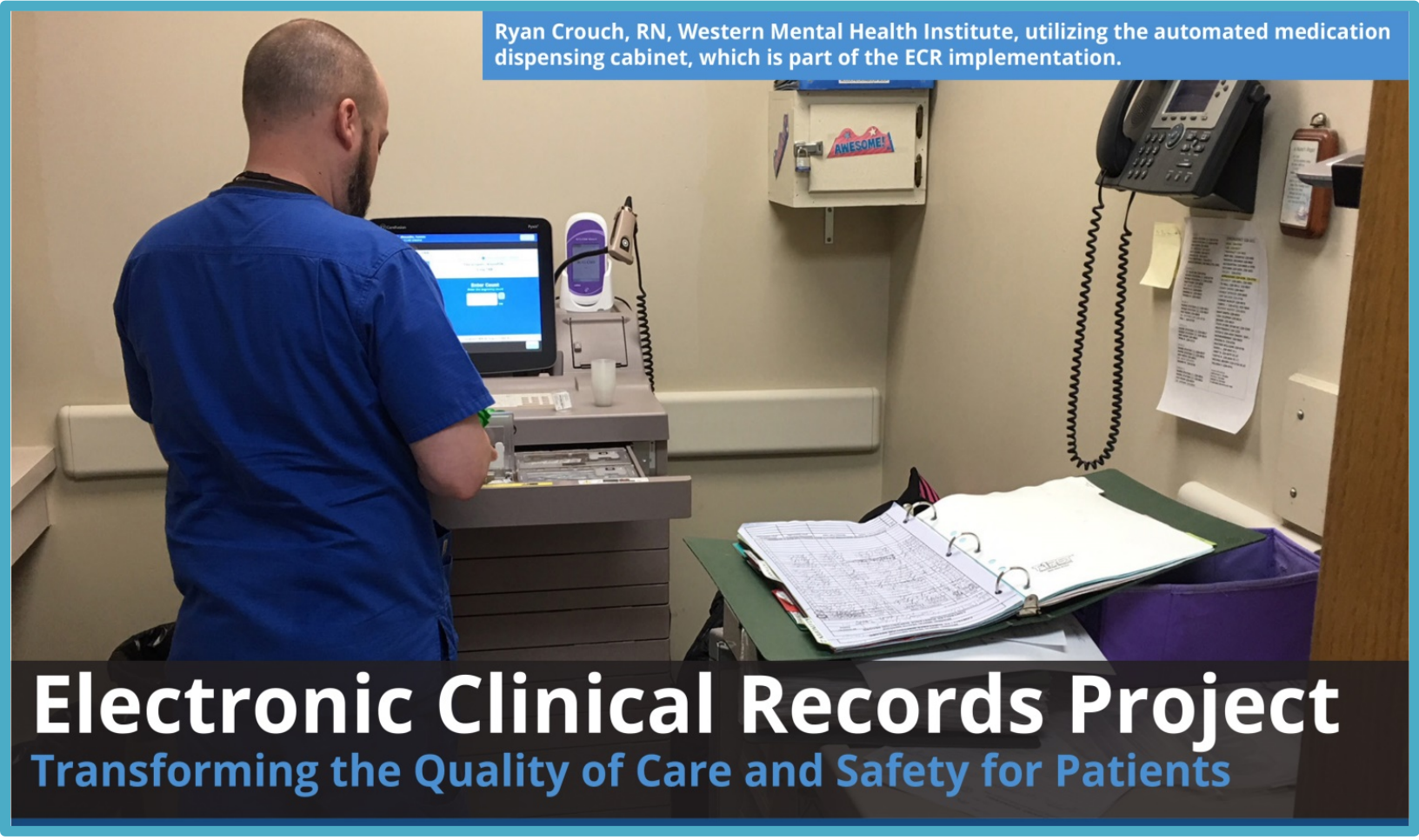

Ryan Crouch, RN, Western Mental Health Institute, utilizing the automated medication dispensing cabinet, which is part of the ECR implementation.

Electronic Clinical Records Project

Transforming the Quality of Care and Safety for Patients

Tennessee Uses IT to Provide Better Patient Care, Eliminating the Paper Record

January 2017 – November 2018

The State of Tennessee
Department of Finance and Administration
Division of Strategic Technology Solutions

NASCIO Award Category: Business Process Innovations

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TN Department of Finance & Administration | Strategic Technology Solutions

Executive Summary

The State of Tennessee's Regional Mental Health Institutes (RMHIs) were completely paper-based, leading to outdated and incomplete information for caregivers. An average of 12,000 clinical assessments and 9,000 admissions were provided annually. Multiply that by an average of 50 pages of information per individual file, each of which had to be copied, scanned and sent to three additional facilities, and you have – conservatively speaking – 1.8M to 2.4M pieces of paper per year that needed to be accessed, understood, and kept current in order to provide quality care for Tennessee residents in need.

Unfortunately, the information contained within the paper chart was not "real-time". This lack of immediacy and availability hindered caregivers in their decision-making about patient care. Historical information was stored in warehouse space which constituted millions of obsolete patient records and made much needed patient history very difficult to obtain.

In addition, prior to the implementation of the program, medications were dispensed from hospital pharmacies from hand-written medication orders. Once filled, the orders were either picked up by nursing staff at the pharmacy door or delivered by pharmacy technicians to the unit and stored in medication rooms. Medication administration was a manual process that was time consuming and susceptible to errors.

It was concluded that myAvatar by Netsmart had the best solution for addressing the project goals, which were: a reduction in paper records, elimination of transcription errors, medication administration and documentation, and the elimination of after-hours medication closets. Netsmart's myAvatar is one of a few products in the electronic records field that is designed specifically for the mental health arena and has a proven record of success. Additionally, this solution has been utilized in the past for other projects, and felt it would be best to build on something existing rather than begin with a completely unfamiliar product.

The implementation was a great success, coming in under budget and in less time than anticipated. Staff efficiency was achieved by providing more time to spend with the patient and less time searching for relevant information in charts. Automation included automated medication dispensing cabinets that were implemented, eliminating night medication closets, providing greater accessibility for medications while improving inventory control. Real Time Alerts consisted of real time allergy and interaction checks as well as other alerts, which have greatly improved patient safety and staff efficiency.

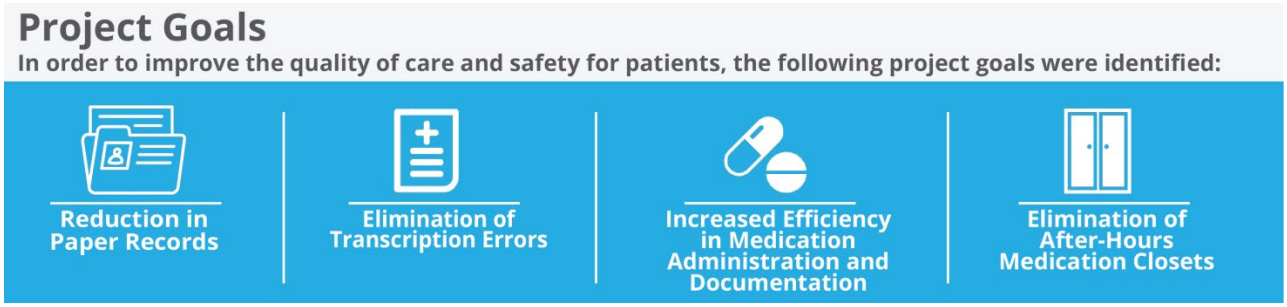
Concept

The Tennessee Department of Mental Health and Substance Abuse Services (TDMHSAS) currently operates four (4) Joint Commission Accredited Hospitals RMHIs throughout the state, providing clinical assessments to an average of 12,000 patients per year. Prior to implementation of the Electronic Clinical Records (ECR) project, the staff were utilizing a multi-copy, paper chart process with duplicate records kept at each facility. Using the paper process, staff had to navigate 50 pages of paper in order to assist one patient. The primary issue centered on paper processes that resulted in three major problem areas:

1. **Duplication of Forms and Accuracy**
   Using the paper process, hospital staff handled up to 50 pages or more of information including the duplication of demographics and medical history. These documents were copied and scanned in order to inform each unit in the RMHI of the patient's records. Given that the patient record is paper-based, oftentimes the information contained within it was not "real-time" accurate.

2. **Medication Prescribing and Administration was a Manual Process**
   Medications were dispensed from the hospital pharmacy from hand-written medication orders. Once filled, the orders were either picked up by nursing staff at the pharmacy door or delivered by pharmacy technicians to the units and stored in medication rooms. Medications were administered to the patients on the units by an assigned medication nurse. Medication prescribing and administration was a manual process that was time consuming and susceptible to errors. Medication lists were also maintained on paper which is an inefficient and time-consuming process with many opportunities for human error.

3. **Access to Patient's Full Record**
   Patient records could only be viewed by one person at a time. The RMHIs used paper charts to document patient treatment. This process proved to be very inefficient over time, especially for patients that were admitted frequently for short term stays. The preponderance of forms that request the same information created exponential work for both patients and RMHI staff. Multiple copies of patient information documents were required to exist in numerous physical locations. This lack of immediacy and availability hindered caregivers in their decision-making about patient care. In addition, historical information was stored in onsite and offsite warehouse space which constituted millions of obsolete patient records and making needed patient history at times difficult to obtain.



Project Evolution

After reviewing the approaches of all 50 states, and speaking with a multitude of state customers, it was decided that myAvatar by Netsmart was the best solution. The product was utilized in the past for other projects and it was determined it would be best to build on an existing capability rather than begin with a completely unfamiliar product. The expanded solution has saved the department time and expense to migrate data from myAvatar to a new solution. Data migration is costly as it involves the migration of data from one system to another, programming to translate the information to the new software, and finally testing the migrated data in the new software product. The expansion approach also saves the department time and cost to implement since the existing functionality does not have to be replaced.

The project evolved from an initiative of the MHSAS Commissioner to the development of a concept from the department's Chief Information Officer (CIO). A business analyst from Strategic Technology Solutions (STS) partnered with the CIO of the department along with a subject matter expert. An exhaustive study of other inpatient electronic clinical records for state and privately funded psychiatric facilities commenced. Requirements for the electronic clinical record system along with business process improvement maps were completed to help ensure the system would meet the needs of the identified departments within the regional mental health institutes (RMHIs). Such areas included clinical services, nursing, social work, pharmacy, billing, forensics, etc.

Once the vendor was identified and the contract was approved, a clinical application coordinator was hired at the Central Office along with three others to support the RMHIs. Subject matter experts of each area and regulatory experts conducted meetings and developed a test environment product design (all forms among the four RMHIs were standardized prior to this process along with employee titles).

System Requirements

In order to initiate the project, the system requirements for each of the four regional mental health institutes (RMHIs) had to be identified:

- Installation of Wi-Fi hotspots throughout each hospital
- Upgraded network bandwidth
- Support for telehealth for pre-admit evaluations
- Reconfiguration of medication rooms to accommodate automated medication dispensing cabinets
- Reconfiguration of nursing stations to accommodate computer equipment for charting to help ensure privacy of data
- Secure network pipeline to the server hosting sites
- Barcode scanners for medication and patient barcode scanning
- Digital signature pads for electronic document signing
- Workstation-on-wheels and other hardware solutions that would address workflow, that would work with the software program, and that were safe for an inpatient psychiatric setting
- Software modifications to meet the workflow process of each RMHI, but also ensured that federal, state, and accrediting body requirements were met

Implementation Methodology

A "Big Bang" Electronic Medical Record (EMR) implementation methodology was chosen in lieu of something slower and more gradual to help ensure that from an end user engagement perspective, everyone was on the same journey at the same time. From a patient and business continuity perspective, patients could continue to be moved throughout the hospital between different departments, and both the patients and clinicians were guaranteed that their records were all centralized in one location from the beginning.

Implementation also consisted of developing training manuals, conducting training, providing competency assessments, and performing mock trials (an employee acting as a patient was taken to the RMHI and taken through the process with each RMHI staff person as they were being admitted). The mock trial consisted of the employee being admitted in the system, a psychiatric assessment being conducted and entered into the system, orders placed for the employee, and the employee taken to the unit. All of this was used to monitor time, process, and functionality of the system. On the day of go-live, a round-the-clock command center was established with team members from the central office, the vendor, and other RMHIs to assist.

Management oversight consisted of an executive steering committee made up of an executive sponsor, project/business sponsor, clinical sponsor and pharmacy sponsor. The executive steering committee delivered strategy and direction. The hospital core team meetings provided implementation processes.

Areas of Focus

Analysis

SWOT Analysis – The analysis was regularly used to identify strengths, weaknesses, opportunities and threats

GAP Analysis – Identified areas where issues needed to be mitigated and created workarounds until the necessary adjustments could be made within the new system

Support

- Executive Support and Project Sponsor
- Command Center 24x7 support
- Staff from other RMHIs would support during go-live

Lean Event

A lean event was conducted to standardize staff titles and documentation across all four hospitals

Business Process Improvement

All processes were mapped for each area. There were 125 processes for each of the four Regional Mental Health Institutes (RMHI) for a total of 500 processes that were mapped

Designated Hardware Rooms

Designated hardware rooms were provided to staff members to get familiar with the hardware, the system, and to make sure it integrated with their workflow – well in advance of go-live

Computer Skills Assessment and Training

Computer skills assessment and training were provided to all staff, including physicians, to determine the competency in computer skills for each, which then translated to training for those in need to help ensure staff success. It was determined that some staff had never touched a computer of any sort, so the assessment provided highly necessary information for the overall success of the implementation

Policy Review

All policies were reviewed, and brought current, before inputting to the new system, in order to facilitate full Center for Medicare and Medicaid Services (CMS) compliance at go-live

Treatment Room Workflow

The treatment room workflow was analyzed to determine how things would flow in a physical sense within the rooms. The goal was to make sure all equipment was easily accessible and logically placed for efficient utilization

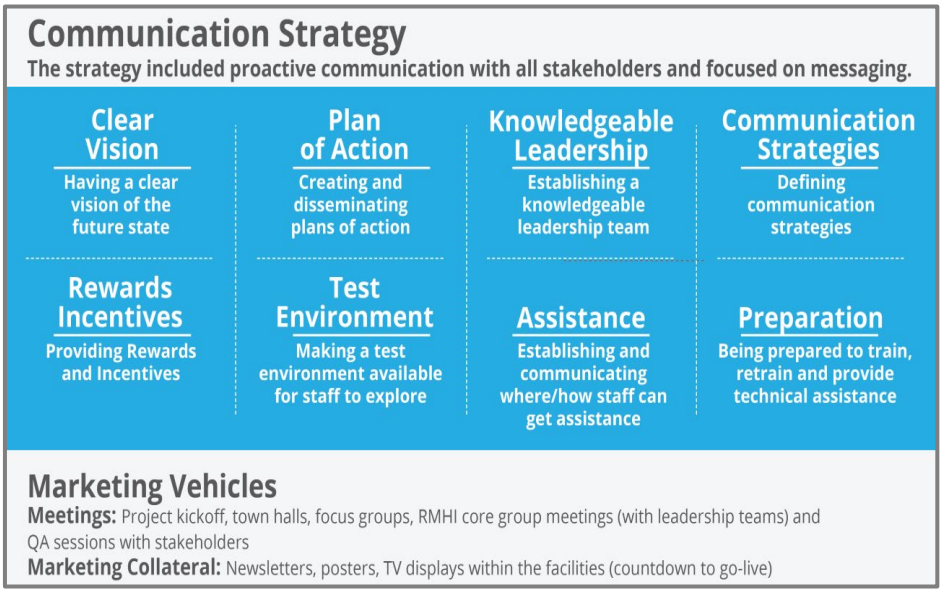
System Requirements

All software requirements were identified to help ensure the vendor could comply and be held accountable via the contract

Assessment of the Initiative

The initiative was evaluated through a blanket review and benchmarking of the following items at 60 day intervals:

- 100% electronic order entry - no written orders
- RxConnect (web-based pharmacy solution) to replace QS/1 as the pharmacy system
- Automated dispensing cabinets
- Electronic Medication Administration Record (eMAR) to replace paper Medication Administration Records (MARs)
- Barcode medication administration for closed-loop medication management
- 90% of the forms that are to remain on paper will be scanned for new admissions
- 75% of the required forms in Clinical Workstations (CWS) are completed by the required time

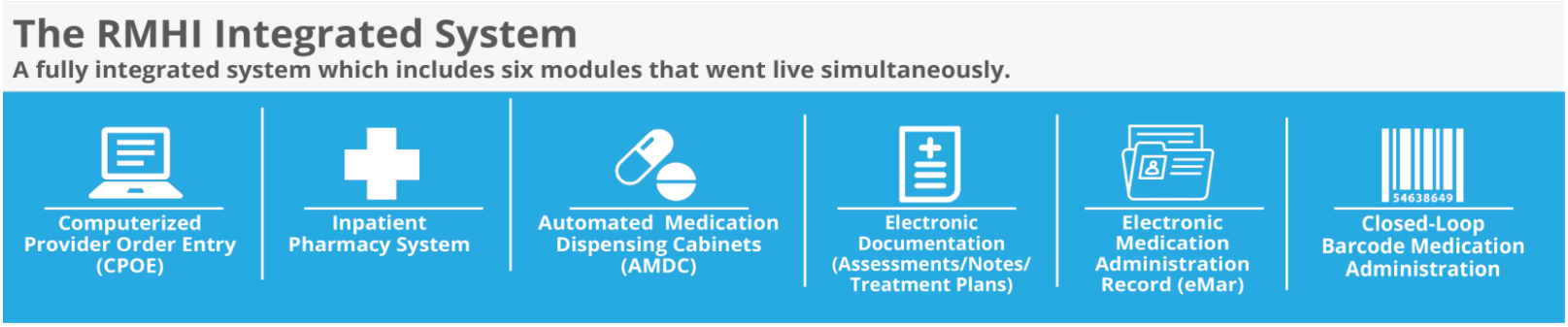


Significance

The ECR project expands the agency's existing myAvatar product to include modules that allow for a fully functional electronic clinical record. This project also resulted in a cloud-based vendor-hosted system for the Tennessee Department of Mental Health and Substance Abuse Services (TDMHSAS) with full disaster recovery, backup capabilities, and full redundancy. The project included the installation of automated medication dispensing cabinets in the medication room of each unit in all four RMHIs. The implementation of this project required coordination and collaboration of resources from multiple areas within the agency such as executive support, clinical, pharmacy and information technology staff. This project was accomplished through a Statement of Work between TDMHSAS and Netsmart that outlined the specific deliverables and costs as well the overall timeline for the project.

The expanded solution saved the department the time and expense to migrate data from myAvatar to a new solution. Data migrations are costly as it involves the physical moving of data from one host to another, programming to translate the information to the new software, and finally testing the migrated data in the new software product. The expansion approach also saved the department time and cost to implement as the existing functionality did not have to be replaced.

Tennessee's project differs from other states in that while some states do have components or modules of an electronic medical record in their inpatient psychiatric facilities, our program consists of a fully integrated system which includes six modules that went live simultaneously.



The implementation of the program allowed not only improved efficiency within the state operated regional mental health institutes in Tennessee, but in other policy areas as well. Having data in an electronic format allows analytic functions to be conducted which can be used to identify risks in a proactive manner. Prevention and early intervention are key areas in addressing mental health and substance abuse issues within the state. Examples of issues and trends that have been identified using data from the program include the need to increase safety net funding and services, the start of the subacute discharge initiative, and the increased visibility to monitor for state, federal and accrediting body compliance.

The project catapulted RMHI's ability to provide excellence in long and short range care for Tennesseans in need. By replacing the paper system, there were several benefits such as the ability to reduce, if not eliminate, clinical record errors, bad handwriting, misplaced documents, and provide better patient care though better documentation, efficient use of resources, dramatically reduced file storage going forward, less time in staff paperwork, and a much better flow of information within teams, along with outside providers such as labs and x-ray facilities. The improvements realized by this project support the agency's mission to provide, plan for, and promote a comprehensive array of quality prevention, early intervention, treatment, habilitation, and recovery support services for Tennesseans with mental illness and substance abuse issues.

Impact

TRANSFORMATIVE PROGRAM

The project was a great success, coming in under budget, in less time than anticipated, and yielded a program that is transformative in how the four Regional Mental Health Institutes are operated.

As an integrated system, it allows the flow of communication from module to module and provides multiple areas of safe guards.

Staff efficiency was achieved by providing more time to spend with the patient and less time searching for relevant information in charts.

Automation included automated medication dispensing cabinets that were implemented, eliminating night medication closets, providing greater accessibility for medications while improving inventory control.

Real Time Alerts consisted of real time allergy and interaction checks as well as alerts. This has greatly improved patient safety and staff efficiency.

Transformation by Area

Streamlined Record

Keeps a record of a patient's medications or allergies, and also automatically checks for problems whenever a new medication is prescribed and alerts the clinician to potential conflicts.

Exposing Potential Safety Problems

Exposes potential safety problems when they occur, helping providers avoid more serious consequences for patients and leading to better patient outcomes.

Medication Administration Process

Requires the patient armband to be scanned. The scan will link to the patient record where the electronic medication administration record is accessed and the medication is scanned where it will go through a second process to ensure the five (5) medication rights are adhered to.

Electronic Documentation

Provides access to patient charts simultaneously by individuals providing inpatient care. It also helps to ensure communication of vital patient information to outpatient providers allowing a seamless transition of care from the inpatient environment to the outpatient setting.

Automated Dispensing Cabinets

Allows only medication that is ordered to be removed from the machines except in emergency situations when a medication override can be conducted. This process helps to ensure the five (5) rights of medication administration are adhered to: right person, right medication, right time, right dose, and right route.

Computerized Provider Order Entry (CPOE)

Reduces errors associated with poor legibility of transcription and wait time for administration of first doses of medication. It also allows checking of medication interactions, checks allergies to potential medications, and checks for potential medication interactions such as with pregnancy or other medical conditions.

IMPLEMENTATION BENEFITS