

Data tool for the Safe Routes to School part of the Montgomery County Safe Streets Act

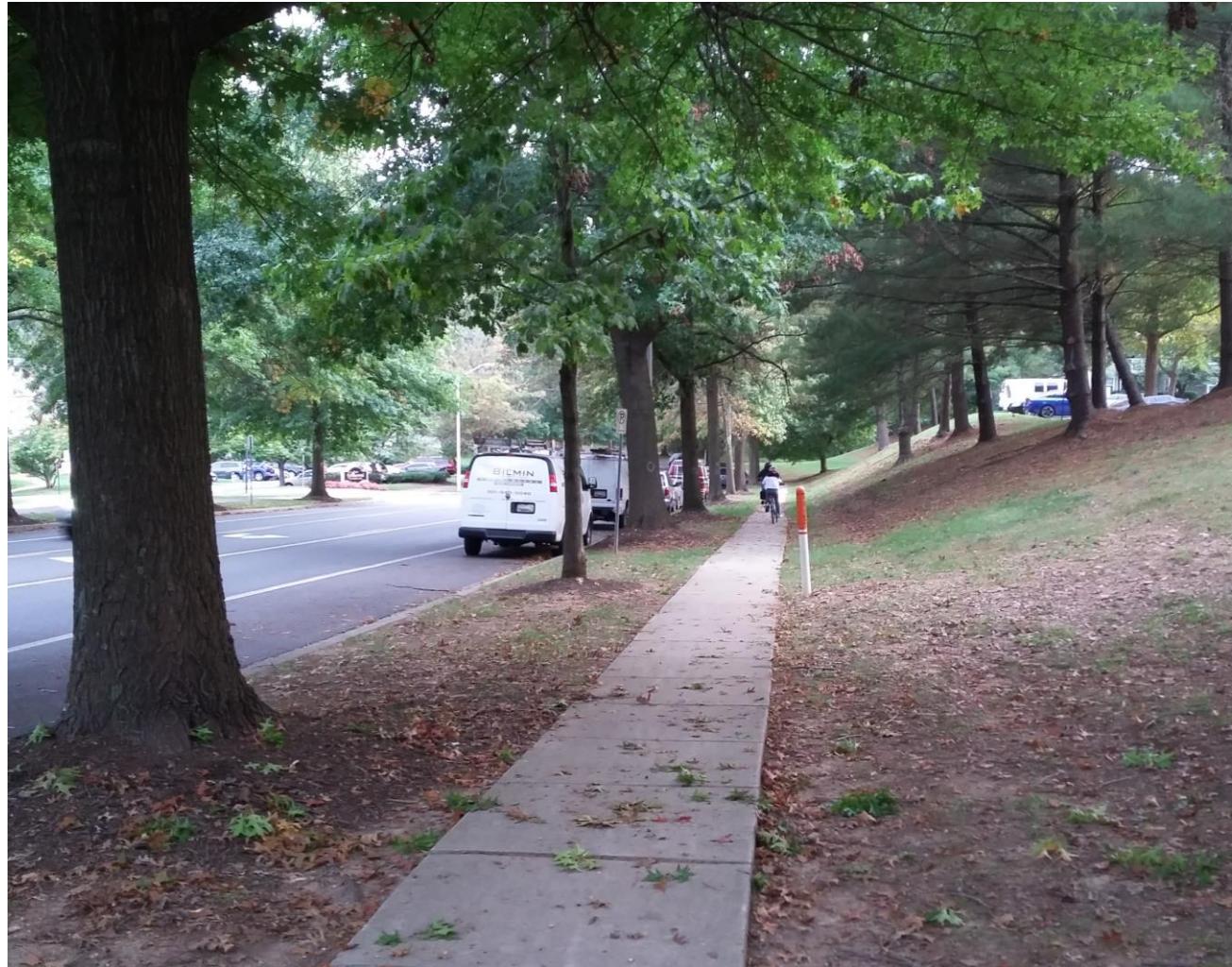
**Miriam Schoenbaum
December 13, 2023**



**Great Seneca Highway (119) across from Northwest H.S., Germantown
Photo by the author**

Requirements of the Montgomery County Safe Streets Act

- Passed: September 27, 2023
- Effective: July 1, 2025
- Safe Routes To School infrastructure reviews for crashes with police reports, involving non-motorists, on county roads, in
 - School zones
 - Walk zones (on school days, 7 am - 9 pm)
 - School bus stops (upon notification by MCPS)
- Leading Pedestrian Intervals + No Right On Red at county-controlled intersections with lots of pedestrians
- Plan for automated traffic enforcement



Waring Station Road in front of Christa McAuliffe E.S., Germantown
Photo by the author

QUESTION: Why infrastructure reviews?

ANSWER: Because removing, replacing, or isolating the hazard is more effective than trying to change human behavior.

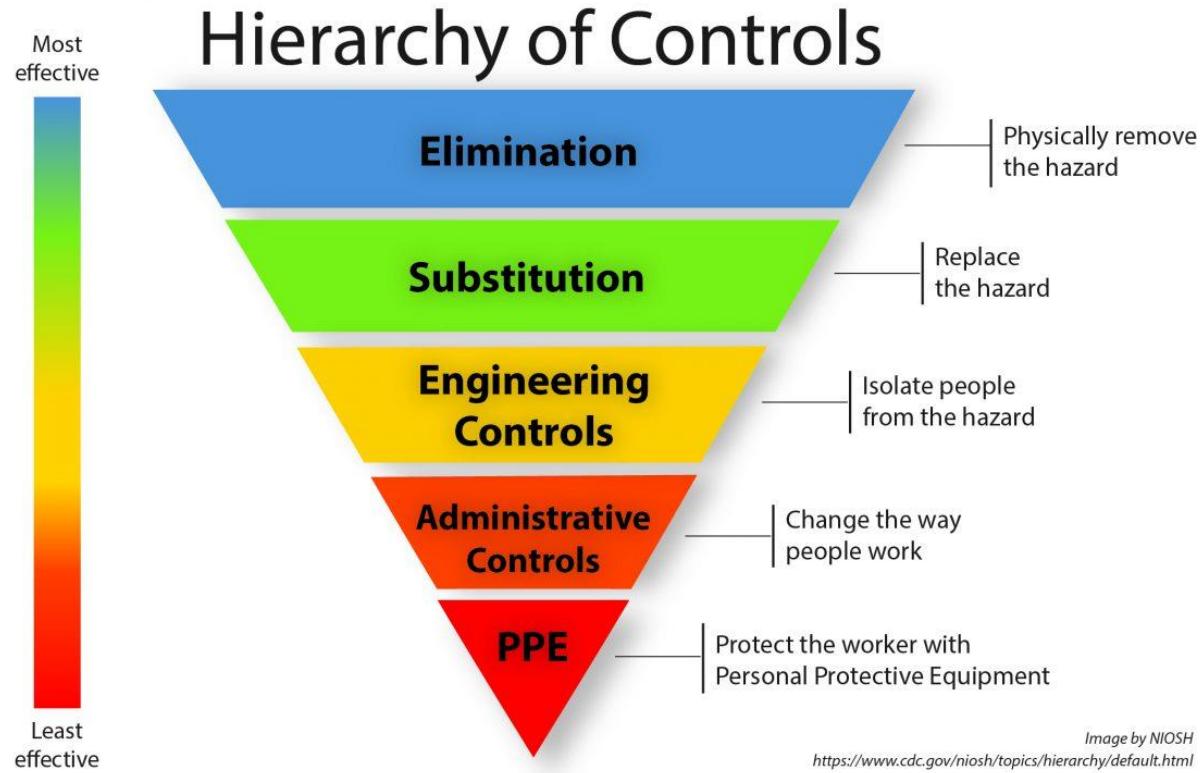


Image by National Institute of Occupational Safety and Health (NIOSH)



Photo from Montgomery County Department of Transportation social media

PROJECT QUESTIONS

1. What are some important characteristics of crashes in Montgomery County where drivers hit non-adult (aged 0-18) non-motorists (pedestrians, bicyclists, etc.)?
2. How many crashes might require infrastructure reviews by the Montgomery Department of Transportation, under the Safe Routes to School provision of the Safe Streets Act, when the law goes into effect on July 1, 2025?



Frederick Road (355) between Clarksburg H.S. and Rocky Hill M.S., Clarksburg
Image by the author

CRASH DATA SOURCES

- Data Montgomery crash open data
 - Non-motorist and Incident datasets
 - Updated weekly (Fridays)
 - January 1, 2015 - present
 - Read in live (static file posted)
- Maryland State Police crash data
 - Includes age and gender
 - Updated daily
 - January 1, 2018 - present
 - Not read in live (dynamic web page)
- Both pull from the same source:
police Automated Collision Report
System (ACRS) forms



Quince Orchard Road (124) and Darnestown Road (28), next to Quince Orchard H.S., Gaithersburg
Image by the author

GEOSPATIAL DATA SOURCES

- Montgomery Planning Department
 - Physical features
 - School locations
 - Public (posted) data
- Montgomery County Public Schools
 - Walk zones (2021-2022)
 - School bus stops (2021-2022)
 - Obtained via Maryland Public Information Act request
- Montgomery County Department of Transportation
 - County school zones (current)
 - Obtained via request to Montgomery County Vision Zero coordinator



Muddy Branch Road at King James Way/Harmony Hall Road, Gaithersburg

PRODUCTION STEPS

1. *[R webscraping file (R Selenium package): read in MSP crash data]*
2. R Markdown file 1: read in, wrangle, and merge crash data; do EDA and inferential data analysis; create output file for spatial processing
3. ArcGIS Pro file: run model to identify non-motorists hit in walk zones, school zones, school bus stops; create output file for further analysis and processing
4. R Markdown file 2: read in and wrangle ArcGIS Pro output file; create Safe Routes to School output file



Georgia Avenue (97) at Mason Street, Glenmont
Image by the author

DATA PRODUCTS

1. A merged, mappable crash data file that includes the non-motorist's age and sex
2. A data file that identifies crashes that might require infrastructure reviews under the Safe Routes to School part of the Safe Streets Act (if they happened after July 1, 2025)

POTENTIAL CUSTOMERS

1. Advocates for safe streets in Montgomery County
2. The Safe Routes to School Program in the Montgomery County Department of Transportation
3. The Montgomery County Vision Zero Coordinator



University Boulevard (193) at Northwood H.S., Silver Spring
Image by the author

DEFINITIONS

- CRASH = crash with police Automated Crash Reporting System report
- SCHOOL ZONE = an area within a half-mile radius of any school established by SHA or MCDOT per Maryland Transportation Code § 21-803.1
- WALK ZONE = an area within which MCPS expects students to walk or bike to school instead of taking a school bus



Newport Mill Road near Newport Mill M.S. and Einstein H.S., Wheaton
Image by the author

MORE DEFINITIONS

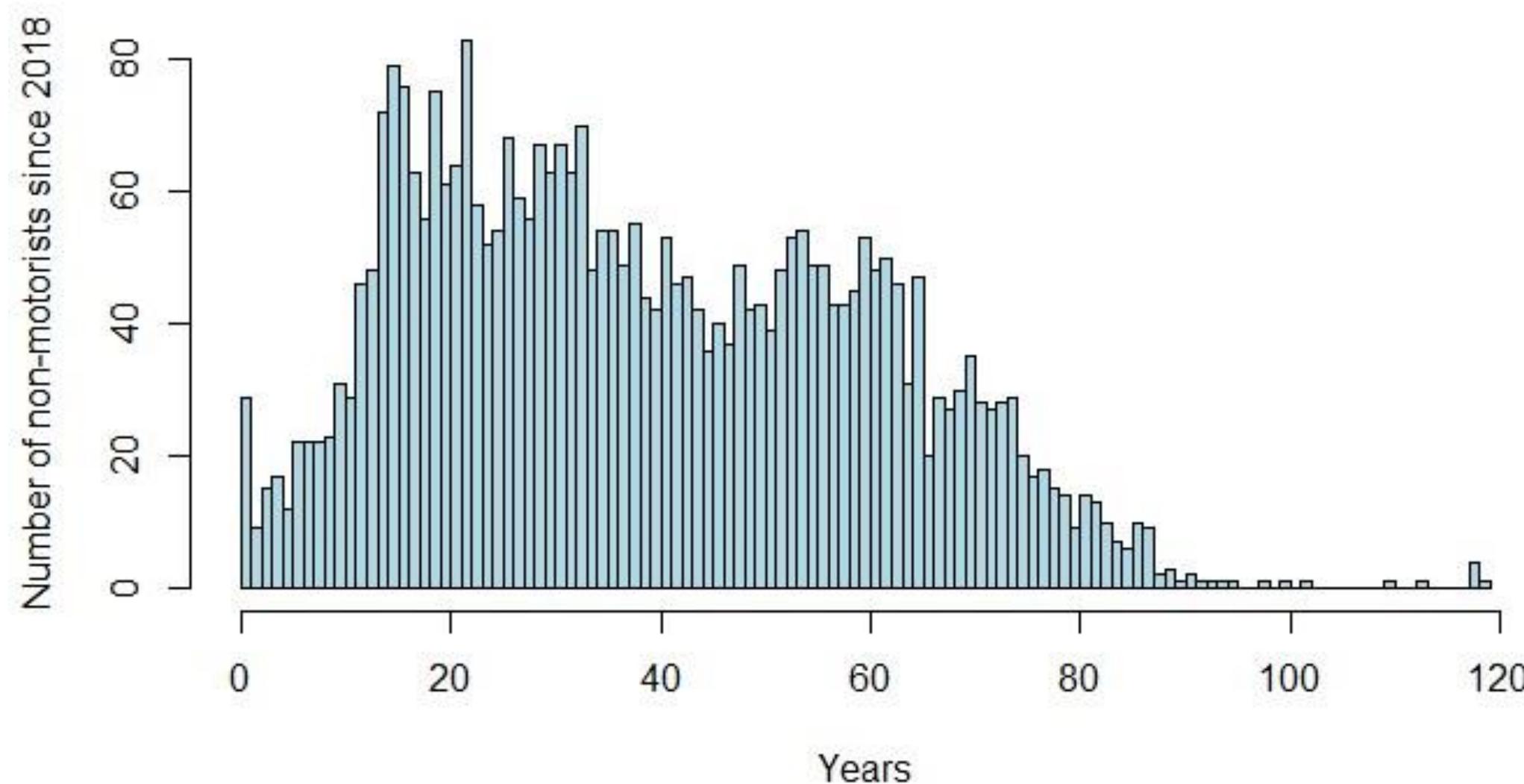
- NON-ADULT = person aged 0-18
- NON-MOTORIST = person who was walking, standing, or using a small thing with wheels
- SMALL THINGS WITH WHEELS = bicycles, scooters, skateboards, strollers, wheelchairs, tricycles, mobility scooters, etc. (including e-powered)
- NON-MOTORIST HIT ≈ non-motorist hit and physically injured (90%)

(Note the implicit bias: the norm is an adult motorist.)



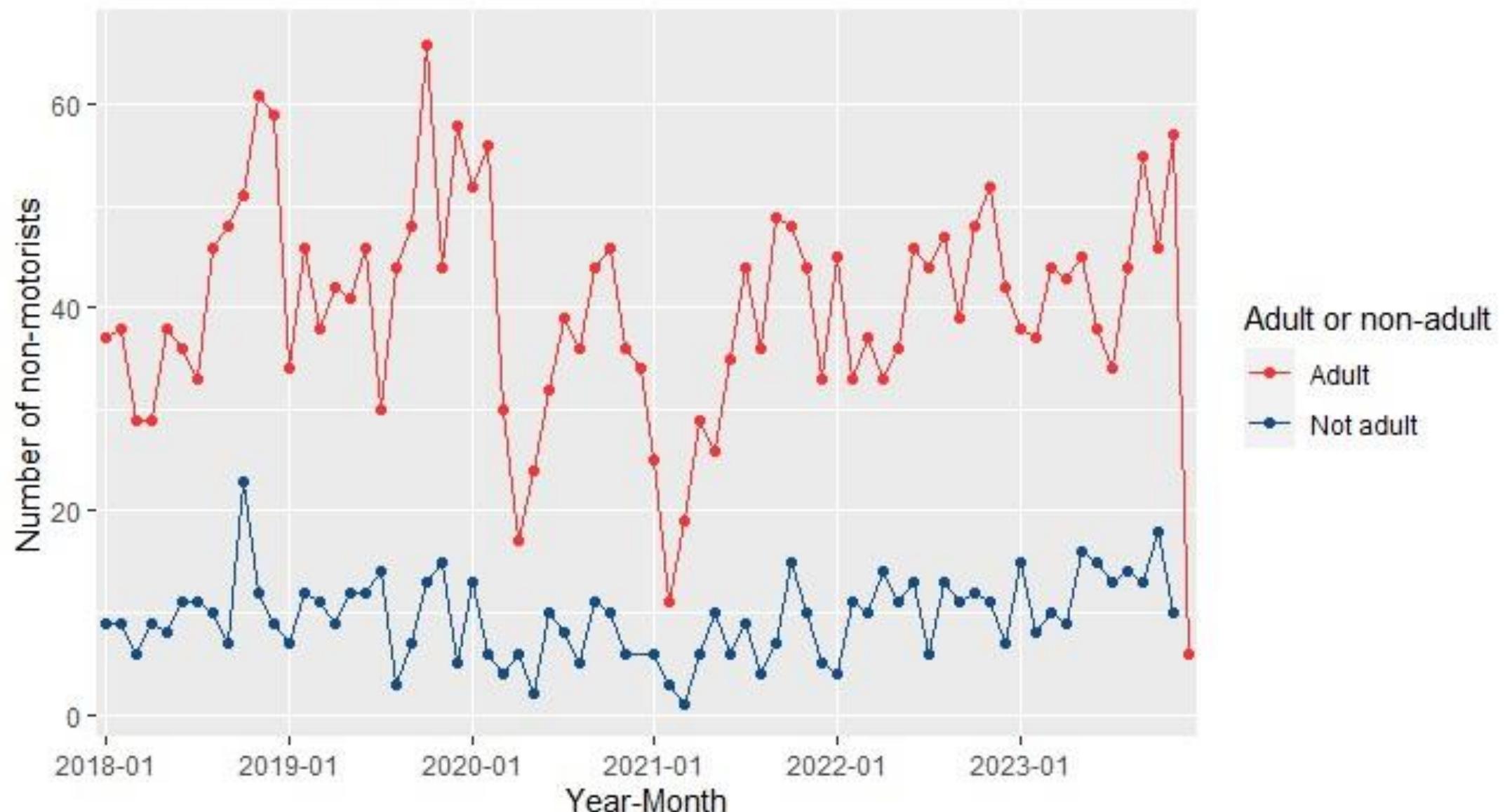
Winterspoon Lane near Wisteria Drive, Germantown
Image by the author

Age (years) of non-motorists in police-reported crashes



Non-motorists with police crash reports, by adult (19+) or non-adult

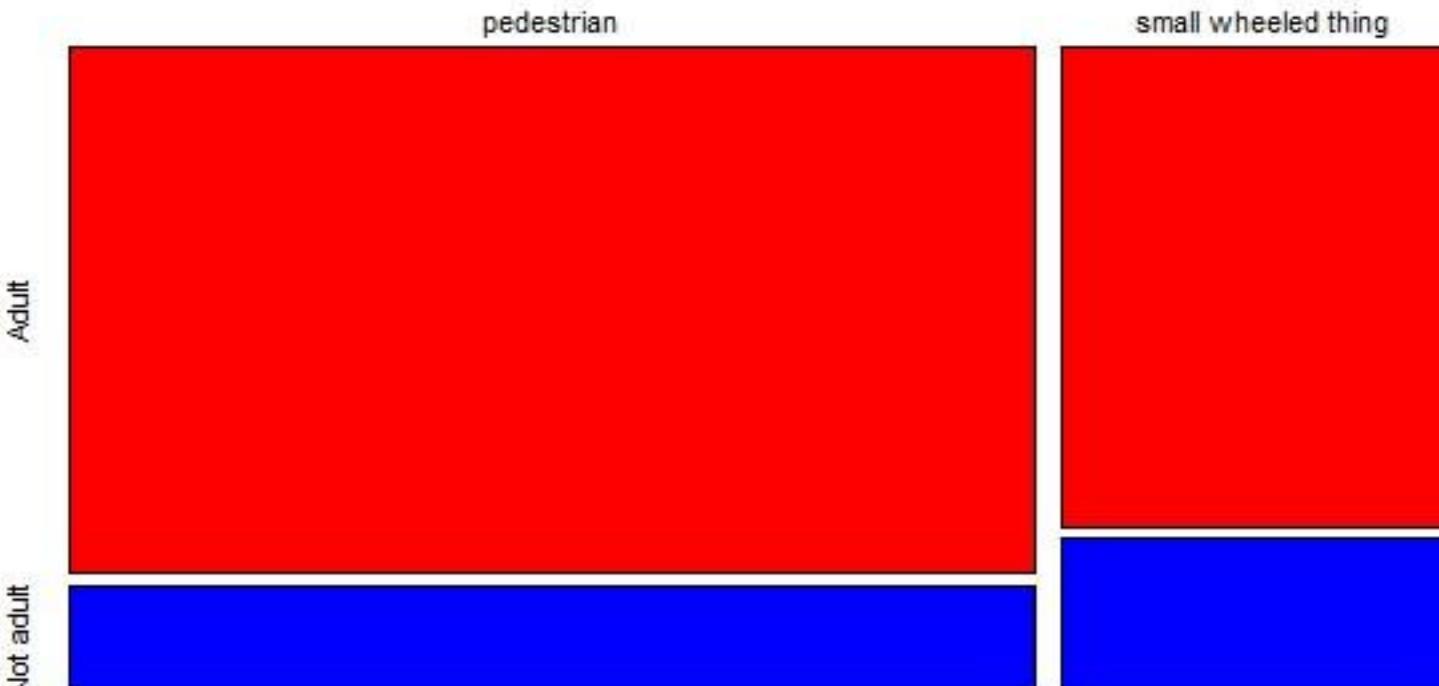
By month, January 2018-present



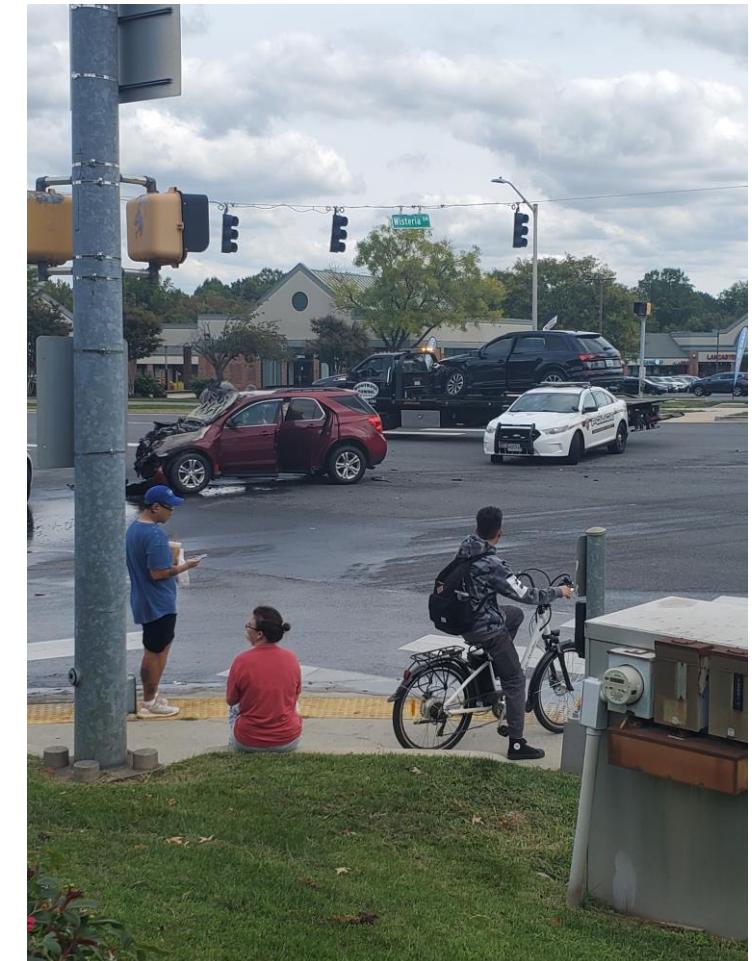
Compared to adult non-motorists, non-adult non-motorists in crash reports were more likely to have been using a small thing with wheels (e.g., bicycle, scooter, skateboard, stroller), vs. walking.

Adult/Not adult and Pedestrian/Small thing with wheels

Adult or not adult



Pedestrian or Small thing with wheels



Great Seneca Highway (119) at Wisteria Drive, next to Seneca Valley H.S., Germantown, at dismissal time
Photo by a friend of the author, used with permission

Taking other significant factors into account, police are about 50% more likely to find the non-motorist at fault when a driver hits a non-adult non-motorist, compared to an adult non-motorist.

Outcome variable of logistic regression model:
non-motorist at fault (yes/no)

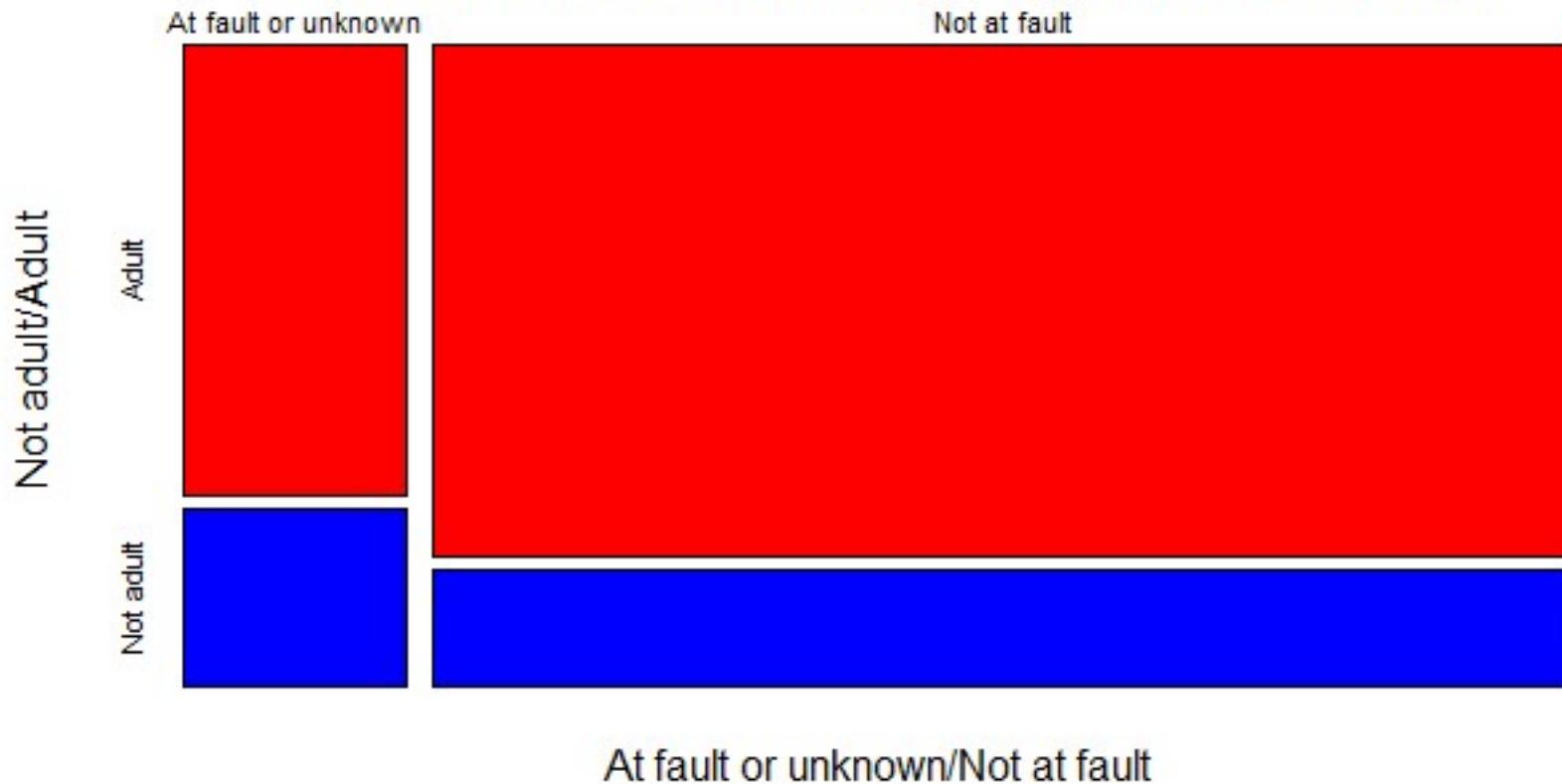
Police MORE likely to find non-motorist at fault	Police LESS likely to find non-motorist at fault
Driver did not hit & run	Driver hit & ran
Non-adult (0-18)	Adult (19+)
Serious or fatal injury	“Minor” or “possible” injury or no injury
At night (9 pm - 7 am)	During the day (7 am - 9 pm)
On road	Off road (e.g., parking lot)
Male	Female



New Hampshire Avenue (650) south of the Beltway, Silver Spring
Photo by the author

Even for non-motorists in crosswalks or on sidewalks, who did not disobey a signal, police were more likely to find non-adult non-motorists at fault, compared to adult non-motorists.

**For nonmotorists hit in crosswalks or on sidewalks,
who did not disobey a signal:
Not adult/Adult and At fault or unknown/Not at fault**



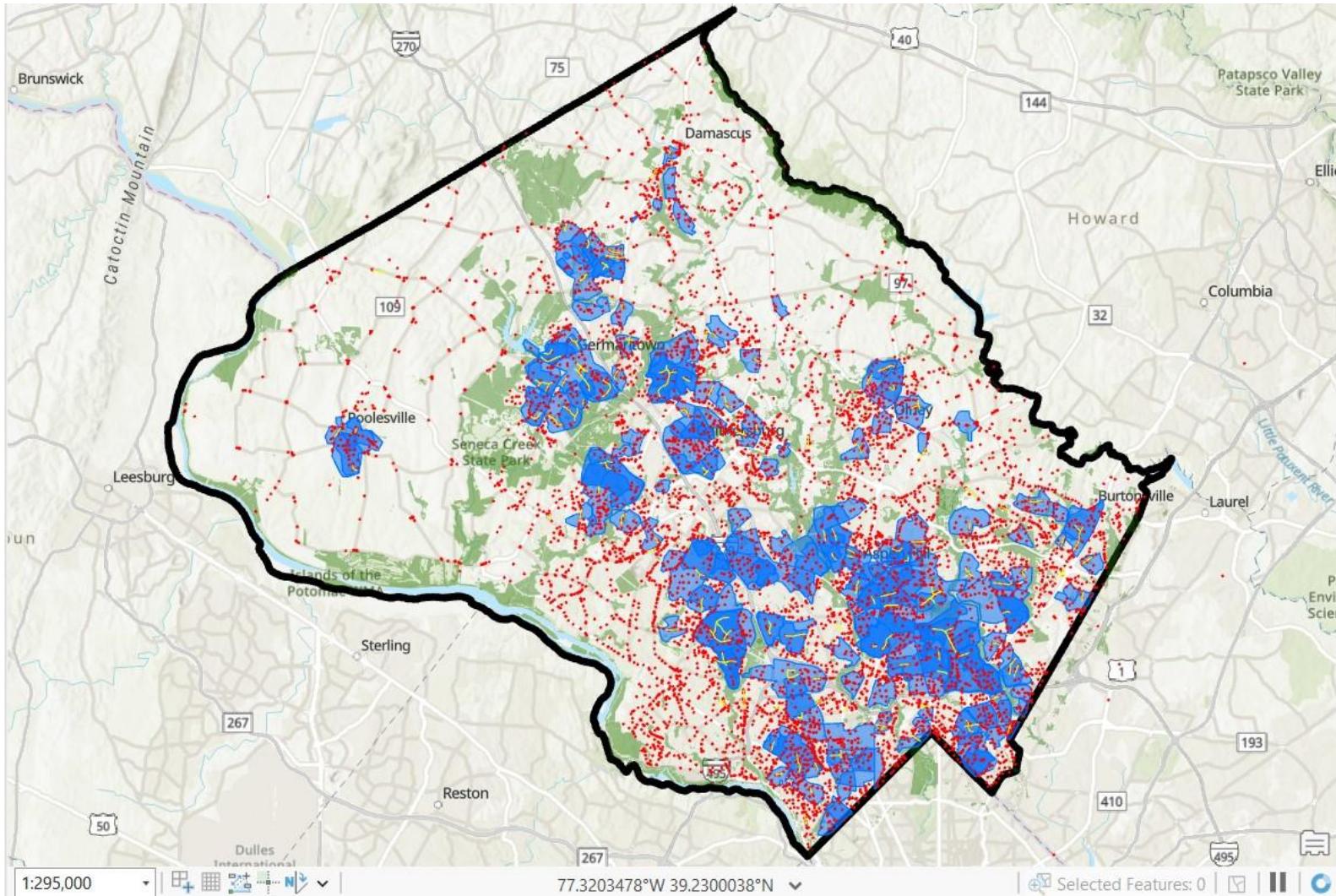
SAFE STREETS ACT CRITERIA FOR REQUIRED SAFE ROUTES TO SCHOOL INFRASTRUCTURE REVIEW

- A police report for a crash
- involving a non-motorist (of any age),
- on a road controlled by the county, AND
- in a county-established “school zone”, OR
- within a designated school walk zone between 7 am and 9 pm on a school day, OR
- at a school bus stop (upon notification by MCPS).

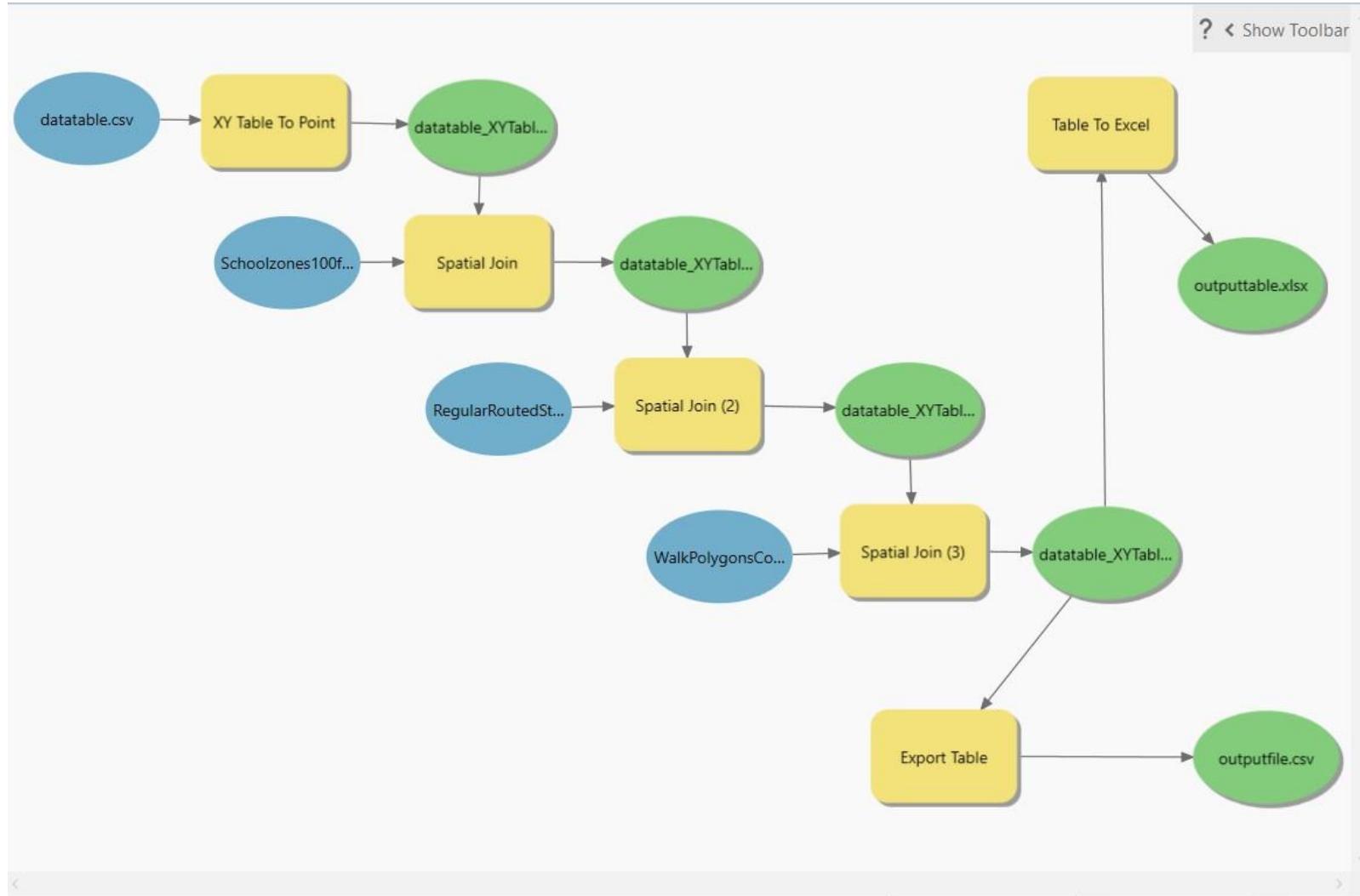


Midcounty Highway (124) at Pier Point Place, Montgomery Village
Photo by the author

Geospatial data: walk zones (blue areas), school bus stops (red dots), school zones (yellow lines)



Geospatial data processing model in ArcGIS Pro



Potential numbers of Safe Routes to School (SRTS) crashes for required infrastructure review

2018-2023 to date

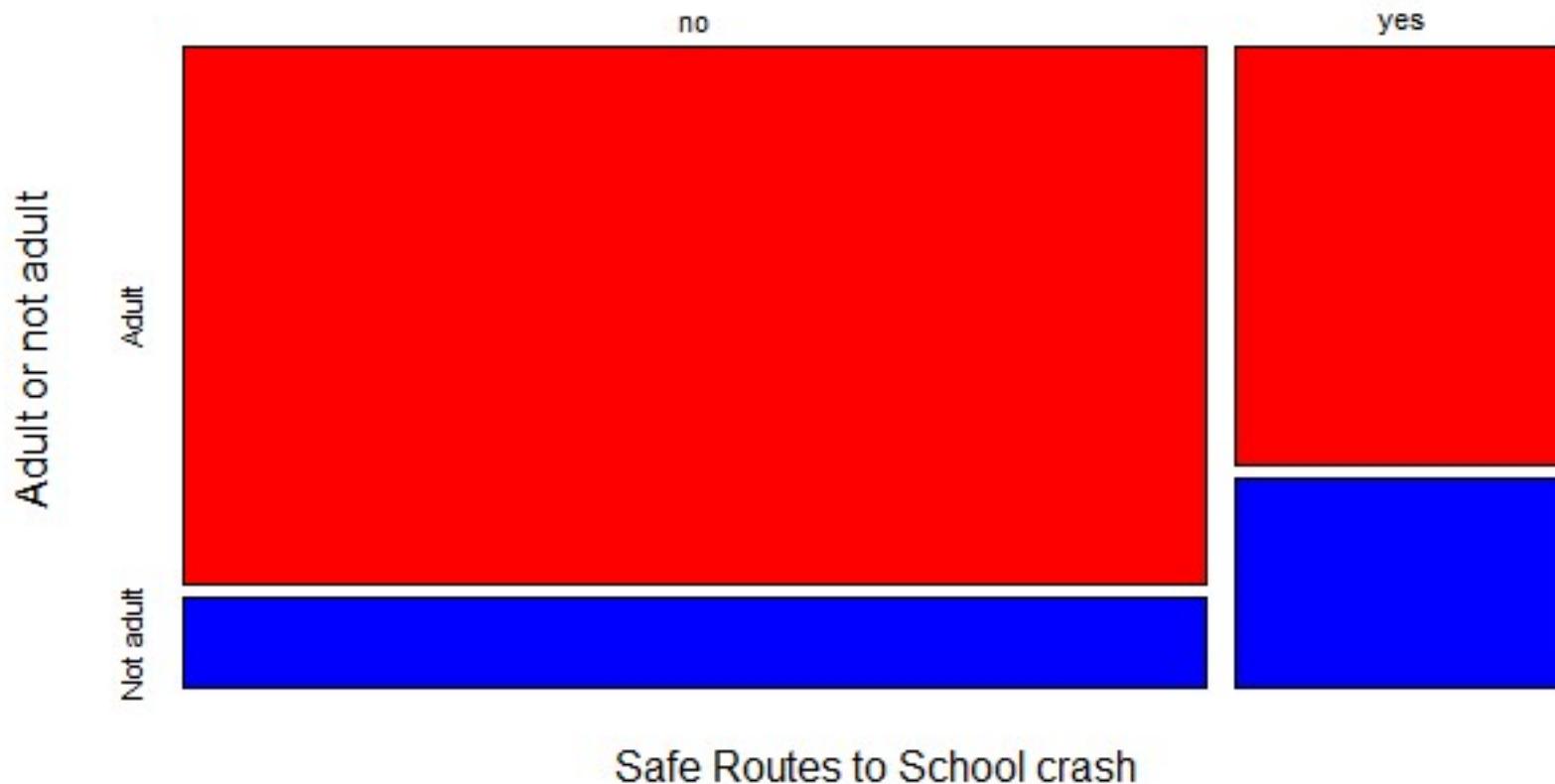
SRTS criteria	2018-2023 to date	2023 to date
School zone	202	46
School bus stop	139	30
Walk zone	736	136
Total	873	162



Dennis Avenue near Georgia Avenue (97), Forest Glen
Photo by a friend of the author, used with permission

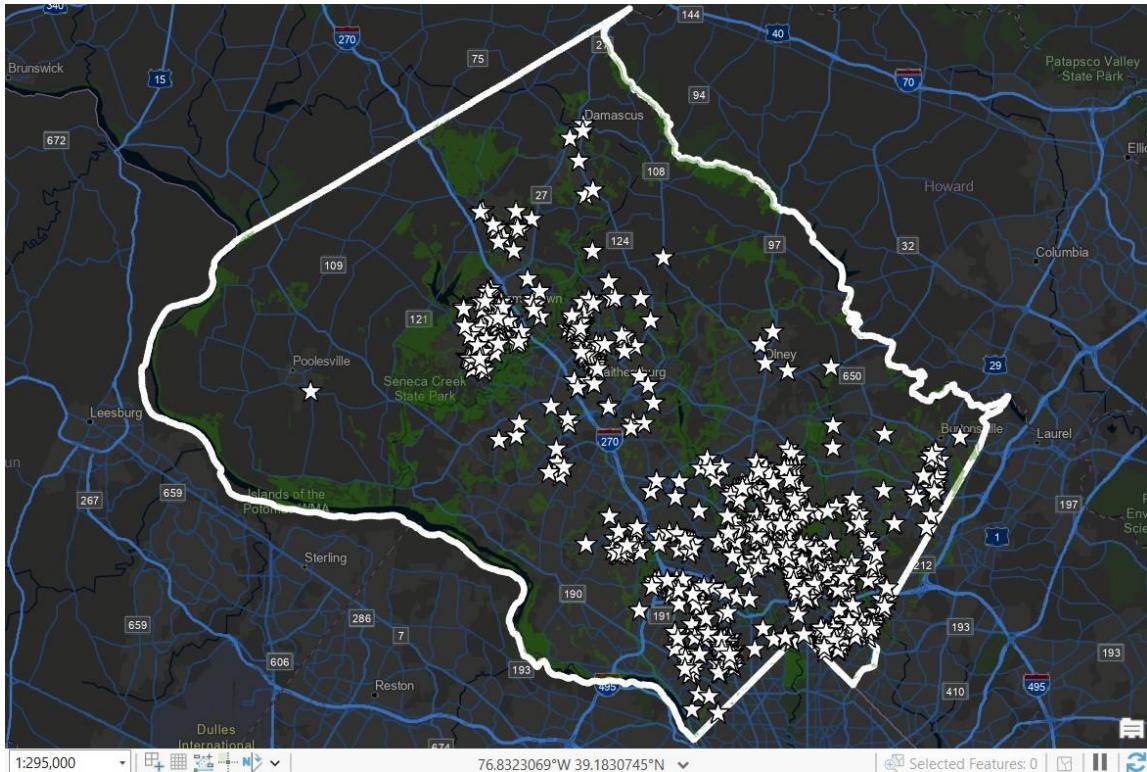
Potential Safe Routes to School crashes disproportionately involve drivers hitting non-adult non-motorists vs adult non-motorists

Adult/Not adult and SRTS crash



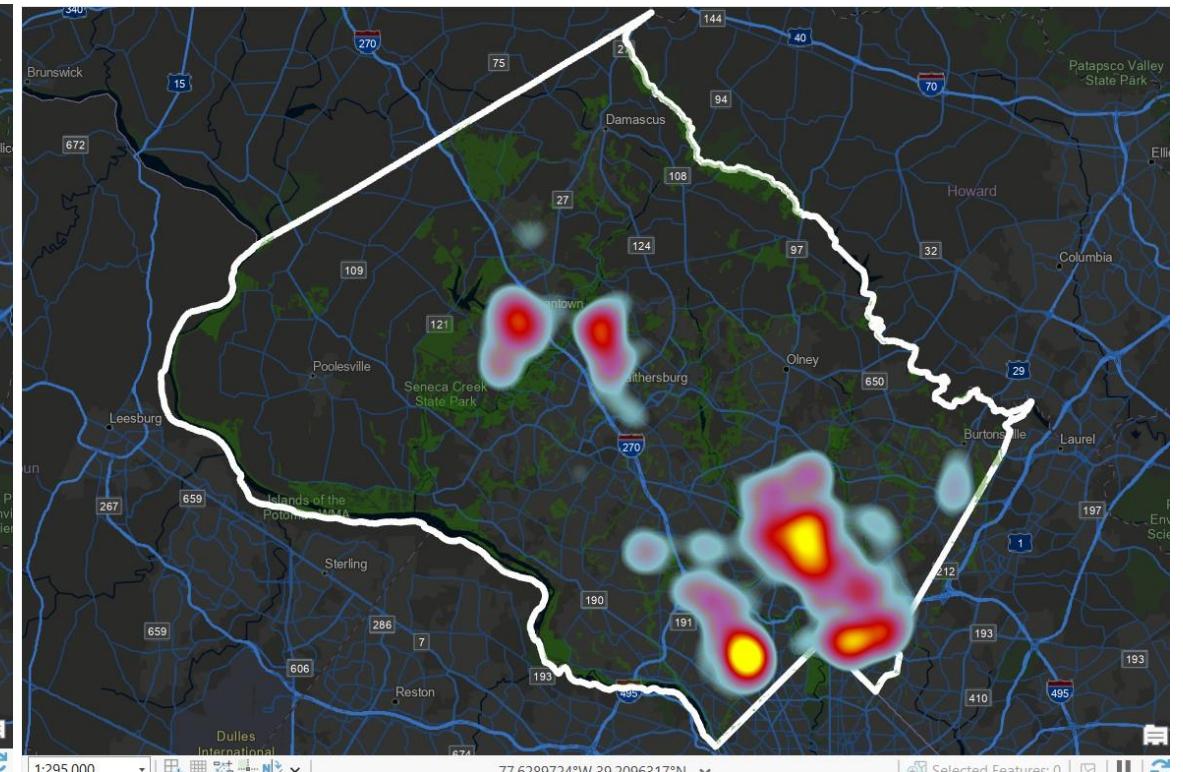
Locations of potential Safe Routes to School crashes

Individual crash locations



There are clusters of SRTS crashes, but there are also individual SRTS crashes outside of those clusters.

Crash heat map



SRTS crash hot spots:
Bethesda/North Bethesda, Silver Spring/Takoma Park, Wheaton/Glenmont/Aspen Hill
Germantown, Montgomery Village
Burtonsville, Rockville/Potomac

OVERALL EXPERIENCE WITH DATA SOURCES

Pros

1. Data Montgomery is an amazing resource, and many localities don't have anything like it.
2. The Montgomery Planning Department is a wonderful resource for geospatial data.
3. In many places, police crash data are secret, even though crashes are an important public safety issue.

Cons

1. It is not easy to get data out of Montgomery County Public Schools.
2. Crash data reports do not have enough information about non-motorist actions and infrastructure.
3. Ideally, police crash reports would be reviewed for data accuracy and consistency.



Colesville Road (29) at the on-ramp to I-495, near Montgomery Blair H.S., Four Corners
Photo by the author

RECOMMENDATIONS

- The Maryland State Police crash data site should retain all of the data they have posted, not just the current year and previous 5 years.
- The Maryland State Police crash data site should provide data files that are downloadable by API.
- The Data Montgomery crash data should include age and gender.
- Montgomery County Public Schools should publicly post school walk zone maps and spatial data files.
- The National Highway Traffic Safety Administration should include more complete data about non-motorist actions and infrastructure in the Model Minimum Uniform Crash Criteria (currently being revised).



Montgomery Village Avenue at Walkers Choice Road, Montgomery Village
Photo by the author

THANK YOU TO

- Data Montgomery
- The GIS team and the Pedestrian Master Plan team at the Montgomery Planning Department
- The safe-streets advocates at Action Committee for Transit, Montgomery County Families for Safe Streets, and the Washington Area Bicyclist Association
- The faculty and students in my Montgomery College Data Science and GIS classes
- The Montgomery County Council and County Executive



Old Georgetown Road at Cheshire Drive, North Bethesda
Photo by the author

QUESTIONS?



Grosvenor Lane at King Charles Way/Grosvenor Place, North Bethesda
Photo by the author