



ALEXANDRIA POLICE DEPARTMENT

Basic Analysis of Traffic Citation Data for 2019

Influenced by the basic analysis completed by Dr. Cynthia Lum and Mr. Xiaoyun Wu of George Mason University in April 2017.

Dr. Lum's study is published on the Alexandria Police Department's website at www.alexandriava.gov/police under Community Advisory Team & Traffic Citation Analysis.

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Introduction and Data for Analysis

The traffic citation data used in this analysis includes all records for 2017-2019 and select data from 2011-2016, except for one charge category which was removed prior to this analysis, "Criminal C--" as it is a misdemeanor criminal arrest. In the 2019 dataset 548 "Criminal C—", 1 blank, and 3 "No Charges" entries were removed. "No Charges" is used to denote voided citations. Note that electronic citations were first issued by the department on May 28, 2019. Both eCitations and handwritten ones are captured in this report, as are electronic and handwritten warnings. The number of traffic citations and warnings does not directly reflect the number of traffic stops made by the officers as an individual may be stopped and issued multiple citations or warnings. This will result in two separate entries in the traffic stop dataset, one for each violation committed. In this analysis, the focus will be on the traffic stops to best represent the number of people stopped and cited or warned. There may be overlap in the citation and warning datasets if an individual was cited for one infraction and warned about another.

The traffic citation analysis draws influence from the April 2017 traffic citation analysis for the Alexandria Police Department conducted by Dr. Cynthia Lum of George Mason University's Center for Evidence-Based Crime Policy and the Department of Criminology, Law & Society, with the help of Mr. Xiaoyun Wu. This report modifies Dr. Lum's initial basic analysis, which focused on 2011-2015, and has been streamlined over the past two years with the addition of 2016 through 2019 data. Although there are similarities in the methods used to analyze the data, the following analysis looks less at the limited details of ethnicity and adds a brief temporal analysis of the data. Traffic Warnings are also briefly examined in the 2018 & 2019 analyses. The form used to capture this data was adopted midway through 2017 so data prior to 2018 is not currently available for a comparison.

Following the methodology of the April 2017 study completed by Dr. Lum and Mr. Wu, the traffic citation data used eleven fields collected in the traffic citation database.

1. The Incident Number (INCINMBR) which identifies each unique traffic stop. If more than one citation is given during the traffic stop, this number will be repeated.
2. The date (DTCITA) the citation(s) was/were issued.
3. The time (TMCITA) the citation(s) was/were issued.
4. The address of the location (LOCATION) at which the traffic stop was made.
5. The method used to observe the violation (METHODUSEDLIT).
6. The description of the violation (CHARGELIT) in which the citation(s) was/were issued.
7. The specific Local or State Code (CODE) under which the citation(s) was/were issued.
8. The race of the individual (RACELIT). Options in this column will include the following: American Indian/Alaskan, Asian/Pacific Islander, Black, Unknown, White, or not filled out.
9. The gender of the individual (SEXLIT). Options in this column will include the following: Female, Male, Unknown or not filled out.
10. The ethnicity of the individual (ETHNICLIT). Options in this column will include the following: Hispanic, Non-Hispanic, Unknown, or entries that were not filled out.
11. The individual's age, which was calculated using the individuals date of birth and the date of the citation.

It should be noted that race and ethnicity (#8 and #10 above) are not required fields. This information is either offered voluntarily by the individual stopped or is a guess on the part of the officer issuing the citation. The officer does not directly ask for this information, and ethnicity is not listed on Virginia, Maryland, or Washington, D.C. issued driver's licenses.

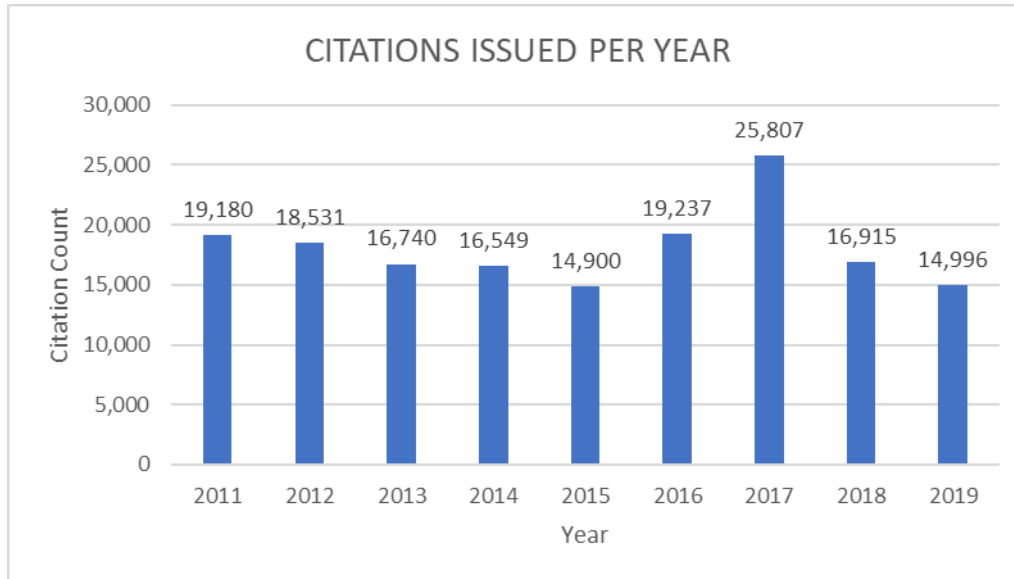
As noted previously, there is a difference between traffic citations and traffic stops. In 2019, there were 14,996 citations issued and 13,420 unique traffic stops completed that resulted in at least one citation. This analysis looks at traffic

citations and traffic stops separately, noting the traffic stops that lead to at least one citation. It also includes information about traffic stops that lead to warnings only. It should be noted that the GMU study also examined traffic citations and traffic stops separately; however, the GMU study referenced the sequence value (“SEQ=1” or the person who received the first citation). This dataset was queried by the primary individual in the stop. The overall values obtained in the GMU study with the use of the sequence value matched with past versions of this analysis where the data was queried by the primary individual. Therefore, the sequence value was not included in this or prior analysis of citation data.

In previous iterations of this analysis, an extensive effort was given towards cleaning the charge data. Citations may be issued referencing the local municipal traffic code or the state traffic code at the discretion of the issuing officer. In the dataset used for this report, the same charge description (CHARGELIT) was used for both municipal and state violations. In order to distinguish the difference in the code, the specific code (CODE) is listed in a separate column. For example, a “Cross Double Yellow Line” in the charge description column can be associated with either Municipal Code 10-3-804.6 or State Code 46.2-804.6. In some instances, a letter was placed at the end of a charge code to help identify the method used to aid the officer in determining the violation (METHODUSEDLIT). This letter designator was not used in every or most instances.

Results for All Citations

Figure 1: Total Traffic Citations Issued from 2011-2019 (N= 162,855)



The 9-year average of citations issued per year between 2011-2019 was 18,095. 2019 citations declined by 11.3% from 2018. Comparing 2019 to 2017 shows a decrease of 41.9% but 2017 was an outlying year due to increased traffic enforcement as speed limits decreased on major roads in the City and additional emphasis was placed on Vision Zero. 2016 provides a better comparator and 2019's total citations are 22.0% lower than 2016's total.

The dataset includes 252 different charge descriptions. These charge descriptions combine the Municipal Code (MC) or the State Code (SC) for the same charge type, as mentioned in the methodology section. 90.22% (13,530) of the citations were issued using 36 different charges (Table 1).

Table 1: Most common violations cited in Alexandria in 2019 (90.22% of the citations issued; N=13,530)

Charge Description	Count	% of Total	Cumulative %
OFFICIAL SIGNS	2318	15.46%	15.46%
FAIL TO GIVE FULL TIME AND ATTENTION	1854	12.36%	27.82%
SPEEDING 25 ZONE RADAR	1680	11.20%	39.02%
SPEED: BUSINES/RESIDENTL 15-19 OVR LIMIT	802	5.35%	44.37%
FAIL TO OBEY HIGHWAY SIGN	777	5.18%	49.55%
OPERATE/PERMT OP UNLIC MTR VEH	717	4.78%	54.33%
HOV VIOLATION	531	3.54%	57.88%
NO OPERATORS LICENSE (1ST OFFENSE)	474	3.16%	61.04%
OFF. SIGN - RED/YELLOW/FLASHING LIGHT	464	3.09%	64.13%
EXPIRED/NO INSPECTION STICKER	406	2.71%	66.84%
SPEEDING 35 ZONE RADAR	332	2.21%	69.05%
SUSPENDED/REVOKED LICENSE	304	2.03%	71.08%
RECKLESS/EXCEEDING SPEED LIMIT 20 MPH OVER	247	1.65%	72.73%
SPEEDING 25 ZONE PACE	228	1.52%	74.25%
SPEED: BUSINES/RESIDENTL 20+ OVR LIMIT	216	1.44%	75.69%

OFF. SIGN - STOP SIGN	190	1.27%	76.95%
DEFECTIVE EQUIPMENT GENERALLY	182	1.21%	78.17%
IMPROPER LANE VIOLATION	170	1.13%	79.30%
SPEED: BUSINES/RESIDENTL 10-14 OVR LIMIT	155	1.03%	80.33%
OFF SIGN - STOP SIGN	130	0.87%	81.20%
EXPIRED REGISTRATION	121	0.81%	82.01%
UNLAW TINT ON VEH WINDOWS	119	0.79%	82.80%
OPER UNINSPECTED VEHICLE	116	0.77%	83.58%
SPEED: IN CITY/TOWN 15-19 MPH OVER LIMIT	113	0.75%	84.33%
FAIL TO MAINTAIN LN TVL	104	0.69%	85.02%
NO REGISTRATION IN POSSESSION	88	0.59%	85.61%
SPEEDING 35 ZONE PACE	85	0.57%	86.18%
HEADLIGHTS NOT TURNED ON	82	0.55%	86.72%
RECKLESS/EXCEEDING SPEED LIMIT	80	0.53%	87.26%
YIELD RT OF WAY/ ENTERING ROADWAY	78	0.52%	87.78%
FOLLOWING TOO CLOSE	76	0.51%	88.28%
LEFT-TURN / YIELD RIGHT OF WAY	75	0.50%	88.78%
REGIS/LIC/TITLE/NAME ADDR	58	0.39%	89.17%
CROSS DOUBLE YELLOW LINE	54	0.36%	89.53%
DUI/DWI OF DRUGS/ALCOHOL	52	0.35%	89.88%
FAIL TO YIELD TO PEDESTRIAN	52	0.35%	90.22%

The top three charges in 2019 were consistent with 2018's top citations, as seen in Table 2. While Registration/License/Title/Name/Address was in the top five charges between 2011-2018 it dropped down to the 33rd highest citation in 2019. Starting in 2019 this field was broken out into separate code violations to allow specific infractions to be captured more granularly, which resulted in the decrease.

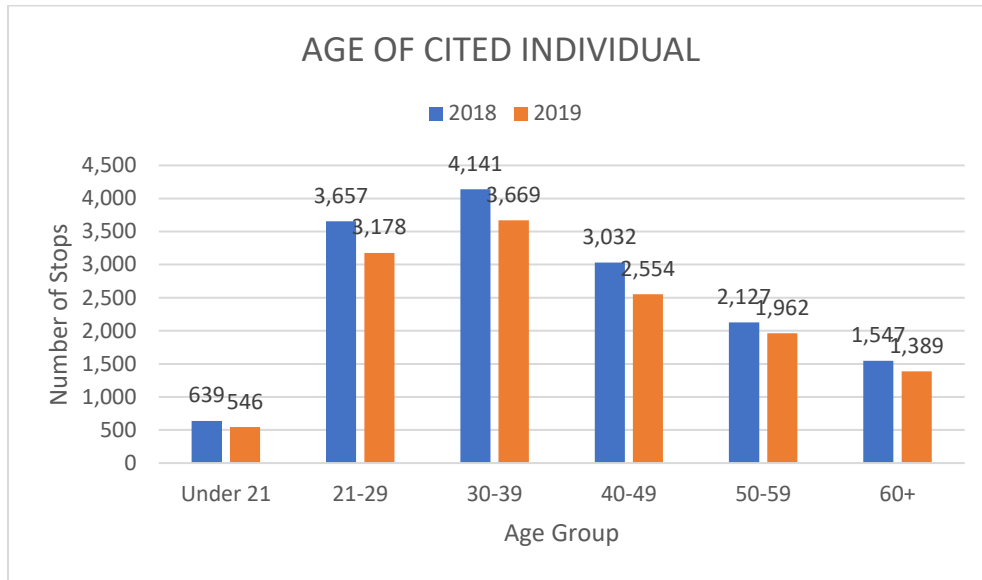
Table 2: Top Five Citation Types 2011-2019

2011-2016	2017	2018	2019
OFFICIAL SIGNS	SPEEDING 25 ZONE RADAR	OFFICIAL SIGNS	OFFICIAL SIGNS
SPEEDING 25 ZONE RADAR	OFFICIAL SIGNS	SPEEDING 25 ZONE RADAR	FAIL TO PAY FULL TIME/ATTN
SPEEDING 35 ZONE RADAR	FAIL TO PAY FULL TIME/ATTN	FAIL TO PAY FULL TIME/ATTN	SPEEDING 25 ZONE RADAR
OFF. SIGN - STOP SIGN	REG./LIC/TITLE/NAME/ADDR.	REG./LIC/TITLE/NAME/ADDR.	SPEED: BUS/RESL 15-19 OVR
REG./LIC/TITLE/NAME/ADDR.	OFF. SIGN - RED/YEL/FLASHING	SPEEDING 35 ZONE RADAR	FAIL TO OBEY HIGHWAY SIGN

Demographic Results for Traffic Stops

There were 14,996 citations (w/o Criminal C-- or voided charges) in 2019, 13,420 of which were during unique stops. In 2019 89.5% of the traffic stops made by the Alexandria Police Department, the individual is cited for only one charge. Only 10.5% of the traffic stops made resulted in multiple citations. In 2018 9.6% of traffic stops involved the individual being cited for multiple charges, while there were 10.25% in 2017. The average for 2011-2016 was 11.5% with multiple charges.

Figure 2: Age of the individuals at the time of the traffic stop 2018 vs 2019 (N=28,441)



Note: The sample size in this chart is 13,298 versus the traffic stop volume of 13,420 due to 122 citations that did not capture the individual's age. Blanks/Unknown values are not included.

As indicated in Figure 2, the majority of traffic stops are performed on those between the age of 21-39 (51.5% in both 2018 and 2019). The age group 30-39 was the group with the highest percentage of traffic stops in 2017-2019 with 27.74%, 27.35%, and 27.59% chronologically. Figure 3 indicates that subjects in a traffic stop were more likely to present as male in gender (57.31% in 2019 and 58.65% in 2018). This data is consistent with previous year findings.

Figure 3: Gender of the individual in table 2018 vs. 2019 and pie chart for 2019

% of Total	2018 Total	Gender	2019 Total	% of Total
40.62%	6,210	Female	5,525	41.17%
58.65%	8,967	Male	7,691	57.31%
0.73%	111	Unknown	204	1.52%
100.00%	15,288	Total	13,420	100.00%

Note: The known sample size is 13,216 versus the traffic stop value of 13,420 due to 204 entries missing the individual's gender. Unlisted or invalid gender entries are captured as "Unknown" in the table and in grey in the pie chart.

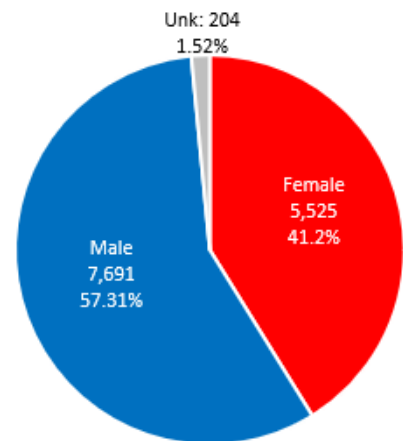
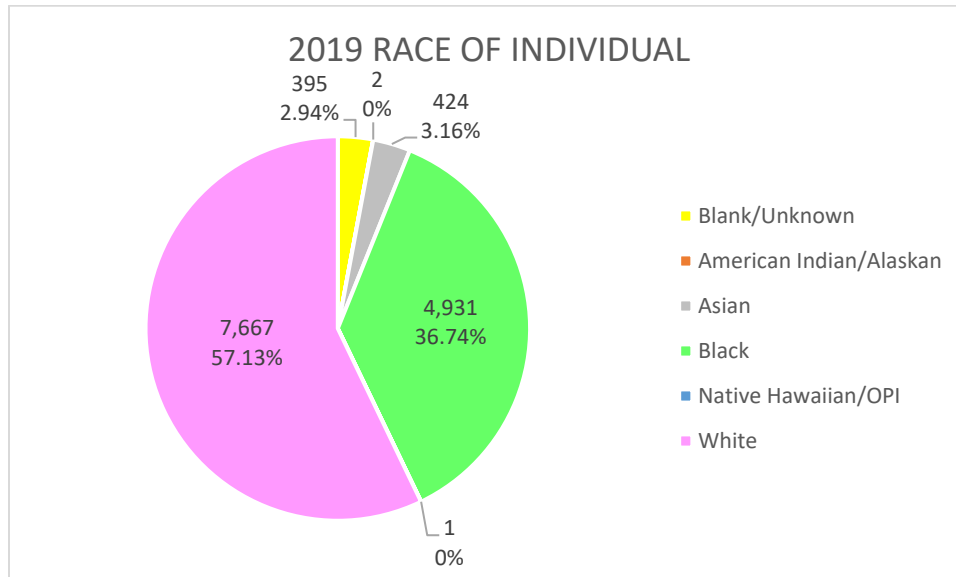


Figure 4A: Race of the individual in table and pie chart (N=13,420)

% of Total	2018 Total	Race	2019 Total	% of Total
2.37%	363	Blank/Unknown	395	2.94%
0.12%	18	American Indian/Alaskan	2	0.01%
3.26%	499	Asian	424	3.16%
35.85%	5,481	Black	4,931	36.74%
0.03%	4	Native Hawaiian/OPI	1	0.01%
58.37%	8,923	White	7,667	57.13%
100.00%	15,288	Total	13,420	100.00%



Note: The known sample size in the table and pie chart is 13,025 versus the traffic stop value of 13,420 due to 395 entries not capturing the stopped individual's race.

Figure 4B: Race by Year

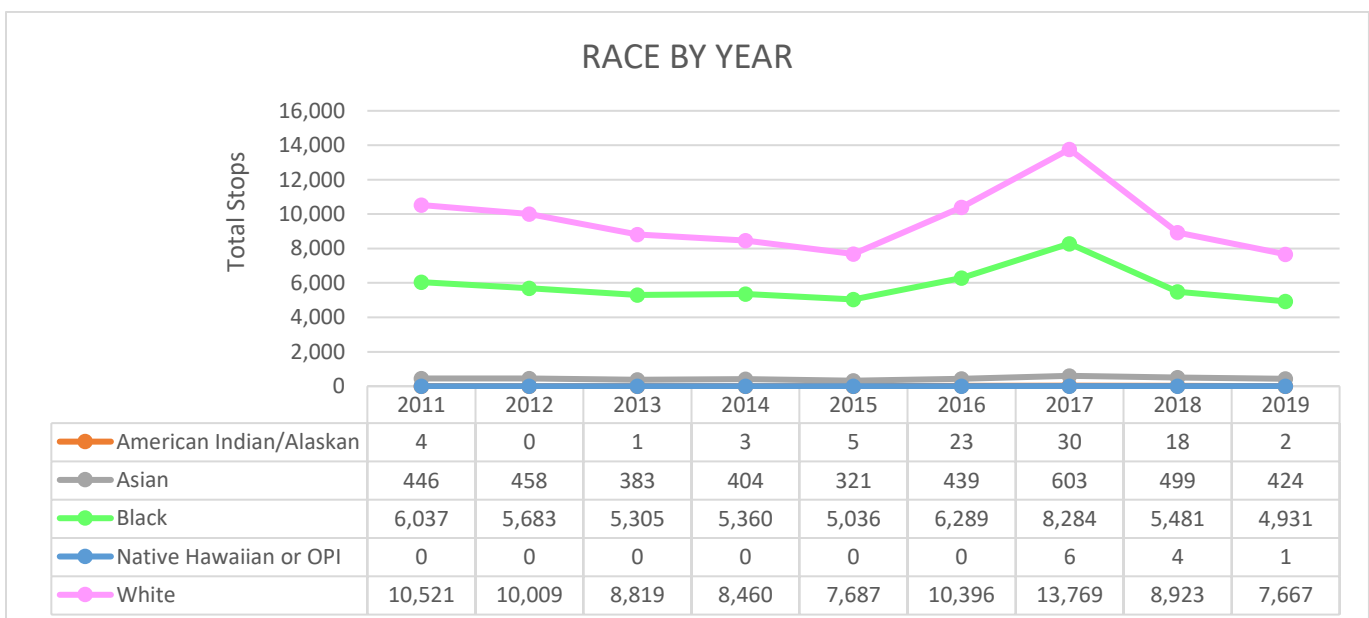
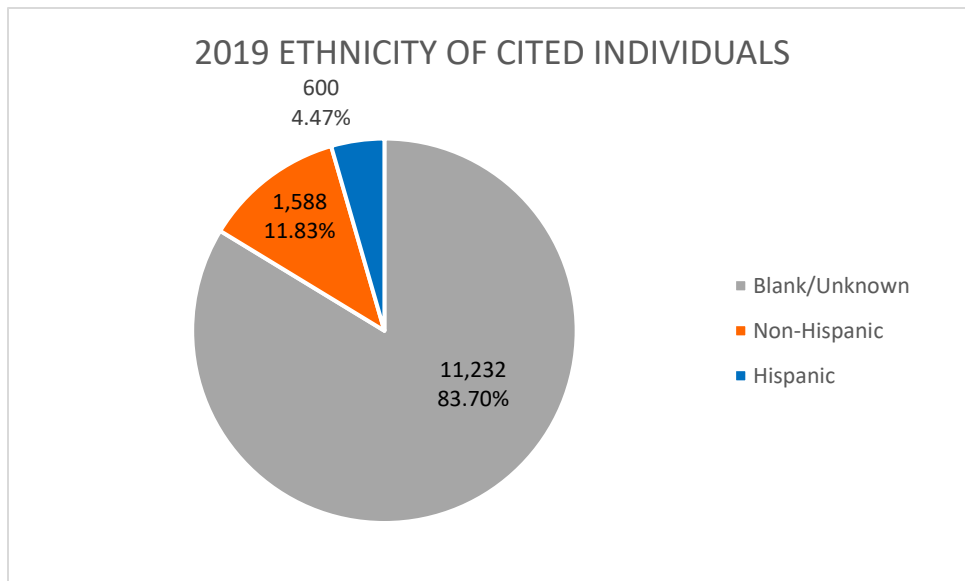


Figure 4A indicates that the majority of individuals involved in traffic stops with the Alexandria Police Department are White (57.13%), followed by Black (36.74%). 2019 data is consistent with prior year findings. Note that this is based on an officer's assessment only rather than the stopped individual self-identifying their race.

Figure 4B shows that citations issued to White and Black individuals decreased between 2011-2015, reaching a 5-year low in 2015, before increasing in 2016-2017. Though the numbers of individuals cited changed considerably, the percentage of the total number of stops for White and Black individuals remained consistent throughout the nine years captured. Of those cited, White individuals make up 58.37-61.22% and Black individuals account for 34.76-38.38% of the total. The percentage of Asian individuals who were cited was at a nine-year high in 2018, though they accounted for only 3.26% of those cited, and in 2019 the percentage remained consistent at 3.16%.

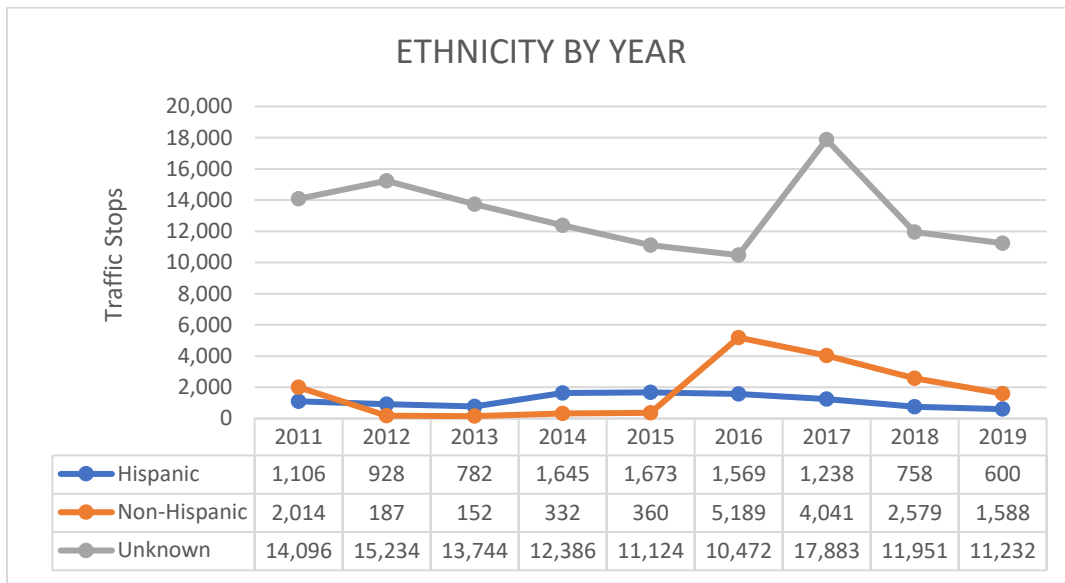
Figure 5A: Ethnicity of the individuals in pie chart and table (N=13,420)



% of Total	2018 Total	Ethnicity	2019 Total	% of Total
78.17%	11,951	Blank/Unknown	11,232	83.70%
16.87%	2,579	Non-Hispanic	1,588	11.83%
4.96%	758	Hispanic	600	4.47%
100.00%	15,288	Total	13,420	100.00%

Note: The sample size in the pie chart is 2,188 (16.3%) versus the traffic stop value of 13,420 due to 11,232 entries (83.7%) not capturing the individual's ethnicity.

Figure 5B: Ethnicity by Year and Percentage Table



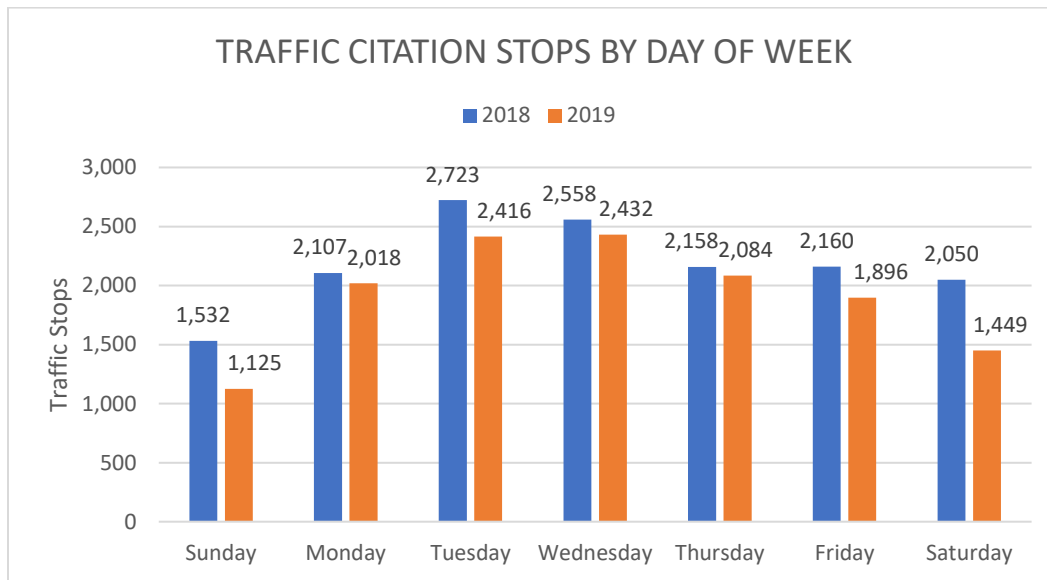
	2011	2012	2013	2014	2015	2016	2017	2018	2019
Hispanic	6.42%	5.68%	5.33%	11.45%	12.72%	9.11%	5.34%	4.96%	4.47%
Non-Hispanic	11.70%	1.14%	1.04%	2.31%	2.74%	30.12%	17.45%	16.87%	11.83%
Unknown	81.88%	93.18%	93.64%	86.24%	84.55%	60.78%	77.21%	78.17%	83.70%

The percentage of individuals listed as having 'Unknown' ethnicity increased in 2019, making up 83.70% of the records. Cited individuals identified as Hispanic is at a 9-year low in 2018 with 4.47%. Due to the large percentage of 'Unknowns' present in the Ethnicity data, the validity of this field cannot be determined. This field is not required by the State of Virginia when issuing citations and is not captured on licenses in Virginia, Maryland, or Washington, D.C., nor is there a field for it on the handwritten citation form used by officers.

Temporal Results for Traffic Stops

In this last section of the citation analysis, temporal elements will be examined as they pertain to unique traffic stops that lead to citations.

Figure 6A: Traffic Citation Stops by Day of Week 2018-2019 (N=28,708)



In 2019, over 80% of traffic stops that led to citations were completed on weekdays, with Tuesday (18.00%) and Wednesday (18.12%) being the highest. This followed the trend of 2017 and 2018. 2017-2019 also saw the lowest workweek citations issued on Mondays and Fridays. In 2019, Saturday and Sunday accounted for 19.18% of all the traffic stops that led to citations. This is a decrease from 2018's 23.43% but is in line with 2017's 20.96% and 2011-2016's 17.8% of stops during the weekend.

Figure 6B: Traffic Citation Stops by Day of Week and Hour of Day in 2019

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Total
Sunday	55	69	59	26	22	13	12	18	42	79	82	92	61	43	51	52	50	45	37	23	30	55	54	55	1,125
Monday	50	94	85	39	81	86	64	143	126	116	102	130	154	57	52	91	123	107	61	51	32	51	61	62	2,018
Tuesday	39	76	63	75	139	135	110	183	180	113	128	140	168	74	96	99	155	128	62	42	19	63	64	65	2,416
Wednesday	37	65	65	88	133	104	78	209	194	135	113	144	115	70	68	72	188	182	80	53	46	60	80	53	2,432
Thursday	59	79	72	53	81	62	90	164	174	124	129	121	112	69	93	89	122	92	54	34	37	52	65	57	2,084
Friday	46	73	43	27	55	35	65	132	140	126	136	131	122	53	62	89	110	101	71	34	49	64	67	65	1,896
Saturday	66	70	33	26	17	14	12	30	69	129	101	103	91	69	60	64	71	59	46	41	51	79	82	66	1,449
Total	352	526	420	334	528	449	431	879	925	822	791	861	823	435	482	556	819	714	411	278	264	424	473	423	13,420

Note: The sample size of this chart is 13,420 as all traffic stops in which citations were issued captured the time. The above heat map broke down the citation stops by day of the week and hour of the day and formatted this data so that the highest volume of citation stops would be represented by red down through gradients of pink and the lowest numbers are indicated by darker shades of blue. The 'Totals' at the bottom and right side of the chart are also formatted to show the overall high and low hours and days.

The majority of traffic stops leading to citations in 2019 were between 0700-1259 hrs and pick up again between 1600-1759 hrs on weekdays. On Tuesday and Wednesday this window starts earlier, at 0400 hrs, and still runs through 1259 hrs. In 2017 and 2018 this majority was extended over the entire 0700-1759 timeframe on weekdays. 2011-2016 data indicated that the majority of these stops were between 0700-1659 hrs. The most prominent hour of day for traffic

citations in 2019 was 0800-0859 hrs, followed by 0700-0759 hrs. In 2017 and 2018 the most prominent hour of day was 1600-1659 followed by 0700-0759 hrs (in 2017) and 0800-0859 hrs (in 2018). Between 2011-2012 and 2014-2016 the highest number of traffic citations were during the 0800 hour.

Figure 7: Traffic Citation Stops by Hour of Day 2018-2019

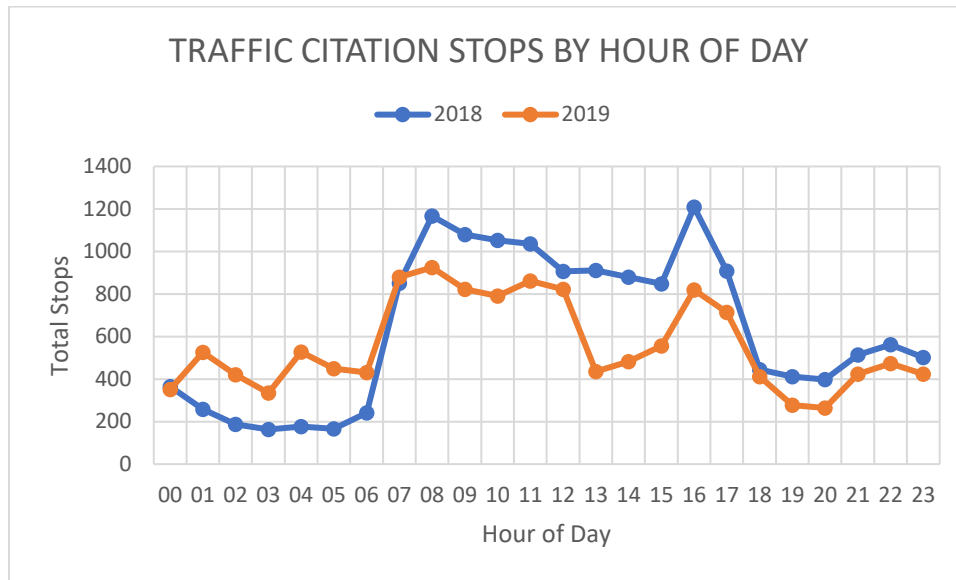


Table 3: Most Prominent Hour of Day by Year (2011-2019)

Year	Prominent Hour	TS Count for Hour	TS Total for Year	% for Hour of Total TS
2011	0800-0859	1,683	17,216	9.78%
2012	0800-0859	1,500	16,349	9.17%
2013	1100-1159	1,037	14,678	7.06%
2014	0800-0859	1,019	14,363	7.09%
2015	0800-0859	1,197	13,157	9.10%
2016	0800-0859	1,533	17,230	8.90%
2017	1600-1659	1,762	23,162	7.61%
2018	1600-1659	1,209	15,288	7.91%
2019	0800-0859	925	13,420	6.89%

Figure 8A: 2019 Traffic Citation Stops by Hour of Day (Weekdays) (N=10,846)

Weekday	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	50	94	85	39	81	86	64	143	126	116	102	130	154	57	52	91	123	107	61	51	32	51	61	62
Tuesday	39	76	63	75	139	135	110	183	180	113	128	140	168	74	96	99	155	128	62	42	19	63	64	65
Wednesday	37	65	65	88	133	104	78	209	194	135	113	144	115	70	68	72	188	182	80	53	46	60	80	53
Thursday	59	79	72	53	81	62	90	164	174	124	129	121	112	69	93	89	122	92	54	34	37	52	65	57
Friday	46	73	43	27	55	35	65	132	140	126	136	131	122	53	62	89	110	101	71	34	49	64	67	65

Note: Stops from Saturday and Sunday were removed from the chart. The citation stops were broken down by day of the week and hour of the day and formatted this data so that the highest volume of citation stops would be represented by red down through gradients of pink and the lowest numbers are indicated by darker shades of blue.

Figure 8B: 2018 Traffic Citation Stops by Hour of Day (Weekends) (N=2,574)

Weekend	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Saturday	66	70	33	26	17	14	12	30	69	129	101	103	91	69	60	64	71	59	46	41	51	79	82	66
Sunday	55	69	59	26	22	13	12	18	42	79	82	92	61	43	51	52	50	45	37	23	30	55	54	55

Note: Stops from Monday through Friday were removed from the chart. The citation stops were broken down by day of the week and hour of the day and formatted this data so that the highest volume of citation stops would be represented by red down through gradients of pink and the lowest numbers are indicated by darker shades of blue.

Traffic patterns on the weekend, Saturday and Sunday, have varied between 2011-2019. In 2019, the majority of traffic stops were seen on Saturday between 0900-1259 hrs (Figure 8b). In 2018 the majority of traffic stops leading to citations happening between 0900-1659 hrs. This is also a departure from 2011-2017 which saw the majority of citations issued between 1600-0200 hrs in 2017 and 1800-0200 hrs in 2011-2016.

Table 4: Most Prominent Hour of Day by Day of Week in 2019

Sunday	1100-1159 (92)
Monday	1200-1259 (154)
Tuesday	0700-0759 (183), 0800-0859 (180)
Wednesday	0700-0759 (209), 0800-0859 (194), 1600-1659 (188), 1700-1759 (182)
Thursday	0800-0859 (174)
Friday	0800-0859 (140)
Saturday	0900-0950 (129)

- Sunday's peak hour of 1100-1159 remained nearly consistent with 2018's shift to the late morning hours. This was a departure from 2017's peak being nighttime hours of 0000-0059 hrs.
- Tuesday's peak hour in 2019 returned to the trend set between 2011-2017 in which 0700-0759 and 0800-0859 hrs were the peak. In 2018 this had shifted to the afternoon with 1600-1659 hrs.
- Wednesday's peak hours were the greatest of the days of the week and were expanded from the morning peak of 0700-0859 hrs to include a late afternoon/early evening peak of 1600-1759 hrs.
- Like Sunday, Saturday's peak hours shift dramatically from the nighttime in previous years (2100-2259 hours between 2011-2017) to the morning in 2019 with 0900-0959 hrs.

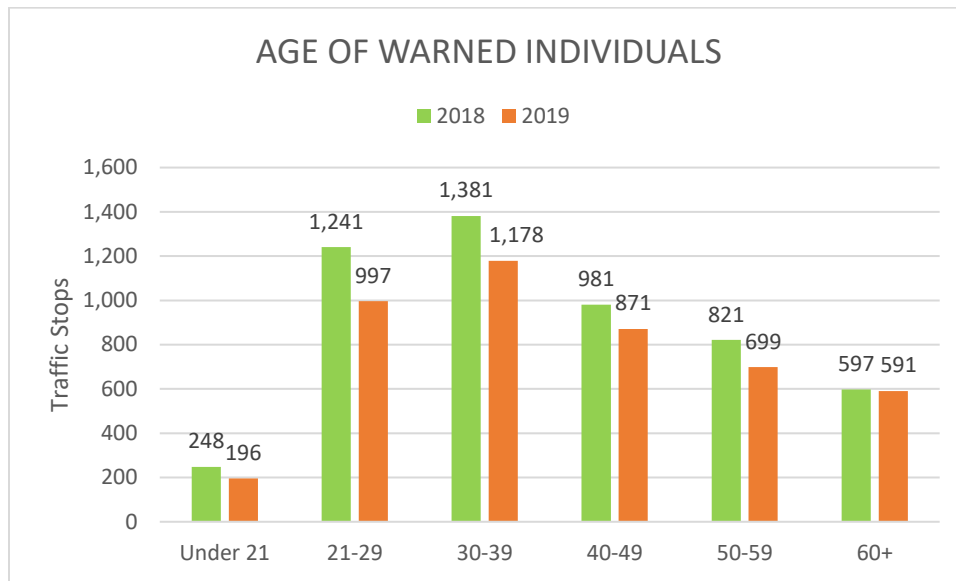
Traffic Warnings

In 2018, there were 4,736 Traffic Warnings issued in 4,621 unique traffic stops. Officers capture Traffic Warnings as handwritten warnings and starting on May 28, 2019, also electronically. Due to how eWarnings are captured, multiple warnings can be issued for one stop, unlike the handwritten warnings, which only capture the reason for the stop as free text in the Field Interview narratives. As such, the specific reason(s) for the stops cannot be separated out across the entire dataset, just the six months of eWarnings (N=1,009), which were exclusively issued by the Traffic Safety Section. Additionally, multiple people may be warned in one handwritten Traffic Warning. Due to this, all handwritten warnings which appeared to have duplicated Field Interview numbers in the dataset were reviewed to determine if multiple people were warned, in which case both were left in the dataset, or if some individuals were simply passengers in the warned individual's vehicle or the parent of the warned juvenile, in which case they were removed. Multiple people were most often warned in one Field Interview report primarily for bicyclists not stopping at stop signs.

Table 5: Top 20 common violations for which electronic warnings were issued in Alexandria in 2019 (86.03% of the eWarnings issued; N=868)

eWarning Description	Count
FAIL TO OBEY HIGHWAY SIGN	141
OFFICIAL SIGNS	121
NO REGISTRATION IN POSSESSION	103
SPEED: BUSINES/RESIDENTL 15-19 OVR LIMIT	90
HOV VIOLATION	78
SPEED: BUSINES/RESIDENTL 10-14 OVR LIMIT	43
DEFECTIVE EQUIPMENT GENERALLY	39
EXPIRED/NO INSPECTION STICKER	28
FAILURE TO GIVE FULL TIME AND ATTENTION	27
EXPIRED REGISTRATION	26
OFF. SIGN - STOP SIGN	25
NO OPERATORS LICENSE IN POSSESSION	24
UNLAW TINT ON VEH WINDOWS	23
SPEED: IN CITY/TOWN 15-19 MPH OVER LIMIT	21
OFF. SIGN - RED/YELLOW/FLASHING LIGHT	19
FAIL TO UPDATE LICENSE	14
SPEED: BUSINES/RESIDENTL 20+ OVR LIMIT	12
SPEED: IN CITY/TOWN 10-14 MPH OVER LIMIT	12
OPER UNINSPECTED VEHICLE	11
SPEED: 15-19 OVER LIMIT (55-65 ZONE)	11

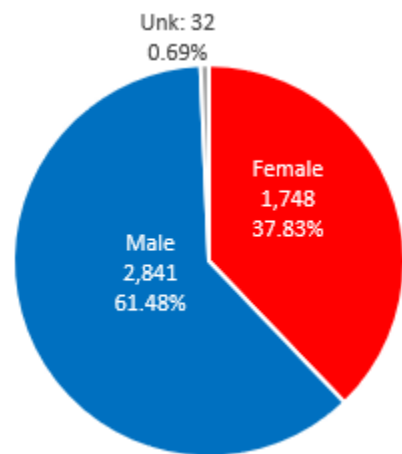
Figure 9: Age of the individuals at the time of the traffic warning 2018-2019 (N=9,801)



Note: Note: The sample size of the 2019 traffic warnings in this chart is 4,532 versus the total traffic warning volume of 4,621 due to 89 entries missing the individual's age. The sample size of the 2018 traffic warnings in this chart is 5,269 versus the total traffic warning volume of 5,439 due to 170 entries missing the individual's age. Blanks/Unknown age values are not included.

Figure 10: Gender of the individual in table 2018 vs. 2019 and pie chart for 2019

% of Total	2018 Total	Gender	2019 Total	% of Total
35.82%	1,948	Female	1,748	37.83%
62.59%	3,404	Male	2,841	61.48%
1.60%	87	Blank	32	0.69%
100.00%	5,439	Total	4,621	100.00%

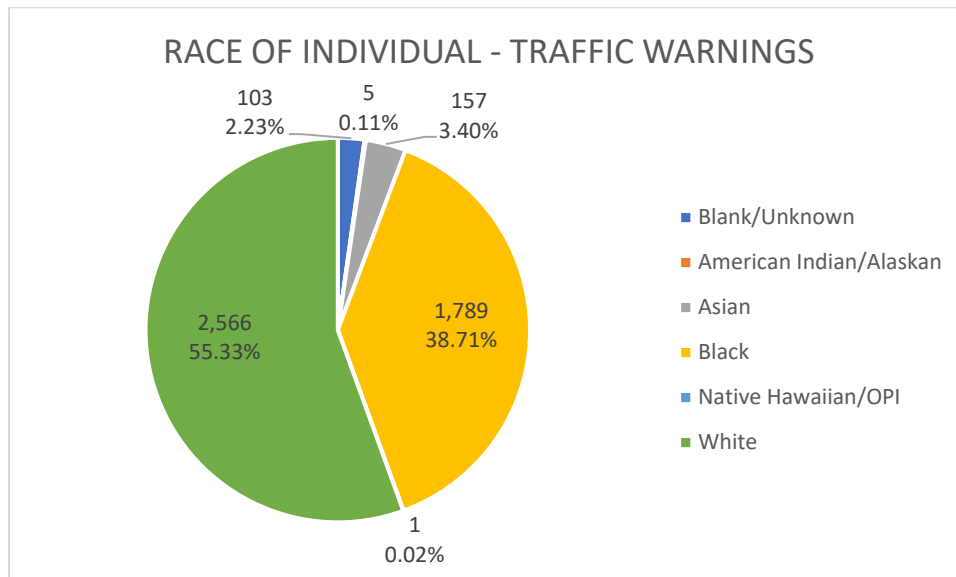


Note: The known sample size of the pie chart is 4,589 versus the traffic warning value of 4,621 due to 32 entries missing the individual's gender. Unlisted or invalid gender entries are captured as "Unknown" in the table and in grey in the pie chart.

As was the case with the citation data, the most warnings are issued for individuals between the age of 21-39 (47.99%), with the age group 30-39 having the highest percentage of traffic warnings with 25.99% of the total. This is directly in line with 2018 data in which 25.39% of those warned were between the age of 30-39 and 48.21% of the warnings were for 21-39 year-olds. Figure 10 indicates that individuals issued traffic warnings were more likely to present as male in gender (61.48%) in 2019. This data lines up with the 2019 traffic citations in which 57.31% of those cited were identified as male (58.65% were male in 2018).

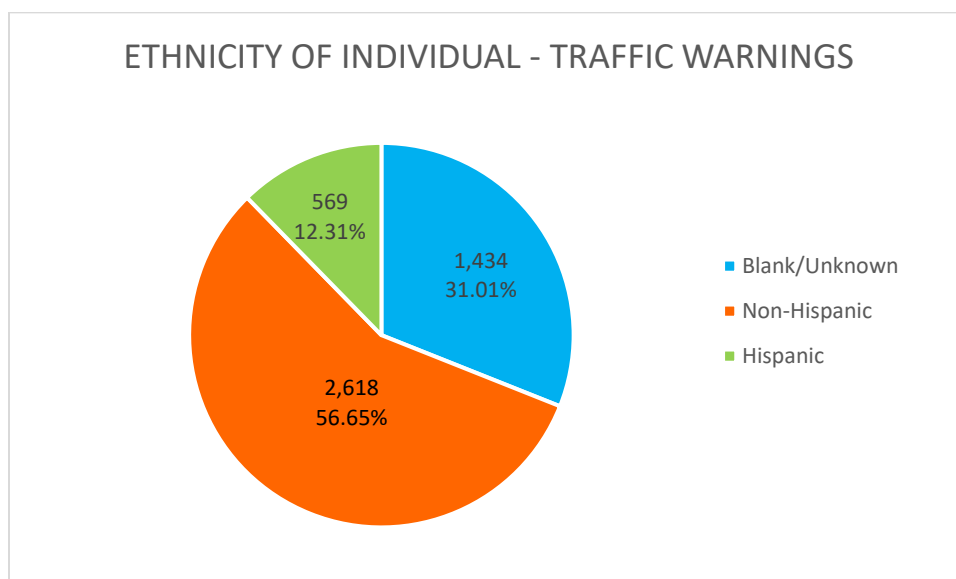
Figure 11: Race of the individual in Traffic Warnings in table and pie chart from 2019 (N=4,621)

% of Total	2018 Total	Race	2019 Total	% of Total
3.35%	182	Blank/Unknown	103	2.23%
0.13%	7	American Indian/Alaskan	5	0.11%
3.55%	193	Asian	157	3.40%
37.64%	2,047	Black	1,789	38.71%
0.11%	6	Native Hawaiian/OPI	1	0.02%
55.23%	3,004	White	2,566	55.53%
100.00%	5,439	Total	4,621	100.00%



Note: The known sample size in the table and pie chart is 4,518 versus the traffic stop value of 4,621 due to 103 entries not capturing the stopped individual's race.

Figure 12: Ethnicity of the individual in Traffic Warnings in table and pie chart from 2019 (N=4,621)



% of Total	2018 Total	Ethnicity	2019 Total	% of Total
13.61%	740	Blank/Unknown	1,434	31.03%
70.79%	3,850	Non-Hispanic	2,618	56.65%
15.61%	849	Hispanic	569	12.31%
100.00%	5,439	Total	4,621	100.00%

Note: There were 279 records in which the driver's ethnicity was not listed and 1,155 records in which it was left blank. As such, the known sample size is 3,187 in 2019.

Unlike the handwritten traffic citations, which do not include a field for ethnicity, the Field Interview form in which Traffic Warnings are captured include the 'ethnicity' field, though it is not required. A much higher percentage of officers entered information in this field than for citations, 68.97% compared to 16.3%, though as noted earlier in the analysis, this information is voluntarily offered by the stopped individual or a guess on the part of the responding officer. As 31.03% of the Ethnicity data was left blank or listed as unknown, the validity of this field is limited. It is worth noting that in 2019 the percentages of individuals identified as Hispanic who were cited (4.47%) and warned (12.31%) differed greatly, as was the case in 2018 (4.96% cited to 15.61% warned).

Figure 13: Traffic Warnings by Day of Week and Hour of Day in 2019 (N=4,621)

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Total
Sunday	29	24	8	6	4	3	5	7	8	20	14	18	9	4	16	20	24	12	4	21	24	64	57	35	436
Monday	47	17	14	11	13	5	9	24	32	22	14	22	18	15	14	11	36	46	21	21	27	55	77	53	624
Tuesday	49	27	19	17	20	17	14	51	28	29	21	40	24	20	29	28	41	38	26	22	31	42	62	52	747
Wednesday	55	33	17	17	13	19	22	35	44	11	19	34	27	18	26	26	57	55	33	28	38	63	70	70	830
Thursday	47	23	15	16	15	19	14	54	42	23	28	18	18	18	24	24	44	37	23	16	24	64	70	43	719
Friday	41	34	7	12	12	8	24	34	29	17	23	16	17	17	9	17	35	28	13	32	36	70	75	47	653
Saturday	32	25	21	9	8	7	5	3	9	28	28	30	13	24	24	17	29	26	20	26	52	59	69	48	612
Total	300	183	101	88	85	78	93	208	192	150	147	178	126	116	142	143	266	242	140	166	232	417	480	348	4,621

Figure 14: Traffic Warnings and Traffic Citations by Hour of Day in 2019

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Total
Citations	352	526	420	334	528	449	431	879	925	822	791	861	823	435	482	556	819	714	411	278	264	424	473	423	13,420
Warnings	475	298	161	142	133	131	158	334	316	229	255	287	213	206	239	242	447	405	247	287	402	694	786	579	4,621

Note: The sample size of the Traffic Warning data is 4,621 and the Traffic Citations is 13,420. Conditional formatting was applied to the Traffic Warnings and Citations to show the extremes of when citations and traffic warnings were individually issued by time of day. This is not meant to be a comparison of the counts in the two fields depicted above.

Figure 13 indicates that the majority of traffic warnings given in 2019 were between 1600-1759 hrs and picked up again from 2000-0059 hrs and the most prominent hours of the day were 2100-2259 hrs, shifting an hour earlier in the late evening from 2018. This contrasts with the citations issued in 2019 as the majority of citations are issued during the morning rush through evening rush hour (0700-1259 hrs & 1600-1759 on weekdays). Both citations and warnings experienced peaks between 1600-1759 hrs, though this was to a lesser extent for the traffic warnings. The above chart indicates that citations and warnings are inversely proportional to each other, with the exception of the evening rush hours of 1600-1759.

Conclusion

This basic analysis of the Alexandria Police Department's traffic citations and traffic warnings was conducted on data from the years 2011-2019. Electronic citation and electronic warning data was introduced in the 2019 analysis, having been combined with handwritten warnings and citations when calculating the count totals. Traffic warning data was introduced in the 2018 analysis so 2019 is the first report in which a comparison between the multiple years was possible. The analysis in this report was influenced by the study completed by Dr. Cynthia Lum of George Mason University in April 2017, which used data from 2011-2015. Alexandria Police Department's Crime Analysis Section based the 2016-2019 analyses off of this initial study. This report is a continued analysis of Alexandria Police Department's issuance of traffic citations and introduces a brief look at traffic warnings and how they compare to citations.

Below are the summarizing points taken from the review of the data from the nine-year period.

- Year 2017 had the highest number of citations issued in the nine-year period with 25,807 and 2019 is the lowest with 14,996.
- Throughout the nine-year period, white individuals continue to be largest population of subjects given citations, followed by black individuals.
- The age group of 30-39 has been the largest group of individuals receiving traffic citations throughout the nine-year period. This is also reflected in the 2018 and 2019 traffic warning data.
- The gender ratio remains very similar between the nine years reporting and with the 2018 and 2019 traffic warnings, with males being more likely to receive citations or warnings.
- Over the nine-year period, mid-week (Tuesday through Thursday) had the highest number of traffic citations.
- In 2019 traffic citations were issued in greater numbers surrounding the workday (0700-1759 hrs), while traffic warnings were issued in greater numbers in the evening through early part of the night (1600-1759 hrs and 2000-0059 hrs).