

Kansas



South Central Trauma Triage Tag Linkage Pilot Project 2007, Kansas Trauma Registry

Research Summary

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Our Vision – Healthy Kansans Living in Safe and Sustainable Environments

As the state's environmental protection and public health agency, KDHE promotes responsible choices to protect the health and environment for all Kansans. Through education, direct services, and the assessment of data and trends, coupled with policy development and enforcement, KDHE will improve health and quality of life. We prevent illness, injuries and foster a safe and sustainable environment for the people of Kansas.

Introduction

The Kansas Trauma Registry is a statewide data repository for traumatic injuries occurring in Kansas or treated by hospitals in Kansas. The registry dataset includes demographic, pre-hospital, clinical and outcome data crucial for characterizing injury in Kansas. Because the trauma system in Kansas is an inclusive system, data is submitted to the state registry by each facility for each trauma patient. One of the goals of a central site registry is to relate data for the same patient that may have been collected from multiple facilities in order to characterize the continuum of care for that patient as they move between facilities in the system.

There are a number of methods for linking records, mostly developed for combining large datasets collected independently (for example, linking death certificate records to disease registries). Most rely on data elements that are common to both records, such as name and social security number. However, to assure confidentiality of personal health information, the Kansas Trauma Registry does not collect these common identifiers, so retrospective linkage methods (either deterministic or probability-based) are difficult to implement successfully within the trauma registry.

Another approach to linking records, which might circumvent the need to collect common identifiers, is to assign a trauma-specific identification number that can be recorded by all facilities in the continuum of care for a patient. Such an identifier would be assigned at the time the patient enters into the trauma system (first responder or first facility providing care) and recorded in the registry by each facility encountering the patient. This approach requires that the number be physically attached to the patient so that registry staff will have access to the identification number at each facility. To assess the feasibility of this approach, the South Central Trauma Region initiated a project to use triage tag numbers for linking. This report will briefly summarize the pilot project methodology, report linkage results from trauma registry data and will discuss findings with regard to the feasibility of triage tags for record linkage within the trauma registry.

Summary of Methods

Briefly, 700 triage tags were purchased by the South Central Regional Trauma Council and distributed to Emergency Medical Service (EMS) agencies and Hospitals throughout the region in early April, 2007. The mailing included instructions to the service director or ER director to arrange for triage tags to be affixed to each patient meeting trauma criteria and to record the 7-digit tag number in their registries. Subsequently, registry staff at KDHE emailed registry contacts directly with specific instructions for entering the tag numbers in the "Trauma Bracelet Number" field on the first screen of the trauma registry form.

In the first weeks after the initial tag mailing, there were numerous reports that the number of tags provided was insufficient. On June 5, an additional 3,000 tags, paid for by the Kansas Department of Transportation, were mailed with a request that agencies continue to use triage tags on injured patients if possible, even after the quantity provided was exhausted. The pilot project concluded in late August with a mailed

survey. Record linkage was evaluated in the central site trauma registry using a simple deterministic method based on the trauma bracelet number field using SAS version 9.1.3 (SAS Institute Inc., Cary, North Carolina).

Results

The effective period of data collection for this study spanned May to September 2007. During that period, 1,591 records were submitted to the Kansas Trauma Registry central site database (KTR) by member facilities of the South Central Regional Trauma Council. Of those, 597 (37.5%) contained valid 6- or 7-digit tag numbers. Record linkage focused on the 169 records where an outgoing emergency transfer was indicated (discharged to "other acute care facility"). Only 41 (24.3%) of those contained valid 6- or 7-digit tag numbers recorded in the trauma bracelet number field. Results of the linkage algorithm are summarized in Table 1. Fourteen linkages were found comprising 28 records: 12 simple transfers to the final destination of care hospital, and 2 links between 2 facilities in a double transfer involving 3 facilities. In addition, 2 links were identified between records with errors in documentation of the transfer. In one case, the destination facility was specified incorrectly. In the other case, the transfer was apparently a non-medical transfer. In total, 16 linkages were identified.

Table 1. Summary of trauma registry linked pairs.

Total	16
Simple	12
1/2 of a Double Transfer	2
Transfer Misdocumentation	2

Among the 41 records indicating outgoing transfers with valid triage tag numbers, 14 were linked to receiving facility records in the database. There were 27 records that could not be linked on the basis of matching triage tag numbers. One alternative method for linkage relies on patient specific identifiers available in the trauma registry. To compare methods, linkage was attempted on the basis of birth date and gender, two personal identifiers present in the registry. Results are displayed in Table 2. Among the 27 records with valid triage tag numbers from referring facilities, 15 (55.6%) were linkable to other records in the central site database. For these pairs, the receiving facility recorded a null or non-matching triage tag number, but the linkage seemed to be plausible based on an exact match on birth date and gender and visual comparison of clinical data elements in each record.

Table 2. Linkability of qualifying records by date of birth and gender.

Expected transfer linkages	41
Linked	14
<i>Matching on DOB</i>	11
<i>Not Matching on DOB</i>	3
Not Linked	27
<i>Linkable by DOB</i>	15
<i>Not linkable by DOB</i>	12

In late August, surveys were distributed to all facilities and agencies in the region. Surveys were received from 15 (50%) hospitals and 10 (23%) EMS agencies. Among the responding hospitals, 4 were associated with a hospital-based Emergency Medical Service. Fourteen of the 15 hospitals in the response sample reported that they were able to record triage tag numbers in their trauma registry. Thirteen of the 14 hospital-based or independent EMS agencies reported recording tag numbers in their data systems. Methods used by the responding hospitals for processing the tag numbers into the registry are shown in Table 3. The most common method reported was to note the tag-number on the ER flow sheet. Only two surveys indicated that the physical presence of the tag caused distraction, one from a hospital and one from an EMS agency. There was one reported instance of a tag becoming physically disassociated from the patient.

Table 3. Methods reported by Hospitals for processing triage tag numbers.

Process Method	Facilities*
Physical Tag in Record	3
Recorded on ER flow sheet	11
Recorded in ER log	3
Used EMS sheet	1
No Method	1
Other (attached smaller tag to ER form)	1

*Sum exceeds the number of hospitals because of multiple responses by some facilities.

Discussion

In general, the pilot project showed that trauma registry records can be linked using triage tag ID numbers, although a number of challenges must be overcome. The greatest challenge proved to be establishing the practice of affixing triage tags by EMS services and hospitals, particularly at referring hospitals. To establish a linked record, the tag must be affixed at or before the patient arrives at the referring hospital. During the pilot, many of the tags were affixed to patients that did not meet registry inclusion criteria or were only seen at one hospital. While there may be benefits to the practice of using triage tags on non-traumas and those taken from the scene of the injury directly to the final destination of care, from the point of view of record linkage there is no need to affix tags to these patients. Consequently, if emergency and clinical personnel are expected to only affix tags to certain patients, a great need for training arises to assure that tags are only used on true trauma patients who are transferred between facilities. It is not clear to what extent agency contacts were able to train their staff on registry inclusion criteria and the registry linkage process. Also, the line of communication between hospital contacts for the pilot study and their trauma registry staff is direct for some facilities, but perhaps not for other facilities within the region. For record linkage to be successful, it is important for trauma registrars to understand how the tags are used and where the identification number can be found. The survey results showed that a variety of methods were used for this process (Table 3). Standardizing this

business process among hospitals in the region may improve the rate of successful linkage.

Another important consideration in evaluating the pilot project is the complexity of administrating such a process among facilities within the region. Tags were distributed by the lead facility, Via-Christi Regional Medical Center, according to estimated numbers of transfers to hospitals in Wichita. However, because the initial supply was relatively small, some of the participating agencies may have received a very small number of tags and may have exhausted their supply very quickly. Another administrative hurdle for record linkage is timely and complete reporting by all facilities. At the time this report was prepared, 100% of facilities in the region had reported for 2nd quarter, but only 86% of facilities for 3rd quarter, 2007. The linkage rate is likely to improve as those registries are updated with 3rd quarter data. There were 15 records that were linkable based on transfer documentation and matching date of birth and gender where a valid triage tag number was documented at the referring facility but not at the receiving hospital. Thus, there may have been problems with disassociation of tags from patients during the inter-facility transfer. The extent of this problem would be evident if tag numbers were also collected from the run sheets for inter-facility transfers.

Finally, this pilot study did highlight several ongoing concerns for overall data quality in the registry. Matching based on triage tag numbers was able to identify two records constituting a non-medical transfer resulting in a double count of that patient. The extent of double counting for these patients in the broader state registry is unknown. However, this problem was recognized recently and an option was added to document these kinds of transfers to prevent double counting in the future. Triage tag number linkage also identified two examples of double transfers where a patient was seen in two facilities before reaching the final destination of care. In both instances, trauma registry data was submitted by only one of the two referring facilities in the chain. It is not clear whether these omissions are due to tardiness or oversight. Finally, among the 14 cases of successful record linkage where adequate documentation of the transfer was available, there was an exact match on the date of birth field for only 11 pairs. The presence of these data entry errors further highlights the need for establishing a procedure for linking patient records.