Exploratory Analysis of Wichita Traffic Accidents

Maggie Sharma

11/23/2021

Purpose

Explore publicly available traffic accident data for Wichita, KS using Excel, SQL, and Tableau

Guiding Questions

- What day of the week has the most traffic accidents?
- Where do the most traffic accidents occur?
- How many accidents occur along the main highways?
- What time of day do the most traffic accidents occur?

Preparing the Data

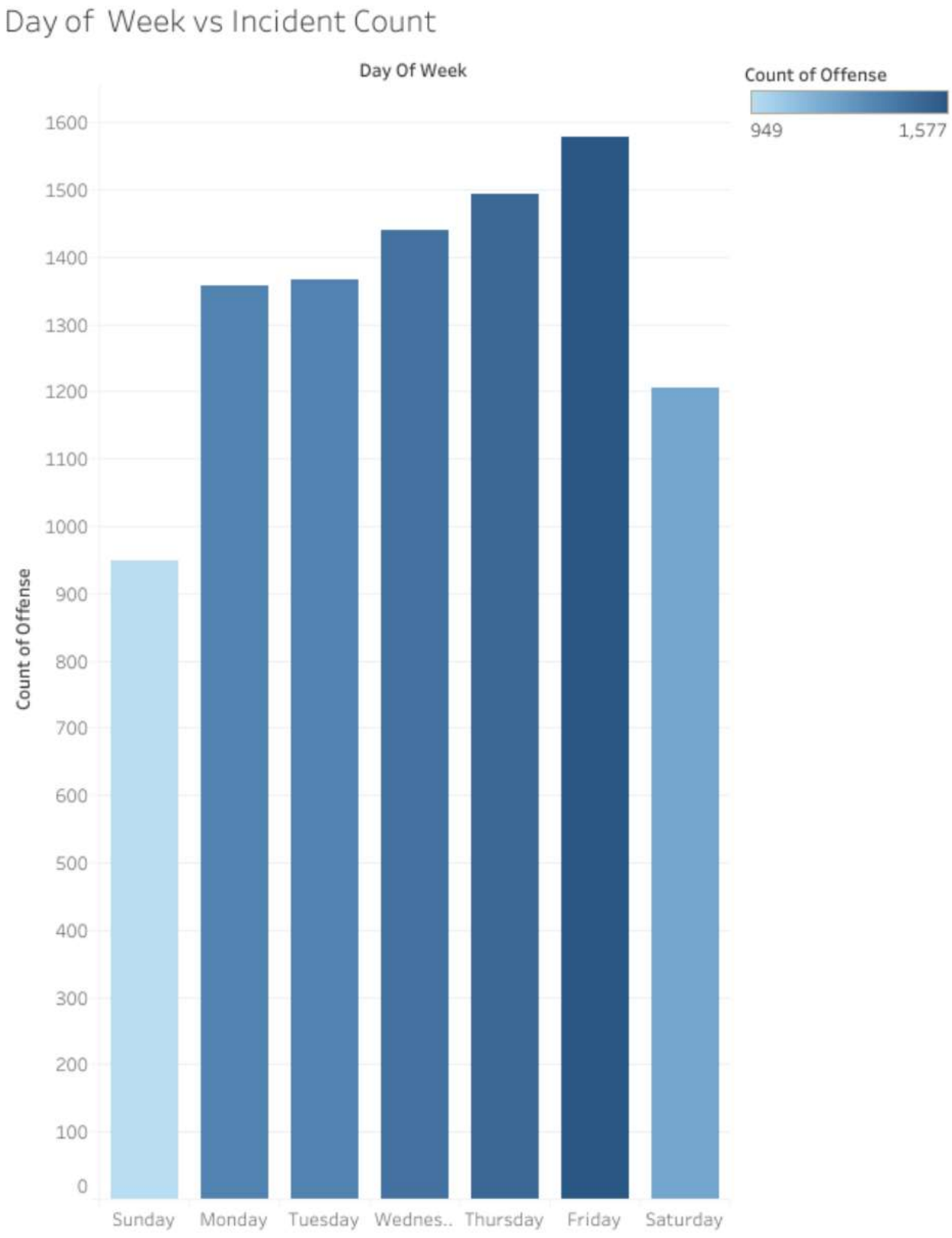
The data was collected from the City of Wichita's Open Data Portal via access.wichita.gov. The dataset includes traffic accident reports from February 1, 2020 through April 4, 2021. source

The dataset was exported for initial cleaning to an Excel spreadsheet. No duplicate values were found. As the primary objective of this analysis focuses on location of accident, 29 entries that did not contain the Beat number were removed. Entries without an address were included as long as the Beat number was included. Since all entries occurred in the Wichita metro, missing City entries were filled in with "Wichita." To look at the time of day distribution of accidents, the time was separated from the date and formatted as time. Columns without data were removed.

Incidents by police beat and day of the week

Using Excel, a PivotTable showing the total number of accidents by day of the week and police beat was created. Then the total incidents per day of the week were graphed using Tableau.

Row Labels	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Grand Total
11	28	40	41	40	49	59	35	292
12	32	38	44	49	43	46	38	290
13	27	35	24	33	36	52	34	241
14	34	43	45	58	72	53	35	340
15	17	20	28	23	26	22	21	157
16	20	34	33	41	51	34	26	239
17	15	49	30	47	34	38	26	239
18	31	35	37	39	47	47	36	272
19	46	50	63	81	68	85	63	456
21	30	83	66	46	61	52	49	387
22	26	46	35	42	44	39	32	264
23	29	33	38	25	26	46	24	221
24	19	17	21	22	19	23	16	137
25	19	30	27	38	31	51	29	225
26	13	24	22	28	21	32	25	165
27	23	24	23	40	48	33	35	226
28	23	23	27	28	28	32	25	186
29	11	18	15	17	15	13	15	104
31	31	59	59	52	63	68	33	365
32	22	33	38	38	29	49	28	237
33	33	28	41	31	34	36	31	234
34	24	24	14	19	13	22	21	137
35	19	25	27	29	23	33	26	182
36	31	26	46	37	30	49	31	250
37	34	73	61	58	68	49	56	399
38	23	37	44	44	45	47	42	282
39	37	71	67	62	70	59	59	425
41	13	19	23	27	22	13	17	134
42	20	32	35	29	32	36	27	211
43	17	20	28	24	29	22	24	164
44	17	21	13	17	27	13	20	128
45	16	21	24	29	28	23	15	156
46	24	48	51	53	56	56	41	329
47	19	20	19	24	26	34	24	166
48	30	33	29	28	37	51	35	243
49	28	29	29	36	38	43	35	238
199	31	44	38	49	53	53	30	298
299	17	23	23	28	21	28	21	161
399	20	29	37	28	29	36	25	204
Grand Total	**949**	**1357**	**1365**	**1439**	**1492**	**1577**	**1205**	**9384**



Through the PivotTable and chart, we see that Friday has the most accidents followed by Thursday. Sunday and Saturday had the least amount of accidents.

Using the values generated with the pivot table on Excel, the percentage of incidents per day were calculated. Conditional formatting was applied to easily identify police beats with higher than average incidents and lower than average incidents.

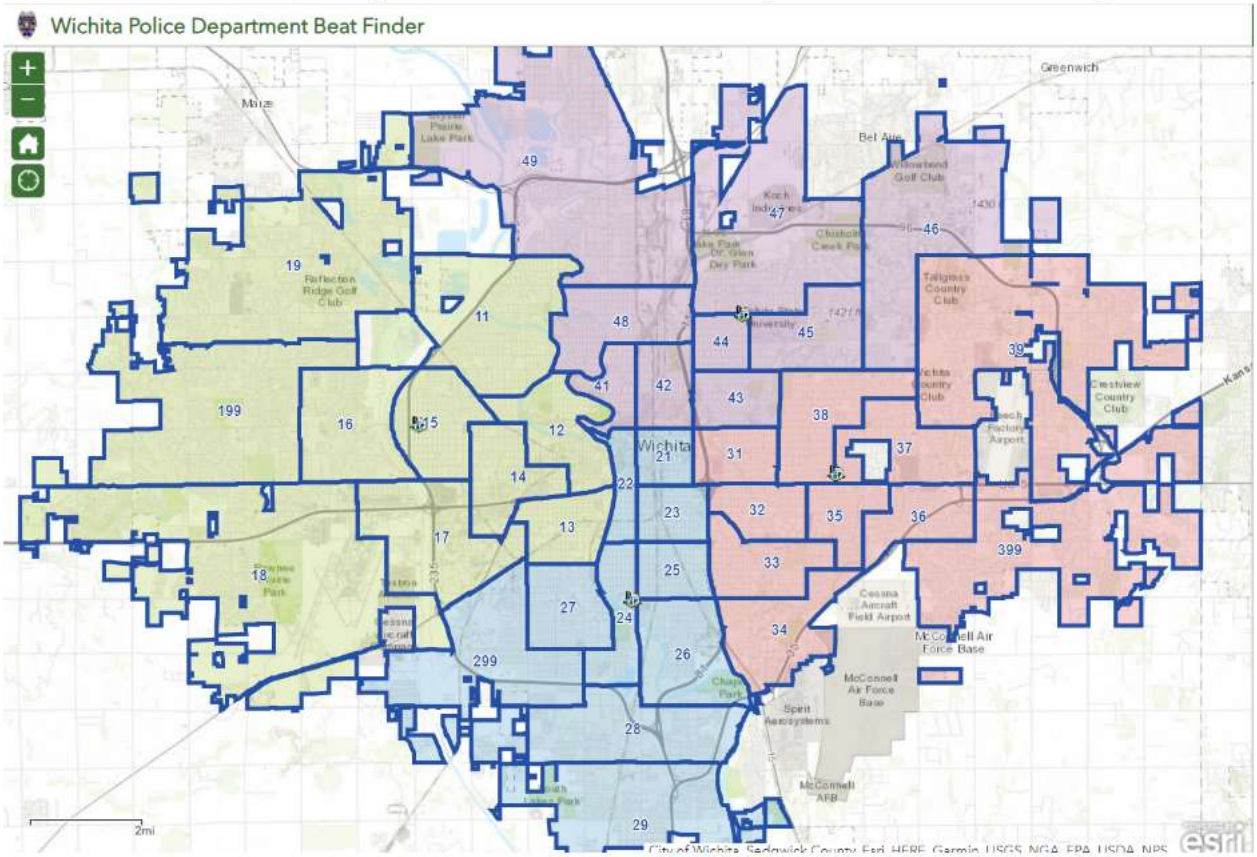
Beat	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
11	10%	14%	14%	14%	17%	20%	12%
12	11%	13%	15%	17%	15%	16%	13%
13	11%	15%	10%	14%	15%	22%	14%
14	10%	13%	13%	17%	21%	16%	10%
15	11%	13%	18%	15%	17%	14%	13%
16	8%	14%	14%	17%	21%	14%	11%
17	6%	21%	13%	20%	14%	16%	11%
18	11%	13%	14%	14%	17%	17%	13%
19	10%	11%	14%	18%	15%	19%	14%
21	8%	21%	17%	12%	16%	13%	13%
22	10%	17%	13%	16%	17%	15%	12%
23	13%	15%	17%	11%	12%	21%	11%
24	14%	12%	15%	16%	14%	17%	12%
25	8%	13%	12%	17%	14%	23%	13%
26	8%	15%	13%	17%	13%	19%	15%
27	10%	11%	10%	18%	21%	15%	15%
28	12%	12%	15%	15%	15%	17%	13%
29	11%	17%	14%	16%	14%	13%	14%
31	8%	16%	16%	14%	17%	19%	9%
32	9%	14%	16%	16%	12%	21%	12%
33	14%	12%	18%	13%	15%	15%	13%
34	18%	18%	10%	14%	9%	16%	15%
35	10%	14%	15%	16%	13%	18%	14%
36	12%	10%	18%	15%	12%	20%	12%
37	9%	18%	15%	15%	17%	12%	14%
38	8%	13%	16%	16%	16%	17%	15%
39	9%	17%	16%	15%	16%	14%	14%
41	10%	14%	17%	20%	16%	10%	13%
42	9%	15%	17%	14%	15%	17%	13%
43	10%	12%	17%	15%	18%	13%	15%
44	13%	16%	10%	13%	21%	10%	16%
45	10%	13%	15%	19%	18%	15%	10%
46	7%	15%	16%	16%	17%	17%	12%
47	11%	12%	11%	14%	16%	20%	14%
48	12%	14%	12%	12%	15%	21%	14%
49	12%	12%	12%	15%	16%	18%	15%
199	10%	15%	13%	16%	18%	18%	10%
299	11%	14%	14%	17%	13%	17%	13%
399	10%	14%	18%	14%	14%	18%	12%
Grand Total	10%	14%	15%	15%	16%	17%	13%

Summary of day of the week analysis

- Most police beats had a higher percentage of incidents on Friday, but several police beats had a higher percentage of incidents occur on Thursday.
- While most police beats saw the end of the work week to have the higher percentages of incidents, police beats 17 and 21 saw the most incidents occur on Mondays.
- Interestingly, police beat 34 saw a different breakdown than other police beats with a smaller percentage of accidents on Tuesday/Thursday and higher percentages Sunday/Monday.

Location of Traffic Accidents

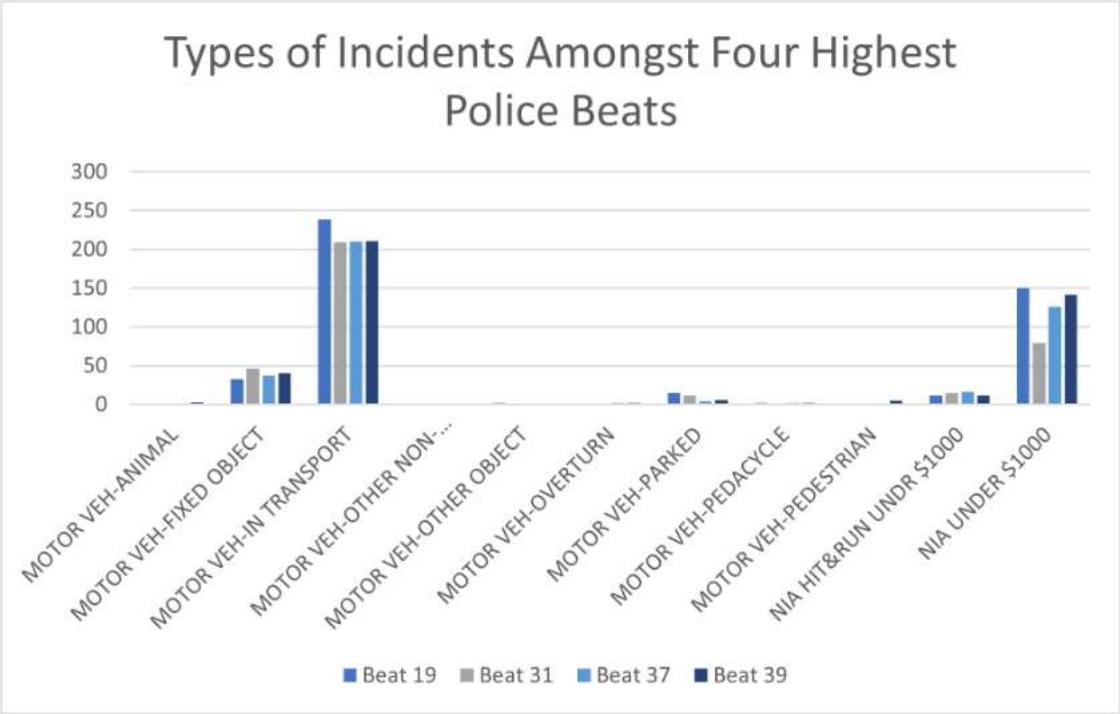
Importing the Wichita Police Department Beat Finder onto Tableau was not available with Tableau Public. Instead the publicly available Wichita Police Department Beat Finder map was used.



source

Earlier, it was found that beats 19, 31, 37, and 39 appear to have the highest number of accidents. Police beat 31 covers the downtown district of Wichita, but beats 19, 37, and 39 are not downtown. In fact, beat 19 covers a primarily residential suburban area.

Since beat 19 is in a more suburban area, it was hypothesized that perhaps beat 19 sees different types of incidents such as animal involved accidents. To look at the breakdown of types of incidents for the four police beats with the highest number of incidents, see the below graph:



As we can see beat 19 had a similar breakdown of incident types compared to beats 31, 37, and 39. The majority of incidents were categorized as Motor Veh-In Transport. In fact, there were *no animal related incidents* in police beat 19 despite being a suburban location.

Location Analysis using SQL

```
SELECT COUNT(*) FROM `wichita-traffic-accidents.wichitatraffic.ICT_TRAFFIC` AS  KELLOGG
WHERE ADDRESS LIKE '%KELLOGG%'

```

Kellogg Avenue is the main East-West highway in Wichita. Using SQL, the total address that contained 'Kellogg' equaled 1,087 and the total incidents equaled 9384. **Accidents occurring on Kellogg accounted for 12% of incidents.**

```sql
SELECT COUNT(*) FROM `wichita-traffic-accidents.wichitatraffic.ICT_TRAFFIC` AS  KELLOGG
WHERE ADDRESS LIKE '%I135%';
```

Processing location: US

Query results SAVE RESULTS EXPLORE DATA

Query complete (0.4 sec elapsed, 215 KB processed)

Job information | Results | JSON | Execution details

Row	f0_
1	159

I-135 is the main north-south interstate that intersects Wichita. Using SQL, 159 incidents occurred along I-135, which accounts for **2% of incidents.**

Time of Day of Accident Analysis

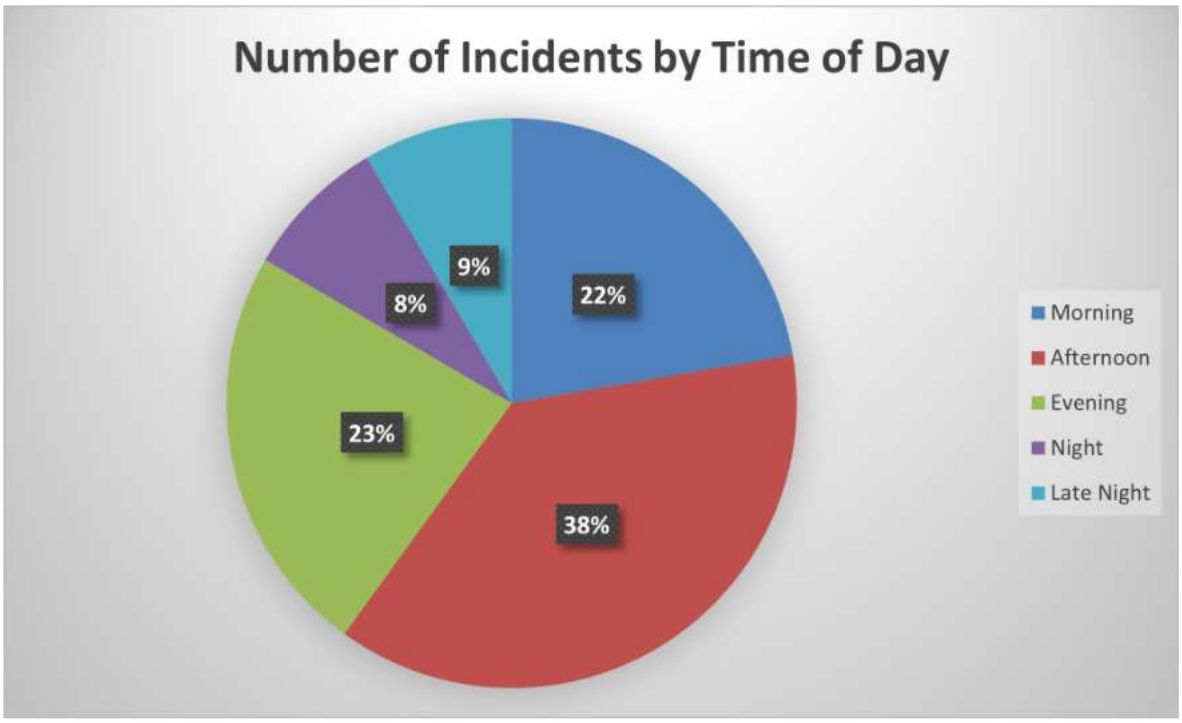
```sql
SELECT COUNT(START_TIME) FROM `wichita-traffic-accidents.wichitatraffic.ICT_TRAFFIC` AS MORNING_ACCIDENTS
WHERE START_TIME BETWEEN '06:00:00+00' AND '11:59:59+00';

SELECT COUNT(START_TIME) FROM `wichita-traffic-accidents.wichitatraffic.ICT_TRAFFIC` AS AFTERNOON_ACCIDENTS
WHERE START_TIME BETWEEN '12:00:00+00' AND '16:59:59+00';

SELECT COUNT(START_TIME) FROM `wichita-traffic-accidents.wichitatraffic.ICT_TRAFFIC` AS EVENING_ACCIDENTS
WHERE START_TIME BETWEEN '17:00:00+00' AND '20:59:59+00';

SELECT COUNT(START_TIME) FROM `wichita-traffic-accidents.wichitatraffic.ICT_TRAFFIC` AS NIGHT_ACCIDENTS
WHERE START_TIME BETWEEN '21:00:00+00' AND '23:59:59+00';

SELECT COUNT(START_TIME) FROM `wichita-traffic-accidents.wichitatraffic.ICT_TRAFFIC` AS LATENIGHT_ACCIDENTS
WHERE START_TIME BETWEEN '00:00:00+00' AND '05:59:59+00';
```



Using SQL and Excel, we can see that the majority of accidents occured in the afternoon (Noon-5:00p.m.) timeframe.

Conclusions:

- Most accidents occurred toward the end of the work week, with Friday seeing the most incidents.
- Most accidents occurred in the afternoon.
- 12% of accidents occurred along U.S. 54 Kellogg
- Police beat 19, a nortwestern suburb, had the highest amount of accidents.

Further points to consider

It would be interesting to investigate the high number of incidents in police beat 19 given further data. Perhaps there are more stop signs in this area or specific intersections with high incident rates. Investigating the cause of incidents may allow the police force to implement changes in the area to reduce accidents.

The city of Wichita police department may want to allocate more police staffing for Thursday/Friday as incident rates increased on these days. Police may want to focus on reducing incidents in high areas, such as by running awareness campaigns in targeted zones or increasing presence during busy times. Further data analysis on time of day may help identify patterns further.

Further analysis of areas of lower than average traffic incidents may also shed light on how to reduce traffic incidents in other parts of town.