

# **EHR Usability Test Report of P.A.G.R. Prescriptions Version 1.2**

*Report based on NISTIR 7742*

EirSystems Inc. P.A.G.R. Prescriptions Version 1.2

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## EXECUTIVE SUMMARY

A usability test of P.A.G.R. Prescriptions Version 1.2 e-prescribing software was conducted on 05/05/2023 at 100 W MLK BLVD Chattanooga, TN 37403 by EirSystems Inc. The purpose of this test was to test and validate the usability of the current user interface and provide evidence of usability in the E-Prescribe Under Test (EPRUT). During the usability test, 10 healthcare providers matching the target demographic criteria served as participants and used the EPRUT in simulated, but representative tasks. This study collected performance data on 5 tasks typically conducted on an E-Prescribe platform:

- Prescriber changes drug due to pharmacy being out of stock
- Prescriber refills drug
- Prescriber cancels a prescription
- Prescriber views medication history of patient
- Prescriber denies a renew request from the pharmacy

EirSystems followed the UCD standard of NISTIR 7741 to conduct its testing.

Name; NISTIR 7741

Description: NIST guidance for developing electronic health record (EHR) applications.

Citation: NIST Interagency/Internal Report (NISTIR) – 7741 /

<https://doi.org/10.6028/NIST.IR.7741>

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

The administrator introduced the test and instructed participants to complete a series of tasks (given one at a time) using the EPRUT. During the testing, the administrator timed the test and,

along with the data logger(s) recorded user performance data on paper and electronically. The administrator did not give the participant assistance in how to complete the task.

Participant screens, head shots and audio were recorded for subsequent analysis. The following types of data were collected for each participant:

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

All participant data was de-identified – no correspondence could be made from the identity of the participant to the data collected. Following the conclusion of the testing, participants were asked to complete a post-test questionnaire and were not compensated 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 EPRUT.

Following is a summary of the performance and rating data collected on the EPRUT.

Task	Number	Task Success	Path Deviation	Task Time	Task Time	Errors	Task Rating
Name	Number	Mean / Standard deviation	Deviations (observed/optimal)	Mean/standard deviation	Deviations (observed/optimal)	Mean / standard deviation	Mean (1 - 100)/standard deviation
B.3.1 - Prescriber changes drug due to pharmacy being out of stock	10	100 / 100	4/4	28 / 29	28 / 22	0 / 0	93/1
B.3.2 - Prescriber refills drug	10	100 / 100	3/3	13 / 4	13 / 10	0 / 0	98/8
B.3.3 - Prescriber cancels a prescription	10	100 / 100	3/3	10 / 10	10 / 7	0 / 0	95/3
B.3.4 - Prescriber views	10	100 / 100	2/2	6 / 5	6 / 4	0 / 0	96/4

medication history							
B.3.5 - Prescriber denies a renew request from the pharmacy	10	100 /100	5/5	19 / 22	19 / 13	0 / 0	91/2

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

1. Prescriber changes drug due to pharmacy being out of stock
  - a. Usability score of 93
2. Prescriber refills drug
  - a. Usability score of 98
3. Prescriber cancels a prescription
  - a. Usability score of 95
4. Prescriber views medication history
  - a. Usability score of 96
5. Prescriber denies a renew request from the pharmacy
  - a. Usability score of 91

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

- **Major findings** – Prescribers had a 100 percent success rate in terms of completing all tasks and scored very highly on the System Usability Scale for all tasks. The interface was easily navigated, and deviation tended to be very low from the standard results. Platform overall performed very efficiently with a high rate of satisfaction from all users.

- **Areas for improvement** – Need to make alerts and notifications clearer or defined for physicians when logging in to the platform. For cancel prescription functionality, have status clearly identified when it is successfully completed. We need to find a way to include over the counter and vitamin supplements to our medical history functionality.

## **INTRODUCTION**

The EPRUT tested for this study was P.A.G.R. Prescriptions Version 1.2. Designed to present medical information to healthcare providers in all physician specialty settings. EPRUT consists of P.A.G.R. Prescriptions Version 1.2 e-prescribing software where the users were prompted to write prescriptions and transact medication history. 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 E-Prescribe Under Test (EPRUT). To this end, measures of effectiveness, efficiency and user satisfaction, such as, such as task success, task path deviation, task time, and task rating were captured during the usability testing.

## **METHOD**

### **PARTICIPANTS**

A total of 10 participants were tested on the EPRUT(s). Participants in the test were physicians. Participants were current users of P.A.G.R. Prescriptions. In addition, participants had no direct connection to the development of or organization producing the EPRUT(s). Participants were not from the testing or supplier organization. Participants were given the opportunity to have the same orientation and level of training as the actual end users would have received. For the test

purposes, end-user characteristics were identified and translated into a recruitment screener used to solicit potential participants; an example of a screener is provided in Appendix 1. Recruited participants had a mix of backgrounds and demographic characteristics conforming to the recruitment screener. 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.

	<b>Part ID</b>	<b>Gender</b>	<b>Age</b>	<b>Education</b>	<b>Occupation/role</b>	<b>Professional Experience</b>	<b>Computer Experience</b>	<b>Product Experience</b>	<b>Assistive Technology Needs</b>
<b>1</b>	P1	Male	49	M.D. J.D	Physician	276	180	12	No
<b>2</b>	P2	Male	62	M.D.	Physician	456	240	48	No
<b>3</b>	P3	Female	54	Bachelor's	Nurse Practitioner	360	192	24	Yes
<b>4</b>	P4	Male	64	M.D.	Physician	480	240	6	Yes
<b>5</b>	P5	Female	35	Bachelor's	Nurse Practitioner	84	120	24	No
<b>6</b>	P6	Female	41	Bachelor's	Nurse Practitioner	180	168	36	No
<b>7</b>	P7	Female	40	Bachelor's	Nurse Practitioner	168	192	36	No
<b>8</b>	P8	Female	47	M.D.	Physician	228	216	1	Yes
<b>9</b>	P9	Male	53	M.D.	Physician	312	240	1	Yes
<b>10</b>	P10	Male	34	M.D.	Physician	72	72	4	No

10 participants (matching the demographics in the section on Participants) were recruited and 10 participated in the usability test. Participants were scheduled for 5-minute sessions with 5 minutes in between each session for debrief by the administrator and a data logger, and to reset systems to proper test conditions. A spreadsheet was used to keep track of the participant schedule and included each participant's demographic characteristics as provided by the recruiting firm.

## 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 e-prescribe platform and/or comparison with other e-prescribe platforms, 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 E-prescribe platform. Each participant used the system in the same location 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 verbalizations
- Participant's satisfaction ratings of the system

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



## TASKS

A number of tasks were constructed that would be realistic and representative of the kinds of activities a user might do with this EHR, including:

- Prescriber changes drug due to pharmacy being out of stock
- Prescriber refills drug
- Prescriber cancels a prescription
- Prescriber views medication history
- Prescriber denies a renew request from the pharmacy

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

## PROCEDURES

Upon arrival, participants were greeted; their identity was verified and matched with a name on the participant schedule. Participants were then assigned a participant ID. Each participant reviewed and signed an informed consent and release form (See Appendix 3). A representative from the test team witnessed the participant's signature. To ensure that the test ran smoothly, two staff members participated in this test, the usability administrator and the data logger. The usability testing staff conducting the test was experienced usability practitioners with 6 years of experience in the healthcare field and both receiving their bachelor's degree in science. 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. A second person served as the data logger and took notes on task success, path deviations, number and type of errors, and comments.

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

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

For each task, the participants were given a written copy of the task. Task timing began once the administrator finished reading the question. The task time was stopped once the participant indicated they had successfully completed the task. Scoring is discussed below in Section 3.9. Following the session, the administrator gave the participant the post-test questionnaire (e.g., the System Usability Scale, see Appendix 5), compensated them for their time, and thanked everyone for their participation. Participants' demographic information, task success rate, time on task, errors, deviations, verbal responses, and post-test questionnaire were recorded into a spreadsheet.

#### TEST LOCATION

All testing was done via Zoom with the participant's screen being shared for the administrators to record all tasks being performed. The administrators were located at their office in Chattanooga, TN, and the providers were located at their respective physician offices.

#### TEST ENVIRONMENT

The EPRUT would typically be used in a healthcare office or facility. In this instance, the testing was conducted in the offices of the respective participant and the administrators were located at their head office in Chattanooga, TN. For testing, the

participants used a laptop either using Mac or Windows operating systems. The participants used their keyboard and mouse pad when interacting with the EPRUT. The EPRUT used the UI of the P.A.G.R Prescriptions doctor portal to present the information and would be accessible through a web browser. The application was set up by EirSystems Inc according to the vendor's documentation describing the system set-up and preparation. The application itself was running on a MacBook Pro using a test environment on a HTTPS connection.

Technically, the system performance (i.e., response time) was representative 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
2. Moderator's Guide
3. Post-test Questionnaire

Examples of these documents can be found in Appendices 3-5 respectively. The Moderator's Guide was devised to be able to capture required data. The participant's interaction with the EPRUT was captured and recorded digitally with screen capture software running on the test machine. A web camera recorded each participant's facial expressions synced with the screen capture, and verbal comments were recorded with a microphone. The test session was electronically transmitted to a nearby observation room where the data logger observed the test session.

## PARTICIPANT INSTRUCTIONS

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

*Thank you for participating in this study. Your input is very important. Our session today will last about 30 minutes. During that time you will use an instance of an electronic health record. 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 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 the EHR and as their first task, were given time (10 minutes) to explore the system and make comments. 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. <sup>9</sup> I will ask you your impressions about the task once you are done.*

Participants were then given 5 tasks to complete. Tasks are listed in the moderator's guide in Appendix [B4].

## USABILITY METRICS

According to the *NIST Guide to the Processes Approach for Improving the Usability of Electronic Health Records*, e-prescribe platforms 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 EPRUT by measuring participant success rates and errors
2. Efficiency of EPRUT by measuring the average task time and path deviations
3. Satisfaction of EPRUT by measuring the participants ease of use on a scale of 1 through 5

## DATA SCORING

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

Measures	Rationale and Scoring
<p><b>Effectiveness:</b> Task Success</p>	<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 that allows some time buffer because the participants are presumably not trained to expert performance. Thus, if expert, optimal performance on a task was 30 seconds then allotted task time performance was <math>30 * 1.25</math> seconds. This ratio should be aggregated across tasks and reported with mean and variance scores.</p>
<p><b>Effectiveness:</b> Task Failures</p>	<p>If the participant abandoned the task, did not reach the correct answer or performed it incorrectly, or reached the end of the allotted time before successful completion, the task was counted as an “Failures.” No task times were taken for errors.</p> <p>The total number of errors was calculated for each task and then divided by the total number of times that task was attempted. Not all deviations would be counted as errors. This should also be expressed as the mean number of failed tasks per participant.</p> <p>On a qualitative level, an enumeration of errors and error types should be collected.</p>
<p><b>Efficiency:</b> Task Deviations</p>	<p>The participant’s path (i.e., steps) through the application was recorded. Deviations occur if the participant, for example, went to a wrong screen, clicked on an incorrect menu item, followed an incorrect link, or interacted incorrectly with an on-screen control. This path was compared to the optimal path. The number of steps in the observed path is divided by the number of optimal steps to provide a ratio of path deviation.</p>

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

**Table 1 . Details of how observed data were scored.**

## RESULTS

### DATA ANALYSIS AND REPORTING

The results of the usability test were calculated according to the methods specified in the Usability Metrics section above. Participants who failed to follow session and task instructions had their data excluded from the analyses. No participants had their data excluded in this study. The score is a relative benchmark that is used against other iterations of the system. Some irregularities that occurred during testing was if the participant had bad internet connection and the screen was lagging which gave the impression that more time was needed to complete the tasks, or they did not fully

comprehend the directions told to them. The usability testing results for the EPRUT are detailed below (see Table 1) The results should be seen considering the objectives and goals outlined in Section 3.2 Study Design. The data should yield actionable results that, if corrected, yield material, positive impact on user performance.

Task	Number	Task Success	Path Deviation	Task Time	Task Time	Errors	Task Rating
Name	Number	Mean / Standard deviation	Deviations (observed/ optimal)	Mean/ standard deviation	Deviations (observed/ optimal)	Mean / standard deviation	Mean (1 - 100)/ standard deviation
B.3.1 -Prescriber changes drug due to pharmacy being out of stock	10	100 / 100	4/4	28 / 29	28 / 22	0 / 0	93/1
B.3.2 - Prescriber refills drug	10	100 / 100	3/3	13 / 4	13 / 10	0 / 0	98/8
B.3.3 - Prescriber cancels a prescription	10	100 /100	3/3	10 / 10	10 / 7	0 / 0	95/3
B.3.4 -Prescriber views medication history	10	100 / 100	2/2	6 / 5	6 / 4	0 / 0	96/4
B.3.5 -Prescriber denies a renew request from the pharmacy	10	100 /100	5/5	19 / 22	19 / 13	0 / 0	91/2

The results from the SUS (System Usability Scale) scored the subjective satisfaction with the system based on performance with these tasks to be: 93, 98, 95, 96, 91.



Broadly interpreted, scores under 60 represent systems with poor usability; scores over 80 would be considered above average.

#### DISCUSSION OF THE FINDINGS

The overall usability study of the EirSystems P.A.G.R. Prescriptions platform scored high in terms of effectiveness and efficiency for provider's while providing input on where the product can be improved. The system usability scores were all above 80 signaling an above average score for the effectiveness of the product. The standard deviation of the 5 tasks performed were all less than 3 which translates to a high level of efficiency for all providers that were tested. The overall satisfaction with the product also remained high as the average satisfaction rating for each task was a 93. Most of the providers thought the software had an intuitive workflow that did not need much time to be trained on no matter what level of experience the user had. With improved training manuals to help guide the user through the workflow and explain what some of our advance features offer, the EirSystems platform could be improved to score higher on the satisfaction rating and reduce the time it takes to perform each task.

**EFFECTIVENESS** – Overall, the platform was very effective based on the high system usability scale scores of 93, 98,95,96, 91 for all five tasks performed by the medical providers. The task completion percentage was 100% for all five tasks, which shows the platform is practical and easy to use for users with a wide range of experience levels on the P.A.G.R. platform. The deviation was very low for most tasks, with only b.3.2 showing a standard deviation of 8 on the system usability score and 7 on task steps taken. All other tasks had a standard deviation of less than 4.

**EFFICIENCY** – Based on the observations of the task time and deviation data, our platform was shown to be very efficient to use and perform the tasks asked of the medical providers. The medical providers had a standard deviation of less than 3 for all 5 of the

tasks asked of them, which shows a high level of efficiency and a low level of deviation for prescribers of all experience levels on the P.A.G.R. platform. The platform was easily navigable with all tasks being completed very quickly and efficiently when in the prescribing workflow of the platform.

**SATISFACTION** – Overall our satisfaction rate was very high, with an average score of 93 for b.3.1, 98 for b.3.2, 95 for b.3.3, 96 for b.3.4 and 91 for b.3.5. The users found the navigation of the user interface to be very easy to follow and understand. This was uniform across all users regardless of experience and time spent on the P.A.G.R. platform. The users all said the platform was intuitive and the tasks were clearly identifiable on the platform. There were minor problems with the “prescriber refills drug” task with an average score of 91. This was due to some user having trouble initiating the process from the current medications inbox when prescribing. This was not a problem for users with a higher amount of experience on our platform, but for newer users that had not become familiar with the system yet. This has helped us provide better training videos when first logging into the platform so we can highlight this feature for all new users.

**MAJOR FINDINGS** – We found that users had very high satisfaction rates and our product was easy to navigate for users of all experience levels. They liked the way the interface was laid out and were able to understand the workflow processes. There were a few minor workflow issues where sometimes buttons took longer to locate and clicking the correct feature sometimes led to longer times to complete the test tasks. Physicians had an easy time understanding the platform’s advanced features and overall, all reported a positive experience. The deviation of every task except for b.3.2 was under 4 seconds, which shows us that the experience for most users was uniform in terms of difficulty and steps taken to complete the given tasks. We found that users with more experience with e-prescribe platforms and computer experience had higher satisfaction and faster times when completing the tasks. EirSystems Inc was very happy with the findings and now have a better understanding of the physician user experience on our platform.

**AREAS FOR IMPROVEMENT** – Newer users had slightly longer times when completing the test tasks during our review. This shows that our training materials can be improved to make for a more seamless transition for new users to understand the nuances of our platform better. We had a 100 percent success rate when completing all tasks which speaks to the ease of navigation of the platform when performing tasks, but time can still be saved by making certain features stand out more though enlarging buttons, cutting clicks, and making color changes to make them easier to spot. This will allow our product to be more efficient and helpful to all physicians who use our platform.

# APPENDICES

1: Recruiting screener

2: Participant demographics

3: Non-Disclosure Agreement (NDA) and  
Informed Consent Form

4: Moderator's Guide

5: System Usability Scale Questionnaire

## Appendix 1: RECRUITING SCREENER

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

### **Recruiting Script for Recruiting Firm**

Hello, my name is Tyler Seaberg, calling from EirSystems Inc. We are recruiting individuals to participate in a usability study for an electronic health record. We would like to ask you a few questions to see if you qualify and if would like to participate. This should only take a few minutes of your time. This is strictly for research purposes. If you are interested and qualify for the study, you will be paid to participate.

Can I ask you a few questions?

1. Have you participated in a focus group or usability test in the past *12 months*?
2. Do you, or does anyone in your home, work in marketing research, usability research, web design?
3. Do you, or does anyone in your home, have a commercial or research interest in an electronic health record software or consulting company?

4. Which of the following best describes your age?
5. Which of the following best describes your race or ethnic group?
6. Do you require any assistive technologies to use a computer?

### **Professional Demographics**

7. What is your current position and title? (Must be healthcare provider)
  - ⑤ RN: Specialty \_\_\_\_\_
  - ⑤ Physician: Specialty \_\_\_\_\_
  - ⑤ Resident: Specialty \_\_\_\_\_
  - ⑤ Administrative Staff
  - ⑤ Other
8. How long have you held this position?
9. Describe your work location (or affiliation) and environment?
10. Which of the following describes your highest level of education?

### **Computer Expertise**

11. Besides reading email, what professional activities do you do on the computer?
12. About how many hours per week do you spend on the computer?
13. What computer platform do you usually use?
14. What Internet browser(s) do you usually use?
15. In the last month, how often have you used an electronic health record?
16. How many years have you used an electronic health record?
17. How many EHRs do you use or are you familiar with?
18. How does your work environment use patient records?
  - ⑤ On paper
  - ⑤ Some paper, some electronic
  - ⑤ All electronic

### **Contact Information**

Those are all the questions I have for you. Your background matches the people we're looking for. Would you be able to participate on 05/05/2023 at 12pm EST?

**May I get your contact information?**

- ③ Name of participant:
- ③ Address:
- ③ City, State, Zip:
- ③ Daytime phone number:
- ③ Evening phone number:
- ③ Alternate [cell] phone number:
- ③ Email address:

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

This study will take place at your office location and EirSystems will be located at their office on 100 W MLK BLVD suite 717, Chattanooga, TN. I will confirm your appointment a couple of days before your session and provide you with directions to our office. What time is the best time to reach you?

## Appendix 2: PARTICIPANT DEMOGRAPHICS

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

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

### **Gender**

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Men	[5]
Women	[5]
Total (participants)	[10]

### **Occupation/Role**

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RN/BSN	[4]
Physician	[6]
Admin Staff	[0]
Total (participants)	[10]

### **Years of Experience**

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Years experience	[218]
Facility Use of EHR	
All paper	[0]
Some paper, some electronic	[0]
All electronic	[10]
Total (participants)	[10]

*As an appendix to the report, the full participant breakdown (de-identified) should be included.*



Appendix 3: NON-DISCLOSURE AGREEMENT AND INFORMED CONSENT FORM

*These are sample forms. The non-disclosure agreement is discretionary. Other examples may be found at [www.usability.gov](http://www.usability.gov).*

**Non-Disclosure Agreement**

THIS AGREEMENT is entered into as of May 5, 2023 between

PARTICIPANT NAME (“the Participant”) and the testing organization *EirSystems Inc located at 100 W MLK BLVD suite 717, Chattanooga, TN.*

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 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**

*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. 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 *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 and release of the videotape by *Test Company*. I understand that the information and videotape 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 videotape and understand the videotape may be copied and used by *Test Company* 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 *Test Company* and *Test Company's* client. 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:**

- ⑤ YES, I have read the above statement and agree to be a participant.
- ⑤ NO, I choose not to participate in this study.

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

## ***EPRUT* Usability Test**

### **Moderator's Guide**

**Administrator** Tyler Seaberg  
**Data Logger:** Ryan Seaberg

**Date** 05/05/2023

**Time** 12:00pm EST

**Participant #** 1-10

**Location** 100 W MLK BLVD Suite 717, Chattanooga, TN 37403

#### Prior to testing

- ③ Confirm schedule with Participants
- ③ Ensure EPRUT lab environment is running properly
- ③ Ensure lab and data recording equipment is running properly

#### Prior to each participant:

- ③ Reset application
- ③ Start session recordings with *tool*

#### Prior to each task:

- ③ Reset application to starting point for next task

#### After each participant:

- ③ End session recordings with *tool*

#### After all testing

- ③ Back up all video and data files
-

## **Orientation (5 minutes)**

Thank you for participating in this study. Our session today will last **30 minutes**. During that time you will take a look at an electronic health record system.

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

I did not have any involvement in its creation, so please be honest with your opinions.

The product you will be using today is *P.A.G.R. Prescriptions version 1.2*. . Some of the data may not make sense as it is placeholder data.

We are recording the audio and screenshots of our session today. All of the information that you provide will be kept confidential and your name will not be associated with your comments at any time.

Do you have any questions or concerns?

## **Preliminary Questions (5 minutes)**

---

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.

**1: First Impressions (60 Seconds)**

This is the application you will be working with. Have \_\_\_\_\_  
you heard o it? Yes No If so, tell me what you know about it.

③ *Show test participant the EPRUT.*

③

③ Please don't click on anything just yet. What do you notice? What are you able to do here? Please be specific.

*Notes / Comments:*

**2: Prescriber changes drug due to pharmacy being out of stock (20 seconds)**

*Take the participant to the starting point for the task.*

You just received a message that the drug you prescribed is out of stock from the pharmacy and they asked you to change it. 170.315(b)(3)

**Success:**

- ⑤ Easily completed
- ⑤ Completed with difficulty or help :: Describe below
- ⑤ Not completed *Comments:*

**Task Time:** 22 Seconds

**Optimal Path:** *Screen A ↗ Screen B ↗ Drop Down B<sup>1</sup> ↗ “OK” Button ↗ Screen X...*

- ⑤ Correct
  - ⑤ Minor Deviations / Cycles :: Describe below
  - ⑤ Major Deviations :: Describe below
- Comments:*

**Observed Errors and Verbalizations:**

*Comments:*

**Rating:**

Overall, this task was: \_\_\_\_

*Show participant written scale: “Very Difficult” (1) to “Very Easy” (5)*

**Administrator / Notetaker Comments:**

### 3: Prescriber Refills a Drug (10 seconds)

*Take the participant to the starting point for the task. Hover over one of the medications in the patient's list. You will see a green refill button appear and this is where you will begin the task. 170.315(b)(3)*

**Success:**

- ⑤ Easily completed
- ⑤ Completed with difficulty or help :: Describe below
- ⑤ Not completed *Comments:*

**Task Time:** 10 Seconds

**Optimal Path:** *Screen A ⇨ Screen B ⇨ Drop Down B<sup>1</sup> ⇨ "OK" Button ⇨ Screen X...*

- ⑤ Correct
  - ⑤ Minor Deviations / Cycles :: Describe below
  - ⑤ Major Deviations :: Describe below
- Comments:*

**Observed Errors and Verbalizations:**

*Comments:*

**Rating:**

Overall, this task was: \_\_\_\_

*Show participant written scale: "Very Difficult" (1) to "Very Easy" (5)*

**Administrator / Notetaker Comments:**



#### 4: Prescriber Cancels a Drug (30 seconds)

*Take the participant to the starting point for the task. Hover over one of the medications in the patient's list. You will see a red cancel button appear and this is where you will begin the task. 170.315(b)(3)*

**Success:**

- ⑤ Easily completed
- ⑤ Completed with difficulty or help :: Describe below
- ⑤ Not completed *Comments:*

**Task Time:** 7 Seconds

**Optimal Path:** *Screen A ⇨ Screen B ⇨ Drop Down B<sup>1</sup> ⇨ "OK" Button ⇨ Screen X...*

- ⑤ Correct
  - ⑤ Minor Deviations / Cycles :: Describe below
  - ⑤ Major Deviations :: Describe below
- Comments:*

**Observed Errors and Verbalizations:**

*Comments:*

**Rating:**

Overall, this task was: \_\_\_\_

*Show participant written scale: "Very Difficult" (1) to "Very Easy" (5)*

**Administrator / Notetaker Comments:**

## 5: Prescriber Views Medication History (30 seconds)

*Take the participant to the starting point for the task. By clicking search patient you will be prompted to search for a patient and have several data fields available to search. Once you get on this screen this is where we will begin the task. 170.315(b)(3)*

### Success:

- ⑤ Easily completed
- ⑤ Completed with difficulty or help :: Describe below
- ⑤ Not completed *Comments:*

**Task Time:** 4 Seconds

**Optimal Path:** *Screen A ⇄ Screen B ⇄ Drop Down B<sup>1</sup> ⇄ “OK” Button ⇄ Screen X...*

- ⑤ Correct
  - ⑤ Minor Deviations / Cycles :: Describe below
  - ⑤ Major Deviations :: Describe below
- Comments:*

### Observed Errors and Verbalizations:

*Comments:*

### Rating:

Overall, this task was: \_\_\_\_

*Show participant written scale: “Very Difficult” (1) to “Very Easy” (5)*

### Administrator / Notetaker Comments:

## 6: Prescriber denies a renew request from the pharmacy (30 seconds)

*Take the participant to the starting point for the task. By clicking the envelope icon at the top right on the screen you will see a prescription renew request. Once you find the envelope icon we will start the task. 170.315(b)(3)*

### Success:

- ⑤ Easily completed
- ⑤ Completed with difficulty or help :: Describe below
- ⑤ Not completed *Comments:*

**Task Time:** 19 Seconds

**Optimal Path:** *Screen A ⇨ Screen B ⇨ Drop Down B<sup>1</sup> ⇨ "OK" Button ⇨ Screen X...*

- ⑤ Correct
  - ⑤ Minor Deviations / Cycles :: Describe below
  - ⑤ Major Deviations :: Describe below
- Comments:*

### Observed Errors and Verbalizations:

*Comments:*

### Rating:

Overall, this task was: \_\_\_\_

*Show participant written scale: "Very Difficult" (1) to "Very Easy" (5)*

### Administrator / Notetaker Comments:

### **Final Questions (5 Minutes)**

What was your overall impression of this system?

What aspects of the system did you like most?

What aspects of the system did you like least?

Were there any features that you were surprised to see?

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

Compare this system to other systems you have used.

Would you recommend this system to your colleagues?

*Administer the SUS*

Appendix 5: SYSTEM USABILITY SCALE QUESTIONNAIRE

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

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

1

2

3

4

5



1

2

3

4

5