Is evidence in practice? A review of driver and cyclist education materials with respect to cycling safety evidence

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Introduction
Countries with high cycling rates have national, school-based, mandatory cycling education programs whereas in North America cycling education is diverse and disparate. The aim of this project was to understand what cycling safety content is delivered in Canadian jurisdictions and how training materials align with scientific evidence.

1. Literature review on safety evidence


Databases: PubMed, Medline, Transportation Research Information Service, published up to January 2012. Reference lists were searched for additional citations.

Inclusion criteria: Research had to investigate the relationship between a defined metric of bicyclist safety (injury, injury severity, crash/collision/fall, conflict) and: a riding practice (e.g., use of visible clothing, bicycling operations, or route choice), or an environmental factor (e.g., road grade, weather). It had to be peer-reviewed original research, use a measure of relative risk, and be in English.

Exclusion criteria: Studies examining gross numbers or types of injuries without either calculating risks (i.e., no denominator) or considering factors influencing risk of those injuries; studies only examining personal characteristics (e.g., age, sex, experience); studies that reported only subjective perceptions; studies of injuries or crashes that occurred when the bicycle was being used for racing, mountain-biking, trick/trials riding, or play; and studies of injuries not related to a crash event. We did not search the primary research literature on helmets, but instead considered factors influencing risk of those injuries; studies only examining personal characteristics; studies examining gross numbers or types of injuries.

Results: Of over 400 articles identified in our search, most were excluded based on the above criteria (especially lack of a denominator) leaving 56 additional citations.

Inclusion criteria: We included any studies meeting one or more of the following criteria: evidence on a specific route characteristic or condition; evidence on a defined metric of bicyclist safety (injury, injury severity, crash/collision/fall, conflict); evidence on a factor influencing risk of those injuries; evidence on a relationship between a defined metric of bicyclist safety and a riding practice; evidence on a relationship between a defined metric of bicyclist safety and an environmental factor.

Exclusion criteria: Studies investigating gross numbers or types of injuries; studies that only examined personal characteristics; studies only examining subjective perceptions; studies of injuries or crashes that occurred when the bicycle was being used for racing, mountain-biking, trick/trials riding, or play; and studies of injuries not related to a crash event. We did not search the primary research literature on helmets, but instead considered factors influencing risk of those injuries.

2. Cycling Education Materials

Search: Cycling education materials meant for cyclists and drivers were identified using a systematic search of driver licensing agencies, cycling education and advocacy organizations, the web, and word of mouth.

Results: 48 training materials were gathered from 12 provincial and territorial driver’s licensing jurisdictions, 5 municipalities, and 7 advocacy organizations.

Main themes: bicycle–motor vehicle interactions, route characteristics & conditions, route types, bicycling operations, safety equipment.

Implications for practice
Overall, we found that many of the principles covered in the cycling education materials were supported by scientific evidence. A full report on these findings has been disseminated to all of the agencies who contributed materials, and is available at: http://cyclingincities.sphh.ubc.ca/files/2012/09/EvidenceTrainingReport.pdf.

The findings were also discussed in webinars in Summer 2012 which included individuals and agencies across Canada.

Scientific Evidence vs. Education Materials

We analysed the topics covered in scientific evidence, and those covered in educational materials to determine where there were agreements, disagreements or gaps. *Venn diagram not to scale: more topics were covered by education materials than by scientific evidence.

Gaps and Incomplete Messages in Education Materials

<table>
<thead>
<tr>
<th>Overarching Theme</th>
<th>Issue</th>
<th>Scientific evidence where there is a gap or an incomplete message in education materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Route Characteristics &amp; Conditions</td>
<td>Gap</td>
<td>Evidence indicates that roundabouts present an elevated injury risk for cyclists</td>
</tr>
<tr>
<td>Route Types</td>
<td>Gap</td>
<td>Evidence indicates that foggy conditions increase injury severity</td>
</tr>
<tr>
<td>Bicycling Operations</td>
<td>Gap</td>
<td>Evidence indicates that listening to music while cycling reduces cyclist stability and perception</td>
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<td>Evidence indicates that, after dark, routes without streetlights increase injury risk and severity</td>
</tr>
<tr>
<td>Route Types</td>
<td>Gap</td>
<td>Evidence indicates that bike-specific routes (cycle tracks, painted bike lanes, and off-street bike paths) decrease crash risk and injury severity</td>
</tr>
<tr>
<td>Bicycling Operations</td>
<td>Gap</td>
<td>Evidence indicates vehicles pass closer to cyclists riding further from the curb, and that passing distances are smaller with higher vehicle speeds, vehicles in the opposing direction, and heavy vehicles.</td>
</tr>
</tbody>
</table>

Bicycle – Motor Vehicle Interactions

Incomplete Message

Education message recommends taking the lane. (included in 11/48 materials)

Incomplete guidance on positioning: Advice on road positioning, which was commonly included, should indicate situations where motorists are likely to pass closer to cyclists.

Funding and Acknowledgments
This study was supported by the Canadian Institutes of Health Research under a Knowledge Translation Supplement Grant.

http://cyclingincities.sphh.ubc.ca