The Hungry Hornets:
Final Report

Lately, controversy surrounding law enforcement has been ubiquitous. Indeed, especially in the setting of recent events, stories, editorials and discussion panels about police officer use of force, attitudes and other aspects of behavior have been inundating media outlets throughout the country. However, despite heightened attention to various issues surrounding the force, a significant one has seemingly been left out – that is, the role of police officer mental health.

Studies have shown that 20-30% of police officers nationwide are engaged in substance abuse, compared to 10% of the general population. Given the stressful and life-threatening nature of the job, long hours, associated mental health conditions, access to illicit substances in the community and marginalization by society, this figure may come as no surprise. In fact, a recently formulated biopsychosocial model attempts to rationalize how vulnerability and stress can affect officer health, including substance abuse behavior[1]. Along the same lines, the health, safety, competence and behavioral implications of intoxication are critical to consider. Thus, while a relatively taboo subject in society in general, any investigation and/or intervention for questionable police officer activity should practically account for his or her mental state, in addition to consideration of other factors impairing judgment and overall wellbeing. However, data and analysis pertaining to this topic is rather scarce.

As a result, our team decided to study patterns of drug and alcohol abuse and medical violation (DAM) allegations within the Chicago Police Department (CPD), based on data made available by the Citizens Police Data Project (CPDP). Namely, our objective was to explore the relationship between CPD officer compliance with Department medical policy, including but not limited to incidents of drug and alcohol abuse, with the following: allegations of police misconduct, officer salary and rank, use of force by police, location and type of police work conducted and distribution of awards given by the Department.

Characterizing the Problem

For our first checkpoint, we quantitatively defined various dimensions of DAM allegations, among CPD officers. Overall, our queries revealed that 1578/24,287 or 6.5% of police officers in the CPDP database have had at least one drug and alcohol abuse allegation. While this appears to be a small percentage, it nevertheless amounts to a large volume of officers with this purported issue. Interestingly, 10.6% of officers with more than 20 police misconduct allegations have had at least one drug and alcohol abuse allegation. Further, 14.9% of officers with more than 50 police misconduct allegations have had this history. The increase in prevalence of drug and abuse allegations among officers with higher number of overall allegations could reflect an artifact but could also suggest a concerning association between drug and alcohol abuse and misconduct in general, as reflected by some of our other analyses. though it is unclear which triggered which.

In terms of context, our queries further demonstrated that 1169/1578 or 74.1% of drug and alcohol abuse allegations were made against on-duty officers. It is unclear how much of

this trend can be attributed to a tendency towards underreporting of off-duty misconduct. At the same time, it is remarkable to consider this high frequency of substance abuse allegations while on duty. If an officer is engaged in this behavior and/or under the influence while in the field, it could impair judgment and contribute to other forms of misconduct. It may also reflect heightened stress or trauma associated with work, as evidenced by our analysis of geographic distribution, which will be addressed below.

We also found that 29/33,671 or 0.09% of officers have received medical policy violation allegations, which include medical roll violations, disability violations, failure to receive approval for travel, refusal of direct order for physical, altering medical documents, working while on medical leave or injury on duty (IOD) status and other miscellaneous medical violations. As this is a small percentage, we combined medical policy violation allegations with drug and alcohol abuse allegations in our analyses, to obtain a cumulative assessment regarding global officer health. The very low volume of medical violations among officers is reassuring. However, the fact that it occurs at all suggests that it must be addressed and could potentially be correlated with noncompliance with other protocols that could be associated with misconduct, warranting further investigation.

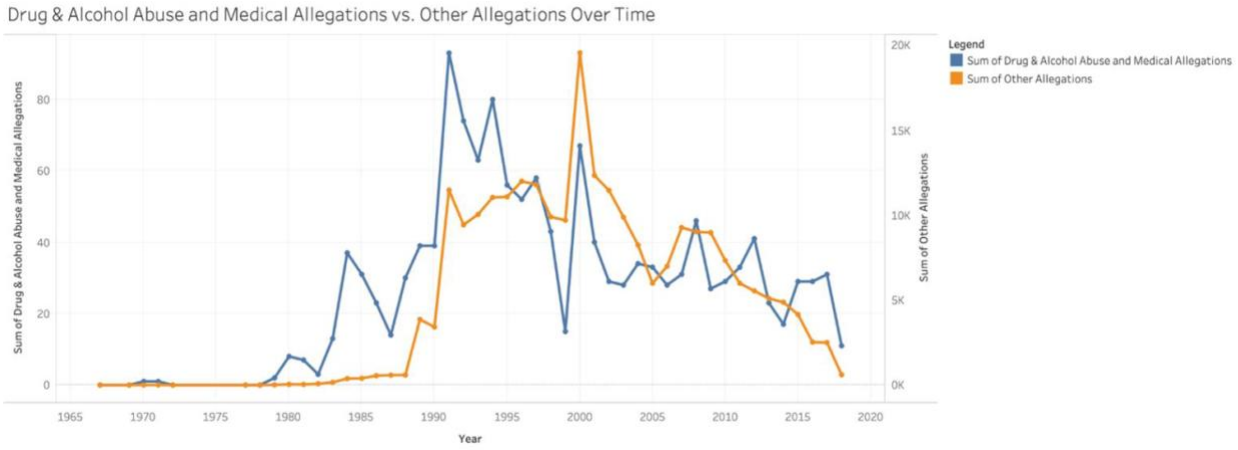
DAM Allegations Over Time

As shown by our checkpoint two analysis (**Figure 1**), the number of DAM and other types of allegations against officers demonstrate intriguing trends over time. For both allegation categories, there appears to be a peak in 1995-2001, though this peak occurs earlier and alongside another lower peak in the early 1990s for DAM allegations. This pattern may have multiple explanations, given the historical context. In particular, the peaks in DAM allegations correlates with an increase in nationwide substance abuse of every class occurring in the 1990s[2]. Given that both types of allegations peaked in the 1990s, this could also reflect heightened recognition, attention to, or enhanced documentation or allegation protocol by the CPD during this decade. Perhaps higher crime burden in Chicago was a precipitant for increased officer allegations of all kinds, though this is not well-documented in the literature. Especially given the opioid epidemic beginning in 2016, it is surprising that the number of DAM allegations among officers continued to decrease overall. This could reflect the positive influence of referral to substance abuse professionals or the trauma intervention program. The overall decrease in number of all kinds of allegations throughout the 2000s may further reflect the deterrent effect of discipline, whether threatened or imposed. It is further possible that the CPD and society were more focused on other types of allegations (i.e., pertaining to minorities and use of force), resulting in less of an emphasis on DAM allegations.

Type of DAM allegations showed a similar trend over time, as shown by the interactive word cloud we created for checkpoint three (https://observablehq.com/@41f225c25079d5fe/word-cloud-3-2). Perhaps most notable is the increase in number of distinct allegation types reported over time. While early allegations pertained to “intoxication” and “impairment,” these began to diversify, especially beginning in the late 1980s. Perhaps this reflects an increased awareness or focus on the various kinds of substance abuse and medical violations among CPD officers over time, or an evolution in the recording and documentation practices of the CPD. In terms of specific allegation types, “positive drug screen – physical exam” appears to become increasingly elevated, particularly in

the 1990s. As evidenced by our word cloud in checkpoint two, both civilian and officer complaints of this allegation type were prevalent, suggesting that in this era, the attitude towards substance abuse among officers was focused on identifying who may have been "on drugs" based on a visual assessment, again a very subjective category. Furthermore, in the 2000s, there was an increased prevalence of off duty violations, including intoxication, driving under the influence (DUI) and substance abuse allegations. This suggests a heightened focus among complainants on officer activity outside of work, which could indicate a trend towards higher surveillance of officer activity in general. In terms of overall number of allegations, an intriguing pattern emerges between 2016-2018. Like our checkpoint two analysis, though there are multiple allegation types, the words/phrases are homogeneously smaller in size during this time interval, suggesting that the overall volume of DAM allegations was reduced from previous years. Again, this is surprising, given the heightened attention on police practices driven by multiple controversial cases in this period.

Figure 1.



Officer vs. Civilian Complainants

We generated word clouds in checkpoint two (**Figure 2**), which exhibit fascinating and significant comparisons between the frequency of different types of DAM allegations made by officer and civilian complainants, while also revealing potential inconsistencies in how these allegations are substantiated, classified and documented. Perhaps not surprisingly, off duty complaints are overall more commonly made by other officers than civilians, which could be associated with officers having more exposure or interactions with one another outside the work setting, leading to the increased opportunity to observe substance abuse behavior in this context. There is also more variation in type of "positive drug screen" complaints among officers, which can be explained by officer access to a greater variety of supporting evidence. Further, though relatively uncommon in general, medical roll and other medical procedural violations appear to be more commonly reported by other officers. This is logical, considering that officers have direct access to witnessing these situations or reviewing these reports, while civilians do not.

However, there are also certain trends that are unexpected. The "positive drug screen – other physical exam" complaint frequency is similar if not higher among civilians when

compared to officers. This raises the question of how one would define a positive drug screen, and how one performs a physical examination. Is it that complainants base their assessment of whether an officer is on drugs by a visual assessment? What constitutes a physical exam? The latter seems highly subjective and likely variable between officer and civilian complainants, suggesting that this allegation name would benefit from revision. Similarly, there is a sizable representation of "impairment 0.04 or greater" and both on and off duty "intoxication" complaints among civilians, when it is unlikely that a civilian is taking this measurement or using objective criteria to evaluate impairment or intoxication. Along similar lines, the fact that "refusal of direct order to provide drug screen specimen" has any representation among civilian complaints is illogical and calls into question how these allegations are recorded. Additional ambiguity is reflected in certain allegation names, such as "possession/drinking alcohol on duty," as possession and drinking are different activities and should ideally be divided into distinct allegation names. "Just cause" and "failure to ensure civil rights," among others, seem to be misclassified into the wrong allegation category, as it is unclear how they are associated with substance abuse and other medical allegations.

Figure 2a. DAM Allegations by Officer Complainants

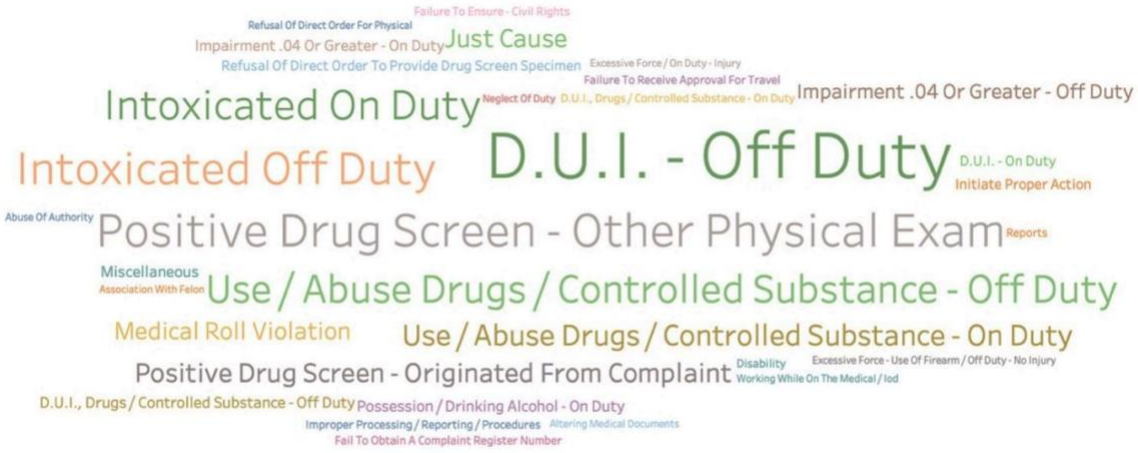
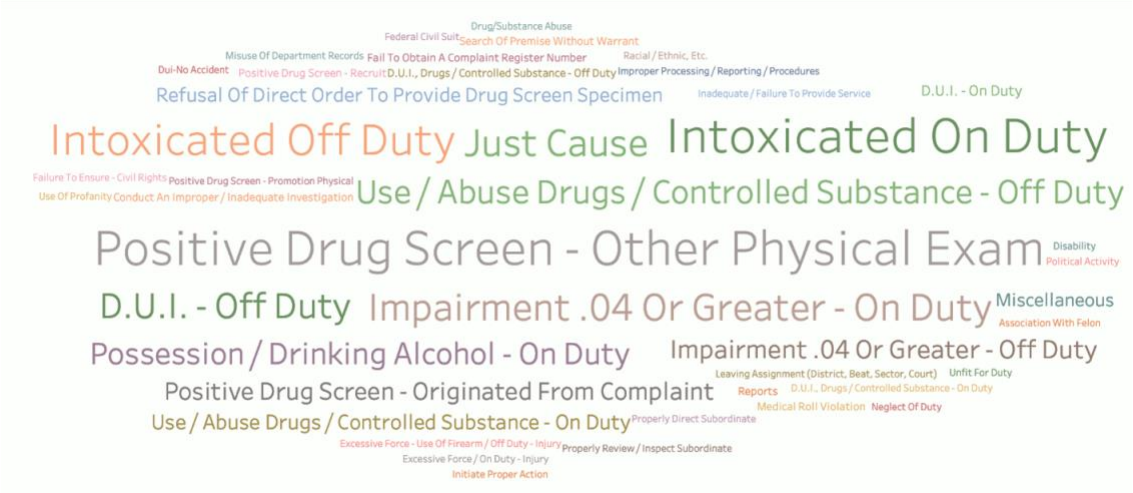


Figure 2b. DAM Allegations by Civilian Complainants



Association with Tenure

Based on our checkpoint one queries, officers with DAM allegations have been on the force for an average of 20.29 years, while those without these allegations have been on for an average of 24.91 years. The shorter tenure among officers with DAM allegations suggests that this behavior may affect their ability to perform their job and satisfy the requirements necessary to remain on staff, and/or lead to adverse health outcomes or behaviors that necessitate their earlier resignation. At the same time, these results may be surprising. One might expect that a longer tenure on the force may be a risk factor for heightened trauma and stress that could trigger a higher amount of polysubstance abuse. However, these data appear to refute the latter hypothesis.

Association with Salary

We explored the relationship between DAM allegations and officer salary in our first and fourth checkpoints. From our first checkpoint queries, we determined that on average, officers with DAM allegations earn a salary that is $1,012.55 higher than those without these allegations. The factors influencing officer salary are not well-described in the existing literature. One question to consider is if it is possible that a higher salary enables greater access to recreational drugs and alcohol. Another possibility is that those officers working a greater number of shifts or in more crime-ridden neighborhoods may receive a higher salary. Simultaneously, these factors increase their propensity towards substance abuse and/or non-compliance with medical care.

However, these findings contrast with those from our graph analytics in checkpoint four. For this analysis, we explored co-accusal patterns among officers with DAM allegations. We discovered that peak triangle count, an index of extent of involvement in co-accusal "cliques," was higher among lower-salaried (105) than higher-salaried (91) officers having DAM allegations. Thus, while officers with a history of DAM allegations may be higher paid overall,

those that earn less than the average salary are more likely to be part of a co-accusal clique. These triangle counts for each group are shown in **Figure 3.**

Figure 3. Triangle Count Stratified by Officer Salary

Lower-Earning Officer Triangle Counts:

count	id	officer_name	salary
105	8561	Anthony Finney	58896
105	27686	Eric Strickland	87372
105	7005	Vincent Dobbins	59412
105	9489	Willie Ganison	57426
105	22847	Thomas Porter	89130
105	11512	Carolyn Harris	36984
105	24677	Kenneth Rose	106920
105	7007	Darrell Dobbs	60600
105	8821	Gwendolyn Flowers	75372
105	19279	Joseph Mitchell	58572
105	5683	Victor Creed	117894
105	12852	Jerry Hutch	64662
105	30952	Sam Wilson	58572
105	11530	Henry Harris	55764
105	17492	Charles Martin	69270
105	8773	Joseph Flores	70656
55	22480	Edwin Phillips	80724
55	8015	Robert Ervin	82008
55	18758	Erskin Melchor	73116
55	4034	Robert Carroll	92430

Higher-Earning Officer Triangle Counts:

count	id	officer_name	salary
91	11530	Henry Harris	55764
91	17492	Charles Martin	69270
91	11512	Carolyn Harris	36984
91	27686	Eric Strickland	87372
91	30952	Sam Wilson	58572
91	24677	Kenneth Rose	106920
91	7007	Darrell Dobbs	60600
91	8821	Gwendolyn Flowers	75372
91	19279	Joseph Mitchell	58572
91	5683	Victor Creed	117894
91	12852	Jerry Hutch	64662
91	7000	Milton Dixon	78012
91	8773	Joseph Flores	70656
91	7005	Vincent Dobbins	59412
91	9489	Willie Ganison	57426
55	4034	Robert Carroll	92430
55	9679	Charles Gary	67704
55	19154	Raymond Mills	75816
55	22480	Edwin Phillips	80724
55	4416	Jerome Chapman	83220

This could suggest that those officers more often engaged in co-offenses are not able to perform sufficiently well in order to earn a pay raise, or perhaps they are more often of a lower-earning rank. Conversely, perhaps a lower salary translates into disenfranchisement or stress for an officer, which could serve as a precipitant for co-substance abuse behavior, in addition to engagement in other offenses within their co-accusal cliques, thus resulting in other allegations. In summary, it is unclear whether increased participation in co-offenses precludes a salary raise, or a lower salary precipitate increased participation in co-offenses.

Association with Awards

The relationship between DAM allegations and awards was also studied in the first and fourth checkpoints. Based on our SQL analytics in checkpoint one, officers with these allegations receive on average of one less honorable mention than those without. These findings aligned with those of our graph analytics in checkpoint four, which examined peak PageRank, a metric for co-accusal interconnectedness. We discovered that those officers with DAM allegations who were less decorated than average had a peak PageRank of 2.08, while those who were more decorated than average had a peak PageRank of 1.67. These findings are shown in **Figure 4**.

Figure 4. PageRank Stratified by Average Award Count

Less-Decorated Officer PageRanks:

id	officer_name	num_awards	pagerank
31464	Michael Ytsen	15	2.0803279453002217
17964	Michael Mc Carthy	13	1.910639575934099
27442	Scott Stehlik	11	1.8928392785739436
18359	John Mc Knight	13	1.804237365395038
12641	Charles Howard	13	1.7209128686438844
9713	Gary Gaski	1	1.6844792794109509
29668	Dean Vitulski	15	1.6721654236222592
23410	Raphael Ramos	15	1.667130229111527
7597	Patrick Durkin	19	1.6447051684758143
29056	Charles Turner	1	1.633025278576153
13270	Jason Jankowski	19	1.633025278576153
30313	George Weir	14	1.633025278576153
28580	Edward Tiedje	3	1.633025278576153
22751	Sterling Poindexter	1	1.633025278576153
19750	Edward Moses	14	1.633025278576153
30173	Andre Watkins	15	1.6247974685466495
24416	Michael Rodriguez	2	1.5031072788039452
24016	Michael Riordan	14	1.491715912617793
29207	Joseph Vaclavik	9	1.370930290385305
29848	Garvey Walker	3	1.3664850229610375

Most-Decorated Officer PageRanks:

id	officer_name	num_awards	pagerank
18958	Diane Michaels	38	1.6717113250776576
28878	Joseph Treacy	129	1.2591088504897885
31945	Melvin Ector	45	1.1892831327106976
29574	William Vick	31	1.1668348957616044
28275	Frederick Taylor	78	1.1596556038826997
32181	Paul Meagher	49	1.1363736734977217
25299	Daniel Sanchez	25	1.1340528178229516
32346	Mark Smith	59	1.1320279790416539
32091	Skip Katich	73	1.1137584535741631
24918	Gilbert Ruiz	136	1.1097057212006216
26150	Brian Sheehan	29	1.106981601850434
19867	Kevin Mulcahy	27	1.097669911316994
31191	Jimmy Woods	145	1.0968520402734792
29150	Akil Upchurch	73	1.09564863873333
22466	Martin Philbin	57	1.09564863873333
15695	Wilfredo Lapitan	87	1.09564863873333
22827	Karen Popp	24	1.0867861358664939
24457	Joseph Rodriguez	31	1.0827301933576976
16545	Enrique Lopez	41	1.0739931496085788
23153	Joshua Purkiss	100	1.0725457335887196

Based on these findings, it is possible that those officers who more often engage in co-offenses are not able to achieve the performance that would warrant an award. Like lower salary, a lower number of awards earned could be disenfranchising for officers, which could serve as a precipitant for co-substance abuse behavior, in addition to co-committal of other offenses resulting in allegations. Also, as the distribution of awards can be dictated by politics and/or how well-connected an officer is with the Department administration, or officer seniority, those officers associated with more co-accusal cliques may not interact with these figures as much, or they may not remain on the force long enough to have the opportunity to earn as many awards.

Geographic Distribution

The interactive map of Chicago that we developed for checkpoint three (http://observablehq.com/@41f225c25079d5fe/3-2-map) demonstrates an interesting but perhaps not entirely surprising geographic distribution of DAM allegations. The highest number of allegations is found in the Douglas neighborhood (146), where the overall crime rate is 120% higher than the national average[3], and the median household income is $39,234, which is significantly below the national average of $62,843[4]. The next highest number occurs in West Loop, which, while having a relatively high median household income of $122,685 and being named the #3 best neighborhood in Chicago to live[5], does have a crime rate that exceeds the national average[5]. The latter trends indicate that officers may be more inclined to abuse substances or be non-compliant with medical protocols, either as the result of heightened stress associated with overseeing a more crime-ridden neighborhood or due to increased accessibility of recreational drugs in these areas. The next highest number of allegations is in the United Center region (120), a venue where there are multiple sports events, shows and concerts, where officers must manage a vast population both on and off the premises. This finding again suggests how heightened stress from more a more demanding workload could

precipitate substance abuse among assigned officers. Perhaps it also supports the suggestion that increased accessibility to illicit substances may contribute to the prevalence of these allegations.

The latter theories are not supported by Englewood, however. Though this neighborhood's crime rate is notoriously high, and its economic status compromised, only 19 allegations have been reported. One possibility is that civilian underreporting may occur in certain crime-ridden neighborhoods, to avoid their own prosecution for similar acts and prevent a possible loss of access to these agents. Additionally, in some areas with compromised socioeconomic status, civilians may not have the resources to participate in the reporting process. While economic status of a neighborhood may play a role in DAM allegations, the ethnic demographic does not appear to be correlated. For instance, while Douglas has the highest frequency of allegations, Uptown also has a significant frequency. However, both neighborhoods are similarly diverse. This suggests there may not be a multicultural variation in reporting practices. Additionally, ethnic homogeneity vs. heterogeneity of a neighborhood may not have a relationship with accessibility to substances.

These findings have highly important implications for the CPD. In particular, the possible association between DAM allegations and crime rate/economic status of the neighborhood to which officers are assigned, suggests that officers may need to be rotated between neighborhood assignments more frequently, in order to reduce the burden imposed by heightened stress and more significant workload in these regions. The latter may also minimize substance accessibility. Additionally, awareness of these trends may stimulate the CPD to anticipate the propensity of officers assigned to these areas towards DAM violations. If not already in existence, perhaps counseling services and/or a monitoring initiative could be established, to prevent substance abuse and ensure adherence to medical protocols.

Natural Language Processing (NLP) Implementation

For checkpoint five, to facilitate public engagement with and accessibility to the CPDP, we developed a natural language processing question and answer algorithm, specifically pertaining to officers with a history of DAM allegations.

We asked the model the following questions for every single officer [X]:

1. What is the race of [X]?
2. What is the gender of [X]?
3. What is the birth year of [X]?
4. What is the allegation count of [X]?
5. What is the sustained count of [X]?
6. What is the current salary of [X]?

The accuracies of the algorithm's responses to each of these queries are presently as follows:

Gender	Race	Birth Year	Allegation Count	Sustained Count	Current Salary

86%	73.33%	68.89%	71.11%	68.89%	66.67%

Due to constraints in computational power with the model itself, we limited our analysis to officers with more than 2 DAM allegations, who have had at least 1 sustained allegation and have a numerical value listed for their current salary.

For the questions that were answered incorrectly, the model correctly identified the column for which to find the answer but provided an answer from an incorrect row (i.e., from a different officer). This could be occurring due to clashes when retrieving the same value, for example when two officers have the same birth year or race.

Going forward, an approach such as this would be markedly improved by enabling responses to more complicated questions, such as those that combine different rows and columns or require some form of computation, such as an average, with an acceptable degree of accuracy. This will likely be an incremental innovation.

Conclusions and Future Directions

Overall, DAM allegations among CPD officers are prevalent, carry multiple implications and warrant anticipatory monitoring and early intervention. Upon assessment of officer and civilian allegation patterns, there appear to be potential inconsistencies in how DAM allegations are substantiated, classified and documented, requiring a closer look by CPD leadership. Further, there may be an association between DAM allegations and feelings of disenfranchisement or stress emanating from lower salary, less recognition and geographic assignment, which may need to be further explored and addressed by the CPD.

In terms of future directions, there are multiple areas related to DAM allegations that could be of benefit to evaluate. To better ascertain officer mental health, it would be valuable to assess the relationship between DAM allegations and referral to the CPD's Traumatic Incident Stress Management Program (TIPS). To understand how intoxication is defined and perceived, it would be beneficial to better understand the demographics of the complainants, the data for which is currently available in the CPDP database. Finally, based on this research, it would be ideal for the CPD administration to evaluate their current interventions, and discuss what additional programming could help prevent substance abuse and medical policy violations and promote mental wellness among officers.

References

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