

Trauma Band Pilot Project 2015

BACKGROUND

The linkage of records among electronic databases has become an increasingly important component in managing, monitoring, assessing and reviewing a range of service areas. This information can be used to provide insights into significant health issues, support health policy development, and improve clinical practice and service delivery.¹ The ability to link trauma care data in Emergency Medical Services (EMS) with trauma care data in acute care hospitals is of particular interest in the development of a statewide trauma system in Michigan.² The linkage of these records tracks trauma patients through the system of care, enabling performance improvement activities.

The State of Michigan has an established electronic patient care record for Emergency Medical Services called the Michigan Emergency Medical Services Information System (MI-EMSIS). There are over eight million records in the database from approximately 800 EMS agencies. Additionally, the State of Michigan Trauma System has established a registry to aggregate data on all trauma patients, per the National Trauma Data Standard™.³ There are more than 120,000 trauma incidents in the State of Michigan Trauma Registry, with 70% of all Michigan acute care hospitals currently reporting data.

While probabilistic linkage data elements are present in MI-EMSIS and the State of Michigan Trauma Registry, the ability to deterministically link records does not yet exist. The absence of this functionality limits the flow of crucial information that drives emergency care. Consequently, quality, actionable, and complete data are not clear or available to drive education and change. This is most evident in the lack of feedback regarding patient outcomes to pre-hospital or transferring facility staff.

Arkansas has been successfully using a trauma band to deterministically track patients since 2011. As of January 1, 2011 all patients who are suspected to have sustained any traumatic injuries have been banded with Arkansas Trauma System identification bands. These bands are plastic fluorescent orange snap on bands that are pre-printed with a unique alpha-numeric code. Ideally, the transport EMS agency places the uniquely numbered band on the trauma patient; each additional responding agency and care provider (EMS and hospital) uses that number as an additional means to identify the patient. The bands are provided free of charge to all EMS services and hospitals that are participating in the trauma system from the Injury Prevention and Trauma Systems Section at the Arkansas Department of Health.⁴

In 2015, the Michigan Department of Health and Human Services, Trauma Section implemented the Trauma Band Pilot Project which was designed to facilitate the identification of an injured patient in the field through their transfer and discharge from definitive care. This pilot project was conducted to test the feasibility of identifying an injured patient in the field with a uniquely

colored band labeled MICHIGAN TRAUMA SYSTEM with a unique alpha-numeric identifier. The pilot project began in May 2015 and concluded in September 2015.

METHODS

Participants:

The focus for this pilot project was on areas of Michigan which are primarily rural in composition, but with at least an existing Level II Trauma Center. The existing preparedness regional construct was employed to identify the target areas for this initial effort. Additionally, of interest in regional selection, the objective was to ensure the majority of trauma patients in the catchment area would have the opportunity to be banded. This enabled the comparison of total banded patients to the total volume of trauma patients during the study period, within the subject regions.

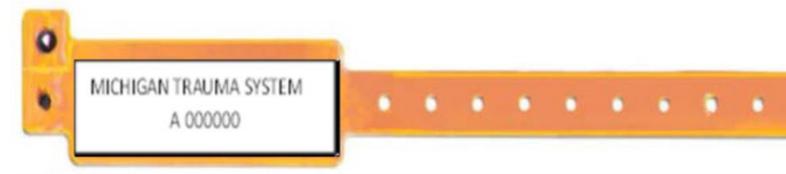
- 2 Rural Regions
 - REGION 3
 - REGION 7
- 4 Acute Care Hospitals
 - MIDMICHIGAN MEDICAL CENTER (Level II Trauma Center)
 - MUNSON HEALTHCARE CADILLAC HOSPITAL
 - MUNSON MEDICAL CENTER (Level II Trauma Center)
 - OTSEGO MEMORIAL HOSPITAL
- 3 EMS Agencies
 - MIDMICHIGAN EMS
 - NORTH FLIGHT, INC
 - OTSEGO COUNTY AMB CORPS

Trauma Banding Process:

The Trauma Band Pilot Project involved placing a neon orange identification band with a unique alpha-numeric identifier (Figure 1) on every injured patient encountered by the participating Emergency Medical Services agency or if not then was placed on the injured patient who presented to the participating Emergency Department. The identifier was tracked in both the local EMS and state EMS patient care record (MI-EMSSIS) and the local hospital and state trauma registry. Participating hospitals and EMS agencies were able to utilize existing and locally customized solutions for initial recording and documentation of the identifier. In order keep the scale of the project manageable, only injured patients older than 15 were to be banded. Acute

care facilities were asked to band injured patients if they arrived un-banded or did not arrive via EMS.

Figure 1. Trauma Band Example



The Region 7 participating hospitals and EMS agencies participated for the full pilot project period (5 months). The Region 3 participating hospitals and EMS agencies participated for 4 months. At the conclusion of the pilot, the participants shared their experiences during key informant interviews, identifying the challenges and issues to be addressed, and to make suggestions for improvements for the next phase of the project.

Non-participating hospitals and EMS agencies, in Regions 3 and 7, were requested to leave the trauma band in place until such time as the patient is discharged home. This was done to allow the capture of movement of the patient in the event they were transferred by or readmitted to one of the EMS agencies/hospitals participating in the project.

Prior to the start of the Trauma Band Pilot Project, a leadership team was identified from each participating hospital and EMS agency. Hospital leadership teams were composed of a hospital administrator, the trauma program manager, the trauma registrar, the emergency department supervisor, and a representative from medical records. The EMS agency leadership teams were composed of the agency manager and the education coordinator. Each leadership team chose one person to serve as the single point of contact with the regional trauma coordinator regarding all matters associated with their participation in the Project.

The Regional Trauma Coordinators in Region 3 and 7 traveled to each facility and EMS agency in their respective regions to explain the process of applying and recording the Trauma Band. The trauma coordinators provided a train the trainer education at the individual agencies and provided posters announcing and explaining the project. The entities were also provided with specific lot numbers of Trauma Bands. The Trauma Band project was also presented at the Michigan EMS EXPO in April of 2015 as both an informational and continuing education offering.

Each hospital leadership team engaged in a face-to-face meeting with the regional trauma coordinator. The agenda for this meeting included a presentation which outlined the goals and objectives of the project, roles and responsibilities of the team, and a review of the statement of work and other State documents. Each team was provided with educational materials suitable for duplication and distribution to their staff which included a copy of the Powerpoint®

presentation and speaker notes, flyers for posting in the emergency department to remind staff to place the band on trauma patients, and a three page handout which outlined the program, roles and responsibilities of staff, and a section with frequently asked questions. Each hospital agreed to develop a format for providing in-service to their staff which best suited their needs. A total of 116 emergency department staff attended the Trauma-Band in-service education program.

Each EMS agency leadership team was provided with a packet similar to that which was given to the hospitals but which was adapted to serve as a train the trainer for each agency’s staff. The regional trauma coordinator provided the first in-service program to each EMS agency. The leadership team then in turn took the training materials back to their respective agencies and provided a one hour in-service education program to the remainder of their staff. Mandatory attendance at one of several in-service education offerings was required of all EMS personnel at each of the agencies. The total number of EMS personnel who participated in the educational component of the project was 176.

In an effort to monitor compliance with the terms of the statement of work, each hospital and EMS agency were asked to submit a monthly report to their respective regional trauma coordinator. The reports were then reviewed by the coordinator and further discussed with the leadership team as appropriate. The regional trauma coordinators periodically contacted the leadership team to provide further monitoring of the project.

RESULTS

Throughout the project period, participating hospitals placed and/or documented 503 trauma bands (Table 1), and participating EMS agencies placed and/or documented 906 trauma bands (Table 2).

Table 1. Total Trauma Bands Placed and/or Documented by Hospital

Hospital	Total Trauma Bands Place and/or Documented
MIDMICHIGAN MEDICAL CENTER	103
MUNSON HEALTHCARE CADILLAC HOSPITAL	27
MUNSON MEDICAL CENTER	316
OTSEGO MEMORIAL HOSPITAL	57
TOTAL	503

Table 2. Total Trauma Bands Placed and/or Documented by EMS Agency

EMS Agency	Total Trauma Bands Place and/or Documented
MIDMICHIGAN EMS	212
NORTH FLIGHT, INC	536
OTSEGO COUNTY AMB CORPS	158
TOTAL	906

After evaluation of trauma banded patients, 429 trauma incidents were documented in the State of Michigan Trauma Registry (Table 3). The 429 trauma incidents identified in the State of Michigan Trauma Registry represented 43% of the total trauma registry incidents recorded during the project period of observation (Table 4). The trauma band proof of concept demonstration of deterministic incident tracking from pre-hospital through definitive care was highlighted through the origination of 184 EMS Agency trauma banded patients that met inclusion criteria for the State of Michigan Trauma Registry (Table 3).

Table 3. State of Michigan Trauma Registry Incidents* by Trauma Band Source of Origination

Hospital / EMS Agency**	Total Trauma Banded Patients*
MIDMICHIGAN EMS**	80
MIDMICHIGAN MEDICAL CENTER	20
MUNSON HEALTHCARE CADILLAC HOSPITAL	21
MUNSON MEDICAL CENTER	160
NORTH FLIGHT, INC**	84
OTSEGO COUNTY AMB CORPS**	20
OTSEGO MEMORIAL HOSPITAL	44
TOTAL	429 (245 Hospital / 184 EMS Agency)

*Incidents/Patients which met National Trauma Data Standard Inclusion Criteria per *ACS NTDB National Trauma Data Standard: Data Dictionary 2015 Admissions*

**EMS Agencies with Trauma Banded Patients that met Inclusion Criteria for the State of Michigan Trauma Registry

Table 4. State of Michigan Trauma Registry Incidents* with a Placed and Documented Trauma Band

Hospital	Total Trauma Banded Patients*	Total Trauma Patients	Percentage of Total Trauma Patients with Trauma Band
MIDMICHIGAN MEDICAL CENTER	100	234	43%
MUNSON HEALTHCARE CADILLAC HOSPITAL	23	37	62%
MUNSON MEDICAL CENTER	249	623	40%
OTSEGO MEMORIAL HOSPITAL	57	101	56%
TOTAL	429	995	43%

*Incidents/Patients which met National Trauma Data Standard Inclusion Criteria per ACS NTDB National Trauma Data Standard: Data Dictionary 2015 Admissions

Additionally, 3 trauma incidents were tracked from an initial EMS agency to an acute care hospital then by a transferring EMS agency to a second acute care hospital (Figure 2). These 3 trauma incidents demonstrated the ability to track an individual patient from pre-hospital through definitive care with an inter-facility transfer. Additionally, registry software proved to be adaptable to allow for trauma band ID data entry, including Digital Innovations and ImageTrend.

Figure 2. Trauma Band Proof of Concept Demonstration of Deterministic Incident Tracking from Pre-Hospital through Definitive Care – Examples with Multiple EMS & Hospital Records



Trauma Band Number	Initial EMS Agency	1st Destination Facility Name	Transferring EMS Agency	2nd Destination Facility Name
A010546	NORTH FLIGHT, INC	MUNSON HEALTHCARE CADILLAC HOSPITAL	NORTH FLIGHT, INC	MUNSON MEDICAL CENTER
A010652	NORTH FLIGHT, INC	MUNSON HEALTHCARE CADILLAC HOSPITAL	NORTH FLIGHT, INC	MUNSON MEDICAL CENTER
A007557	OTSEGO COUNTY AMB CORPS	OTSEGO MEMORIAL HOSPITAL	OTSEGO COUNTY AMB CORPS	MUNSON MEDICAL CENTER

DISCUSSION

The Trauma Band Pilot Project successfully demonstrated the potential to deterministically link an injured patient from the pre-hospital setting through their transfer and discharge from definitive care. With nearly half of all trauma incidents (43%) during the project period of observation being successfully banded with a unique identifier, the feasibility of such an

initiative was also demonstrated. However, to ensure that follow-on efforts to deterministically link pre-hospital and trauma registry incidents are effective, participants shared their experiences during key informant interviews.

The key informant interviews highlighted the need to expand the project timeline for future initiatives. Specifically, a longer timeframe to establish processes and train staff and to conduct the project. This would allow for more time to acclimate to the new processes and ascertain the efficacy of the processes over an extended period. Further, the expanded timeline would allow for process improvement interventions as required, and the ability to measure their impact over suitable timeframes.

It was also identified that consistent project management/monitoring is needed to ensure compliance with established protocols. This includes both process monitoring as well as routine data entry audits and validation throughout the project.

Additionally, simplified Trauma Band numbers with a corresponding bar code (for those with readers) would aid in data entry error reduction. It was further noted that removable barcode stickers (e.g. triage tag format) could be beneficial to keeping the unique identifier associated with the trauma patient and their records.

CONCLUSION

In order to operationalize a statewide deterministic linkage programs, the lessons learned from the Trauma Band Pilot Project will require application in a more comprehensive project. Implementing the pilot project made it clear that to be reproducible on a larger scale a more exhaustive project with more partners and time was needed. A project on that scale is beyond the scope of the Trauma Section and needs to be designed and executed by the stakeholders who use the data, understand the challenges and can create processes to address them, and whose patients and communities will ultimately benefit from the linkages in the form of better outcomes for the injured.

REFERENCES

¹ The concept of linking records was introduced as early as 1945 by Halbert Dunn, Chief of the National Office of Vital Statistics. The Manitoba Population Health Information System, Oxford Record Linkage Study, and Western Australian Data Linkage System have effectively linked multiple large, population-based, administrative data sets.

² The linkage of EMS data with other data sets, including trauma data, has been successfully demonstrated as evidenced by the following examples: Newgarth, C et al *Validation of Probabilistic Linkage to Match De-identified Ambulance Records to a State Trauma Registry*, Mears, G et al *A Link to Improve a Stroke Patient Care: A Successful Linkage Between a Statewide Emergency Medical Services Data System and a Stroke Registry*, Clark, D *Practical introduction to record Linkage for Injury research* and Boyle M *The experience of linking Victorian Emergency Medical Service Trauma Data*.

³ *ACS NTDB National Trauma Data Standard: Data Dictionary 2015 Admissions*
<http://www.ntdsdictionary.org/dataelements/datasetDictionary.html>

⁴ *Arkansas Department of Health Injury Prevention and Trauma: EMS and Hospitals join together to track trauma patients*
<http://www.healthy.arkansas.gov/programsservices/hslicensingregulation/emsandtraumasystems/documents/training/trainingmaterials/traumaband.pdf>