MEDITECH

ARRA Meaningful Use Stage 3 Usability Study
Usability Issues and Recommendations

Acute CS 5.67

Medication Allergy List

Medication List

Drug-Drug, Drug-Allergy Interaction Checks

Electronic Prescribing

Computerized Provider Order Entry - Medications

Computerized Provider Order Entry - Laboratory

Computerized Provider Order Entry - Diagnostic Imaging

Clinical Information Reconciliation and Incorporation

Clinical Decision Support

Demographics

Problem List

Implantable Device List

Table of Contents

SUMMARY

From September 2016 to December 2016, we conducted a usability test of the Acute CS 5.67 MEDITECH platform, in accordance with National Institute of Standards and Technology (NIST) and Meaningful Use certification guidelines. In these tests, end users completed a variety of tasks throughout the system; these tasks were designed to assess how easily users could complete representative clinical workflows and to identify areas to improve the usability of our software.

To meet Meaningful Use requirements, we had to assess the usability of twelve features throughout the system:

- Medication Allergy List
- Medication List
- Drug-drug, Drug-allergy Interaction Checks
- Computerized Provider Order Entry - Medications
- Computerized Provider Order Entry - Laboratory
- Computerized Provider Order Entry - Diagnostic Imaging
- Electronic Prescribing
- Clinical Information Reconciliation and Incorporation
- Clinical Decision Support
- Demographics
- Problem List
- Implantable Device List

After conducting tests with end users to analyze the usability to each of those features, we analyzed each test to evaluate the usability of our software based on three metrics.

This metric:	**Analyzes:**
Effectiveness	Whether or not participants completed the task
Efficiency	The time required and steps taken to complete the task
User Satisfaction	Participant feedback on ease of use and areas for improvement

While gathering and analyzing testing sessions, we noted areas users struggled in the system, the cause of those struggles, and ways to improve the usability of those areas. From these observations, we crafted a list of usability issues and recommendations.

This document describes the usability study for Acute C/S 5.67 MEDITECH.

TESTING PROCESS

This section provides a brief outline of our testing process, including participant profiles, testing procedure, evaluative metrics, and issue identification.

Participants

We tested a total of 24 representative participants for this usability test. All of the participants are active users of the Acute CS 5.67 MEDITECH software representing clinical, administrative, and IT staff. Participants were asked to perform tasks for functions that most closely matched their daily workflow. On average, these participants had, at the time of testing, 6 years of experience using the MEDITECH system.

Testing Procedure

Participants completed 31 tasks across the system to test multiple functionality points. We composed the tasks to mimic a representative clinical workflow, with different tasks spread across a patient visit. Here's an example task:

> Amanda has taken nitrofurantoin for her urinary tract infection, but has had dyspnea, cough, and chest and back pain since starting the medication. Discontinue this medication.

Each participant performed each task without assistance to the best of his or her ability, as quickly as possible, and with the fewest possible deviations. After each task, we asked the participant to rate the ease or difficulty of the task and gathered any participant feedback about the task.

Test Environment

Following is a summary of the participants' computing environment:

Tested product:	MEDITECH EHR, version CS 5.67
Computer platforms:	HP Probook with a 15" display
Display:	VA1926wSERIES display
Screen resolution:	1440 x 900 resolution
Operating system:	Windows 7

Morae© software was used to assist with data collection.

Evaluative Metrics

To analyze testing results, we captured seven primary pieces of data: task success, task errors, task deviations, task performance time, task time standard deviations, task rating, and System Usability Scale scores.

Task Success

We counted a task as a success if the participant was able to achieve the correct outcome without assistance. We compiled the overall success rate for a task by dividing the number of task successes by the number of task attempts.

Task Errors

While each participant worked through a task, we recorded his or her path to complete the task. We noted an error if the participant, for example, went to a wrong screen, clicked on an incorrect menu item, or followed an incorrect link *and* was not able to complete the task without returning to a previous step in the intended path.

Task Deviations

While each participant worked through a task, we recorded his or her path to complete the task. We noted a deviation if the participant performed an unexpected or unnecessary action, navigated to an incorrect screen, or selected an incorrect item, but was able to continue towards completing the task.

Task Time

We recorded the time from when a participant started a task to the time they finished it, expressed in seconds. Participants reported when they finished a task. We stopped task times when a participant failed to finish a task and continued task times when participants finished a task but failed to recognize they had completed it.

Task Time Standard Deviation

We calculated the standard deviation of task performance times. The task time standard deviation captures the number of seconds that constitutes one standard deviation from the mean task performance time. For example, a standard deviation of 10 seconds indicates that one standard deviation from the mean task time is equal to the mean task time plus or minus 10 seconds.

Task Rating

After each task, participants scored the ease or difficulty of the task on a scale of 1 (very difficult) to 5 (very easy). We computed the average rating for each task. In addition, during this process, we gathered participant feedback about the task—what they liked, disliked, thought could be improved, etc.

System Usability Scale (SUS)

The SUS is an industry-standard, 10-item questionnaire that assesses the usability of the system under test. We administered the SUS to each participant following each testing session and compiled the overall SUS scores. During this process, we asked participants for their feedback on the entire system.

Issue Identification

After completing each testing session and compiling test data and observations, we identified areas where participants struggled in using the system. For example, if a task had a low task success rate and high task time, we analyzed the task to see if participants made common deviations to increase task time and prevent them from completing the task. If a task had low task ratings, we reviewed feedback to determine if participants had common complaints about the functionality in the task.

Conversely, we noted areas where the system performed well to determine what sort of workflows participants liked. We can use positive findings to help identify intuitive areas of the system and expand that functionality when possible to less intuitive functions.

For each issue, we calculated the number of participants who struggled with that issue, where the issue occurred in the participants' workflow, how the issue affected the outcome of the task, and whether or not the issue may affect patient safety. With that information, we assigned a priority to each issue, on a scale of 1 −3.

Severity 1: Severe usability issue that caused multiple or significant task failures or has room to improve patient safety.

Severity 2: Major usability issue that caused major struggles, or significantly slowed down users, or caused an isolated task failure.

Severity 3: Efficiency usability issue. Efficiency or workflow could be improved but the issue did not cause significant disruption.

In addition to identifying the details and priority of each issue, we composed a recommendation to each issue.

Task Data

The Medication Allergy List portion of the usability study was composed of three tasks. The following table outlines the mean effectiveness, efficiency, and user satisfaction data of these three tasks.

Task	Effectiveness (% Success)	Efficiency	User Satisfaction (Rating)
Access Allergies	**100%**	Time (sec): **22** Std Dev (sec): **9** Errors: **0** Deviations: **0**	**4.8**/5.0
Change Allergy	**100%**	Time (sec): **27** Std Dev (sec): **8** Errors: **0** Deviations: **0**	**4.4**/5.0
Record Allergy	**100%**	Time (sec): **57** Std Dev (sec): **30** Errors: **0** Deviations: **1**	**4.0**/5.0

Medication Allergy List Issues

Issue 1: Extra click when entering/editing allergies and adverse reactions

Issue Data

Severity: **3**   Patient Safety: **No**   Number of users: **2**

Findings

After entering a new allergy or editing an existing allergy, there is an additional screen that appears when filing the entry. This requires an extra click to save the allergy changes

Quotes

None

Recommendations

Review screen design to determine if new entries and edits can be filed from the Enter/Edit screen without having to be subsequently saved from the main display screen.

Task Data

The Medication List portion of the usability study was composed of three tasks. The following table outlines the mean effectiveness, efficiency, and user satisfaction data of these three tasks.

Task	Effectiveness (% Success)	Efficiency	User Satisfaction (Rating)
Access Medication	**100%**	Time (sec): **31** Std Dev (sec): **14** Errors: **0** Deviations: **0**	**4.4**/5.0
Change Medication	**91%**	Time (sec): **63** Std Dev (sec): **25** Errors: **3** Deviations: **0**	**4.0**/5.0
Record Medication	**73%**	Time (sec): **224** Std Dev (sec): **105** Errors: **8** Deviations: **0**	**4.0**/5.0

Medication List Issues

Issue 1: Difficulty entering new Home Medication order

Issue Data

Severity: **2**   Patient Safety: **No**   Number of users: **3**

Findings

Three participants experienced difficulty entering a new Home Medication order. Specifically, users struggled with selecting the correct action to file an order as a reported home medication, rather than a new prescription.

Quotes

"I don't know. This is wrong, this is adding it as a new prescription."

"This is not my workflow to enter a home medication."

Recommendations

Evaluate changes to enhance the display of available action selections.

DRUG-DRUG, DRUG-ALLERGY INTERACTION CHECKS

Task Data

The Drug-Drug, Drug-Allergy Interaction Checks portion of the usability study was composed of two tasks. The following table outlines the mean effectiveness, efficiency, and user satisfaction data of these two tasks.

Task	Effectiveness (% Success)	Efficiency	User Satisfaction (Rating)
Adjustment of Severity Level for Drug-Drug Interaction Check	**100%**	Time (sec): **65** Std Dev (sec): **23** Errors: **0** Deviations: **0**	**4.4**/5.0
Drug-Allergy Interaction	**100%**	Time (sec): **26** Std Dev (sec): **12** Erros: **0** Deviations: **0**	**4.2**/5.0

Drug-Drug, Drug-Allergy Interaction Checks Issues

Issue 1: Users would like more information on the interaction screen to provide a clear reason for why the interaction appears

Issue Data

Severity: **2**   Patient Safety: **No**   Number of users: **4**

Findings

Four participants commented that they receive too many alert messages, which may lead to alert fatigue. The consensus was that participants wanted the alert to appear but wanted the presentation of information streamlined to make the reason of the alert more prominent on the screen.

Quotes

"I would have liked a hard stop if there was truly an allergy, rather than just having a warning."

"I would like to see when I should find an alternative alert for my medication order. Food is not my concern, it would be noise to me. Dietary concerns are already handled."

Recommendations

Organizations are trained to manage the alerts that appear to help with alert fatigue. Review the presentation of information included on alert messages to ensure that users can quickly understand and respond to interaction alerts.

Task Data

The Electronic Prescribing portion of the usability study was composed of two tasks. The following table outlines the mean effectiveness, efficiency, and user satisfaction data of these two tasks.

Task	Effectiveness (% Success)	Efficiency	User Satisfaction (Rating)
Locating Rx Fill Status	**73%**	Time (sec): **157** Std Dev (sec): **86** Errors: **8** Deviations: **1**	**3.0**/5.0
Generate a Refill	**73%**	Time (sec): **189** Std Dev (sec): **95** Errors: **5** Deviations: **0**	**3.0**/5.0

Electronic Prescribing Issues

Issue 1: Users cannot easily locate the Rx Fill Status

Issue Data

Severity: **2**   Patient Safety: **No**   Number of users: **3**

Findings

Three participants had difficulty locating the Rx Fill Status and were unable to successfully complete the task. Multiple participants commented that they liked the Rx Fill Status, but thought it would be difficult to use because it was hard to locate.

Quotes

"The transmission looks like it has been received."

Recommendations

When pharmacies begin to utilize Rx Fill Status messages, evaluate any points in the workflow where the system could more prominently display Rx Fill Status.

Issue 2: Users struggled to generate an ePrescribing refill order

Issue Data

Severity: **2**   Patient Safety: **No**   Number of users: **3**

Findings

Three participants experienced difficulty initiating a refill order through electronic prescribing and were unable to successfully complete the task.

Quotes

"I normally would have done this and just went to print."

Recommendations

Evaluate the process for generating a refill using ePrescribing to determine if the process can be enhanced. Also, ensure the online help and supporting documentation is sufficient to guide and instruct users on performing this function.

Task Data

The Computerized Provider Order Entry (CPOE) portion of the usability study was composed of nine tasks. The following table outlines the mean effectiveness, efficiency, and user satisfaction data of these eight tasks.

Task	Effectiveness (% Success)	Efficiency	User Satisfaction (Rating)
Record CPOE Medication	**91%**	Time (sec): **102** Std Dev (sec): **76** Errors: **1** Deviations: **0**	**4.0**/5.0
Change CPOE Medication	**91%**	Time (sec): **98** Std Dev (sec): **60** Errors: **3** Deviations: **2**	**3.8**/5.0
Access CPOE Medication	**100%**	Time (sec): **28** Std Dev (sec): **4** Errors: **0** Deviations: **0**	**4.6**/5.0
Record CPOE Laboratory	**100%**	Time (sec): **96** Std Dev (sec): **35** Errors: **0** Deviations: **0**	**4.0**/5.0
Change CPOE Laboratory	**91%**	Time (sec): **82** Std Dev (sec): **27** Errors: **2** Deviations: **1**	**4.0**/5.0
Access CPOE Laboratory	**100%**	Time (sec): **31** Std Dev (sec): **9** Errors: **0** Deviations: **0**	**4.6**/5.0
Record CPOE Diagnostic Imaging	**100%**	Time (sec): **102** Std Dev (sec): **75** Errors: **0** Deviations: **0**	**4.0**/5.0
Change CPOE Diagnostic Imaging	**82%**	Time (sec): **77** Std Dev (sec): **42** Errors: **2** Deviations: **1**	**4.0**/5.0
Access CPOE Diagnostic Imaging	**100%**	Time (sec): **28** Std Dev (sec): **6** Errors: **0** Deviations: **0**	**4.6**/5.0

Computerized Provider Order Entry Issues - Medications/Laboratory/Diagnostic Imaging

Issue 1: Users can only edit service date/time by clicking View/Change footer button

Issue Data

Severity: **3**   Patient Safety: **No**   Number of users: **2**

Findings

Currently, users cannot change the service date of existing orders by clicking on the entry under the date column. Users must select the order and then click the View/Change footer button.

Quotes

None

Recommendations

Evaluate changes to allow for edits to be made by clicking directly on the service date value, without accessing the View/Change screen.

Issue 2: New Orders and New Meds search tabs do not allow for ordering flexibility

Severity: **3**   Patient Safety: **No**   Number of users: **2**

Findings

Two participants made errors placing orders when either attempting to order a medication with the New Orders tab selected instead of New Meds, or vice versa. The system has checks in place to require the user to select the correct tab but these participants expressed frustration with the system not automatically searching between both tabs when entering an order. This did not prevent the participants from entering the orders but required extra time to switch tabs to enable the correct search.

Quotes

None

Recommendations

Evaluate ordering functionality to determine if it would be possible to have the system utilize one universal search option for medications or procedures.

Task Data

The Clinical Information Reconciliation and Incorporation portion of the usability study was composed of three tasks. The following table outlines the mean effectiveness, efficiency, and user satisfaction data of these three tasks.

Task	Effectiveness (% Success)	Efficiency	User Satisfaction (Rating)
Consume CCD - Allergies	**91%**	Time (sec): **253** Std Dev (sec): **188** Errors: **10** Deviations: **5**	**3.5**/5.0
Consume CCD - Problems	**82%**	Time (sec): **204** Std Dev (sec): **162** Errors: **8** Deviations: **3**	**3.5**/5.0
Consume CCD - Medications	**100%**	Time (sec): **308** Std Dev (sec): **248** Errors: **4** Deviations: **1**	**3.5**/5.0

Clinical Information Reconciliation – Problems/Medications/Allergies

Issue 1: Lack of consistency when reconciling external problems/medications/allergies

Issue Data

Severity: **1**   Patient Safety: **No**   Number of users: **5**

Evidence

The workflow to reconcile problems, medications, and allergies is different. Five participants expressed frustration that they have to perform the same function in three different areas, and the screen layout and workflow are not consistent across each location.

Quotes

"The screens for problems and medications appear to be similar, but allergies is totally different."

Recommended Solution

Evaluate screen layout and design so that consistency is maintained across all three areas when external data is consumed.

Issue 2: System should automatically match data from CCD to data in patient record

Issue Data

Severity: **1**   Patient Safety: **No**   Number of users: **5**

Findings

Five participants commented that the system should be able to match any data coming in from the CCD to existing data entries in the system. There is too much manual data entry when the system could alleviate some of the work. For example, if any allergy (including severity and reaction) comes in from a CCD and the data values match data entry values in the system, then the system should default all of that data instead of requiring a user to manually enter each value.

Quotes

"The reaction should pop into the box from the CCD and I could change it."

Recommendations

Evaluate changing system functionality to enable the system to default any values that match existing entries in the system. Users could then make edits, as needed.

Issue 3: Allergy header not instantly updating after Processing External Data

Issue Data

Severity: **1**   Patient Safety: **No**   Number of users: **2**

Findings

Two participants commented that upon reconciling external allergies, the allergy header was not instantly updating. The header would update upon navigating away from the screen.

Quotes

None

Recommendations

Review the process of updating the allergy header to ensure edits are displayed immediately upon filing.

Issue 4: Select All option only available for External Problems

Issue Data

Severity: **2**   Patient Safety: **No**   Number of users: **2**

Findings

The ability to Select All when processing external data is only available for problems. The functionality does not exist for allergies and medications.

Quotes

None

Recommendations

Review the workflow process to evaluate adding Select All functionality when processing external allergies and medications.

Task Data

The Clinical Decision Support portion of the usability study was composed of eight tasks. The following table outlines the mean effectiveness, efficiency, and user satisfaction data of these eight tasks.

Task	Effectiveness (% Success)	Efficiency	User Satisfaction (Rating)
Generate Problem List Interventions	**100%**	Time (sec): **35** Std Dev (sec): **9** Errors: **0** Deviations: **0**	**4.0**/5.0
Generate Medication List Interventions	**100%**	Time (sec): **48** Std Dev (sec): **11** Errors: **0** Deviations: **0**	**4.0**/5.0
Generate Medication Allergy Interventions	**100%**	Time (sec): **36** Std Dev (sec): **4** Errors: **0** Deviations: **0**	**4.0**/5.0
Generate Demographics Interventions	**100%**	Time (sec): **41** Std Dev (sec): **8** Errors: **0** Deviations: **0**	**4.0**/5.0
Generate LAB Test and Result Interventions	**100%**	Time (sec): **33** Std Dev (sec): **4** Errors: **0** Deviations: **0**	**4.0**/5.0
Generate Vital Signs Interventions	**100%**	Time (sec): **27** Std Dev (sec): **9** Errors: **0** Deviations: **0**	**4.0**/5.0
Identify User Diagnostic and Therapeutic Reference Information	**46%**	Time (sec): **106** Std Dev (sec): **58** Errors: **6** Deviations: **0**	**3.0**/5.0
Enable Clinical Decision Support Interventions	**100%**	Time (sec): **76** Std Dev (sec): **21** Errors: **3** Deviations: **0**	**4.6**/5.0

Clinical Decision Support – Infobutton Issues

Issue 1: Users had trouble utilizing the right-click functionality to access InfoButton to search for more information about a medication

Issue Data

Severity: **2**   Patient Safety: **No**   Number of users: **7**

Findings

Seven users failed to use the right-click functionality to locate the InfoButton in order to search for more information about a medication.

Quotes

"I didn't know you could do that. That's helpful once you know it's there."

Recommendations

This issue is likely due to lack of training. Right-clicking is a usable feature for users who are aware of it. It is important to teach users about right-clicking to alert them to the presence of this functionality.

Task Data

The Problem List portion of the usability study was composed of two tasks. The following table outlines the mean effectiveness, efficiency, and user satisfaction data of these two tasks.

Task	Effectiveness (% Success)	Efficiency	User Satisfaction (Rating)
Access Active Problem List	**100%**	Time (sec): **21** Std Dev (sec): **5** Errors: **0** Deviations: **0**	**4.6**/5.0
Change Active Problem List	**100%**	Time (sec): **145** Std Dev (sec): **91** Errors: **3** Deviations: **2**	**3.2**/5.0

Problem List Issues

Issue 1: Difficulty changing an existing problem

Issue Data

Severity: **2**   Patient Safety: **No**   Number of users: **4**

Findings

Four participants had difficulty changing the status of an existing diabetes problem to uncontrolled. All were able to successfully complete the task, but some experienced deviations as they followed a pathway that differed from the expected workflow.

Quotes

"I thought that was a lot of work. If there was an easier way, I would like to know."

Recommendations

Evaluate users' preferred workflows for updating existing problems, and ensure those primary workflows are accessible.

Task Data

The Demographics portion of the usability study was composed of four tasks. The following table outlines the mean effectiveness, efficiency, and user satisfaction data of these four tasks.

Task	Effectiveness (% Success)	Efficiency	User Satisfaction (Rating)
Record Patient Demographics (Race, Ethnicity, Preferred Language, Sex, Sexual Orientation, Gender Identity,Date of Birth)	**91%**	Time (sec): **141** Std Dev (sec): **73** Errors: **3** Deviations: **0**	**4.7**/5.0
Access and Edit Patient Demographics (Race, Ethnicity, Preferred Language, Sex, Sexual Orientation, Gender Identity,Date of Birth)	**100%**	Time (sec): **48** Std Dev (sec): **11** Errors: **0** Deviations: **0**	**4.7**/5.0
Record Preliminary Cause of Death and Date of Death	**91%**	Time (sec): **96** Std Dev (sec): **29** Errors: **2** Deviations: **0**	**4.7**/5.0
Access and Change Preliminary Cause of Death and Date of Death	**100%**	Time (sec): **36** Std Dev (sec): **8** Errors: **0** Deviations: **0**	**4.7**/5.0

Demographics Issues

Issue 1: Provide standard queries and responses for data collection

Issue Data

Severity: **3**   Patient Safety: **No**   Number of users: **1**

Findings

One participant suggested that the system provide standard queries and responses in order to collect key demographic information.

Quotes

"I'm not sure if this is captured at our organization so I'm not sure who would do it."

"If it's required to be captured, it would probably be done during triage."

Recommendations

Participants were informed that there are standard values associated with each demographic criterion and that group response queries can be built to include each of the standard value responses.

Task Data

The Implantable Device List portion of the usability study was composed of two tasks. The following table outlines the mean effectiveness, efficiency, and user satisfaction data of these two tasks.

Task	Effectiveness (% Success)	Efficiency	User Satisfaction (Rating)
Record Unique Device Identifiers Associated with Implantable Device	**82%**	Time (sec): **111** Std Dev (sec): **74** Errors: **6** Deviations: **0**	**3.6**/5.0
Change Status of Unique Device Identifier	**100%**	Time (sec): **101** Std Dev (sec): **68** Errors: **5** Deviations: **0**	**4.0**/5.0

Implantable Device List

Issue 1: Implantable Device List not available from Patient Summary

Issue Data

Severity: **2**   Patient Safety: **No**   Number of users: **2**

Findings

Two participants experienced difficulty with this task due to the fact that the Implantable Device List is not available from the Patient Summary screen.

Quotes

None

Recommendations

Evaluate adding the Implantable Device List to the Patient Summary.

Issue 2: Explanted/Inactive tab confusing

Issue Data

Severity: **2**   Patient Safety: **No**   Number of users: **3**

Findings

Three participants questioned the difference between Explanted and Inactive tabs when viewing the implantable device list.

Quotes

None

Recommendations

Review the labels to determine if clearer text can be selected. Research the regulation and gather user input in this evaluation.

SYSTEM USABILITY SCALE (SUS) SCORE

The System Usability Scale (SUS) analyses subjective user feedback to the system, on a numeric scale from 0 - 100. Generally, anything above 68 is considered usable. In this test, the SUS was 62.4, indicating that there is some room for usability improvements, as outlined in the key issues described above.

Overall SUS Score
62.4

Scenario One

Harriet Thompson is a 67-year-old female who was recently admitted. Harriet has diabetes and chronic kidney disease.

Harriet has a winter residence in Arizona, and has been seeing a physician there over the last few months. Harriet has a CCD from that practice. You need to reconcile Harriet's medical information with her record at her other provider. You also want to gather additional clinical information to ensure that Harriet's chart is up to date.

Task 1: Reconcile the allergies on Harriet's CCD with those on her allergy list.

Task 2: Reconcile the problems on Harriet's CCD with those on her problem list.

Task 3: Reconcile the medications on Harriet's CCD with those on her medication list.

Task 4: Harriet reports that she has also started an aspirin regimen. Add this to her medication list as a home medication.

Task 5: Harriet also reports that she got a hip replacement while in Arizona. Record her Regenerex Hip System as an implantable device.

Task 6: Your organization has begun to capture gender identity and sexual orientation in social history. Update Harriet's PFSH to must record this information. Record Harriet's gender identity as female.

Task 7: Next, update her sexual orientation to homosexual.

Scenario Two

Now that you have reconciled external data and updated Harriet's clinical information, you begin your visit workflow.

Task 8: While updating Harriet's clinical information, you noticed that she has an outstanding order for a mammogram. Harriet indicates that she has not had a mammogram in over a year. Update the service date on the mammogram so that Harriet gets the mammogram in the next month.

Task 9: You also noticed Harriet has an outstanding HbA1c order. You decide to perform the procedure while she is admitted. Update the service date to today.

Task 10: After your nurse performed the HbA1c procedure, you continue your review while you await the results. Harriet had high blood pressure when admitted. You decide to prescribe a medication for her hypertension. Order nifedipine 10mg PO QD. If Nifedipine is contraindicated, do not place the order.

Task 11: Because Harriet has CKD and high blood pressure, you are concerned about renal artery stenosis. Order a Renal Arteriogram. If contraindicated, do not place the order.

Task 12: Because the MRA was contraindicated, you want to consider a different diagnostic procedure. Find more info about alternative diagnostics for a Renal Arteriogram to analyze renal artery stenosis.

Task 13: Based on the information you found, you decide to order a Pelvic Ultrasound. Place this order. If the order is contraindicated, do not place the order.

Task 14: Harriet has been complaining of minor headaches. Prescribe prescription-strength ibuprofen. If contraindicated, do not place the order.

Task 15: Submit your orders for Harriet.

Task 16: Update Harriet's problem list based on your observations from this visit. Update her diabetes diagnosis to uncontrolled.

Task 17: Add hypertension as problem.

Scenario Three

Your next patient is 26-year-old Amanda Sullivan. Amanda has a urinary tract infection for which she has received antibiotics, but she's still symptomatic. In addition, she's been having side effects from her antibiotic.

Task 18: Amanda has taken nitrofurantoin for her urinary tract infection, but has had dyspnea, cough, and chest and back pain since starting the medication. Discontinue this medication.

Task 19: You decide to order a urinalysis to determine if Amanda's UTI has been resolved. Order this test for today.

Task 20: Based on results from Amanda's urinalysis, you want to prescribe another antibiotic. Order trimethoprim/sulfamethoxazole. If contraindicated, do not place the order.

Task 21: Because Amanda is allergic to TMP/SMX, order fosfomycin. If contraindicated, do not place the order.

Task 22: Submit your orders for Amanda

Task 23: Update Amanda's allergies based on today's visit. Add nitrofurantoin to her allergies.

Task 24: Update the severity on her TMP/SMX allergy to severe.

Task 25: Amanda has asthma and has a refill ordered for her inhaler. She's curious if the pharmacy has filled her prescription. Check the fill status on the prescription.

Task 26: While admitted Amanda would also like to have her Stradis IUD removed. Record the Explant of the the Stradis IUD from her implantable device list.

Scenario Four

You have received a phone call from Ademaro Reynoso. He plans to come into your clinic for his first appointment next week.

Task 27: Create a new patient entry fro Ademaro Reynoso for Practice LSSMPMA GP and book a NEW PT VIS appointment for him.

He gives his address as 574 3rd Ave for Saint Paul, MN, 55103.

His birth date is 08/09/1982, he is male, he chooses not to give his Social Security, he is married, he says he is Hispanic or Latino for race, and his preferred language is Spanish.

His home phone is 651-555-7844.

The visit reason will be New Pt and book the appointment 7 days from now for 10:00 am.

Scenario Five

You have received a phone call from patient Helen Potter. She has decided to disclose some additional demographics to you.

Task 28: Access Helen Potter's account and update her demographics with the following:

Her preferred language is English.

Her race is White.

Scenario Six

A provider at your clinic, Dr. Mark Jones, would no longer like to see overdue health maintenance items when opening Ambulatory Order Management and is frustrated with receiving mild drug-drug interaction warnings.

Task 29: Turn off Dr. Mark Jones' setting that shows overdue health maintenance items when opening Ambulatory Order Management via the RXM Access Dictionary.

Task 30: Edit the necessary settings for the MARKJONES entry in the MIS Interaction/Conflict Groups Dictionary to remove mild drug-drug interaction warnings.

Scenario Seven

Your organization has noted that pregnant women are not getting the recommended DTaP immunization in the third trimester of pregnancy. In the interest of increasing compliance with this recommendation, your organization plans to edit an existing pregnancy order set.

Task 31: Modify the 28 Week Pregnancy Visit order set in the AOM Ordre Set Dictionary to include a DTaP immunization procedure. Set the item to be checked as a default for the set.

APPENDIX B: CLINICAL PARTICIPANT DEMOGRAPHICS

Gender

Female	16	66%
Male	8	34%

Age

Choose not to disclose	0	0%
Under 20	0	0%
20-29	5	21%
30-39	6	25%
40-49	10	42%
50-59	2	8%
60-64	0	0%
Over 65	1	4%

What is the highest level of education you have completed?

Choose not to disclose	0	0%
No schooling	0	0%
8th grade or under	0	0%
High school graduate, or equivalent	3	13%
Trade/technical/vocational training	4	16%
Associate degree	3	13%
Bachelor's degree	6	25%
Master's degree	0	0%
Professional degree	0	0%

Doctorate degree	8	33%

What is your occupation/role? (Select all that apply)

Registered Nurse	2
LPN	1
Nurse Practitioner	1
Physician	6
Resident	0
Administrative	6
IT Staff	6
Other	2

How many years have you been working in your current profession?

Less than 1 year	1	4%
1-3 years	4	17%
4-6 years	5	21%
7-9 years	5	21%
Over 10 years	9	37%

How many hours per week do you spend on a computer?

0-10	0	0%
11-25	1	4%
26+	23	96%

How many years experience do you have with any EHR?

Less than 1 year	1	4%
1-2 years	0	0%
3-5 years	2	8%

Over 5 years	21	88%