MRI 3 USF Progress Report 6/20 (synthesis)

Status

sets required a great deal of data assembly and experimentation to end up with the data set for analysis. That effort has been completed an analysis and modeling is underway.

- talk with him (Dr. Chu) about **lessons learned**

we **explored differential safety performance across states and regions** in several ways during this period:

1) We examined the differential safety performance between the Southeastern region and other regions as well as how this difference varies over time and across travel conditions and socio-demographic groups. Socio-demographic groups were defined by person age, gender, and race and ethnicity. Travel conditions include the day of week and time of day for crashes and the functional classification of roadways. Safety performance was measured in terms of fatalities per person hour traveled for examining differences across socio-demographic groups and time periods for a single year of 2009 because of the need of using the 2009 NHTS for exposure measurement but in terms of fatalities per VMT for examining differences across functional class for the period from 1994 to 2013. **The time-based fatality rate in 2009 was higher in the Southeastern region than other regions as a whole for each gender-age group, each day of week and time of day combination, and every combination of gender and race-ethnicity. Again, the VMT-based fatality rate throughout the 1994-2013 period was consistently higher in the Southeastern region than in other regions for various functional classes, particularly in rural areas.**

2) Instead of comparing traffic mortality rates (fatalities per capita) or traffic fatality rates (fatalities per unit of exposure), **further insights may be gained from decomposing these rates and comparing each component**. Specifically:

Mortality rate = product of fatality rate (=fatalities per VMT) and per capita VMT (=VMT per person)

Fatality rate = product of

- involvement risk (=injury crashes per VMT)
- injury risk (=injuries per injury crash)
- death risk (=fatalities per injury of any severity)

This decomposition approach was applied to individual states as well as the Southeastern region versus other regions for the combined 3-year period of 2007 to 2009. **The results from the regional analysis showed that Southeastern Region's higher mortality rate during the 2007-2009 period resulted from its 21% higher per capita exposure and 31% higher fatality rate than other regions and that Southeastern Region's higher fatality rate resulted from its 23% higher involvement risk, 7% higher injury risk, and 1% lower risk of death.**

3) We developed a mathematical relationship to attribute the overall difference in the fatality rate between the Southeastern region and other regions to each of the travel segments defined by one or two variables. This analysis was applied to 2009 data with exposure measured from the 2009 NHTS for the socio-demographic factors and travel conditions used in earlier analyses. This analysis was also applied to the 20-year period from 1994 through 2013 with **one result indicating that almost 80% of the overall elevation in VMT-based fatality rate for the Southeastern Region over other regions can be attributed to non-limited-access facilities in rural areas.**

4) Using the combined data for the 2007-2009 period, **we expanded the limited regression analysis in the completed thesis during the previous reporting period to include a broader set of control variables** (e.g., population density, traffic density, weather, economic conditions, exposure to visitors, etc.), additional variables on general risk-taking a behavior (e.g., per-capita crimes), separate analyses of fatality rates (e.g., involvement risk, injury risk, and death risk), and the use of a dummy variable for the Southeastern region. In addition to the set of general risk-taking behavioral factors, the **other explanatory variables were grouped into several categories: land use and system conditions, weather, and socio-demographics**. **When each category was added separately, the coefficient for the Southeastern dummy stayed significant both in its magnitude and its statistical significance when system features or weather features were controlled. The coefficient for the Southeastern dummy, however, essentially disappeared when either the socio-demographic factors or the general risk-taking behavioral variables were controlled.**

Products—none reported

Needs

Additional time beyond the August 31 current deadline would be much appreciated as would additional funding.

Collaboration

Our MRI work has been **very independent** of the work that Shashi is carrying out given his various commitments and reliance on different students. **It simply hasn't been possible to integrate our work** beyond occasional conference calls to share what we're doing.

Things we are seeing and future research ideas:

- **critical issue of pedestrian safety in Florida**--bodes well for the prospect of future matching funds.

Florida has recently seen a huge uptick in fatalities for 2015, +18%, when VMT increased about 6%. Fred Mannering and I have discussed the situation of **disproportional deterioration in safety performance relative to percent change in VMT coming out of recessions**.

a set of hypotheses developed as to why that might be the case

I think it's an intriguing issue that could get some national attention and might be the basis for a research synthesis, panel discussion at a conference, perhaps even some data analysis. I know this problem is not unique to Florida.

- think a published **critique of research pieces (linking the presence of Uber with improved DUI safety)** perhaps with the specification of a research design that could discern the impact of these services on DUI safety could get a great deal of attention.

- research idea--the prospect of trying to come up with **a speed weighted pedestrian accident exposure metric using InRix data**

- slightly crazier idea--to use the naturalistic driving study to see if one could come up with **some type of pedestrian incident opportunity exposure measure and/or classify pedestrian exposures** in some way per mile driven.