Observing & Analyzing Crime Rates in Charlotte

Yoshi's Island: Dante Dillahunt, Kyndall Kelly, Levar McKnight, Jacob Southern, Kristina Swanson

Using this dataset, we began by analyzing crime rates in Charlotte Area from 2017 to Present.

Our specific interest became how Covid affected crime in Charlotte in the years before and after.

Sources

The City of Charlotte Incident Report Dataset
https://data.charlottenc.gov/datasets/charlotte::cmpd-incidents-1/about

Spectrum News 1: "Timeline: A look at COVID in N.C. over the last two years of the pandemic"
https://spectrumlocalnews.com/nc/charlotte/news/2022/03/11/timeline--a-look-at-covid-in-n-c--over-the-last-two-years-of-the-pandemic - March 2020- May 2023

Charlotte Crime Statistics Report: 2023 1st Quarter Public Safety Report
https://www.charlottenc.gov/cmpd/News-Resources/Newsroom/Crime-Statistics-Report

Database Overview

YEAR	INCIDENT_REPORT_ID	LOCATION	ZIP	X_COORD_PUBLIC	Y_COORD_PUBLIC	LATITUDE_PUBLIC	LONGITUDE_PUBLIC	CMPD_PATROL_DIVISION	NPA	DATE_REPORTED	DATE_INCIDENT_BEGAN	DATE_INCIDENT_END	ADDRESS_DESCRIPTION
2023	20231022-2159-03	11000 NORTHLAKE LANDING DR	28216	1446960	592756	35.364506	-80.85514	North	72	2023/10/22 00:00:00+00	2023/07/20 00:00:00+00	2023/10/22 00:00:00+00	Location of occurrence
2023	20231022-2151-00	5800 MONROE RD	28212	1472824	527355	35.186132	-80.7645	Independence	52	2023/10/22 00:00:00+00	2023/08/17 00:00:00+00	2023/10/22 00:00:00+00	Location of occurrence
2023	20231022-2131-00	2400 N TRYON ST	28206	1456970	549523	35.246247	-80.818913	Metro	157	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00	Location of occurrence
2023	20231022-2006-03	4400 SHARON RD	28211	1453419	514991	35.1512	-80.828674	Providence	358	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00	Location of occurrence
2023	20231022-1958-01	4600 WATERFORD KNOLL DR		1446684	493480	35.091762	-80.849861	South	303	2023/10/22 00:00:00+00	2023/10/21 00:00:00+00	2023/10/22 00:00:00+00	Location of occurrence
2023	20231022-1955-01	3800 PIMILICO TRACE LN	28216	1439123	583318	35.338173	-80.880823	North	266	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00		Location of occurrence
2023	20231022-1934-01	4400 SHARON RD	28217	1453419	514991	35.1512	-80.828674	Providence	358	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00	Location of occurrence
2023	20231022-1933-02	6800 ALBEMARLE RD	28212	1483003	533144	35.202529	-80.730775	Hickory Grove	316	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00	Location of occurrence
2023	20231022-1932-01	1300 MAPLE SHADE LN	28270	1479303	510121	35.1391	-80.741807	Independence	36	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00	Location of occurrence
2023	20231022-1925-02	2900 CORONET WY	28208	1440799	551336	35.250401	-80.87318	Metro	88	2023/10/22 00:00:00+00	2023/10/21 00:00:00+00	2023/10/22 00:00:00+00	Location of occurrence
2023	20231022-1918-00	2100 LINCOLN HEIGHTS CT	28216	1449567	555795	35.263102	-80.844094	Metro	374	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00	Location of occurrence
2023	20231022-1916-03	2000 EAST ARBORS DR		1477097	581905	35.336201	-80.753426	University City	153	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00	Location of occurrence
2023	20231022-1913-00	3400 MERRILL PL		1444451	562116	35.280204	-80.861627	Metro	123	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00	Location of occurrence
2023	20231022-1909-01	4400 SHARON RD	28211	1453419	514991	35.1512	-80.828674	Providence	358	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00		Location of occurrence
2023	20231022-1851-02	3100 MILTON RD	28215	1481095	545693	35.236912	-80.737897	Hickory Grove	247	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00		Location of occurrence
2023	20231022-1835-01	5500 NEW FASHION WY	28278	1411001	522353	35.169195	-80.971043	Steele Creek	45	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00		Location of occurrence
2023	20231022-1831-00	8600 UNIVERSITY CITY BV	28213	1481121	567829	35.297726	-80.739108	University City	64	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00		Location of occurrence
2023	20231022-1830-00	7100 SPRING MORNING LN		1493752	525982	35.183362	-80.694388	Independence	442	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00		
2023	20231022-1822-01	1800 EASTWAY DR	28205	1470131	544212	35.232311	-80.774521	Eastway	314	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00		Location of occurrence
2023	20231022-1812-00	1900 PIEDMONT HILLS PL	28217	1428407	526647	35.181927	-80.913087	Westover	178	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00		Location of occurrence
2023	20231022-1810-01	2600 SOUTH BV	28210	1442828	533827	35.202406	-80.865283	Westover	381	2023/10/22 00:00:00+00	2020/05/22 00:00:00+00	2020/05/22 00:00:00+00	Location of occurrence
2023	20231022-1809-02	4400 SHARON RD	28211	1453419	514991	35.1512	-80.828674	Providence	358	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00	Location of occurrence
2023	20231022-1808-01	4400 SHARON RD	28211	1453419	514991	35.1512	-80.828674	Providence	358	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00	Location of occurrence
2023	20231022-1801-01	5400 N TRYON ST	28213	1470286	554760	35.261296	-80.774633	North Tryon	371	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00		Location of occurrence
2023	20231022-1800-02	4400 RANDOLPH RD		1461896	524633	35.178115	-80.800904	Providence	320	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00	Location of occurrence
2023	20231022-1753-00	2400 PRUITT ST	28208	1433129	543593	35.228729	-80.898371	Freedom	387	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00	Location of occurrence
2023	20231022-1748-02	200 GOFF ST	28208	1437575	555990	35.263019	-80.884273	Freedom	385	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00		Location of occurrence
2023	20231022-1738-00	2600 WEST BV		1431598	537202	35.211092	-80.903086	Westover	120	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00		Location of occurrence
2023	20231022-1733-01	9600 ALBEMARLE RD	28227	1497479	535947	35.210913	-80.682482	Hickory Grove	323	2023/10/22 00:00:00+00	2023/10/21 00:00:00+00	2023/10/21 00:00:00+00	Location of occurrence
2023	20231022-1701-01	3800 BROOKSHIRE BV	28216	1438924	555994	35.2631	-80.879755	Freedom	141	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00		Location of occurrence
2023	20231022-1659-05	9100 ALBEMARLE RD	28227	1495380	536252	35.211653	-80.689525	Hickory Grove	323	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00	Location of occurrence
2023	20231022-1658-00	6000 CHARING PL		1472130	523015	35.174175	-80.766564	Independence	391	2023/10/22 00:00:00+00	2023/10/20 00:00:00+00	2023/10/22 00:00:00+00	Location of occurrence
2023	20231022-1657-00	7900 PHILADELPHIA CT	28216	1445761	588370	35.352395	-80.858885	North	72	2023/10/22 00:00:00+00	2023/10/21 00:00:00+00	2023/10/22 00:00:00+00	Location of occurrence
2023	20231022-1656-00	8800 PARK RD		1444605	501175	35.112795	-80.857291	South	74	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00	Location of occurrence

What time of day is crime most likely to occur?
What time of day is crime most unlikely to occur?

| LOCATION	ZIP	X_COORD_PUBLIC	Y_COORD_PUBLIC	LATITUDE_PUBLIC	LONGITUDE_PUBLIC	CMPD_PATROL_DIVISION	NPA	DATE_REPORTED	DATE_INCIDENT_BEGAN
11000 NORTHLAKE LANDING DR	28216	1446960	592756	35.364506	-80.85514	North	72	2023/10/22 00:00:00+00	2023/07/20 00:00:00+00
5800 MONROE RD	28212	1472824	527355	35.186132	-80.7645	Independence	52	2023/10/22 00:00:00+00	2023/08/17 00:00:00+00
2400 N TRYON ST	28206	1456970	549523	35.246247	-80.818913	Metro	157	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00
4400 SHARON RD	28211	1453419	514991	35.1512	-80.828674	Providence	358	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00
4600 WATERFORD KNOLL DR		1446684	493480	35.091762	-80.849861	South	303	2023/10/22 00:00:00+00	2023/10/21 00:00:00+00
3800 PIMILICO TRACE LN	28216	1439123	583318	35.338173	-80.880823	North	266	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00
4400 SHARON RD	28217	1453419	514991	35.1512	-80.828674	Providence	358	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00
6800 ALBEMARLE RD	28212	1483003	533144	35.202529	-80.730775	Hickory Grove	316	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00
1300 MAPLE SHADE LN	28270	1479303	510121	35.1391	-80.741807	Independence	36	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00
2900 CORONET WY	28208	1440799	551336	35.250401	-80.87318	Metro	88	2023/10/22 00:00:00+00	2023/10/21 00:00:00+00
2100 LINCOLN HEIGHTS CT	28216	1449567	555795	35.263102	-80.844094	Metro	374	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00
2000 EAST ARBORS DR		1477097	581905	35.336201	-80.753426	University City	153	2023/10/22 00:00:00+00	2023/10/22 00:00:00+00

Which patrol division in Charlotte has the highest crime rate annually? Which has the lowest?

YEAR	Airport	Central	Eastway	Freedom	Hickory Grove	Independence	Metro	North	North Tryon	Providence	South	Steele Creek	University City	Westover
2017	957	5963	5762	6906	6270	5989	7354	8539	7549	5811	5332	8452	9404	6534
2018	1151	5980	5706	6734	6141	5943	7434	8370	6942	5525	5518	8843	9401	6923
2019	1213	6122	6313	6683	6350	5982	7730	8436	7304	5800	5343	10122	10394	7220
2020	1092	5298	5442	6158	5850	5543	6977	8178	6742	4885	4702	9362	9788	6689
2021	1560	6239	5508	6047	5362	5248	6627	8141	6409	5200	4938	9645	10162	6614
2022	1640	6965	5512	6382	5318	5054	6554	8457	6473	5690	5328	10556	10557	7676
2023	1431	5734	4428	5554	4397	4026	5465	6907	5480	4846	4212	8877	9036	6077

Number of Incidents Annually for Each Division (Excluding Huntersville, Davidson, Unknown)
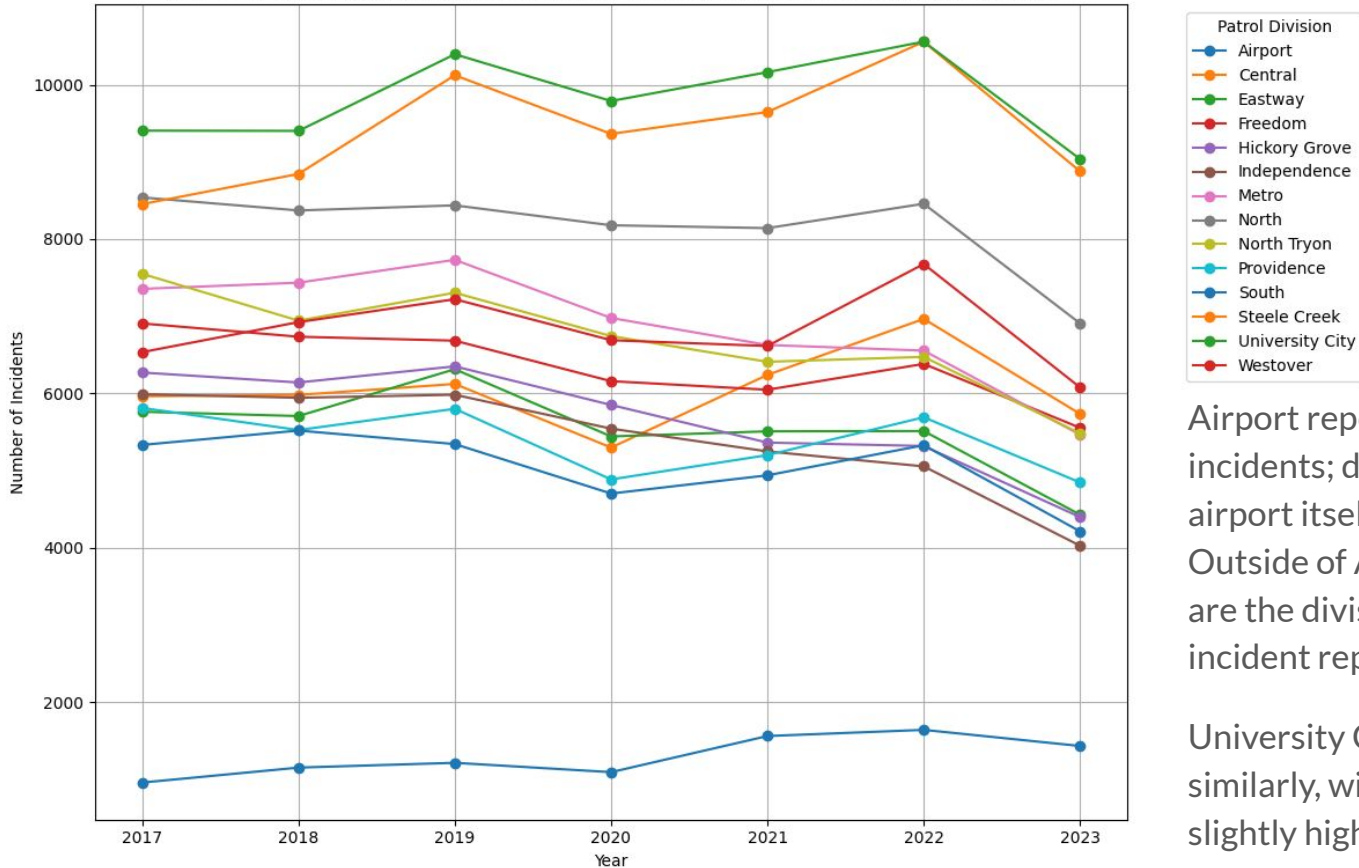
Lowest:
**Airport***
Independence
South

Highest:
University City
Steele Creek

Airport reports the lowest number of incidents; division is only reporting on the airport itself.

Outside of Airport, Independence and South are the divisions with the fewest number of incident reports.

University City and Steele Creek trend very similarly, with University City having a slightly higher number of incident reports.

CMPD_PATROL_DIVISION	Airport	Central	Davidson	Eastway	Freedom	Hickory Grove	Huntersville	Independence	Metro	North	North Tryon	Providence	South	Steele Creek	University City	Unknown	Westover
YearMonth																	
2017	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
2018	157.0	-14.0	-9.0	-94.0	-272.0	-272.0	-65.0	-163.0	-26.0	-302.0	-687.0	-387.0	43.0	240.0	-153.0	-1.0	271.0
2019	66.0	91.0	3.0	552.0	-65.0	198.0	-51.0	-9.0	268.0	56.0	320.0	262.0	-205.0	1279.0	895.0	0.0	313.0
2020	-108.0	-856.0	-3.0	-833.0	-533.0	-460.0	-15.0	-409.0	-716.0	-314.0	-548.0	-919.0	-635.0	-834.0	-574.0	0.0	-529.0
2021	427.0	999.0	0.0	8.0	-108.0	-555.0	21.0	-301.0	-356.0	-21.0	-353.0	291.0	299.0	289.0	343.0	0.0	-100.0
2022	111.0	671.0	3.0	17.0	279.0	-39.0	-5.0	-222.0	-122.0	301.0	25.0	486.0	241.0	872.0	385.0	0.0	1028.0

Yearly Changes in Incident Reports by Police Division
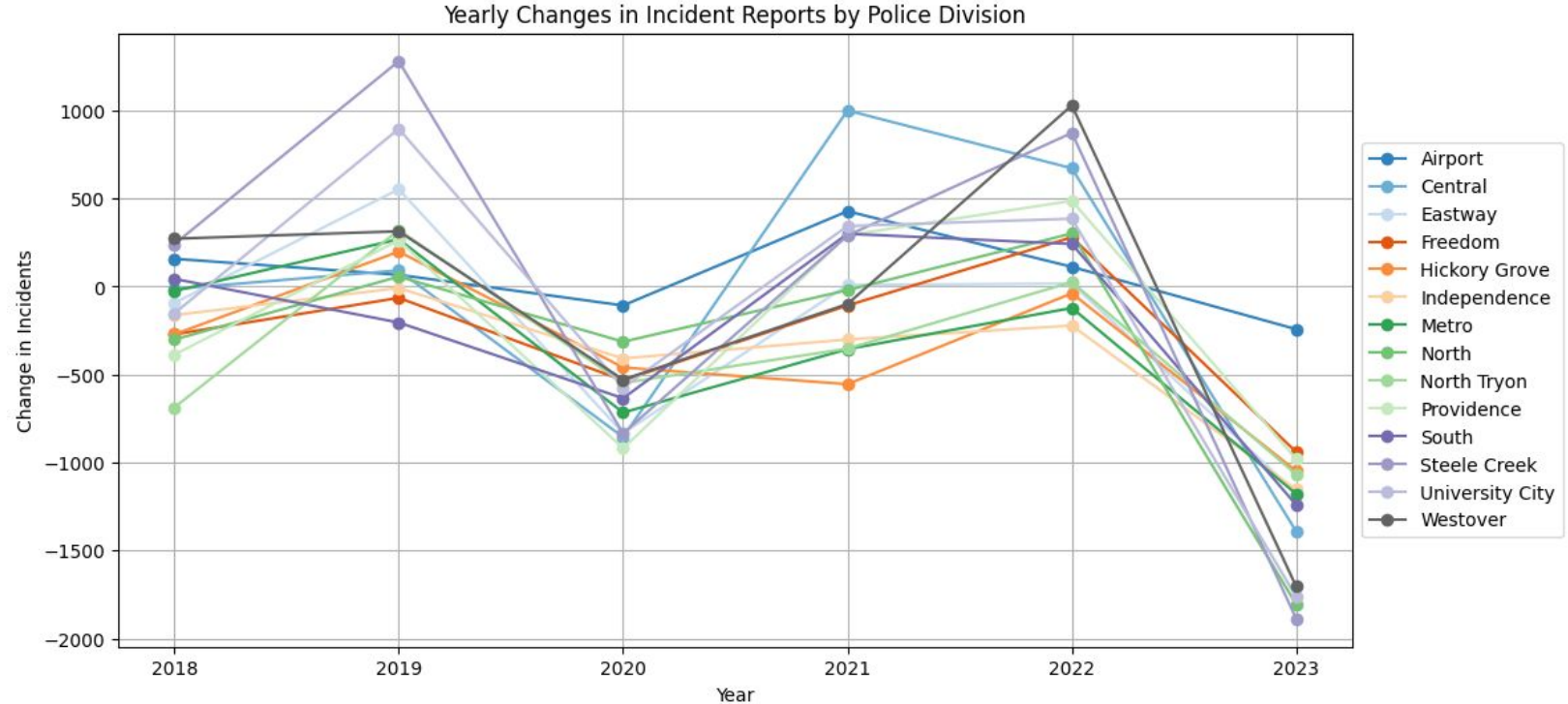
Plotted points represent the changes from year to year in the number of Incident Reports by all CMPD Police Division from 2017-Present.
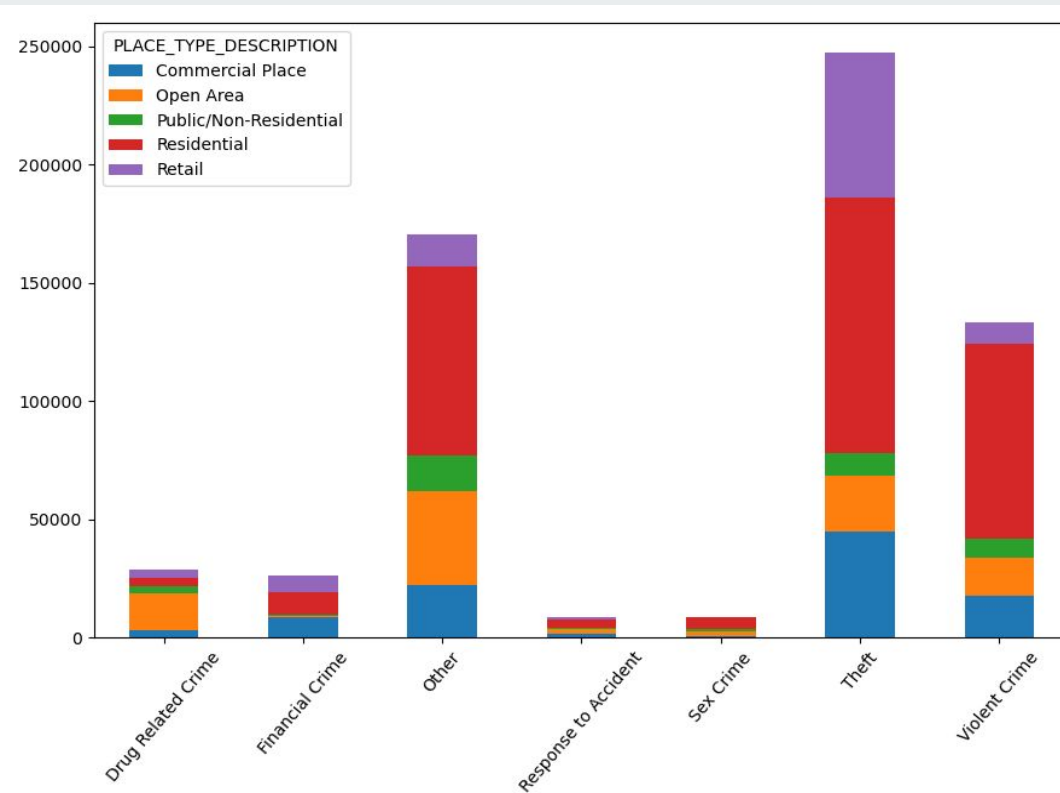
PLACE_TYPE_DESCRIPTION	HIGHEST_NIBRS_DESCRIPTION	
Commercial Place	Drug Related Crime	759
	Financial Crime	6267
	Other	10265
	Response to Accident	620
	Sex Crime	624
	Theft	17149
	Violent Crime	7744
Open Area	Drug Related Crime	113

- Financial crimes almost never occur in open or public areas
- Most cases of retail crimes are theft
- Theft occurs more in residential areas than commercial and retail combined
- Residential areas appear to be the most at risk of criminal activity
- 'Theft', 'Violent Crime', or 'Other' incidents make up 88% of the recorded incidents

What Type of Crime Happens in What Type of Place? (2017-2023)

Incident Report Counts from 2017-2023

All Incident Reports from years 2017-Present

With a decrease in Incident counts in 2020 and a gradual increase from there.

Incident Counts from 2017-2023
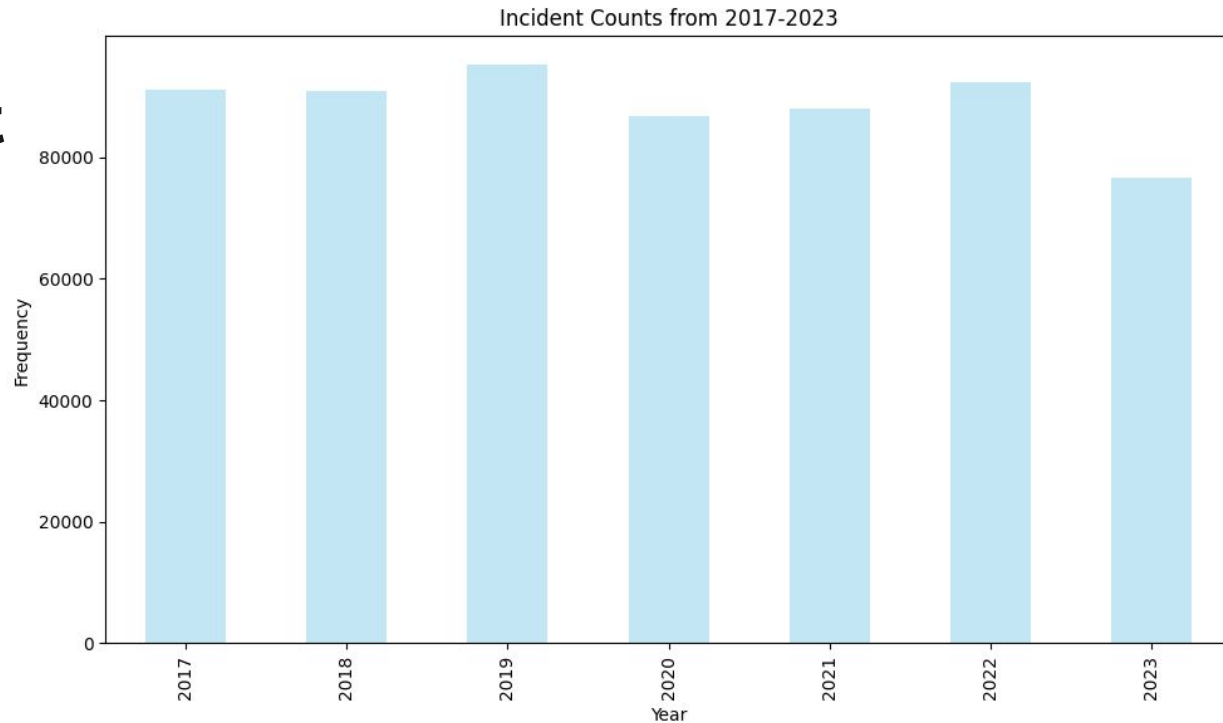
Which Year Was Reported Crimes the Highest in Charlotte? Was It Before, During or After Covid?

- Initial Dataframe also contained multiple cities that were not pertinent to our desired information
- Highest in 2019
- Significant drop in 2020
- Steady rise back up after lifting of mandates of COVID

Reclassified_type Year	Charlotte
2017	92941
2018	91176
2019	94941
2020	86501
2021	87761
2022	91780
2023	74745

Crime incidents in Charlotte by Year
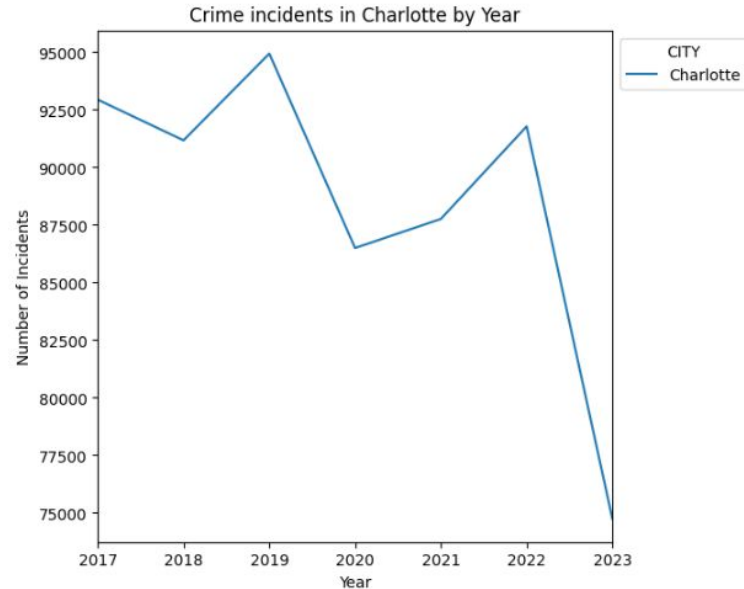
Criminal Offenses in Charlotte by Year
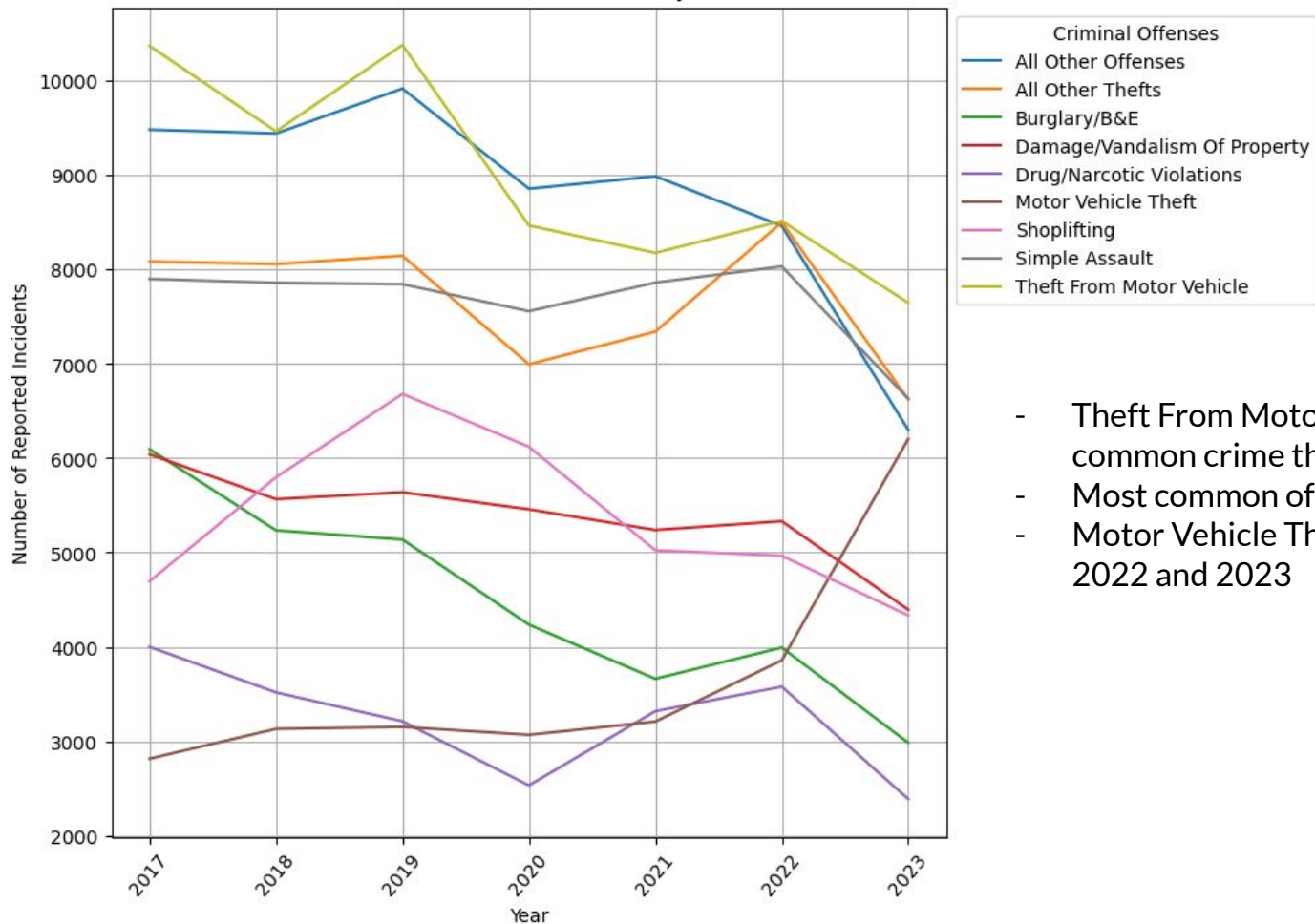
- Theft From Motor Vehicle was the most common crime throughout most of the years
- Most common offenses dropped in 2020
- Motor Vehicle Theft rose significantly in 2022 and 2023

By Years and Location

Initial Data Frame

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                   PD_PATROL_DIVISION
Airport            9085
Central            42556
Eastway            38897
Freedom            44791
Hickory Grove      39983
Independence       38036
Metro              48413
North              57539
North Tryon        47192
Providence         37969
South              35717
Steele Creek       66271
University City    69217
Westover           47961
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By Years and Location

Crime Location by Year and Location
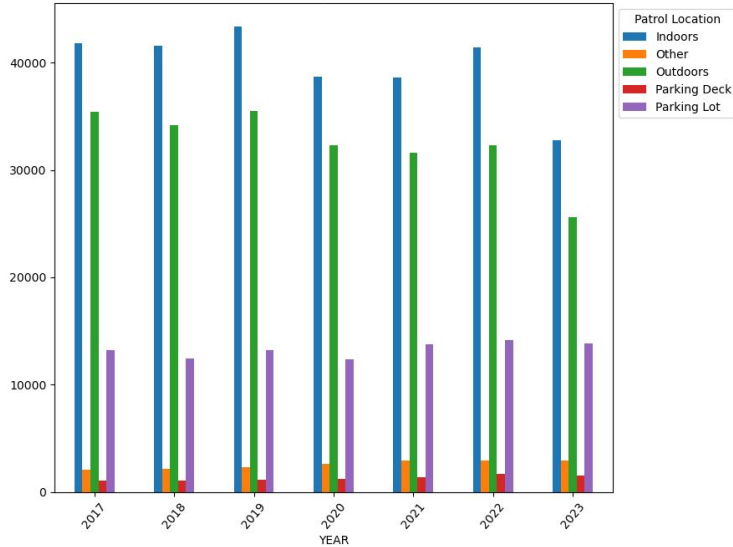
LOCATION_TYPE_DESCRIPTION	Indoors	Other	Outdoors	Parking Deck	Parking Lot
YEAR					
2017	41771	2046	35416	1019	13197
2018	41553	2181	34183	1081	12410
2019	43353	2316	35509	1168	13217
2020	38723	2633	32269	1193	12372
2021	38598	2890	31620	1347	13758
2022	41399	2937	32328	1699	14156
2023	32791	2905	25612	1549	13797

Overall crimes went down during COVID except for Other Crimes and Parking Deck crimes.

Median Days to Clear

Average Days to Clear

Mode Median Mean
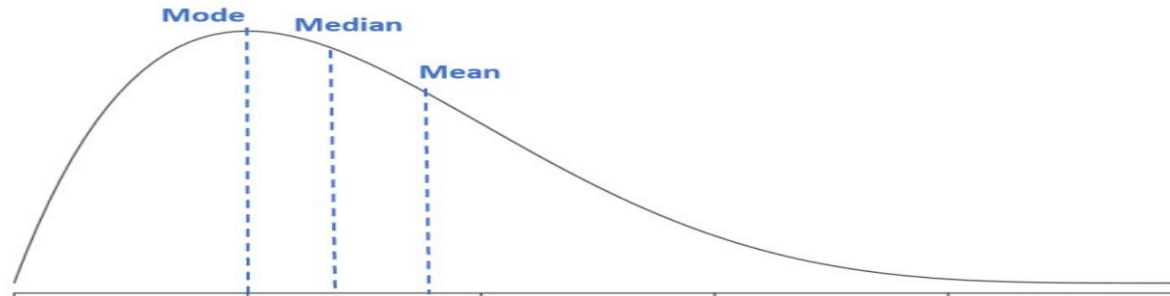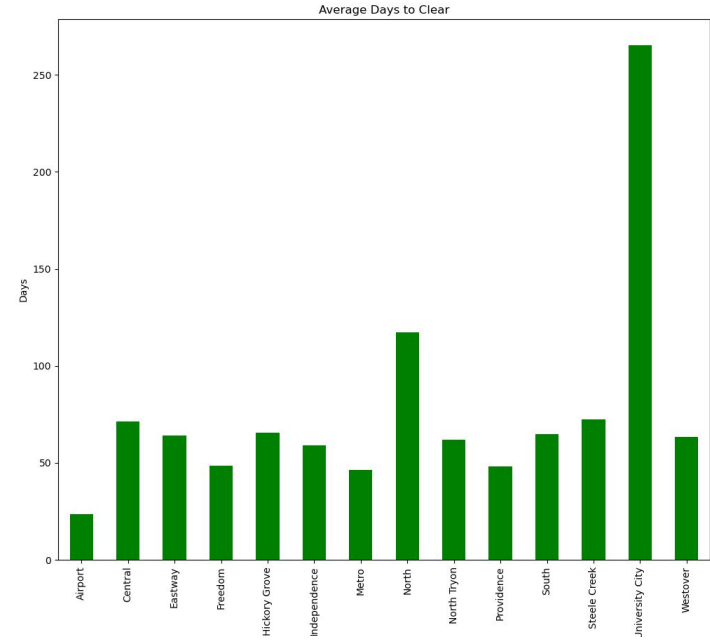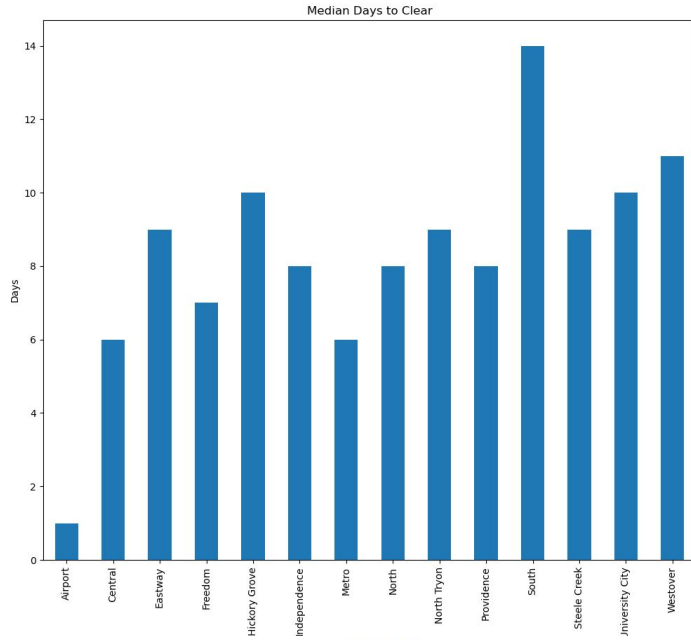
Effectiveness of Each Division by How Long the Typical Incident Takes to Clear