

**Project Title:**

Teen Drivers: Crash Factor Analysis

**University:**

North Dakota State University

**Principal Investigators:**

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**Research Needs:**

Reducing crashes, in particular those that result in injury or fatality, is an on-going struggle for agencies tasked with reducing crashes and making our roads safer. Any ability to predict these crashes would allow the agencies tasked with traffic safety to develop an intervention targeting these drivers to change their behavior and ultimately reduce the number of crashes.

Teen drivers are ideally suited for this type of intervention for several reasons. They are disproportionately over-represented in crashes, with teens accounting for only 4% of the driver population, but accounting for 10% of crashes (Vachal and Malchose 2009). Also, a large share of teen crashes occurs within the first year after licensure due to a lack of driving experience. Lastly, the learning curve at this point in their driving history is still large, which makes teen drivers more susceptible to these interventions.

Using North Dakota driver's licensing data and crash data, logistic regression modeling identifies gender, traffic convictions, rural/urban, and involvement in previous property damage only (PDO) crashes as markers that are significant in predicting injury and fatal crashes in teen drivers (Malchose and Vachal 2010). According to the model, living in an urban area increases your risk of being in an injury or fatal accident within the first year after attaining your license by 2.5 times compared to drivers who live in rural areas. Drivers involved in a previous PDO crash are 25 times more likely to be involved in an injury or fatal crash than those not involved in a previous PDO crash.

While graduated licensing and other population-based driver improvement programs have shown promise as tools for reducing teen crash risk, a real-time performance-based intervention such as this offers an important supplemental for targeting the highest risk teen drivers. Crash risk markers, or predictors, may be used in a preventative intervention such as an advisory letter to parents or warning letters to teen drivers who exhibit the risk markers, hopefully, altering their behavior and reducing their likelihood of being involved in an injury or fatal crash (Jones 1997, Masten 2004, Strathman 2007). Specific training or education requirements attached to licensure may also be an intervention strategy, but would be beyond the bounds of administrative agency authority in most cases.

**Research Objectives:**

The goal of this project is to analyzing contributing factors in ND teen driver traffic crashes through multifactor analysis that incorporates both behavior and engineering elements.

**Objectives**

- (1) Develop a GIS-based platform of crash locations to allow use of existing crash form longitude/latitude and descriptor fields with new layers that capture roadway and traffic features in other dataset such as RIMS, ATR, and rumble stripe.
- (2) The feasibility of establishing other useful roadway element datasets, such as vertical and horizontal curve measurement, will be assessed and pursued where possible.
- (3) Model teen driver crashes, through regression analysis, to produce quantitative results that measure the relative role of contributing factors in teen driver injury crashes.
- (4) Coordinate regression modeling work with an effort to identify, collect and test calibration of the crash and road feature data an application of the Highway Safety Manual on a ND road.

**Research Methods:**

Descriptive analysis and regression modeling will used to assess citation and crash involvement as predictors for driver involvement in future single vehicle and at-fault multicar crashes.

**Expected Outcomes:**

This research will contribute to an ongoing effort to reduce teen driver crash injury. Results will add to the understanding of potential interventions for teen drivers considering the driver, vehicle, roadway and vehicle factors.

**Relevance to Strategic Goals:**

Safety: Teen Crashes are a Priority Area in the NDDOT SHSP – this pilot will build the platform for a more holistic multivariate approach to safety for this inexperienced driver group, as risk factor identification and intervention strategies for private and public sector parties.

**Educational Benefits:**

Not Applicable

**Work Plan (Expected Completion Date):**

1. Literature Review (Month 2)
2. Data Element Identification (Month 3)
3. Data Collection (Month 5)
4. GIS Transformation for Spatial Factor Crash Analysis (Month 6)
5. Statistical Modeling and Analysis (Month 8)
6. Draft Research Report (Month 10)
7. Finalize Report (Month 11)
8. Present Findings (Month 12)

**Project Cost:**

Total Project Costs: \$97,000

MPC Funds Requested:

\$47,500

Matching Funds: \$47,500

Source of Matching Funds: NDSU Returned

Indirect Costs; NDDOT In-Kind Contribution with Teen Driver Records

**TRB Keywords: Safety, Teen Driver, Crash,**

**Intervention References:**

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