The master data, after reduction and filtration, used for analysis consisted of 283,298 data records. Data marked as incomplete were removed. Records outside of January 2010 and February 2015 were removed. For the purposes of this study, the EMS response time was defined as the time from the scene to the time the final scene point was reached.

**Response Time Data**
Agencies with the longest and shortest response times, on average, were compared and evaluated to investigate the potential differences among rural and urban response time on an agency basis.

### Summary: Total Time of EMS Response (minutes)

<table>
<thead>
<tr>
<th></th>
<th>Urban/Rural</th>
<th>Classification</th>
<th>Scene</th>
<th>Transportation</th>
<th>Total Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>30,979</td>
<td>41,139</td>
<td>61-120 min</td>
<td>21</td>
<td>156</td>
</tr>
<tr>
<td>Med. Time</td>
<td>21</td>
<td>23</td>
<td>43</td>
<td></td>
<td>66</td>
</tr>
<tr>
<td>Urban</td>
<td>114,816</td>
<td>194</td>
<td>21-30 min</td>
<td>2</td>
<td>43</td>
</tr>
<tr>
<td>Med. Time</td>
<td>13</td>
<td>11</td>
<td>46</td>
<td></td>
<td>54</td>
</tr>
</tbody>
</table>

### Response Time per Year: Rural Counties
- **Rural**: populations greater than or equal to 50,000 residents
- **Urban**: populations less than 50,000 residents.

### Response Time per Year: Urban Counties
- **Urban**: populations greater than or equal to 50,000 residents
- **Rural**: populations less than 50,000 residents.

**Data Classification**

<table>
<thead>
<tr>
<th>No. of Data Records</th>
<th>Percentage of Original Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transportation Time</td>
<td>37%</td>
</tr>
<tr>
<td>Rural Health</td>
<td>33%</td>
</tr>
<tr>
<td>Rural Transport</td>
<td>32%</td>
</tr>
<tr>
<td>Urban Health</td>
<td>29%</td>
</tr>
<tr>
<td>Urban Transport</td>
<td>28%</td>
</tr>
<tr>
<td>Other</td>
<td>10%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

### Data Reduction
- **Response Time**: Time interval between initial contact and the arrival of the EMS unit at the scene (Q, 2, 5).
- **Scene Time**: Time allowed for activities performed by the EMS unit at the scene (3).
- **Transport Time**: Time associated with the transport of the patient (3).

**Rural & Urban Classification**
- **Rural**: populations greater than or equal to 50,000 residents
- **Urban**: populations less than 50,000 residents.

### Conclusion
- Michigan EMS Agency data was provided on a voluntary basis (there is no mandate that requires agencies to provide the data to a central agency).
- Procedures, forms are completed using agency selected software from several existing software vendors, and must be provided within 30 days of the incident. A considerable amount of resources were used to salvage records for this study, which is evident in the reported data reduction-related effects.
- Integrating crash databases maintained by EMS and police departments is highly desirable. Two sets of data reside in two distinct databases for the same incident, it is very challenging to link the databases to extract useful information.
- It is very beneficial to link the data from all reporting agencies.

**Transportation Time Data**
Main insights from transportation time analysis:
- 1. Urban location of incident yields a lower transportation time when compared with rural regions, potentially due to proximity to hospitals.
- 2. Rural areas, on average, have longer transport times than urban, 21 to 14 minutes, respectively. This may be due to the increase in rural population density.
- 3. There appears to be marginal increase in the average transportation time during the hours with a higher number of incidents during the evening and late night (11 pm – 2 am) time slot.
- 4. Rural locations consistently exhibited higher transportation times throughout the day. A probable cause could be the spread-out nature and potentially limited medical facilities within these locations.
- 5. Rural transportation time per county ranged from 14 to 44 minutes, on average, while urban counted presented averages between 11 and 25 minutes.

**References**