COUNTY OF RIVERSIDE DEPARTMENT OF PUBLIC HEALTH

Epidemiology & Program Evaluation

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Using GIS to Identify Dangerous Intersections Near Riverside City Elementary Schools

Introduction

One utility of using Geographic Information Systems (GIS) is the ability to localize data with extreme specificity, helping to guide where the greatest need may exist for intervention. The present analysis is as an example of how GIS was used to examine injury-related data. The Research questions below were developed to guide this assessment and equip the community with the practical information needed to improve the safety of their neighborhoods.

Research Questions

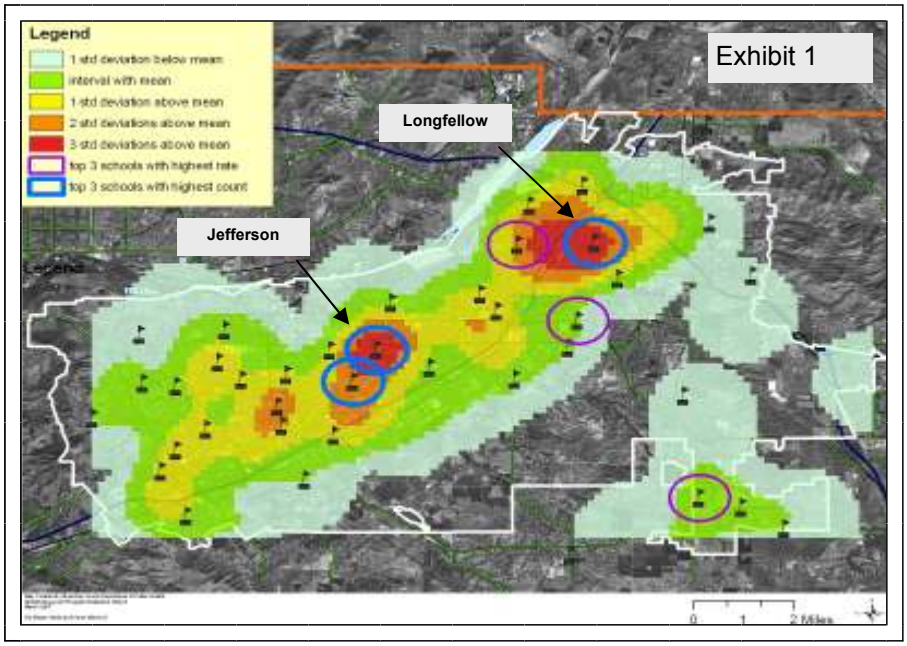
1. What areas surrounding Riverside City public elementary schools have the highest rate of vehicle collisions involving school-aged pedestrians or cyclists?
2. What are the most dangerous intersections or street segments within a one half-mile radius of schools in the highest risk areas?

What elementary schools are in the most dangerous areas for youth walking or bicycling to school?

Three years of traffic collision data (2003-2005) were analyzed to determine: 1) the number of victims, 2) the victim rate*, and 3) the density or clustering of victims, within a one half-mile radius of Riverside City elementary schools. Data were restricted to only those incidents involving school-aged pedestrians or cyclists (Exhibit 1).

Schools with the three highest numbers of victims within a one half-mile radius are circled in blue. The three schools circled in purple had the highest victim rates. Finally, the geographic areas shaded in red represent hotspots where the number of victims recorded were tightly clustered.

The highest numbers of victims occurring within the smallest geographic areas are where the blue circles and red shaded areas overlap. This indicates increased danger posed to youth on bicycles or walking within a one half-mile radius of the school. The two schools located in the highest risk areas are Jefferson Elementary and Longfellow Elementary.



*The denominator for the rate was derived by spatially joining the 5-15 year-old population of all census blocks whose centroid fell within the 1/2-mile radial buffer surrounding the schools.

Are there intersections or street segments that are more dangerous than others? Why?

City-level data used to identify hotspots were next examined at the individual incident-level. This revealed intersections or street segments with higher numbers of vehicle collisions involving school-aged pedestrians or cyclists.

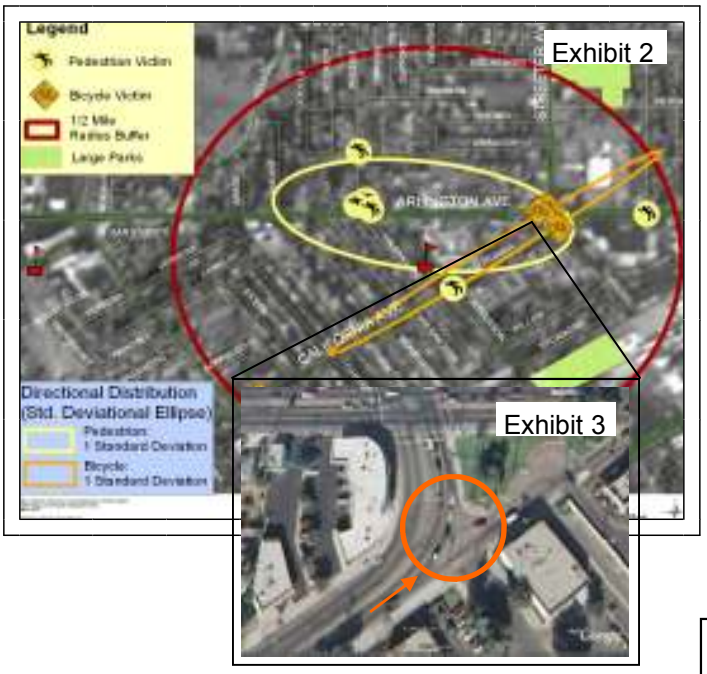


Exhibit 2 displays street level data for bicycle (orange) and pedestrian (yellow) collisions to help determine if there are different patterns or clusters. There are markedly separate clusters of pedestrian and bicycle incidents at several intersections.

Satellite imagery was then used to isolate dangerous intersections. Shown in Exhibit 3, drivers might often change their direction of travel suddenly and without warning which may be due to the street layout. Cars traveling in the direction of the arrow do not have a stop sign. Further, there are no crosswalks.

This area is mixed-use residential and commercial with a large amount of pedestrian and bicycle traffic. Children are traveling to and from school while people are driving to school as well as local businesses.

Exhibit 4 provides an additional perspective by highlighting the large distance between crosswalks along this avenue. Children may cross illegally rather than walk or ride their bicycles to signal-controlled intersections.

Conclusions

These maps can be utilized to: 1) quickly communicate the relative traffic safety around each elementary school; 2) identify traffic routes that may be more dangerous to pedestrians and cyclists; 3) advocate changes to minimize risk to pedestrian and bicycle traffic; and 4) guide future evaluation and analysis.

These findings will further advance traffic injury prevention efforts. Possible future directions for this research include: 1) assessing the time and day of collision to temporally quantify risk; and 2) assessing the high-risk areas and proximity to parks.

Suggested Citation
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