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Better data integration to create a complete picture for cycling safety

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1. Introduction

The USDOT recently granted a National University Transportation Center (UTC) with a safety focus to a team led by UNC-Chapel Hill (The Collaborative Sciences Center for Road Safety). One of the first areas of research, lead by the authors, is to develop a systematic framework to integrated data to provide a more complete view of pre-crash, crash, and post crash outcomes, focusing on injury and health for all road users. Bicycle crashes is one mode that suffers from underreporting in police crash datasets and injury severity reporting is problematic for vulnerable road users. This work aims to fill that gap for cyclists.

Traditionally, safety and injury analysis has occurred in siloed fields, with road safety researchers relying predominately on police-recorded crash reports, and public health researchers relying on hospitalization records. Depends on context of the study and used database, findings vary, this is the case for micro-level (e.g., injury severity of an individual) to macro-level (injury rate) scale.

This work is beginning to map disparate datasets to inform questions surrounding crashes. The data-mapping process will aim to build linkages between police-crash dataset and other datasets (i.e., Incident-Oriented Data, Spatial Data, Emerging Datasets) and scale it up to larger geographic areas. Efforts to augment crash data are not new. A notable health-oriented example which sought to link health and police records was Crash Outcome Data Evaluation System (CODES). Although this federal program ended in 2013, some states have continued this effort, including the California, North Carolina and Tennessee. Moreover, the recently released ISW8 report on Pedestrian Injury surveillance is a strong standard to integrate disparate datasets. We are launching from these best practices to develop more nuianced understanding of contributions to crashes and injuries, and reporting our efforts related to bicycle safety here.

Added data and analytics will result in a more "Complete Picture" of bicycle crashes and injuries. This Complete Picture enables researchers to improve their modeling, assist policy makers, and contribute to visualization that helps tell compelling safety stories that guide safety improvements.

2. Expected Results

This project is underway and we are working to have develop a framework to provide more informed crash data, for cyclists in this context, and determine which elements of data that exist outside of conventional crash data that can contribute to this complete picture. These elements likely include EMS, ED, DMV, Health Expenditure, Census, and Land Use, among others. We will build on existing efforts (e.g., CODES, CMOD, ISW8 and others). We also intend to understand how emerging datasets (e.g., probe data, C/AV data) can be mapped to crash data. The primary application presented at ICSC will be a focus on reporting bicycle safety indicators from these datasets.

We intend to present the results of our work and identify innovative statistical, probabilistic, and big data visualization tools to link crashes with other records, either by record-matching, or augmenting datasets based on spatial or temporal indicators to perform more-advanced safety analysis.