



# Attestation document for §170.314(g)(3) Safety-enhanced design: gMed, Inc.

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Usability of the application is one of the core benefits and advantages of gMed's Ambulatory EHR system and all the other products offered by the company (such as the Practice Management solution, the Patient Portal, etc). gMed prides itself in the fact that the application is quick to learn, easy to use and consistent across the look and feel of the various modules. To achieve this level of usability, gMed uses a User Centered Design that can be described as a combination of various industry standards. User requirements and needs are considered right from the beginning of the design and included into the entire product life cycle.

Below is a brief description of gMed's User Centered Design approach.

## Reference 1

**ISO 13407:** Human Centered Design Process for Interactive Systems

The standard describes four principles of human-centered design:

1. Active involvement of customers (or those who speak for them).
2. Appropriate allocation of function (making sure human skill is used properly).
3. Iteration of design solutions (therefore allow time in project planning).
4. Multi-disciplinary design (but beware overly large design teams).

And four key human-centered design activities

1. Understand and specify the context of use (make it explicit – avoid assuming it is obvious).
2. Specify user and socio-cultural requirements (note there will be a variety of different viewpoints and individuality).
3. Produce design solutions (note plural, multiple designs encourage creativity).
4. Evaluate designs against requirements (involves real customer testing not just convincing demonstrations).

## Reference 2

**ISO 9241-210:** Ergonomics of human-system interaction -- Part 210: Human-centered design for interactive systems

The standard describes 6 key principles that will ensure a design is user centered:

1. The design is based upon an explicit understanding of users, tasks and environments.
2. Users are involved throughout design and development.
3. The design is driven and refined by user-centered evaluation.



4. The process is iterative.
5. The design addresses the whole user experience.
6. The design team includes multidisciplinary skills and perspectives.

As the above referenced standards dictate, gMed's User Centered Design begins with the thorough understanding of the users, their tasks, needs and environments by:

1. Observation of the users in their work environment to understand their day to day activities, track the repetitive tasks and determine the optimal solutions
2. Involvement of the users in detailed discussions and analysis of their tasks
3. Interviewing users with various levels of computer skills, familiarity with the system and attention to detail
4. Observing the users perform functions in the system to derive common behavioral patterns, collect feedback and observations.

Once the initial understanding of the user needs and wants is obtained, the design team, consisting of Subject Matter Experts, Business Analysts, Product and Project Managers, System Architects, UI Designers and Quality Assurance specialists works on design and development of prototypes and the actual functionality in the application. Various solutions are presented to the users (ensuring that various roles and levels of expertise in the system are properly represented) to gain insight into the most optimal solution, to observe user reaction to the proposed solutions, to obtain feedback, suggestions and opinions from the users prior to the final development of the functionality in the software. In the process of the design and development, the team closely follows the Usability Maxims defined by Lund in the 1997 publication (*Lund, A. M. (1997). Expert ratings of usability maxims. Ergonomics in Design, 5(3), 15-20. A study of the heuristics design experts consider important for good design*).

- Know the user, and You are not the user.
- Things that look the same should act the same.
- The information for the decision must be there when the decision is needed.
- Error messages should actually mean something to the user and tell the user how to fix the problem.
- Every action should have a reaction.
- Everyone makes mistakes, so every mistake should be fixable.
- Don't overwhelm the user.
- Consistency, consistency, consistency.
- Minimize the need for a mighty memory.
- Keep it simple.
- The user should always know what is happening.
- The more you do something, the easier it should be to do.
- The user should control the system. The system should not control the user. The user is the boss and the system should show it.
- Eliminate unnecessary decisions and illuminate the rest.



- The best journey has the fewest steps. Shorten the distance between the user and the goal.
- User should be able to do what they want.
- Alert users to an error before things get worse.
- Users should always know how to find out what to do next.
- Strive to empower the user, not speed up the system.
- Things that look different should act different.

After the software is deployed to the client sites, the continuous monitoring and feedback from the users is integrated back into the application in an iterative manner to ensure that the optimal workflow and usability is achieved and that the design is constantly validated and improved in the real-world use scenarios.

As represented in the NISTIR Usability report that is accompanying this attestation, the UCD process employed by gMed does indeed result in an easy to use, well integrated system that is relatively quick to learn, and is consistent across various modules and releases.

Signed by: Marina Simonian, Product Manager, gMed. Inc.

Signature:

A handwritten signature in blue ink, appearing to read 'MS', written over a horizontal line.

Date:

08.26.2013

# EHR Usability Test Report

## gGastro, version 4.52

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

Product name: gGastro

Product version: version 4.52

Date of Usability Test: August 15 – 23, 2013

Date of Report: August 26, 2013

Report Prepared By: Marina Simonian, gMed, Inc. Product Manager

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To Whom It May Concern:

By this letter we attest to the veracity and authenticity of the NISTIR Usability Report provided to Drummond Group Inc. for the purposes of certification of ONC Test Procedure 170.314(g)(3) Safety Enhanced Design.

Signed by: Marina Simonian, Product Manager, gMed. Inc.

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

Date: \_\_\_\_\_

08.26.2013

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## EXECUTIVE SUMMARY

A usability test of *Ambulatory EHR gGastro version 4.52* was conducted by gMed staff on several dates between August 14 and 23, 2013 over remote tele-conferencing sessions using Go To Meeting. The purpose of this test was to test and validate the usability of the current user interface, and provide evidence of usability in the EHR Under Test (EHRUT). During the usability test, a total of 19 healthcare providers and administrators matching the target demographic criteria served as participants and used the EHRUT in simulated, but representative tasks.

This study collected performance data on a total of 19 tasks typically conducted on an EHR and presented for certification under the Meaningful Use Stage 2 program.

The test procedures under the Meaningful Use certification program are the following:

- §170.314(a)(1) Computerized provider order entry
- §170.314(a)(2) Drug-drug, drug-allergy interaction checks
- §170.314(a)(6) Medication list
- §170.314(a)(7) Medication allergy list
- §170.314(a)(8) Clinical decision support
- §170.314(b)(3) Electronic prescribing
- §170.314(b)(4) Clinical information reconciliation

The tasks presented for usability testing based on the abovementioned test procedure are the following:

1. Use Computerized physician order entry (CPOE) to create a Medication order
2. Use Computerized physician order entry (CPOE) to view and modify a Medication order
3. Use CPOE to create a Lab order
4. Use CPOE to view and modify a Lab order
5. Use CPOE to create a Diagnostic study (Radiology) order
6. Use CPOE to view and modify a Diagnostic study (Radiology) order
7. Record a patient allergy and prescribe a medication that would be contraindicated to that allergy, to get a drug-allergy interaction alert
8. Adjust a drug/drug interaction level
9. Prescribe two medications that are contraindicated to get a drug-drug interaction alert
10. Review patient's active medications list.
11. Record a new medication.
12. Modify an existing medication.
13. Review patient's allergy list
14. Record a new allergy
15. Modify an existing allergy
16. Prescribe a medication for a patient and send it in electronic format
17. Reconcile the medications, allergies and problems from a received CCDA document into the patient's chart.
18. Configure clinical decision support Guidelines (as administrator)
19. Review a clinical decision support guideline and reference information (as a user)

A sub-group of the abovementioned tasks was presented to each participant based on their role. The detailed listing of which role was presented with which tasks is discussed in the Tasks section of this document.

Due to the remote nature of the test, all the paperwork (included in Appendices B and C) was discussed and obtained from the participants in advance over email (TOC, Consent form, Demographics questionnaire).

During the one hour one-on-one usability test, each participant was greeted by the administrator, the purpose of the study and the process were reviewed with the participant; they were instructed that they could withdraw at any time. Participants had prior experience with the EHRUT, but not with all of the functionality under test, as some of it was newly developed in the release under test. The administrator introduced the test, and instructed participants to complete a series of tasks (given one at a time) using the EHRUT. During the testing, the administrator timed the test and recorded user performance data on paper and electronically. The administrator did not give the participants assistance in how to complete the task. All participants were provided a brief overview of the newly introduced functionality in the form of a training seminar prior to the test. The contents of the training were the same for all participants. Participants' use of the EHRUT was recorded for subsequent analysis.

The following types of data were collected for each participant:

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

All participant data was de-identified – no correspondence could be made from the identity of the participant to the data collected. Following the conclusion of the testing, participants were asked to complete a post-test questionnaire and were compensated with a gift card for their time. 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 EHRUT.

Task/ Measure	Task Success	Task Time	Task time Deviations	Path Deviation	Task Ratings
	Mean (SD)	Mean (SD) seconds	Deviations (observed/optimal)	(1 = no deviation, 2 = minor deviation 3 = major deviation) Average	Mean
1 Review Clinical Decision support recommendations and reference information	91.67%	40.20	1.91	1.64	3.50
2 Use Computerized physician order entry (CPOE) to create a Medication order	100.00%	92.01	1.86	1.58	3.36
3 Use (CPOE) to view and modify a Medication order	92.86%	96.80	1.61	1.27	3.43
4 Use CPOE to create a Lab order	92.31%	99.10	2.87	1.45	3.69
5 Use CPOE to view and modify a Lab order	100.00%	66.09	2.45	1.45	2.93
6 Use CPOE to create a Diagnostic study order	100.00%	53.65	2.55	1.09	3.79
7 Use CPOE to view and modify a Diagnostic study order	92.31%	39.50	1.79	1.20	3.69
8 Create drug-drug and interventions prior to order completion	100.00%	121.52	1.52	1.17	3.53

9	Drug-allergy interaction	100.00%	88.38	1.50	1.00	3.60
10	Record active medications.	100.00%	65.08	1.72	1.17	3.53
11	access patient's active medications list and change a medication	100.00%	62.62	1.72	1.00	3.67
12	Record patient's active medication allergy.	100.00%	76.08	2.86	1.25	3.27
13	Access patient's active medication allergies list and change the allergy info	100.00%	38.85	1.85	1.00	3.67
14	Reconcile the medications, allergies and problems from a received CCDA document into the patient's chart.	100.00%	74.67	2.54	1.11	3.20
15	Adjust a drug/drug interaction level for all users	100.00%	32.25	2.09	1.25	4.00
16	Grant/revoke permission from a group of users to adjust drug/drug interaction level	100.00%	33.75	1.85	1.50	4.00
17	Configure a single occurrence guideline based on: Problem list, Lab tests and results, age	100.00%	140.75	2.01	1.25	3.33
18	Configure a single occurrence guideline based on: Medication list and Allergy list	100.00%	44.50	1.14	1.25	3.67
19	Configure a recurrent guideline based on: Vital signs and identify Diagnostic and Therapeutic reference info	100.00%	97.75	1.79	1.00	3.50

The results from the System Usability Scale scored the subjective satisfaction with the system based on performance with these tasks to be: **85.65** (calculated based on the Computation of SUS score in Brooke's paper at <http://www.usabilitynet.org/trump/documents/Suschapt.doc>)

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

#### Major findings

- Most users found the system user friendly and easy to use
- Most users indicated the system was easy to learn and consistent across various modules
- Most users easily completed the tasks using the optimal path or with minor deviations

#### Areas for improvement (discussed in more detail in Discussion of the Findings section)

- The workflow of order modification has some areas for improvement (to save clicks and provide shortcuts)
- The workflow of modifying a medication order required an extra step of voiding and creating a new medication order.
- Reconcile workflow – add a UI icon on toolbar to make function more apparent
- My activities screen customization
- Ability to move popups

## INTRODUCTION

The EHRUT tested for this study was gGastro, version 4.52. Designed to present medical information to healthcare providers in Ambulatory setting, in the Medical Office as well as the Ambulatory Surgery Centers in the Gastroenterology Specialty, the EHRUT consists of various modules that provide end-to-end support for administrative and clinical operations of any Gastroenterology practice. The modules include Office visit notes, Patient chart and medical history charting, Electronic Prescribing, Patient education and Clinical Decision Support, Endoscopic report writer, Task and Result management, Scheduling and Billing, Scanning, Faxing, Interfacing with laboratories for receipt of various lab results, integrations with online Patient Portal. The usability testing attempted to represent realistic exercises and conditions and focused primarily on the set of tasks and measures that are presented for certification under the Meaningful Use 2014 certification program and required for the 170.314(g)(3) measure.

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). To this end, measures of effectiveness, efficiency and user satisfaction, such as time to complete a task, success rate in completing the task, as well as overall satisfaction rating with the functionality were captured during the usability testing.

## METHOD

### INTENDED USERS

The Intended users for the Usability testing of the EHRUT were selected based on their day to day tasks' relevance to the tasks needed to be tested during the Usability study. Their demographics, education, years of experience in their position as well as in the use of the EHRUT were considered. The intended users had to be Providers, Nurses or MA's and Administrators (based on the type of tasks needed for testing).

### PARTICIPANTS

A total of 19 participants were tested on the EHRUT. Participants in the test were Physicians, Nurses, Medical Assistants and Administrators from various practices already using and familiar with gGastro. Participants were recruited by gMed, Inc. and were compensated in the form of \$50 gift card for Administrators and Nurses/Medical assistants, and \$100 gift card for Physicians for their time. The difference in the amount on the gift card is due to the difference in the value of the time that the participants give up from their daily business in favor of participating in the usability testing. A sub-group of physicians and administrators who participated in the usability testing are on gMed's Advisory Board and provide regular feedback in the development of functionality. As such, they are compensated for their feedback and time on a yearly basis and thus were not included in the same pool of gift card recipients. None of the participants were from the vendor organization, nor did they have any direct connection to the development of the EHRUT. Participants were given the opportunity to have the same orientation and level of training by providing an introductory training on the functionality and features that were new in the application.

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, number of

previous EHR's used. Participant names were replaced with Participant IDs so that an individual's data cannot be tied back to individual identities.

#	Part ID	Gender	Age	Education	Professional Experience (yrs)	Product experience	Hrs per day average	# of previous EHR's
1	P1	M	50-59	MD	31	4	10	0
2	P2	M	50-59	MD	31	1	7	1
3	P3	F	50-59	Other/Mgr	2	1.5	10	0
4	P4	F	20-29	MA	9	2	6-8	1
5	P5	F	20-29	LPN	4	1	7	2
6	P6	F	30-39	MA	7	7	8-9	0
7	P7	F	30-39	LPN	6	1	8	0
8	P8	M	60-74	MD	47	3	1	1
9	P9	M	40-49	MD	18	2.5	10	0
10	P10	F	50-59	LPN	22	12	8	0
11	P11	F	50-59	Admin	1.5	1	8-12	2
12	P12	F	30-39	Admin	3	4	7	0
13	P14	F	40-49	Admin	4	1	8	3
14	P15	M	50-59	MD	40	n/a	n/a	0
15	P16	M	50-59	MD	27	4	4	0
16	P17	F	20-29	MA	8	3	8	0
17	P18	F	20-29	MA	6	3	8	0
18	P19	M	50-59	MD	n/a	n/a	n/a	0
19	P20	F	50-59	Admin	12	1	6	0

29 participants (matching the demographics in the section on Participants) were contacted for recruiting in the usability test. 19 participated in the usability test. 10 participants were not able to accommodate their schedules for the study.

Participants were scheduled for 60 minute sessions. A spreadsheet was used to keep track of the participant schedule, and included each participant's demographic characteristics.

## STUDY DESIGN

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

During the usability test, participants interacted with 1 EHR. Each participant used the system from the same setup of a remote server, 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 without assistance
- Time to complete the tasks
- Number and types of errors
- Path deviations
- Participant's verbalizations (comments)
- Participant's satisfaction ratings of the system

Additional information about the various measures can be found in the 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 within this EHR and representative of the functionality presented for certification for the 2014 Meaningful Use program, including:

1. Use Computerized physician order entry (CPOE) to create a Medication order
2. Use Computerized physician order entry (CPOE) to view and modify a Medication order
3. Use CPOE to create a Lab order
4. Use CPOE to view and modify a Lab order
5. Use CPOE to create a Diagnostic study (Radiology) order
6. Use CPOE to view and modify a Diagnostic study (Radiology) order
7. Record a patient allergy and prescribe a medication that would be contraindicated to that allergy, to get a drug-allergy interaction alert
8. Adjust a drug/drug interaction level
9. Prescribe two medications that are contraindicated to get a drug-drug interaction alert
10. Review patient's active medications list.
11. Record a new medication.
12. Modify an existing medication.
13. Review patient's allergy list
14. Record a new allergy
15. Modify an existing allergy
16. Prescribe a medication for a patient and send it in electronic format
17. Reconcile the medications, allergies and problems from a received CCDA document into the patient's chart.
18. Configure clinical decision support Guidelines (as administrator)
19. Review a clinical decision support guideline and reference information (as a user)

The tasks were selected based on the measures presented for certification on Meaningful Use 2014 program and required for Test Procedure §170.314(g)(3) Safety-enhanced design. These tasks are also representative of some of the most commonly performed tasks by the personnel recruited for participation.

The following breakdown of the tasks was presented to the users based on their role.

#### Physician

1. Use Computerized physician order entry (CPOE) to create, modify and view a Medication order
2. Use CPOE to create, modify and view a Lab order
3. Use CPOE to create, modify and view a Diagnostic study order
4. Record a patient allergy and prescribe a medication that would be contraindicated to that allergy, to get a drug-allergy interaction alert
5. Prescribe two medications that are contraindicated to get a drug-drug interaction alert
6. Review patient's active medications list.
7. Record a new medication.
8. Modify an existing medication.
9. Review patient's allergy list
10. Record a new allergy
11. Modify an existing allergy
12. Review a clinical decision support guideline and reference information (as a user)
13. Prescribe a medication for a patient and send it in electronic format

#### Nurse/Medical Assistant

1. Use Computerized physician order entry (CPOE) to create, modify and view a Medication order
2. Use CPOE to create, modify and view a Lab order
3. Use CPOE to create, modify and view a Diagnostic study order
4. Record a patient allergy and prescribe a medication that would be contraindicated to that allergy, to get a drug-allergy interaction alert
5. Prescribe two medications that are contraindicated to get a drug-drug interaction alert
6. Review patient's active medications list.
7. Record a new medication.
8. Modify and existing medication.
9. Review patient's allergy list
10. Record a new allergy
11. Modify an existing allergy
12. Review a clinical decision support guideline (as a user) and indicate that the recommendation has been performed for the patient.
13. Prescribe a medication for a patient and send it in electronic format
14. Reconcile the medications, allergies and problems from a received CCDA document into the patient's chart.

#### Administrator

1. Adjust a drug/drug interaction level for all users
2. Grant/revoke permission from a group of users to adjust drug/drug interaction level

3. Configure a clinical decision support guideline for each one or a combination of the following:
  - a. Problem List
  - b. Medication List
  - c. Medication Allergy List
  - d. Demographics
  - e. Lab Tests and Results
  - f. Vital Signs
  - g. Identify User Diagnostic and Therapeutic Reference Information

## PROCEDURES

Upon connection to the online meeting tool (Go To Meeting), participants were greeted; their identity was verified and matched with a name on the participant schedule. Participants were then assigned a participant ID. Each participant had reviewed and signed an informed consent and release form prior to the study (See Appendix C). Signed documents were then provided to gMed via scan or fax.

The administrator moderated the session including administering instructions and tasks. The administrator also monitored task times, obtained post-task rating data, and took notes on participant comments.

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.

Task timing began once the administrator finished reading the question. The task time was stopped once the participant indicated they had successfully completed the task. Scoring is discussed below in the Data Scoring section.

Following the session, the administrator gave the participant the post-test System Usability Scale questionnaire (see Appendix E), and thanked each individual for their participation. Since the participation was in a remote session, participants were sent the compensation via certified mail. Participants signed a receipt and acknowledgement form (See Appendix F) indicating that they had received the compensation and send it back to gMed.

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

## TEST LOCATION

*All participants were tested over a remote conferencing session using Go To Meeting.*

The participant was requested in advance to secure a quiet room with minimal distractions and a computer that could connect to the internet via a Go To Meeting session. The administrator and the participants were the only ones on the call. The Go To Meeting session was recorded for further analysis.

## **TEST ENVIRONMENT**

The EHRUT would be typically used in a healthcare office or Ambulatory Surgery Center facility. In this instance, the testing was conducted over the Go To Meeting session. The participants used a mouse and keyboard when interacting with the EHRUT. The participants were given remote control of the administrator's workstation to perform the tasks, since the testing was being performed on an un-released version in a local environment.

gGastro was set up using the recommended screen resolution settings. The application itself was running on a Windows platform using a test database on a LAN connection. Technically, the system performance (i.e., response time) was slightly slower compared to what actual users would experience in a field implementation. Additionally, participants were instructed not to change any of the default system settings (such as control of font size).

## **TEST FORMS AND TOOLS**

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

1. Informed Consent and Non-Disclosure Agreement (Appendix C)
2. Moderator's Guide (Appendix D)
3. Post-test System Satisfaction Questionnaire (Appendix E)
4. Incentive Receipt and Acknowledgment Form (Appendix F)

Examples of these documents can be found in abovementioned Appendices. The Moderator's Guide was devised so as to be able to capture required data and ensure consistent approach and process across all the sessions.

The participant's interaction with the EHRUT was captured and recorded digitally with screen capture software (Go To Meeting) running on the test machine. Verbal comments were recorded with a microphone and written notes. The test sessions were recorded and analyzed at a later time.

## **PARTICIPANT INSTRUCTIONS**

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

*Thank you for participating in this study. Our session today will last approximately 60 minutes. During that time you will take a look at the new version of gGastro, and specifically some functionality and tasks*

*required for Meaningful Use Certification. Most of these tasks you are already familiar with and they are part of your day to day workflows.*

*I will ask you to complete the tasks using the system and answer some questions. We are interested in how easy (or how difficult) this system is to use, and how we could improve it. You will be asked to complete these tasks on your own trying to do them as quickly as possible with the fewest possible steps, errors or deviations. Do not do anything more than asked. If you get lost or have difficulty I cannot answer or help you with anything to do with the system itself, but I can remind you the test data or the task itself if you need me to repeat it. Please save your detailed comments until the end of a task or the end of the session as a whole when we can discuss freely. Please be honest with your opinions.*

*The product you will be using today is gGastro version 4.52, test environment. This is not the final release. Some of the data may not make sense as it is test data.*

*We are recording the audio and video of our session today using Go To Meeting. All of the information that you provide will be kept confidential and your name will not be associated with your comments and overall test results at any time.*

*Do you have any questions or concerns?*

Following the procedural instructions, participants were shown the EHR, the administrator gave the participant control of keyboard and mouse on their workstation, and then 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. We will start each task from the My Activities screen. We will use the same login information and the same patient. We have an appointment for this patient on your schedule.*

Participants were then given the tasks to complete: 13 for Providers, 14 for MA’s and Nurses, and 5 for the administrators. Tasks are listed in the moderator’s guide in Appendix D.

## **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 gGastro by measuring participant success rates and errors
2. Efficiency of gGastro by measuring the average task time and path deviations
3. Satisfaction with gGastro by measuring ease of use ratings

## DATA SCORING

<b>Effectiveness:</b> Task Success	A task was counted as a “Success” if the participant was able to achieve the correct outcome, without assistance, within the time allotted on a per task basis. The total number of successes were calculated for each task and then divided by the total number of times that task was attempted. The results are provided as a percentage.
<b>Efficiency:</b> Task Deviations	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. The task deviations were rated on the scale of 1 = no deviations, 2 = minor deviations, 3 = major deviations
<b>Efficiency:</b> Task Time	<p>Each task was timed from when the administrator said “Begin” until the participant said, “Done.” If he or she failed to say “Done,” the time was stopped when the participant stopped performing the task. Only task times for tasks that were successfully completed were included in the average task time analysis. Average time per task was calculated for each task.</p> <p>Optimal task performance time, as benchmarked by expert performance under realistic conditions, was recorded when constructing tasks. Target/optimal task times were defined by taking multiple measures of optimal performance and multiplying by a factor of 1.45 to allow for some time buffer because the participants are presumably not trained to expert performance, and also to account for the difference in network speed.</p> <p>Observed task times divided by the optimal time for each task is a measure of optimal efficiency.</p>
<b>Satisfaction:</b> Task Rating	<p>Participant’s subjective impression of the ease of use of the application was measured by administering both a simple post-task question as well as a post-session questionnaire. After each task, the participant was asked to rate “Overall, this task was:” on a scale of 1 (Very Difficult) to 5 (Very Easy). These data are averaged across participants per task.</p> <p>Common convention is that average ratings for systems judged easy to use should be 3.3 or above.</p> <p>To measure participants’ confidence in and likeability of gGastro overall, the testing team administered the System Usability Scale (SUS) post-test questionnaire that included questions like “I thought the system was easy to use,” and “I would imagine that most people would learn to use this system very quickly.” See full System Usability Score questionnaire in Appendix E.</p>

## 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 task relevant data excluded from the analyses. The only exclusions were made for individual tasks but not for an entire study

The usability testing results for the EHRUT are detailed below. The results should be seen in light of the objectives and goals outlined in Study Design section.

Task/ Measure	Task Success	Task Time	Task time Deviations	Path Deviation	Task Ratings
	Mean (SD)	Mean (SD) seconds	Deviations (observed/optimal)	(1 = no deviation, 2 = minor deviation 3 = major deviation) Average	Mean
1 Review Clinical Decision support recommendations and reference information	91.67%	40.20	1.91	1.64	3.50
2 Use Computerized physician order entry (CPOE) to create a Medication order	100.00%	92.01	1.86	1.58	3.36
3 Use (CPOE) to view and modify a Medication order	92.86%	96.80	1.61	1.27	3.43
4 Use CPOE to create a Lab order	92.31%	99.10	2.87	1.45	3.69
5 Use CPOE to view and modify a Lab order	100.00%	66.09	2.45	1.45	2.93
6 Use CPOE to create a Diagnostic study order	100.00%	53.65	2.55	1.09	3.79
7 Use CPOE to view and modify a Diagnostic study order	92.31%	39.50	1.79	1.20	3.69
8 Create drug-drug and interventions prior to order completion	100.00%	121.52	1.52	1.17	3.53
9 Drug-allergy interaction	100.00%	88.38	1.50	1.00	3.60
10 Record active medications.	100.00%	65.08	1.72	1.17	3.53
11 access patient's active medications list and change a medication	100.00%	62.62	1.72	1.00	3.67
12 Record patient's active medication allergy.	100.00%	76.08	2.86	1.25	3.27
13 Access patient's active medication allergies list and change the allergy info	100.00%	38.85	1.85	1.00	3.67
14 Reconcile the medications, allergies and problems from a received CCDA document into the patient's chart.	100.00%	74.67	2.54	1.11	3.20
15 Adjust a drug/drug interaction level for all users	100.00%	32.25	2.09	1.25	4.00
16 Grant/revoke permission from a group of users to adjust drug/drug interaction level	100.00%	33.75	1.85	1.50	4.00
17 Configure a single occurrence guideline based on: Problem list, Lab tests and results, age	100.00%	140.75	2.01	1.25	3.33

18	Configure a single occurrence guideline based on: Medication list and Allergy list	100.00%	44.50	1.14	1.25	3.67
19	Configure a recurrent guideline based on: Vital signs and identify Diagnostic and Therapeutic reference info	100.00%	97.75	1.79	1.00	3.50

The results from the SUS (System Usability Scale) scored the subjective satisfaction with the system based on performance with these tasks to be **85.65**. Broadly interpreted, scores under 60 represent systems with poor usability; scores over 80 would be considered above average.

## DISCUSSION OF THE FINDINGS

The major areas that were the focus of the test had to deal with the tasks supporting the Meaningful Use certification for Stage 2. The list of tasks is discussed in the Tasks section. Overall, those areas revolved around CPOE, Electronic prescribing, Drug/Drug/Allergy interactions and Clinical Decision Support. The study demonstrated that the majority of the tasks were completed successfully with no or minor deviations. The task ratings indicated that most of the users found the tasks easy to perform (1 or 2 on a 1 to 5 scale, 1 being easy). The verbal comments and feedback regarding the areas of improvement also were aligned with the statistical data presented by the task time deviations, task success and ratings.

### EFFECTIVENESS

Based on the success, failure and path deviation data, the success rating of the majority of the tasks was 100%, with only a few tasks in the 91% and up (indicating a small percentage of users who were not able to complete a task). The path deviation data also shows that only a small percentage of users demonstrated the completion of a task with major deviations. Most users performed the task with either no or minor deviations. This data indicates high level of effectiveness of the functionality under test.

### EFFICIENCY

Based on the observations of the task time and deviation data most of the tasks took on average 1.5 to 2.5 or 3 times longer for the users to perform as compared to expert performance. This indicates that there is still some room for improvement on the efficiency of the application. Some discounting must be made for the network speed deviations as well as for the psychological state of mind of the test subjects. Some of them made the comment that they usually perform the tasks more quickly in their own system, because it is set up with familiar data and they are used to finding it in the same place.

### SATISFACTION

Based on the task ratings and SUS results data, most users are very satisfied with the system, consider it user friendly, easy to learn and use, and consistent across various modules. The SUS rating of the application and functionality under test was 85.65.

## MAJOR FINDINGS

Overall, the majority of the participants identified the application as user friendly, easy to use, easy to learn. They indicated that the EHRUT is consistent across various modules, which make it easier to adjust to the new releases and learn the new functionality quickly. There is a number of areas that the users identified as their “favorites”, among which:

- how easily the application allows to record multiple medications for patient history,
- how easy it is to follow the information for the encounters in the “document” format,
- that the application “thinks like a doctor”
- the application is specialty specific.

When comparing the EHRUT with other EHR's used, they indicated that the system was easier to use and more consistent, as well as more advanced in the User Interface and overall usability.

## AREAS FOR IMPROVEMENT

Some of the common areas for improvement were identified based on the comments from the users, as well as from the observations of user interaction with the system in the performance of specific tasks, and basing on the analysis of path deviations, task success and ratings, as well as comparative analysis of average task time to the “optimal” task time. Those areas are:

- modifying a medication order currently requires a user to void the previous order and create a new one. Suggested improvement: Allow users to modify the order and (void and prescribe new) in the backend, to reduce clicks and provide a more intuitive workflow.
- Modifying an order (lab or diagnostic study) currently requires a user to copy/paste some of the modified information, to ensure that it’s accurately reflected in all the needed fields. Suggested improvement: facilitate the updating of the relevant fields when the order is modified.
- Add an icon on the toolbar of the reconcile workflow to make it more apparent (instead of only on right click).
- My activities screen organization (allowing more flexible customization based on user preferences).
- Ability to move pop ups around (they are currently fixed pop ups).

## APPENDICES

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

- A. Participant demographics
- B. Participant demographics questionnaire
- C. Non-Disclosure Agreement (NDA) and Informed Consent Form
- D. Moderator's Guide
- E. System Usability Scale Questionnaire
- F. Acknowledgement of Incentive Receipt

## Appendix A

### PARTICIPANT DEMOGRAPHICS

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

#### Gender

Male	7
Female	12

#### Age

20-29	4
30-39	4
40-49	3
50-59	7
60-74	1

#### Occupation/Education

MD	7
MA/RN	7
Admin	5

#### Professional experience

5-10 yrs	10
11-20 yrs	3
21-30 yrs	2
31-50 yrs	4

#### Product experience

1-5 yrs	16
More than 5 yrs	3

#### Hours per day using the gGastro application

6-10 hrs	15
1-5 hrs	4

## Appendix B

### PARTICIPANT DEMOGRAPHICS QUESTIONNAIRE

Please complete the following information for the Usability Study

Name \_\_\_\_\_

Age group

20-29 \_\_\_\_\_

30-39 \_\_\_\_\_

40-49 \_\_\_\_\_

50-59 \_\_\_\_\_

60-74 \_\_\_\_\_

75 and older \_\_\_\_\_

Your current title

MD \_\_\_\_\_

RN \_\_\_\_\_

MA \_\_\_\_\_

Administrative \_\_\_\_\_

Other \_\_\_\_\_

How long have you held this title?

\_\_\_\_\_ years

What is your primary work environment

Private Practice/Office \_\_\_\_\_

%

(please provide approximate percentage

Ambulatory Surgery Center \_\_\_\_\_

%

break down if you work in more than one

Hospital \_\_\_\_\_

%

setting)

How many years have you used  
gGastro?

years

\_\_\_\_\_

How many hours per day on average do you use gGastro?

hrs

\_\_\_\_\_

How many EHR's have you used before gGastro?

\_\_\_\_\_

Indicate your primary use and frequency of the following tasks within gGastro (mark all  
that apply)

Frequently    Sometimes    Never

Create/modify/review medication orders

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Create/modify/review Lab  
orders

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Create/modify/review Dx Study orders

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Drug/Drug/Allergy interaction checks

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Adjust severity level of drug/drug interactions

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Record/update patient medications list

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Review patient medications list

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Record/update patient medication allergies list

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Review patient medication allergies list

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Prescribe medications

Reconcile patient's active medications, problems and/or allergies

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Configure Clinical Decision support guidelines

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

View Clinical Decision support guidelines/recommendations

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## Appendix C

### NON-DISCLOSURE AGREEMENT (NDA)

THIS AGREEMENT is entered into as of \_\_ \_\_ \_\_\_\_\_, 2013, between \_\_\_\_\_ -  
\_\_\_\_ ("the Participant") and the testing organization *gMed, Inc.* located at 2125 N. Commerce Pkwy,  
Weston, FL 33326.

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 *gMed, Inc.*, 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 *gMed, Inc.* 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 receive monetary compensation for feedback and will not disclose this confidential information obtained today to anyone else or any other organizations.

Participant's printed name: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## INFORMED CONSENT FORM

gMed, Inc. would like to thank you for participating in this study. The purpose of this study is to evaluate gMed's electronic health records system - gGastro. If you decide to participate, you will be asked to perform several tasks using the application and give your feedback. The study will last about 60 minutes. At the conclusion of the test, you will be compensated for your time.

### *Agreement*

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

I understand and consent to the use and release of the recordings by gMed.

I understand that the information and recording is for research purposes only and that my name and image will not be used for any purpose other than research.

I relinquish any rights to the recording and understand the recording may be copied and used by gMed without further permission.

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

I understand and agree that the data collected from this study may be shared with outside of gMed.

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

I agree to immediately raise any concerns or areas of discomfort with the study administrator.

I understand that I can leave at any time.

Please check one of the following:

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

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## Appendix D

### MODERATOR'S GUIDE ON CONDUCTING THE USABILITY TEST FOR GGASTRO VERSION 4.52

**Administrator:**

---

**Data logger:**

---

**Date/time:**

---

**Participant number:**

---

**Location:**

---

#### **Prior to testing**

- Confirm schedule with Participants
- Ensure EHRUT lab environment is running properly
- Ensure lab and data recording equipment is running properly

#### **Prior to each participant:**

- Reset application
- Start session recordings with *Go To Meeting*  
! Verify the *Go To Meeting* folder is on a local drive and a folder you can easily locate

#### **Prior to starting testing**

- Verify the participants identity and match them on the schedule
- Assign the participant ID
- Review the NDA and Informed consent form and have the participant sign the form
- Provide the remote link and test credentials to the participant to verify they are able to log in remotely.
- Walk the participant through enabling the ActiveX control to make sure they can log in.
- Ask the participant if they have the test data reference sheet printed.

#### **Prior to each task:**

- Reset application to starting point for next task

#### **After each participant:**

- End session recordings with *Go To Meeting*

#### **After all testing**

- Back up all video and data files

#### **Upon completion of testing with each participant:**

- Provide payment to participant
- Obtain Acknowledgement of Receipt

**Prior to starting the session, provide a brief overview of the new functionality in [Guidelines for the reference link](#).**

**\* Start recording**

### **Orientation (5 minutes)**

Thank you for participating in this study. Our session today will last approximately 60 minutes. During that time you will take a look at the new version of gGastro, and specifically some functionality and tasks required for Meaningful Use Certification. Most of these tasks you are already familiar with and they are part of your day to day workflows.

I will ask you to complete the tasks using the system and answer some questions. We are interested in how easy (or how difficult) this system is to use, and how we could improve it. You will be asked to complete these tasks on your own trying to do them as quickly as possible with the fewest possible steps, errors or deviations. Do not do anything more than asked. If you get lost or have difficulty I cannot answer or help you with anything to do with the system itself, but I can remind you the test data or the task itself if you need me to repeat it. Please save your detailed comments until the end of a task or the end of the session as a whole when we can discuss freely. Please be honest with your opinions.

The product you will be using today is gGastro version 4.52, test environment. This is not the final release. Some of the data may not make sense as it is test data.

We are recording the audio and video of our session today using Go To Meeting. All of the information that you provide will be kept confidential and your name will not be associated with your comments and overall test results at any time.

Do you have any questions or concerns?

### **TASK Administration and Documentation**

For each task, take the participant to the starting point, provide the *Individual Task Instructions* outlined below and use the provided excel spreadsheet to complete the following information:

- A. Success:
  - 1= Easily completed
  - 2 = Completed with difficulty (Provide details)
  - 3 = Not completed
  
- B. Rating:
  - 1 = “Very Easy”
  - 5 = “Very Difficult”

C. Administrator Comments

**Individual Task Instructions**

Provide the login information and the Patient name that will be used for testing. These will be the same for all tasks. Each task needs to start at My activities page (right after the user logs in).

**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. We will start each task from the MY Activities screen.**

**We Will use the same login information and the same patient. We have an appointment for this patient on your schedule.**

**Let’s begin:**

**Provider Tasks**

1	Review Clinical Decision support recommendations and reference information	View the patient chart (MRN 123) Review the reference information provided for the recommendation. Suppress the alert for the rest of the day.	Rate on scale from 1 to 5 Comments/feedback?  Return to My Activities
2	Use Computerized physician order entry (CPOE) to create a Medication order	Prescribe Medication: <i>Omeprazole 20 mg tablet by mouth once daily. Send electronically. Use Handy’s Pharmacy.</i>	Rate on scale from 1 to 5 Comments/feedback?  Return to My Activities
3	Use (CPOE) to view and modify a Medication order	View the medication and modify the order to <i>Omeprazole 40 mg tablet by mouth once daily</i>	Rate on scale from 1 to 5 Comments/feedback?  Return to My Activities
4	Use CPOE to create a Lab order	Add the following Laboratory Order: <i>Cholesterol in HDL in serum or plasma</i>	Rate on scale from 1 to 5 Comments/feedback?  Return to My Activities
5	Use CPOE to view and modify a Lab order	View the Lab order and Modify <i>Cholesterol in HLD.....To Cholesterol in LDL in serum or plasma</i>	Rate on scale from 1 to 5 Comments/feedback?  Return to My Activities
6	Use CPOE to create a Diagnostic study order	Add the following Dx Study (Radiology/Imaging) Orders: <i>CT scan abdomen with contrast</i>	Rate on scale from 1 to 5 Comments/feedback?  Return to My Activities
7	Use CPOE to view and modify a Diagnostic study order	View and Modify <i>CT scan abdomen with contrast to CT scan abdomen with and without contrast</i>	Rate on scale from 1 to 5 Comments/feedback?  Return to My Activities
8	Create drug-drug interventions prior to order completion	Prescribe <i>Advicor</i> for the patient. Then Prescribe <i>Sporanox</i> . (these drugs are	Rate on scale from 1 to 5 Comments/feedback?

		contraindicated). Suppress the alert to continue prescribing.	Return to My Activities
9	Drug-allergy interaction	Add a patient allergy: <i>Penicillin</i> and then prescribe <i>Keflex</i> . Suppress the alert to continue prescribing.	Rate on scale from 1 to 5 Comments/feedback?  Return to My Activities
10	Record active medications.	Record as existing medications: <i>Nexium 40 mg tablet by mouth once daily</i>	Rate on scale from 1 to 5 Comments/feedback?  Return to My Activities
11	access patient's active medications list and change a medication	Review recorded medications and update: <i>The frequency of Nexium from daily to every six hours</i>	Rate on scale from 1 to 5 Comments/feedback?  Return to My Activities
12	Record patient's active medication allergy.	Record allergy: <i>Potassium, manifestation: Nausea</i>	Rate on scale from 1 to 5 Comments/feedback?  Return to My Activities
13	Access patient's active medication allergies list and change the allergy info	Modify Potassium: <i>Change manifestation to rash</i>	Rate on scale from 1 to 5 Comments/feedback?  Return to My Activities

#### MA/Nurse tasks

1	Review Clinical Decision support recommendations and reference information	View the patient chart (MRN 456) Review the reference information provided for the recommendation. Suppress the alert for the rest of the day.	Rate on scale from 1 to 5 Comments/feedback?  Return to My Activities
2	Use Computerized physician order entry (CPOE) to create a Medication order	Prescribe Medication: <i>Omeprazole 20 mg tablet by mouth once daily. Send electronically. Use Handy's Pharmacy.</i>	Rate on scale from 1 to 5 Comments/feedback?  Return to My Activities
3	Use (CPOE) to view and modify a Medication order	View the medication and modify the order to <i>Omeprazole 40 mg tablet by mouth once daily</i>	Rate on scale from 1 to 5 Comments/feedback?  Return to My Activities
4	Use CPOE to create a Lab order	Add the following Laboratory Order: <i>Cholesterol in HDL in serum or plasma</i>	Rate on scale from 1 to 5 Comments/feedback?  Return to My Activities
5	Use CPOE to view and modify a Lab order	View the Lab order and Modify <i>Cholesterol in HLD.....To Cholesterol in LDL in serum or plasma</i>	Rate on scale from 1 to 5 Comments/feedback?  Return to My Activities
6	Use CPOE to create a Diagnostic study order	Add the following Dx Study (Radiology/Imaging) Orders:	Rate on scale from 1 to 5 Comments/feedback?

		<i>CT scan abdomen with contrast</i>	Return to My Activities
7	Use CPOE to view and modify a Diagnostic study order	View and Modify <i>CT scan abdomen with contrast to CT scan abdomen with and without contrast</i>	Rate on scale from 1 to 5 Comments/feedback?  Return to My Activities
8	Create drug-drug and interventions prior to order completion	Prescribe <i>Advicor</i> for the patient. Then Prescribe <i>Sporanox</i> . (these drugs are contraindicated). Suppress the alert to continue prescribing.	Rate on scale from 1 to 5 Comments/feedback?  Return to My Activities
9	Drug-allergy interaction	Add a patient allergy: <i>Penicillin</i> and then prescribe <i>Keflex</i> . Suppress the alert to continue prescribing.	Rate on scale from 1 to 5 Comments/feedback?  Return to My Activities
10	Record active medications.	Record as existing medications: <i>Nexium 40 mg tablet by mouth once daily</i>	Rate on scale from 1 to 5 Comments/feedback?  Return to My Activities
11	access patient's active medications list and change a medication	Review recorded medications and update: <i>The frequency of Nexium from daily to every six hours</i>	Rate on scale from 1 to 5 Comments/feedback?  Return to My Activities
12	Record patient's active medication allergy.	Record allergy: <i>Potassium, manifestation: Nausea</i>	Rate on scale from 1 to 5 Comments/feedback?  Return to My Activities
13	Access patient's active medication allergies list and change the allergy info	Modify Potassium: <i>Change manifestation to rash</i>	Rate on scale from 1 to 5 Comments/feedback?  Return to My Activities
14	Reconcile the medications, allergies and problems from a received CCDA document into the patient's chart.	<i>Access the patient's chart and reconcile the information from the Patient Summary Record.</i>	Rate on scale from 1 to 5 Comments/feedback?  Return to My Activities

#### Administrator tasks

1	Adjust a drug/drug interaction level for all users		Rate on scale from 1 to 5 Comments/feedback? 12 sec 1 Return to Configurations
---	--	--	--

2	Grant/revoke permission from a group of users to adjust drug/drug interaction level	Adjust the permission for Non-clinical role not to be able to adjust drug-drug interaction level	Rate on scale from 1 to 5 Comments/feedback? 30 sec to give 2 Would help to have some explanation on what the roles do Return to My Activities
3	Configure a single occurrence guideline based on: Problem list, Lab tests and results, age	Guideline title: test1 Use generic wording for “Test diagnosis”, Test Lab > 5 ,and select age 50-80	Rate on scale from 1 to 5 Comments/feedback? 1 1m30sec Config on timeframe (e.g. seasonal for vaccines) Return to My Activities
4	Configure a single occurrence guideline based on: Medication list and Allergy list	Guideline title: test2 Use generic wording for “Test medication” and “Test Allergy”	Rate on scale from 1 to 5 Comments/feedback?  Return to My Activities
5.	Configure a recurrent guideline based on: Vital signs and identify Diagnostic and Therapeutic reference info	Guideline title: test 3 Use generic wording for “Test reference” as the Source, use “Test citation” for citation, enter 2013 as reference release date. Frequency: every 5 years Vital signs – BMI 30-35	Rate on scale from 1 to 5 Comments/feedback?  Return to My Activities

### Final Questions (5 Minutes)

- What is your overall impression of the functionality under test?
- What is your overall impression of the system?
- What aspects of the system do you like most?
- What aspects of the system do you like least?
- Compare this system to other systems you have used (if any)

*Administer the System Usability Scale Questionnaire*

**\* Stop the recording after the Questionnaire**

## Appendix E

### System Usability Scale Questionnaire

Participant number: \_\_\_\_\_

Date: \_\_\_\_\_

	Strongly Agree					Strongly Disagree				
1. I found the tasks were easy to identify and perform based on the amount of training received.	1	2	3	4	5					
2. I found the system unnecessarily complex	1	2	3	4	5					
3. I thought the system was easy to use	1	2	3	4	5					
4. I think that I would need the support of a technical person to be able to use this system	1	2	3	4	5					
5. I found the various functions in this system were well integrated	1	2	3	4	5					
6. I thought there was too much inconsistency in this system	1	2	3	4	5					
7. I would imagine that most people would learn to use this system very quickly	1	2	3	4	5					
8. I found the system very cumbersome to use	1	2	3	4	5					
9. I felt very confident using the system	1	2	3	4	5					
10. I needed to learn a lot of things before I could get going with this system	1	2	3	4	5					

*NOTE: The scale of 1 to 5 was reversed (1 meaning strongly agree, instead of disagree). For SUS calculations, the scale was adjusted to mirror the SUS scale in Brooke's paper, to accurately reflect the score formula.*

## Appendix F

### Acknowledgement of Payment Receipt

I hereby acknowledge receipt of \$\_\_\_\_\_ *gift card* for my participation in a Usability Testing research study run by *gMed, Inc.*

Printed Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Usability Researcher: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_