Pediatric Pedestrian Motor-Vehicle Trauma in Delaware: A 10-year Geographic Perspective

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Background
Motor vehicle-related accidents are the leading cause of accidental death in individuals between the ages of 5 and 24 years. Additionally, in 2010, nearly 20% of all children between the ages of 5 and 9 who were killed in motor vehicle-related accidents were pedestrians. When geographic location of injury is examined, it has been found that these accidents tend to cluster in urban areas where there are larger proportions of minorities, higher population densities, and lower income levels. The purpose of this study is to identify the characteristics of the areas of Delaware where these accidents occur the most.

Study Design
Retrospective analysis of the Delaware State Trauma Registry.

Setting
Data was collected from all over Delaware by the state’s six trauma centers.

Sample
Data were collected on 362 children between 2002 and 2012 who presented to one of the state’s six trauma centers after being a pedestrian that was struck by a motor-vehicle. All children were between the ages of 7 months and 18 years and 257 of them were male.

Methods
The geographic location (longitude, latitude) of all accidents that occurred within Delaware was recorded. Using longitude and latitude, accident location data were grouped according to 2010 US Census Tract. Demographics of each individual census tract in the state was obtained from the US Census website. Frequency of accident per 10,000 individuals was calculated. Analysis of variance (ANOVA) was used to correlate how the frequency of accidents was affected by median income, percent African American population, education level, gender, and percent population of children of each census tract. Using mapping software, the Getis-Ord statistic was run to indicate the specific location of hot-spots (frequency of accidents x regional characteristics).

Results
Statewide, the number of accidents was highest in poor, urban areas with the highest population densities. The census tracts that included the city of Wilmington had the highest frequency of accidents per capita. ANOVA indicate significantly higher accident counts in areas with lowest median income, highest percentage individuals without a high school degree, highest percentage of African Americans, and the highest percentage of females in the population.
**Conclusion**

We conclude that urban, poor children in high population areas are disproportionately affected by motor-vehicle pedestrian trauma in the state of Delaware. Infrastructure improvement and prevention strategies need to be directed at these high risk areas.

**Figures**

Figure 1a) Frequency of accidents per 10,000 individuals plotted by census tract.

Figure 1b) Close up of northern Delaware where the frequency of accidents is greatest.
Figure 2a) ANOVA results broken down by quintiles of ratio of black population to total population. Multiple comparison post-hocs are not shown for clarity.

Figure 2b) ANOVA results broken down by quintiles of median income. Multiple comparison post-hocs are not shown for clarity.

Figure 2c) ANOVA results broken down by quintiles of ratio of population without a highschool degree to total population. Multiple comparison post-hocs are not shown for clarity.

Figure 2d) ANOVA results broken down by quintiles of ratio of male population to total population. Multiple comparison post-hocs are not shown for clarity.