Pedestrian Safety Initiative – Bicycle Safety

DOT, MCPD, PIO

December 10, 2014

CountyStat

CountyStat Principles

- **Require Data-Driven Performance**
- **Promote Strategic Governance**
- **Increase Government Transparency**
- **Foster a Culture of Accountability**

Agenda

- **Welcome and Introductions**
- **Overview of Bicycle Collision Data**
- **Examination of Party at Fault Variables**
- **Times and Dates of Bicycle Collisions**
- **Geospatial Analysis of Bicycle Collisions**
  - Bethesda Central Business District
  - Silver Spring Central Business District
- **Overview of Bicycle Safety Budget**
- **Wrap-up**

Meeting Goals

- Identify and discuss specific engineering, education, and enforcement strategies for mitigating bicycle collisions based on data trends
- Utilize trends in bicycle collisions to drive targeted resource allocation

Desired Outcomes

- Lower the amount of bicycle and vehicle collisions in Montgomery County through data-driven decision making

Section 1

OVERVIEW OF BICYCLE COLLISION DATA

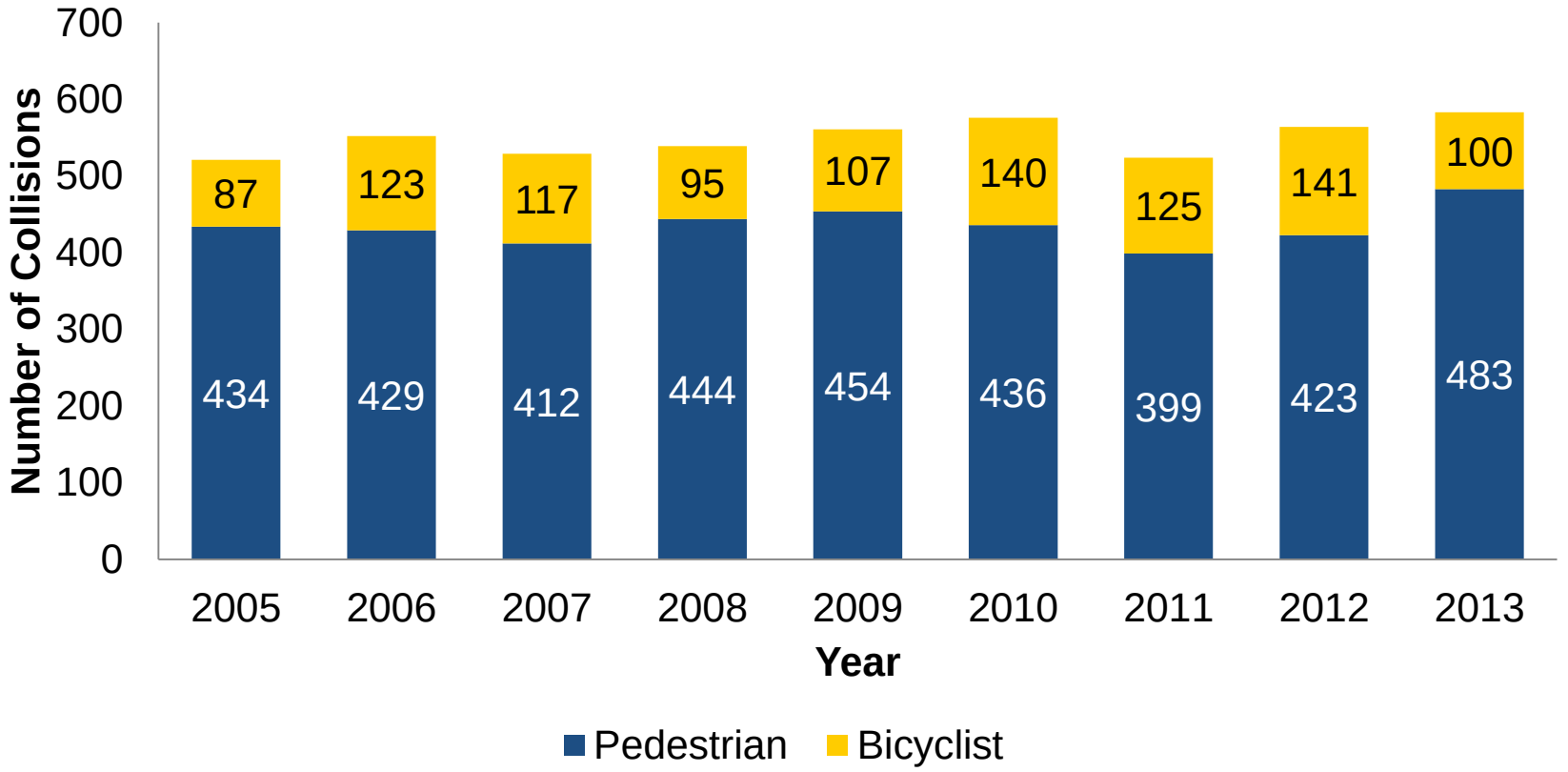
Notes on Bicycle Collision Data

- **Bicycle Crash Data**
  - Data are entered manually into the database, which can lead to data entry errors
  - Not all collisions, especially ones that do not result in property damage or personal injuries, are reported to MCPD
  - Does not include pedestrian and bicycle incidents
  - Takoma Park Police data are not included
  - Collision data are mapped at the nearest intersection

- **2014 Data**
  - 2014 data are not readily available due to the transition from the Maryland Automated Accident Reporting System (MAARS) to the Automated Collision Reporting System (ACRS)
  - The State indicates access to the ACRS system will not occur until 2015 at the earliest

Analysis of bicycle crash data will not meet all standards of statistical rigor due to small sample sizes, but comparison over time will yield meaningful results.

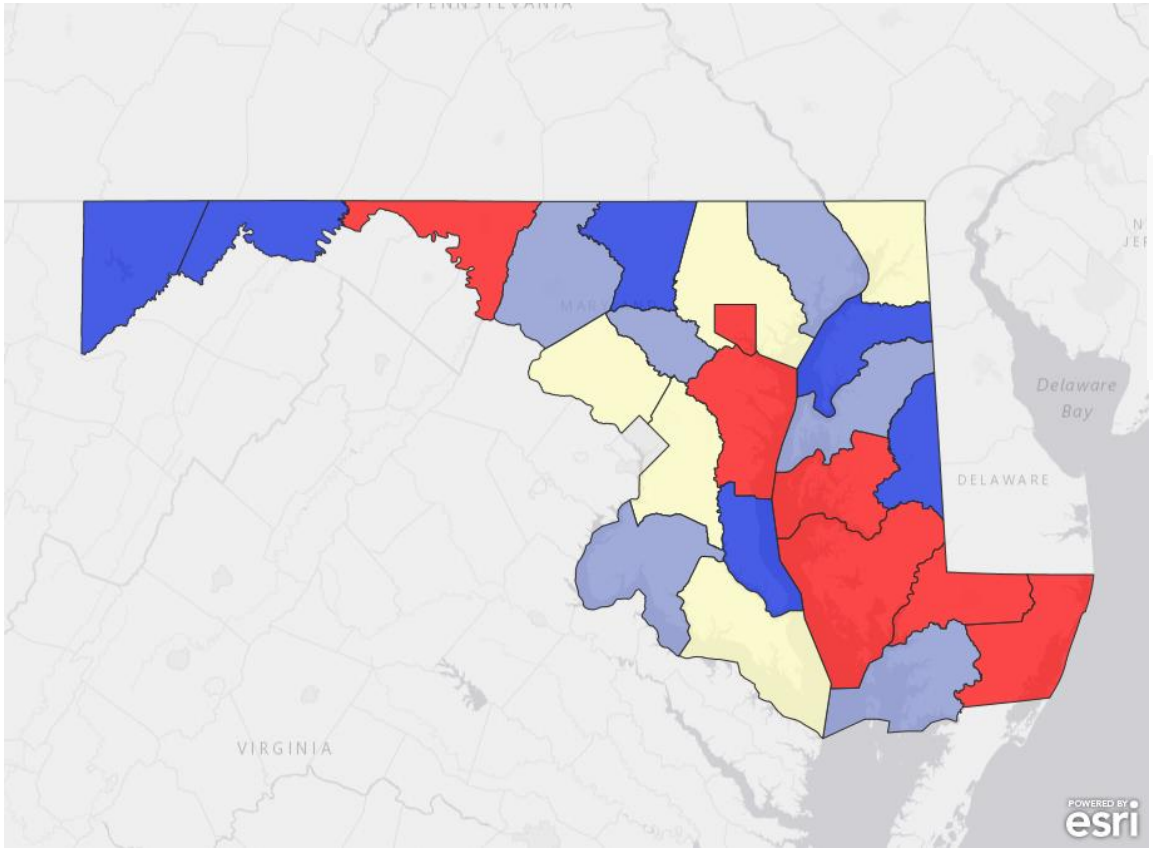
Bicycle and Pedestrian Collisions in Montgomery Co.



From 2005 to 2013, bicyclists averaged 21% of all bicycle and pedestrian collisions with motor vehicles. The share that were bicycle collisions ranged from 17% in 2005 and 2013 to 25% in 2012. The ratio of bicycle to walking pedestrians involved in a collision in Montgomery County was similar to the statewide trend.

Sources: MCPD; MCTSA

Cyclist Collisions by MD County – 2008 to 2012 Average per 100k Population (1/2)



Cyclist Collisions per 100k:

- 1st Quartile: 2.6 – 6.1 Collisions
- 2nd Quartile: 6.1 - 7.6 Collisions
- 3rd Quartile: 7.6 – 14.2 Collisions
- 4th Quartile: 14.2 – 50.5 Collisions

From 2008 to 2012, Montgomery County averaged 11.9 cyclist collisions per 100,000 residents. This was the 8th highest rate among Maryland counties, placing it in the 3rd quartile. However, data were not adjusted for the population of cyclists in each county as these data are unavailable.

Source: Maryland Highway Safety Office; US Census Bureau 2010 population data

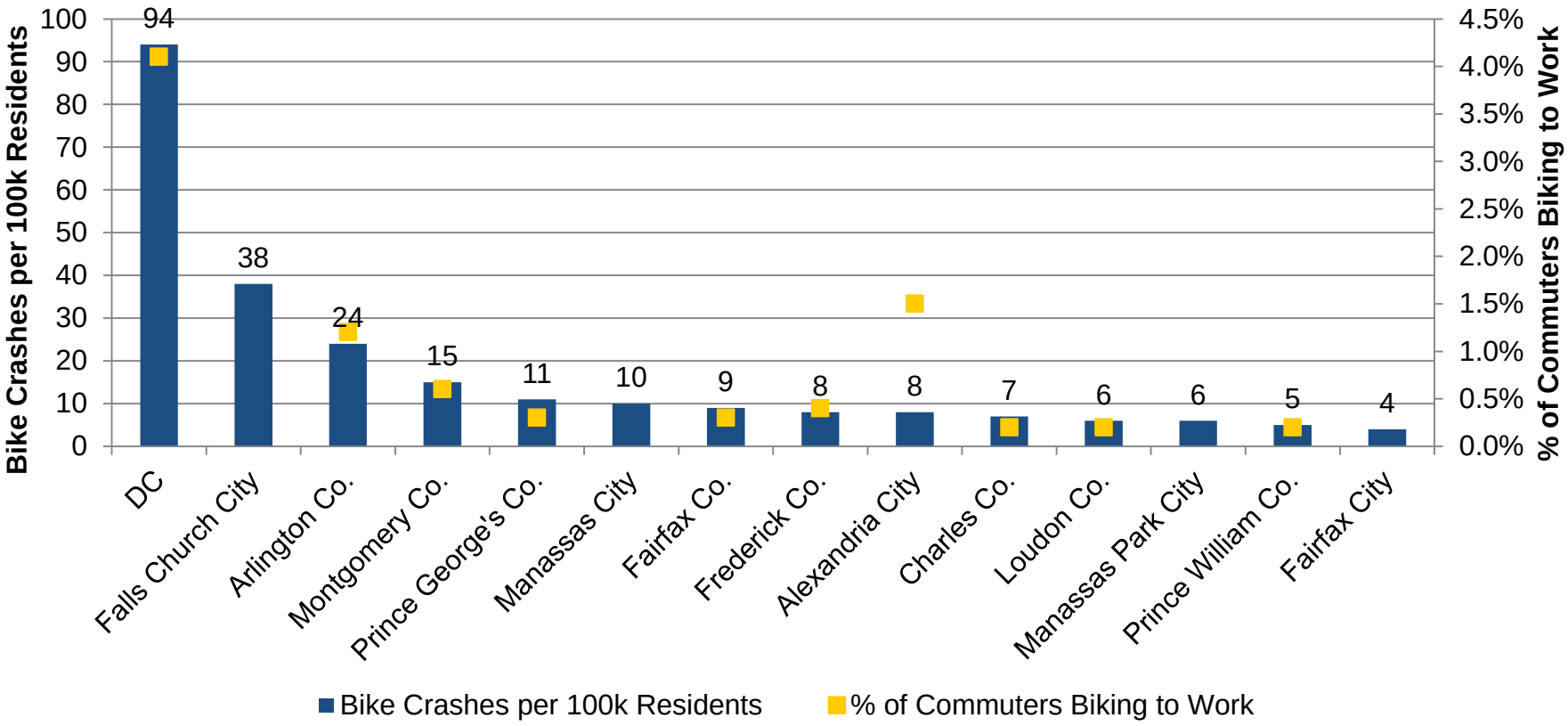
Cyclist Collisions by MD County – 2008 to 2012 Average per 100k Population (2/2)

County	Collisions per 100,000 Population
Worcester	50.5
Baltimore city	29.5
Wicomico	21.3
Dorchester	18.4
Talbot	15.9
Anne Arundel	14.7
Washington	14.2
Montgomery	**11.9**
Cecil	11.9
Baltimore	11.2
Prince George's	10.7
St. Mary's	8.6

County	Collisions per 100,000 Population
Somerset	7.6
Charles	7.5
Howard	7.3
Harford	6.9
Frederick	6.9
Queen Anne's	6.3
Caroline	6.0
Calvert	5.6
Carroll	5.4
Kent	5.0
Garrett	3.3
Allegany	2.7

Source: Maryland Highway Safety Office; US Census Bureau 2010 populations

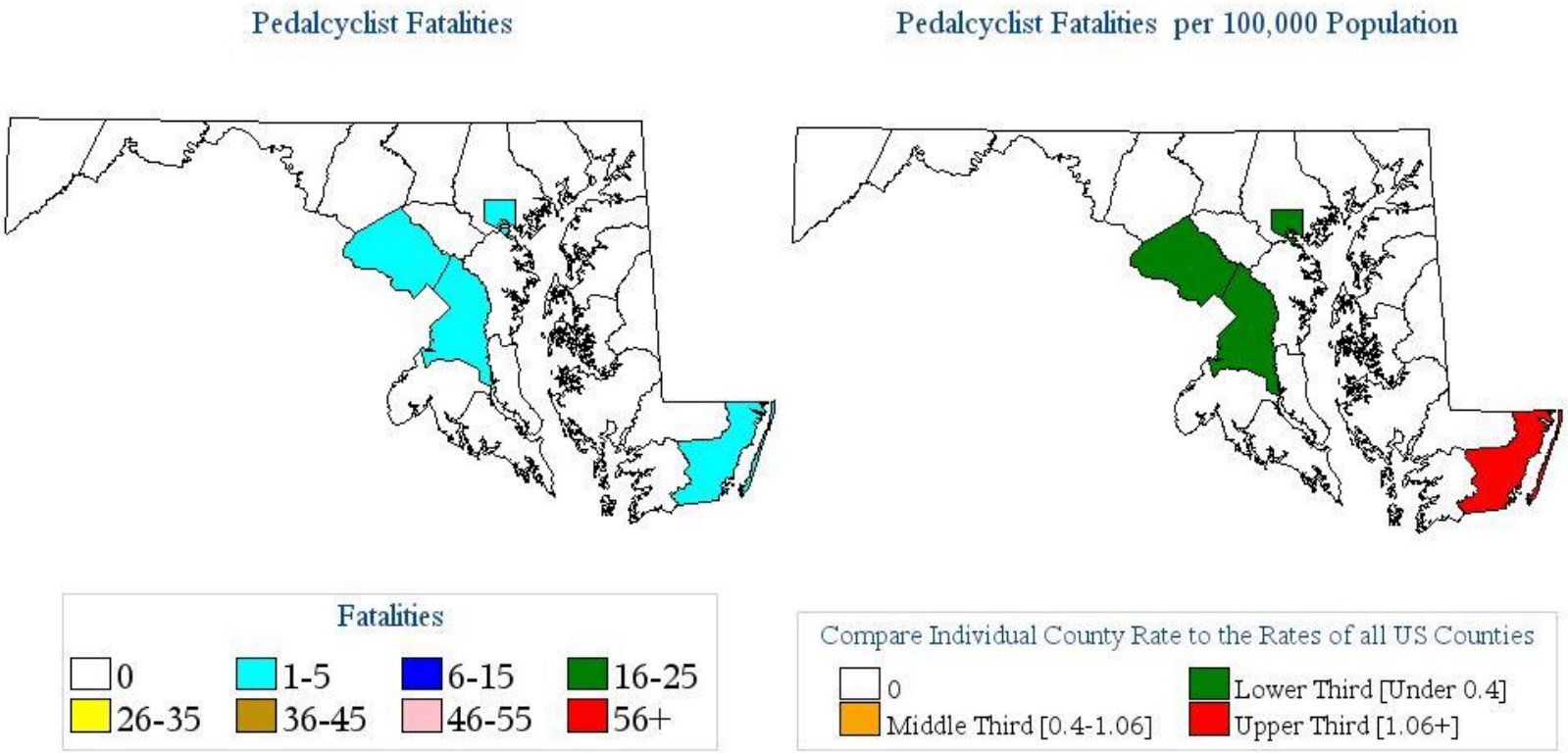
2012 Bicyclist Crashes and Injuries per 100k Population in the Washington Region



Based on MWCOG's data, Montgomery County had the 4th highest rate of bicycle crashes in the region. The jurisdictions with the higher collision rates tend to be inner ring jurisdictions.

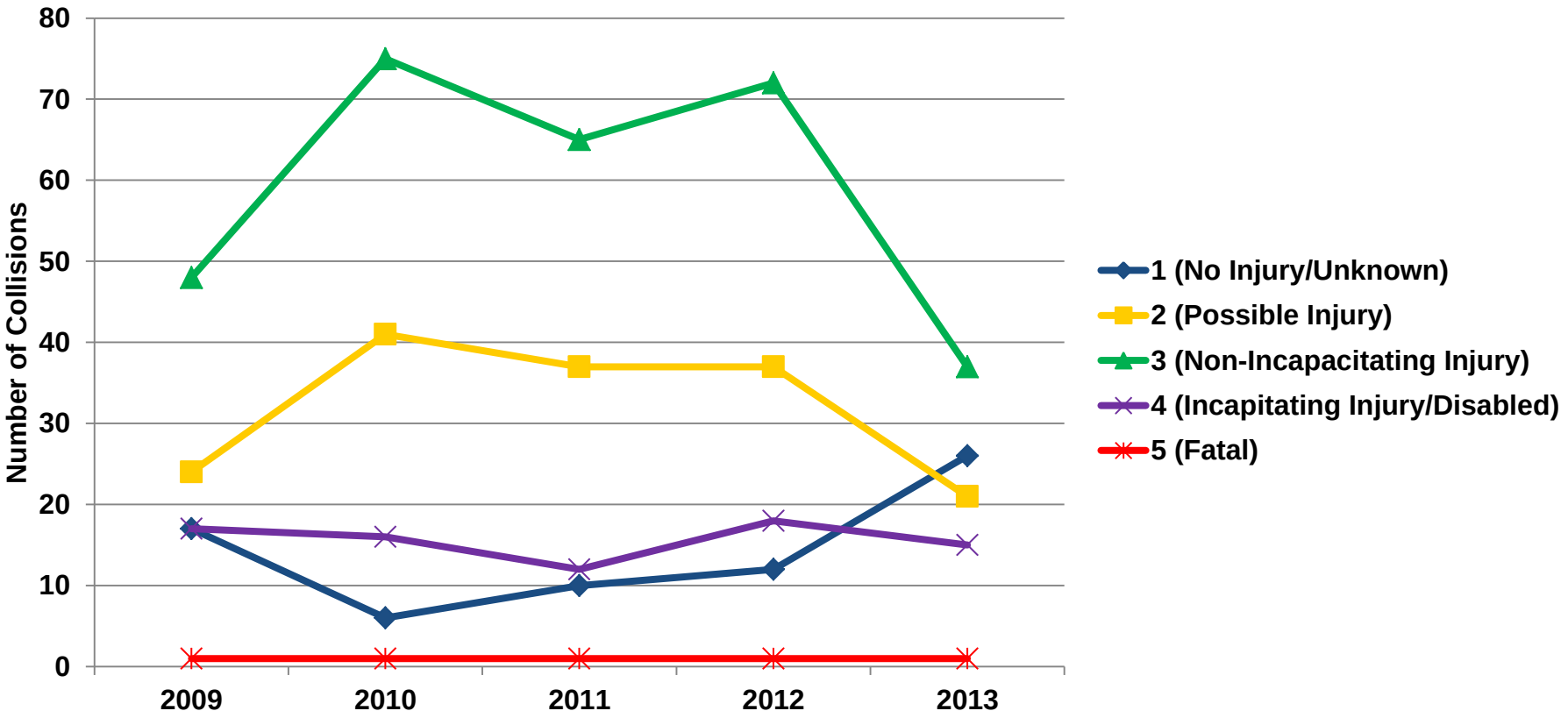
Source: MWCOG - Bicycle and Pedestrian Plan for the National Capital Region; pg. 3-10

Cyclist Fatalities by MD County for 2012



As with pedestrian fatalities, Montgomery County was among the lower third for cyclist fatalities per 100,000 population for all US counties.

Bicycle Collisions by Highest Injury Level*

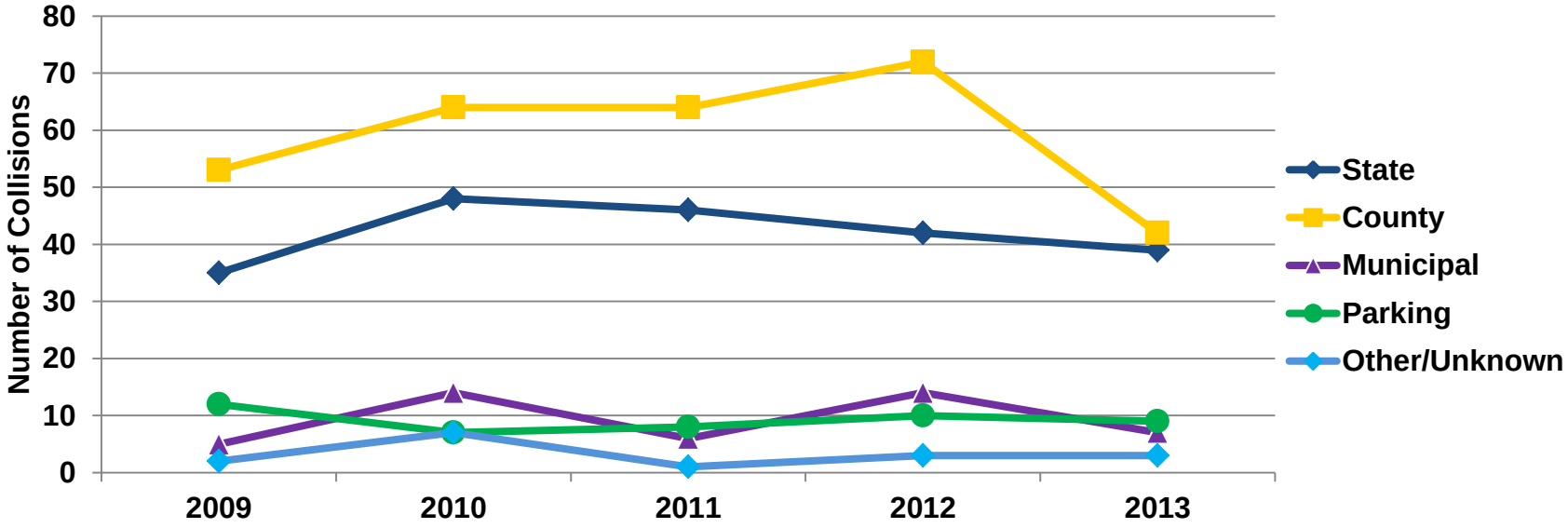


From 2009 to 2013, the County had one bicyclist fatality each year. From 2012 to 2013, levels 2, 3, and 4 recorded injuries declined. The increases in level 1 crashes between 2010 and 2013 are partially a result of better reporting of no injury collisions. The uptick in level 1 collisions was also seen in the pedestrian collision data.

***Due to reporting practices, only the highest level injury is recorded. Highest injury level refers to the highest recorded bike injury for a given collision (e.g. if two cyclists are struck, and one has a level 3 injury and one has a level 1 injury, the collision is recorded as a level 3 collision).**

Source: MCPD

Collisions by Roadway Type

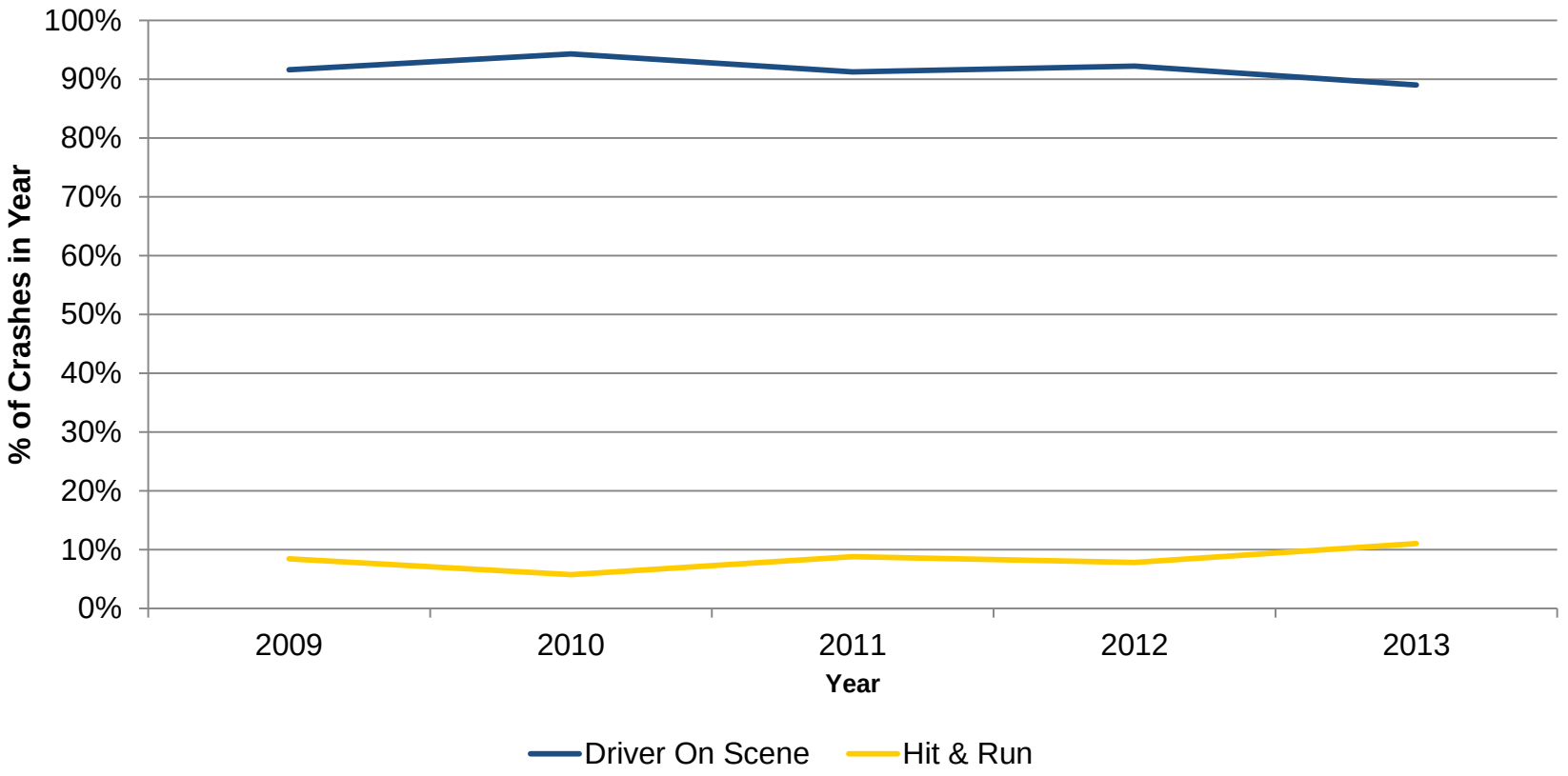


Highway Lane Miles				
State	County	Toll	Municipal	Total
1,395.14	4,846.58	88.01	761.36	7,091.09
20%	68%	1%	11%	100%

48% of bicycle collisions occurred on County maintained roadways from 2009 to 2013. From 2012 to 2013, County maintained roadways saw a 42% reduction in bicycle collisions.

Source: MCPD

Hit and Run Bicycle Collisions



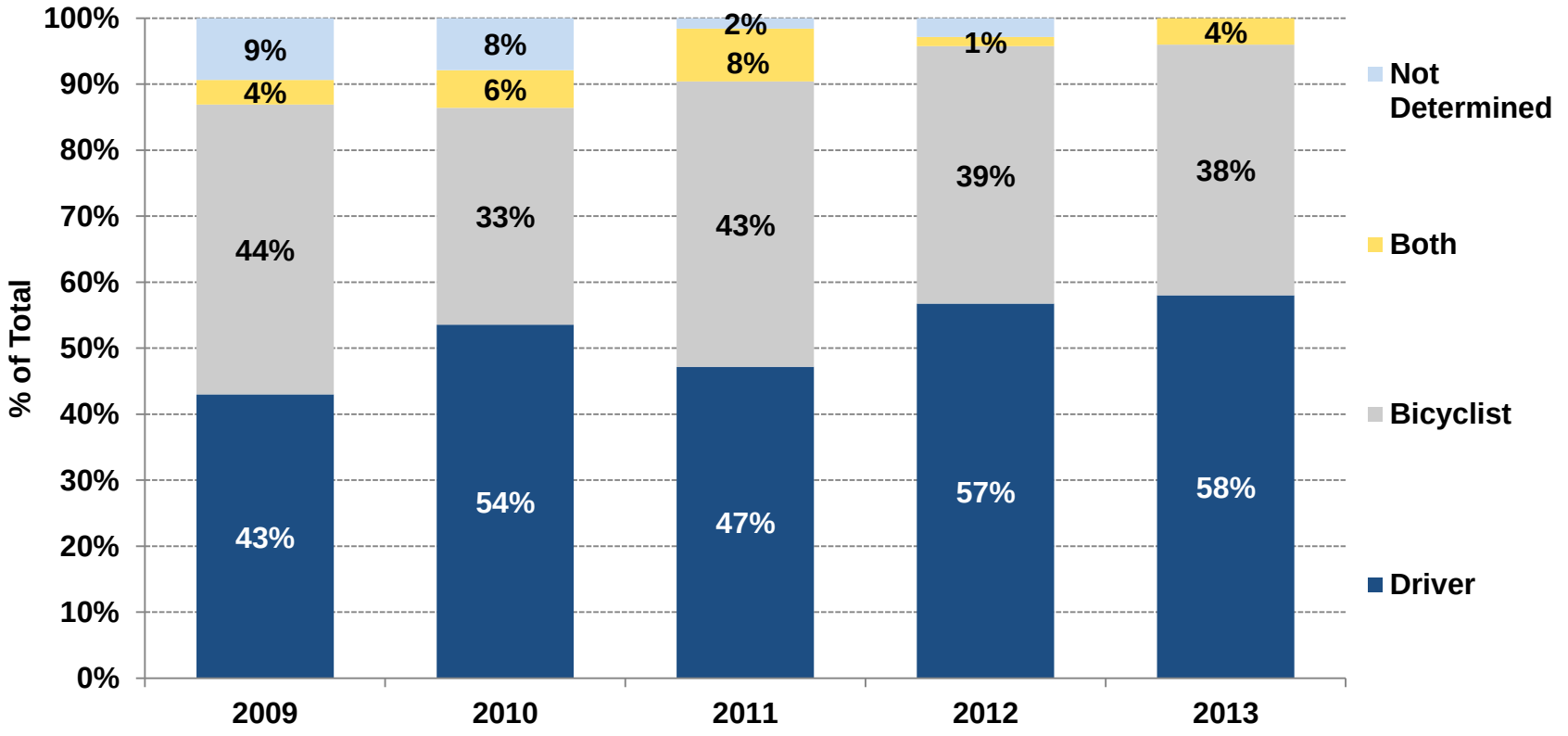
From 2009 to 2013, 8% of vehicle and bicycle collisions were recorded as hit and run collisions. None of the bicyclist deaths (level 5 collisions) were the result of hit and run.

Source: MCPD

Section 2

AT FAULT VARIABLES

Party at Fault in Bicycle Collisions



For 3 of the 5 years, drivers were at fault for the majority of collisions with bicyclists.

Source: MCPD

CountyStat

Variables: Drivers At Fault (2009 – 2013)

Driver Movement	Number of Collisions
Making Right Turn	60 (19%)
Making Left Turn	59 (19%)
Moving at Constant Speed	52 (16%)
Accelerating	28 (9%)
Slowing or Stopping	26 (8%)
Starting from Traffic Lane	24 (7%)
Other / NA / No Factor Recorded	69 (22%)

Primary Cause	Number of Collisions
Failed to Yield ROW	155 (49%)
Failed to Give Full Time and Attention	73 (23%)
Vision Obstruction	9 (3%)
Other / NA / No Factor Recorded	81 (25%)

Nearly a third (29%) of collisions where the driver was at fault resulted from the cyclist and vehicle colliding at a 90 degree angle.

Collision Type	Number of Collisions
Straight Movement Angle	91 (29%)
Head On Left Turn	33 (10%)
Angle Meets Right Turn	30 (9%)
Single Vehicle	24 (8%)
Same Direction Rear End	19 (6%)
Same Direction Sideswipe	18 (6%)
Other / NA / No Factor Recorded	103 (32%)

Gender	Number of Collisions
Male	181 (57%)
Female	108 (34%)
Other / NA / No Factor Recorded	29 (9%)

Driver Condition	Number of Collisions
Apparently Normal	268 (84%)
Unknown	14 (4%)
Physical Defects	2 (<1%)
Had Been Drinking	1 (<1%)
Other / NA / No Factor Recorded	33 (10%)

Source: MCPD. 318 of 613 (52%) of collisions from 2009 to 2013 were the driver's fault.

Variables: Bicyclists At Fault (2009 – 2013)

Bicyclist Location	Number of Collisions
On Roadway not at Crosswalk	100 (41%)
On Roadway at Crosswalk	64 (27%)
Other / NA / No Factor Recorded	77 (32%)

Bicyclist Movement	Number of Collisions
Cross/Enter at Intersection	91 (38%)
Riding with Traffic	34 (14%)
Riding Against Traffic	27 (11%)
Cross/Enter not at Intersection	20 (8%)
Other / NA / No Factor Recorded	69 (29%)

Bicyclist Condition	Number of Collisions
Apparently Normal	212 (88%)
Had Been Drinking	14 (6%)
Using Drugs	2 (1%)
Other / NA / No Factor Recorded	13 (5%)

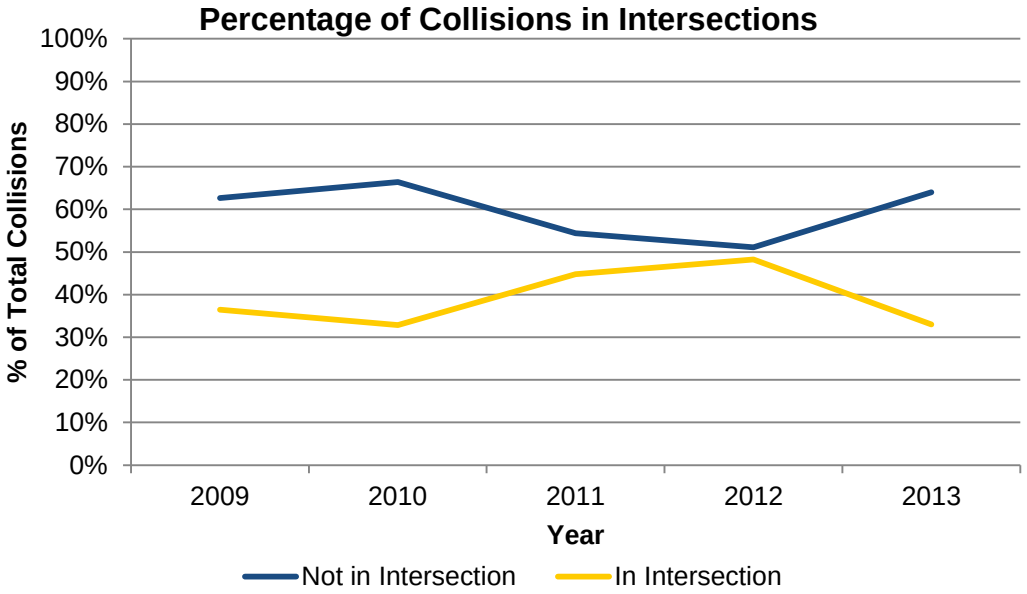
Primary Cause	Number of Collisions
Failed to Give Full Time and Attention	28 (12%)
Failed to Yield ROW	26 (11%)
Illegally in Roadway	24 (10%)
Bicycle violation	12 (5%)
Other / NA / No Factor Recorded	151 (62%)

Gender	Number of Collisions
Male	203 (84%)
Female	37 (15%)
No Gender Recorded	1 (<1%)

Bicyclist Safety Equipment Used	Number of Collisions
None	50 (21%)
Bike Helmet	32 (13%)
Bike Eye Shield	1 (<1%)
NA / No Factor Recorded	158 (66%)

Source: MCPD. 241 of 613 (39%) of collisions from 2009 to 2013 were the cyclist's fault.

Intersection Collisions



Party at Fault	Number of Collisions
Driver	128 (53%)
Bicyclist	94 (39%)
Both	11 (5%)
Not Determined	9 (3%)

Traffic Signal (Y/N)	Number of Collisions
No	152 (63%)
Yes	89 (37%)
Not Recorded	1 (<1%)

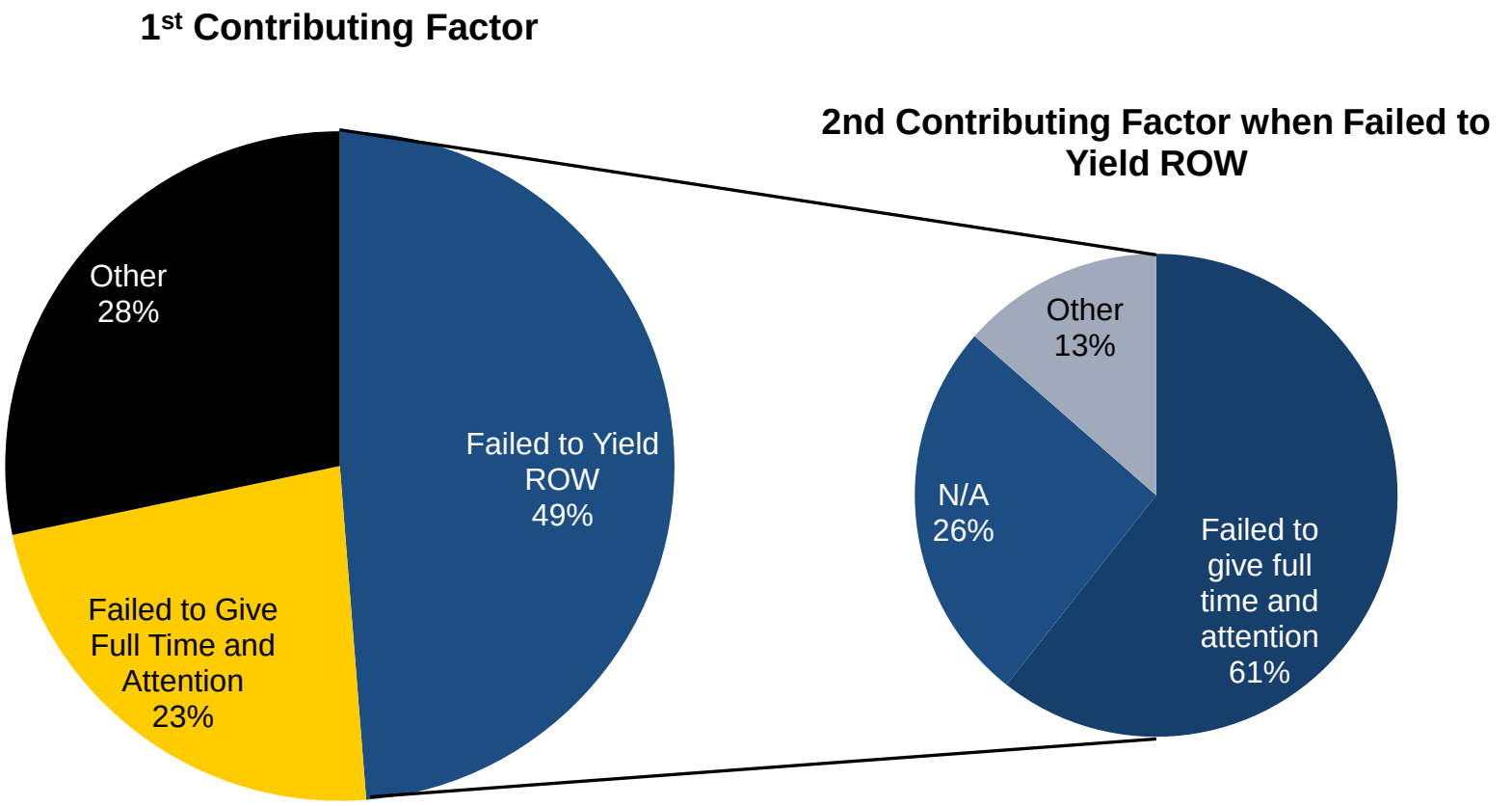
Collision Type in Intersection	Number of Collisions
Straight Movement Angle	91 (38%)
Head On Left Turn	27 (11%)
Angle Meets Right Turn	26 (11%)
Angle Meets Left Turn	22 (9%)
Other / NA / No Factor Recorded	76 (31%)

Bicyclist Obedience	Number of Collisions*
No Pedestrian Signal	49 (21%)
Obeyed Pedestrian Signal	49 (21%)
Disobeyed Pedestrian Signal	25 (11%)
Other / NA / No Factor Recorded	114 (47%)

63% of collisions occurred outside of an intersection in the County from 2009 to 2013. Nationwide, only 29% of cyclist injuries occurred outside of an intersection in 2012.

Sources: MCPD; NHTSA (pg. 152) Analysis excludes 7 collisions where the intersection data were not recorded ***Note:** Does not add to the total amount of intersection collisions due to missing or miscoded bicyclist information.

Contributing Factors when Driver was at Fault

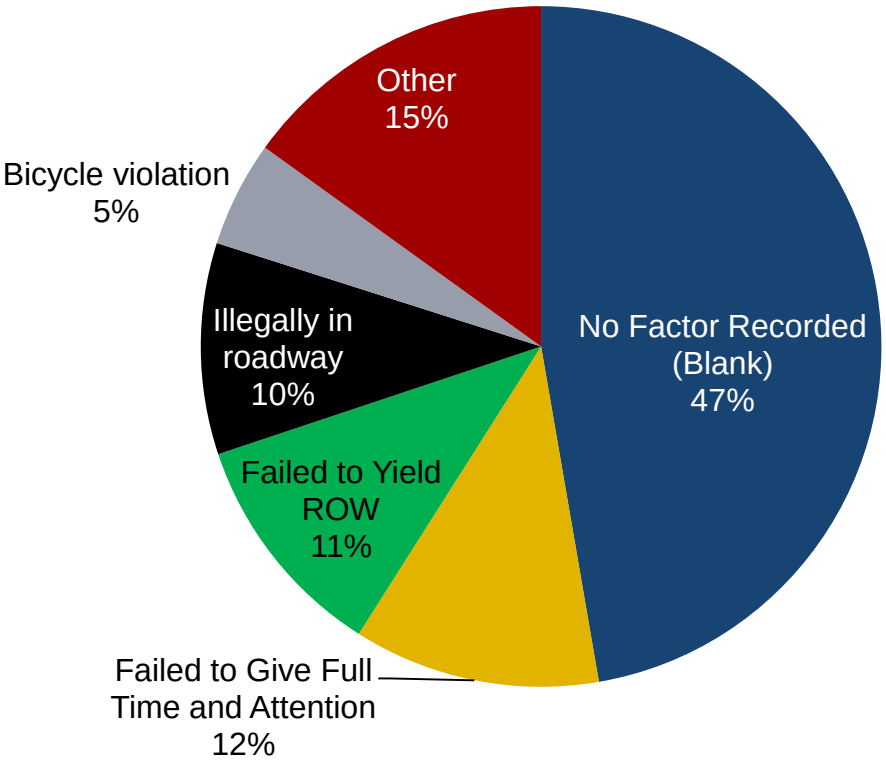


In the majority of cases where the driver was at fault, the primary or secondary contributing factor for the collision was that the driver failed to give full time and attention.

Source: MCPD. 318 of 613 (52%) of collisions from 2009 to 2013 were the driver's fault.

Contributing Factors when Bicyclist was at Fault

1st Contributing Factor

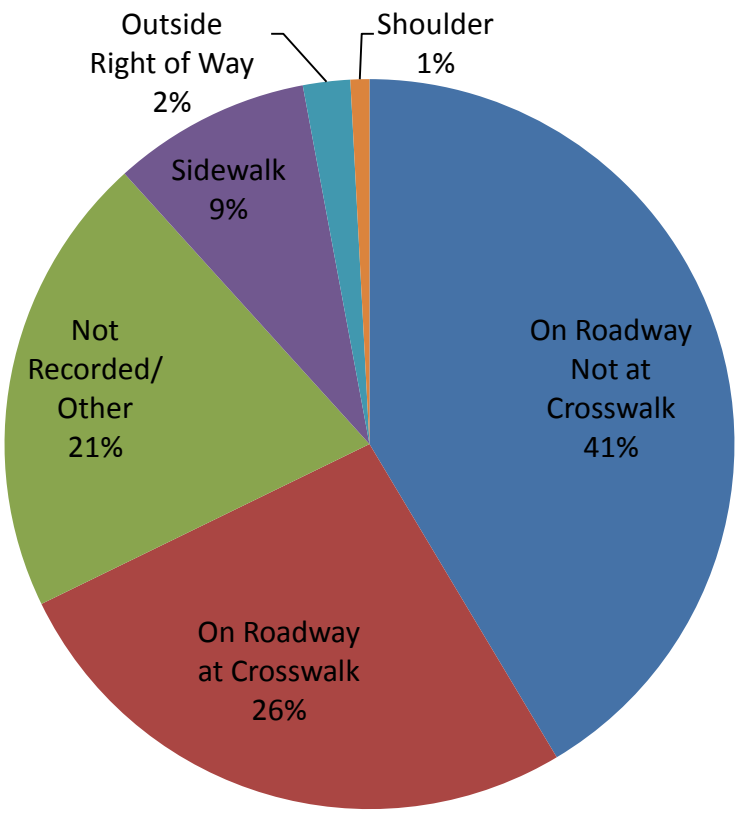


In 47% of collisions where the bicyclist was at fault, no contributing factor was recorded.

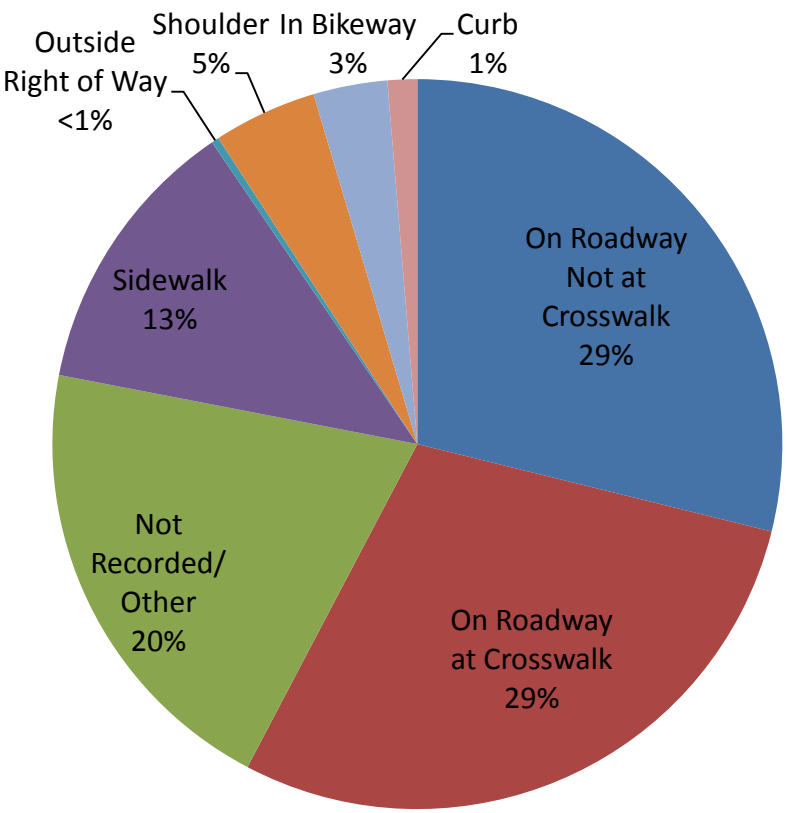
Source: MCPD. 241 of 613 (39%) of collisions from 2009 to 2013 were the cyclist's fault.

Bicyclist Location

Bicyclist at Fault



Driver at Fault

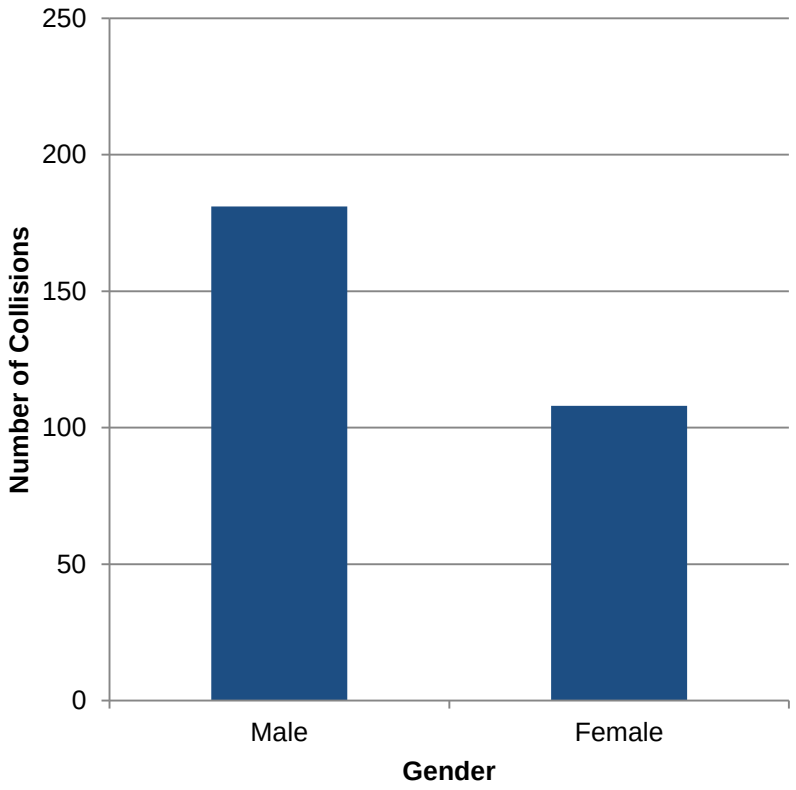


When the driver was at fault for a bicycle collision, there were a higher rate of collisions on the shoulder of the road or in a bikeway as compared to when the bicyclist was at fault.

Source: MCPD

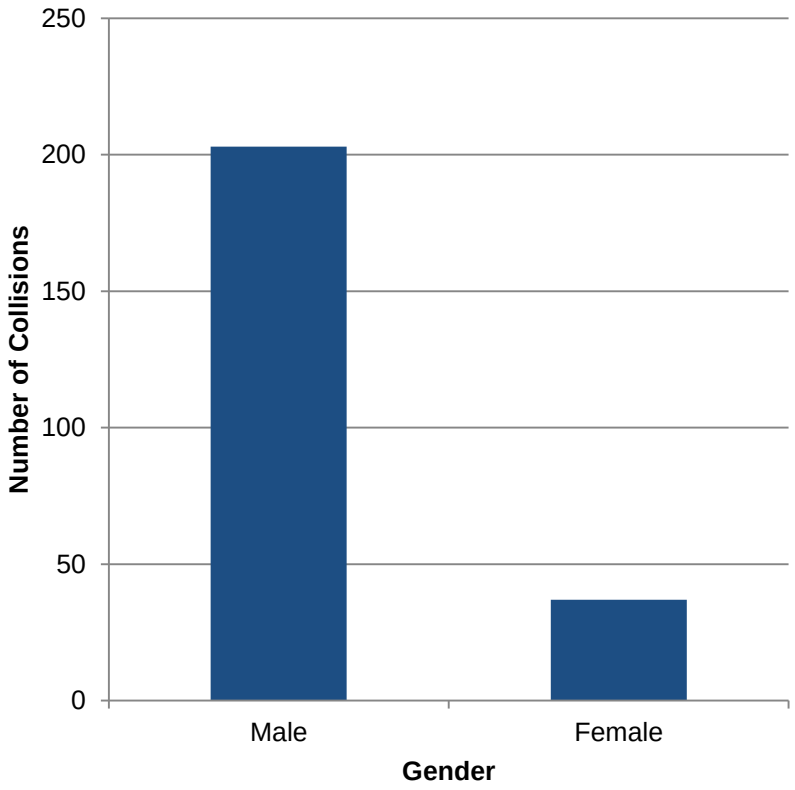
Party at Fault by Gender

Driver



*Excludes 29 collisions where driver gender was not captured.

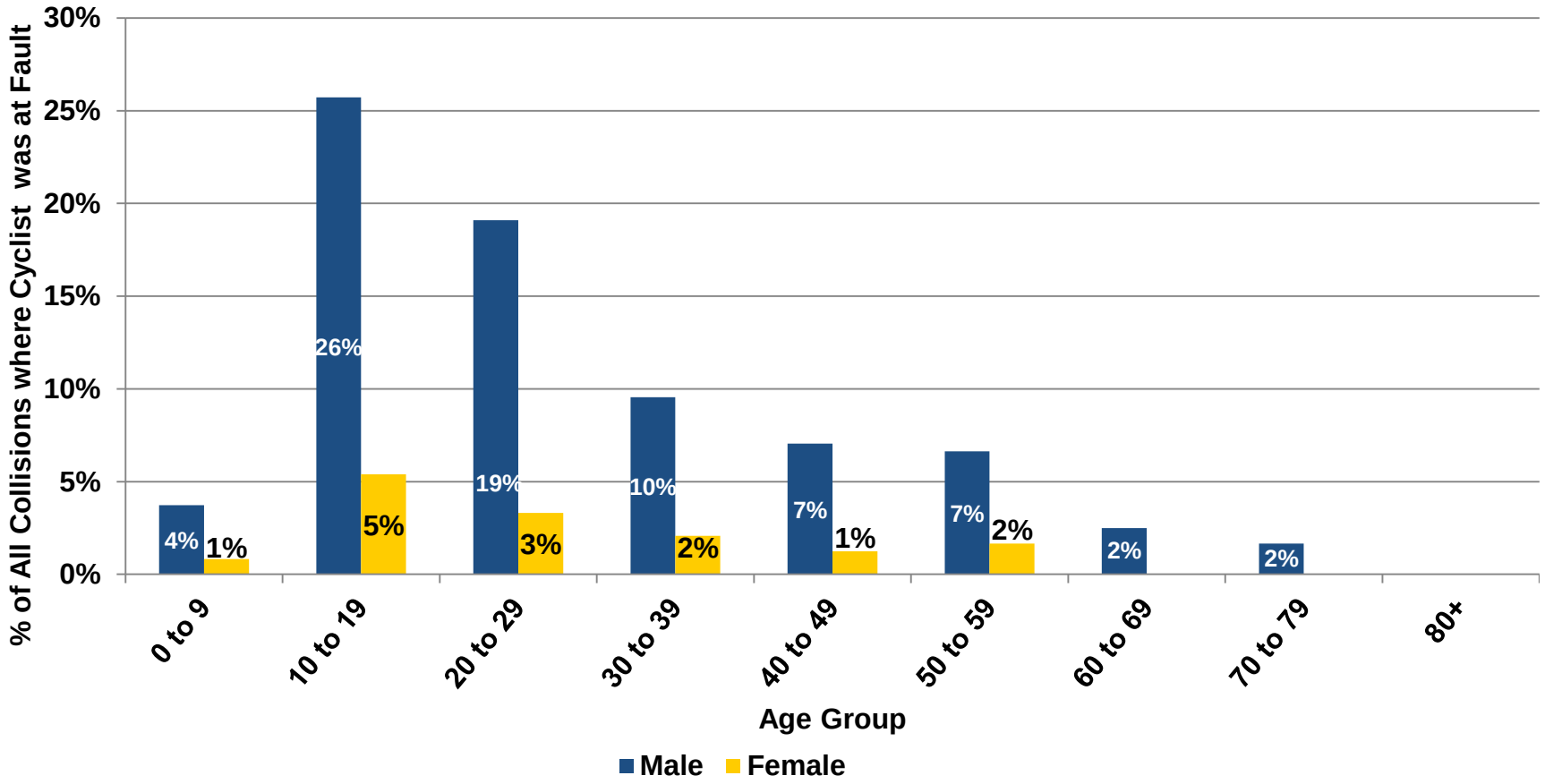
Bicyclist



*Excludes 1 collision where cyclist gender was not captured.

Males were overrepresented as the party at fault for both drivers and bicyclists. The disparity between the sexes was largest for the bicyclist at fault where 84% of collisions were caused by a male cyclist. The high rate of males involved in crashes in Montgomery County was similar to nationwide (80% in 2012) and statewide (83% from 2008-2012) trends.

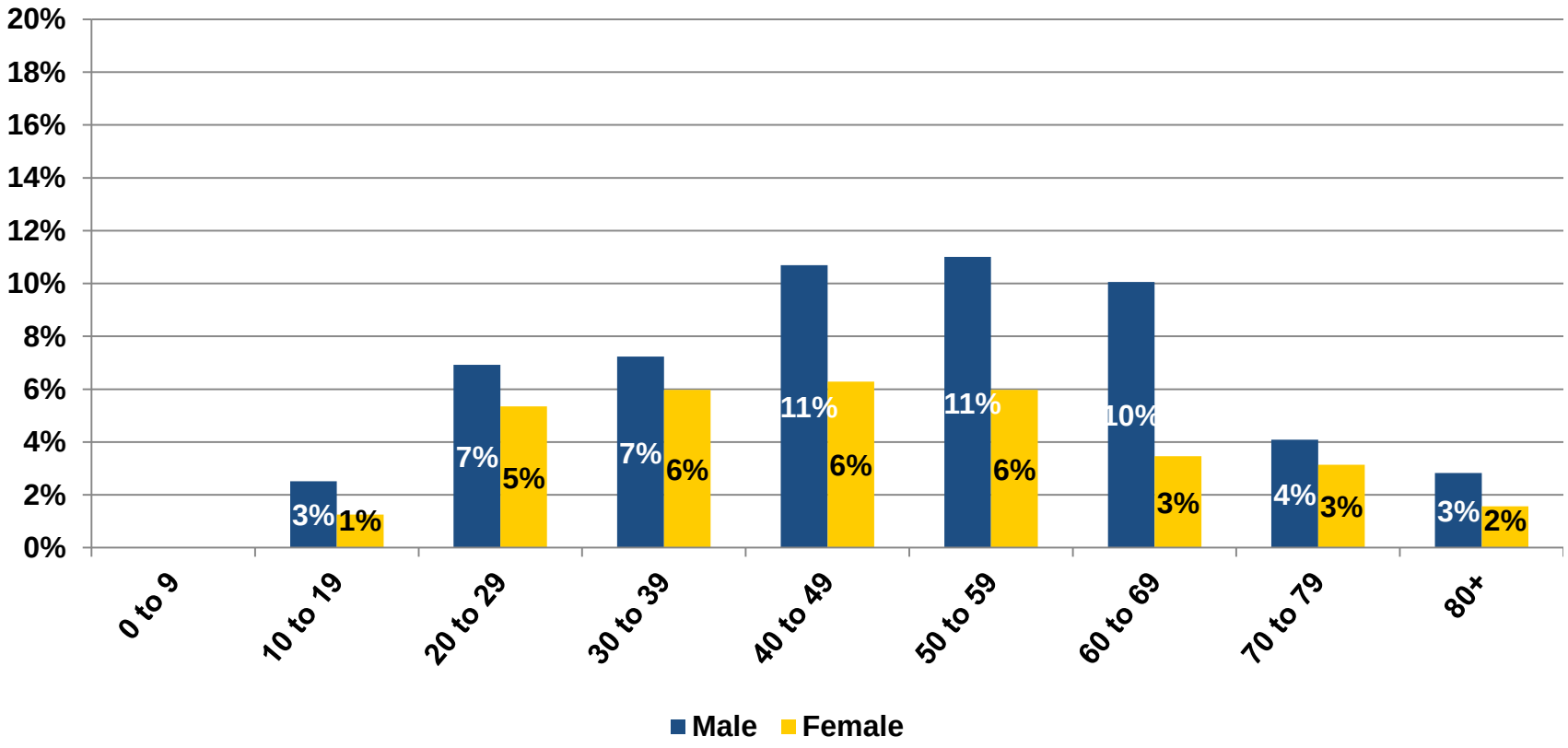
Bicyclist at Fault by Gender and Age



Males ages 10 to 19 represented 26% of all bicycle collisions where the bicyclist was at fault. Across Montgomery County, this age and gender group represented only 13% of the population.

Sources: MCPD; US Census 2013 Population Estimates

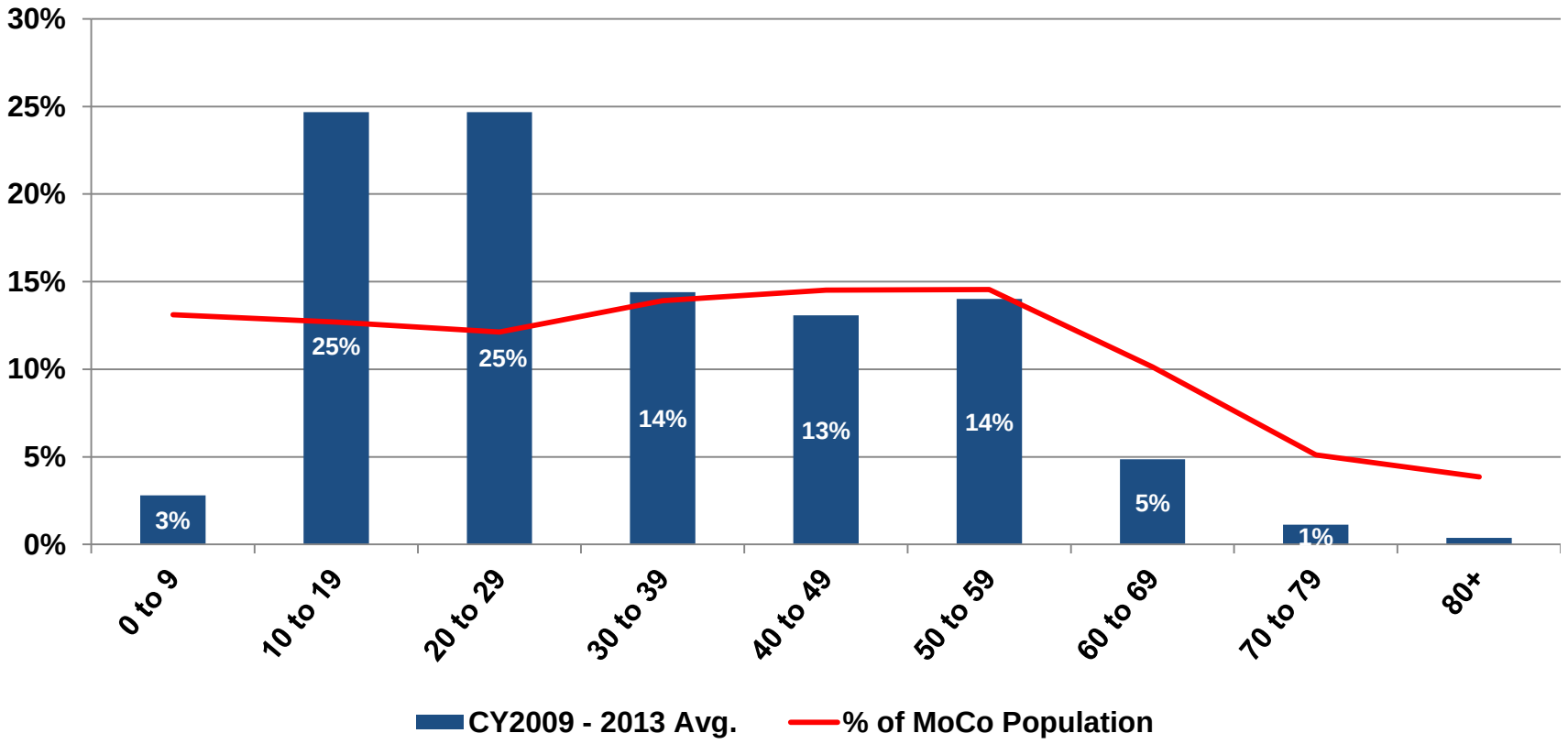
Driver at Fault by Gender and Age



As compared to bicyclists at fault, the age of the driver at fault was more widely distributed by age. However, males were more likely to be at fault as compared to female drivers.

Source: MCPD; Excludes 34 collisions where the age and/or gender of the driver was not recorded.

Age of Bicyclists Involved in Collisions (1/2)

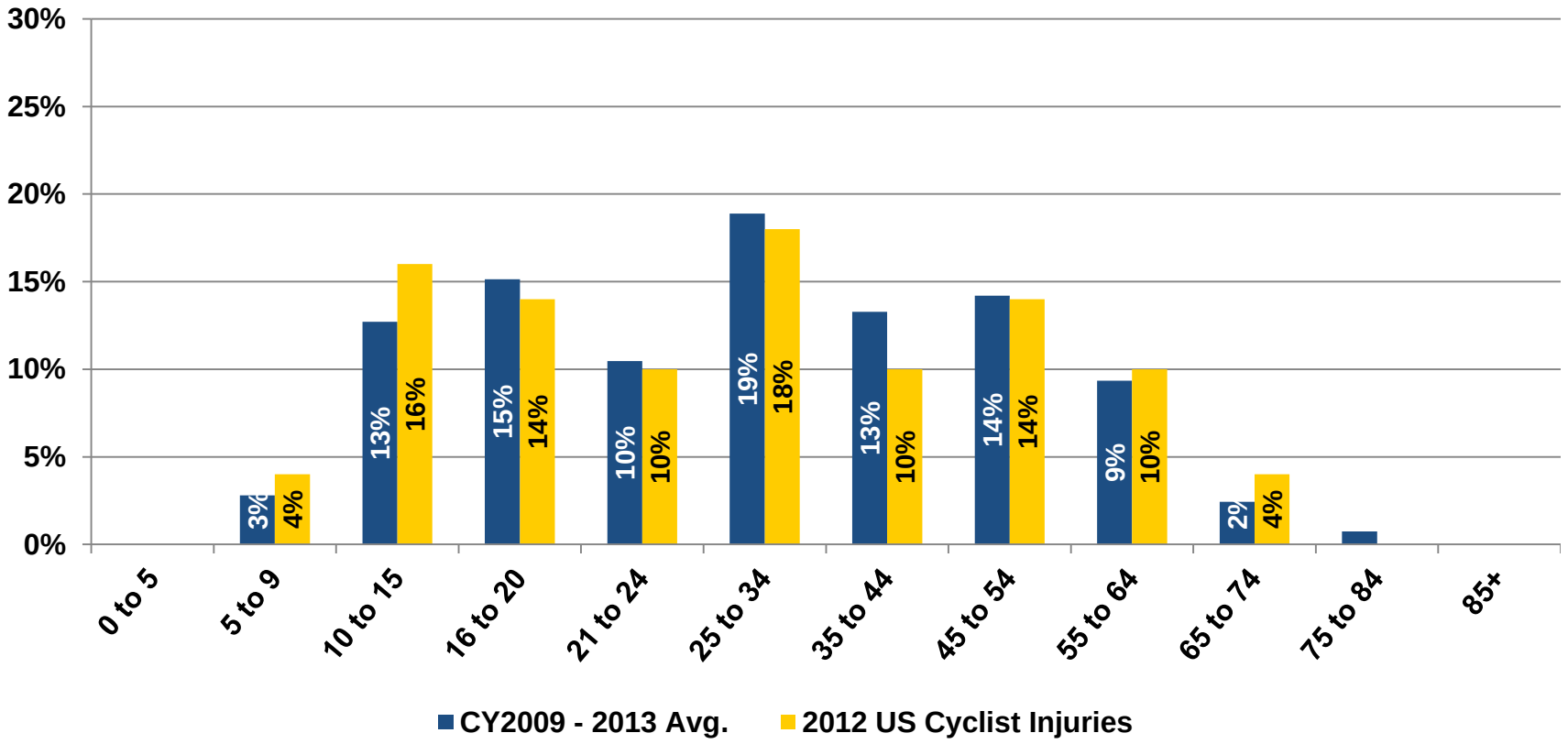


The ages of 10 through 29 are overrepresented in the share of collisions as compared to the overall Montgomery County population. However, these age groups are more likely to comprise of a larger share of the bicycling population. The median age of a bicyclist involved in a collision was 28 years old.

*Age/DOB was not recorded for the following shares of cyclists involved in collisions: (2009) 12.1% (2010) 22.0%; (2011) 13.3%; (2012) 0.7%; (2013) 4.9%

Sources: MCPD; US Census 2013 Population Estimates

Age of Bicyclists Involved in Collisions (2/2)

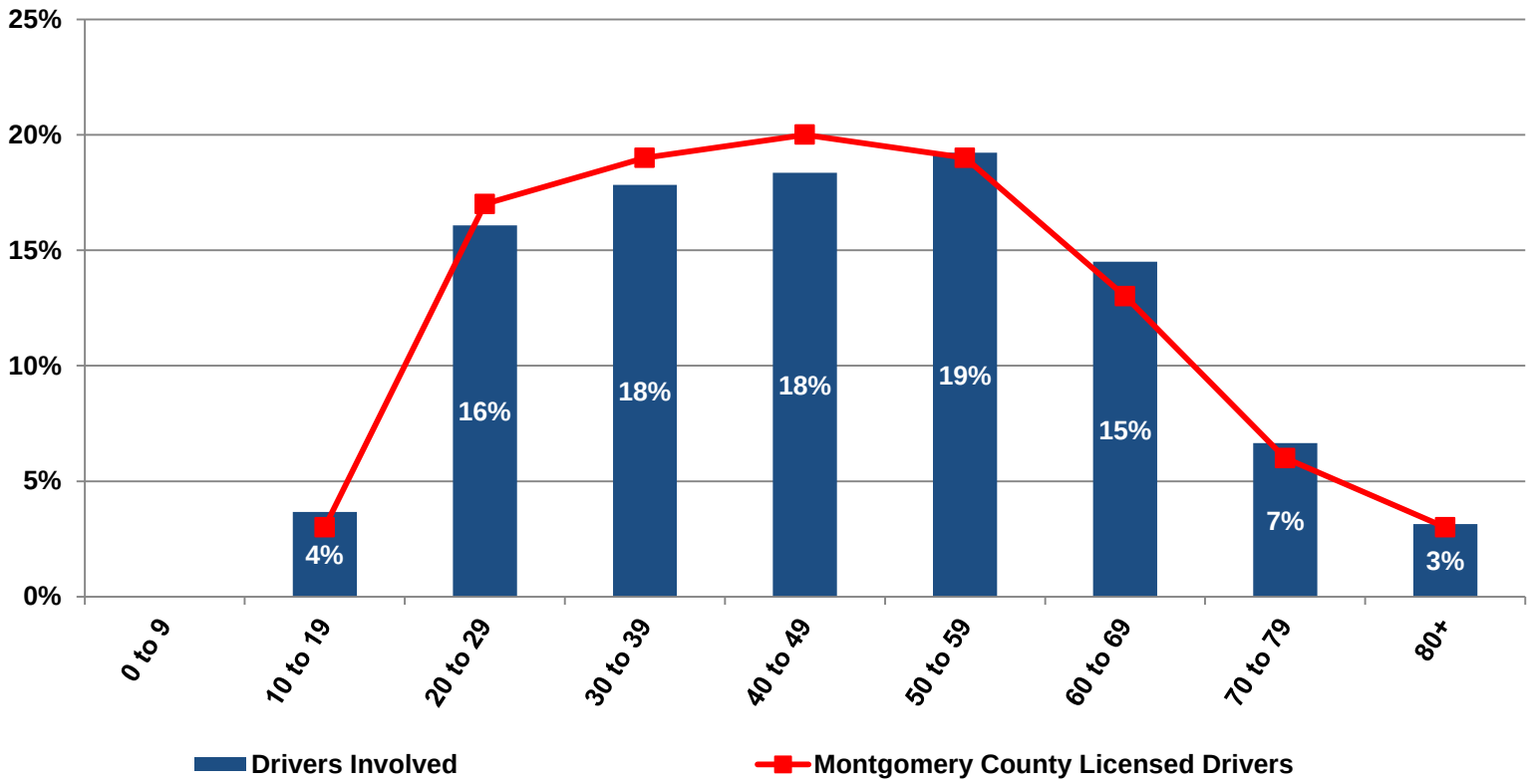


Montgomery County's bicycle collisions mirror national trends for the age of the cyclist involved.

*Age/DOB was not recorded for the following shares of cyclists involved in collisions: (2009) 12.1% (2010) 22.0%; (2011) 13.3%; (2012) 0.7%; (2013) 4.9%

Sources: MCPD; National Highway Traffic Safety Administration (NHTSA)

Age of Drivers Involved in Collisions



No age group of drivers involved in collisions with cyclists was disproportionately represented as compared to the total number of licensed drivers. The median age of a driver involved in a collision was 46 years old.

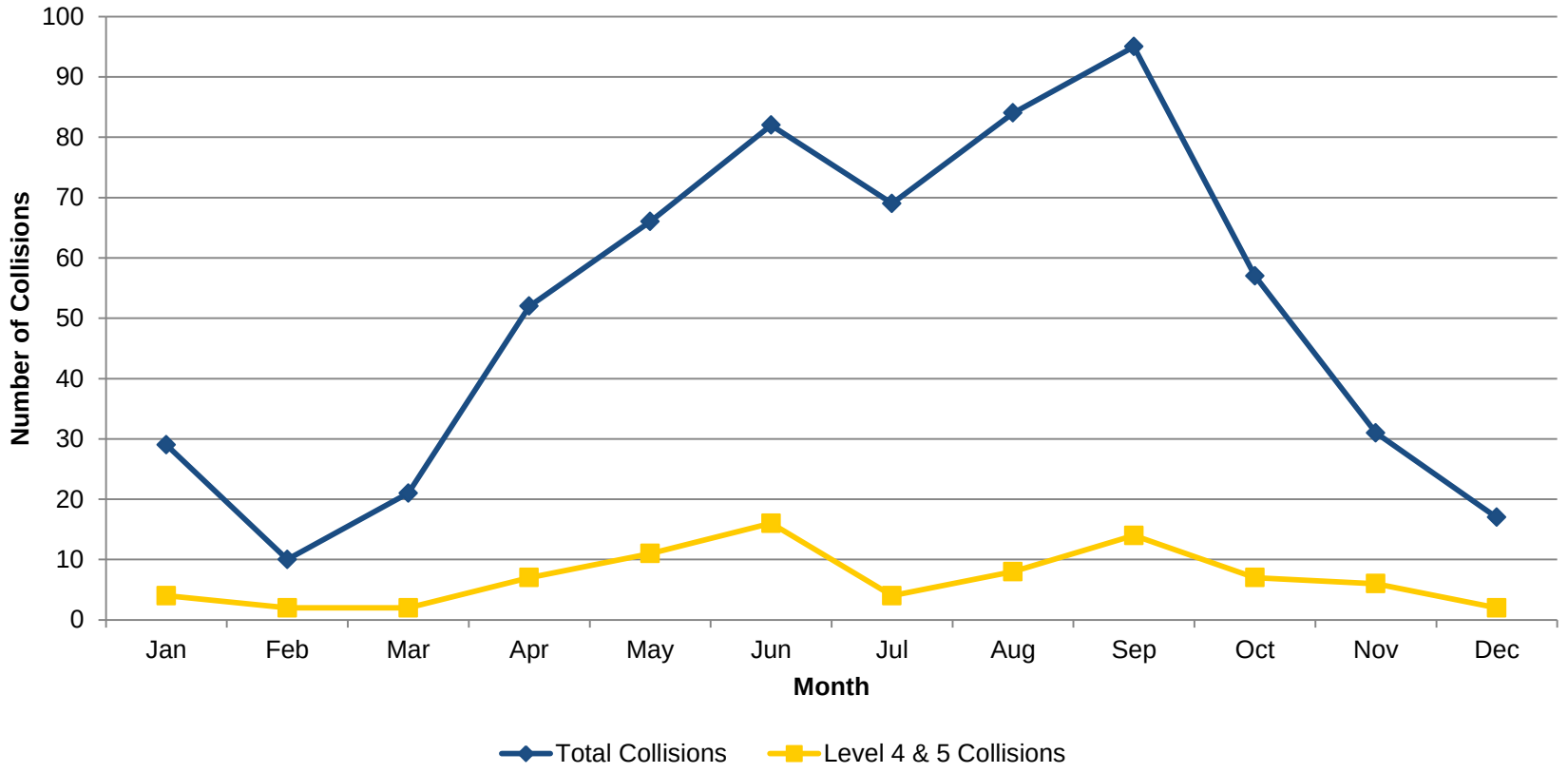
*Age/DOB was not recorded for the following shares of drivers involved in collisions: (2009) 9.0% (2010) 10.2%; (2011) 8.7%; (2012) 5.0%; (2013) 10.1%

Sources: MCPD; Maryland Highway Safety Office

Section 3

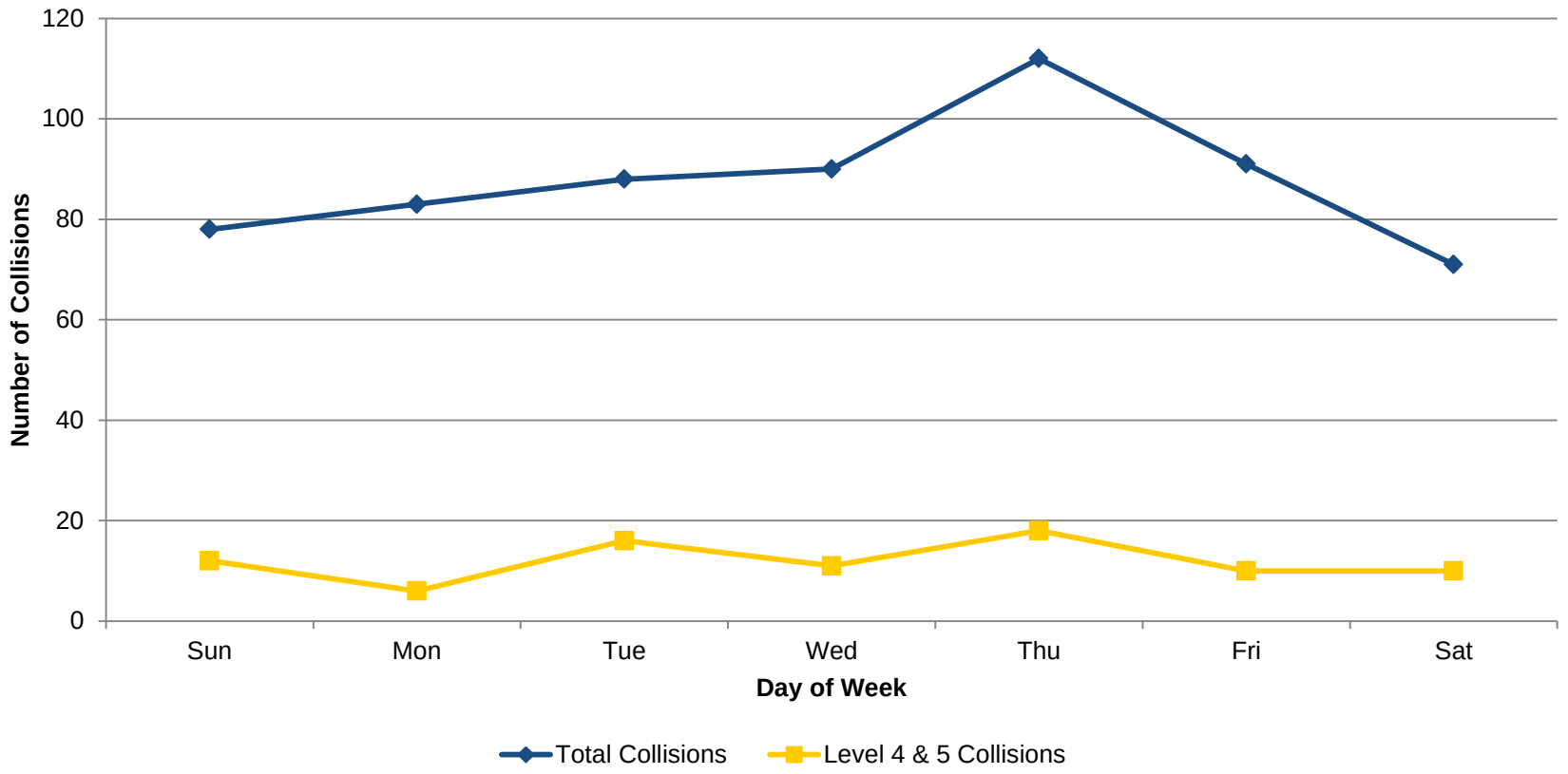
TIMES AND DATES OF BICYCLE COLLISIONS

2009-2013 Bicycle Collisions by Month



July through September accounted for 40% of all bicycle collisions recorded between 2009 and 2013. The rate of severe crashes (levels 4 and 5) mirrored the overall trend.

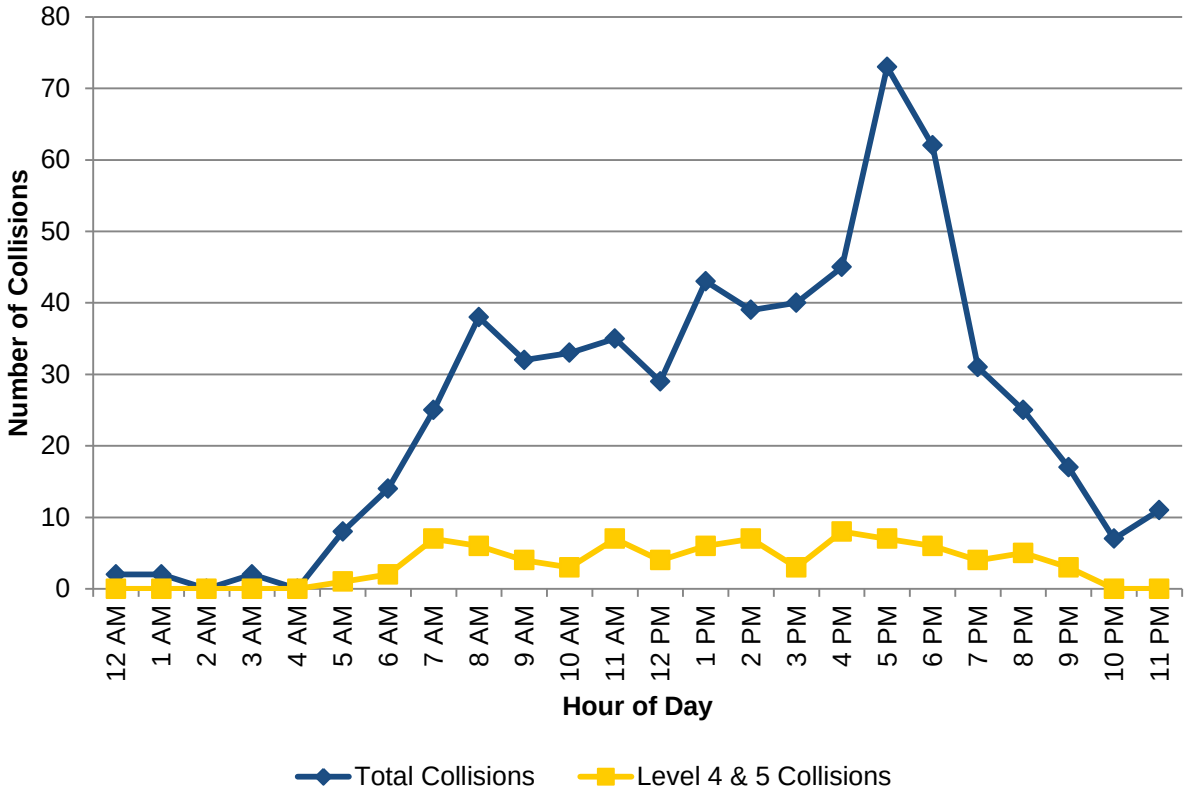
2009-2013 Bicycle Collisions by Day of Week



18% of all bicycle collisions (112 out of 613) occurred on Thursdays from 2009 to 2013. Saturdays were the lowest at 12%, then the rate increased each day to the peak on Thursday.

Source: MCPD

2009-2013 Bicycle Collisions by Time of Day



Lighting Conditions for All Collisions* (2009-2013)

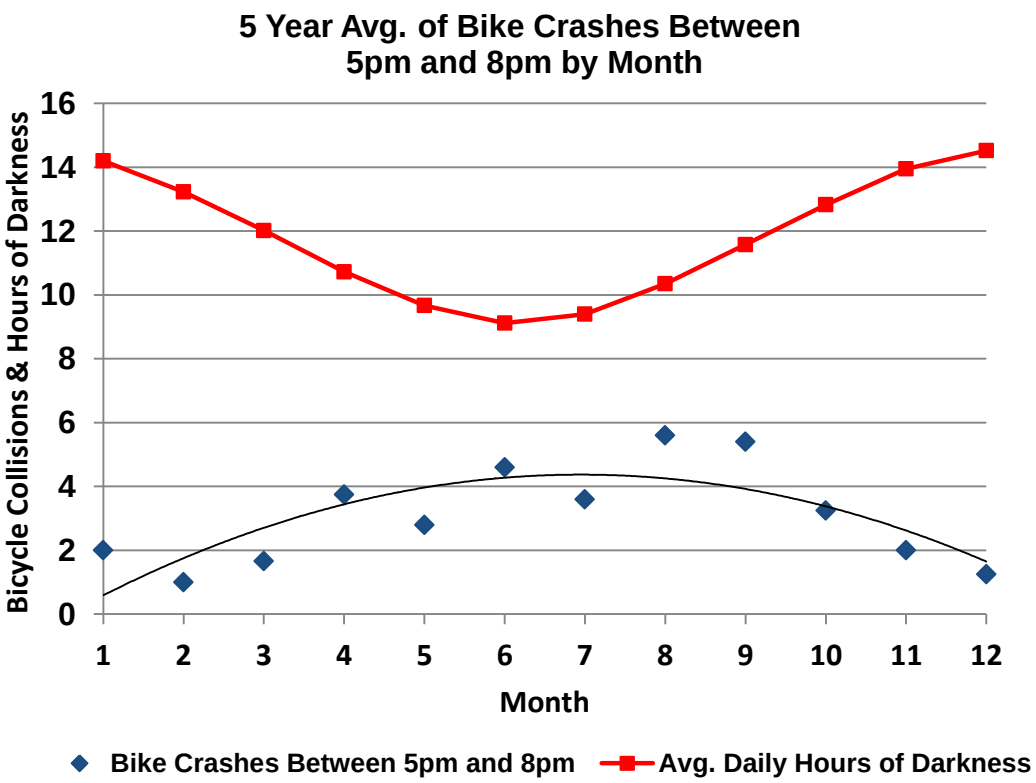
Lighting Conditions	Number of Collisions	% of Total
Dark: No Street Lights	11	2%
Dark: Street Lights On	81	13%
Dawn/ Dusk	28	5%
Daylight	491	80%
Total	611	100%

*Excludes 2 collisions where lighting conditions were not captured in report.

27% of all bicycle collisions from 2009-2013 occurred between 5:00PM and 7:59PM. For the morning commute, from 7:00AM-9:59AM, 16% of incidents occurred during this timeframe. The overall trend in the time of day bicycle incidents occur was similar to walking pedestrian incidents.

Source: MCPD

Bicycle Collisions: Evening Commute



Lighting Conditions for Collisions Occurring Between 5pm and 8pm (2009-2013)

Lighting Conditions	Number of Collisions	% of Total
Dark: No Street Lights	2	1%
Dark: Street Lights On	23	14%
Dusk	17	10%
Daylight	124	75%
Total	166	100%

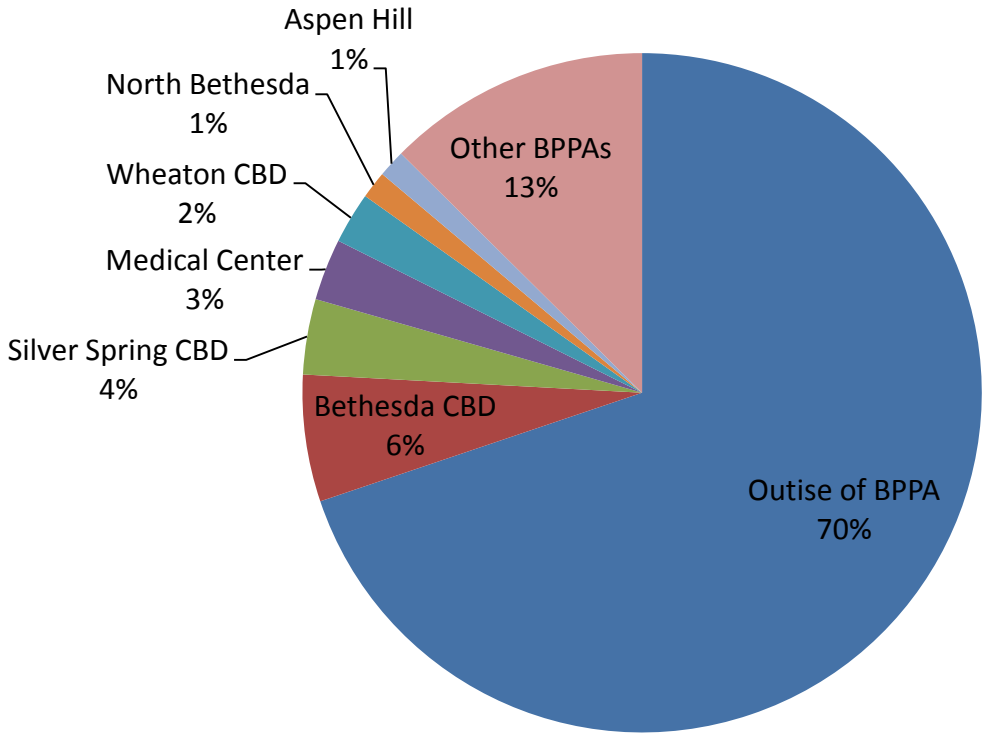
The relationship between average hours of darkness and the number of bicycle collisions during the evening commute was *opposite* of the trend seen in pedestrian collisions. The different trends are likely due to more people bicycle during warmer months and bicyclists, especially casual riders, are less likely to ride in the dark. Therefore, lighting and visibility are less of an issue for bicycle collisions as compared to overall pedestrian collisions for the evening commute.

Source: MCPD

Section 4

GEOSPATIAL ANALYSIS OF BICYCLE COLLISIONS

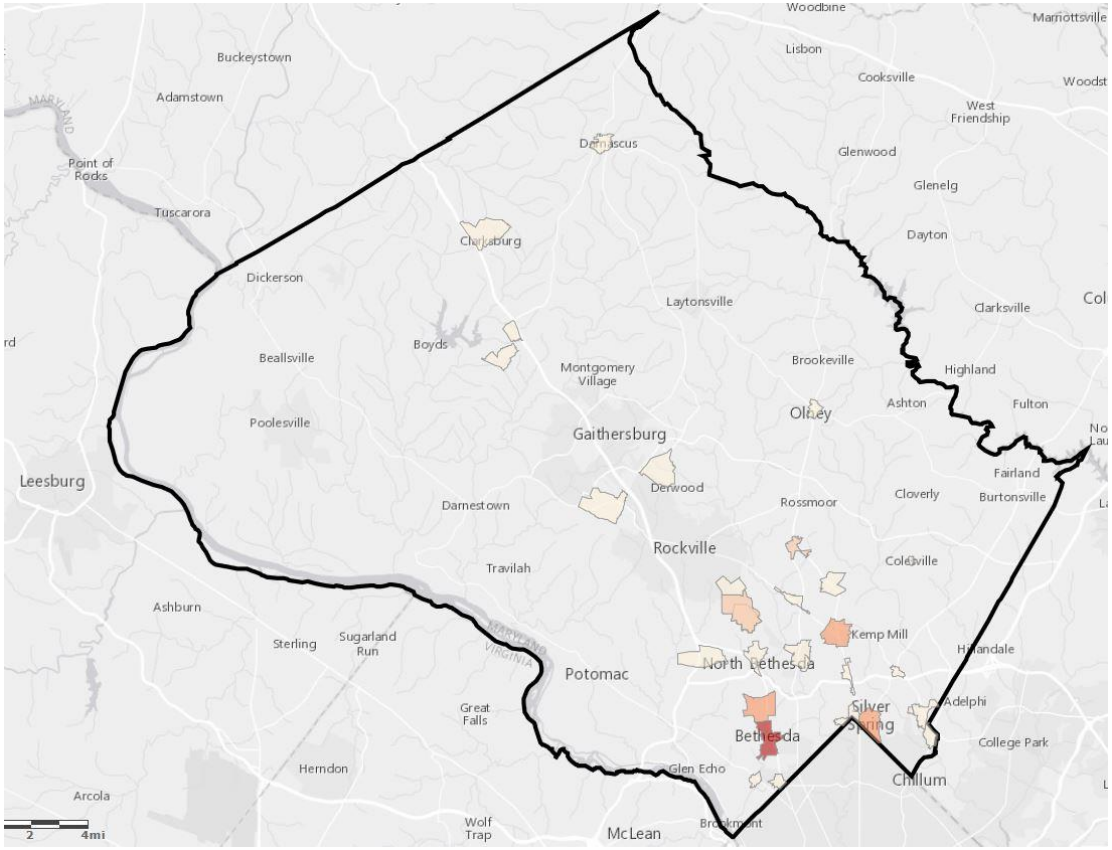
2009-2013 Bicycle Collisions by Bicycle Pedestrian Priority Area (BPPA) (1/2)



The majority of bicycle collisions from 2009 to 2013 occurred outside of identified bicycle pedestrian priority areas. 59 collisions (10%) were recorded in the Bethesda and Silver Spring central business districts. According to the County's 2014 Mobility Assessment Report, the Bethesda CBD had the highest level of bicycling activity in the County.

Sources: MCPD, Park and Planning (pg. 39)

2009-2013 Bicycle Collisions by Bicycle Pedestrian Priority Area (BPPA) (2/2)



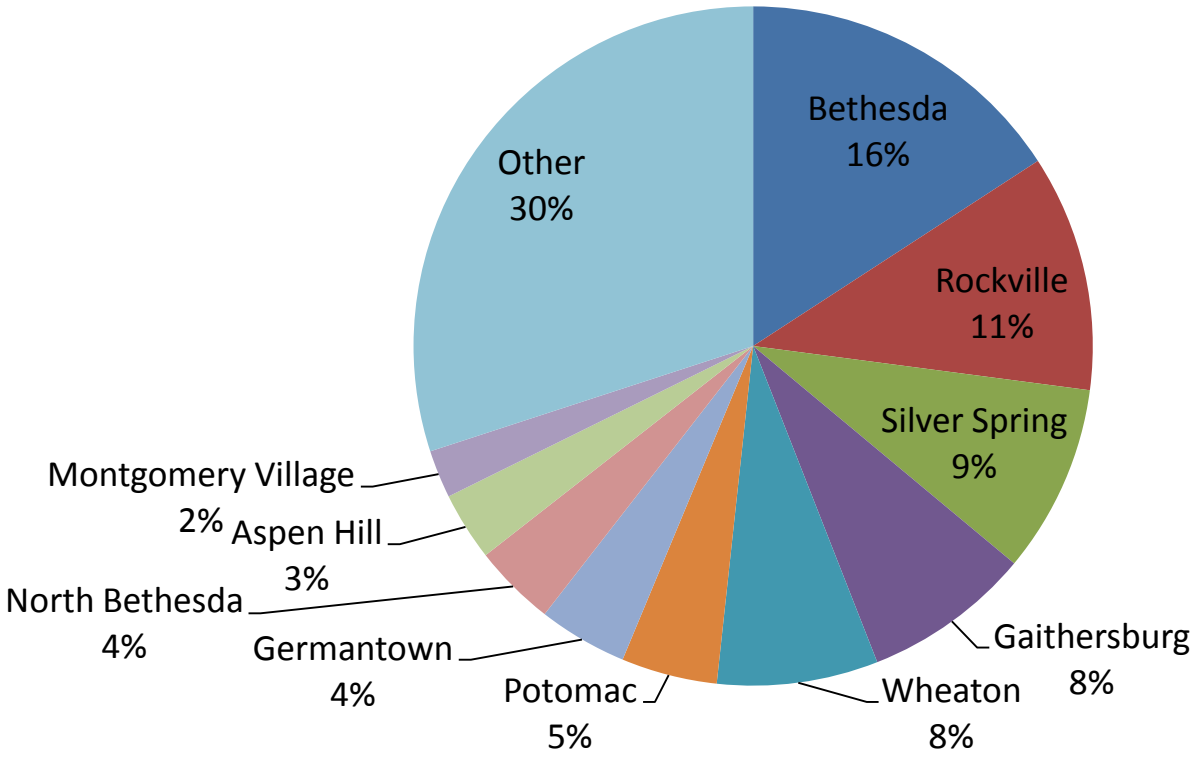
Legend

2009-2013 Bicycle Collisions by BPPA

- 0 - 7.4
- 7.4 - 14.8
- 14.8 - 22.2
- 22.2 - 29.6
- 29.6 - 37

Source: MCPD

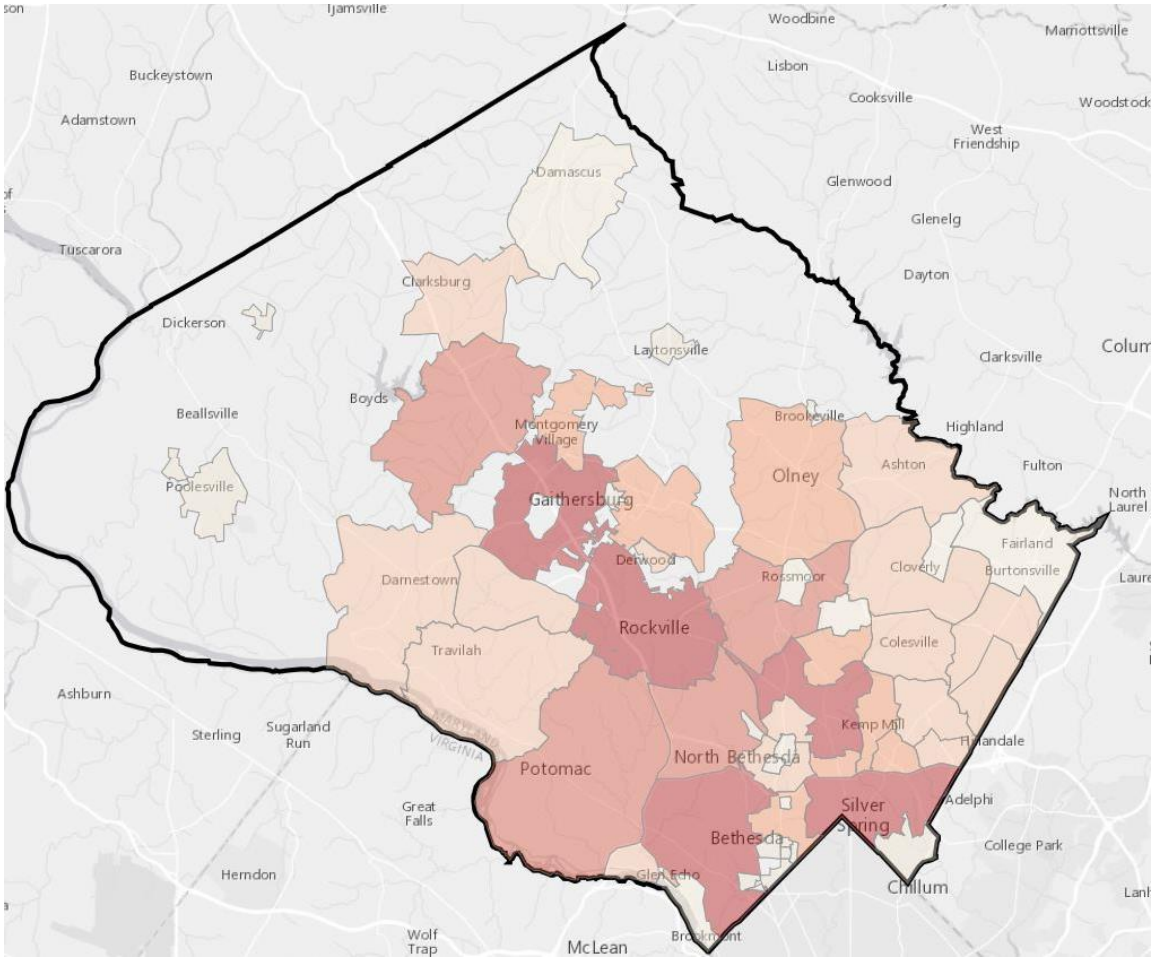
2009-2013 Bicycle Collisions by Municipality or CDP (1/2)*



Bethesda and North Bethesda CDPs accounted for 121 of 613 (20%) bicycle collisions from 2009 to 2013.

Source: MCPD
*CDP = Census Designated Place

2009-2013 Bicycle Collisions by Municipality or CDP* (2/2)



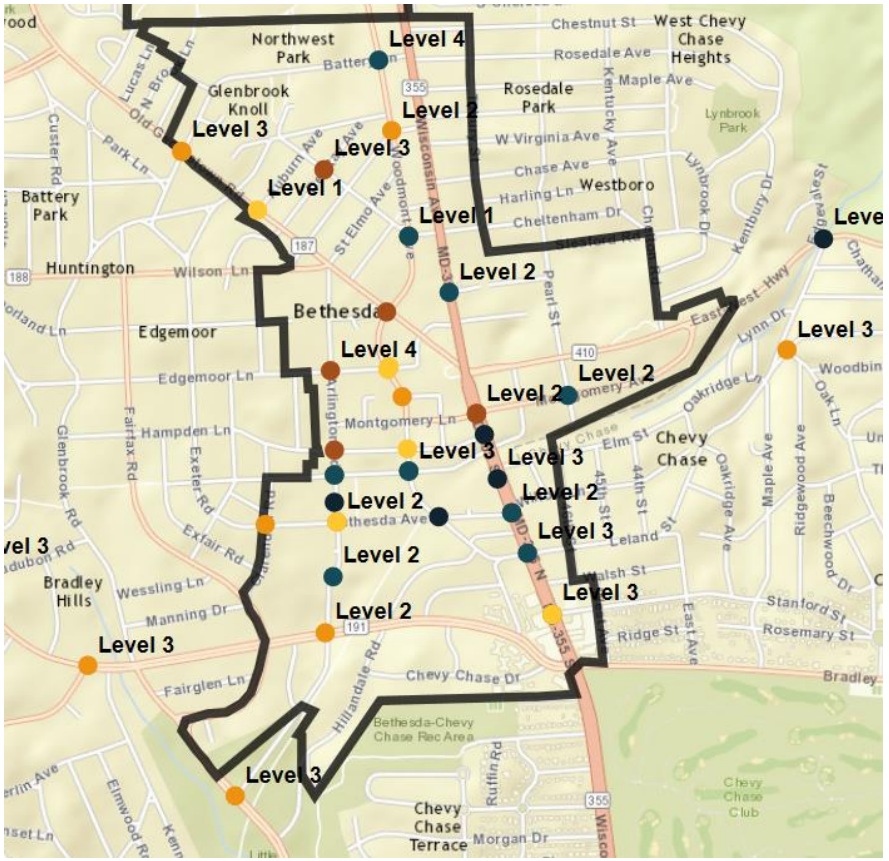
Legend

2009-2013 Bicycle Collisions by CDP

- 0 - 2
- 2 - 6
- 6 - 14
- 14 - 28
- 28 - 96

Source: MCPD *CDP = Census Designated Place.

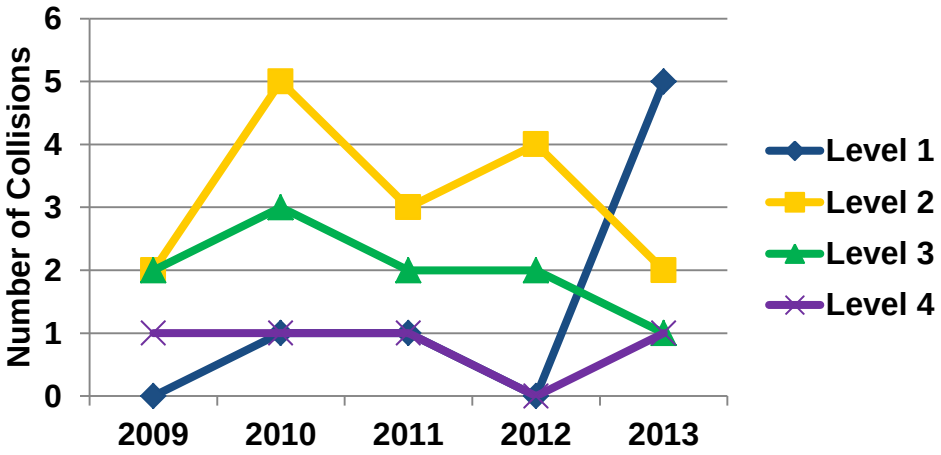
30 collisions that occurred outside of either a municipality or CDP are not shown above



Section 4A

BETHESDA CENTRAL BUSINESS DISTRICT

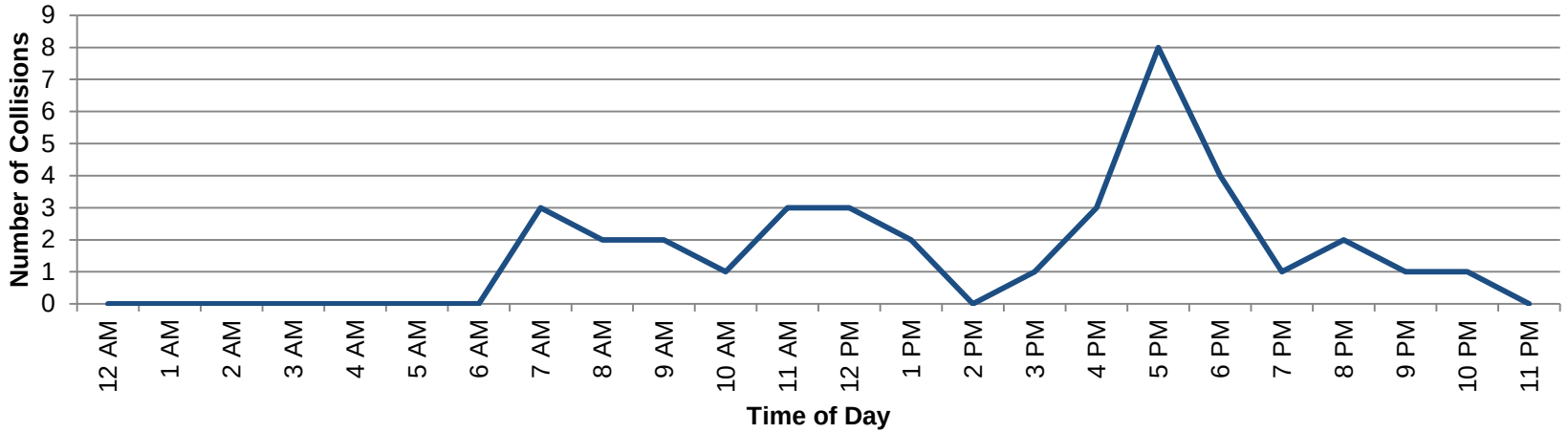
Bethesda Central Business District (1/2)



*No fatality (level 5) collisions occurred in Bethesda CBD

Road	Number of Collisions
Woodmont Ave.	8 (4 in 2010)
Wisconsin Ave.	7
Bethesda Ave.	4
Parking Lot	4
Other	14

Fault	Number of Collisions
Driver	20 (54%)
Bicyclist	13 (35%)
Both	2 (5%)
Not Determined	2 (5%)



Source: MCPD

Bethesda Central Business District (2/2)

Driver At Fault

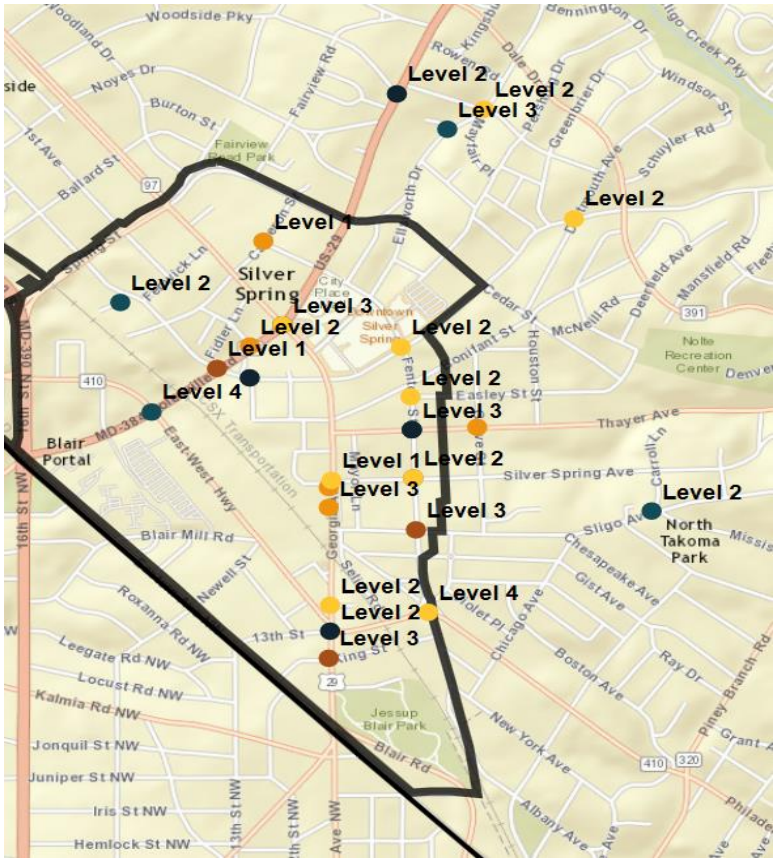
Primary Cause	Number of Collisions
Failed to Yield ROW	8
Failed to Give Full Time and Attention	6
Other/ Not Recorded	6

Driver Age Group	Number of Collisions
0 to 9	0
10 to 19	0
20 to 29	3
30 to 39	3
40 to 49	5
50 to 59	5
60 to 69	0
70 to 79	2
80+	0
None Recorded	2

Bicyclist At Fault

Primary Cause	Number of Collisions
Cyclist Illegally in Roadway	5
Failed to Obey Other Traffic Controller	1
Failed to Obey Traffic Signal	1
Stopping in Lane/ Roadway	1
None Recorded	5

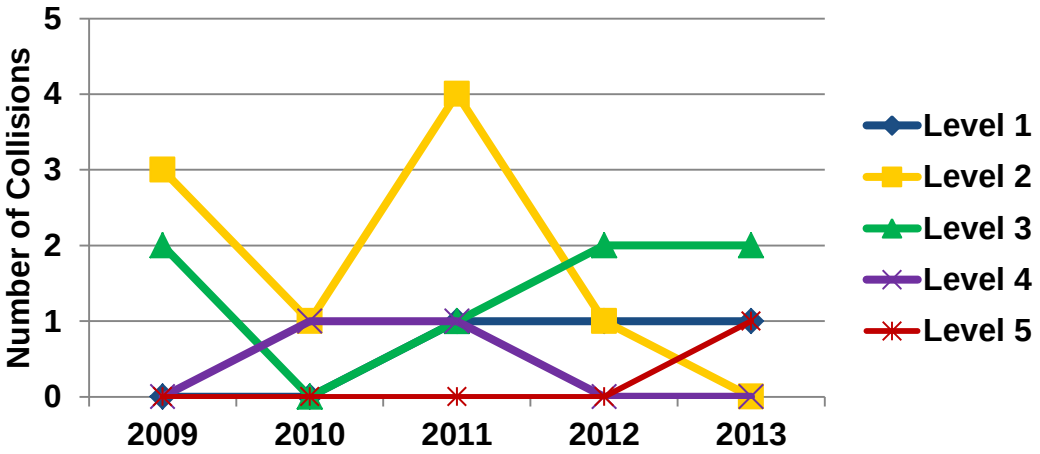
Cyclist Age Group	Number of Collisions
0 to 9	0
10 to 19	4
20 to 29	2
30 to 39	2
40 to 49	2
50 to 59	1
60 to 69	0
70 to 79	0
80+	0
None Recorded	2



Section 4B

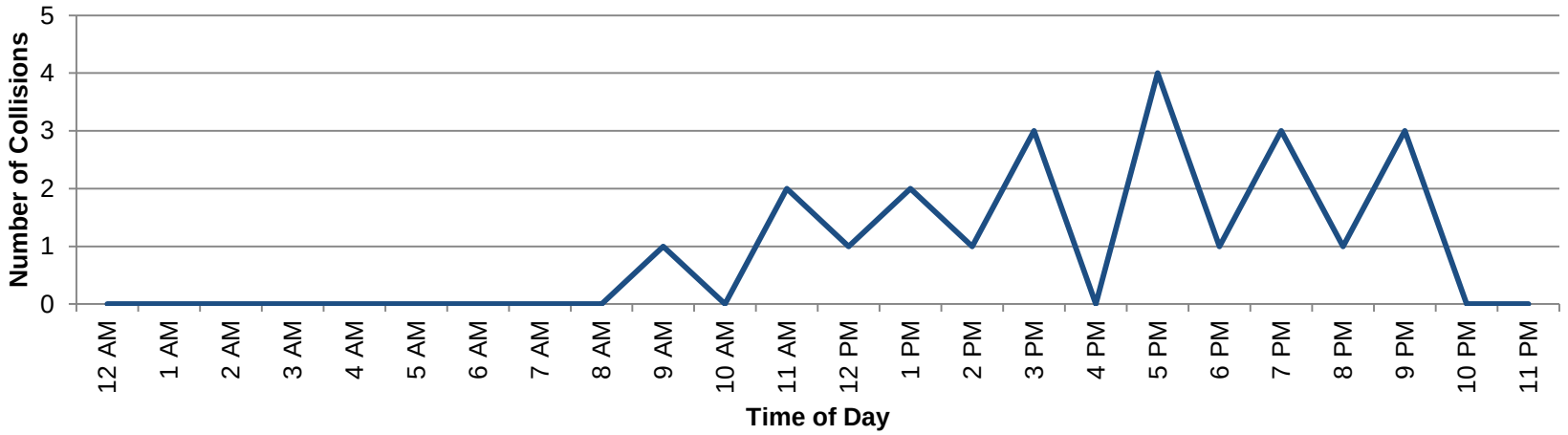
SILVER SPRING CENTRAL BUSINESS DISTRICT

Silver Spring CBD (1/2)



Road	Number of Collisions
Fenton St.	5
Colesville Rd.	4
Georgia Ave.	4
Parking Lot	2
Other Roads	7

Fault	Number of Collisions
Driver	12 (55%)
Bicyclist	9 (41%)
Both	1 (4%)



Silver Spring CBD (2/2)

Driver At Fault

Primary Cause	Number of Collisions
Failed to Yield ROW	6
Failed to Give Full Time and Attention	2
Vision Obstruction	1
Improper Backing	1
Improper Turn	1
None Recorded	1

Driver Age Group	Number of Collisions
0 to 9	0
10 to 19	0
20 to 29	2
30 to 39	2
40 to 49	1
50 to 59	2
60 to 69	0
70 to 79	1
80+	0
None Recorded	4

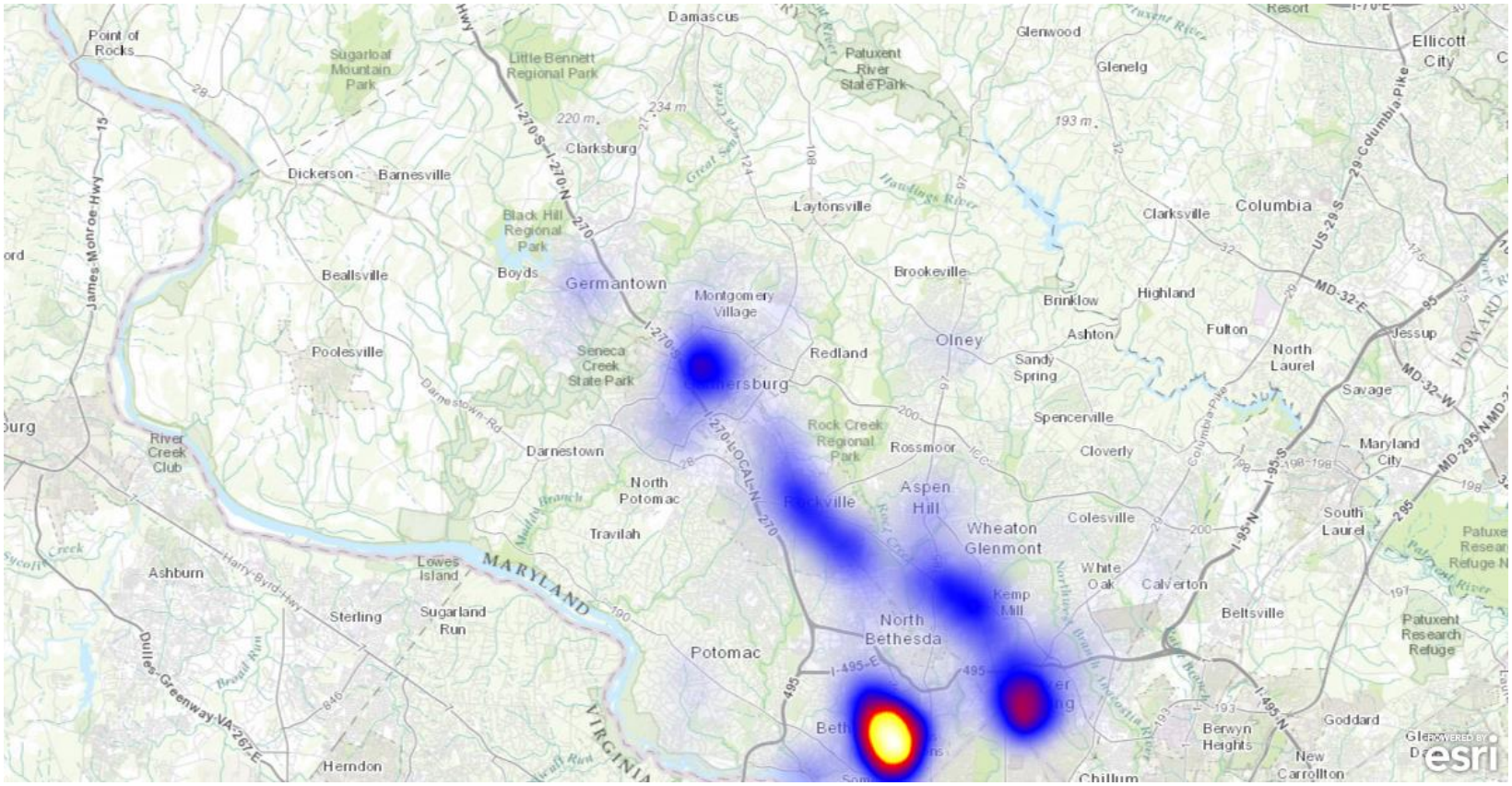
Bicyclist At Fault

Primary Cause	Number of Collisions
Failed to Give Full Time and Attention	2
Cyclist Illegally in Roadway	1
Failed to Obey Other Traffic Controller	1
Failed to Drive within a Single Lane	1
None Recorded	4

Cyclist Age Group	Number of Collisions
0 to 9	0
10 to 19	2
20 to 29	4
30 to 39	1
40 to 49	0
50 to 59	1
60 to 69	0
70 to 79	1
80+	0
None Recorded	0

Source: MCPD

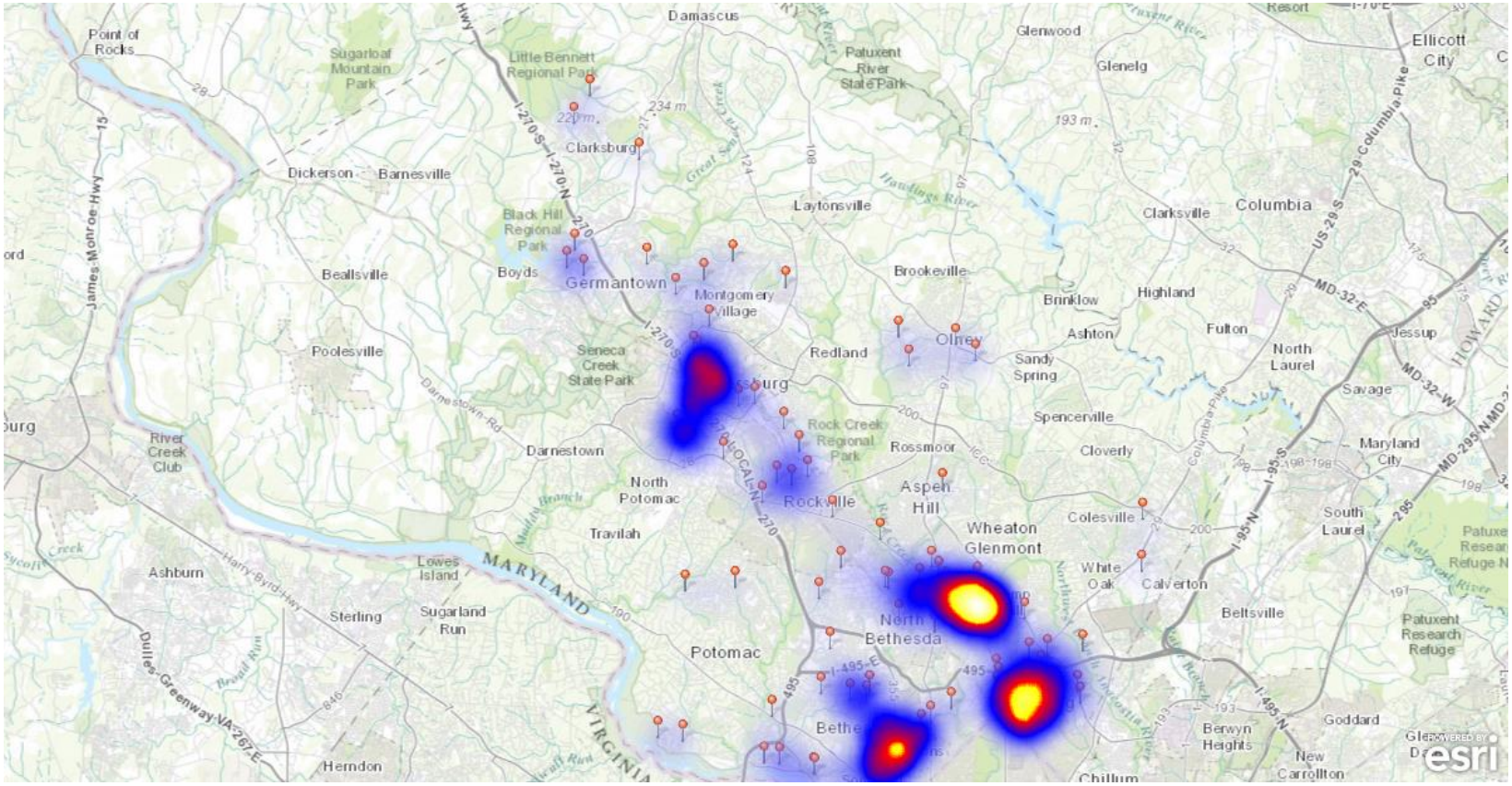
Bicycle Collision Hotspots for 2009 - 2013



For the five most recent years, downtown Bethesda and Silver Spring have the highest concentrations of bicycle collisions. According to the County's 2014 Mobility Assessment Report, the Bethesda CBD had the highest level of bicycling activity in the County.

Sources: MCPD, Park and Planning (pg. 39)

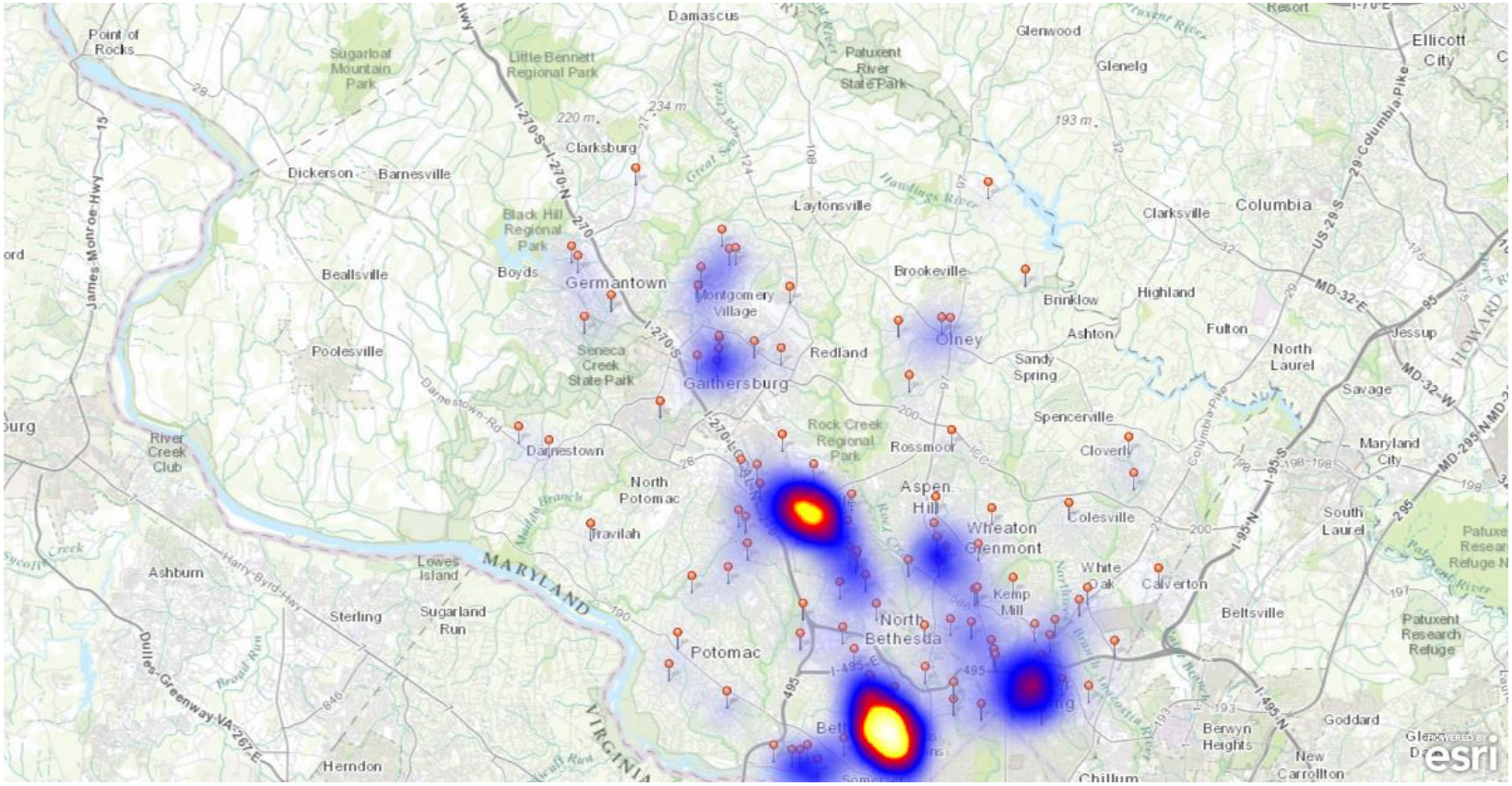
2009



Source: MCPD

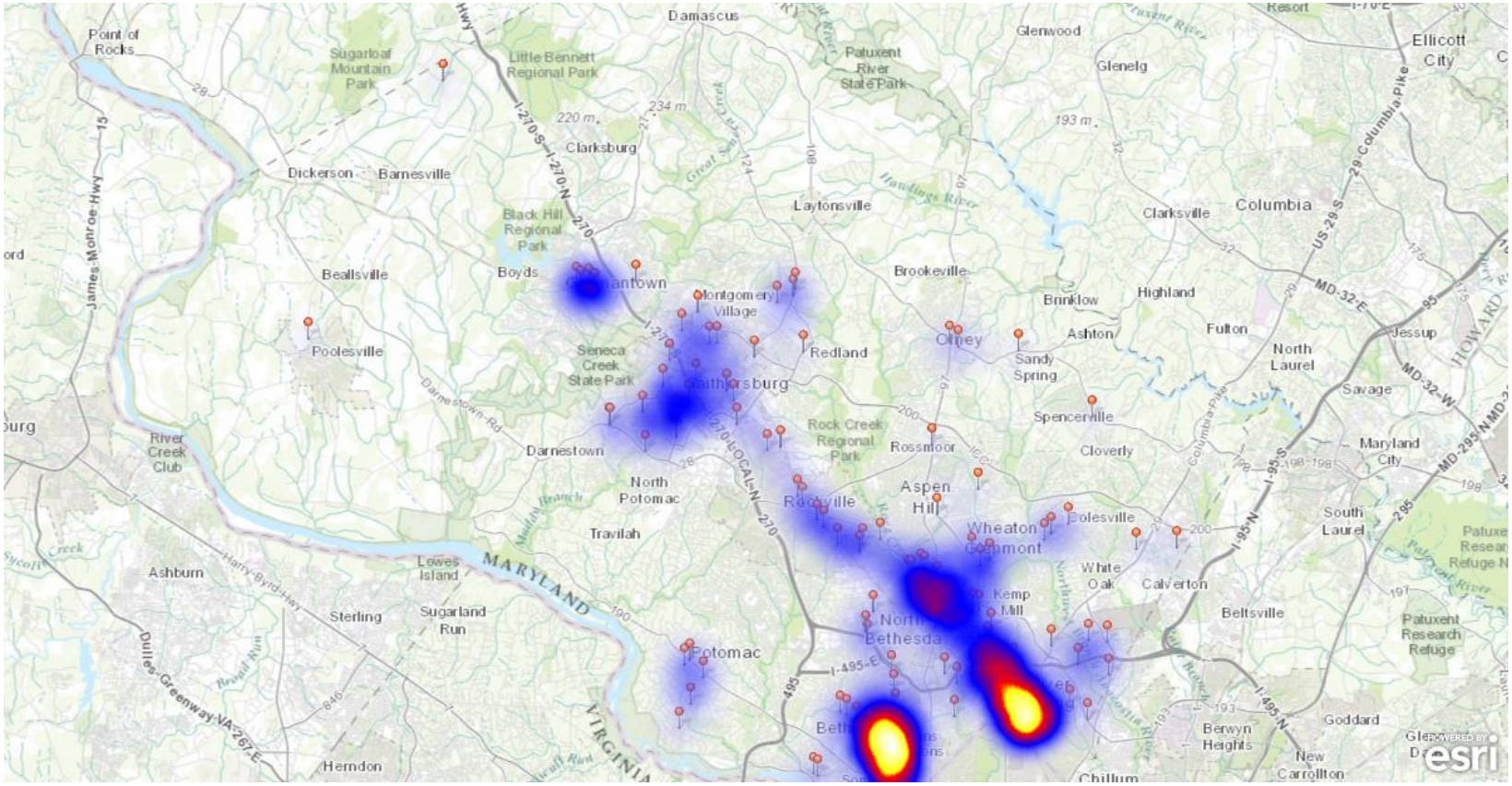
CountyStat

2010



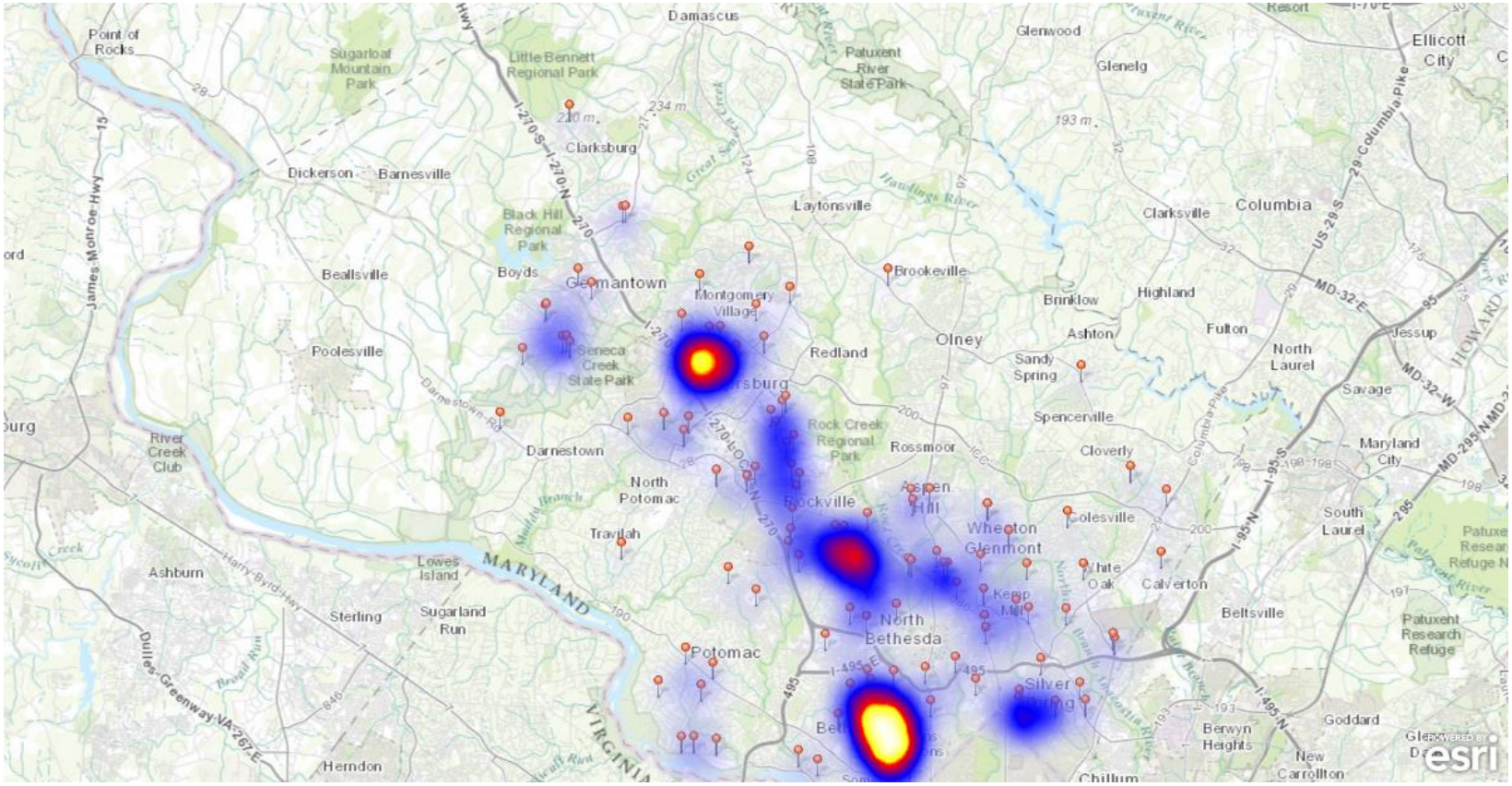
Source: MCPD

2011



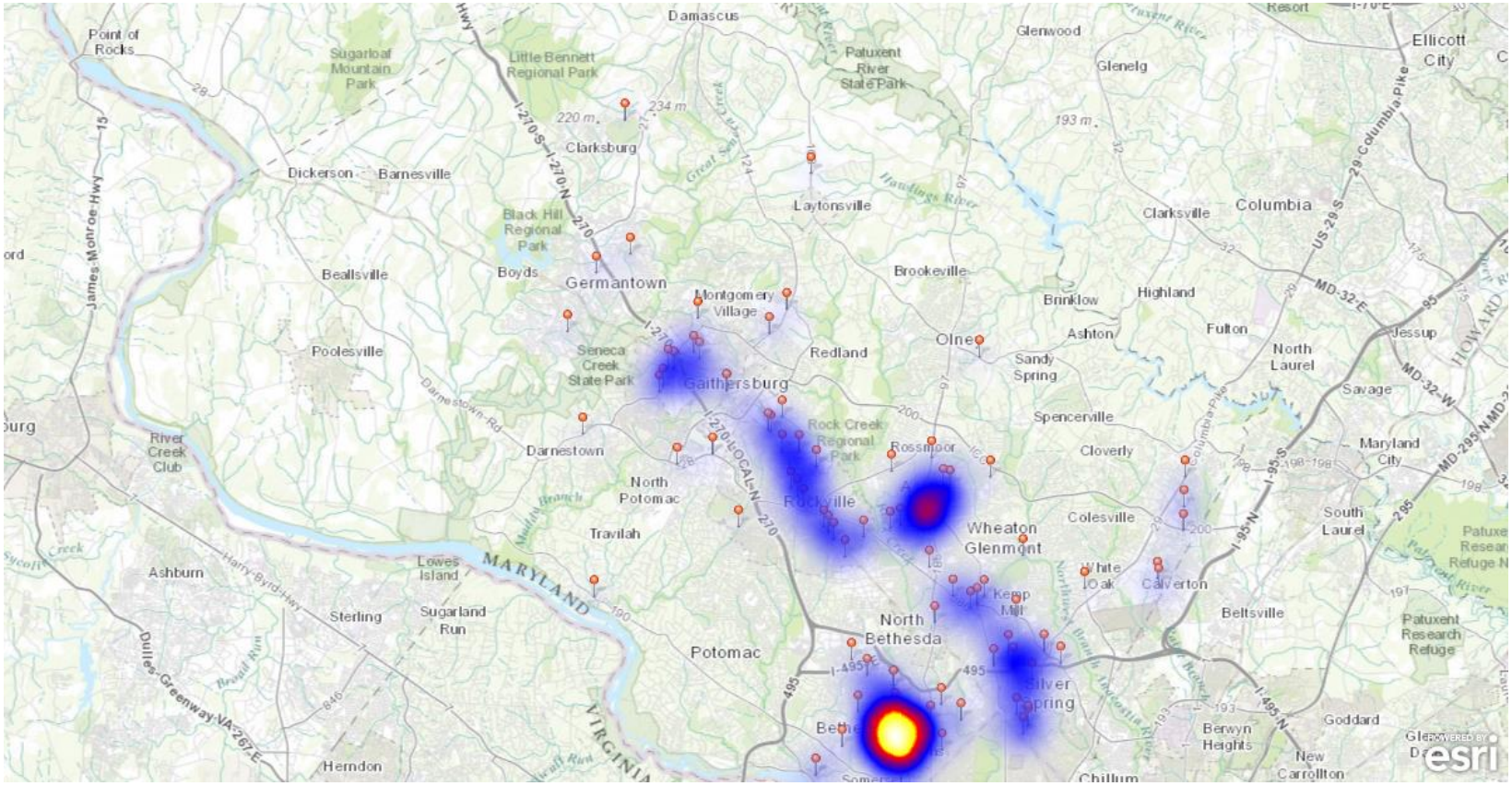
Source: MCPD

2012



Source: MCPD

2013



Source: MCPD

CountyStat

Section 5

BICYCLE SAFETY ITEMS IN COUNTY BUDGET

Bicycle Specific Budget Items in Ped. Safety Budget

Department	Budget	Project/ Program	FY15
MNCPPC	CIP	Trails	$1,350,000
DOT	CIP	MacArthur Blvd. Bikeway Improvements	$863,000
DOT	CIP	Frederick Road Bike Path	$657,000
DOT	CIP	Bikeway Program- Minor Projects	$1,000,000
DOT	CIP	Bethesda Bikeway and Pedestrian Facilities	$936,000
DOT	CIP	Metropolitan Branch Trail	$1,740,000

Funds dedicated directly for bicycle safety are used for bikeway improvement projects around the County. Operating funds for pedestrian safety education and enforcement could also be utilized to reach out to the bicyclist population where HIAs for the two populations overlap.

Source: OMB

Note: The budget information above only includes funds listed in the pedestrian safety section of the budget. Other funds and dept. activity also affect bicycle safety.

Wrap-Up

- **Follow-up items developed during the meeting will be distributed to meeting participants and posted online**