



Investigation of a supplementary tool to assist in the prioritization of emphasis areas in North American strategic highway safety plans[☆]

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ABSTRACT

An important potential benefit of a jurisdiction developing an upper-level traffic safety policy statement, such as a strategic highway safety plan (SHSP) or a traffic safety action plan, is the creation of a manageable number of focus areas, known as emphasis areas. The responsible agencies in the jurisdiction can then direct their finite resources in a systematic and strategic way designed to maximize the effort to reduce the number and severity of roadway collisions. In the United States, the federal government through AASHTO has suggested 22 potential emphasis areas. In Canada, CCMTA's 10 potential emphasis areas have been listed for consideration. This study reviewed the SHSP and traffic safety action plan of 53 jurisdictions in North America, and conducted descriptive data analyses to clarify the issues that currently affect the selection and prioritization process of jurisdiction-specific emphasis areas. We found that the current process relies heavily on high-level collision data analysis and communication among the SHSP stakeholders, but may not be the most efficient and effective way of selecting and prioritizing the emphasis areas and allocating safety improvement resources. This study then formulated a formal collision diagnosis test, known as the beta-binomial test, to clarify and illuminate the selection and the prioritization of jurisdiction-specific emphasis areas. We developed numerical examples to demonstrate how engineers can apply the proposed diagnosis test to improve the selection and prioritization of individual jurisdictions' emphasis areas.

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1. Introduction

1.1. Brief history of the North American strategic highway safety plan

In North America, the idea of using a strategic highway safety plan (SHSP) to improve roadway safety by directing resources to address major safety concerns, known as “emphasis areas,” was established in the 1980s and 1990s (TRB, 1987, 1991). In 1991, for example, the Transportation Research Board (TRB) specified 19 emphasis areas (e.g., seat belts, young drivers, older drivers, pedestrians, heavy trucks, high collision locations, and rural emergency medical services) under five elements (e.g., people, vehicles, highway environment). At the same time, TRB suggested establishing long term safety strategies and implementation programs to reduce the number of fatal/injury collisions. More recently (2005),

the United States' “Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)” provides various structures and significant funds to be used to improve public highway safety. Under SAFETEA-LU, each individual state ratifies its own SHSP and announces its own jurisdiction-specific emphasis areas (FHWA, 2005). The jurisdiction-specific emphasis areas are usually based on the 22 updated emphasis areas under six revised elements recommended by the American Association of State Highway and Transportation Officials (AASHTO) in 1998. AASHTO's 22 emphasis areas are similar to the original emphasis areas suggested by TRB in 1991, but were revised to include issues such as work zone safety. The main difference between SHSPs before and after SAFETEA-LU is not so much the revision of the emphasis areas, but the progress made in the overall procedures used to determine the emphasis areas. SAFETEA-LU requires, for example, a data driven approach, and substantial multi-disciplinary and multi-institutional communication and collaboration among stakeholders.

Canada does not have SAFETEA-LU-like legislation to mandate provincial level safety plans and action programs for individual provinces' public highways. Canada has a federal-level traffic safety action plan known as Canada's Road Safety Strategy 2015 (CCMTA, 2011). This strategy lists 10 emphasis areas (e.g., young drivers, vulnerable road users, high risk drivers, impaired driving, speed and aggressive driving, and environmental factors), and groups

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