EHR Usability Test Report of T-System EV 5.1

Dates of Usability Test: September 5th, 2017 through September 13th, 2017
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THE T-SYSTEM®

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EXECUTIVE SUMMARY

Usability tests of T-System EV 5.1 functionality were performed in September of 2017. Testing was performed at T-System's Dallas office, in the training room of building 4040. Test participants included new client end-users with no prior product training or experience and consisting of a representative cross-section of users at the facility. Testing was integrated in train-the-trainer educational activities. The purpose of the testing was to validate the user interface and feature workflow and provide evidence of usability under testing conditions that mimicked "real world", live demands.

During testing, participants were asked to complete 17 tasks:

- Enter demographics for a new patient
- Edit demographic data
- Document home medications
- Edit a home medication
- Strike a home medication
- Document an allergy
- Document a medical problem
- Strike a medical problem
- View drug-drug and drug-allergy alerts
- Delete orders prior to placing
- Place a medication order
- Place a lab order
- Place a diagnostic study order
- Cancel an order
- Document a patient's implantable device
- Deactivate an implantable device
- Import data from a CCDA document

Prior to testing, participants were provided access to the online learning management system and all current learning modules. Participants also received standard train-the-trainer instruction and were provided materials standardly dispersed for train-the-trainer sessions.

Participants were provided scenario(s) to complete that were relevant to functions being certified for Meaningful Use. Education staff evaluators monitored the participants' interaction with the system. Feedback from the participants was elicited in the areas of subjective usability and opportunities for improvement.

Measure / Task	N	Task Success	Path Deviation	Task Time		Errors	Task Ratings 5 = Easy
	#	Mean (SD)	Deviations (Observed / Optimal)	Mean (SD)	Deviations (Observed / Optimal)	Mean (SD)	Mean (SD)
Enter demographics for a new patient	10	100% (0)	3.1 (1.03)	69.8 (9.21)	84 (0.93)	0% (0)	4.8 (0.422)
Edit demographic data	10	100% (0)	3.3 (1.10)	14.5 (15.5)	39 (1.63)	0% (0)	4.7 (0.483)
Document home	10	100% (0)	8.6 (1.08)	78.8 (48.6)	142 (2.37)	0% (0)	5 (0)

medications							
Edit a home medication	10	100% (0)	4 (1.00)	12.7 (4.67)	12.7 (1.00)	0% (0)	5 (0)
Strike a home medication	10	100% (0)	5.1 (1.02)	19.1 (5.32)	30 (1.67)	0% (0)	5 (0)
Document an allergy	10	100% (0)	6.1 (1.02)	28.2 (22.5)	89 (2.97)	0% (0)	5 (0)
Document a medical problem	10	100% (0)	8.3 (1.04)	55.1 (15.07)	68.5 (1.14)	0% (0)	5 (0)
Strike a medical problem	10	100% (0)	5.3 (1.06)	24.5 (11)	38.66 (1.84)	0% (0)	4.7 (0.483)
View drug-drug and drug-allergy alerts	10	100% (0)	7.5 (1.07)	31.5 (75.5)	75.5 (1.68)	0% (0)	4.9 (0.316)
Delete orders prior to placing	10	100% (0)	2.4 (1.2)	25.2 (20.2)	40.75 (2.72)	0% (0)	4.3 (1.06)
Place a medication order	10	100% (0)	12.2 (1.02)	59.5 (31)	144 (2.4)	0% (0)	4.7 (0.48)
Place a lab order	10	100% (0)	9.1 (1.01)	34.6 (15.8)	22 (0.73)	0% (0)	5 (0)
Place a diagnostic study order	10	100% (0)	12.2 (1.02)	50.6 (16.67)	62 (1.38)	0% (0)	5 (0)
Cancel an order	10	100% (0)	7 (1.17)	15.9 (11.7)	15.4 (1.03)	0% (0)	5 (0)
Document a patient's implantable device	10	100% (0)	8 (1.14)	157 (118)	270 (4.50)	0% (0)	3.6 (1.35)
Deactivate an implantable device	10	100% (0)	5 (1.00)	15.4 (12.1)	15.4 (1.00)	0% (0)	5 (0)
Import data from a CCDA document	10	100% (0)	9.2 (1.02)	88 (24.7)	96 (1.07)	0% (0)	4.5 (0.527)

MAJOR FINDINGS

Participants are able to successfully use the EHR in a manner consistent with expectations in the emergency department setting. End-user satisfaction with the modules is very high in all areas, including workflow, UI and ease of use. The evaluators noted some deviations from expected workflow. However these deviations were not critical and did not compromise task completion, acceptable time to task completion or create potential safety issues.

AREAS FOR IMPROVEMENT

The following areas for improvement were identified during these tests. Many of these were offered by participants and evaluators, not as a result of failures or deviations, but out of recognition of ways to reduce clicks, or improve workflow. These items were reported to solution management and/or solution development staff and recorded in an enhancement tracking tool. Items that were identified as opportunities for improvement related to failures or deviations are noted with an asterisk below (*)

1. Entry of date of birth in the demographic section can be improved. Using the tab key allows users to move from field to field within the demographic entry screen, however, to move between month, day, and year the user needs to use the left and right arrow keys rather than using the tab key, as the tab key moves the focus to the next field in the dialog. Several users tried to tab from month to day, only to move the focus to the next field, and then they had to click back on the

birthdate field to complete the entry of the date of birth.

2. The button used to strike a problem and the button used to strike a med or allergy have different labels. The buttons provide the same functionality, but one is labeled “strike” and the other “remove”. Users stated that by using the same label, the action of striking would be more intuitive across these screens.*
3. One tester stated that it would be helpful to be able to see the list of orders selected prior to processing the orders so they could ensure their earlier selections were still populated.
4. Two testers mentioned that it would be helpful to be able to multiselect and delete orders rather than deleting them one at a time.
5. One tester stated that the reason for study list would be easier to use if it filtered as you typed rather than just scrolled to the place in the list that matched what was typed.

Several users stated that it was cumbersome to have to type the implantable devices UID into the entry field since this was a very long text string of numbers, letters, and special characters.

INTRODUCTION

The EHR tested for these studies was T-System EV 5.1. The EHR is designed to support emergency department patient documentation, provider workflow, order entry, discharge management, clinical decision support and departmental reporting. The modules that where the focus of these tests were the modules within the application related to the following Meaningful Use Measures:

- 170.315 (a)(1) Computerized provider order entry – medications
- 170.315 (a)(2) Computerized provider order entry – laboratory
- 170.315 (a)(3) Computerized provider order entry – diagnostic imaging
- 170.315 (a)(4) Drug-drug, drug-allergy interaction checks
- 170.315 (a)(5) Demographics
- 170.315 (a)(6) Problem list
- 170.315 (a)(7) Medication list
- 170.315 (a)(8) Medication allergy list
- 170.315 (a)(14) Implantable device list
- 170.315 (b)(2) Clinical information reconciliation and incorporation

The purpose of these studies is to validate the usability of the user interface. To this end, efficiency, workflow effectiveness and user satisfaction were captured during the usability testing. In addition, opportunities for improvement are identified and logged for future development consideration. Critical (patient safety) defects and workflow risks are also captured and addressed through timely product improvements.

METHOD

PARTICIPANTS

All T-System's EV products are Emergency Department Information System (EDIS) and therefore the primary users of the system are ED nurses and ED physicians; other staff also use the system such has Mid-level providers and Medical Records personnel, in addition to IT and Nursing Education staff. A total of 10 end-users participated in feature testing. Participants included clinical healthcare providers (physicians, nurses and midlevel providers), medical staff professionals, and technical support personnel (IT clinical analysts and other IT professionals). The cross section of individuals that participated in the testing were highly representative of the individuals that use the system on a daily basis to document care within the Emergency Department.

Testing was integrated into new end-user educational activities. This training is administered to new T-System clients prior to installation and implementation of T System EV 5.1. Because these participants were tested during actual end-user training, they received training that is identical to that provided to end-users. The participants were compensated with gift cards by T-System and all expenses related to training and testing are paid for by the client hospital as a part of the EHR implementation fees.

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.

Particpant Number	Gender	Age	Assitive Tech	Position, Title	Years in role	Highest Education	Weekly Computer Use	EHR Usage	EHR Years	# of EHRs	Patient Records
90701	Female	40-59	No	RN, CNO	2	Post Graduate	26+	5x	10	2	Some paper, some electronic
90702	Male	40-59	No	MD, Chief Medical Officer	20	Post Graduate	26+	2x	14	3	Some paper, some electronic
90703	Female	60-74	No	Clinical Nurse Specialist	9	Collage graduate	11-25	2x	12	1	Some paper, some electronic
90704	Male	20-29	No	Nurse	7	Collage graduate	0-10	Daily	7	1	Some paper, some electronic
90705	Female	40-59	No	RN	4	Collage graduate	26+	Daily	4	1	Some paper, some electronic
90706	Male	30-39	No	Administrator	0	Post Graduate	26+	2x	0	0	All Electronic
90707	Female	20-29	No	Nurse	3	Collage graduate	26+	Daily	3	1	Some paper, some electronic
90708	Male	30-39	No	Scribe	2	Collage graduate	26+	Daily	1	5	Some paper, some electronic

90709	Female	30-39	No	Application Analyst	7	Collage graduate	26+	2x	0	3	All Electronic
90710	Female	20-29	No	Clerk	1	Some Collage	26+	Daily	1	1	Some paper, some electronic

STUDY DESIGN

During the usability test, participants interacted with the modules of T System EV 5.1. Each participant used the system in the same location, and was provided with the same instructions. All participants received substantially similar training presentation and identical supporting training materials. After receiving training on tested functionality, participants were asked to complete tasks described to them as the end result (e.g. create a new patient). Specific data for entry was described.

Evaluators include the trainer and additional training staff. The system was evaluated for efficiency, workflow and user satisfaction as defined by evaluator feedback:

- Ability to complete described workflows and data entry with prescribed training
- Ability to complete described workflows and data entry in a timely fashion (consistent with "real world" performance expectations)
- Frequency of deviations from expected workflows
- Participant verbal comments
- Participant suggestions for improvement

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. These tasks and the criteria to which they relate are:

- 170.315 (a)(1) Computerized provider order entry – medications
  - Place a medication order
  - Delete orders prior to placing
- 170.315 (a)(2) Computerized provider order entry – laboratory
  - Place a lab order
  - Cancel an order
- 170.315 (a)(3) Computerized provider order entry – diagnostic imaging
  - Place a diagnostic study order
- 170.315 (a)(4) Drug-drug, drug-allergy interaction checks
  - View drug-drug and drug-allergy alerts
- 170.315 (a)(5) Demographics
  - Enter demographics for a new patient
  - Edit demographic data
- 170.315 (a)(6) Problem list
  - Document a medical problem
  - Strike a medical problem
- 170.315 (a)(7) Medication list
  - Document home medications
  - Edit a home medication
  - Strike a home medication
- 170.315 (a)(8) Medication allergy list

    - Document an allergy
- 170.315 (a)(14) Implantable device list
    - Document a patient's implantable device
    - Deactivate an implantable device
- 170.315 (b)(2) Clinical information reconciliation and incorporation
    - Import data from a CCDA document

These tasks were chosen based upon their expected "real world" frequency of use, criticality of function, and those that are required for users to complete for the tested module to be effective.

PROCEDURE

Upon arrival, participants were greeted and their identity was confirmed with the list of expected participants provided by the client hospital. Participants signed in on an attendance sheet. Participants were provided with a nurse participant guide, provider participant guide and individual logon information for access to the EV application.

A minimum of two education staff members participated in the test. All education staff members participating in the test had received specific training, education or certification in teaching prior to the test. All staff members had undergone supervisor evaluation for their ability to effectively teach product functionality and evaluate the testers' abilities and conformance with test procedures and expected outcomes.

One staff member administered product training (administrator) and other staff members assisted as needed, and on an individual basis with participants during the training process. After product training, the administrator moderated the testing session, providing instructions and tasks. Other staff monitored participants' interaction with the system, monitoring their ability to complete tasks as well as tracking performance against the system evaluation items noted in the study design section above. These staff members also collected participant comments.

Participants were instructed to perform the tasks:

- As quickly as possible making as few errors and deviations as possible.
- With a goal of specific outcomes of the tasks
- Without regard to specific workflow, so long as the task were completed

Following the test, participants were asked to provide feedback on their impressions of usability in an emergency department setting and in the process of providing patient care. Participants were also asked for suggestions for improving feature functionality and/or workflow. Specific comments on patient safety impacts and risks were solicited.

Participants were thanked for their participation. Evaluation forms were provided to each participant soliciting feedback on the education and evaluation process. Some participants moved on to training and testing on other aspect of the product. Those that did not departed the testing facility.

TEST LOCATION

The tests were administered at T-System facilities. The location included an education and evaluation room, separate conference room and a kitchen containing water, other beverages and snacks. Bathroom facilities were provided and were located in a public area of the building.

The training and evaluation room included seating for each participant at a desk providing ample space for hard copies of educational and task materials. Each participant was provided a color computer monitor, keyboard and computer mouse. An elevated podium with a computer connected to an overhead projector was provided for the administrator. The room was configured such that staff evaluators could view participants' faces, computer screens, as well as keyboards and mice.

To ensure that the environment was comfortable for users, noise levels were kept to a minimum with the ambient temperature within a normal range. All of the safety instruction and evacuation procedures were valid, in place, and visible to the participants.

TEST ENVIRONMENT

The EHR is intended for use in emergency departments, urgent care centers and other locations that deliver unscheduled urgent or emergent patient care. The EHR is generally installed at the site, in a client-server configuration. Input devices typically include a keyboard and mouse, although handwriting and voice recognition and touchscreen inputs are supported. For the purposes of training and testing, to minimize distractions, testing was performed in the test location described above.

The participants were provided a color computer screen, keyboard and computer mouse to emulate the common setup in a live environment. The EV testing instance was located on-site, at the T-System offices and was installed in a client-server topology, consistent with the common live environment. Participant computer screens were connected to desktop computers, to which the participants had access, but no need to interact with. Individual thin-client sessions were installed on each local computer in the testing room allowing access to the application. Participants' computers were connected the EV application server via local area network. The application, test environment and live environment are Microsoft Windows environments.

TEST FORMS AND TOOLS

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

1. Sign in sheet
2. Proctor Guide
3. Participant guide
4. Scenario handouts
5. Scribe score sheets
6. Informed Consent document
7. Non-disclosure document
8. System Usability Survey

Examples of some of these documents can be found in the Appendix section

PARTICIPANT INSTRUCTIONS

Following the greeting, the administrator displays slides and reads text to orient the participants to the structure of the educational and evaluation sessions for the day. Participants are provided several hours of training covering the majority of the aspects of the system, including administrative, clinical and reporting functions. Following instructional sessions, participants are provided instructions for the test evaluation scenario.

The administrator reads:

Thank you for participating in this study. Your input is very important. Our session today will last about 60 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 of the information that you provide will be kept confidential and your name will not be associated with your comments at any time. Should you feel it necessary you are able to withdraw at any time during the testing.

Do you have any questions or concerns?

Following the case scenario, participants are asked to debrief, providing feedback on their interaction with the system while completing the scenario. The administrator reads:
"What did you observe as you were working with T SystemEV? (The administrator listens for both positive and negative reactions.)
What did you observe about yourself while working in the system? (The administrator listens for expressed feelings.)
What was easy for you to do in the system? What seemed hard at first for you? What did you begin to think about regarding your home environment as you were working in T SystemEV? (The administrator listens for responses)
On a scale of 1-5 with 1 being very difficult and 5 being very easy, how would you rate this task?

Participants are encouraged to not only verbalize responses, but write the responses in the participant guide provided at the beginning of the session.

Additional patient case scenarios are administered in a similar fashion to ensure all tasks are evaluated.

USABILITY METRICS
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 EV by evaluating participants' ability to complete tasks without assistance
2. Efficiency of EV by evaluating workflow deviations
3. Satisfaction with EV by evaluating participants' ease of use and safety feedback

RESULTS

DATA ANALYSIS AND REPORTING

The following table describes how tasks and errors were evaluated.

Measure	Evaluation Methodology
Effectiveness: Task Success	A task was considered as a "success" if the participant was able to achieve the correct outcome, without assistance. Evaluators reported the frequency for which users, collectively, performed successful tasks as a percentage of all tasks evaluated.
Effectiveness: Task Failure	A task was considered as a "failure" if the participant was unable to achieve the correct outcome, without assistance or abandoned the task. The task was also considered a failure if subjectively the task exceeded a time to complete that was greater than what would be expected, or tolerated in a live environment. Evaluators reported the frequency for which users, collectively, failed to performed successful tasks as a percentage of all tasks evaluated.
Efficiency: Task Deviations	A task was considered "deviated from" if the participant's path (i.e., steps) in demonstrating the task was inconsistent with the expected path. These inconsistencies could include launching the wrong module, interacting with on-screen controls inappropriately or unnecessarily or navigated to the wrong screen or tab. A task could be considered a deviation as well as success or failure simultaneously. Evaluators reported the frequency for which users, collectively, deviated from the anticipated path, regardless of outcome, as a percentage of all tasks evaluated. Deviations are counted as only 0 or 1 (no deviation or any deviation) per task, not as a count of total deviations per task.
Efficiency: Task Time	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. 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.

Satisfaction	Participants' subjective impression of the ease of use of the application and was measured by verbal responses to specific questions asked of them by the administrator as well as any other comments offered.

DISCUSSION OF THE FINDINGS

The table below describes the percentages of success, failures and deviations for the tasks described in the task session above.

Measure / Task	N	Task Success	Path Deviation	Task Time		Errors	Task Ratings 5 = Easy
	#	Mean (SD)	Deviations (Observed / Optimal)	Mean (SD)	Deviations (Observed / Optimal)	Mean (SD)	Mean (SD)
Enter demographics for a new patient	10	100% (0)	3.1 (1.03)	69.8 (9.21)	84 (0.93)	0% (0)	4.8 (0.422)
Edit demographic data	10	100% (0)	3.3 (1.10)	14.5 (15.5)	39 (1.63)	0% (0)	4.7 (0.483)
Document home medications	10	100% (0)	8.6 (1.08)	78.8 (48.6)	142 (2.37)	0% (0)	5 (0)
Edit a home medication	10	100% (0)	4 (1.00)	12.7 (4.67)	12.7 (1.00)	0% (0)	5 (0)
Strike a home medication	10	100% (0)	5.1 (1.02)	19.1 (5.32)	30 (1.67)	0% (0)	5 (0)
Document an allergy	10	100% (0)	6.1 (1.02)	28.2 (22.5)	89 (2.97)	0% (0)	5 (0)
Document a medical problem	10	100% (0)	8.3 (1.04)	55.1 (15.07)	68.5 (1.14)	0% (0)	5 (0)
Strike a medical problem	10	100% (0)	5.3 (1.06)	24.5 (11)	38.66 (1.84)	0% (0)	4.7 (0.483)
View drug-drug and drug-allergy alerts	10	100% (0)	7.5 (1.07)	31.5 (75.5)	75.5 (1.68)	0% (0)	4.9 (0.316)
Delete orders prior to placing	10	100% (0)	2.4 (1.2)	25.2 (20.2)	40.75 (2.72)	0% (0)	4.3 (1.06)
Place a medication order	10	100% (0)	12.2 (1.02)	59.5 (31)	144 (2.4)	0% (0)	4.7 (0.48)
Place a lab order	10	100% (0)	9.1 (1.01)	34.6 (15.8)	22 (0.73)	0% (0)	5 (0)
Place a diagnostic study order	10	100% (0)	12.2 (1.02)	50.6 (16.67)	62 (1.38)	0% (0)	5 (0)
Cancel an order	10	100% (0)	7 (1.17)	15.9 (11.7)	15.4 (1.03)	0% (0)	5 (0)
Document a patient's implantable device	10	100% (0)	8 (1.14)	157 (118)	270 (4.50)	0% (0)	3.6 (1.35)
Deactivate an implantable device	10	100% (0)	5 (1.00)	15.4 (12.1)	15.4 (1.00)	0% (0)	5 (0)
Import data from a CCDA document	10	100% (0)	9.2 (1.02)	88 (24.7)	96 (1.07)	0% (0)	4.5 (0.527)

EFFECTIVENESS
Based on results of this test, all the tasks were completed successfully indicating that with standard, minimal training, users can successfully perform critical tasks that will commonly be required in the live clinical setting.

EFFICIENCY
Deviations, although present and higher than failure rates, are considered acceptable, in part because deviations did not result in unsuccessful completion of tasks. This implies that, although deviations were present, tasks were completed successfully and in an acceptable timeframe. In many cases, these deviations were correctable with minimal education or tasks were completed in slightly less than optimal paths. Opportunities for reducing these deviations are discussed below as logged as opportunities for improvement.

SATISFACTION
In general, participant satisfaction was high. Most of the participants were comfortable with completing the tasks that they were asked to complete.

MAJOR FINDINGS
Participants are able to successfully use the EHR in a manner consistent with expectations in the emergency department setting. End-user satisfaction with the modules is very high in all areas, including workflow, UI and ease of use. The evaluators noted some deviations from expected workflow. However these deviations were not critical and did not compromise task completion, acceptable time to task completion or create potential safety issues.

AREAS FOR IMPROVEMENT
The following areas for improvement were identified during these tests. Many of these were offered by participants and evaluators, not as a result of failures or deviations, but out of recognition of ways to reduce clicks, or improve workflow. These items were reported to solution management and/or solution development staff and recorded in an enhancement tracking tool. Items that were identified as opportunities for improvement related to failures or deviations are noted with an asterisk below (*)

6. Entry of date of birth in the demographic section can be improved. Using the tab key allows users to move from field to field within the demographic entry screen, however, to move between month, day, and year the user needs to use the left and right arrow keys rather than using the tab key, as the tab key moves the focus to the next field in the dialog. Several users tried to tab from month to day, only to move the focus to the next field, and then they had to click back on the birthdate field to complete the entry of the date of birth.
7. The button used to strike a problem and the button used to strike a med or allergy have different labels. The buttons provide the same functionality, but one is labeled “strike” and the other “remove”. Users stated that by using the same label, the action of striking would be more intuitive across these screens.*
8. One tester stated that it would be helpful to be able to see the list of orders selected prior to processing the orders so they could ensure their earlier selections were still populated.
9. Two testers mentioned that it would be helpful to be able to multiselect and delete orders rather than deleting them one at a time.
10. One tester stated that the reason for study list would be easier to use if it filtered as you typed rather than just scrolled to the place in the list that matched what was typed.
11. Several users stated that it was cumbersome to have to type the implantable devices UID into the entry field since this was a very long text string of numbers, letters, and special characters.

APPENDICES

The following pages contain supporting materials referenced in the body of this document.

5.1 De-identified participant list
5.2 System Usability Scale Questionnaire
5.3 Sign in sheet
5.4 Non-Disclosure Form and Informed Consent
5.5 Incentive Receipt and Acknowledgement Form

Appendix 5.1

De-identified Participant List

Particpant Number	Gender	Age	Assitive Tech	Position, Title	Years in role	Highest Education	Weekly Computer Use	EHR Usage	EHR Years	# of EHRs	Patient Records
90701	Female	40-59	No	RN, CNO	2	Post Graduate	26+	5x	10	2	Some paper, some electronic
90702	Male	40-59	No	MD, Chief Medical Officer	20	Post Graduate	26+	2x	14	3	Some paper, some electronic
90703	Female	60-74	No	Clinical Nurse Specialist	9	Collage graduate	11-25	2x	12	1	Some paper, some electronic
90704	Male	20-29	No	Nurse	7	Collage graduate	0-10	Daily	7	1	Some paper, some electronic
90705	Female	40-59	No	RN	4	Collage graduate	26+	Daily	4	1	Some paper, some electronic
90706	Male	30-39	No	Administrator	0	Post Graduate	26+	2x	0	0	All Electronic
90707	Female	20-29	No	Nurse	3	Collage graduate	26+	Daily	3	1	Some paper, some electronic
90708	Male	30-39	No	Scribe	2	Collage graduate	26+	Daily	1	5	Some paper, some electronic
90709	Female	30-39	No	Application Analyst	7	Collage graduate	26+	2x	0	3	All Electronic
90710	Female	20-29	No	Clerk	1	Some Collage	26+	Daily	1	1	Some paper, some electronic

Appendix 5.2

System Usability Scale

T-System, Inc. Version 5.1 Safety Enhanced Design Testing

SYSTEM USABILITY SCALE QUESTIONNAIRE

	Strongly Disagree Agree				Strongly
1. I think that I would like to use this system frequently	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

Appendix 5.3

Sign in Sheet

Class Date: _____ Class Time: _____

	Attendee Name (Please print)	Credentials "MD/RN"	Web-Based Training Completed (✓ below)	Signature
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

Primary Instructor _____

Certified Client Instructor Class
Physician Class
Nurse Class
Clerk Class

Appendix 5.4

Non-disclosure and Informed Consent Forms

NON-DISCLOSURE AGREEMENT AND INFORMED CONSENT FORM

Non-Disclosure Agreement

THIS AGREEMENT is entered into as of September 7th, *2017*, between ("the Participant") and the testing organization *T-System, Inc.* located at *4020 McEwen Dr. Dallas, TX 75244*.

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 *T-System, 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 *T-System, 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 information necessary to provide 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

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

Agreement

I understand and agree that as a voluntary participant in the present study conducted by T-System, Inc. 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 T-System, Inc.

I understand and consent to the use and release of the videotape by T-System, Inc. 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 T-System, Inc. 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 T-System, Inc. and T-System's clients. 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 5.4

INCENTIVE RECEIPT AND ACKNOWLEDGMENT FORM

INCENTIVE RECEIPT AND ACKNOWLEDGMENT FORM

Acknowledgement of Receipt
I hereby acknowledge receipt of *$ [_____]* for my participation in a research study run by *T-System, Inc.*

Printed Name:_____

Address:_____

Signature:_____ Date:_____

Usability Researcher: _____

Signature of Usability Researcher:_____ Date:_____

Witness: _____

Witness Signature:_____ Date:_____