Albion Crash Study

- Preliminary results
- Why present now?
GIS Analysis

• Geo-located traffic crash data obtained from Michigan Traffic Crash Facts (MTCF), an archive of Michigan State Police accident reports (www.michigantrafficcrashfacts.org)

  – Query filters:

    • Geographic Area: **Lower Peninsula**
    • Area of Road at Crash: **All freeway areas**
    • Road Conditions: **Dry** or **Wet** (no ice or snow)
    • Weather: **Clear**, **Cloudy**, or **Rain** (no snow)
GIS Analysis

• Crashes mis-coded by MTCF as occurring in freeway areas removed
  – 0.1 mile proximity to *limited access primary roads* (TIGER/Line road Feature Class Code category A1)
  
http://www.census.gov/geo/maps-data/data/data/tiger.html
GIS Analysis

- Permitted full digital billboard locations obtained from Michigan Department of Transportation (MDOT) Highway Advertising Program (HAP)
GIS Analysis

- Limited access primary road crashes selected by proximity to digital billboards

Traffic crashes within 0.25 mi of digital billboards, Grand Rapids area (2004)
GIS Analysis

- 2004/2012 comparison of digital billboard-proximal traffic crashes on Michigan freeways:

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>All limited access primary road crashes*</td>
<td>30106</td>
<td>27392</td>
</tr>
<tr>
<td>≤0.50 mi from digital billboards</td>
<td>2489</td>
<td>2545</td>
</tr>
<tr>
<td>≤0.25 mi from digital billboards</td>
<td>1202</td>
<td>1286</td>
</tr>
<tr>
<td>≤0.10 mi from digital billboards</td>
<td>402</td>
<td>431</td>
</tr>
</tbody>
</table>

*Lower peninsula only
Road conditions: dry or wet
Weather conditions: clear, cloudy, or rain
Change in Distribution of Crashes

2004/2012 change in digital billboard-proximal traffic crashes on Michigan freeways:

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>Rate, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>All limited access primary road crashes*</td>
<td>-2714</td>
<td>-9.01</td>
</tr>
<tr>
<td>≤0.50 mi from digital billboards</td>
<td>56</td>
<td>2.25</td>
</tr>
<tr>
<td>≤0.25 mi from digital billboards</td>
<td>84</td>
<td>6.99</td>
</tr>
<tr>
<td>≤0.10 mi from digital billboards</td>
<td>29</td>
<td>7.21</td>
</tr>
</tbody>
</table>

*Lower peninsula only
Road conditions: dry or wet
Weather conditions: clear, cloudy, or rain
Change in Distribution of Crashes

-90.99% of 2004 Actual for 2012

Number of crashes

Distance from digital billboards

0.50 mi 0.25 mi 0.10 mi

-224 56 84

-108

-36 29
“Before” and “After” Comparison

- $H_0: p_{2012} - p_{2004} = 0 \quad n_{2004} = 30106$
- $H_a: p_{2012} - p_{2004} > 0 \quad n_{2012} = 27393$

<table>
<thead>
<tr>
<th>Distance from Digital Billboards</th>
<th>Z</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤0.50 mi</td>
<td>4.337093</td>
<td>0.000007219</td>
</tr>
<tr>
<td>≤0.25 mi</td>
<td>4.133381</td>
<td>0.00001787</td>
</tr>
<tr>
<td>≤0.10 mi</td>
<td>2.387108</td>
<td>0.008491</td>
</tr>
</tbody>
</table>

- The proportions of digital billboard-proximal traffic crashes on Michigan freeways are significantly higher “after” than “before” the digital billboards were installed.
Next Steps

• Seek independent auditor to verify methodology.

• Seek credible and widely recognized sponsor to oversee and publish final findings.

• Incorporate additional years--2004-2005 for "before" data and 2012-2013 for "after" data.

• Incorporate directional data for crashes and digital billboards.

• Determine crash/digital correlations in different weather conditions.