2011 Bike Safety Web Survey
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Executive Summary

By John Harkey[i]

Introduction

This study was conducted by the Bike Pedestrian Advisory Committee to Mayor Dean (BPAC) and the Nashville Area Metropolitan Planning Organization (NMPO) to provide a better understanding of the factors contributing to bike accidents in the Nashville/Middle Tennessee area. The study involved a web-based survey of residents of Davidson and surrounding counties who completed an earlier web survey conducted by the Nashville MPO and who ride bicycles at least a few times a year.

Information was collected on:

- biking behavior (where ride, how often ride, miles ridden),
- bike accidents occurring within the past five years with a focus on injury accidents,
- factors contributing to the bike accidents, and
- background information about the respondents (demographic, health, education)

The goal of the study was to identify actionable findings concerning bike accidents that would help regional officials improve the biking infrastructure and design a bike safety education program. A secondary goal was to provide a better general understanding of biking behavior as a part of a biking needs assessment.

Methods

- **Web tool:** Survey Monkey.
- **Population surveyed: (**1) BPAC members; (2) Approximately 1100 respondents to a previous web survey conducted by NMPO in 2009 and 2010. The respondents are not representative of the adult resident population of Middle Tennessee and are not necessarily representative of all adult bicycle riders in Middle Tennessee.
- **Invite email:** An email was sent to the sample inviting them to take the survey. Also, the email advised the recipients that other adult members of their household could take the survey on the same computer.
- **Survey dates:** The invite was sent out on May 15, 2011 and the analysis conducted on surveys completed on or before June 9, 2011.
- **Respondent Number:** There were 591 respondents to the survey as of June 9.
- **The respondents:** The respondents consist of mostly healthy, highly educated, non-Latino white adults who live in the Middle Tennessee area and ride bikes. Approximately two thirds are from Davidson County ZIP codes.

Key Findings

The following were the key findings concerning injury producing bike accidents. Respondents could (and did) choose multiple contributing factors.

- **Road conditions.** Road conditions were more likely to be a factor in bike accidents than any of the other listed factors. Road conditions included potholes, gravel or other debris, broken pavement, and rough pavement. These types of road conditions were implicated in 44% of accidents with minor injuries, but only 16% of accidents involving major injuries. Other road conditions that were accident factors included drainage grates facing the wrong direction, rumble strips, slick or broken road markings, and railroad tracks. Each of these "other road conditions" involved 3 to 5 percent of all accidents.
- **Environmental conditions.** Rain was mentioned as a factor in 19% of accidents, and snow or ice in another 5% of accidents. Darkness was a factor in 8% of accidents. Approximately 40% of respondents say they often or sometimes bike in the rain or at night, while 15% admit to biking sometimes or often in snow or ice.
- **Road intersects.** A substantial portion of bike accidents were reported to have occurred at road intersections, particularly accidents involving more serious injuries. Road intersections were part of the accident context for 33% of accidents involving serious injuries but for only 16% of accidents involving minor injuries.
- **Motor vehicle driver behavior.** 15% of injury accidents involved collision with moving motor vehicles.
    - ❑ Most (73%) of bike collisions with moving motor vehicles involved the driver swerving into the bike rider's path, unaware of the bike rider's presence
    - ❑ A significant minority of driver factors included hostile shouting or honking, i.e., abusive behavior (38% of moving vehicle accidents)
    - ❑ Passing within 3 feet of a bicyclist was a factor in 16% of the moving motor vehicle accidents.
- **Bicyclist behavior.** The bicyclists often indicated that their own behaviors or negligence led to the accident. About the same number of injury accidents results from collisions with other bikers (9% of serious accidents but 19% of minor accidents) as from collision with moving motor vehicles (19% of serious accidents but 15% of minor accidents). Collision with animals (21% of serious accidents) and with fixed objects (14% of serious accidents) were also important and more likely to be involved in serious injury accidents than minor accidents.
    - ❑ Many respondents indicated they often or sometimes engaged in rolling stops at stop signs (50%) or traffic lights (18%), but no one listed either as a factor in injury accidents
    - ❑ Small numbers of respondents indicated that moving back and forth between road and sidewalk were accident factors (2% of accidents) or passing on the right (1% of accidents). Riding more than 2 abreast was also mentioned by a few (1% of accidents)
    - ❑ The respondents indicated self or other was at fault in 84% of all accidents, with the remainder either being environmental conditions or "not sure." Among accidents in which the respondent assigned fault, 18% of those accidents involved **both** self and other at fault, 54% of the accidents involved the bicyclist being **solely** at fault, and 28% of the accidents involved the other person solely at fault. Most biking accidents, then, involve the bicyclist at least partially at fault.
    - ❑ Motor vehicle accidents were a different story. Respondents indicated that the motor vehicle driver was solely at fault in 72% of accidents and jointly at fault (with the

respondent biker) in the remaining cases (28%), and that the biker was not solely at fault in any of the motor vehicle accidents.

- **Other factors**. Mechanical problems with the bike were implicated in 13% of accidents.

Recommendations

Infrastructure

Debris removal/pothole repair. The most frequently mentioned contributing factor in biking accidents was road debris and rough spots, particularly potholes.

Recommendation I: Target more frequent street sweeping and pothole repair to areas of high bike usage, and target known hot spots (where gravel or debris tend to accumulate) after heavy rains. A similar approach could be taken to replacing drains that face the wrong direction, i.e., target heavy biking areas for drain cover replacement. (Example of heavy biking area: Vanderbilt University environs)

Recommendation II. Metro Public Works has a customer service contact (phone or email), and that is where calls/emails about road hazards to bikes can be received and acted on. BPAC should work to make that line more known to the biking community by linking to it from bike oriented web sites. In addition, BPAC could make public works aware that they may begin receiving more calls from bicyclists.

Biking education

Knowing/obeying the law. Although bicyclist failure to follow the rules of the road did not appear to be a large direct factor in accidents, many bicyclists took a casual view towards traffic lights and stop signs. Bike safety education might address the general disregard of the rules of the road by pointing out the need for reciprocity. If bicyclists expect drivers to obey rules related to sharing the road with bicyclists, then the bicyclists should evidence "share the road" rule compliance as well.

Road/environmental conditions as risk factors. Given the large role road conditions (potholes, gravel) and environmental conditions (rain, snowing and ice, nighttime biking) played in accidents, educating new (and experienced) bikers about those risks is important.

Defensive biking. Given that motor vehicle accidents are often the result of unaware drivers, a bike safety education focus on defensive biking is important.

Driver friendly biking. A small minority of accidents were associated with angry drivers shouting or gesturing to the bicyclist. A larger number of respondents reported this rude driver behavior outside of the context of an accident. Information about biking in ways that avoids being an annoyance to drivers should become a part of biking education.

Recommendation: Develop an on-line bike safety education course for bicyclists. The course could include written materials including discussion of the above topics, a rules-of-the-road knowledge test, and a reward for taking and passing the test. The test might require a fee or become part of the process of joining bike clubs or biking organizations.

Motor vehicle driver education

Bike awareness. The key findings concerning moving motor vehicle and bicyclist accidents is that such accidents typically involve the bicyclist being seemingly "invisible" to the motor vehicle driver. In a minority of cases the bicyclists becomes an annoyance, promoting driver anger. Promoting a better understanding of the bicyclists' rights (to be on the road) and obligations (to obey the traffic laws) is important, as is promoting an awareness of the most common types of accidents between moving motor vehicles and bicycles (turning into bikes when the driver is not aware of their presence). Making bicyclist more visible is a difficult charge, but two approaches that might work are (1) making the driver more aware of those items associated with biking (bike lanes, share the road signs) and (2) giving the road cyclist a favorable identity that the car driver can relate to.

Tennessee Driver's License Manual. The Tennessee Comprehensive Driver's License Manual has a defensive driving section that includes a focus on interacting with bicyclists on the road (pages 104-105). The pages on biking cover the bicyclists' legal rights and obligations and some of the common types of accidents. This part of the manual also includes a discussion of the 3 feet clearance requirement. However, it represents 2-3 pages in a 100 plus page document, and so is easily overlooked.

Value of biking. An education program might try to providing a better understanding of the benefits of biking as a health promotion activity and as one component of a solution to traffic congestion and urban livability.

Recommendation: The "Share the Road" campaign should include a focus on the most important rights and obligations of drivers and bicyclists (rules of the road) and also highlight the most common types of accidents between drivers and bike riders and how they might be prevented. An attempt to put a real (and appealing) face to the biker might also help (it is "someone like me", the driver).

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[i] Sean Davies, Michael Skipper, and Leslie Meehan provided assistance in reviewing the questions, drafting the invite to take the survey, and providing input on the analysis.