Tennessee State Government

Healthcare Resource Tracking System (HRTS)

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Submitting State: State of Tennessee
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Executive Summary

The Healthcare Resource Tracking System (HRTS) is a secure, web-based platform used across the State of Tennessee to provide real-time visibility into the capacity and operational status of healthcare facilities. Developed as a centralized tool for healthcare coordination and emergency response, HRTS enables hospitals, EMS units, emergency management agencies, and public health officials to monitor and manage critical healthcare resources such as hospital beds, ventilators, staffing levels, and medical supplies.

Since 2007, HRTS has been instrumental in supporting over 1,000 disaster responses, including tornadoes, and mass casualty incidents (MCIs). It provides a common operating picture for healthcare coalitions and Tennessee Department of Health (TDH), enabling data-driven decisions in real time. The system ensures that patients are routed to the most appropriate facility based on current conditions, alleviating strain on overwhelmed hospitals and optimizing patient care.

Key capabilities include:

- **Hospital Bed and Resource Tracking:** Real-time data on ICU, medical/surgical, and specialty unit capacity.
- **Disaster Response and Surge Planning:** Essential for managing healthcare system strain during emergencies.
- **Inter-facility Coordination:** Guides EMS transport decisions based on facility status and availability.
- **Trend Analysis and Proactive Planning:** Supports early identification of shortages and targeted response.
- **Secure and Compliant Access:** Meets HIPAA standards, with access restricted to authorized personnel.

Unicoi County Hospital in Erwin, TN, overcome by flooding.

Photo courtesy of WBIR-TV, Knoxville

HRTS is a daily-use tool that enhances routine healthcare coordination and becomes even more critical during large-scale incidents. During a recent airlift evacuation of 54 patients from the roof of Unicoi County Hospital *(photo, left)* due to floodwater from Hurricane Helene, HRTS played a vital role in rapidly identifying available beds statewide, ensuring seamless patient transfers.

Tennessee's HRTS is often integrated with national systems like HHS Protect or EMResource, and contributes data to state health dashboards, making it a cornerstone of Tennessee's public health informatics infrastructure. By strengthening both emergency preparedness and day-to-day operational awareness, HRTS helps ensure a more resilient, responsive, and coordinated healthcare system statewide.

Project Description

The Healthcare Resource Tracking System (HRTS) Modernization Project enhances Tennessee's statewide health infrastructure by expanding system capabilities, improving performance, and aligning with current technology standards to better support emergency preparedness and patient care.

Key enhancements include:

- **Integrated Inventory Management:** The updated system now provides real-time visibility into critical healthcare resources, including bed availability, Personal Protective Equipment supplies, and patient status—empowering Emergency Preparedness (EP) and Immunization teams with accurate, actionable data to inform response efforts.
- **Cloud Hosting and Scalability:** By transitioning to a secure, cloud-based environment, the system gains the ability to scale resources rapidly during public health emergencies, ensuring high availability and performance when demand surges.
- **Mobile Optimization:** The platform is now fully accessible on mobile devices, enabling field teams, EMS personnel, and healthcare providers to access and update data on the go, improving responsiveness and situational awareness in real time.
- **Faster Data Updates:** System architecture improvements deliver significantly faster update and refresh rates, enhancing the timeliness and reliability of operational decisions.
- **Patient Bed Matching (PBM) Module:** A major new feature, the PBM module streamlines the placement of mental health patients by enabling emergency departments to locate and secure appropriate behavioral health beds across the state. The tool allows providers to search by location, patient needs, and bed type—reducing transfer delays and improving continuity of care.

Together, these upgrades transform HRTS into a modern, flexible, and mission-critical platform that supports both day-to-day healthcare operations and large-scale emergency response, reinforcing Tennessee's position as a national leader in health system readiness and coordination.

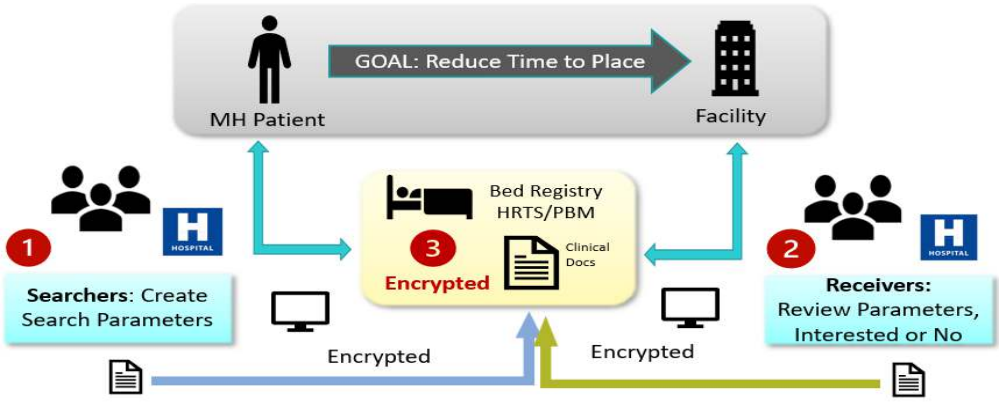
Idea

Why It Matters: Timely and accurate data on health resources is essential for informed decision-making during crises. Without this visibility, state and local agencies cannot efficiently coordinate emergency responses. HRTS fills this gap by enabling seamless communication and resource planning, ultimately saving lives and improving outcomes.

What problem or opportunity does the project address: The Health Resource Tracking System (HRTS) addresses the critical need for real-time, statewide visibility into the availability and status of healthcare resources—such as hospital beds, staffing, supplies, and finding available psychiatric beds with the new Patient Bed Matching module —especially during public health emergencies or natural disasters. Legacy systems lacked centralized coordination, resulting in delayed responses and misallocation of life-saving resources.

What Makes It Different: Timely and accurate data on health resources is essential for informed decision-making during crises. Without this visibility, state and local agencies cannot efficiently coordinate emergency responses. Without the PBM module psychiatric Tennesseans may not get the care they need. HRTS fills this gap by enabling seamless communication and resource planning, ultimately saving lives and improving outcomes.

What Makes It Universal: All states face mandates to ensure emergency preparedness and healthcare system resilience. HRTS addresses priorities outlined in the NASCIO State CIO Top Ten, including cybersecurity, data-driven decision-making, and legacy modernization. It is scalable and adaptable to any state or jurisdiction.



Implementation

Project Management Approach: Project governance followed a hybrid Agile/PMBOK model. Sprints and standups enabled iterative development, with each sprint cycle incorporating robust Quality Assurance (QA) and User Acceptance Testing (UAT) in dedicated environments to ensure reliability, user validation, and stakeholder confidence, while formal stage-gate reviews ensured milestone accountability and documentation.

What was the roadmap?

The roadmap followed an agile, phased approach:

1. Requirements gathering with stakeholders.
2. Rapid prototyping and user feedback.

3. Iterative sprints tested through QA and UAT environments.
4. Statewide deployment.
5. Ongoing evaluation and iteration.

Describe how this project fits into an enterprise view

HRTS integrates with hospital bed availability reporting systems, and the Patient Bed Matching application. It aligns with the state's broader digital transformation strategy and health IT modernization roadmap.

Outline how the project will be assessed and what successful implementation looks like

Success is measured by:

- Reduction in response time during emergencies.
- Increased resource visibility across facilities.
- User satisfaction and engagement metrics.
- Sustained data quality and system uptime.
- Increase bed rate for psychiatric patients.

Who was involved?

Key participants included:

- Hospital administrators, Emergency Department Directors
- TN Emergency Preparedness
- Software developers and Quality Assurance teams

Share how approval, buy-in, awareness and adoption were obtained from these stakeholders and include key pieces of communications/marketing plans

Key steps contributing to the success of the project include stakeholder engagement, sessions to gather requirements, statewide user engagement, User Acceptance Testing (UAT), and providing the means for feedback from all involved. A comprehensive communications plan included training materials, active user involvement to help strategize development priorities, and extensive email communication to drive awareness and adoption.

How did you do it?

Outline the resources needed, such as financial, human and time

- **Funding:** State and federal preparedness grants totaling $1,200,000
- **Team:** Developers, testing analysts, business analysts, and release manager.
- **Timeframe:** Full statewide implementation in 18 months.

Give a brief overview of the technical architecture focusing on why it matters more than how it was delivered

HRTS is a cloud-native solution hosted on AWS and developed using a modern .NET architecture.

Project delivery was managed through Azure DevOps, enabling streamlined development workflows. The system's architecture prioritizes long-term maintainability, and rapid onboarding of new data sources as state needs evolve. The focus on maintainability allows the resource to make rapid changes to the system as they arise to ensure the application meets the needs of end users to provide vital care for Tennesseans.

Impact

What did the project make better?

- Enabled real-time visibility and coordination of hospital bed capacity and resource availability
- Significantly improved emergency response timelines through timely data access and situational awareness
- Strengthened collaboration and information sharing among healthcare providers, public health agencies, and emergency responders

Tell the story of why the project matters, connecting the results back to the business rationale

Previously, facilities operated in silos with limited visibility. HRTS unified data from across the state, empowering decision-makers to deploy resources effectively. During a recent hurricane response, the system played a pivotal role in identifying critical care capacity.

PBM is a transformative solution that has successfully decreased the time behavioral health patients spend waiting for suitable care while also preserving Emergency Department resources to respond to unforeseen tragedies such as natural disasters and medical outbreaks. The application has optimized patient care, unified operational workflow, and enabled data driven decision by tracking key performance metrics. In 2024, the application was used to search for placement of 12,783 patients. Since its implementation, the median time for patients to be admitted has been reduced from two weeks to three days.

Compare the environment before and after the project was completed

Before: Lack of built in patient bed matching, non-respondent for mobile devices, slow data/code changes, fragmented, local hosting.
After: Built in Patient bed matching, mobile device ready, faster updates, centralized, cloud hosting.

How do you know?

Include the data – quantitative and qualitative – to support the story, such as cost savings/avoidance, ROI, usage, transaction times, citizen feedback.

We measure our return on investment by the number of disasters the systems has been used to help avoid loss of life and property. The system has been used to help manage our response to more than 700 Disasters/Incidents, such as floods, storms, evacuations, bus crashes, planned events, power or water outages, Mass Casualty Incidents, or any event that may overload the local health system.

Provide a testimony of either a citizen or business area underscoring the impact

I have observed significant improvements in patient care due to the implementation of Patient Bed Matching (PBM). It has proven to be an invaluable tool in streamlining patient placement and expediting care. We've recently experienced an influx of acute individuals from the community requiring immediate psychiatric treatment. PBM has allowed us to facilitate their admission process much more efficiently than before:

- ***Faster Documentation Processing***
- ***Improved Patient Tracking***
- ***Efficient Waitlist Management***
- ***Enhanced Communication with Community Partners***
- ***Seamless Document Uploads***

"The efficiency and accessibility provided by PBM have greatly improved our ability to manage patient care, ensuring individuals receive the treatment they need as quickly as possible."

Ricky Herron, MSW | Admissions Program Director
Middle Tennessee Mental Health Institute, Nashville, TN

What now?

Detail the longer-term plan for the project, including how the project will be maintained

The system is supported through a centralized DevOps and application support model, ensuring timely updates, routine monitoring, and long-term maintainability. Regular user training and stakeholder engagement will continue to support adoption and evolving needs. Future enhancements are planned to incorporate HL7 and expanded integrations with federal and multi-state platforms to enhance data interoperability and situational awareness.

Tell us why this project is worthy of the initial investment and any ongoing investment

The investment delivers increases in public safety, cost-efficiency, and user adoption. As threats to public health evolve, HRTS ensures the state remains proactive, not only reactive—protecting lives with technology-driven insight.