



ANALYSIS OF CRIME PATTERNS AND ARREST RATES IN CHICAGO

(Using MySQL)

OBJECTIVE: Examining crime patterns and arrest rates across various communities in Chicago to identify trends and disparities.

Firstly, let's look at the number of crimes committed on a yearly basis in Chicago during the period 2001 to 2018

Query 1:

```
SELECT YEAR(DATE) AS 'Years', COUNT(*) AS 'Number of Crimes'  
FROM CRIME GROUP BY 'Years' ORDER BY 'Years';
```

Insights: This output illustrates the distribution of crimes over the years.

- Between 2002 to 2009, the number of crimes steadily increased, averaging between 20 and 35 incidents, peaking in 2009 with 35 crimes, which accounts for 9.91% of the total reported crimes from 2001 to 2018.
- Following this peak, there was a slight decline in crime rates, with most years falling within the average range of 10 to 25 incidents, continuing through to 2018.

Years	Number of Crimes
2001	1
2002	20
2003	28
2004	22
2005	29
2006	22
2007	31
2008	11
2009	35
2010	18
2011	18
2012	25
2013	13
2014	21
2015	20
2016	19
2017	18
2018	2

During these years, the total number of crimes committed in various communities across Chicago is summarized below.

Query 2:

```
SELECT  
COUNT(DISTINCT(COMMUNITY_AREA_NUMBER))  
AS 'Number of Communities' FROM CENSUS;
```

Communities	
▶	77

Query 3:

```
SELECT COUNT(ID) AS 'Total Crimes'  
FROM CRIME;
```

Total Crimes	
▶	353

Insights: Our analysis is based on data from 77 communities in Chicago, providing insights into reported crimes across these areas.

Insights: This output encompasses the total number of crimes committed in Chicago's 77 communities from 2001 to 2018.

Now, let's examine how the total number of crimes committed is distributed across various crime categories.

Query 3:

```
SELECT PRIMARY_TYPE, COUNT(PRIMARY_TYPE)
AS 'Number of Crimes'
FROM CRIME GROUP BY PRIMARY_TYPE
ORDER BY 'Number of Crimes' DESC;
```

Insights :

- The data shows that THEFT is the most prevalent crime in Chicago, accounting for 28% of all reported incidents.
- This is followed by CRIMINAL DAMAGE at 15% and NARCOTICS offenses at 14%.
- Together, these three categories represent 57% of the total crimes committed.

PRIMARY_TYPE	Number of Crimes
THEFT	100
CRIMINAL DAMAGE	55
NARCOTICS	51
OTHER OFFENSE	29
BURGLARY	27
MOTOR VEHICLE THEFT	22
DECEPTIVE PRACTICE	14
CRIMINAL TRESPASS	13
ROBBERY	9
OFFENSE INVOLVING CHILDREN	4
PROSTITUTION	3
PUBLIC PEACE VIOLATION	3
SEX OFFENSE	3
CRIM SEXUAL ASSAULT	2
INTERFERENCE WITH PUBLIC ...	2
GAMBLING	2
LIQUOR LAW VIOLATION	2
ARSON	2
KIDNAPPING	1
INTIMIDATION	1
OBSCENITY	1
CONCEALED CARRY LICENSE V...	1
PUBLIC INDECENCY	1
NON-CRIMINAL	1
OTHER NARCOTIC VIOLATION	1
HUMAN TRAFFICKING	1
NON - CRIMINAL	1
NON-CRIMINAL (SUBJECT SPE...	1

Next, we'll explore how the total number of crimes committed is distributed across different communities.

Query 4:

```
SELECT CS.COMMUNITY_AREA_NAME, COUNT(CR.ID) AS 'Number of Recorded Crimes Per Area' FROM CENSUS AS CS JOIN CRIME AS CR ON CS.COMMUNITY_AREA_NUMBER = CR.COMMUNITY_AREA_NUMBER GROUP BY CS.COMMUNITY_AREA_NAME ORDER BY 'Number of Recorded Crimes Per Area' DESC;
```

- Insights :**
- The output shows the top 15 communities ranked by the number of reported crimes.
 - Austin has the highest crime rate, accounting for 7% of all crimes, followed by Humboldt at 3.9%, Englewood at 3.68%, and both Near West Side and Near North Side at approximately 3.4% each.
 - Together, these top 5 communities contribute to 21.8% of the total crimes committed in Chicago.
 - When a small number of communities (5 out of 77, which is about 6.5%) account for nearly 22% of all crimes, it indicates a high concentration of criminal activity in these areas. This suggests that these communities face disproportionate levels of crime compared to the rest.

COMMUNITY_AREA_NAME	Number of Recorded Crimes Per Area
Austin	26
Humboldt park	14
Englewood	13
Near West Side	12
Near North Side	12
West Town	11
Chicago Lawn	10
West Englewood	9
Brighton Park	9
Greater Grand Crossing	9
Auburn Gresham	9
Logan Square	8
North Lawndale	8
Lower West Side	7
West Garfield Park	7

Let's now explore where different crime types occur prominently across communities to identify crime hotspots

Query 5:

```
SELECT CR.PRIMARY_TYPE, CS.COMMUNITY_AREA_NAME, COUNT(CR.ID) AS  
'Number of Crimes', SUM(COUNT(CR.ID)) OVER(PARTITION BY  
CR.PRIMARY_TYPE) AS 'Total Crimes by Type' FROM CRIME AS CR  
JOIN CENSUS AS CS ON CR.COMMUNITY_AREA_NUMBER =  
CS.COMMUNITY_AREA_NUMBER GROUP BY CR.PRIMARY_TYPE,  
CS.COMMUNITY_AREA_NAME HAVING COUNT(CR.ID) > 0 ORDER BY 'Total  
Crimes by Type' DESC, 'Number of Crimes' DESC;
```

Insights :

The output highlights the top 5 communities contributing to the most frequent crimes - THEFT, CRIMINAL DAMAGE, and NARCOTICS.

- THEFT is notably common in Austin, Near West Side, and Englewood, comprising 18% of all thefts, with Austin alone accounting for 8 incidents.
- CRIMINAL DAMAGE is concentrated in West Town and Brighton Park, together representing 13% of these crimes.
- NARCOTICS offenses are prominent in Austin, Humboldt Park, and Uptown, collectively making up 30% of such cases.

PRIMARY_TYPE	COMMUNITY_AREA_NAME	Number of Crimes
THEFT	Austin	8
THEFT	Near West Side	5
THEFT	Englewood	5
THEFT	Humboldt park	4
THEFT	Loop	4
CRIMINAL DAMAGE	West Elsdon	1
CRIMINAL DAMAGE	North Center	1
CRIMINAL DAMAGE	Montclare	1
CRIMINAL DAMAGE	Dunning	1
CRIMINAL DAMAGE	Burnside	1
NARCOTICS	Austin	7
NARCOTICS	Humboldt park	5
NARCOTICS	Uptown	4
NARCOTICS	Brighton Park	3
NARCOTICS	Near West Side	3

After exploring the distribution of crime across communities, we will now shift our focus to examining arrest patterns within these areas, starting with the total number of arrests made.

Query 6:

```
SELECT COUNT(ARREST) AS 'Total Arrests'  
FROM CRIME WHERE ARREST = "TRUE";
```

Insights:

- The output displays the total number of arrests made across the 77 communities in Chicago from 2001 to 2018.
- During this period, arrests accounted for approximately 30.59% of all reported crimes across these communities.

Total Arrests
108

Next, we explore the relationship between crime reports and arrest numbers over time, highlighting changes in arrest trends across different years.

Query 7:

```
WITH year_arrest AS (SELECT YEAR(DATE) AS 'Years', COUNT(ID)
AS 'Number of Crimes', SUM(CASE WHEN ARREST = "TRUE" THEN 1
ELSE 0 END) AS 'Number of Arrests' FROM CRIME GROUP BY
'Years' ORDER BY 'Years', 'Number of Arrests' DESC)

SELECT year_arrest.'Years', 'Number of Crimes', 'Number of Arrests',
ROUND('Number of Arrests' / 'Number of Crimes') * 100 ,2) AS '% of
Arrests` FROM year_arrest ORDER BY 'Years', '% of Arrests' DESC;
```

Years	Number of Crimes	Number of Arrests	Rate of Arrests
2001	1	1	100.00
2002	20	6	30.00
2003	28	8	28.57
2004	22	9	40.91
2005	29	13	44.83
2006	22	7	31.82
2007	31	13	41.94
2008	11	3	27.27
2009	35	12	34.29
2010	18	2	11.11
2011	18	3	16.67
2012	25	9	36.00
2013	13	5	38.46
2014	21	5	23.81
2015	20	5	25.00
2016	19	1	5.26
2017	18	4	22.22
2018	2	2	100.00

Insights:

- We observe a slight increase in the number of arrests and arrest rate corresponding with the rise in crime reports up to 2009
- However, after 2009, the number of arrests begins to decline relative to the number of crimes committed, with a noticeable drop in the arrest rate between 2010–2018, as compared to the arrest rate between 2001– 2009.
- This downward trend continues through to 2018.

Now, lets explore the relationship between crime reports and arrest rates across communities

Query 8:

```
SELECT COMMUNITY_AREA_NAME, 'Number of Crimes', 'Number of Arrests', ROUND((`Number of Arrests`/ `Number of Crimes`),2)* 100 AS 'Percentage of Arrests' FROM comm_crime ORDER BY 'Number of Crimes' DESC;
```

Insights:

For readability, the output displays only those communities having more than 5 crimes.

- In communities with more than 10 crimes, arrest rates are generally low.
- Near North Side is the exception, standing out as the only community with an arrest rate as high as 50%.
- In contrast, other communities with similar crime levels, such as Austin, Humboldt Park, Englewood, and Near West Side, have much lower arrest rates.

COMMUNITY_AREA_NAME	Number of Crimes	Number of Arrests	Rate of Arrests
Austin	26	11	42.00
Humboldt park	14	6	43.00
Englewood	13	2	15.00
Near West Side	12	3	25.00
Near North Side	12	6	50.00
West Town	11	2	18.00
Chicago Lawn	10	5	50.00
West Englewood	9	1	11.00
Brighton Park	9	3	33.00
Greater Grand Crossing	9	2	22.00
Auburn Gresham	9	3	33.00
Logan Square	8	1	13.00
North Lawndale	8	4	50.00
Lower West Side	7	2	29.00
West Garfield Park	7	3	43.00
New City	7	3	43.00
Ashburn	7	4	57.00
Lake View	7	2	29.00
South Chicago	6	1	17.00

Why are arrest rates in Austin, Humboldt Park, Englewood, and Near West Side so low despite having high crime?

- From a previous analysis, we observed that these specific communities also had a higher concentration of THEFT and NARCOTICS related crimes as compared to other communities.

PRIMARY_TYPE	COMMUNITY_AREA_NAME	Number of Crimes
THEFT	Austin	8
THEFT	Near West Side	5
THEFT	Englewood	5
THEFT	Loop	4
THEFT	Humboldt park	4

PRIMARY_TYPE	COMMUNITY_AREA_NAME	Number of Crimes
NARCOTICS	Austin	7
NARCOTICS	Humboldt park	5
NARCOTICS	Uptown	4
NARCOTICS	Brighton Park	3
NARCOTICS	North Lawndale	3

As we can see here, the top 5 communities where THEFT related crimes as highest include all 4 of these communities.

The top 5 communities where NARCOTICS related crimes are highest include all these communities too, except Englewood.

To gain further insights, lets look at the arrest rates for the most common crime types.

Query 9:

```
SELECT PRIMARY_TYPE, 'Number of Crimes', 'Number of Arrests', ('Number of Arrests' / 'Number of Crimes') * 100 AS 'Rate of Arrests' FROM crime_percent ORDER BY 'Number of Crimes' DESC;
```

Insights: The output shows the top 10 most reported types of crimes.

- NARCOTICS and CRIMINAL TRESPASS have notable arrest rates, both exceeding 70%. indicating that the presence of these crimes may not lower a community's arrest rate.
- THEFT, CRIMINAL DAMAGE, BURGLARY, and MOTOR VEHICLE THEFT have low arrest rates, ranging from 0% to 11%, even though their crime counts exceed 20.
- Notably, THEFT, the most frequently occurring crime with 100 incidents, has an arrest rate of just 11%.
- If crimes like THEFT, which have particularly high number of crime counts, have a low arrest rate, they can significantly contribute to the overall reduction in arrest rates for those communities.

PRIMARY_TYPE	Number of Crimes	Number of Arrests	Rate of Arrests
THEFT	100	11	11.00
CRIMINAL DAMAGE	55	5	9.09
NARCOTICS	51	50	98.04
OTHER OFFENSE	29	5	17.24
BURGLARY	27	1	3.70
MOTOR VEHICLE THEFT	22	0	0.00
DECEPTIVE PRACTICE	14	4	28.57
CRIMINAL TRESPASS	13	11	84.62
ROBBERY	9	3	33.33
OFFENSE INVOLVING CHILDREN	4	1	25.00

As seen, THEFT can heavily impact community arrest rates. Let's now focus on these communities where this pattern is most pronounced.

Query 10:

```
SELECT CS.COMMUNITY_AREA_NAME, CPT.PRIMARY_TYPE, COUNT(CR.ID) AS  
'Number of Crimes' FROM CENSUS AS CS CROSS JOIN (SELECT DISTINCT  
PRIMARY_TYPE FROM CRIME) AS CPT LEFT JOIN CRIME AS CR ON  
CS.COMMUNITY_AREA_NUMBER = CR.COMMUNITY_AREA_NUMBER AND  
CR.PRIMARY_TYPE = CPT.PRIMARY_TYPE WHERE COMMUNITY_AREA_NAME IN  
("Austin", "Near West Side", "Englewood", "Humboldt Park") GROUP BY  
CS.COMMUNITY_AREA_NAME, CPT.PRIMARY_TYPE HAVING 'Number of Crimes' > 0  
ORDER BY CS.COMMUNITY_AREA_NAME, 'Number of Crimes' DESC;
```

Insights:

- From the output, it is clear that Austin, Englewood, Near West Side, Humboldt Park and consistently report THEFT as their highest-ranking crime.
- In Austin, THEFT accounts for 30.76% of all reported crimes.
- Englewood has an even higher proportion, with THEFT making up 38.46% of its total crimes.
- In Humboldt Park, THEFT constitutes 28.57% of the crimes reported in that community.
- Near West Side has the highest percentage, with THEFT representing 41.67% of its total crimes.

COMMUNITY_AREA_NAME	PRIMARY_TYPE	Number of Crimes
Austin	THEFT	8
Austin	NARCOTICS	7
Austin	BURGLARY	3
Austin	CRIMINAL DAMAGE	2
Austin	OTHER OFFENSE	2
Austin	MOTOR VEHICLE THEFT	1
Austin	PROSTITUTION	1
Austin	KIDNAPPING	1
Austin	CONCEALED CARRY L...	1
Englewood	THEFT	5
Englewood	BURGLARY	2
Englewood	MOTOR VEHICLE THEFT	2
Englewood	CRIMINAL DAMAGE	1
Englewood	NARCOTICS	1
Englewood	OTHER OFFENSE	1
Englewood	CRIM SEXUAL ASSAULT	1
Humboldt park	NARCOTICS	5
Humboldt park	THEFT	4
Humboldt park	OTHER OFFENSE	3
Humboldt park	CRIMINAL DAMAGE	1
Humboldt park	NON-CRIMINAL (SUBJ...)	1
Near West Side	THEFT	5
Near West Side	NARCOTICS	3
Near West Side	MOTOR VEHICLE THEFT	2
Near West Side	CRIMINAL TRESPASS	1
Near West Side	NON - CRIMINAL	1

OBSERVATIONS:

01

For these communities, THEFT stands out as the most frequent crime, yet it has an arrest rate of just 11%.

02

With THEFT occurring in such high numbers and having one of the lowest arrest rates, it directly contributes to the overall reduction in arrest rates within these communities.

03

In communities where low-arrest crimes like THEFT dominate, the overall arrest rate naturally declines, highlighting the critical role crime type plays in shaping community arrest dynamics.



CONCLUSION



01

Our analysis shows that certain community areas, like AUSTIN, have disproportionately higher crime rates, particularly for THEFT and NARCOTICS.

02

THEFT is the most recorded crime, with 100 incidents—almost double that of the second-highest crime, NARCOTICS, which has 55 incidents. However, THEFT has an arrest rate of just 11%, much lower than other crimes.

03

The low arrest rate of THEFT contributes to a decline in overall arrest rates in the communities where it occurs frequently, suggesting that the types of crimes prevalent in an area significantly influence its arrest dynamics.

04

The low arrest rate may also be a key factor in THEFT's high recurrence across many Chicago communities, indicating that without effective intervention, such crimes continue to thrive.

05

To tackle these challenges, increasing surveillance, boosting community policing, and prioritizing arrests for frequently occurring crimes like THEFT could help reduce crime rates and enhance public safety.