North Carolina Data Integration for Motor Vehicle Crash Injury Research: The Long Road Ahead

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Background

Motor vehicle crashes (MVCs) are one of the leading causes of fatal and nonfatal injuries. 1,450 people were killed and 130,137 people were non-fatally injured in North Carolina MVCs in 2016.

The NC Traffic Records Coordinating Committee (TRCC) has an interest in a statewide MVC injury surveillance system. The ability to integrate safety information from a variety of sources has the potential to improve safety outcome analysis and inform policy and safety programs.

Methods

First, we performed a pilot project linking all NC Division of Motor Vehicles (NC DMV) crash report data with Emergency Medical Services (EMS) and NC DETECT emergency department (ED) visit data in Wake County, NC.

Next, we identified and interviewed NC MVC crash injury stakeholders (crash data owners, crash data users, etc.).

Then, we held two half-day meetings with NC MVC crash injury stakeholders to identify and discuss potential health outcome data sources for integration.

Finally, we performed a series of demonstration and quality improvement projects using NC DMV crash report and health outcome data sources. Many of these projects are on-going.

Table 2. Results with Deterministic Linkage

<table>
<thead>
<tr>
<th>Project / Description</th>
<th>Data Sources</th>
<th>Linkage Fields Used</th>
<th>Results of Linkage (% Matched)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilot Project</td>
<td>Crash</td>
<td>Pre-Hospital</td>
<td>Hospital</td>
</tr>
<tr>
<td>EMV crash data</td>
<td>EMS data from Wake EMS</td>
<td>ED visit data in NC DETECT</td>
<td>Date of birth (DOB) (same) + sex (same)</td>
</tr>
<tr>
<td>EMV crash report data</td>
<td>EMS data from EMSPIC</td>
<td>ED visit data in NC DETECT +/3 of date elements: day, month, or year + sex (same)</td>
<td>Crash date/time +/- 3 hours</td>
</tr>
<tr>
<td>Quality Improvement Project I</td>
<td>EMV report, ED report from NC DMV crash report data</td>
<td>ED visit data in NC DETECT + data from a level I trauma center</td>
<td>Medical record # (same)</td>
</tr>
</tbody>
</table>

Table 3. Other Motor Vehicle Crash-Health Outcome Data Integration Projects

<table>
<thead>
<tr>
<th>Description</th>
<th>Status (April 2019)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstration Project 2</td>
<td>Crash Report -&gt; NC DETECT ED visit data integration</td>
</tr>
<tr>
<td>Demonstration Project 3</td>
<td>Crash Report -&gt; NC trauma center data integration</td>
</tr>
<tr>
<td>Demonstration Project 4</td>
<td>Crash Report -&gt; NCHA hospital encounter data integration</td>
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</table>

Recommendations

Pilot Project

1. Add a yes/no variable to DMV crash reports to indicate if EMS responded to the scene.
2. Include a unique personal identifier on all MVC injury data sources.
3. Improve capture of transport mode in ED visit data.

Demonstration Project I

1. Document methods used to perform data linkage.
2. Improve quality of health outcome data captured by NC OEMS.

Quality Improvement Project I

1. Improve injury mechanism coding in NC DETECT data for the improvement of pedestrian/bicycle crash injury surveillance.
2. Explore the use of keyword-based definitions for identifying pedestrian/bicycle crash-related NC DETECT ED visits.

Conclusion

NC contains many health outcome data sources that are suitable for integration with NC DMV crash data. These health outcome data sources provide a more detailed characterization of MVC injuries as compared to the crash report data.

Finding appropriate fields for linkage (and receiving permission to utilize these fields, which often contain personal identifying information) has been a challenge.

Acknowledgments

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