficiency – When users parse UDI most of the info is filled by API. But some info is manual entry. Users suggested that all the manual entries should be more prompt and at the top of screen so that users can see it easily.</p> |
| <p>§ Satisfaction levels were rated at the system level and at a Task level.</p> <p>Participants have rated the Task which included these tasks on the scale of 1 (very difficult) to 5 (very easy)</p> <p>Task 1 : Mean is 4.0</p> <p>Task 2 : Mean is 4.6</p> |
| <p>§ Major Findings – 60 % participants were able to add new device as active. Participants were able to add and parse UDI number but most of the people didn't add status as active. May be its because they didn't follow the instructions, or they think when they add device it will added by default as active.</p> |
| <p>§ Areas for Improvement –</p> <ul style="list-style-type: none"> • All manual entries should be more prompt and at the top of the screen so that users can see it easily. • Status field should be clearer because lot of people were missing it while adding a new device. |

Results: [§170.315\(b\)\(2\) Clinical Information Reconciliation and Incorporation \(CIRI\)](#)

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|---------------|--|
| Measure Title | <p>§ 170.315(b)(2) Clinical Information Reconciliation and Incorporation</p> <p>(i) General requirements. Paragraphs (b)(2)(ii) and (iii) of this section must be completed based on the receipt of a transition of care/referral summary formatted in accordance with the standards adopted in § 170.205(a)(3) and § 170.205(a)(4) using the Continuity of Care Document, Referral Note, and (inpatient setting only) Discharge Summary document templates.</p> <p>(ii) Correct patient. Upon receipt of a transition of care/referral summary formatted according to the standards adopted § 170.205(a)(3) and §</p> |
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| | <p>170.205(a)(4), technology must be able to demonstrate that the transition of care/referral summary received can be properly matched to the correct patient.</p> <p>(iii) Reconciliation. Enable a user to reconcile the data that represent a patient's active medication list, medication allergy list, and problem list as follows. For each list type:</p> <p>(A) Simultaneously display (i.e., in a single view) the data from at least two sources in a manner that allows a user to view the data and their attributes, which must include, at a minimum, the source and last modification date.</p> <p>(B) Enable a user to create a single reconciled list of each of the following: medications; medication allergies; and problems.</p> <p>(C) Enable a user to review and validate the accuracy of a final set of data.</p> <p>(D) Upon a user's confirmation, automatically update the list, and incorporate the following data expressed according to the specified standard(s):</p> <p>(1) Medications. At a minimum, the version of the standard specified in § 170.207(d)(3);</p> <p>(2) Medication allergies. At a minimum, the version of the standard specified in § 170.207(d)(3); and</p> <p>(3) Problems. At a minimum, the version of the standard specified in § 170.207(a)(4).</p> <p>(iv) System verification. Based on the data reconciled and incorporated, the technology must be able to create a file formatted according to the standard specified in § 170.205(a)(4) using the Continuity of Care Document template.</p> |
| <p>Tasks</p> | <p>To successfully complete the clinical task, participants were required to complete each of the following subtasks</p> <p>Test IMA is existing patient in Writepad. And he gave clinic information from another source (CCDA) which you need to reconcile it into writepad.</p> <p>Find Patient Test IMA.</p> <p>Goto Screen Medication reconcile screen.</p> <p>Import CCDA document.</p> <p>Reconcile Allergies</p> |

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| | <p>identify medications allergies from outside source</p> <p>identify medications allergies from EHR.</p> <p>Reconciles medication allergies List - Ampicillin from outside source and Zinc from EHR.</p> <p>Validate the accuracy of a final set of reconciled list of medication allergies and record into EHR.</p> <p>Reconcile Medications</p> <p>identify medications from outside source</p> <p>identify medications from EHR.</p> <p>Reconciles medication list.- IBUPROFEN from EHR and Ceftriaxone from outside source</p> <p>Validate the accuracy of a final set of reconciled medication list and record into EHR.</p> <p>Reconcile Problems</p> <p>show and identify Problems from outside source</p> <p>show and identify Problems from EHR.</p> <p>Reconciles Problems list – Fever from outside source and Headache from EHR.</p> <p>Validate the accuracy of a final set of Problems list and record into EHR.</p> |
|--|---|

| Measure | N | Task Success | Path Deviation | Task Time | | Errors | Task Ratings |
|---------|----------------|--------------|---------------------------------|-------------------|---------------------------------|-----------|--------------|
| Task | # | Percent (%) | Deviations (Observed / Optimal) | Mean (SD) Seconds | Deviations (Observed / Optimal) | Mean (SD) | Mean (SD) |
| | Task 1: | 10 | 70% | | | | 30% |

| | | | | | | | |
|--|----|-----|-------|---------------|--------|--------------|--------------|
| <p>Reconcile Medication Allergies identify medications allergies from outside source Identify medications allergies from EHR. Reconciles medication allergies List - Ampicillin from outside source and Zinc from EHR. Validate the accuracy of a final set of reconciled list of medication allergies and record into EHR.</p> | | | 8.3/6 | 155 (14.0) | 155/98 | (4.4) | 3.8 (1.1) |
| <p>Task 2: Reconcile Medications identify medications from outside source identify medications from EHR. Reconciles medication list.- IBUPROFEN from EHR and Ceftriaxone from outside source Validate the accuracy of a final set of reconciled medication list and record into EHR.</p> | 10 | 60% | 8/6 | 145 (18.9) | 143/95 | 40% (4.8) | 3.6 (1.0) |
| <p>Task 3: Reconcile Problems</p> | 10 | 80% | | 95 (18.9) | 125/95 | 20% (3.8) | |

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| <p>Show and identify Problems from outside source show and identify Problems from EHR.</p> <p>Reconciles Problems list – Fever from outside source and Headache from EHR.</p> <p>Validate the accuracy of a final set of Problems list and record into EHR.</p> | | | 7/6 | | | | 3.8 (1.2) |
|---|--|--|-----|--|--|--|--------------|

Data Analysis and Reporting

As this concept was new to a lot of participants, we had to provide initial knowledge about this test, what is the purpose of it and give a little bit of idea about reconciliation and import of CCDA document and how to import it in WritePad.

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| <p>§ Effectiveness – 100 % Participants were able to identify Allergies, medications and problems from WritePad and CCDA.</p> <p>For Task 2, 3 & 4, where user has to create the reconciled list of allergies, medications and problems, performance was below 80%.</p> <p>For Medication, participants got confused with instructions and selected wrong drug for reconciliation. One common issue with reconciliation is that people were not able to understand that reconcile list means they need to add drug from WritePad and outside source (CCDA) and then create a final list. Instead they clicked directly to the save/reconcile button.</p> |
| <p>§ Efficiency – No critical issues found.</p> <p>If Search option is given for drug, allergy and problem, it will save time for finding it. Right now, they have to go through the whole list to find it.</p> <p>If name of the drug, allergy or problem is long its not visible completely. Complete name should be displayed.</p> |
| <p>§ Satisfaction levels were rated at the system level and at a Task level.</p> <p>Participants have rated the Task which included these tasks on the scale of 1 (very difficult) to 5 (very easy)</p> <p>Task 1 : Mean is 3.8</p> <p>Task 2 : Mean is 3.6</p> <p>Task 3 : Mean is 3.8</p> |

§ Major Findings – 100 % Participants were able to identify Allergies, medications and problems from WritePad and CCDA.

For Task 2, 3 & 4, where user has to create the reconciled list of allergies, medications and problems, performance was below 80%. Details of this are mentioned above in the Efficiency section.

§ Areas for Improvement –

1. Users are getting confused by the word Reconcile/Save, it should be given more appropriate and easier to understand name.
2. Instructions should be displayed that user needs to select and then hit add button to insert the record in the final reconciled list.

6. Appendices

6.1 Participant's info

| ID | Gender | Age | Education | Role | Professional Experience | Computer Experience | Product Experience | Assistive Technology Needs |
|-----|--------|-------|-------------------|-----------|-------------------------|---------------------|--------------------|----------------------------|
| P1 | F | 50-59 | Doctorate degree | Physician | 210 | 330 | 182 | No |
| P2 | M | 40-49 | Doctorate degree | Physician | 187 | 260 | 145 | No |
| P3 | F | 30-39 | Doctorate Degree | Physician | 120 | 264 | 90 | No |
| P4 | F | 60-69 | Doctorate degree | Physician | 404 | 300 | 176 | No |
| P5 | M | 40-49 | Doctorate degree | Physician | 252 | 310 | 204 | No |
| P6 | M | 20-29 | Bachelor's degree | UI Tester | 60 | 92 | 0 | No |
| P7 | M | 20-29 | Bachelor's Degree | UI Tester | 55 | 84 | 1 | No |
| P8 | M | 30-39 | Bachelor's Degree | UI Tester | 82 | 132 | 12 | No |
| P9 | F | 30-39 | Bachelor's Degree | UI Tester | 58 | 118 | 0 | No |
| P10 | F | 20-29 | Bachelor's degree | UI Tester | 49 | 84 | 0 | No |

6.2 Example Moderator's Guide

Thank you for participating in this study. Our session today will last 60 -90 minutes. We will be evaluating some of the features of the application called WritePad. With the help of your feedback we will know whether the application is effective and efficient in terms of Meaningful Use Certification Criteria.

Functionality needs to tested

- (a)(1) Computerized Provider Order Entry (CPOE) – medications
- (a)(2) CPOE – laboratory
- (a)(3) CPOE – diagnostic imaging
- (a)(5) Demographics
- (a)(6) Problem List
- (a)(7) Medication List
- (a)(8) Medication Allergy List
- (a)(9) Clinical Decision Support
- (a)(14) Implantable Device List
- (b)(2) Clinical Information Reconciliation and Incorporation.

Above functionalities are treated different measures and each measure is divided into multiple Tasks that are treated as individual tasks.

My role will be as the administrator. During the testing, I will time each task and record user performance data on paper. I cannot give the participant assistance in completing the task. To log the data efficiently one administrator is assigned to each participant.

I did not have any involvement in this software's creation. I am from the support team of the AHS company. I will ask you to complete specific activities using this system and answer some questions. We are interested in learning how easy/difficult and how efficient/inefficient this system is to use. You will be asked to complete these activities on your own trying to do them as quickly as possible with the fewest possible deviations from what I ask you to do. Do not do anything more than asked. When you are doing these activities, I am not going to interact or talk to you while you are completing the activity. I will be taking notes about what you are doing. After each task, you will rate how easy or difficult it was to perform.

The feedback you provide will not be associated with your name.

This test needs to be done with 10 different participants and you are one of them.

Tests would be conducted on remote computer using gotomeeting app. Each participant will use the system over gotomeeting in his/her location and will be provided with the same instructions.

Task timing begins once the administrator explains the task and says "Begin". The task time is stopped once the participant says "Done". They can say "Done" either when they successfully complete the task or want to abandon the task.

The following types of data will be 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

Do you have any questions or concerns before we begin? I will pass control to the participant. We will start by collecting some of the information.

| |
|---|
| Participants info |
| · Gender |
| · Age |
| · Education (highest degree) |
| · Occupation/Role |
| · Professional Experience |
| · Computer Experience |
| · EHR Writepad Product Experience |
| · Assistive Technology Needs (yes-what, no) |
| Administrator Info |
| Name:- |
| Date and info |

I will start the time once you finish reading about the task and say “Begin”. Participants will be given a various number of tasks to complete. Tasks are listed in each measure. One example is like this

Task 1:

| 170.315(a)(5) Demographics - Clinical | | | | | | | | |
|---|------------|----------|------------|---------------|----------------|-------|---------------------|-------|
| We will be creating a new patient called: Sed Test | | | | | | | | |
| | Start Time | End Time | Pass/ Fail | Time on Task: | Clicks / Steps | Error | Fail reason in case | Notes |
| Scenario 1: Access patient demographic data and create new patient's file: | | | | | | | | |
| Put in Chart # if there is none | | | | | | | | |
| · Sex: Female | | | | | | | | |
| · Title: Ms. | | | | | | | | |
| · FName: Sed LName: Test | | | | | | | | |
| · Date of Birth: 12/ 8/ 1991 | | | | | | | | |
| · Race: Other Race | | | | | | | | |
| · Ethnicity (Check Box): Declined to provide | | | | | | | | |
| · Preferred Language: Spanish | | | | | | | | |
| · Save new patient | | | | | | | | |
| Scenario 2: Please select the Patient: Sed Test | | | | | | | | |
| Change the following information into the patient's file: | | | | | | | | |
| · Sex: Male | | | | | | | | |
| · Race: White | | | | | | | | |
| · Ethnicity: Hispanic or Latino | | | | | | | | |
| · Preferred Language: English | | | | | | | | |
| · Gender Identity: Genderqueer, neither exclusively male nor female | | | | | | | | |
| · Sexual Orientation: Don't Know | | | | | | | | |
| · Save changed patient | | | | | | | | |

6.3 System Usability Scale Questionnaire

System Usability Scale

Instructions: For each of the following statements, mark one box that best describes your reactions to the website *today*.

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