

EHR Usability Test Report of ChartMaker® Medical Suite, Version ChartMaker® 2018

ChartMaker® Medical Suite: ChartMaker® 2018

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STI Computer Services, Inc used the following usability design industry standard in developing and designing our health IT module, ChartMaker® Medical Suite, version ChartMaker® 2018: NISTIR 7741

This report is based on NISTIR 7742 Customized Common Industry Format Template for Electronic Health Record Usability Testing

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EXECUTIVE SUMMARY

A usability test of ChartMaker® Medical Suite, Version ChartMaker® 2018, a full ambulatory EHR was conducted between the dates of 11/15/17 thru 12/21/17 by STI Computer Services, Inc (STI). The purpose of this assessment was to test and validate the usability of the current user interface, and provide evidence of usability in ChartMaker® 2018 within the functionality of each of the criteria to be tested.

During the usability test, 10 healthcare providers, clinical staff and other EHR users matching the target demographic criteria served as participants and used the ChartMaker® 2018 in simulated, but representative tasks in STI’s test environment.

This study collected performance data on 13 scenarios typically conducted on an EHR:

- Order, change and view a medication order
- Order, change and view a laboratory order
- Order, change and view a radiology order
- Drug-drug and drug-allergy interactions
- Add, change and view various demographic elements
- Add, change and view the problem list
- Add, change and view the medication list
- Add, change and view the medication allergy list
- Configure, trigger and review various Clinical Decision Support rules
- Record, change and access Unique Device Identifiers
- Incorporate, reconcile and generate CCDA
- Create, change, cancel, refill, receive various E-prescribing events

Prior to the usability test, each participant was contacted by a member of the “Product Usability Team” who discussed the intent of this test and to schedule a one-on-one testing time.

All release notes and Help file documentation were provided and participants were informed of any specific changes that affected the functionality described in this document.

During the 120-minute one-on-one onsite usability test, the participant was greeted by the administrator and asked to review and sign an informed consent/release form (included in Appendix 3); they were instructed that they could withdraw at any time. Participants all had prior experience with

the EHR. The administrator explained the confines of the test, and instructed the participants to complete a series of tasks which were read to them one at a time. During the test, the administrator timed the test and recorded user performance on paper. The administrator did not give the participant assistance in how to complete the task.

The following types of data were collected for each participant:

- Number of tasks successfully completed within the allotted time without assistance or the fact that a task was not completed.
- Time to complete the tasks
- Number and types of errors
- Path deviations
- Participant’s verbalizations
- Participant’s satisfaction ratings of the system

All participant data was de-identified – no correspondence could be made from the identity of the participant to the data collected. Following the conclusion of the testing, participants were asked to complete a posttest questionnaire and were compensated with a \$200 credit on their account. Various recommended metrics, in accordance with the examples set forth in the NIST Guide to the Processes Approach for Improving the Usability of Electronic Health Records, were used to evaluate the usability of the EHRUT. Following is a summary of the performance and rating data collected on the EHR.

SUMMARY OF PERFORMANCE

Task	N #	Task Success %	Path Deviation Observed/optimal clicks	Task Time Mean (SD) seconds	Task Time Deviations Observed/optimal seconds	Errors %	Task Ratings (5=Easy) Mean (SD) Likert
A1: CPOE – Medications							
A1.1 Add a medication order	10	100%	8/8	36 (18)	36/30	0%	4.6 (0.69)
A1.2 Change a medication order	10	100%	15/12	29 (14)	29/26	0%	4.8 (0.42)
A1.3 Access a medication order	10	100%	2/1	7 (9)	7/1	0%	4.8 (0.42)

Task	N #	Task Success %	Path Deviation Observed/optimal clicks	Task Time Mean (SD) seconds	Task Time Deviations Observed/optimal seconds	Errors %	Task Ratings (5=Easy) Mean (SD) Likert
A2: CPOE - Laboratory							
A2.1 Add a laboratory order	10	100%	5/4	24 (16)	24/15	0%	4.9 (0.31)
A2.2 Change a laboratory order	10	100%	10/6	18 (13)	18/12	0%	4.7 (0.67)
A2.3 Access a laboratory order	10	100%	3/1	9 (8)	9/3	0%	4.7 (0.31)
A3: CPOE – Radiology							
A3.1 Add a radiology order	10	100%	6/4	22 (15)	22/15	0%	4.7 (0.94)
A3.2 Change a radiology order	10	100%	4/4	16 (11)	16/12	0%	4.9 (0.31)
A3.3 Access a radiology order	10	100%	1/1	7 (9)	7/3	0%	5.0 (0)
A4: Drug-drug & Drug-Allergy Interaction							
A4.1 Add a medication creating a contraindication with an existing medication	10	100%	10/8	36 (23)	36/15	0%	4.7 (0.67)
A4.2 Add a medication that creates an interaction with an existing medication allergy	10	100%	8/8	25 (10)	25/15	0%	5.0 (0)

Task	N #	Task Success %	Path Deviation Observed/optimal clicks	Task Time Mean (SD) seconds	Task Time Deviations Observed/optimal seconds	Errors %	Task Ratings (5=Easy) Mean (SD) Likert
A4.3 Change the severity level for interaction alerts	10	80%	10/6	28 (23)	28/11	20%	3.3 (1.41)
A5: Demographics							
A5.1 Record a patient's preferred language	10	100%	2/2	15 (11)	15/5	0%	5.0 (0)
A5.2 Record a patient's date of birth	10	100%	3/2	20 (17)	20/8	0%	4.2 (1.13)
A5.3 Record a patient's birth sex	10	100%	2/2	8 (9)	8/2	0%	5.0 (0)
A5.4 Record a patient's race	10	100%	2/2	8 (8)	8/5	0%	5.0 (0)
A5.5 Record a patient's ethnicity	10	100%	2/2	6 (4)	6/5	0%	5.0 (0)
A5.6 Record a patient's sexual orientation	10	100%	5/3	25 (18)	25/12	0%	4.1 (0.74)
A5.7 Record a patient's gender identity	10	100%	4/3	13 (9)	13/12	0%	4.9 (0.31)
A5.8 Change an existing patient's preferred language	10	100%	4/3	7 (10)	7/2	0%	5.0 (0)
A5.9 Change an existing patient's date of birth	10	100%	1/1	14 (23)	14/6	0%	4.4 (1.34)
A5.10 Change an existing patient's birth sex	10	100%	1/1	5 (6)	5/2	0%	5 (0)

Task	N #	Task Success %	Path Deviation Observed/optimal clicks	Task Time Mean (SD) seconds	Task Time Deviations Observed/optimal seconds	Errors %	Task Ratings (5=Easy) Mean (SD) Likert
A5.11 Change an existing patient's race	10	100%	3/3	5 (7)	5/2	0%	5 (0)
A5.12 Change an existing patient's ethnicity	10	100%	2/2	5 (6)	5/2	0%	5 (0)
A5.13 Change an existing patient's sexual orientation	10	100%	3/3	9 (9)	9/4	0%	5 (0)
A5.14 Change an existing patient's gender identity	10	100%	3/3	9 (9)	9/4	0%	5 (0)
A5.15 View the existing patient's preferred language	10	100%	1/1	4 (4)	4/2	0%	5 (0)
A5.16 View the existing patient's date of birth	10	100%	1/1	4 (3)	4/2	0%	5 (0)
A5.17 View the existing patient's birth sex	10	100%	1/1	3 (4)	3/2	0%	5 (0)
A5.18 View the existing patient's race	10	100%	1/1	3 (4)	3/2	0%	5 (0)
A5.19 View the existing patient's ethnicity	10	100%	1/1	3 (4)	3/2	0%	5 (0)
A5.20 View the existing patient's sexual orientation	10	100%	2/2	5 (4)	5/3	0%	5 (0)
A5.21 View the existing patient's gender identity	10	100%	2/2	5 (3)	5/3	0%	5 (0)

Task	N #	Task Success %	Path Deviation Observed/optimal clicks	Task Time Mean (SD) seconds	Task Time Deviations Observed/optimal seconds	Errors %	Task Ratings (5=Easy) Mean (SD) Likert
A6: Problem List							
A6.1 Add a problem from the chart note	10	100%	7/4	31 (13)	31/10	0%	4.9 (0.31)
A6.2 Change a problem from the chart note	10	100%	5/4	21 (12)	21/8	0%	4.7 (0.67)
A6.3 Access the active problem list	10	100%	2/1	8 (10)	8/2	0%	4.7 (0.67)
A6.4 Access the historical problem list	10	100%	4/2	13 (9)	13/6	0%	4.8 (0.42)
A7: Medication List							
A7.1 Add a medication	10	100%	8/8	24 (18)	24/10	0%	5 (0)
A7.2 Change a medication	10	100%	8/8	22 (19)	22/8	0%	5 (0)
A7.3 Access the medication list	10	100%	1/1	4 (5)	4/2	0%	5 (0)
A7.4 Access the historical medication list	10	100%	1/1	5 (3)	5/2	0%	5 (0)
A8: Medication Allergy List							
A8.1 Add a medication allergy	10	100%	10/8	24 (17)	24/10	0%	4.8 (0.42)
A8.2 Change an existing medication allergy	10	100%	8/8	13 (9)	13/10	0%	5 (0)
A8.3 Access the active medication allergy list	10	100%	1/1	4 (3)	4/2	0%	5 (0)

Task	N #	Task Success %	Path Deviation Observed/optimal clicks	Task Time Mean (SD) seconds	Task Time Deviations Observed/optimal seconds	Errors %	Task Ratings (5=Easy) Mean (SD) Likert
A8.4 Access the historical allergy list	10	100%	2/2	21 (24)	21/4	0%	5 (0)
A9: Clinical Decision Support							
A9.1 Configure a CDS intervention for a problem	10	80%	22/12	264 (386)	264/65	20%	2 (1.41)
A9.2 Generate a problem CDS alert automatically and electronically	10	100%	6/4	64 (81)	64/10	0%	4.4 (1.26)
A9.3 Configure a CDS intervention for a medication	10	90%	18/12	102 (67)	102/65	10%	2.8 (1.22)
A9.4 Generate a Medication CDS alert automatically and electronically	10	90%	9/8	59 (92)	59/10	10%	4 (0.72)
A9.5 Generate an Allergy CDS alert automatically and electronically	10	100%	8/8	38 (52)	38/10	0%	4.9 (0.31)
A9.6 Configure a CDS intervention for a demographic	10	90%	15/12	94 (56)	94/65	10%	3.6 (1.50)

Task	N #	Task Success %	Path Deviation Observed/optimal clicks	Task Time Mean (SD) seconds	Task Time Deviations Observed/optimal seconds	Errors %	Task Ratings (5=Easy) Mean (SD) Likert
A9.7 Generate a Demographics CDS alert automatically and electronically	10	90%	2/2	48 (73)	48/10	10%	4.6 (1.26)
A9.8 Configure a CDS intervention for a lab result	10	90%	17/12	94 (95)	94/65	10%	3.3 (1.82)
A9.9 Generate a Lab Result CDS alert automatically and electronically	10	90%	4/2	38 (33)	38/10	10%	4.4 (1.26)
A9.10 Configure a CDS intervention for vital signs	10	90%	15/12	86 (78)	86/65	10%	3.3 (1.56)
A9.11 Generate a Vital Signs CDS alert automatically and electronically	10	100%	5/5	30 (34)	30/10	0%	5 (0)
A9.12 Trigger CDS from CDA import	10	100%	19/12	129 (100)	129/60	0%	3.8 (1.55)
A9.13 Access bibliographic citation, developer, funding source and release/revision date for CDS intervention	10	100%	5/3	25 (19)	25/5	0%	4.5 (1.08)

Task	N #	Task Succes s %	Path Deviation Observed/optimal clicks	Task Time Mean (SD) seconds	Task Time Deviations Observed/optimal seconds	Errors %	Task Ratings (5=Easy) Mean (SD) Likert
A14 Implantable Device							
A14.1 Record UDI for a new implantable device	10	100%	10/6	120 (105)	120/24	0%	3.3 (1.70)
A14.2 Change the UDI status for an implantable device	10	100%	3/3	25 (18)	25/3	0%	4 (1.63)
A14.3 Access the implantable device information	10	100%	1/1	14 (12)	14/2	0%	4.8 (0.63)
B2 Clinical Information Reconciliation and Incorporation							
B2.1 Incorporate a CCDA into a patient's chart	10	100%	15/12	60 (62)	60/60	0%	4.4 (0.70)
B2.2 Conduct reconciliation of medications from CCDA in patient's chart	10	100%	5/5	26 (16)	26/8	0%	4.4 (0.33)
B2.3 Conduct reconciliation of allergies from CCDA in patient's chart	10	100%	5/5	17 (14)	17/8	0%	4.8 (0.33)
B2.4 Conduct reconciliation of diagnoses from CCDA in patient's chart	10	100%	5/5	17 (15)	17/8	0%	4.8 (0.33)

Task	N #	Task Success %	Path Deviation Observed/optimal clicks	Task Time Mean (SD) seconds	Task Time Deviations Observed/optimal seconds	Errors %	Task Ratings (5=Easy) Mean (SD) Likert
B2.5 Generate a CCDA that contains reconciled data	10	90%	12/8	69 (90)	69/10	10%	4.5 (0.52)
B3 E-Prescribing							
B3.1 Create a new prescription and submit via e-Prescribing	10	100%	5/5	35 (17)	35/19	0%	5 (0)
B3.2 Change an existing prescription and submit via e-Prescribing	10	100%	5/5	34 (36)	34/19	0%	4.9 (0.31)
B3.3 Cancel a prescription electronically	10	100%	3/3	21 (18)	21/5	0%	4.8 (0.42)
B3.4 Refill a prescription electronically	10	100%	4/4	23 (23)	23/6	0%	4.6 (0.69)
B3.5 Receive fill status notification	10	100%	1/1	28 (27)	28/5	0%	4.4 (1.34)
B3.6 Request and receive medication history information	10	100%	5/3	55 (60)	55/7	0%	4.2 (1.13)

The results from the System Usability Scale scored the subjective satisfaction with the system based on performance with these tasks to be: **83.12**. In addition to the performance data, the following qualitative observations were made:

- Major findings:
 - Our SUS score at 83.12 shows that our users are mostly satisfied with the system. Of course, STI will strive to achieve even higher scores in the future. For most of the areas presented the test participants knew the system well, the one major exception was in

the Clinical Decision Support feature, which STI calls DSS Decision Support System. Although the alerts are easily 'fired off' and seen, configuring the said alerts has shown to be a challenging task for our users. Further discussion will take place in areas for improvement.

Several of the participants commented on how much they like the import process of Transition of Cares, and how easy it is to reconcile them.

- Areas for improvement
 - Based on participants comments, the standard deviations, optimal vs actual time and the Likert scores STI need to improve the CDS process for our clients. Specifically, the setting up or configuring of the CDS rules.

INTRODUCTION

The EHRUT(s) tested for this study was ChartMaker® Medical Suite version ChartMaker 2018® for:

- § 170.315 (a)(1) Computerized provider order entry – medications
- § 170.315 (a)(2) Computerized provider order entry – laboratory
- § 170.315 (a)(3) Computerized provider order entry – diagnostic imaging
- § 170.315 (a)(4) Drug-drug, drug-allergy interaction checks
- § 170.315 (a)(5) Demographics
- § 170.315 (a)(6) Problem list
- § 170.315 (a)(7) Medication list
- § 170.315 (a)(8) Medication allergy list •
- § 170.315 (a)(9) Clinical decision support
- § 170.315 (a)(14) Implantable device list
- § 170.315 (b)(2) Clinical information reconciliation and incorporation
- § 170.315 (b)(3) Electronic prescribing<Medication List>.

This EHR is designed to present medical information to healthcare providers of any specialty in ambulatory care facilities. The usability testing attempted to represent realistic exercises and conditions. The purpose of this study was to test and validate the usability of the current user interface, and provide evidence of usability in the EHR Under Test (EHRUT).

METHOD

PARTICIPANTS

A total of 10 participants were tested on the EHRUT(s). Participants in the test were medical professionals ranging from front desk personnel to physicians. Participants were recruited by STI. In addition, participants had no direct connection to the development of the EHRUT(s). Participants were not employed previously or currently at STI Computer Services, Inc. Participants were actual users of the system so no training or orientation was required.

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

	Participant ID	Gender	Age Range	Education	Occupation/role	Professional Experience (in months)	Computer Experience (in months)	Product Experience (in months)	Assistive Tech Needs (in month)
1	1	F	40-49	Associates Degree	Billing Manager	241	203	120	No
2	2	F	30-39	Trade/Technical/Vocational training	Administrative Assistant	40	40	24	No
3	3	F	30-39	Some college credit, no degree	Office Manager	6	80	6	No
4	4	F	40-49	Bachelor's Degree	Office Manager	200	187	123	No
5	5	M	40-49	Master's Degree	Athletic Trainer	214	150	73	No
6	6	M	60-69	Doctorate degree (e.g MD,DNP, DMD, PhD)	Physician	468	205	84	No
7	7	F	20-29	Trade/technical/vocational training	Medical Assistant	60	150	60	No
8	8	F	50-59	Some college credit, no degree	Office Manager	221	140	3	No
9	9	F	50-59	Some college credit, no degree	Office Manager	348	300	133	No
10	10	F	50-59	Some college credit, no degree	Office Manager	369	245	216	No

Ten (10) participants (matching the demographics in the section on Participants) were recruited and participated in the usability test.

Participants were scheduled for one 2 hour session sessions with 30 minutes allotted immediately following test execution to collect appropriate ideas, concerns, etc. A checklist was used to keep track of the participant schedule, and included each participant’s demographic characteristics.

STUDY DESIGN

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

Each participant used the system, and was provided with the same instructions. The system was evaluated for effectiveness, efficiency and satisfaction as defined by measures collected and analyzed for each participant:

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

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

TASKS

A number of tasks were constructed that would be realistic and representative of the kinds of activities a user might do with this EHR related to adding, changing and viewing a information in a patient chart. The tasks are identified in the above Summary of Performance section

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

PROCEDURES

Participants were assigned a participant ID. The usability testing staff conducting the test were STI trainers having 40 + years of combined experience with the EHR.

Each participant reviewed and signed an informed consent and release form (See Appendix 2). The trainer moderated the session including administering instructions and tasks. The trainer also monitored task times, obtained post-task rating data, took notes on participant comments, took notes on task success, path deviations and number and type of errors. Participants were instructed to perform the tasks (see specific instructions below):

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

For each task, the participants were given a written copy of the task. Task timing began once the trainer finished reading the question. The task time was stopped once the participant indicated they had successfully completed the task.

Following the session, the trainer gave the participant the post-test questionnaire (e.g., the System Usability Scale, see Appendix 4) and thanked each individual for their participation.

Participants' demographic information, task success rate, time on task, errors, deviations, verbal responses, and post-test questionnaire were recorded on a checklist and then collated by the Product Manager into a spreadsheet.

TEST LOCATION

The test location varied by participant. The trainer visited the office of the participant and sat with them at their desk. All participants used Remote Desktop (RDP) to connect to a test environment hosted by STI Computer Services, Inc.

TEST ENVIRONMENT

The EHRUT would typically be used in a healthcare office or facility. In this instance, the testing was conducted in these offices using the participants computer to establish a Remote Desktop Connection to STI's 2012 R2 test Server. The participants used a mouse and keyboard when interacting with the EHRUT.

The EHRUT used monitors that are 17 inches or larger, text set to the "smaller" default of 100%, screen resolution set to 1024x768 or larger and color set to True Color (32 bit). The application was set up by the vendor according to the vendor's documentation describing the system set-up and preparation. The application itself was running on Microsoft Windows 2012 R2 Server and using STI's test database via an RDP connection.

TEST FORMS AND TOOLS

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

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

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

PARTICIPANT INSTRUCTIONS

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

Thank you for participating in this study. Your input is very important. Our session today will last about 2 hours. During that time you will use your workstation to connect to STI's test server which is running ChartMaker Medical Suite version ChartMaker® 2018. I will ask you to complete a few tasks using this system and answer some questions. You should complete the tasks as quickly as possible making as few errors as possible. Please try to complete the tasks on your own following the instructions very closely. Please note that we are not testing you, we are testing the system, therefore if you have difficulty all this means is that something needs to be improved in the system. I will be here in case you need specific help, but I am not able to instruct you or provide help in how to use the application.

Overall, we are interested in how easy (or how difficult) this system is to use, what in it would be useful to you, and how we could improve it. I did not have any involvement in its creation, so please be honest with your opinions. All of the information that you provide will be kept confidential and your name will not be associated with your comments at any time. Should you feel it necessary, you are able to withdraw at any time during the testing.

Following the procedural instructions, participants were shown how to connect to the test system and what user to login as. Once this task was complete, the administrator gave the following instructions:

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

Participants were then given 58 tasks to complete. Tasks are listed in the moderator's guide in Appendix.

USABILITY METRICS

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

The goals of the test were to assess:

1. Effectiveness of ChartMaker® Medical Suite, ChartMaker® 2018 by measuring participant success rates and errors
2. Efficiency of ChartMaker® Medical Suite, ChartMaker® 2018 by measuring the average task time and path deviation
3. Satisfaction with ChartMaker® Medical Suite, ChartMaker® 2018 by measuring ease of use ratings

DATA SCORING

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

Measures	Rationale and Scoring
Effectiveness: Task Success	<p>A task was counted as a “Success” if the participant was able to achieve the correct outcome, without assistance, within the time allotted on a per task basis.</p> <p>The total number of successes were calculated for each task and then divided by the total number of times that task was attempted. The results are provided as a percentage.</p> <p>Task times were recorded for successes. Observed task times divided by the optimal time for each task is a measure of optimal efficiency.</p> <p>Optimal task performance time, as benchmarked by expert performance under realistic conditions, is recorded when constructing tasks. Target task times used for task times in the Moderator’s Guide must be operationally defined by taking multiple measures of optimal performance and multiplying by some factor [e.g., 1.25] that allows some time buffer because the participants are presumably not trained to expert performance. Thus, if expert, optimal performance on a task was [x] seconds then allotted task time performance was [x * 1.25] seconds. This ratio should be aggregated across tasks and reported with mean and variance scores.</p>
Effectiveness: Task Failures	<p>If the participant abandoned the task, did not reach the correct answer or performed it incorrectly, or reached the end of the allotted time before successful completion, the task was counted as an “Failures.”</p> <p>No task times were taken for errors.</p>

The total number of errors was calculated for each task and then divided by the total number of times that task was attempted. Not all deviations would be counted as errors.

On a qualitative level, an enumeration of errors and error types should be collected.

This should also be expressed as the mean number of failed tasks per participant.

Efficiency: The participant's path (i.e., steps) through the application was recorded. Deviations occur if the participant, for example, went to a wrong screen, clicked on an incorrect menu item, followed an incorrect link, or interacted incorrectly with an on-screen control. This path was compared to the optimal path. The number of steps in the observed path is divided by the number of optimal steps to provide a ratio of path deviation.

RESULTS

DATA ANALYSIS AND REPORTING

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

The SUS score for ChartMaker® 2018 is 83.12

DISCUSSION OF FINDINGS:

Overall: Almost all of the tasks achieved a high completion rate of 90% or higher. The areas that did not achieve 100% completion rate were related to the CDS, and CIR tasks. The path deviation for all tasks were not that out of line. The optimal time deviation for some tasks especially related to CDS and CIR were many times the expected/optimal time. Looking at the overall Likert scores 28/70 scored 5.0, further breakdown of that is as follows: Number of tasks that earned a Likert Score greater than or equal 4.8 was 41/70, number of tasks that earned a Likert Score between 4.4 and 4.7 was 16/70 and the number of tasks that earned a Likert Score of less than 4.4 was 13/70, with the lowest being 2.0. A majority of the lower scored are attached to the CDS tasks. Further discussion about each specific criterion will be held below.

The breakdown of criteria and it’s individual results and subsequent discussions will now follow:

The usability testing results and discussion for **CPOE- Medications (A1)** for the ChartMaker® are detailed below:

170.315 (a)(1) – CPOE – Medications:

Task	N #	Task Success %	Path Deviation Observed/optimal clicks	Task Time Mean (SD) seconds	Task Time Deviations Observed/optimal seconds	Errors %	Task Ratings (5=Easy) Mean (SD) Likert
A1: CPOE – Medications							
A1.1 Add a medication order	10	100%	8/8	36 (18)	36/30	0%	4.6 (0.69)
A1.2 Change a medication order	10	100%	15/12	29 (14)	29/26	0%	4.8 (0.42)
A1.3 Access a medication order	10	100%	2/1	7 (9)	7/1	0%	4.8 (0.42)

EFFECTIVENESS

For CPOE- Medications ChartMaker® 2018 performed very well and effectively. All tasks had a 100% completion rate, all participants appeared confident and at ease with the tasks at hand.

EFFICIENCY

Regarding efficiency of ChartMaker® 2018 for CPOE- Medications there were some path deviations, but participants still reached the desired result. One participant for change medication went about it in a more complicated path than the most efficient/optimal path. For the last task, of “Access a medication order” several participants didn’t pursue the optimal path which would be just looking at the note or the facesheet for that patient. They took extra steps therefore time to achieve the goal. At the end of this section, some of the trainers asked the participant why they just didn’t reference the easier path, three of them responded that it seemed too easy to go down what was determined to be the optimal path.

SATISFACTION

Based on the Likert score range of 4.6 – 4.8 for these tasks and the overall SUS score of 83.12 participants seemed satisfied with the efficiency and effectiveness of ChartMaker® 2018 for CPOE- Medications.

MAJOR FINDINGS

There were no major or unexpected findings for CPOE- Medications. This feature has been in ChartMaker® Medical Suite for many years and users are extremely comfortable with this feature.

AREAS FOR IMPROVEMENT

No critical areas for improvement were identified. Since most users took a non-optimal path to achieve accessing the medication order, consideration for a training video or tip sheet has been passed on to our Digital Content Team who are responsible for all training materials.

170.315.(a)(2) CPOE-Laboratory

Task	N #	Task Success %	Path Deviation Observed/optimal clicks	Task Time Mean (SD) seconds	Task Time Deviations Observed/optimal seconds	Errors %	Task Ratings (5=Easy) Mean (SD) Likert
A2: CPOE - Laboratory							
A2.1 Add a laboratory order	10	100%	5/4	24 (16)	24/15	0%	4.9 (0.31)
A2.2 Change a laboratory order	10	100%	10/6	18 (13)	18/12	0%	4.7 (0.67)
A2.3 Access a laboratory order	10	100%	3/1	9 (8)	9/3	0%	4.7 (0.31)

EFFECTIVENESS

For CPOE- Laboratory ChartMaker® 2018 performed very well and effectively. All tasks had a 100% completion rate, all participants appeared confident and at ease with the tasks at hand.

EFFICIENCY

Regarding efficiency of ChartMaker® 2018 for CPOE- Laboratory there were some path deviations, but participants still reached the desired result. One participant for change laboratory went about it in a more complicated path than the most efficient/optimal path. The largest path deviation was on the last task of access a laboratory order. Participants did not access the lab order from the patient's facesheet, instead accessed it from the note widget. Achieved the end result but in more clicks and time.

SATISFACTION

Based on the Likert score range of 4.7 – 4.9 for these tasks and the overall SUS score of 83.12 participants seemed satisfied with the efficiency and effectiveness of ChartMaker® 2018 for CPOE-Laboratory.

MAJOR FINDINGS

There were no major or unexpected findings for CPOE- Laboratory. This feature has been in ChartMaker® Medical Suite for many years and users are extremely comfortable with this feature.

AREAS FOR IMPROVEMENT

No critical areas for improvement were identified. Since most users took a non-optimal path to achieve accessing the medication order, consideration for a training video or tip sheet has been passed on to our Digital Contact Team who are responsible for all training materials.

170.315.(a)(3) CPOE-Radiology

Task	N #	Task Success %	Path Deviation Observed/optimal clicks	Task Time Mean (SD) seconds	Task Time Deviations Observed/optimal seconds	Errors %	Task Ratings (5=Easy) Mean (SD) Likert
A3: CPOE – Radiology							
A3.1 Add a radiology order	10	100%	6/4	22 (15)	22/15	0%	4.7 (0.94)
A3.2 Change a radiology order	10	100%	4/4	16 (11)	16/12	0%	4.9 (0.31)
A3.3 Access a radiology order	10	100%	1/1	7 (9)	7/3	0%	5.0 (0)

EFFECTIVENESS

For CPOE- Radiology ChartMaker® 2018 performed very well and effective. All tasks had a 100% completion rate, all participants appeared confident and at ease with the tasks at hand.

EFFICIENCY

Regarding efficiency of ChartMaker® 2018 for CPOE- Radiology there were some path deviations, but participant still reached the desired result. Less path deviation was seen with these tasks than the

similar tasks of CPOE – Medications and CPOE- Laboratory. This reflects the consistency within the system and participants able to adjust to the optimal paths as they went through the test.

SATISFACTION

Based on the Likert score range of 4.7– 5.0 for these tasks and the overall SUS score of 83.12 participants seemed satisfied with the efficiency and effectiveness of ChartMaker® 2018 for CPOE- Radiology.

MAJOR FINDINGS

There were no major or unexpected findings for CPOE- Radiology. This feature has been in ChartMaker® Medical Suite for many years and users are extremely comfortable with this feature.

AREAS FOR IMPROVEMENT

None identified for this criterion.

170.315.(a)(4) Drug-Drug-Drug-Allergy Interaction Checking

Task	N #	Task Success %	Path Deviation Observed/optimal clicks	Task Time Mean (SD) seconds	Task Time Deviations Observed/optimal seconds	Errors %	Task Ratings (5=Easy) Mean (SD) Likert
A4: Drug-drug & Drug-Allergy Interaction							
A4.1 Add a medication creating a contraindication with an existing medication	10	100%	10/8	36 (23)	36/15	0%	4.7 (0.67)
A4.2 Add a medication that creates an interaction with an existing medication allergy	10	100%	8/8	25 (10)	25/15	0%	5.0 (0)
A4.3 Change the severity level for interaction alerts	10	80%	10/6	28 (23)	28/11	20%	3.3 (1.41)

EFFECTIVENESS

For Drug-Drug-Drug-Allergy Interaction ChartMaker® 2018 performed very well on two of the three tasks. The first two tasks achieved 100% task success, but for the third task achieved 80%, therefore a 20% failure rate. The third task was to change the severity level for interaction alerts. ChartMaker® Medical Suite does not allow all users to have access to this setting for the obvious patient safety concerns. The user must be granted permission to have access to this setting, therefore most of our participants have never needed to change this setting or have had access to change the severity level. It is a good practice, if not best practice that most users do not have access to change the severity level of allergy interaction. The low results of this task were expected and acceptable. For those participants that had the permission in their own systems to change this setting, did in fact, perform well.

EFFICIENCY

Regarding efficiency of ChartMaker® 2018 for Drug-Drug-Drug-Allergy Interaction there were some path deviations, and 2 participants did not complete the task. The reason for that is documented in the above effectiveness section.

SATISFACTION

Based on the Likert score range of 3.3 – 5.0 for these tasks and the overall SUS score of 83.12 some participants were frustrated as they did not know where to navigate to achieve the task.

MAJOR FINDINGS

There were no major or unexpected findings for Drug-Drug-Drug-Allergy Interaction. This feature has been in ChartMaker® Medical Suite for many years and users are extremely comfortable with this feature. The lower scoring in the Change the severity level task was an expected outcome based on the discussion in the effectiveness section.

AREAS FOR IMPROVEMENT

None identified for this criterion.

170.315.(a)(5) Demographics

Task	N #	Task Success %	Path Deviation Observed/optimal clicks	Task Time Mean (SD) seconds	Task Time Deviations Observed/optimal seconds	Errors %	Task Ratings (5=Easy) Mean (SD) Likert
A5: Demographics							
A5.1 Record a patient's preferred language	10	100%	2/2	15 (11)	15/5	0%	5.0 (0)
A5.2 Record a patient's date of birth	10	100%	3/2	20 (17)	20/8	0%	4.2 (1.13)
A5.3 Record a patient's birth sex	10	100%	2/2	8 (9)	8/2	0%	5.0 (0)
A5.4 Record a patient's race	10	100%	2/2	8 (8)	8/5	0%	5.0 (0)

Task	N #	Task Success %	Path Deviation Observed/optimal clicks	Task Time Mean (SD) seconds	Task Time Deviations Observed/optimal seconds	Errors %	Task Ratings (5=Easy) Mean (SD) Likert
A5.5 Record a patient's ethnicity	10	100%	2/2	6 (4)	6/5	0%	5.0 (0)
A5.6 Record a patient's sexual orientation	10	100%	5/3	25 (18)	25/12	0%	4.1 (0.74)
A5.7 Record a patient's gender identity	10	100%	4/3	13 (9)	13/12	0%	4.9 (0.31)
A5.8 Change an existing patient's preferred language	10	100%	4/3	7 (10)	7/2	0%	5.0 (0)
A5.9 Change an existing patient's date of birth	10	100%	1/1	14 (23)	14/6	0%	4.4 (1.34)
A5.10 Change an existing patient's birth sex	10	100%	1/1	5 (6)	5/2	0%	5 (0)
A5.11 Change an existing patient's race	10	100%	3/3	5 (7)	5/2	0%	5 (0)
A5.12 Change an existing patient's ethnicity	10	100%	2/2	5 (6)	5/2	0%	5 (0)
A5.13 Change an existing patient's sexual orientation	10	100%	3/3	9 (9)	9/4	0%	5 (0)
A5.14 Change an existing patient's gender identity	10	100%	3/3	9 (9)	9/4	0%	5 (0)
A5.15 View the existing patient's preferred language	10	100%	1/1	4 (4)	4/2	0%	5 (0)
A5.16 View the existing patient's date of birth	10	100%	1/1	4 (3)	4/2	0%	5 (0)

A5.17 View the existing patient's birth sex	10	100%	1/1	3 (4)	3/2	0%	5 (0)
A5.18 View the existing patient's race	10	100%	1/1	3 (4)	3/2	0%	5 (0)
A5.19 View the existing patient's ethnicity	10	100%	1/1	3 (4)	3/2	0%	5 (0)
A5.20 View the existing patient's sexual orientation	10	100%	2/2	5 (4)	5/3	0%	5 (0)
A5.21 View the existing patient's gender identity	10	100%	2/2	5 (3)	5/3	0%	5 (0)

EFFECTIVENESS

For Demographics ChartMaker® 2018 performed very well and effective. All tasks had a 100% completion rate, all participants appeared confident and at ease with the tasks at hand except for two participants struggling with the date control for Date of Birth as well as two participants trying to remember where you accessed the Gender Identity and Sexual Orientation information.

EFFICIENCY

Regarding efficiency of ChartMaker® 2018 for Demographics there were minimal path deviations, but participant still reached the desired result. The task time deviation was minimal on most of the 21 tasks.

SATISFACTION

Based on the Likert score range of 4.1 – 5.0 for these tasks and the overall SUS score of 83.12 participants seemed satisfied with the efficiency and effectiveness of ChartMaker® 2018 for Demographics. There were 21 tasks and 17/21 achieved a Likert score of 5.

MAJOR FINDINGS

The major finding with Demographics for ChartMaker® 2018 involves the trouble around the date control for Date of Birth. 20% of the participants really struggled with entering and changing a Date of Birth for patient. 80% of the participants completed the tasks well with the acceptable margin of clicks and time.

AREAS FOR IMPROVEMENT

With 20% of the participants have encountered a problem with the Date of Birth, the date control being used should be updated.

170.315.(a)(6) Problem List

Task	N #	Task Success %	Path Deviation Observed/optimal clicks	Task Time Mean (SD) seconds	Task Time Deviations Observed/optimal seconds	Errors %	Task Ratings (5=Easy) Mean (SD) Likert
A6: Problem List							
A6.1 Add a problem from the chart note	10	100%	7/4	31 (13)	31/10	0%	4.9 (0.31)
A6.2 Change a problem from the chart note	10	100%	5/4	21 (12)	21/8	0%	4.7 (0.67)
A6.3 Access the active problem list	10	100%	2/1	8 (10)	8/2	0%	4.7 (0.67)
A6.4 Access the historical problem list	10	100%	4/2	13 (9)	13/6	0%	4.8 (0.42)

EFFECTIVENESS

For Problem Lists ChartMaker® 2018 performed very well and effective. All tasks had a 100% completion rate, all participants appeared confident and at ease with the tasks at hand.

EFFICIENCY

Regarding efficiency of ChartMaker® 2018 for Problem Lists there were minimal path deviations, but participant still reached the desired result.

SATISFACTION

Based on the Likert score range of 4.7 – 4.9 for these tasks and the overall SUS score of 83.12 participants seemed satisfied with the efficiency and effectiveness of ChartMaker® 2018 – Problem List.

MAJOR FINDINGS

There were no major or unexpected findings for Problem Lists. This feature has been in ChartMaker® Medical Suite for many years and users are extremely comfortable with this feature.

AREAS FOR IMPROVEMENT

None identified for this criterion.

170.315.(a)(7) Medication List

Task	N #	Task Success %	Path Deviation Observed/optimal clicks	Task Time Mean (SD) seconds	Task Time Deviations Observed/optimal seconds	Errors %	Task Ratings (5=Easy) Mean (SD) Likert
A7: Medication List							
A7.1 Add a medication	10	100%	8/8	24 (18)	24/10	0%	5 (0)
A7.2 Change a medication	10	100%	8/8	22 (19)	22/8	0%	5 (0)
A7.3 Access the medication list	10	100%	1/1	4 (5)	4/2	0%	5 (0)
A7.4 Access the historical medication list	10	100%	1/1	5 (3)	5/2	0%	5 (0)

EFFECTIVENESS

For Medication List ChartMaker® 2018 performed very well and effective. All tasks had a 100% completion rate, all participants appeared confident and at ease with the tasks at hand.

EFFICIENCY

Regarding efficiency of ChartMaker® 2018 for Medication List there were no path deviations.

SATISFACTION

Based on the Likert score range of 5 for these tasks and the overall SUS score of 83.12 participants seemed satisfied with the efficiency and effectiveness of ChartMaker® 2018 for Medication List.

MAJOR FINDINGS

There were no major or unexpected findings for Medication List. This feature has been in ChartMaker® Medical Suite for many years and users are extremely comfortable with this feature.

AREAS FOR IMPROVEMENT

None identified for this criterion.

170.315.(a)(8) Medication Allergy List

Task	N #	Task Success %	Path Deviation Observed/optimal clicks	Task Time Mean (SD) seconds	Task Time Deviations Observed/optimal seconds	Errors %	Task Ratings (5=Easy) Mean (SD) Likert
A8: Medication Allergy List							
A8.1 Add a medication allergy	10	100%	10/8	24 (17)	24/10	0%	4.8 (0.42)
A8.2 Change an existing medication allergy	10	100%	8/8	13 (9)	13.10	0%	5 (0)
A8.3 Access the active medication allergy list	10	100%	1/1	4 (3)	4/2	0%	5 (0)
A8.4 Access the historical allergy list	10	100%	2/2	21 (24)	21/4	0%	5 (0)

EFFECTIVENESS

For Medication Allergy List ChartMaker® 2018 performed very well and effective. All tasks had a 100% completion rate, all participants appeared confident and at ease with the tasks at hand.

EFFICIENCY

Regarding efficiency of ChartMaker® 2018 for Medication Allergy List there were minimal path deviations, but participant still reached the desired result.

SATISFACTION

Based on the Likert scores range of 4.8-5 for these tasks and the overall SUS score of 83.12 participants seemed satisfied with the efficiency and effectiveness of ChartMaker® 2018 for Medication Allergy List

MAJOR FINDINGS

There were no major or unexpected findings for Medication Allergy List. This feature has been in ChartMaker® Medical Suite for many years and users are extremely comfortable with this feature.

AREAS FOR IMPROVEMENT

None identified for this criterion.

170.315.(a)(9) Clinical Decision Support

Task	N #	Task Success %	Path Deviation Observed/optimal clicks	Task Time Mean (SD) seconds	Task Time Deviations Observed/optimal seconds	Errors %	Task Ratings (5=Easy) Mean (SD) Likert
A9: Clinical Decision Support							
A9.1 Configure a CDS intervention for a problem	10	80%	22/12	264 (386)	264/65	20%	2 (1.41)
A9.2 Generate a problem CDS alert automatically and electronically	10	100%	6/4	64 (81)	64/10	0%	4.4 (1.26)
A9.3 Configure a CDS intervention for a medication	10	90%	18/12	102 (67)	102/65	10%	2.8 (1.22)
A9.4 Generate a Medication CDS alert automatically and electronically	10	90%	9/8	59 (92)	59/10	10%	4 (0.72)

A9.5 Generate an Allergy CDS alert automatically and electronically	10	100%	8/8	37.9 (52.34)	37.9/10	0%	4.9 (0.31)
A9.6 Configure a CDS intervention for a demographic	10	90%	15/12	93.6 (55.93)	93.6/65	10%	3.6 (1.50)
A9.7 Generate a Demographics CDS alert automatically and electronically	10	90%	2/2	48.4 (73.2)	48.4/10	10%	4.6 (1.26)
A9.8 Configure a CDS intervention for a lab result	10	90%	17/12	94.22 (95.43)	94.22/65	10%	3.3 (1.82)
A9.9 Generate a Lab Result CDS alert automatically and electronically	10	90%	4/2	37.66 (33.4)	37.66/10	10%	4.4 (1.26)
A9.10 Configure a CDS intervention for vital signs	10	90%	15/12	85.77 (77.61)	85.77/65	10%	3.3 (1.56)
A9.11 Generate a Vital Signs CDS alert automatically and electronically	10	100%	5/5	29.5 (33.74)	29.5/10	0%	5 (0)
A9.12 Trigger CDS from CDA import	10	100%	19/12	129.3 (100.18)	129.3/60	0%	3.8 (1.55)
A9.13 Access bibliographic citation, developer, funding source and	10	100%	5/3	24.7 (19.16)	24.7/5	0%	4.5 (1.08)

release/revision date for CDS intervention							
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EFFECTIVENESS

For Clinical Decision Support ChartMaker® 2018 performed lower than expected. Task completeness ranged from 80-100%. There was a total of 13 tasks, more than half did not have a 100% task completeness. 5 tasks had 100%, 7 tasks had 90% completeness and 1 task had 80% completeness. The alerts once configured all worked as planned, the struggle was with configuring the actual rules. Our system allows users to configure any type of CDS rule that they want. This flexibility makes the configuration a little more intricate and detailed. Since most users do not configure the rules, and even for those that do, they are not in the configuration screens often. Without using it on a regular basis, one does not get comfortable or confident with the screens.

EFFICIENCY

Regarding efficiency of ChartMaker® 2018 for Clinical Decision Support there were significant path deviations but this improved as the tasks progressed, which indicates that the participant got familiar with the screens from earlier tasks. The alerts once configured did ‘fire’ as expected and these tasks have better optimal to observed times and clicks.

SATISFACTION

Based on the Likert score range of 2.0-5 for these tasks, shows that participants struggled with this section.

MAJOR FINDINGS

The major findings for the Clinical Decision Support feature in ChartMaker® 2018 is that users struggle with configuring the CDS rules. These screens are not used often and are not as intuitive as our other screens.

AREAS FOR IMPROVEMENT

The work flow for configuring CDS rules should be re-evaluated and reworked.

170.315.(a)(14) Implantable Device

Task	N #	Task Success %	Path Deviation Observed/optimal clicks	Task Time Mean (SD) seconds	Task Time Deviations Observed/optimal seconds	Errors %	Task Ratings (5=Easy) Mean (SD) Likert
A14: Implantable Device							
A14.1 Record UDI for a new implantable device	10	100%	10/6	120 (105)	120/24	0%	3.3 (1.70)
A14.2 Change the UDI status for an implantable device	10	100%	3/3	25 (18)	25/3	0%	4 (1.63)
A14.3 Access the implantable device information	10	100%	1/1	14 (12)	14/2	0%	4.7 (0.63)

EFFECTIVENESS

For Implantable Device ChartMaker® 2018 performed well and effective. All tasks had a 100% completion rate.

EFFICIENCY

Regarding efficiency of ChartMaker® 2018 for Implantable Device there were some path deviations, with participant still reaching the desired result. There were significant differences between the optimal and observed time which is attributed to this being a relatively new feature and one that not many of our clients use. The trainers heard several of the participants say they would never use this feature, or that only a surgeon's office would use this. Even though that is not accurate it was the sentiment of several participants. The considerable time deviation included time for the participant to understand the purpose of the screen and to get familiar with it.

SATISFACTION

Based on the Likert score range of 3.3 -4.7 for these tasks the satisfaction is not as one would like. Most of the reason for lower Likert score is related to participants not using this in their offices, and therefore, not being exposed to the screen prior to the test event.

MAJOR FINDINGS

The fact that many of the participants felt that that the Implantable Device feature had no value to their practice was surprising. This information that can be obtained from this feature is invaluable and patient safety related.

AREAS FOR IMPROVEMENT

With many of the participants stating that they would never use this in their office, better awareness and education to the client base is one area that we can improve upon.

170.315.(b)(2) Clinical Information Reconciliation and Incorporation

Task	N #	Task Success %	Path Deviation Observed/optimal clicks	Task Time Mean (SD) seconds	Task Time Deviations Observed/optimal seconds	Errors %	Task Ratings (5=Easy) Mean (SD) Likert
B2 : Clinical Information Reconciliation							
B2.1 Incorporate a CCDA into a patient's chart	10	100%	15/12	60 (62)	60/60	0%	4.4 (0.70)
B2.2 Conduct reconciliation of medications from CCDA in patient's chart	10	100%	5/5	26 (16)	26/8	0%	4.4 (0.33)
B2.3 Conduct reconciliation of allergies from CCDA in patient's chart	10	100%	5/5	17 (14)	17/8	0%	4.8 (0.33)
B2.4 Conduct reconciliation of diagnoses from CCDA in patient's chart	10	100%	5/5	17 (15)	17/8	0%	4.5 (0.33)

B2.5 Generate a CCDA that contains reconciled data	10	90%	12/8	69 (90)	69/10	10%	4.2 (0.52)
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EFFECTIVENESS

For Clinical Information Reconciliation ChartMaker® 2018 performed well and effective. All but one task had a 100% completion rate and that task had 90% completion rate. The participant that did not complete the last task was due to an error that occurred. Looking at the event logs it appears that the client’s internet went unresponsive for a few minutes.

EFFICIENCY

Regarding efficiency of ChartMaker® 2018 for Clinical Information Reconciliation there were minor path deviations for one task and none for the other three. The time deviation for the last task was higher than the other tasks, some of the participants had never generated a CCDA, so that took longer than expected.

SATISFACTION

Based on the Likert scores range of 4.2 – 4.8 for these tasks participants were satisfied, but still did not give the highest scores. CIR has several screens that need to be navigated to complete the process, this may have added to the lower range 4.2 scores. Several of the participants commented on how they like this feature.

MAJOR FINDINGS

There were no major or unexpected findings for Clinical Information Reconciliation. This feature has been in ChartMaker® Medical Suite for many years.

AREAS FOR IMPROVEMENT

With the lower than expected Likert scores, although still in acceptable range, consideration for streamlining or adjusting the workflow of CIR should be considered.

170.315.(b)(3) E-Prescribing

Task	N #	Task Success %	Path Deviation Observed/optimal clicks	Task Time Mean (SD) seconds	Task Time Deviations Observed/optimal seconds	Errors %	Task Ratings (5=Easy) Mean (SD) Likert
B3- E- Prescribing							
B3.1 Create a new prescription and submit via e- Prescribing	10	100%	5/5	35 (17)	35/19	0%	5 (0)
B3.2 Change an existing prescription and submit via e- Prescribing	10	100%	5/5	34 (36)	34/19	0%	4.9 (0.31)
B3.3 Cancel a prescription electronically	10	100%	3/3	21 (18)	21/5	0%	4.8 (0.42)
B3.4 Refill a prescription electronically	10	100%	4/4	23.22 (22)	23/6	0%	4.6 (0.69)
B3.5 Receive fill status notification	10	100%	1/1	28 (27)	28/5	0%	4.4 (1.34)
B3.6 Request and receive medication history information	10	100%	5/3	55 (60)	55/7	0%	4.2 (1.13)

EFFECTIVENESS

For E-prescribing ChartMaker® 2018 performed very well and effective. All tasks had a 100% completion rate, all participants appeared confident and at ease with the tasks at hand.

EFFICIENCY

Regarding efficiency of ChartMaker® 2018 for E-prescribing there were no path deviations for 5 of the 6 tasks, and only minimal path deviation for the last task. All tasks were easily achieved. Some of the time deviations were due to internet connections that seemed slower than usual, and one participant spelling a medication wrong several times.

SATISFACTION

Based on the Likert score range of 4.2 – 5.0 for these tasks and the overall SUS score of 83.12 participants seemed satisfied with the efficiency and effectiveness of ChartMaker® 2018 for E-Prescribing.

MAJOR FINDINGS

There were no major or unexpected findings for CPOE- Medications. This feature has been in ChartMaker® Medical Suite for many years and users are extremely comfortable with this feature.

AREAS FOR IMPROVEMENT

None identified for this criterion.

APPENDICES

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

- 1: Participant demographics
- 2: Non-Disclosure Agreement (NDA) and Informed Consent Form
- 3: Example Moderator's Guide
- 4: System Usability Scale Questionnaire

Appendix 1: Participant Demographics

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

Gender

Men [2]

Women [8]

Total (participants) [10]

Occupation/Role

RN/BSN [0]

Physician [2]

Admin Staff [8]

Total (participants) [10]

Years of Experience

Years experience [180]

Facility Use of EHR

All paper [X]

Some paper, some electronic [X]

All electronic [10]

Total (participants) [10]

Appendix 2: Non-Disclosure Agreement and Informed Consent Form

Non-Disclosure Agreement

THIS AGREEMENT is entered into as of __, 2017, between _____ (“the Participant”) and the testing organization Test Company located at Address. The Participant acknowledges his or her voluntary participation in today’s usability study may bring the Participant into possession of Confidential Information. The term "Confidential Information" means all technical and commercial information of a proprietary or confidential nature which is disclosed by Test Company, or otherwise acquired by the Participant, in the course of today’s study.

By way of illustration, but not limitation, Confidential Information includes trade secrets, processes, formulae, data, know-how, products, designs, drawings, computer aided design files and other computer files, computer software, ideas, improvements, inventions, training methods and materials, marketing techniques, plans, strategies, budgets, financial information, or forecasts.

Any information the Participant acquires relating to this product during this study is confidential and proprietary to Test Company and is being disclosed solely for the purposes of the Participant’s participation in today’s usability study. By signing this form the Participant acknowledges that s/he will not disclose this confidential information obtained today to anyone else or any other organizations.

Participant’s printed name: _____

Signature: _____ Date: _____

Informed Consent

Test Company would like to thank you for participating in this study. The purpose of this study is to evaluate an electronic health records system. If you decide to participate, you will be asked to perform several tasks using the prototype and give your feedback. The study will last about 60 minutes.

Agreement

I understand and agree that as a voluntary participant in the present study conducted by Test Company I am free to withdraw consent or discontinue participation at any time. I understand and agree to participate in the study conducted and videotaped by the Test Company.

I understand and consent to the use of my feedback by Test Company. I understand that the information is for research purposes only and that my name will not be used for any purpose other than research. I relinquish any rights to the information.

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

I understand and agree that data confidentiality is assured, because only deidentified data – i.e., identification numbers not names – will be used in analysis and reporting of the results.

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

Please check one of the following:

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

Signature: _____ Date: _____

Appendix 3: Moderator’s Guide

Usability Test Script for 170.315.g.3 Safety Enhanced Design

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Moderator’s Guide *EHRUT Usability Test*

Moderator’s Guide

Administrator/Data Logger _____

Date _____ Time _____

Participant # _____

Location _____

Prior to testing

- Confirm schedule with Participants
- Ensure Participant's environment is running properly
- Ensure data recording forms and environment is running properly

Prior to each task:

- Instruct Participant to appropriate starting point. < Open a Test Patient record in ChartMaker® Clinical>

Preliminary Questions

What is your job title/appointment?

How long have you been working in this role?

What are some of your main responsibilities?

Tell me about your experience with electronic health records.

Test data for performing tests:

- login as user Kathy/Kathy [provider Kathy Smith]or mike/mike [provider Michael Smith] to perform all tests
- use template "Safety Enhanced Design Usability Testing" for all notes created
- use any patient chart for all tests, unless otherwise noted, there are a few exceptions that require a specific patient
- delete all unsigned notes user created when done and address all DSS alerts
- create your own test patients

CPOE (a.1, a.2, a.3)

Task 1: Add a medication order

Starting point for the task: In ChartMaker® Clinical, a new patient note is open which contains a Medication button.

- **Success:** Easily completed Completed with difficulty/help (describe below)
Not completed
Comments:

- **Task Time:** _____ Seconds
- **Optimal Path:** Click the Medication button within the note > Select Add Medication> Search for medication> Select> add sig data> confirm
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 2: Change a medication order

Starting point for the task: In ChartMaker® Clinical, a new patient note is open which contains a Medication button.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** Click the Medication button within the note > Select Renew Medication> Search for medication> Select> add sig data> confirm
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task3: Access the medication order

Starting point for the task: In ChartMaker® Clinical, a patient chart is open and medication orders exist.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** Look at the facesheet on the left side of screen, the medication history tab or at a current note containing a Medication button.
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 4: Add a laboratory order

Starting point for the task: In ChartMaker® Clinical, a new patient note is open which contains a lab order procedure on a procedure orders checklist.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** Click the laboratory order from the list or select “other” > enter stat or routine> set date if wanted> OK > (some users may also do these steps: from Note menu select send orders > ok)
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: “Very Difficult” (1) to “Very Easy” (5)*
- **Administrator Comments:**

Task 5: Change an existing laboratory order

Starting point for the task: In ChartMaker® Clinical, a patient note is open which contains an existing lab order.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** Click the +(plus) button to the left of the existing lab order > in the procedure order screen make necessary changes to target date, comments, etc. > OK
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: “Very Difficult” (1) to “Very Easy” (5)*
- **Administrator Comments:**

Task 6: Access the laboratory order

Starting point for the task: In ChartMaker® Clinical, a patient chart is open and laboratory orders exist.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** Look at the facesheet on the left side of screen or look at the procedures history tab.

Correct (describe below) Minor Deviations/Cycles (describe below) Major Deviations (describe below)

Comments:

- **Observed Errors and Verbalizations:**

- **Rating:**

Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*

- **Administrator Comments:**

Task 7: Add a radiology/imaging order

Starting point for the task: In ChartMaker® Clinical, a new patient note is open which contains a procedure orders list.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed

Comments:

- **Task Time:** _____ Seconds

- **Optimal Path:** Click the radiology/imaging order from the list or select "other" > enter stat or routine> set date if wanted> OK > (Some users may also do these steps: from Note menu select send orders > ok)

Correct (describe below) Minor Deviations/Cycles (describe below) Major Deviations (describe below)

Comments:

- **Observed Errors and Verbalizations:**

- **Rating:**

Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*

- **Administrator Comments:**

Task 8: Change an existing radiology/imaging order

Starting point for the task: In ChartMaker® Clinical, a patient note is open which contains an existing radiology/imaging order.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed

Comments:

- **Task Time:** _____ Seconds

- **Optimal Path:** Click the +(plus) button to the left of the existing radiology/imaging order > in the procedure order screen make necessary changes to target date, comments, etc. > OK

Correct (describe below) Minor Deviations/Cycles (describe below) Major Deviations (describe below)

Comments:

- **Observed Errors and Verbalizations:**

- **Rating:**

Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*

- **Administrator Comments:**

Task 9: Access the radiology/imaging order

Starting point for the task: In ChartMaker® Clinical, a patient chart is open and radiology/imaging orders exist.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** Look at the facesheet on the left side of screen or look at the procedures history tab or look at a current note with the orders checklist
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Drug-Drug & Drug-Allergy Interaction Checking for CPOE (a.4)

****use patient chart "Drugallergy Patient"(10403)**

Task 1: Add a medication that creates a contraindicated interaction with an existing medication

Starting point for the task: In ChartMaker® Clinical, a patient note is open which contains a Medication button. A prescription for Coumadin exists. User chooses to add a new medication for Anaprox which is contraindicated for Coumadin.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** Click the Medication button within the note > Search for Anaprox> select medication> add the sig info needed for the medication > Drug interactions dialog pops up with red message > choose to cancel the medication
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 2: Add a medication that creates an interaction with an existing medication allergy

Starting point for the task: In ChartMaker® Clinical, patient note is open and contains a Medication button and an Allergy button. The patient has an active medication allergy to amoxicillin. User chooses to add a new medication for Amoxicillin.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** Click the Medication button within the note > Search for Amoxicillin> select medication> add the sig info needed for the medication > Interactions dialog pops up with alert message > choose to cancel the medication
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 3: Change the severity level for interaction alerts

Starting point for the task: ChartMaker® Clinical is open to patient list view and user has permission to prescribe medications and to change interactions severity level.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** Edit> Preferences > Prescription tab > Change Drug Interactions Setting to new value > Click "Set" > OK
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Demographics (a.5)

Task 1: Record a patient's preferred language

Starting point for the task: In ChartMaker® Clinical, a new patient chart is created or existing one is opened.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:

- **Task Time:** _____ Seconds
- **Optimal Path:** From the ID tab > Select an option from the Language drop-down field
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 2: Record a patient's date of birth

Starting point for the task: In ChartMaker® Clinical, a new patient chart is created or existing one is opened.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** From the ID tab > Enter a date of birth in the Birth Date field
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 3: Record a patient's birth sex

Starting point for the task: In ChartMaker® Clinical, a new patient chart is created or existing one is opened.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** From the ID tab > Select an option from the Birth Sex drop-down field
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 4: Record a patient's race

Starting point for the task: In ChartMaker® Clinical, a new patient chart is created or existing one is opened.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** From the ID tab > Select an option from the Race drop-down field
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 5: Record a patient's ethnicity

Starting point for the task: In ChartMaker® Clinical, a new patient chart is created or existing one is opened.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** From the ID tab > Select an option from the Ethnicity drop-down field
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 6: Record a patient's sexual orientation

Starting point for the task: In ChartMaker® Clinical, a new patient chart is created or existing one is opened.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** From the ID tab > Click the Additional Info button > Select an option from the Sexual Orientation list
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 7: Record a patient's gender identity

Starting point for the task: In ChartMaker® Clinical, a new patient chart is created or existing one is opened.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** From the ID tab > Click the Additional Info button > Select one or more options from the Gender Identity list
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 8: Change an existing patient's preferred language

Starting point for the task: In ChartMaker® Clinical, a patient's chart is opened that has preferred language documented.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** From the ID tab > Select a different option from the Language drop-down field
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 9: Change an existing patient's date of birth

Starting point for the task: In ChartMaker® Clinical, a patient's chart is opened that has date of birth documented.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** From the ID tab > Enter a different date in the Birth Date field

Correct (describe below) Minor Deviations/Cycles (describe below) Major Deviations (describe below)

Comments:

- **Observed Errors and Verbalizations:**

- **Rating:**

Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*

- **Administrator Comments:**

Task 10: Change an existing patient's birth sex

Starting point for the task: In ChartMaker® Clinical, a patient's chart is opened that has birth sex documented.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed

Comments:

- **Task Time:** _____ Seconds

- **Optimal Path:** From the ID tab > Select a different option from the Birth Sex drop-down field

Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)

Comments:

- **Observed Errors and Verbalizations:**

- **Rating:**

Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*

- **Administrator Comments:**

Task 11: Change an existing patient's race

Starting point for the task: In ChartMaker® Clinical, a patient's chart is opened that has race documented.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed

Comments:

- **Task Time:** _____ Seconds

- **Optimal Path:** From the ID tab > Select a different option from the Race drop-down field

Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)

Comments:

- **Observed Errors and Verbalizations:**

- **Rating:**

Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*

- **Administrator Comments:**

Task 12: Change an existing patient's ethnicity

Starting point for the task: In ChartMaker® Clinical, a patient's chart is opened that has ethnicity documented.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** From the ID tab > Select a different option from the Ethnicity drop-down field
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 13: Change an existing patient's sexual orientation

Starting point for the task: In ChartMaker® Clinical, a patient's chart is opened that has sexual orientation documented.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** From the ID tab > Click the Additional Info button > Select a different option in the Sexual Orientation list
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 14: Change an existing patient's gender identity

Starting point for the task: In ChartMaker® Clinical, a patient's chart is opened that has gender identity documented.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** From the ID tab > Click the Additional Info button > Select a different option in the Gender Identity list
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*

- **Administrator Comments:**

Task 15: View the existing patient's preferred language

Starting point for the task: In ChartMaker® Clinical, a patient's chart is opened that had preferred language changed.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** From the ID tab > View the language displayed in the Preferred Language field
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 16: View the existing patient's date of birth

Starting point for the task: In ChartMaker® Clinical, a patient's chart is opened that had date of birth changed.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** From the ID tab > View the date displayed in the Birth Date field
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 17: View the existing patient's birth sex

Starting point for the task: In ChartMaker® Clinical, a patient's chart is opened that had birth sex changed.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** From the ID tab > View the sex displayed in the Birth Sex field
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)

Comments:

- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 18: View the existing patient's race

Starting point for the task: In ChartMaker® Clinical, a patient's chart is opened that had race changed.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** From the ID tab > View the race displayed in the Race field
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 19: View the existing patient's ethnicity

Starting point for the task: In ChartMaker® Clinical, a patient's chart is opened that had ethnicity changed.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** From the ID tab > View the ethnicity displayed in the Ethnicity field
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 20: View the existing patient's sexual orientation

Starting point for the task: In ChartMaker® Clinical, a patient's chart is opened that had sexual orientation changed.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:

- **Task Time:** _____ Seconds
- **Optimal Path:** From the ID tab > Click the Additional Info button > View the sexual orientation option selected in the Sexual Orientation list
 - Correct
 - Minor Deviations/Cycles (describe below)
 - Major Deviations (describe below)
- **Comments:**
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 21: View the existing patient's gender identity

Starting point for the task: In ChartMaker® Clinical, a patient's chart is opened that had gender identity changed.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** From the ID tab > Click the Additional Info button > View the gender identity option(s) selected in the Gender Identity list
 - Correct
 - Minor Deviations/Cycles (describe below)
 - Major Deviations (describe below)
- **Comments:**
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Problem List (a.6)

Task 1: Add a problem from the chart note

Starting point for the task: In ChartMaker® Clinical, a new patient note is open which contains a Diagnosis checklist.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** Click the Search button on the diagnosis checklist within the note > Search for a diagnosis > Select a diagnosis > > Click OK to add to chart
 - Correct
 - Minor Deviations/Cycles (describe below)
 - Major Deviations (describe below)

Comments:

- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 2: Change a problem from the chart note

Starting point for the task: In ChartMaker® Clinical, a new patient note is open which contains a Diagnosis checklist and an existing and active diagnosis is present for the patient.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** Click the Open checklist button on the diagnosis checklist within the note > Select the Note Diagnosis option for existing diagnosis in chart > Make desired changes to diagnosis information > > Click OK to update problem list > Click OK on checklist to update chart
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)

Comments:

- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 3: Access the active problem list

Starting point for the task: In ChartMaker® Clinical, a patient chart is open and diagnoses exist in the chart.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** Look at the facesheet on the left side of screen or look at a current note with a diagnosis checklist.
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)

Comments:

- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 4: Access the historical problem list

Starting point for the task: In ChartMaker® Clinical, a patient chart is open and historical diagnoses exist in the chart.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** Look at the diagnosis history tab.
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Medication List (a.7)

Task 1: Add a medication

Starting point for the task: In ChartMaker® Clinical, open a patient chart to access facesheet or create a new patient note that contains a Medication button.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** Click the prescribe button within the note (or select Add Medication option from facesheet) > Search for a medication> select a medication> add the sig info needed for the medication > confirm
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 2: Change a medication

Starting point for the task: In ChartMaker® Clinical, open a patient chart to access facesheet or create a new patient note which contains a Medication button. Chart must have an existing and active medication present for the patient.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds

- **Optimal Path:** Click the prescribe button within the note (or select medication on facesheet) > Select to renew/revise an existing medication> Make desired changes to the sig > complete and confirm
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 3: Access the active medication list

Starting point for the task: In ChartMaker® Clinical, a patient chart is open and medications exist in the chart.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** Look at the facesheet on the left side of screen or view a current note with a medication button.
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 4: Access the historical medication list

Starting point for the task: In ChartMaker® Clinical, a patient chart is open and medications exist in the chart.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** View the medication history tab.
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Medication Allergy List (a.8)

Task 1: Add a medication allergy

Starting point for the task: In ChartMaker® Clinical, a new patient note is open which contains an Allergy button.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** Click the Allergy button within the note > Select to Add/Modify an Allergy> Click Add > search for allergy> select allergy> if needed, add any data for reactions or start date> click OK
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 2: Change an existing medication allergy

Starting point for the task: In ChartMaker® Clinical, a new patient note is open which contains an Allergy button and an existing and active medication allergy is present for the patient. Add severity to allergy.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** Click the Allergy button within the note > Select to Add/Modify allergy > From the list of allergies either change a reaction, severity or click to remove or change start date> Click OK
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 3: Access the active medication allergy list

Starting point for the task: In ChartMaker® Clinical, a patient chart is open and medication allergies exist in the chart.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed

Comments:

- **Task Time:** _____ Seconds
 - **Optimal Path:** Look at the facesheet on the left side of screen or look at a current note with an Allergy button.
 - Correct
 - Minor Deviations/Cycles (describe below)
 - Major Deviations (describe below)
- Comments:**
- **Observed Errors and Verbalizations:**
 - **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
 - **Administrator Comments:**

Task 4: Access the historical medication allergy list

Starting point for the task: In ChartMaker® Clinical, a patient chart is open and medication allergies exist in the chart.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
- Comments:
- **Task Time:** _____ Seconds
 - **Optimal Path:** View the allergies history tab.
 - Correct
 - Minor Deviations/Cycles (describe below)
 - Major Deviations (describe below)
- Comments:**
- **Observed Errors and Verbalizations:**
 - **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
 - **Administrator Comments:**

Clinical Decision Support (a.9)

Task 1: Configure a CDS intervention for a problem (*Rule = Hypertension*)

Starting point for the task: User has permission for CDS setup and maintenance.

As a clinician, you would like to add a new CDS intervention to alert you when patients have a diagnosis of primary hypertension.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
- Comments:
- **Task Time:** _____ Seconds
 - **Optimal Path:** Edit> System Tables> DSS Rule Builder > click on Rules tab and create new rule with rule logic including data point "ActiveDxI10Hypertension" > click on Action Mapping tab and map rule to action "Order CBC and EKG".
 - Correct
 - Minor Deviations/Cycles (describe below)
 - Major Deviations (describe below)

Comments:

- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 2: Generate a problem CDS alert automatically and electronically

Starting point for the task: User has a patient chart open with only demographics info entered. New note is open with diagnosis checklist available.

As a clinician, you add a diagnosis of Primary Hypertension (I10) to the patient chart which triggers the CDS alert for same.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** From note, in diagnosis list select Diabetes > add additional diagnosis info if needed> click OK> click Save icon in top left of chart> CDS alert pop up for Diabetes is triggered.
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)

Comments:

- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 3: Configure a CDS intervention for a medication (Rule = PatientsOnCoumadin)

Starting point for the task: User has permission for CDS setup and maintenance.

As a clinician, you would like to add a new CDS intervention to alert you when patients are currently on Coumadin.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** Edit> System Tables> DSS Rule Builder > click on Rules tab and create new rule with rule logic including data point "OnCoumadin" > click on Action Mapping tab and map rule to action "Order INR".
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)

Comments:

- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 4: Generate a Medication CDS alert automatically and electronically

Starting point for the task: User has a patient chart open with only demographics info entered. New note is open with Medication button available.

As a clinician, you add a medication of Coumadin to the patient chart which triggers the CDS alert for same.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** From note, click Medication button> search and select Coumadin> confirm> click Save icon in top left of chart > CDS alert pop up for Coumadin is triggered.
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)
- **Administrator Comments:**

Task 5: Generate an Allergy CDS alert automatically and electronically

**** use patient chart "DSS Patient (10355)"**

Starting point for the task: User has a patient chart open with a current medication for amoxicillin. New note is open with allergy button available.

As a clinician, you add an allergy of Amoxicillin to the patient chart which triggers the CDS alert for same.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** From note, click Allergy button> select Add/Modify allergy> Add> search and select Amoxicillin as drug allergy > click Select button and receive CDS alert
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)
- **Administrator Comments:**

Task 6: Configure a CDS intervention for a demographic (Rule = FemaleOverForty)

Starting point for the task: User has permission for CDS setup and maintenance.

As a clinician, you would like to add a new CDS intervention to alert you when a patient is Female and age over 40 years.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** Edit> System Tables> DSS Rule Builder > click on Rules tab and create new rule with rule logic including data points “IsFemale and AgeInYears >= 40”. Click on Action Mapping tab and map rule to action “Review mammogram history and order one if not done in past year”.
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: “Very Difficult” (1) to “Very Easy” (5)*
- **Administrator Comments:**

Task 7: Generate a Demographics CDS alert automatically and electronically

Starting point for the task: User has a patient chart open with only name and address entered on the ID tab.

As a user, you add demographics information to the patient chart to indicate patient is a Female and add a birthdate that is greater than 40 years old.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** From patient ID tab, select Birth Sex option for female> enter birthdate which makes patient greater than 40 years old> click Save icon in top left of chart> CDS alert pop up for “Female patient over 40” is triggered.
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: “Very Difficult” (1) to “Very Easy” (5)*
- **Administrator Comments:**

Task 8: Configure a CDS intervention for a lab result (*Rule = LDLGreaterThan130*)

Starting point for the task: User has permission for CDS setup and maintenance.

As a clinician, you would like to add a new CDS intervention to alert you when a patient an elevated LDL lab result. Bibliographic information should be entered for all attributes that support this intervention.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds

- **Optimal Path:** Edit> System Tables> DSS Rule Builder > click on Rules tab and create new rule with rule logic including data point “LDL > 130” > click on Bibliographic Information button and enter information for all attributes that support this intervention. Click on Action Mapping tab and map rule to action “Provide Lowering LDL literature”.
 - Correct
 - Minor Deviations/Cycles (describe below)
 - Major Deviations (describe below)

Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: “Very Difficult” (1) to “Very Easy” (5)*
- **Administrator Comments:**

Task 9: Generate a Lab Result CDS alert automatically and electronically

Starting point for the task: User has a patient chart open with only demographics info entered. New note is open with numeric button configured (tagged) for LDL.

As a clinician, you add a lab result for LDL greater than 130 mg/dL to the patient chart which triggers the CDS alert for same.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** From note, enter a number greater than 130 in the data entry field labeled “LDL result”> tab out of the field> click Save icon in top left of chart> CDS alert pop up for Penicillin is triggered.
 - Correct
 - Minor Deviations/Cycles (describe below)
 - Major Deviations (describe below)

Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: “Very Difficult” (1) to “Very Easy” (5)*
- **Administrator Comments:**

Task 10: Configure a CDS intervention for vital signs (*Rule = BMIAdult*)

Starting point for the task: User has permission for CDS setup and maintenance.

As a clinician, you would like to add a new CDS intervention to alert you when a patient an elevated BMI percentage.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** Edit> System Tables> DSS Rule Builder > click on Rules tab and create new rule with rule logic including data points “AgeInYears > 18 and ResultBMIPercentile > 30”. Click on Action Mapping tab and map rule to action “Provide Educational Resources”.
 - Correct
 - Minor Deviations/Cycles (describe below)
 - Major Deviations (describe below)

Comments:

- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 11: Generate a Vital Signs CDS alert automatically and electronically (fulfills combination test case as well)

Starting point for the task: User has a patient chart open that is greater than 18 years old. New note is open with Vitals button available.

As a clinician, you add vital signs for the patient to height of 5ft 2in and weight of 175lbs to the chart which triggers the CDS alert for same.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** From note, click the Vitals button> for Height enter "5" ft and "2" in> for Weight enter "175"> ok (to close dialog) > click Save icon in top left of chart> CDS alert pop up for elevated BMI is triggered.
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)

Comments:

- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 12: Trigger CDS from CDA import

**** use CCDA file "Patient_DSS_10355.xml" and import into chart for 'DSS Patient (10355)', delete document import note when finished**

Starting point for the task: User has a patient chart open that is at least 18 years old and has an active medication for amoxicillin in chart. entered. A CDA exists for the patient which contains clinical data which will trigger an existing active CDS alert. The CDA is available for import.

As a user, you import a patient's CDA to their existing chart which triggers three relevant CDS alerts.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** From patient list view, select Chart> Patient Data> leave default as "Import to existing patient chart" and browse to file> Next> accept match to patient name> Import> Chart opens to CCDA note > reconcile the imported problem of hypertension, imported medication for Coumadin and imported allergy for amoxicillin > CDS alert for allergy happens during reconciliation > close screen and click Save> CDS pop up alerts are triggered for hypertension and coumadin

Correct (describe below) Minor Deviations/Cycles (describe below) Major Deviations (describe below)

Comments:

- **Observed Errors and Verbalizations:**

- **Rating:**

Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*

- **Administrator Comments:**

Task 13: Access bibliographic citation, developer, funding source and release/revision date for CDS intervention

Starting point for the task: In a patient chart where CDS alert for LDL > 130 mg/dl has been triggered and alert screen is open and available to the user.

As a clinician, you would like to identify CDS intervention attributes.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed

Comments:

- **Task Time:** _____ Seconds

- **Optimal Path:** From the CDS alert screen, user can see the alert name, the actions suggested and a link to the additional information supporting the alert including bibliographic citation, developer, funding source, revision date(s)

Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)

Comments:

- **Observed Errors and Verbalizations:**

- **Rating:**

Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*

- **Administrator Comments:**

Implantable Device (a.14)

Task 1: Record UDI for a new implantable device

Starting point for the task: In ChartMaker® Clinical, a new patient note is open which contains an Implantable Device button and user has a UDI to enter for a device.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed

Comments:

- **Task Time:** _____ Seconds

- **Optimal Path:** Click the Implantable Device button within the note > Click the Add button in Device List box > Enter Device UDI:

+B066000325011NS1/\$\$420020216LOT123456789012345/SXYZ456789012345678/16D20130202

> Click Verify UDI with FDA button > Cardiopulmonary bypass filter information is retrieved > Click OK to add Cardiopulmonary bypass filter to chart

Correct (describe below) Minor Deviations/Cycles (describe below) Major Deviations (describe below)

Comments:

- **Observed Errors and Verbalizations:**

- **Rating:**

Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*

- **Administrator Comments:**

Task 2: Change the UDI status for an implantable device

Starting point for the task: In ChartMaker® Clinical, a new patient note is open which contains an Implantable Device button and an existing and active implantable device with valid UDI is present for the patient.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed

Comments:

- **Task Time:** _____ Seconds

- **Optimal Path:** Click the Implantable Device button within the note > Select the existing implantable device in Device List > change Device Status to Inactive > Click OK to update chart

Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)

Comments:

- **Observed Errors and Verbalizations:**

- **Rating:**

Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*

- **Administrator Comments:**

Task 3: Access the implantable device information

Starting point for the task: In ChartMaker® Clinical, chart is opened with facesheet in view or a new patient note is open which contains an Implantable Device button. An existing and active implantable device with valid UDI is present for the patient.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed

Comments:

- **Task Time:** _____ Seconds

- **Optimal Path:** Click the Implantable Device button within the note (or view Implantable device section on facesheet) > Select the existing implantable device in Device List > view information in Device Details and Device Information sections on screen

Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)

Comments:

- **Observed Errors and Verbalizations:**

- **Rating:**

Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*

- **Administrator Comments:**

Clinical Information Reconciliation and Incorporation (b.2)

***import file 'Patient_CCDA_10350.xml' into patient "CCDA Patient (10350)" for these tests, delete Document Import note when finished*

Task 1: Incorporate a CCDA into a patient's chart

Starting point for the task: Import a CCDA into a patient chart that contains existing medications, diagnoses and allergies.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** Open CCDA Document Import note and click Reconcile button > in the Clinical Information Reconciliation screen click the Medications tab > click "Add" for individual medications or "Add All" under the imported list to add items to the patient's current chart
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 2: Conduct reconciliation of medications from CCDA in patient's chart

Starting point for the task: Open to patient chart that contains the imported CCDA note with a Reconcile button.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** Open CCDA Document Import note and click Reconcile button > in the Clinical Information Reconciliation screen click the Medications tab > click "Add" for individual medications or "Add All" under the imported list to add items to the patient's current chart
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 3: Conduct reconciliation of allergies from CCDA in patient's chart

Starting point for the task: Open to a patient chart that contains the imported CCDA note with a Reconcile button.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** Open CCDA Document Import note and click Reconcile button > in the Clinical Information Reconciliation screen, click the Allergies tab > click "Add" for individual allergies or "Add All" under the imported list to add items to the patient's current chart
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 4: Conduct reconciliation of diagnoses from CCDA in patient's chart

Starting point for the task: Open to a patient chart that contains the imported CCDA note with a Reconcile button.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** Open CCDA Document Import note and click Reconcile button > in the Clinical Information Reconciliation screen, click the Diagnoses tab > click "Add" for individual diagnoses or "Add All" under the imported list to add items to the patient's current chart
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 5: Generate a CCDA that contains reconciled data

Starting point for the task: Open to a patient chart that you just performed medication, allergy and diagnosis reconciliation from an imported CCDA.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** From within patient chart open the Export Patient Data screen from Chart menu > select a date range and provider > click Save to create CCDA

Correct (describe below) Minor Deviations/Cycles (describe below) Major Deviations (describe below)

Comments:

- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

e-Prescribing (b.3)

***use patient Tad Dockendorf for all e-prescribing test cases – do NOT actually process the Refill request*

Task 1: Create a new prescription and submit via e-Prescribing

Starting point for the task: In ChartMaker® Clinical, a new patient note is open which contains a Medication button.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** Click the Medication button within the note (or add medication from facesheet) > Search for a medication > select a medication > add the sig info needed for the medication > select transmission e-prescribe > click next > select pharmacy > click confirm & send button
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 2: Change an existing prescription and submit via e-Prescribing

Starting point for the task: In ChartMaker® Clinical, a patient chart is open which contains a Medication button.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** From the patient note click Medication button (or renew option from facesheet) > select renew medication > select medication to renew > make sig changes > select transmission e-prescribe > click next > select pharmacy > click confirm & send button
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**

Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*

- **Administrator Comments:**

Task 3: Cancel a prescription electronically

Starting point for the task: In ChartMaker® Clinical, patient chart is open and contains an existing active prescription.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** Click on medication in the facesheet > select Cancel Prescription option > select pharmacy > click send
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 4: Refill a prescription electronically

**** don't let user actually click the Approve button, do not process refill**

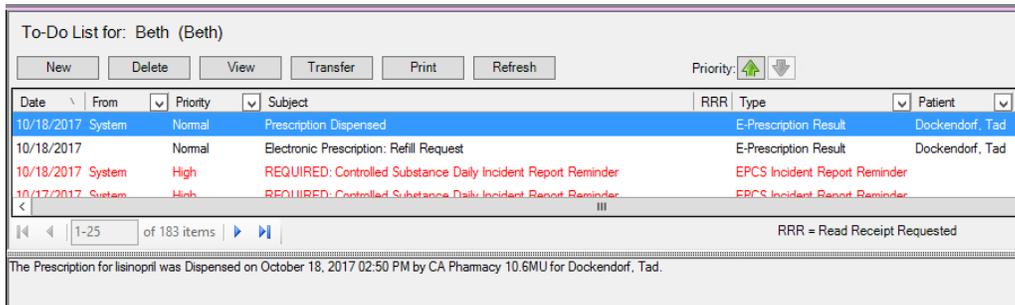
Starting point for the task: In ChartMaker® Clinical, a patient chart is open which contains a refill request for a medication on the facesheet

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** Select medication on facesheet with refill request status > click Process Refill Request > enter # dispensings on Refill Response screen and optional comments > click Approve button
 Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)
Comments:
- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 5: Receive fill status notification

Starting point for the task: In ChartMaker® Clinical, logged in as provider with Rx Fill prescribing level that had previously e-prescribed a medication.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:
- **Task Time:** _____ Seconds
- **Optimal Path:** From to-do list, filter by patient name > look for to-do list item with subject "Prescription Dispensed" for that patient > highlight item to view medication, dispense time and pharmacy in bottom message preview pane



- Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)

Comments:

- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Task 6: Request and receive medication history information

Starting point for the task: In ChartMaker® Clinical, a patient chart is open that has medication history consent set to 'yes'.

- **Success:** Easily completed Completed with difficulty/help (describe below) Not completed
Comments:

- **Task Time:** _____ Seconds
- **Optimal Path:** Select the Medication History option from the Chart menu

- Correct Minor Deviations/Cycles (describe below) Major Deviations (describe below)

Comments:

- **Observed Errors and Verbalizations:**
- **Rating:**
Overall, this task was: _____ *Rating is scaled as: "Very Difficult" (1) to "Very Easy" (5)*
- **Administrator Comments:**

Final Questions

1. What was your overall impression of this system?
2. What aspects of the system did you like most?
3. What aspects of the system did you like least?
4. Were there any features that you were surprised to see?
5. What features did you expect to encounter but did not see? That is, is there anything that is missing in this application?
6. Compare this system to other systems you have used.
7. Would you recommend this system to your colleagues?

Administer the SUS

Appendix 5: System Usability Scale (SUS) Questionnaire

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

Questions are to be answered on a scale of 1 through 5. 1 equates to “Strongly Disagree” and 5 equates to “Strongly Agree.”

1. I think that I would like to use this system frequently
2. I found the system unnecessarily complex
3. I thought the system was easy to use

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