

ANALYSIS OF REGIONAL ROADWAY SAFETY OUTCOMES

Crash Analysis – Preliminary Results

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Technical Committee
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Context

- Study Scope
- Technical Advisory Panel – recent review
- Budget for a deeper dive into three contributing factors

Presentation Items

- Share crash data results for regional and jurisdiction safety priorities
- Ensure that our results are consistent with what each state would expect
- Identify 2-3 safety priorities for further analysis
 - Crash type
 - Contributing factor
 - Roadway type
 - Other



Crash Facts– TPB Region

- Fatalities decreased 38 percent from 2005 to 2013
- Fatalities then increased 13 percent from 2013 to 2018
- Annual trends driven by recent spikes, especially 2017 (313 fatalities)
- Serious Injuries are trending down annually
- Serious Injuries decreased 40 percent over the last 10 years

Crash Severity – By Jurisdiction

Crash Severity by Jurisdiction (2013-2017)					
Jurisdiction	Fatalities	Serious Injuries	Visible Injury	Not Visible Injury	Total Crashes
District of Columbia	124	1765	10307	27500	118166
Charles County, MD	103	955	2888	2593	13391
Frederick County, MD	101	475	3998	3117	16207
Montgomery County, MD	200	1998	14129	15876	64598
Prince George's County, MD	455	2363	14543	18366	76381
Arlington County, VA	21	303	3704	1187	12592
Fairfax County, VA	172	3423	12595	20849	68645
Fauquier County, VA (urbanized area)	3	78	192	496	1706
Loudoun County, VA	69	899	6771	2889	23195
Prince William County, VA	104	1117	8528	4514	28306
Alexandria, VA	15	220	2229	1055	8701
Fairfax City, VA	6	108	574	883	2967
Falls Church, VA	0	79	41	710	681
Manassas, VA	2	324	229	2749	2933
Manassas Park, VA	0	7	140	57	382
Maryland TPB Portion	859	5791	35558	39952	170577
Virginia TPB Portion	392	6558	35003	35389	150108
TPB Region Total	1375	14114	80868	102841	438851



Crash Severity – By Jurisdiction

Crash Severity by Jurisdiction					
Jurisdiction	Fatalities	Fatalities per 1,000 Crashes	Serious Injuries	Serious Injuries per 1,000 Crashes	Total Crashes
District of Columbia	124	1.05	1765	14.94	118166
Charles County, MD	103	7.69	955	71.32	13391
Frederick County, MD	101	6.23	475	29.31	16207
Montgomery County, MD	200	3.10	1998	30.93	64598
Prince George's County, MD	455	5.96	2363	30.94	76381
Arlington County, VA	21	1.67	303	24.06	12592
Fairfax County, VA	172	2.51	3423	49.87	68645
Fauquier County, VA (urbanized area)	3	1.76	78	45.72	1706
Loudoun County, VA	69	2.97	899	38.76	23195
Prince William County, VA	104	3.67	1117	39.46	28306
Alexandria, VA	15	1.72	220	25.28	8701
Fairfax City, VA	6	2.02	108	36.40	2967
Falls Church, VA	0	0.00	79	116.01	681
Manassas, VA	2	0.68	324	110.47	2933
Manassas Park, VA	0	0.00	7	18.32	382
Maryland TPB Portion	859	5.04	5791	33.95	170577
Virginia TPB Portion	392	2.61	6558	43.69	150108
TPB Region Total	1375	3.13	14114	32.16	438851



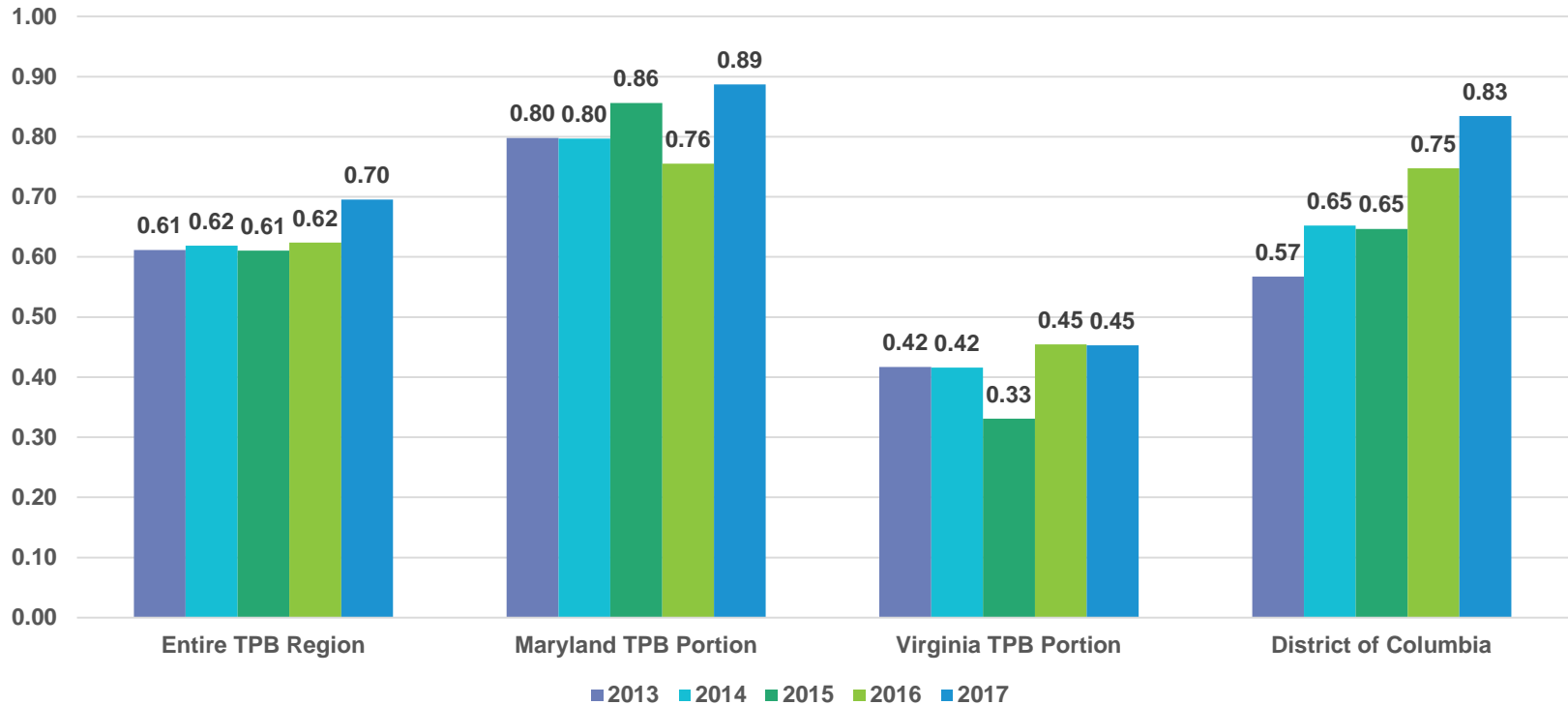
Crash Severity Takeaways

- Crash totals are higher in jurisdictions with higher VMT
- Fatalities are disproportionately higher in jurisdictions with more rural roadway miles
 - State with highest fatalities per 1,000 crashes - Maryland
- Serious injuries are disproportionately higher in Falls Church and Manassas in Virginia, and Charles County in Maryland
 - State with highest serious injuries per 1,000 crashes - Virginia



Fatality Rate

Fatality Rate (Fatalities per 100 Million Vehicle Miles Driven)

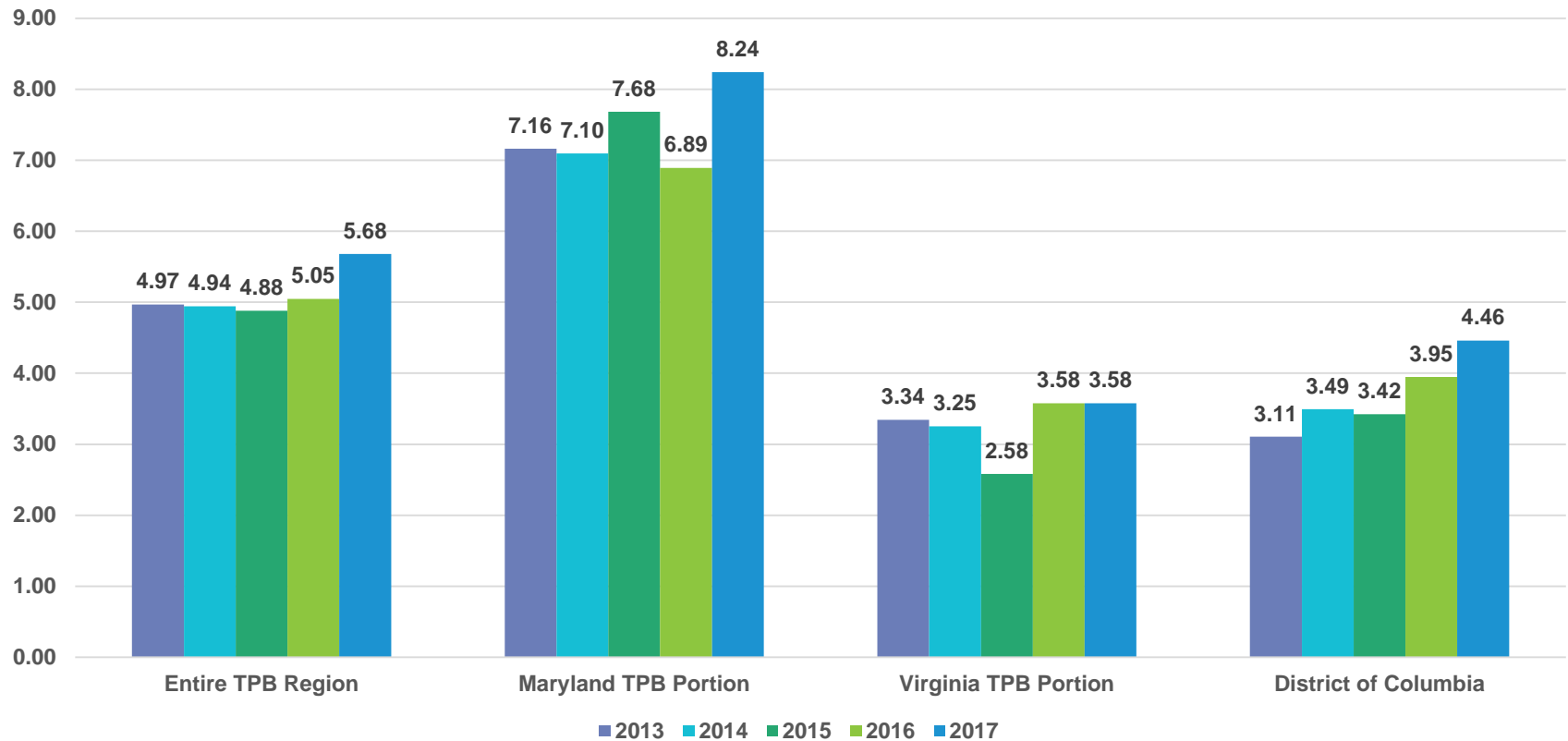


VMT (Daily Weekday)					
Jurisdiction	2013	2014	2015	2016	2017
Entire TPB Region	122,751,101	122,276,485	123,915,776	126,800,382	129,525,600
Maryland TPB Portion	58,768,356	58,843,151	59,812,603	61,330,328	62,922,329
Virginia TPB Portion	53,835,808	53,285,477	53,870,153	55,079,188	55,913,797
District of Columbia	10,146,937	10,147,856	10,233,020	10,390,867	10,689,473



Fatalities per Population

Fatalities per 100,000 Population



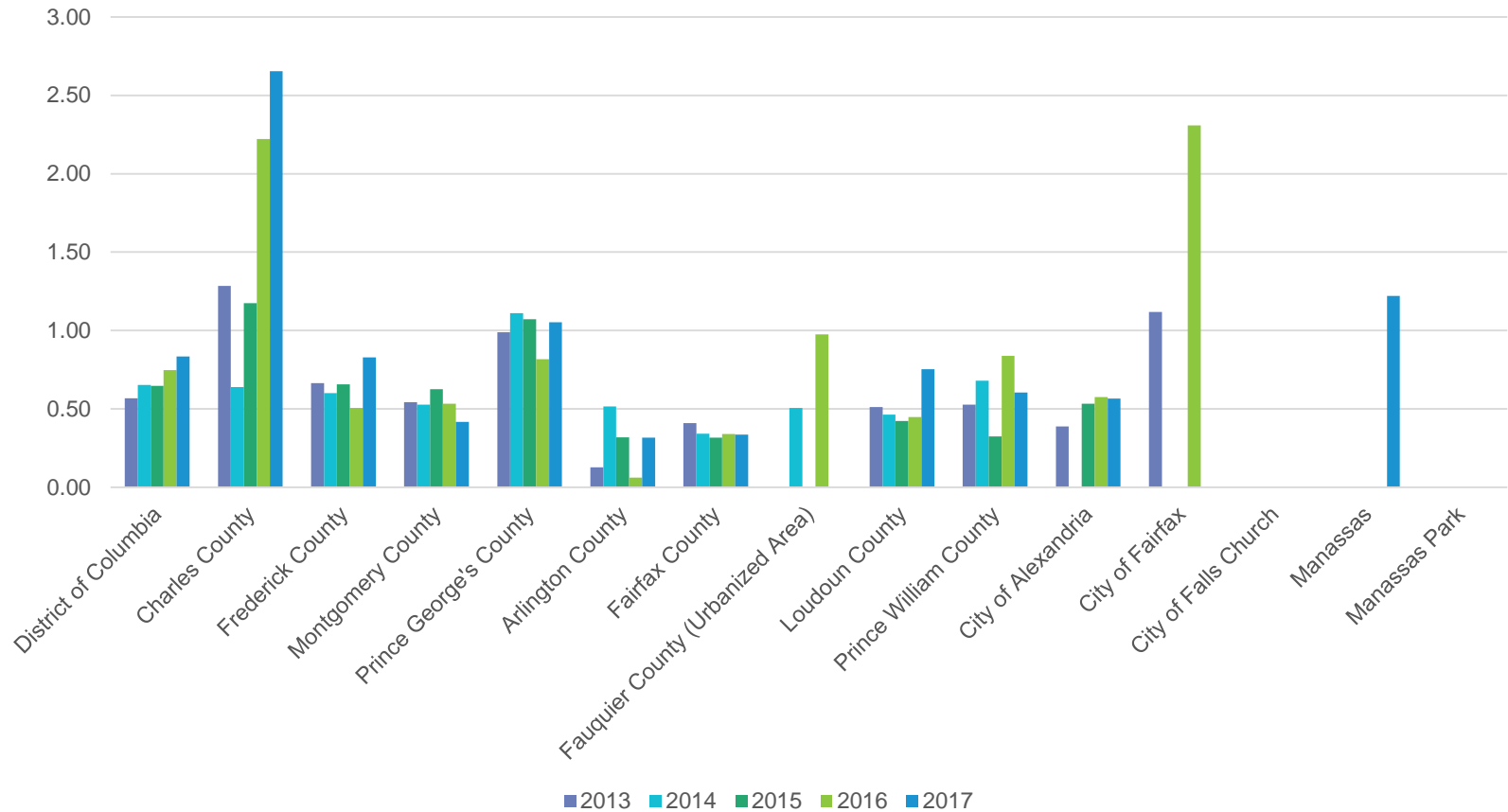
VMT- By Jurisdiction

VMT (Daily Weekday)							
Jurisdiction	2013	2014	2015	2016	2017	Average	Percent Change (2013-2017)
District of Columbia	10,146,937	10,147,856	10,233,020	10,390,867	10,689,473	10,321,631	5.3%
Charles County	3,584,384	3,604,521	3,676,438	3,755,328	3,794,384	3,683,011	5.9%
Frederick County	8,647,397	8,627,260	8,768,219	9,082,787	9,378,082	8,900,749	8.4%
Montgomery County	21,233,014	21,244,521	21,595,479	22,084,426	22,705,890	21,772,666	6.9%
Prince George's County	25,303,562	25,366,849	25,772,466	26,407,787	27,043,973	25,978,927	6.9%
Arlington County	4,539,105	4,459,921	4,505,532	4,578,445	4,552,178	4,527,036	0.3%
Fairfax County	28,161,223	27,738,695	28,230,822	28,742,332	29,026,814	28,379,977	3.1%
Fauquier County (Urbanized Area)	589,668	568,256	580,271	589,501	652,752	596,090	10.7%
Loudoun County	7,294,841	7,444,681	7,474,984	7,697,989	8,011,283	7,584,756	9.8%
Prince William County	9,819,640	9,727,886	9,743,449	10,291,839	10,450,141	10,006,591	6.4%
City of Alexandria	2,226,169	2,172,768	2,159,272	1,996,695	2,030,941	2,117,169	-8.8%
City of Fairfax	514,406	502,315	502,700	498,665	498,440	503,305	-3.1%
City of Falls Church	156,579	143,937	144,033	148,846	146,199	147,919	-6.6%
Manassas	461,254	454,918	456,818	462,188	471,095	461,255	2.1%
Manassas Park	72,923	72,100	72,273	72,687	73,953	72,787	1.4%



Fatality Rate – By Jurisdiction

Fatality Rate (Fatalities per 100 Million Vehicle Miles Driven)



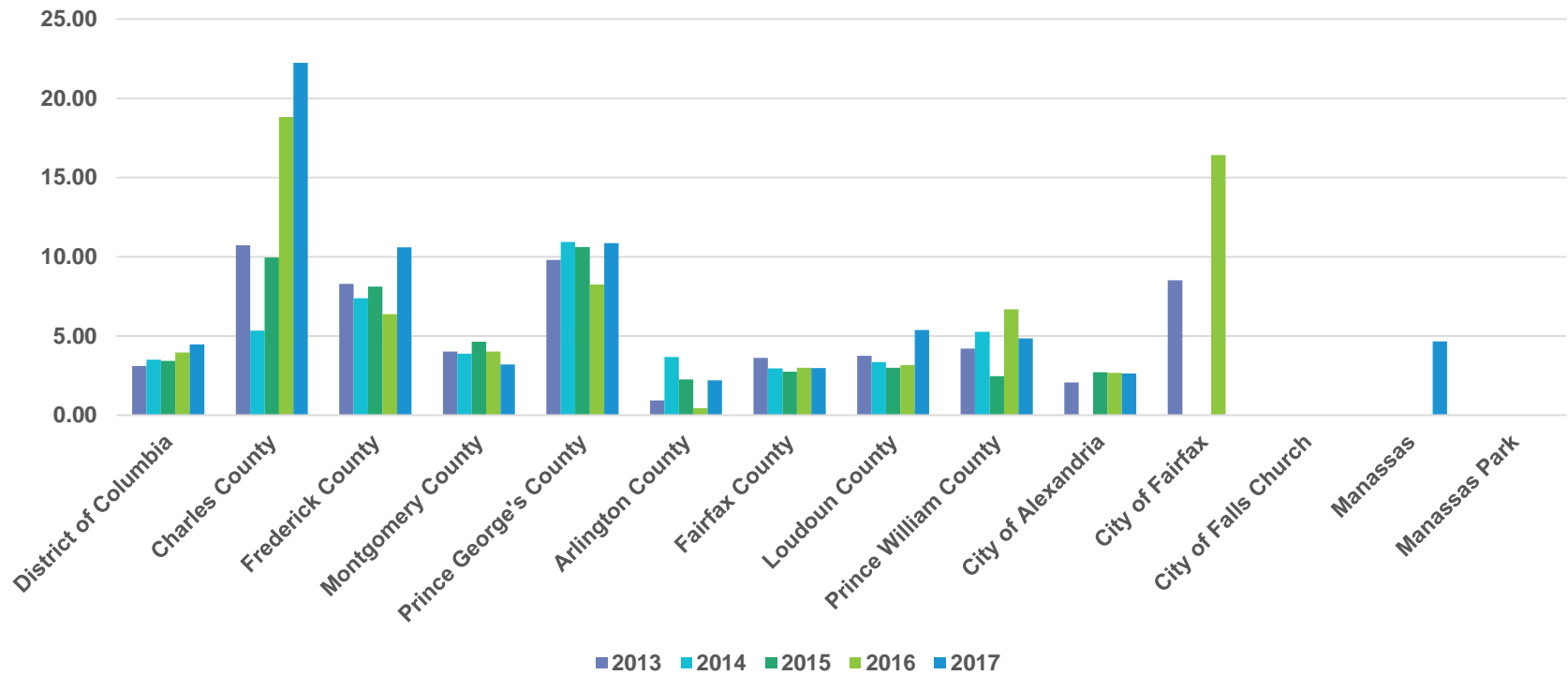
Population – By Jurisdiction

Population							
Jurisdiction	2013	2014	2015	2016	2017	Average	Percent Change (2013-2017)
District of Columbia	644,027	658,129	672,230	683,684	695,138	670,642	7.9%
Charles County	149,089	149,935	150,781	154,032	157,283	152,224	5.5%
Frederick County	241,253	243,876	246,499	250,756	255,012	247,479	5.7%
Montgomery County	997,875	1,006,574	1,015,273	1,022,616	1,029,959	1,014,459	3.2%
Prince George's County	888,026	896,228	904,430	908,173	911,916	901,754	2.7%
Arlington County	215,599	218,256	220,913	224,389	227,866	221,405	5.7%
Fairfax County	1,107,923	1,116,656	1,125,388	1,132,666	1,139,944	1,124,515	2.9%
Loudoun County	346,115	357,383	368,651	379,711	390,771	368,526	12.9%
Prince William County	427,701	436,267	444,833	449,453	454,072	442,465	6.2%
City of Alexandria	144,574	146,110	147,646	149,951	152,255	148,107	5.3%
City of Fairfax	23,460	23,759	24,057	24,363	24,669	24,062	5.2%
City of Falls Church	12,793	12,946	13,100	13,320	13,540	13,140	5.8%
Manassas	40,616	41,548	42,480	42,742	43,005	42,078	5.9%
Manassas Park	14,273	14,273	14,273	14,591	14,909	14,464	4.5%



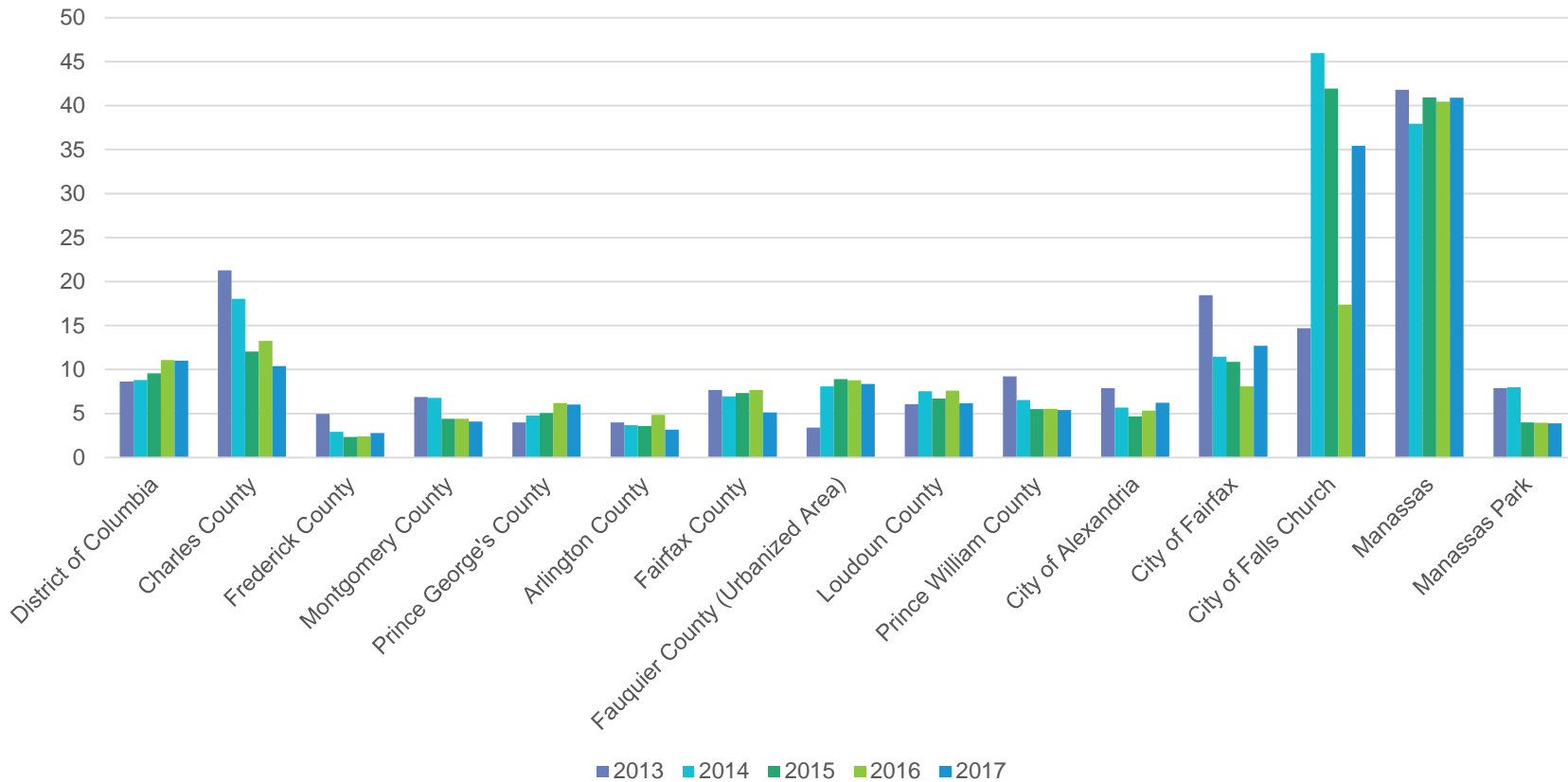
Fatalities per Population – By Jurisdiction

Fatalities per 100,000 Population



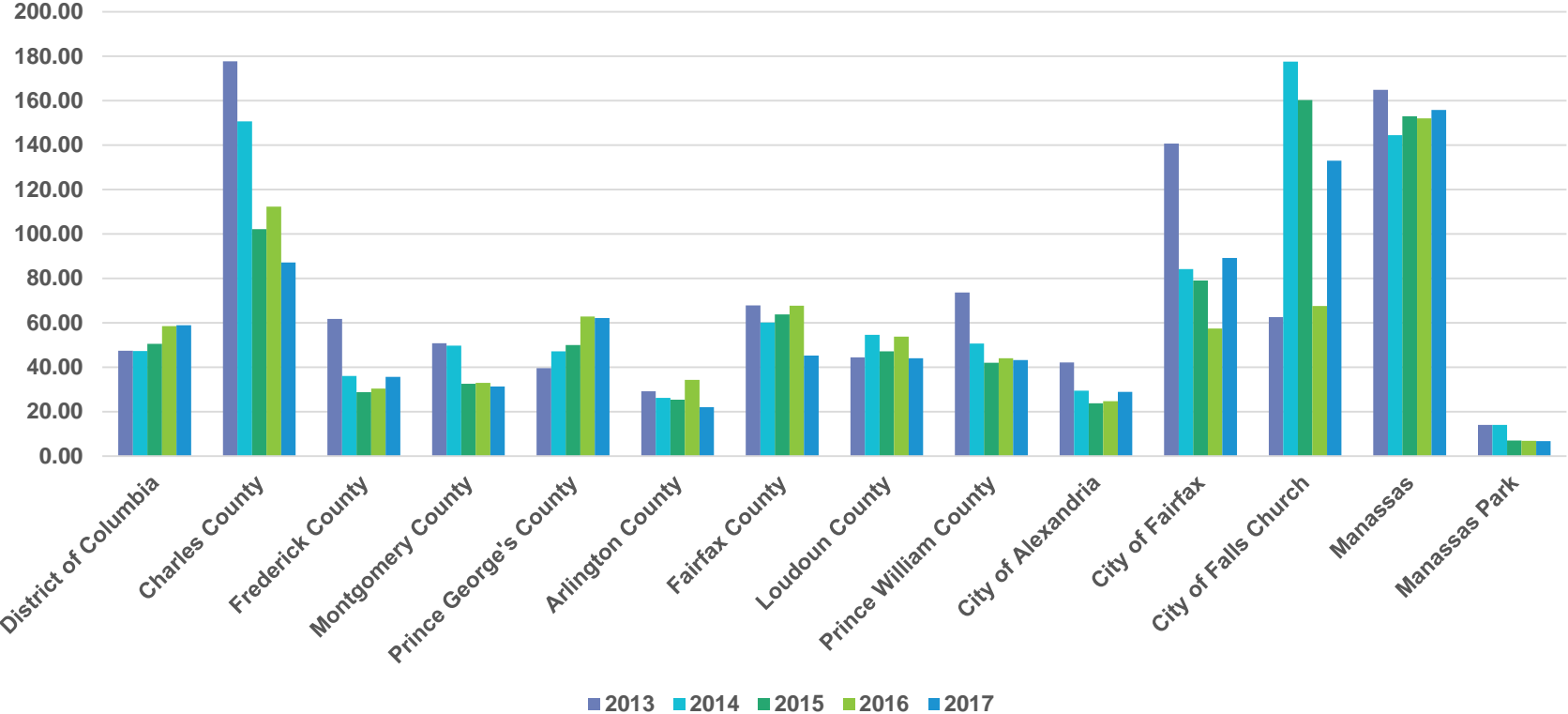
Serious Injury Rate – By Jurisdiction

Serious Injury Rate (Serious Injuries per 100 Million Vehicle Miles Driven)



Serious Inj. per Population – By Jurisdiction

Serious Injuries per 100,000 Population

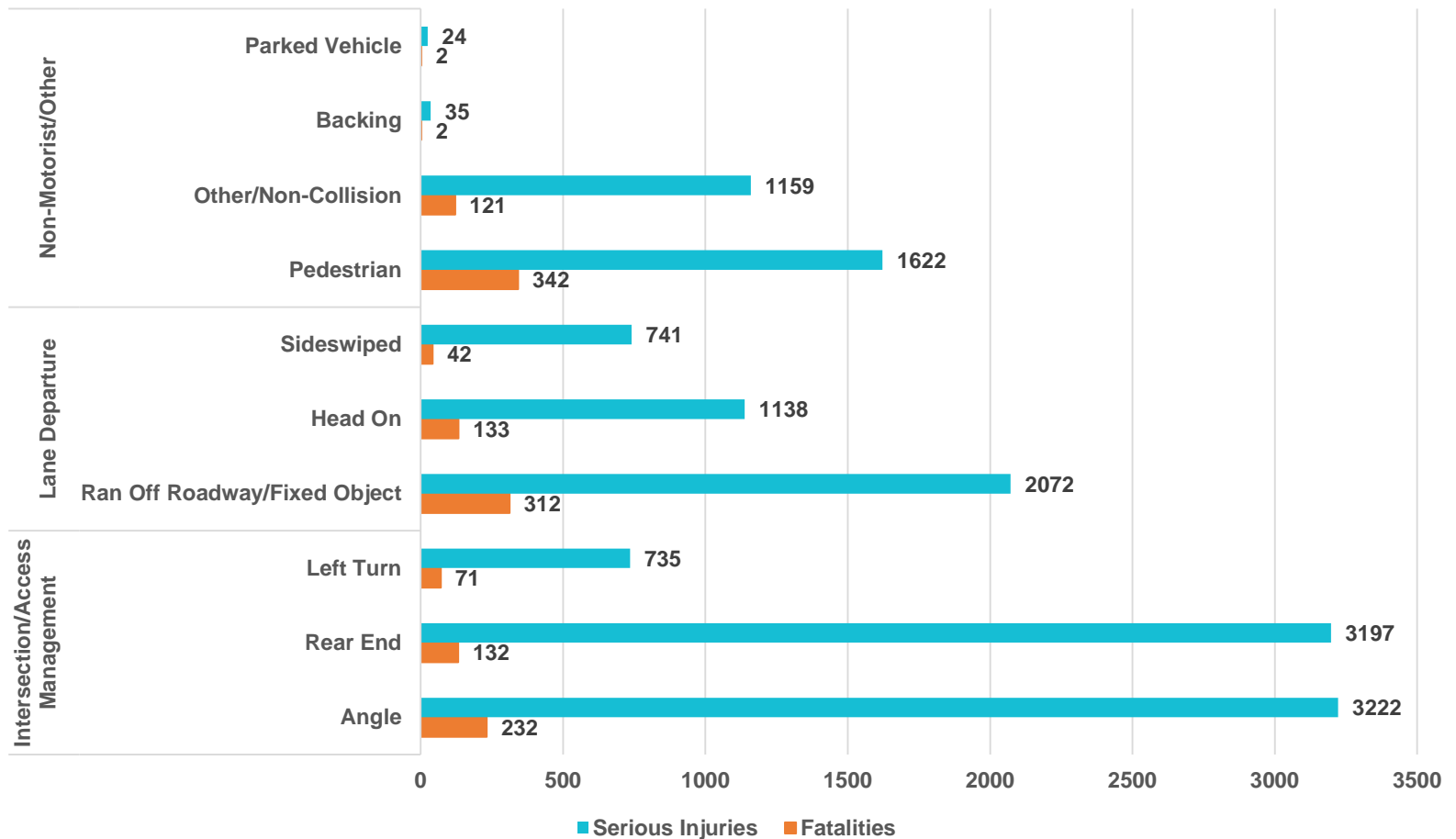


Crash Rate Takeaways

- Among the three states, Virginia has the highest rate of serious injuries per 1,000 crashes
 - Lowest fatality rate per 100 Million Vehicle Miles Traveled
 - Lowest fatality rate per Population
- Charles County has the highest fatality rate per VMT and Population
- Falls Church and Manassas have disproportionately high serious injury rates

Regional Crash Types (2013-2017)

Injury Severity by Crash Type



Crash Types by States/District (2013-2017)

Crash Type FSI by Jurisdiction



Crash Type Takeaways

- The three larger jurisdictions report collision or crash type differently
 - Reporting method for collision type also changed in 2015 for D.C.
 - Virginia does not have a left turn collision type
- Angle and left turn collisions account for 22 percent of fatalities and 28 percent of serious injuries
- D.C. only represents nine percent of fatalities and 12 percent of serious injuries in the region
 - Represent 24 percent of head-on fatalities and serious injuries



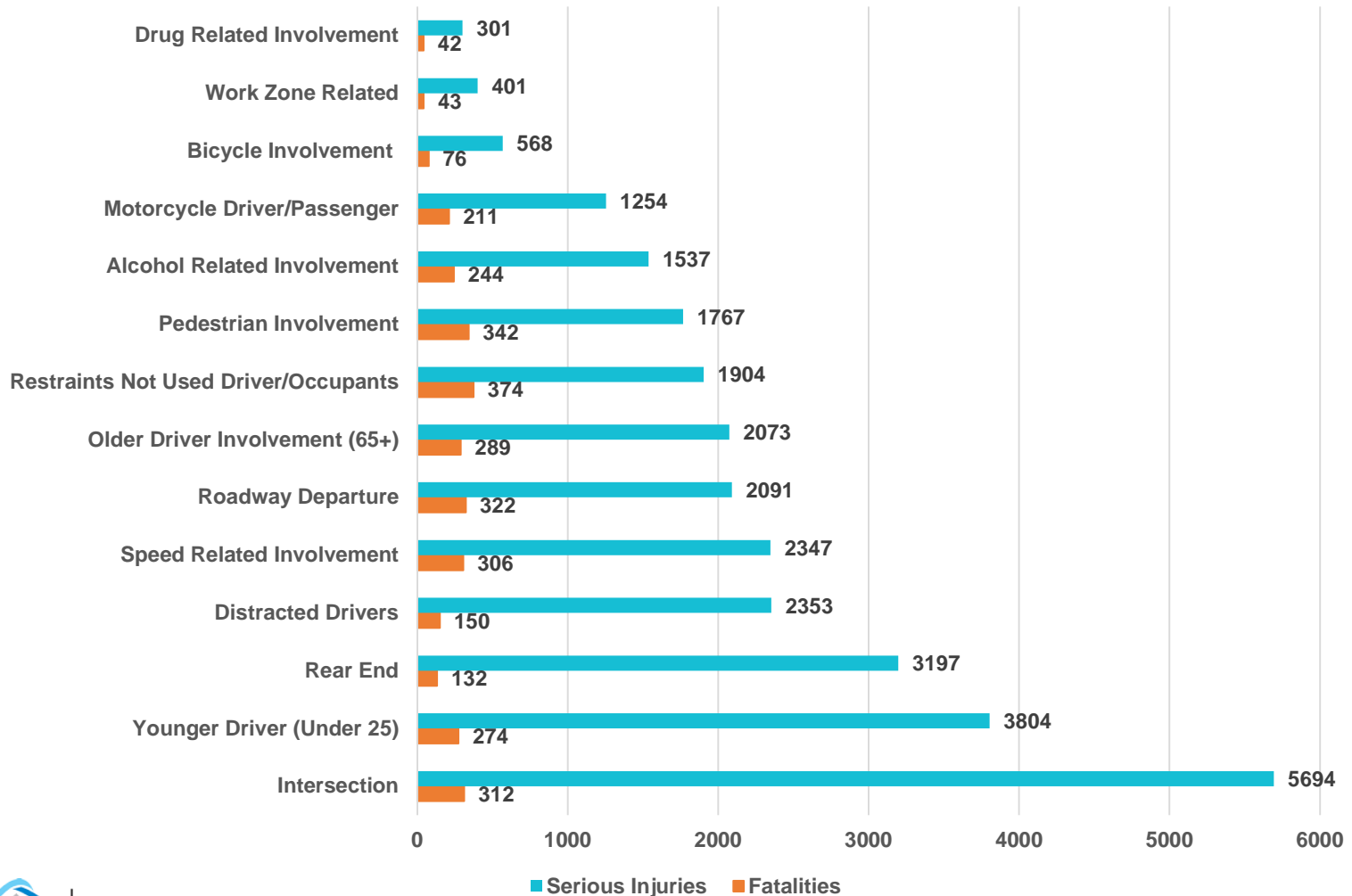
Crash Types

- Any crash type interests to study further?
 - Over-represented jurisdictions
 - Over-represented functional class
 - Overlaps with contributing circumstances or other emphasis areas
 - Heat map



Contributing Factors (2013-2017)

Injury Severity by Contributing Circumstance



Contributing Factors (2013-2017)

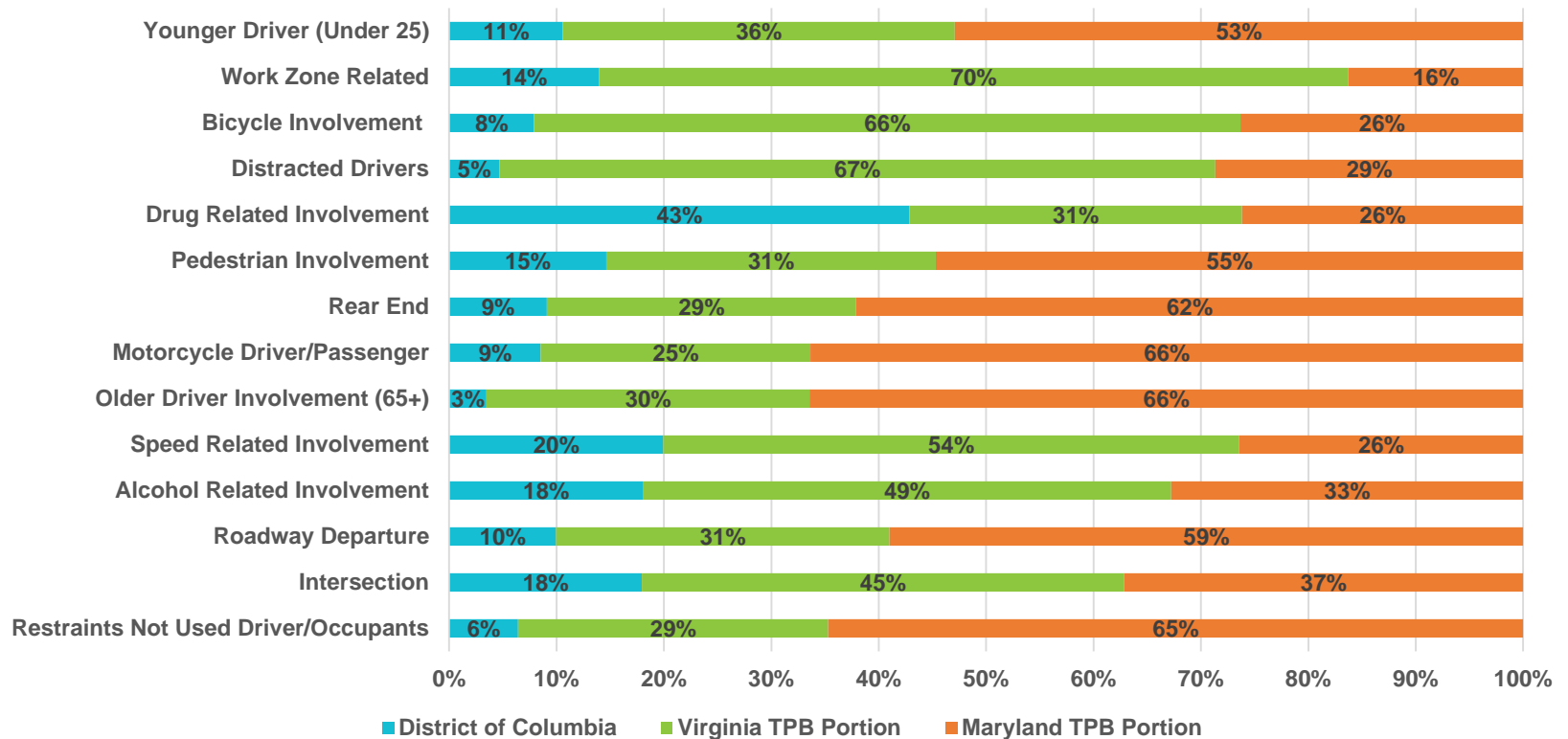
Fatalities by Contributing Circumstance								
Contributing Circumstance	District of Columbia		Virginia TPB Portion		Maryland TPB Portion		Entire TPB Region	
Restraints Not Used Driver/Occupants	24	19%	108	28%	242	28%	374	27%
Intersection	56	45%	140	36%	116	13%	312	23%
Roadway Departure	32	26%	100	26%	190	22%	322	23%
Alcohol Related Involvement	44	35%	120	31%	80	9%	244	18%
Speed Related Involvement	61	49%	164	42%	81	9%	306	22%
Older Driver Involvement (65+)	10	8%	87	22%	192	22%	289	21%
Motorcycle Driver/Passenger	18	15%	53	14%	140	16%	211	15%
Rear End	12	10%	38	10%	82	9%	132	10%
Pedestrian Involvement	50	40%	105	27%	187	22%	342	25%
Drug Related Involvement	18	15%	13	3%	11	1%	42	3%
Distracted Drivers	7	6%	100	26%	43	5%	150	11%
Bicycle Involvement	6	5%	50	13%	20	2%	76	6%
Work Zone Related	6	5%	30	8%	7	1%	43	3%
Younger Driver (Under 25)	29	23%	100	26%	145	17%	274	20%

Serious Injuries by Contributing Circumstance								
Contributing Circumstance	District of Columbia		Virginia TPB Portion		Maryland TPB Portion		Entire TPB Region	
Restraints Not Used Driver/Occupants	125	7%	901	14%	878	15%	1904	14%
Intersection	929	54%	3007	46%	1758	30%	5694	40%
Roadway Departure	132	8%	1166	18%	793	14%	2091	15%
Alcohol Related Involvement	77	4%	1071	16%	389	7%	1537	11%
Speed Related Involvement	111	6%	1968	30%	268	5%	2347	17%
Older Driver Involvement (65+)	156	9%	973	15%	944	16%	2073	15%
Motorcycle Driver/Passenger	193	11%	601	9%	460	8%	1254	9%
Rear End	295	17%	1471	22%	1431	25%	3197	23%
Pedestrian Involvement	399	23%	696	11%	672	12%	1767	13%
Drug Related Involvement	58	3%	173	3%	70	1%	301	2%
Distracted Drivers	147	9%	1733	26%	473	8%	2353	17%
Bicycle Involvement	235	14%	211	3%	122	2%	568	4%
Work Zone Related	26	2%	282	4%	93	2%	401	3%
Younger Driver (Under 25)	248	14%	2390	36%	1166	20%	3804	27%



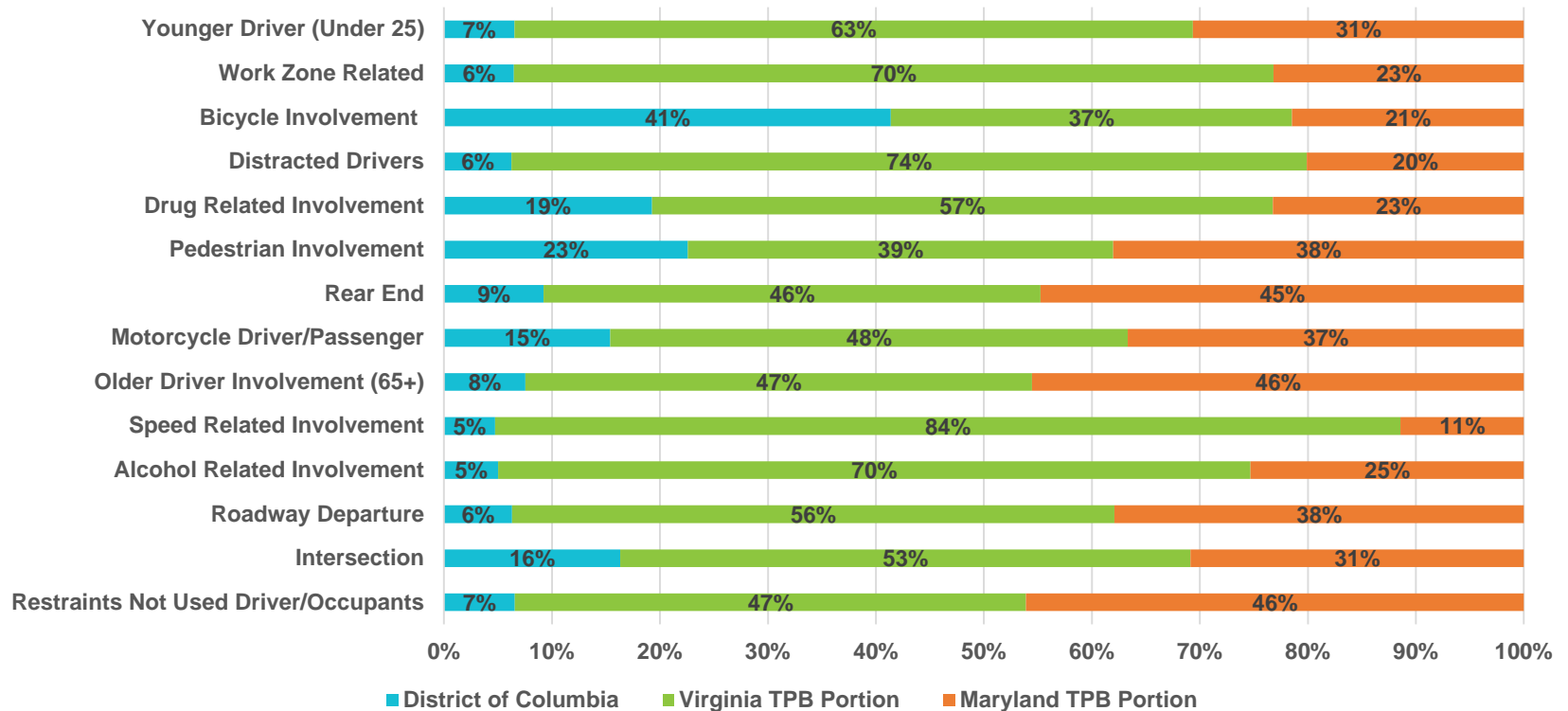
Contributing Factors (2013-2017)

Fatality Contribution by Contributing Circumstance



Contributing Factors (2013-2017)

Serious Injury Contribution by Contributing Circumstance



Contributing Factors Takeaways

- Intersections account for 37 percent of the region's intersection fatalities and 31 percent of the region's intersection serious injuries
 - This follows the trends shown in crash type (angle and left turns)
 - Only 13 percent of Maryland's fatalities are at intersections
- Lack of restraints are the highest contributing circumstance of fatalities at 27 percent
- Pedestrians are the second highest, representing 25 percent of fatalities
- Young Driver Related fatalities ~~only~~ make up 20 percent of fatalities
 - But make up 27 percent of serious injuries



Contributing Factors

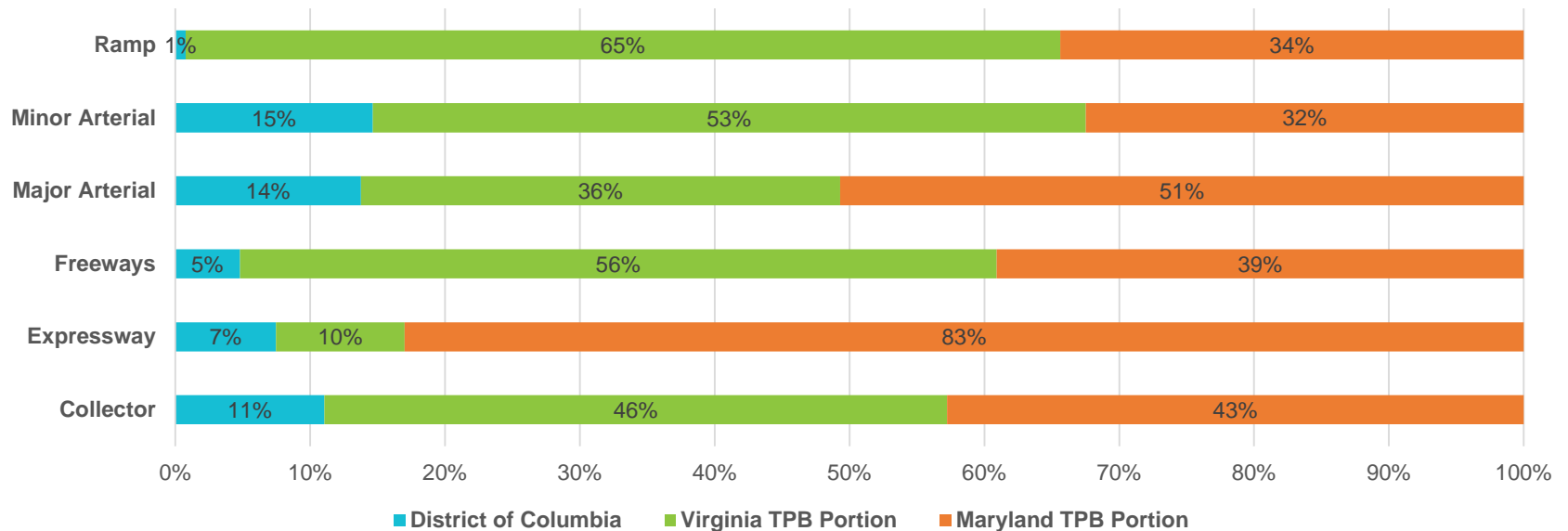
- Any contributing factor interests to study further?
 - Over-represented jurisdictions
 - Over-represented functional class
 - Trends, overlaps with other contributing factors, time of day, day or week, etc.
 - Heat map



Functional Class (2013-2017)

Fatalities and Serious Injuries by Functional Class								
Road Type	District of Columbia		Virginia TPB Portion		Maryland TPB Portion		Entire TPB Region	
Collector	247	14%	1031	15%	955	15%	2233	14%
Expressway	29	2%	37	1%	322	5%	388	3%
Freeways	112	6%	1311	19%	913	14%	2336	15%
Major Arterial	662	37%	1708	25%	2436	38%	4806	31%
Minor Arterial	747	42%	2697	39%	1657	26%	5101	33%
Ramp	2	0%	166	2%	88	1%	256	2%

Fatalities and Serious Injuries Contribution by Functional Class



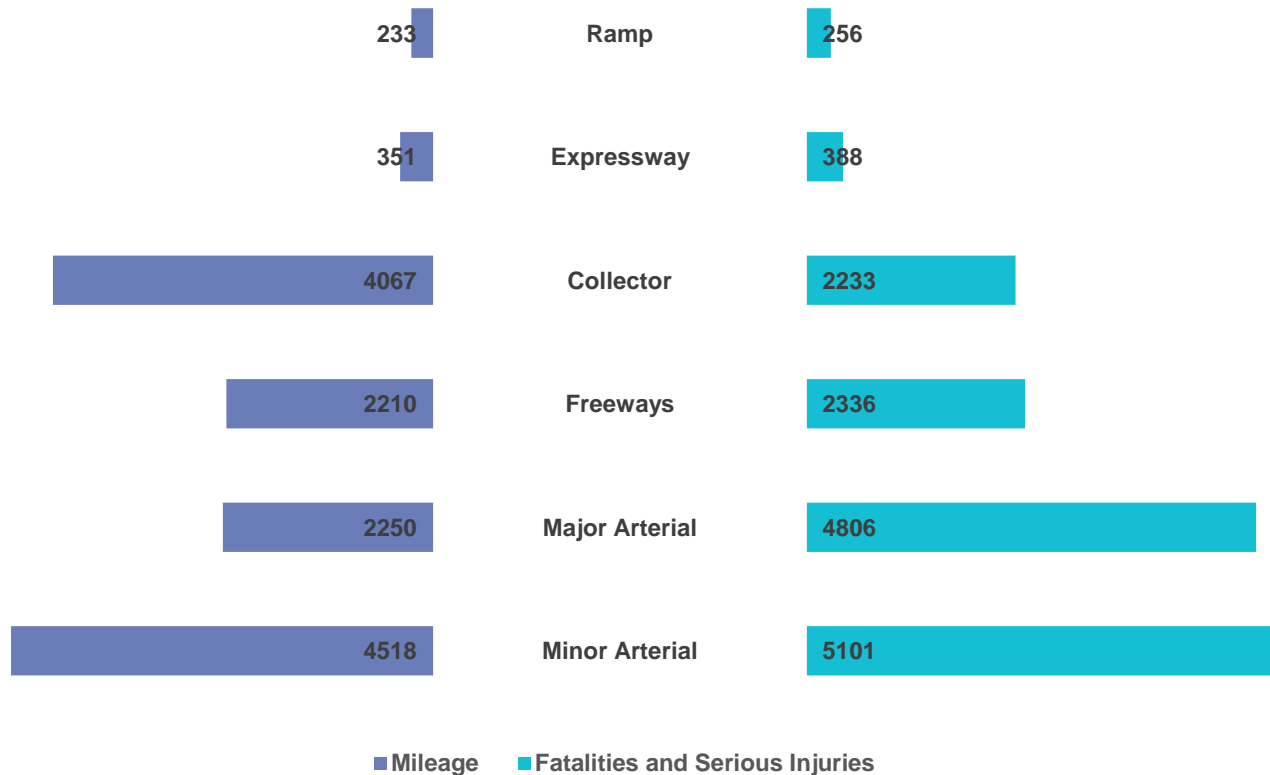
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Fatalities and Serious Injuries per Roadway Mileage by Functional Class								
Road Type	District of Columbia		Virginia TPB Portion		Maryland TPB Portion		Entire TPB Region	
	Length	Rate	Length	Rate	Length	Rate	Length	Rate
Collector	217	1.14	1529	0.67	2321	0.41	4067	0.55
Expressway	14	2.11	84	0.44	254	1.27	351	1.10
Freeways	86	1.31	1252	1.05	872	1.05	2210	1.06
Major Arterial	231	2.87	954	1.79	1065	2.29	2250	2.14
Minor Arterial	308	2.43	2095	1.29	2115	0.78	4518	1.13
Ramp	5	0.38	152	1.09	77	1.15	233	1.10



Functional Class (2013-2017)



Functional Class Takeaways

- Highest number of fatalities and serious injuries (33 percent) occur on minor arterials which also make up the most miles of the roadway network
- Major arterials are overrepresented
 - 31 percent of fatalities and serious injuries
 - Only make up half as many miles of roadway in the region
- Collectors make up the second highest portion of the region's roadways but have the lowest rate in terms of fatalities or serious injuries per mile



Functional Class

- Any functional class interests to study further?
 - Over-represented contributing factors
 - Ownership
 - By the smaller jurisdictions
 - Heat map



Network Screening

- Initial Intersections and Segments ranked by crash frequency and severity
- Potential to separate list by other roadway characteristics to normalize
 - Speed
 - Lanes
 - Functional Class
- Resulting list of priority locations for which countermeasures can be identified to address
 - Priority emphasis areas from the crash data analysis will help point to regional strategies to address these locations as well



Summary/Next Steps

- Recap of priorities identified on call
- Top 2-3 priorities moving forward
- Deeper dive on crash analysis

