

We are interested in analyzing the relationship between tenure policing a specific region and frequency of complaints. Namely, do officers who police one particular area over extended periods of time accrue more complaints? Is it possible that an officer becomes more confident and more reckless after years of arresting individuals in a particular neighborhood? In particularly dangerous areas such as the south side of Chicago, it might make some sense for an officer to develop detrimental biases after arresting BIPOC for 40 years. Conversely, do individuals who transfer and police multiple areas over time not develop these biases? Our SQL analytics aim to glean initial insights from the datasets provided by the CPDB database.

The first set of data we collected included information about the number of complaints each officer in Chicago had per year. This time series of each officer gives us the ability later to visually analyze, via a time series line chart, an officer's behaviour over the course of their tenure. Similarly, the second set of data includes the number of complaints per beat per year. We can cross reference these two sets of data to better understand not just an officer's behaviour over time, but their contribution to the total number of complaints a beat has received in any particular year. For example, in [Figure 1] we see that the officer with officer\_id 1 held a constant rate of complaint counts over a 10 year period. In [Figure 2] we see that beat 1 had 3 complaints total in 2016. If we find that officer\_id 1 operated in beat 1 during 2016, then we know that officer\_id 1 contributed  $\frac{1}{3}$  of the complaints beat 1 experienced. This particular example doesn't seem particularly drastic due to the low numbers overall. However, if we translate this analysis to beats that experience high rates of complaints and officers who experience high rates of complaints, then we can formulate an initial understanding of a particular officer's behaviour over time compared to their peers in the same beat.

Alternatively, we can track an officer's overall behaviour and its correlation with transfers. If we seek to understand if officers who transfer more do not develop bias, then we must understand the circumstances of transfers. Are they highly correlated with individuals who misbehave or are transfers representative of something else? [Figure 3] demonstrates the number of transfers of a particular officer compared to the number of allegations against the respective officer. From this dataset, we see officer\_id 604 has 0 allegations against them, but 27 transfers over the course of their tenure as an officer. This data gives us the ability to view officers who experience a high number of transfers and stack their complaint records against officers with low numbers of transfers. Now we can begin to understand if officers accrue more complaints if they remain in the same area for longer periods of time.

In [Figure 4] we see any particular officer's (by officer\_id) specific complaint record per year. Null values represent 0. If we assume that sustained complaints indicate the guilt of the officer more than unsustained complaints, then we can isolate particularly troubled officers from the entire population for analysis. Similarly, we can compare rates of sustained to total or sustained to unsustained complaints across officers in the same beat, officers who transfer in and out of a particularly troublesome beat, and track growth in sustained complaints for any particular officer of concern.

In sum, the following tables will allow us to analyze officer complaint records over a time series, compare records among peers, compare individuals who transfer units a lot to individuals who don't, understand transfers as a mechanism in policing and track sustained vs nonsustained complaints across time. These analytics will help us to better understand if officers with long tenures in one area accrue higher amounts of complaints on average than their peers, who transfer units more often.

	officer_id	year	count
1	1	2006	1
2	1	2008	1
3	1	2010	1
4	1	2012	1
5	1	2013	1
6	1	2016	1

Figure 1

	allegation_count	year	id	name	area_type
1	1	<null>	1	1713	beat
2	6	2018	1	1713	beat
3	5	2017	1	1713	beat
4	3	2016	1	1713	beat
5	3	2015	1	1713	beat
6	4	2014	1	1713	beat

Figure 2

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	o.id	o.allegation_count	num_trans	o.id	gender	race	appointed_date	ra
1	604	0	27	604	M	White	1947-12-16	Serg
2	1778	11	23	1778	M	White	1967-09-11	Poli
3	1721	39	23	1721	M	Black	1992-09-28	Poli
4	23250	0	23	23250	M	White	1961-01-09	Capt
5	31769	0	23	31769	M	White	1961-05-29	Capt
6	6636	3	22	6636	M	White	1958-02-16	Capt
7	9516	0	22	9516	M	White	1954-10-01	Capt
8	28824	0	22	28824	M	White	1956-09-01	Firs
9	2613	2	22	2613	M	Black	1956-09-01	Serg
10	20969	0	22	20969	M	White	1956-05-16	Lieu
11	3225	0	21	3225	M	Black	1954-06-16	
12	2091	0	21	2091	M	White	1954-06-16	Assi

Figure 3

	officer_id	year	su	other	ns
20	4	2000	<null>	2	<null>
21	4	2000	<null>	2	<null>
22	6	1997	<null>	1	<null>
23	6	1999	<null>	<null>	1
24	6	2001	<null>	<null>	1
25	6	2004	1	<null>	<null>
26	6	2007	1	1	<null>
27	6	2007	1	1	<null>
28	7	1998	<null>	1	2
29	7	1998	<null>	1	2
30	7	1998	<null>	1	2

Figure 4