Exhibit A

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF ILLINOIS
EASTERN DIVISION

ERIC WILKINS, MAHARI BELL, ESSENCE JEFFERSON, JOSE MANUEL ALMANZA, JR., AND JACQUEZ BEASLEY,	)	
	)	Case No. 23-cv-04072
Plaintiffs,	)	
	)	Hon. Mary M. Rowland
v.	)	
CITY OF CHICAGO,	)	
Defendant.	)	

DECLARATION OF DEAN KNOX, Ph.D., IN SUPPORT OF PLAINTIFFS' MOTION FOR CLASS CERTIFICATION

I. INTRODUCTION, QUALIFICATIONS, EXPERIENCE, AND COMPENSATION

1. My name is Dean Knox, Ph.D., and I am an Assistant Professor at the Wharton School of the University of Pennsylvania. My primary academic appointment is in the Operations, Information and Decisions Department; I also hold a secondary appointment in the Department of Statistics and Data Science. Previously, I served as an Assistant Professor in the Princeton University Department of Politics. My work focuses on the development of statistical and computational methods and their application to social scientific questions. I am affiliated with the Wharton AI & Analytics Initiative and the Quattrone Center for the Fair Administration of Justice.

2. I am trained as a political scientist (Ph.D. in 2017, Massachusetts Institute of Technology) and engineer (B.S. in 2008, University of Illinois at Urbana-Champaign). I have published 20 articles in peer-reviewed journals, including premier general science journals (*Science*, *Proceedings of the National Academy of Sciences*, *Nature: Human Behavior*; statistics

journals (*Journal of the American Statistical Association*, *Journal of the Royal Statistical Society*, *Journal of Machine Learning Research*); and political science (*American Political Science Review*, *American Journal of Political Science*). My work has received national recognition including *Science* magazine's inaugural early career award for interdisciplinary research and an Andrew Carnegie fellowship for societal impact.

3. Statistical analysis of imperfect data is one of my core research focuses. As part of this agenda, I have developed methods for studying police administrative records. Together with Jonathan Mummolo at Princeton University, I co-lead the Research on Policing Reform and Accountability research group. Our team has authored a number of applied and methodological articles on analysis of imperfect data, including police records (Knox and Mummolo, 2020; Knox et al., 2020; Ba et al., 2020, 2023; Duarte et al., 2024; Knox and Mummolo, 2025). I am a co-owner of Knox & Mummolo, LLC, a firm which provides statistical consulting services relating to evaluations of police behavior.

4. I have provided expert testimony on behalf of the United States Department of Justice in Melendres and United States of America v. Penzone, CV-07-02523 (D. Ariz.) in 2021. I have not testified as an expert in any other matters within the previous four years.

5. I am being compensated at a rate of $600 per hour. I also receive compensation based on the work performed by subcontractors employed by Knox & Mummolo, LLC. My compensation is not contingent on the results of this analysis or on the outcome of this litigation.

6. A copy of my curriculum vitae is attached as Exhibit A.

II. BACKGROUND, SCOPE OF WORK, AND MATERIALS RELIED UPON

7. Plaintiffs allege that the City of Chicago ("Defendant") and the Chicago Police Department ("CPD") have subjected "Black and Latino drivers to high volumes of traffic stops, frisks, and searches, which violate their civil rights under state and federal law" (Wilkins v. City of Chicago, 2024). More specifically, Plaintiffs allege that "[s]ince 2016, CPD officers have

targeted Black and Latino drivers with extremely high volumes of traffic stops, frisks, and searches, not for the purpose of enforcing traffic laws but to investigate, harass, and intimidate community members (also called "pretextual" stops) on the basis of race and national origin (the "mass traffic stop program"). Plaintiffs allege that the mass traffic stop program has three components: (a) targeting neighborhoods where residents are mostly Black and Latino people for high volumes of traffic stops, along with resulting searches and pat-downs; (b) stopping Black and Latino drivers disproportionately in areas with mostly white residents, as well as subsequently searching and frisking them at disproportionate rates; and (c) implementing quotas or activity targets for traffic stops that result in a disproportionate number of stops, searches, and frisks of Black and Latino drivers in Chicago. Plaintiffs further allege that the harm caused by this program extends beyond the named plaintiffs in this case, affecting all Black and Latino drivers in Chicago who have been or will be subjected to the City of Chicago's mass traffic stop program.

8. I have been asked by counsel representing the Plaintiffs in this case to review data and provide expert opinions regarding traffic enforcement by the Chicago Police Department for the period 2015–2024. Specifically, I was asked to analyze:

a. the volume of traffic stops, searches, and other enforcement actions;

b. the geographic distribution of traffic stops;

c. the demographic composition of involved drivers; and

d. the rate at which contraband was discovered in searches and weapons were found in protective pat-downs associated with vehicle stops.

9. I have reviewed and considered the Plaintiffs' Amended Complaint [Dkt. 87] as well as the declaration of Chris Burbank and the declarations of Plaintiffs Eric Wilkins, Mahari Bell, José Manuel Almanza, Jr., Essence Jefferson and Jacquez Beasley in support of Plaintiffs' motion for class certification. To conduct my analysis, I relied on records provided by CPD to the Plaintiffs' counsel documenting traffic enforcement activity, publicly available data from the City of Chicago's online data portal, and U.S. Census Data. These data sets included:

e. Chicago's Office of Emergency Management Communications (OEMC) data: Bates numbers CITY0031619, CITY0031620, CITY0031626, and CITY00236119.

f. Illinois Department of Transportation (IDOT) vehicle data: Bates numbers CITY009481–9487 and CITY00236108, along with corresponding IDOT data dictionary, "2024 Traffic Stop DB File Format."

g. Chicago's Office of Inspector General (OIG) data on district staffing levels from https://igchicago.org/information-portal/data-dashboards/sworn-cpd-member-demographics-and-staffing/.

h. CPD data on enforcement actions arising from OEMC dispatches: Bates numbers CITY0031618, CITY0031630, CITY00236115.

i. CPD data on traffic collisions: Bates numbers CITY0031632, CITY0031633, CITY0031634, and CITY00236123.

j. CPD's Investigatory Stop Report (ISR) data: Bates numbers CITY0043173, CITY0031569, CITY0031571, CITY0031572, CITY0031573, CITY0031574, and CITY00236111, along with corresponding CPD ISR data dictionary from https://www.chicagopolice.org/statistics-data/isr-data/.

k. A shapefile of CPD districts from the Chicago Data Portal https://data.cityofchicago.org/Public-Safety/PoliceDistrictDec2012/24zt-jpfn/about_data, which was created on 13 February 2013 and last updated by the City of Chicago on 2 December 2024.

l. A shapefile of CPD beats from the Chicago Data Portal https://data.cityofchicago.org/Public-Safety/PoliceBeatDec2012/n9it-hstw/about_data, which was created on 13 February 2013 and last updated by the City of Chicago on 13 November 2024.

m. A shapefile of ZIP codes from the Chicago Data Portal https://data.cityofchicago.org/Facilities-Geographic-Boundaries/Boundaries-ZIP-Codes/unjd-c2ca/about_data, created on 26 September 2013 and

last updated by the City of Chicago on 28 April 2025.

n. Estimates of road user demographics in Chicago, based on Global Positioning System data, published in the peer-reviewed journal *Proceedings of the National Academy of Sciences* (Xu et al., 2024).

o. Census block-group level resident demographic data from the United States Census Bureau's American Community Survey (ACS) 5-year data covering 2018–2022.

10. I was assisted in this work by Dr. Jonathan Mummolo, Associate Professor of Politics and Public Affairs, Princeton University; and Dr. Jacob Kaplan, Professional Specialist, Princeton University.

III. SUMMARY OF OPINIONS

11. This section summarizes my conclusions, which are supported by the explanations and analysis presented in the discussion and tables/figures below. All conclusions are based on analysis of data for the period 2015–2024 except where otherwise stated, as some datasets lack coverage for certain years.

12. Throughout the analysis period, the number of traffic stops conducted by the Chicago Police Department ("CPD") has trended upward substantially. Although it appears that CPD officers underreport the number of stops they make by approximately 200,000 stops per year, compared to the number of traffic stops radioed to dispatch, both CPD's reported traffic stop data and alternative dispatch data indicate a general increase in traffic stops. Further, this increase in traffic stops followed a sharp decline in investigatory stops, consistent with Plaintiffs' theory that CPD replaced its stop-and-frisk strategy with a strategy of high volumes of traffic stops.

13. I conclude that CPD disproportionately stops Black and Latino drivers for moving violations, compared to white drivers engaged in comparably dangerous behavior. I further conclude that CPD disproportionately stops Black drivers for non-moving violations per vehicle-mile driven, and that substantial differences in driver behavior would be required to

explain these patterns with race-neutral enforcement. Due to data limitations, I am unable to assess disparities in stops of Latino drivers for non-moving violations.

14. I conclude that CPD makes significantly more traffic stops per officer in police districts where minority individuals make up a large share of local residents. In a separate analysis, I also show that individuals living in ZIP codes with high concentrations of Black or Latino residents are substantially more likely to be stopped by CPD, compared to residents of majority-white ZIP codes. This data is consistent with Plaintiffs' allegations and the conclusion of expert Chris Burbank that CPD's mass traffic stop program involves extremely high volumes of traffic stops in neighborhoods where the population is mostly Black or Latino people.

15. I conclude that CPD disproportionately stops Black drivers for licensing/registration and equipment violations, per vehicle-mile driven, in police districts with high concentrations of white residents. As noted above, large differences in driver behavior would be needed to explain these observed patterns with race-neutral enforcement. This is consistent with Plaintiffs' allegations that CPD's mass traffic stop program involves disproportionately stopping minority drivers in neighborhoods whom police consider "out of place" in majority-white neighborhoods.

16. I conclude that stops of Black and Latino drivers are disproportionately likely to involve a subsequent search, relative to stops of white drivers. This conclusion holds true both for consent searches and non-consent searches. Further, when CPD officers conduct a search following a stop of a Black or Latino driver, they are less likely to find contraband than in searches following stops of white drivers. This is consistent with officers employing a lower standard of suspicion when initiating searches of Black and Latino drivers and their passengers or vehicles.

17. I conclude that CPD is more likely to subject Black and Latino drivers and passengers to a protective pat down ("frisk"), compared to white individuals, but more likely to find contraband—and weapons specifically—when they frisk a white driver/passenger. This is consistent with officers employing a lower standard of suspicion when initiating frisks of Black

and Latino drivers.

18. I conclude that CPD's mass traffic stop program results in minimal arrests and citations, and the percentage of traffic stops resulting in either type of enforcement action has declined substantially between 2015–2024. This data is consistent with the Plaintiffs' allegations and expert Chris Burbank's conclusion that CPD's mass traffic stop program involves an intent to increase CPD's traffic stops but not citations.

19. I conclude that CPD's traffic stop program involves a majority of stops for alleged licensing/registration and equipment issues, and a minority and decreasing share of stops for alleged moving violations. This is consistent with Plaintiffs' theory that CPD's mass traffic stop program involves pretextual traffic stops for low-level violations.

IV. VOLUME AND TRENDS IN TRAFFIC STOPS AND SEARCHES

20. This section discusses the marked decrease in recorded CPD investigatory stops in 2016, followed by a general increase in traffic stops in Chicago over the subsequent years.

21. The Illinois Traffic and Pedestrian Stop Statistical Study Act, 625 ILCS 5/11-212 et seq., requires CPD to collect data regarding traffic stops and report it annually to the Illinois Department of Transportation ("IDOT"). According to data reported by CPD to IDOT, the annual number of traffic stops in Chicago grew by nearly 600% from 2015 until its peak in 2019, declined during 2020–2021 COVID-19 restrictions in Chicago, and re-peaked in 2023.[1] CPD reported approximately 534,000 traffic stops in 2023 and 293,000 stops in 2024, up from about 86,000 stops in 2015. The precise numbers of stops that CPD reported to IDOT in each year are given in Table 1 and Figure 1, along with additional unreported stops based on dispatch data from the Chicago Office of Emergency Management and Communication ("OEMC"), discussed below.

22. Records maintained by OEMC dispatchers, which track CPD officers' involvement in traffic stops and other events to monitor their location and availability, describe

[1]No stop identifiers were given in Defendant's production of vehicle stop data reported to IDOT; for analysis purposes, I assume the provided data has already been deduplicated.

over two million traffic stops that do not appear in the information that CPD reported to IDOT. Conservative estimates indicate that in most years over the past decade, CPD made over 200,000 stops per year that it did not report to IDOT.[2] When accounting for these additional unreported events, the number of traffic stops has fluctuated from a low of about 330,000 traffic stops in 2016 to a high of about 894,000 traffic stops in 2019. Traffic stops have generally increased over time, re-peaking at about 736,000 in 2023 and reaching about 506,000 in 2024.[3] In 2024, these unreported events represented at least 42% of traffic stops that CPD conducted.

Table 1: Numbers of CPD traffic stops reported to IDOT and logged by OEMC dispatchers, 2015–2024. The difference between the OEMC and IDOT series is given in "Min. Unreported" represents a conservative estimate of the number of stops in each year that went unreported by CPD. "Min. Unreported %" describes the estimated percentage of traffic stops logged by OEMC dispatchers that were not reported to IDOT.

Year	IDOT	OEMC	Min. Unreported	Min. Unreported %
2015	85,835	390,192	304,357	78.0
2016	187,041	329,878	142,837	43.3
2017	284,924	501,738	216,814	43.2
2018	489,257	718,985	229,728	32.0
2019	598,165	894,495	296,330	33.1
2020	327,104	494,822	167,718	33.9
2021	377,721	520,545	142,824	27.4
2022	511,482	664,089	152,607	23.0
2023	534,384	735,826	201,442	27.4
2024	292,987	505,995	213,008	42.1

23. To arrive at this conclusion, I examined OEMC data to identify events that were initiated for "traffic stop" purposes. I probed the robustness of this conclusion in several ways.[4]

[2]The estimated number of unreported stops is conservative because there may exist additional traffic stops that appear in neither IDOT nor OEMC data.

[3]This increase in traffic stops is evident when examining linear trends and when comparing the 2015–2019 five-year period to 2020–2024 (despite COVID-19 restrictions during the latter period).

[4]My primary analysis relies on several assumptions, because data supplied by Defendant were noticeably incomplete (missing rows and columns, lack of a schema or "data dictionary" to define column names and value meanings, undocumented filtering) and multiple requests for clarification/supplementation failed to yield the requested information. These assumptions and corresponding robustness checks are as follows. (a) I counted stops in OEMC dispatch data by taking the number of unique event IDs, as no information to identify groups of related calls was supplied. The large numbers of apparently unreported traffic stops are unlikely to be driven by clusters of related OEMC events, because only 7.3% of OEMC events occur within 0.1 miles and 10 minutes of another OEMC event in the supplied data. (b) Results are generated after subsetting to calls with the initial type (column "INITTYPE") code

To briefly summarize, these unreported traffic stops (a) do not appear to be driven by clusters of duplicate OEMC events for the same underlying traffic stop, (b) do not appear to be driven by differences in initial versus final categorization of OEMC events, and (c) do not appear to be driven by a different type of enforcement action that might be subject to different reporting requirements (such as a CPD response to a call for service). In addition, my findings are consistent with CPD's admission that it failed to report 211,000 traffic stops to IDOT in 2024, with less than a 1% discrepancy that may be attributed to differences in data preprocessing described in Footnote 4 (Heather Cherone, "211K Traffic Stops Were Not Documented by Chicago Police Officers in 2024," WTTW, 25 March 2025).

24. In summary, although CPD substantially under-reports its traffic stops, CPD has conducted hundreds of thousands of traffic stops every year in the period 2015–2024. According to OEMC data, CPD has conducted roughly half a million or more traffic stops in each year 2016–2024.

25. In contrast, all types of investigatory stops reported by CPD have markedly declined after 2015.[5] Notably, the proportion of investigatory stops involving a pedestrian declined, while the proportion involving a vehicle increased significantly over time. In each year 2021–2024, CPD completed more investigatory stops involving vehicles than not involving vehicles. The precise numbers of investigatory stops reported in each year are given in Table 2, both in the aggregate and when separately breaking out vehicular and non-vehicular investigatory stops.[6] Figure 1 compares

of "TS," which appears to correspond to the "TRAFFIC STOP (OV)" type description. This is because I regard the initial call type as a more accurate reason for the stop than the final call type: simply because a non-traffic event occurs later in a stop does not change whether it was initiated for traffic enforcement purposes. Conclusions based on the final call type categorization are highly comparable, as the initial and final categorizations are identical in 99.0% of events in the supplied data. (c) OEMC dispatch records of traffic-stop events are assumed to represent officer-initiated traffic stops, rather than community calls for service for traffic-related issues. To support this, my analyses subset to the 99.95% of calls where the onsite timestamp ("ONSDT" column) is not missing, ensuring that according to OEMC data an officer was physically present. In this subset, over 99.99% of events have an onsite officer by the time the event was recorded in OEMC systems, suggesting that the unreported stops identified in OEMC records are in fact officer-initiated traffic stops.

[5]In ISR data supplied by Defendant, I identify the number of stops by deduplicating the supplied data based on unique contact card identification number assigned to each stop.

[6]Note that ISR data does not consistently indicate whether an incident arose from a vehicular stop; while some ISR datasets contain an indicator for this, the field was left empty in 99.6% of ISR records. To address this issue, I identified vehicular stops in ISR data by supplementing with information drawn from other fields, e.g. by additionally

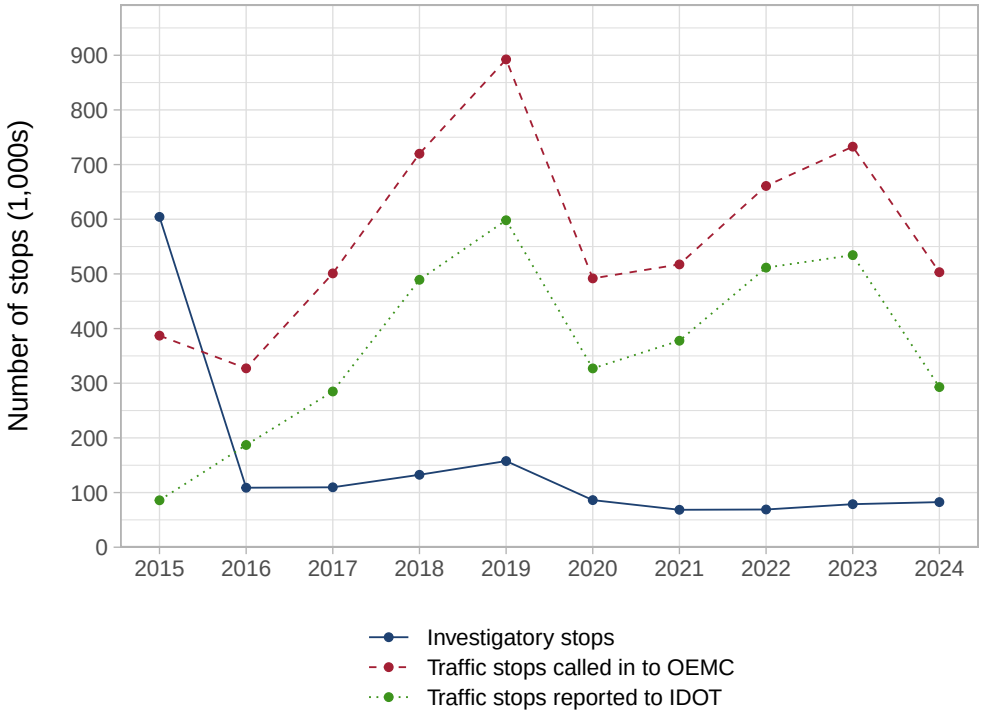
the numbers of investigatory stops and traffic stops (both reported to IDOT and based on OMEC dispatch records) over time.

Table 2: Number of ISRs, by year and vehicle involvement.

Year	All Investigatory Stops	No Vehicle	Vehicle
2015	604,304	409,985	194,319
2016	108,826	78,009	30,817
2017	109,616	75,734	33,882
2018	132,506	85,581	46,925
2019	157,631	94,557	63,074
2020	86,202	43,636	42,566
2021	68,464	28,280	40,184
2022	69,022	27,751	41,271
2023	78,727	34,015	44,712
2024	82,680	40,363	42,317

categorizing investigatory stops in which make, model, color, or other vehicle descriptions were provided as "vehicular investigatory stops."

Figure 1: Numbers of investigatory stops (solid blue) compared to traffic stops reported to IDOT (dotted green) and logged by OEMC dispatchers (dashed red), by year. Investigatory stops fell sharply in 2016, while traffic stops increased in the following years.



26. I conclude that the data shown in Tables 1–2 and Figure 1 above are consistent with Plaintiffs' claims that, in and around late 2015 and early 2016, CPD substituted a strategy of mass traffic stops for its previous strategy of high volumes of investigatory stops (sometimes called "stop and frisk").

V. DISPROPORTIONATE IMPACT OF TRAFFIC STOPS ON MINORITY DRIVERS AND COMMUNITIES

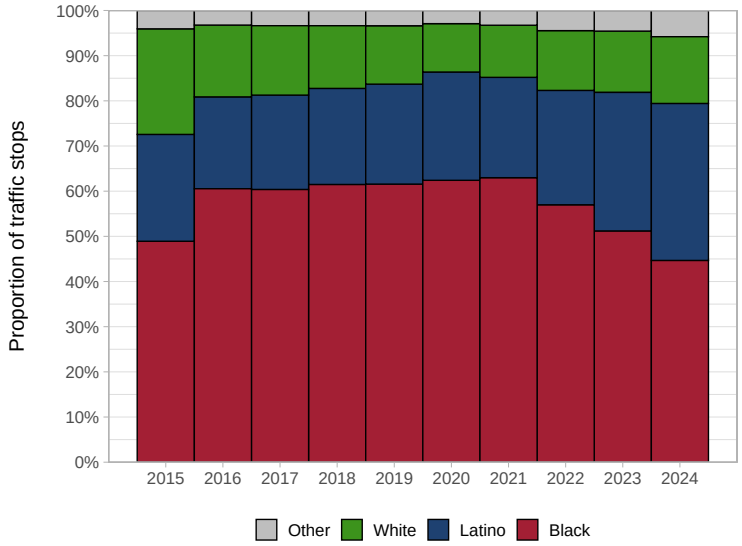
27. In this section, I show that CPD's traffic stops appear to disproportionately affect Black and Latino drivers citywide. They also disproportionately affect police districts where most residents are Black and Latino and ZIP Codes with the most Black and Latino residents.

28. According to data on officers' subjective perceptions of driver race, reported by CPD to IDOT for the years 2015–2024, 57.9% of CPD traffic stops involved Black drivers, 24.7% involved Latino drivers, and 13.6% involved white drivers. The remaining 3.8% belonged to other demographic groups.[7]

29. Proportions have fluctuated over time, but the proportion of white stops has generally declined. The changing racial composition of stops is illustrated in Figure 2. Compared to 2015, when 23.4% of traffic stops involved white drivers, every subsequent year in 2016–2024 had a lower proportion of white-driver traffic stops. On average, 13.3% of traffic stops in the post-2015 period were of white drivers. When comparing the five year period covering 2015–2019, 14.5% of traffic stops involved white drivers; in the 2020–2024 period, this proportion declined to 12.8%.

[7] Results exclude 422 stops (0.01% of those reported to IDOT) in which officers left this field empty.

Figure 2: Racial composition of traffic stops reported to IDOT, by year.



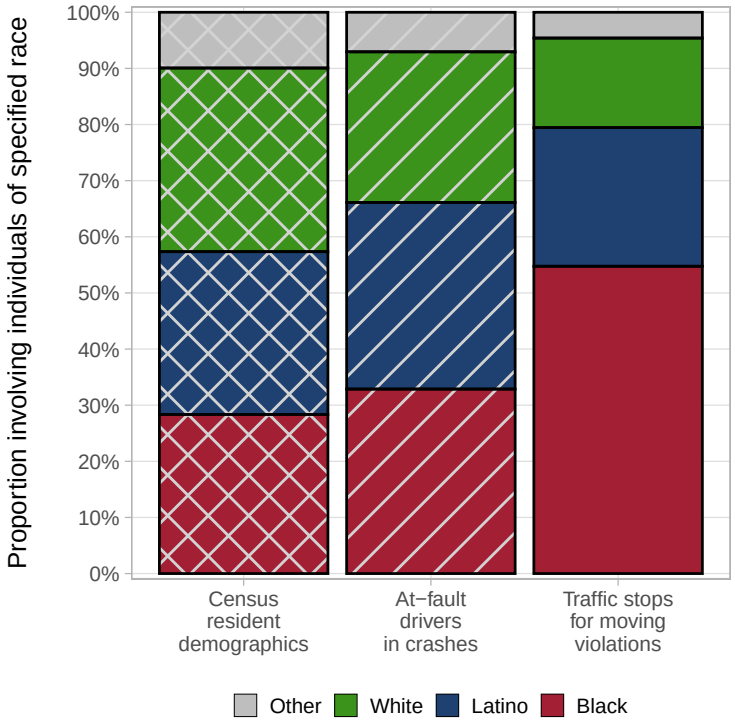
30. To assess whether Black and Latino drivers are disproportionately stopped by CPD for moving violations, compared to drivers who are likely committing moving violations, I created a benchmark of Black and Latino drivers deemed to be at-fault in crashes in Chicago. Over the 2015–2024 period, estimates based on the surnames of at-fault drivers in collisions suggest that Black and Latino drivers represent a combined 66.2% of drivers deemed to be at-fault.[8] To the extent that CPD traffic enforcement is intended to improve roadway safety, this represents a reasonable benchmark that closely proxies the group of drivers committing dangerous moving violations.

31. Compared to this benchmark, CPD appears to disproportionately stop Black and Latino drivers for moving violations: according to data reported to IDOT,[9] these groups

[8]This analysis is based on drivers of vehicles described as "unit 1" in the collision, a descriptor which IDOT documentation indicates should be applied for "Known or perceived vehicles at-fault" (Illinois Department of Transportation, Division of Traffic Safety, 2019). Incidents for which the primary cause was one of the following are excluded, as they may not correspond to dangerous driving behavior that would justify a moving-violation traffic stop: "evasive action due to animal, object, non-motorist;" "road construction/maintenance;" "road engineering/surface/marking defects;" "vision obscured (signs, tree limbs, buildings, etc);" and "weather." I exclude collisions in which the surname field contains values such as "unknown," "parked," "hit and run," and "99." Race estimates for the driver surnames that meet these criteria are computed using Census surname tables through software described in McCartan et al. (2025).

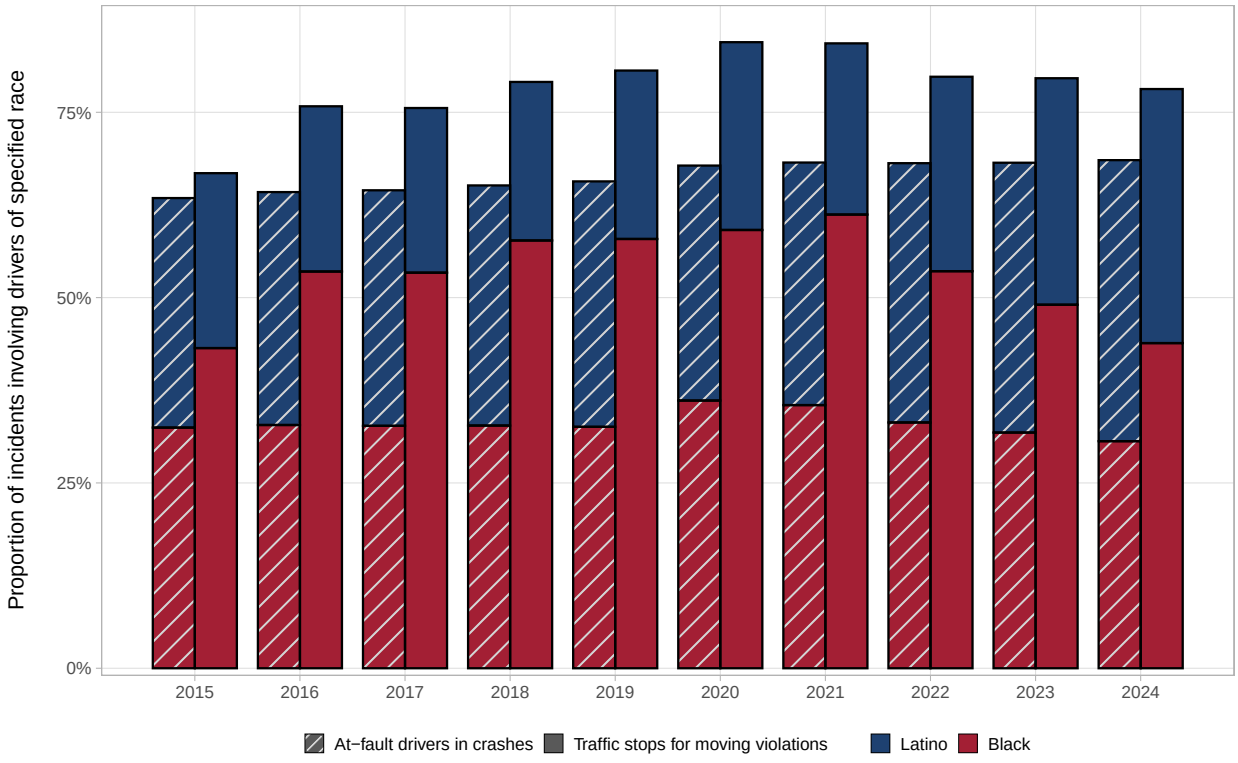
[9]While OEMC dispatch records more accurately represent CPD traffic stops, these records do not indicate the race of stopped drivers and therefore cannot be used for this analysis.

Figure 3: Demographic composition of CPD moving-violation traffic stops (pooled over 2015–2024) compared to two benchmarks: surname-based estimates for at-fault drivers in traffic collisions (2015–2024) and Census ACS estimates for residents within CPD's jurisdiction (2018–2022). Black and Latino drivers are collectively overrepresented in CPD moving-violation traffic stops, compared to both benchmarks.



collectively represent 79.4% of drivers subjected to traffic stops for moving violations. Figure 3 presents the comparisons between at-fault crashes and moving-violation traffic stops in the past decade visually for Black, Latino, and white drivers; as an additional point of reference, it also depicts the demographic composition of residents within CPD's jurisdiction based on Census ACS five-year estimates based on 2018–2022 data. Figure 4 examines these disparities on a year-by-year basis for Black and Latino drivers, showing that these groups have been collectively overrepresented in CPD moving-violation traffic stops in every year where data is available.

Figure 4: Share of Black and Latino drivers in CPD moving-violation stops compared to at-fault drivers in traffic collisions, by year. Black and Latino drivers are collectively overrepresented in CPD moving-violation stops in every year for which data is available.



32. I note two important limitations of these comparisons. First, they compare officer perceptions of race to surname-based estimates of race. And second, surname-based estimates of race do not incorporate additional information on driver home address, which can be used in conjunction with Census data on neighborhood racial composition to refine estimates of driver race via Bayesian improved surname geocoding method (BISG, Elliott et al., 2008; Imai et al., 2022). Additional data was requested to improve these comparisons, but Defendant did not supply the requested information. The requested data include (a) surnames and home addresses of drivers subjected to traffic stops, which IDOT requires CPD to collect and would permit surname-based estimates for traffic stops as well; (b) home addresses of drivers involved in collisions, which is collected as part of the SR1050 Illinois Traffic Crash Report and would permit the BISG analysis described above.

33. Notwithstanding these data limitations, my best estimates based on the available data indicate that CPD disproportionately stops Black and Latino drivers for moving violations: Black and Latino drivers collectively represent 79.4% of drivers stopped in Chicago for alleged moving violations while being responsible for about 66.2% of crashes. I estimate that Black and Latino drivers are twice as likely to be stopped by CPD, compared to white drivers committing similarly dangerous moving violations.

34. Next, I examined whether minority drivers are stopped disproportionately for non-moving violations, as documented in data reported by CPD to IDOT, relative to their presence on the road. To do so, I utilized a peer-reviewed benchmark for the general driving population that uses Global Positioning System (GPS) data to estimate vehicle-miles traveled by drivers of various racial groups on road segments in Chicago. One limitation of this benchmark dataset is that it does not distinguish between "Hispanic white" individuals and "non-Hispanic white" individuals, making direct comparisons for these groups infeasible. According to data from Xu et al. (2024), Black drivers are estimated to be responsible for 26.4% of vehicle-miles driven citywide.

35. Over the same period, 58.5% of CPD equipment stops were reportedly of Black drivers. This implies that Black drivers are subject to 2.9 times more equipment stops per vehicle-

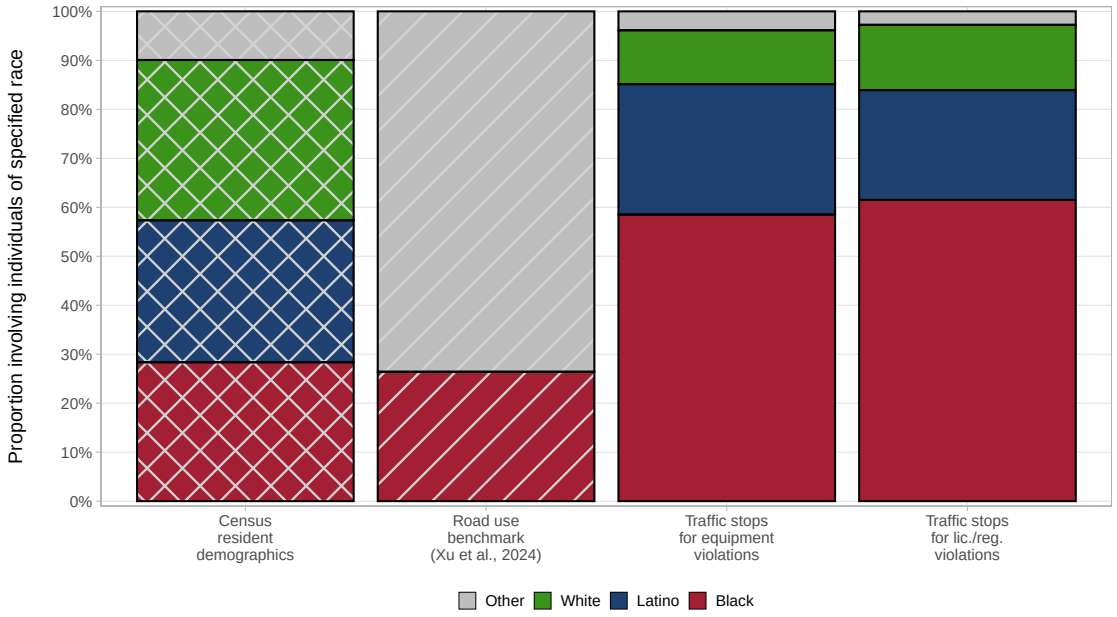
mile driven, compared to non-Black drivers. In other words, when comparing Black individuals to a representative group of non-Black individuals (including white, Latino, and other individuals) with the same road use, I estimate that Black drivers will be subjected to nearly three times more equipment stops than non-Black drivers.

36. It is important to note that unlike the at-fault collision benchmark, which is a direct proxy of drivers who commit dangerous moving violations, no high-quality benchmark is available for the group of drivers committing equipment offenses. As a result, the overrepresentation estimated above does not definitively prove bias in CPD enforcement; however, Black drivers would need to commit equipment violations at a rate that was 2.9 times higher than non-Black drivers in order for these estimated patterns to be consistent with race-neutral enforcement. Furthermore, as discussed above, the data of Xu et al. (2024) does not distinguish between Latino and white drivers. This benchmark is therefore only used to compare CPD equipment stops per vehicle mile driven between Black drivers and non-Black drivers; I do not directly compare Black to white drivers. However, if CPD also disproportionately stops Latino drivers for equipment violations, then this estimated disparity (2.9) would be an underestimate of the Black-to-white disparity. This is because both groups in the current comparison would have an inflated number of stops: Black drivers would be stopped at excessive rates, but they would be compared to a non-Black group that includes Latino drivers who would also be stopped at excessive rates. Therefore, in this scenario, if Black and white drivers could be compared directly, the equipment stops of Black drivers would be more than 2.9 times higher than for white drivers.[10]

37. Black drivers represented 61.5% of individuals subjected to stops for license/registration offenses. Per vehicle-mile driven, Black drivers are estimated to be subject to 3.5 times more license/registration stops, compared to non-Black drivers. These results are

[10]This holds regardless of whether drivers of other racial groups, such as Asian drivers, are subject to equipment stops at rates that are equal to or greater than white drivers per vehicle-mile driven. However, if drivers of other racial groups are stopped at lower rates, then the 3.9 figure may either over- or underestimate the Black-to-white ratio of enforcement stops per vehicle-mile driven.

Figure 5: Demographic composition of two types of CPD non-moving traffic stops (for equipment and license/registration offenses, both pooled over 2015–2024) compared to two benchmarks: road usage estimates for the Chicago general driving population (Xu et al., 2024) and Census ACS estimates for residents within CPD's jurisdiction (2018–2022). For the Xu et al. (2024) benchmark, "Other" covers all non-Black drivers, as this data does not distinguish between white and Latino individuals. Black drivers are overrepresented in CPD nonmoving-violation traffic stops, compared to both benchmarks.

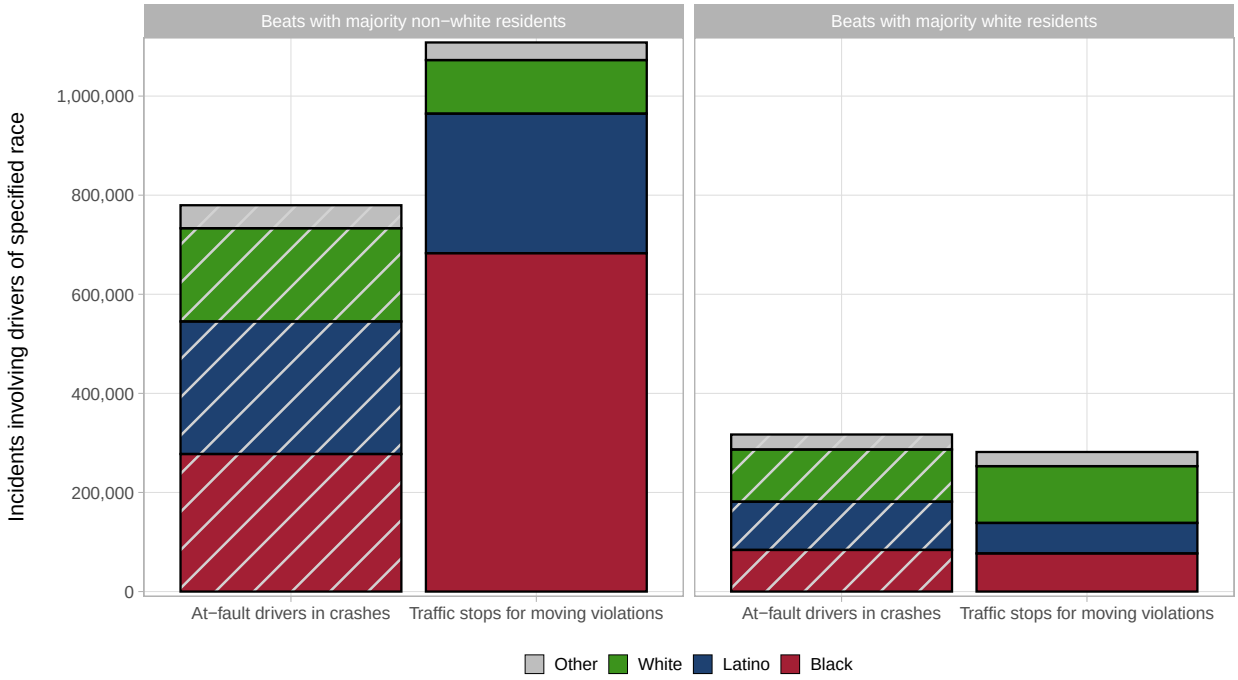


subject to similar notes and caveats: (a) the estimates could be consistent with race-neutral enforcement by CPD if Black drivers committed license/registration offenses at rates that were 3.5 times higher than non-Black drivers, and (b) the estimated disparity, which compares license/registration stops of Black and non-Black drivers, would be an underestimate of the Black-to-white comparison under the same conditions described above.

38. One contributing factor behind the disproportionately high numbers of traffic stops involving Black and Latino drivers appears to be the intensity of traffic enforcement in police districts and beats where a majority of residents are non-white.[11] Over the past decade, CPD has reported 1.1 million moving-violation traffic stops in majority non-white beats,[12] 1.4 moving-violation traffic stops per traffic collision. In contrast, in majority white beats, CPD has reported

[11] Beat demographics are estimated by areal interpolation from Census ACS block-group demographics.
[12] For consistency with prior results in this section, I utilize IDOT data here.

Figure 6: Traffic collisions and moving-violation traffic stops in majority non-white beats (left panel) and majority white beats (right panel). The underlying data is identical to Figure 3; the present figure differs in that it (a) depicts results separately for majority white and non-white beats and (b) does not rescale bars to have equal height.



fewer than 282,000 moving-violation traffic stops, less than 0.9 stops per collision. Assuming that traffic collisions occur proportionately to dangerous moving violations, I estimate that the moving-violation enforcement intensity—defined as the proportion of times that a person is subjected to a traffic stop, out of all times that a violation is committed—is 60% higher in majority non-white beats, compared to majority white beats. Figure 6 compares the number of moving-violation traffic stops to crashes, along with the estimated demographics of at-fault drivers for reference.[13]

39. The focus placed on traffic stops varies greatly by CPD districts. Officers in CPD districts with a lower share of white residents tend to make higher traffic stops. For example, Districts 7 (Englewood) and 6 (Gresham) had the lowest share of white residents, both at 1.2%; CPD made an average of 120.9 and 101.4 traffic stops per officer-year in these districts,

[13]My conclusions holds regardless of whether crashes with no presumptive at-fault "unit 1" or debatable causes (e.g. "evasive action") are excluded.

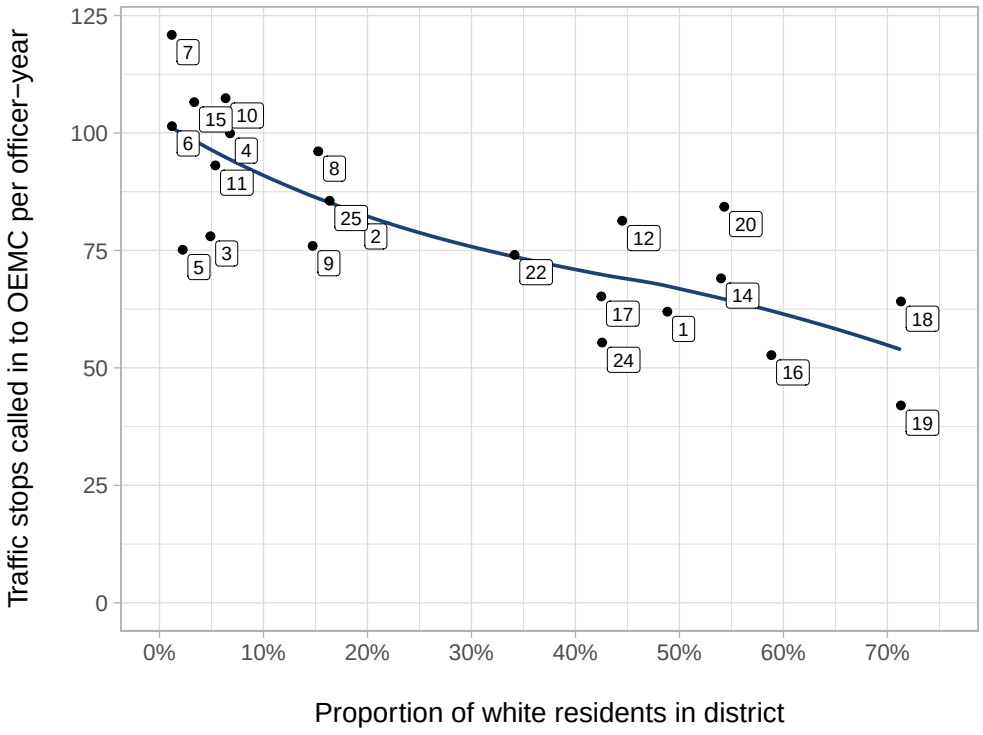
respectively, in the years for which staffing data is available. In contract, the districts with the highest share of white residents—Districts 19 (Town Hall) and 18 (Near North), both at 71.3%—made 42.0 and 64.2 traffic stops per officer-year. To draw this conclusion, I compared OEMC traffic-stop dispatch records to Census demographic data and Chicago's Office of Inspector General (OIG) data on staffing levels describing the number of sworn officers assigned to each district in January of each year in 2018–2024.[14] Complete results are given in Table 3 and illustrated in Figure 7.

Table 3: Traffic stops reported to OEMC dispatchers per officer-year, by district. Districts are sorted by their proportions of white residents.

District	Name	Stops per Officer-Year	White Residents (%)
7	Englewood	120.9	1.2%
6	Gresham	101.4	1.2%
5	Calumet	75.1	2.2%
15	Austin	106.6	3.3%
3	Grand Crossing	78.0	4.9%
11	Harrison	93.1	5.4%
10	Ogden	107.4	6.4%
4	South Chicago	99.9	6.8%
9	Deering	76.0	14.7%
8	Chicago Lawn	96.1	15.3%
25	Grand Central	85.6	16.4%
2	Wentworth	81.7	19.2%
22	Morgan Park	74.1	34.1%
17	Albany Park	65.2	42.5%
24	Rogers Park	55.4	42.6%
12	Near West	81.3	44.5%
1	Central	62.0	48.8%
14	Shakespeare	69.1	54.0%
20	Lincoln	84.3	54.3%
16	Jefferson Park	52.7	58.8%
19	Town Hall	42.0	71.3%
18	Near North	64.2	71.3%

[14] Staffing levels were not available for January 2017 and earlier.

Figure 7: Traffic stops reported to OEMC dispatchers per officer-year, by district. Officers in districts with lower proportions of white residents generally make more traffic stops.



40. Consistent with the above, individuals who reside in neighborhoods with higher proportions of Black and Latino people are far more likely to be subjected to CPD traffic stops than those who reside in areas with larger white populations. (In this analysis, I examine individuals who live in minority and white neighborhoods, then calculate how often people from each group are stopped anywhere in Chicago. In contrast, the previous analyses examined stops that took place in minority and white neighborhoods, regardless of where the stopped individuals lived.) Figure 8 maps the annualized per-capita traffic stop rates for each ZIP code; Figure 9 presents the same data in scatterplot form along with an estimated trend line. For example, in Streeterville (ZIP code 60611, an area with the lowest concentration of Black and Latino individuals, representing less than 10% of local residents), CPD reported 19 traffic stops per year per 1,000 residents. In contrast:

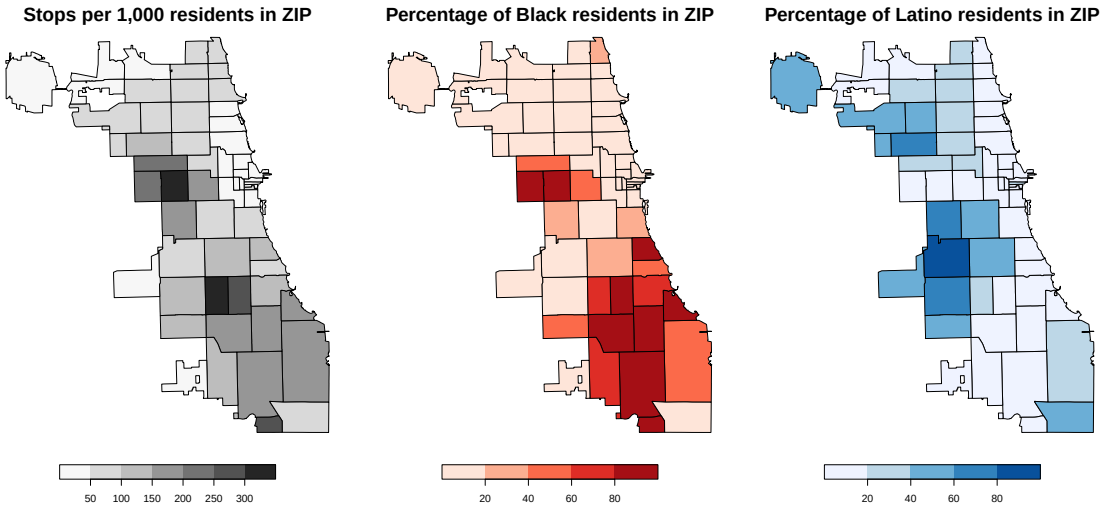
a. In Auburn Gresham (ZIP code 60620), where I understand that Plaintiff Mahari Bell resides today (Bell Decl. ¶ 2), Black and Latino individuals make up 96% of the population and officers reported 193 traffic stops per year per 1,000 residents. This is a per-capita rate of traffic stops 9.0 times higher than in Streeterville.

b. In Roseland (ZIP code 60628), where I understand that Plaintiff Eric Wilkins resides and has been subjected to four traffic stops since 2022 (Wilkins Decl. ¶¶ 2, 10, 13, 18, 21), and where Plaintiff Mahari Bell was stopped this year (Bell Decl. ¶46), Black and Latino individuals make up 96% of the population and officers reported 178 traffic stops per year per 1,000 residents. This is a per-capita rate of traffic stops 8.3 times higher than in Streeterville.

c. In Little Village (ZIP code 60623), where I understand that Plaintiff José Manuel Almanza Jr., resides and has been subjected to numerous traffic stops (Almanza Decl. ¶¶ 2, 11, 18, 28, 37), Black and Latino individuals make up 94% of the population and officers reported 188 traffic stops per year per 1,000 residents. This is a per-capita rate of traffic stops 8.8 times higher than in Streeterville.

d. In Austin (ZIP code 60644), where I understand that Plaintiff Jacquez

Figure 8: Per-capita rates of traffic stops, by driver home ZIP code. Estimates are annualized after pooling 2015–2024 traffic-stop data reported to IDOT. For border ZIP codes that cover both Chicago and a suburban city, estimates utilize only Chicago residents within the ZIP code. See Figure 9 for an alternative representation.

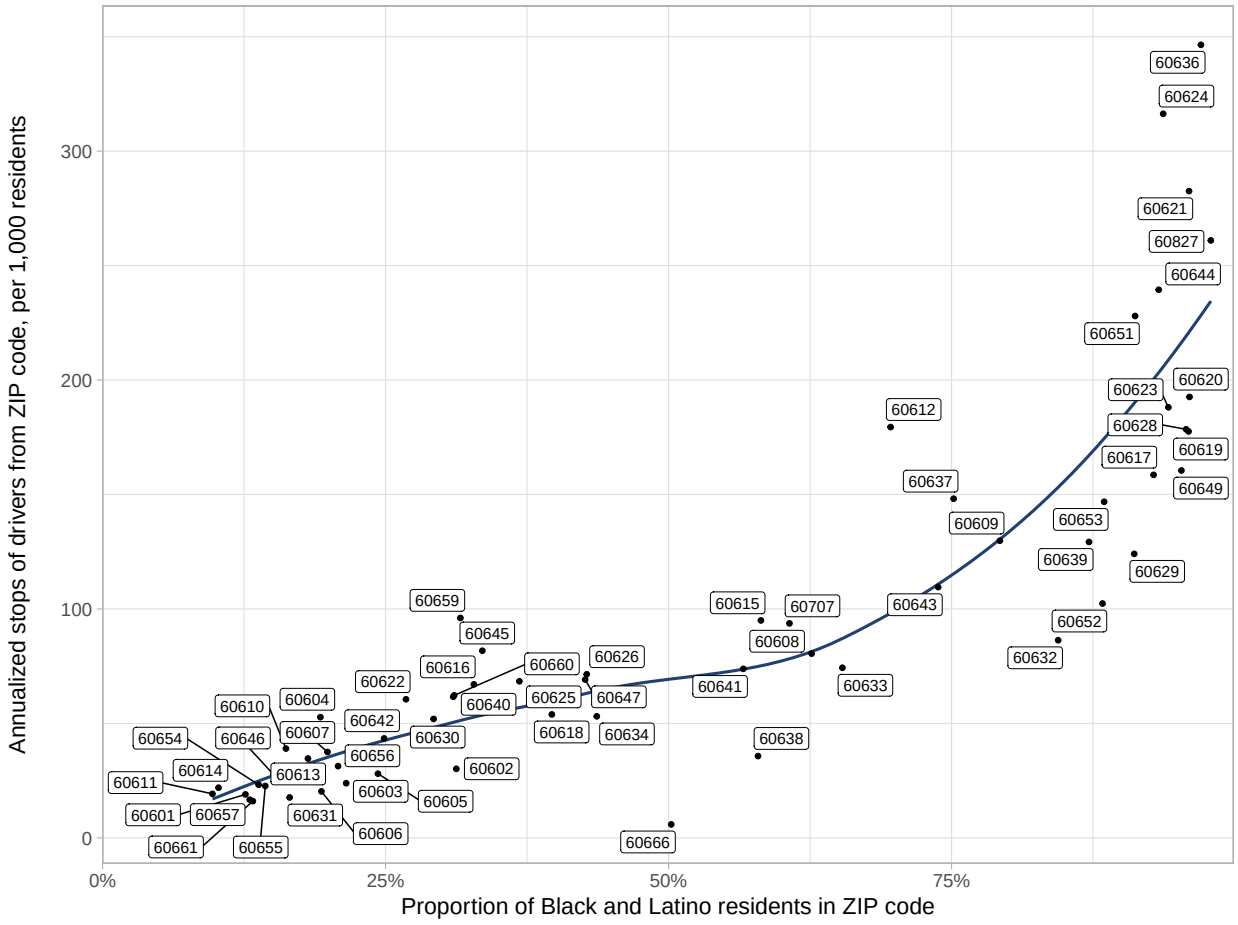


Beasley resided when this matter was filed and has been subjected to at least five traffic stops (Beasley Decl. ¶¶ 3, 6, 33, 36, 44, 49), Black and Latino individuals make up 93% of the population and officers reported 239 traffic stops per year per 1,000 residents. This is a per-capita rate of traffic stops 11.4 times higher than in Streeterville.

e. In Grand Boulevard (ZIP code 60653), where I understand that Plaintiff Essence Jefferson resides and has been pulled over by CPD (Jefferson Decl. ¶¶ 2, 14), Black and Latino individuals make up 88% of the population and officers reported 147 traffic stops per year per 1,000 residents. This is a per-capita rate of traffic stops 6.6 times higher than in Streeterville.

f. In South Shore (ZIP code 60615), where I understand that Plaintiff Mahari Bell resided when this lawsuit was filed (Bell Decl. ¶ 2), Black and Latino individuals make up 58% of the population and officers reported 95 traffic stops per year per 1,000 residents. This is a per-capita rate of traffic stops 3.9 times higher than in Streeterville.

Figure 9: Per-capita rates of traffic stops, by driver home ZIP code. Estimates are annualized after pooling 2015–2024 traffic-stop data reported to IDOT. Trend line calculated by locally estimated scatterplot smoothing. See Figure 8 for an alternative representation.



VI. DISPROPORTIONATE NON-MOVING TRAFFIC STOPS IN POLICE DISTRICTS WITH HIGH PROPORTIONS OF WHITE RESIDENTS

41. This section examines CPD's decisions to conduct traffic stops for non-moving violations in police districts with the highest proportions of white residents. Based on expert Chris Burbank's assessment that CPD's pretextual stops—including of named Plaintiffs—primarily involve equipment and license/registration violations (Burbank Decl. ¶¶ 17, 62), this analysis focuses on these stop reasons. I conclude that CPD disproportionately subjects Black individuals to non-moving stops, relative to the presence of Black drivers on the road in these police districts. (Moving violations in majority white and non-white neighborhoods are examined separately in ¶ 38.)

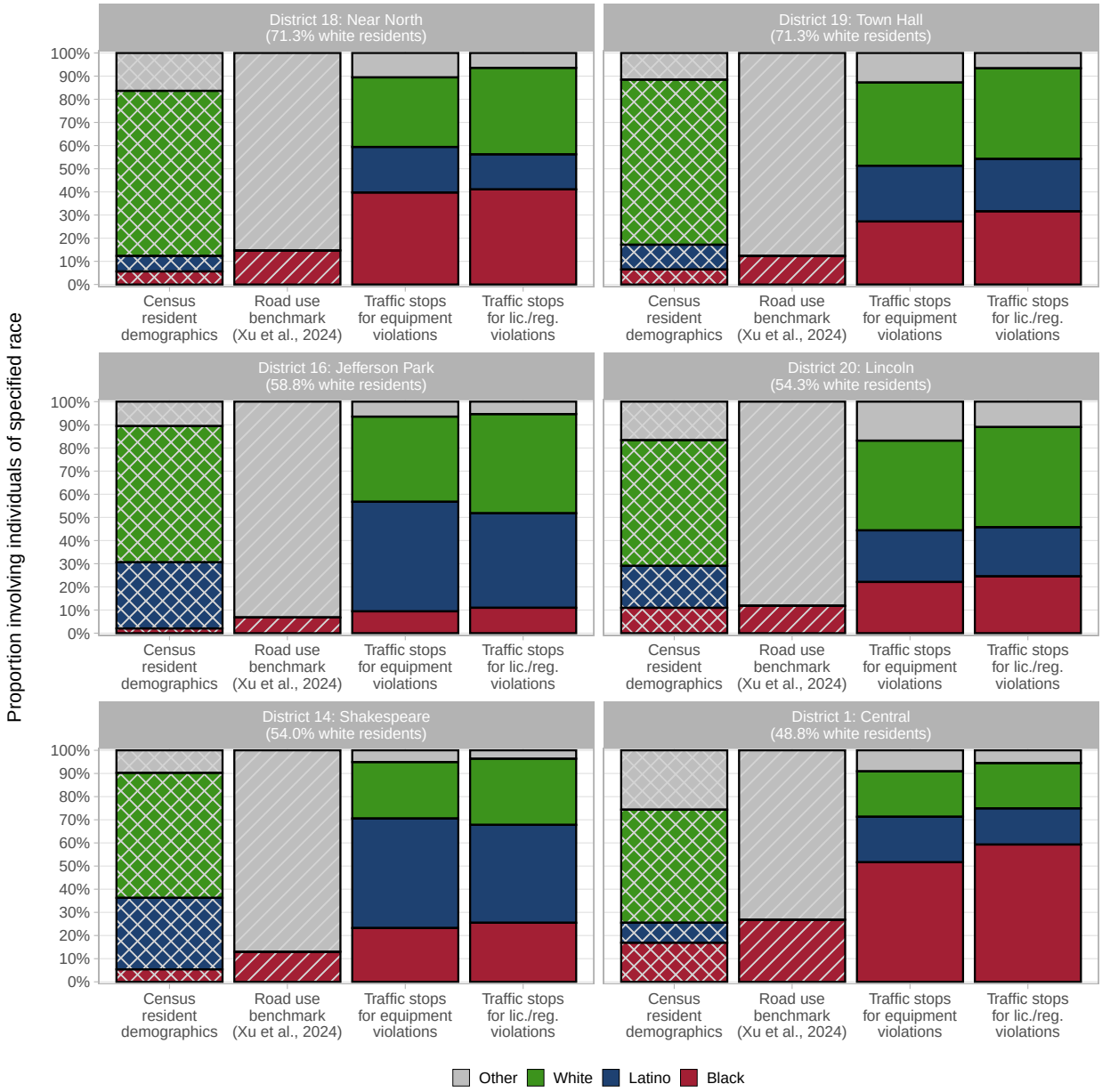
42. To do so, I repeat the analysis described in ¶¶ 34–37 within the six CPD districts with the highest concentration of white residents. The methodology behind this analysis is described in more depth above; at a high level, it compares CPD's reported non-moving traffic stops of Black drivers to the estimated number of vehicle-miles driven by Black individuals, based on peer-reviewed GPS-based data from Xu et al. (2024).

43. In CPD's District 1 (Central), where named Plaintiff Mahari Bell was stopped twice for alleged license/registration offenses (Bell Decl. ¶¶ 34–35, 38–39), I find that Black drivers are responsible for an estimated 26.8% of road usage but are reportedly involved in 59.3% of CPD license/registration stops. In this district, I estimate that Black drivers are disproportionately stopped for license/registration offenses at a rate that is 3.0 times higher than a representative group of non-Black individuals driving the same number of vehicle-miles. Put differently, Black drivers would need to commit license/registration offenses at a rate that is 3.0 times higher than non-Black drivers in order to explain the observed patterns with race-neutral enforcement. When considering equipment stops in District 1, Black drivers are involved in 51.6% of CPD stops (again compared to 26.8% of road usage). I estimate that in District 1, Black drivers are stopped for equipment issues at a rate that is 1.9 times higher than non-Black drivers.

44. In CPD's District 18 (Near North), where named Plaintiffs Mahari Bell and Jacquez Beasley were stopped for equipment violations (Bell Decl. ¶¶ 28–29, (Beasley Decl. ¶¶ 64–65)), Black drivers are responsible for an estimated 14.7% of road usage but reportedly involved in 39.7% of CPD equipment stops. In the Near North, Black drivers are disproportionately stopped for equipment offenses at a rate that I estimate to be 2.8 times higher than non-Black individuals with comparable road usage—meaning that Black drivers would need to commit equipment offenses at a rate that is 2.8 times higher than non-Black drivers in order to explain these CPD stops with race-neutral enforcement. When considering stops for license/registration issues in District 18, Black drivers are reportedly involved in 41.1% of CPD stops (again compared to 14.7% of road usage); based on these figures, I estimate that in District 18, Black drivers are stopped for license/registration issues at a rate that is 3.0 times higher than non-Black drivers per vehicle-mile driven.

45. Figure 10 presents district-by-district results for the six CPD districts with the highest concentration of white residents, comparing the demographics subjected to CPD non-moving enforcement to the demographics of estimated road users and local residents. In every district and for every type of non-moving enforcement (stops for both equipment and license/registration), Black drivers are estimated to be subject to a disproportionately large number of stops per vehicle-mile driven.

Figure 10: Each panel examines one of the six CPD districts with the highest concentration of white residents. Vertical bars compare the demographic composition of two types of CPD non-moving traffic stops (for equipment and license/registration offenses, both pooled over 2015–2024) to two benchmarks: road usage estimates for the Chicago general driving population (Xu et al., 2024) and Census ACS estimates for residents within CPD's jurisdiction (2018–2022). For the Xu et al. (2024) benchmark, "Other" covers all non-Black drivers, as this data does not distinguish between white and Latino individuals. Black drivers are overrepresented in CPD nonmoving-violation traffic stops, compared to both benchmarks.



VII. DISPROPORTIONATE IMPACT OF SUBSEQUENT SEARCHES AND PAT-DOWNS ON MINORITY DRIVERS AND COMMUNITIES

46. This section discusses CPD's decisions to conduct protective pat-downs ("frisks") of drivers and to search vehicle occupants and their cars; I conclude, for the reasons described further below, that CPD disproportionately subjects Black and Latino people to these enforcement actions that result from vehicle stops.

47. While the number and type of searches reportedly conducted during CPD traffic stops has fluctuated over the past decade, the number of stops involving a search has been generally increasing. The precise number of traffic stops involving searches of various types are given in Table 4. When considering the number of traffic stops involving a reported search of any object (whether the vehicle, driver, or any passenger), there were roughly 12% more searches conducted in the five-year period from 2020 to 2024, compared to the five-year period from 2015 to 2019.

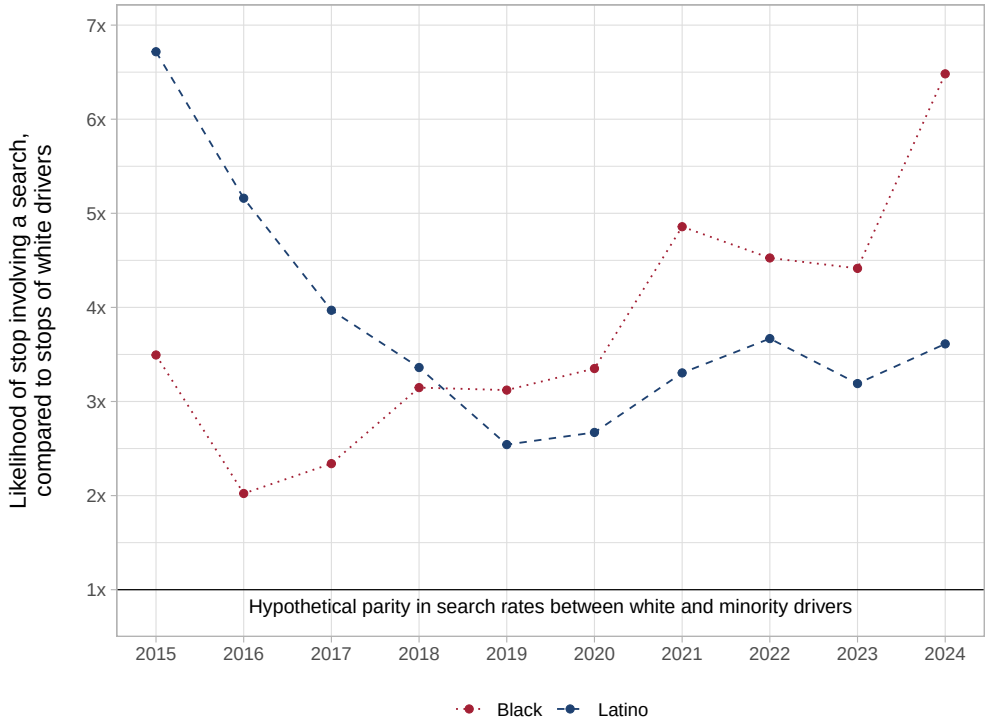
Table 4: Number of searches during traffic stops reported to IDOT, by year and type. The "Total Searches" column reports the number of traffic stops in which CPD searched the vehicle or any occupant. "Any Occupant" reports the number of traffic stops in which CPD searched the driver or any passenger.

Year	Total Searches	Vehicle	Any Occupant	Driver	Passenger
2015	5,037	4,270	4,919	4,886	1,641
2016	3,886	3,145	3,695	3,631	674
2017	3,298	2,781	2,961	2,889	632
2018	4,691	3,996	3,561	3,396	1,075
2019	5,408	4,834	3,801	3,545	1,290
2020	5,078	4,858	3,235	3,075	1,393
2021	5,764	5,503	3,505	3,341	1,215
2022	5,434	5,102	3,307	3,179	1,079
2023	4,956	4,715	2,810	2,681	843
2024	3,714	3,555	2,174	2,037	786

48. I find that stops of Black and Latino drivers are disproportionately likely to involve a subsequent search, relative to stops of white drivers.[15] While search rates reported by CPD have declined over time, Figure 11 shows that Black and Latino drivers have been searched at least twice

[15] I define a stop as involving a search if CPD reports a vehicle, driver, or passenger search in IDOT data.

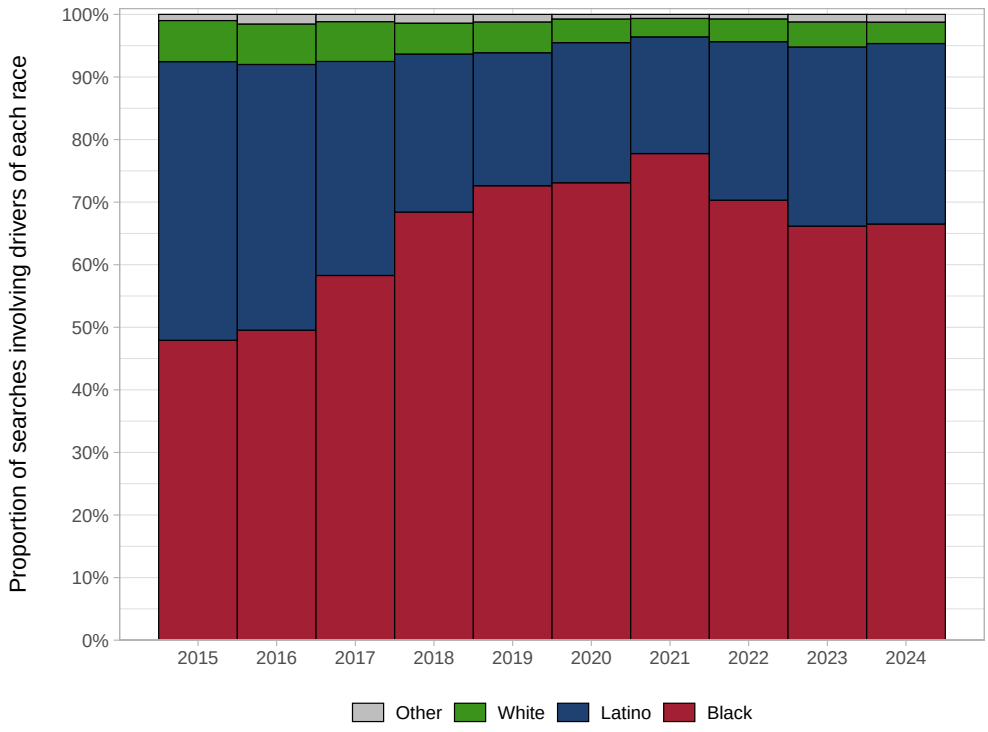
Figure 11: Relative search rates in stops of Black and Latino drivers, compared to stops of white drivers, by year. In every year for which data is available, stopped drivers from these minority groups were searched at over double the rate of their white counterparts; in certain years, Black or Latino drivers were searched over six times more frequently.



as frequently as white drivers in every year for which data is available. In 2015, 5.7% of Black-driver stops and 11.0% of Latino-driver stops led to a search, compared to 1.6% of white-driver stops—meaning that stops of Black and Latino drivers were 3.5 and 6.7 times as likely to involve a search, respectively (parity in search rates would imply a minority-to-white ratio of one). In 2024, CPD reported lower search rates in traffic stops, but the disproportionality of those searches remained comparable: searches were conducted in 1.9% of Black-driver stops and 1.1% of Latino-driver stops, respectively 6.5 and 3.6 times higher than the search rate of 0.3% in white-driver stops.

49. The demographic composition of drivers involved in CPD searches has shifted considerably over the past decade. In the 2015–2019 five-year period, 5.7% of CPD traffic-stop searches involved white drivers; by 2020–2024, this share declined to 3.5%. Black drivers make

Figure 12: Demographic composition of drivers involved in traffic-stop searches, by year.

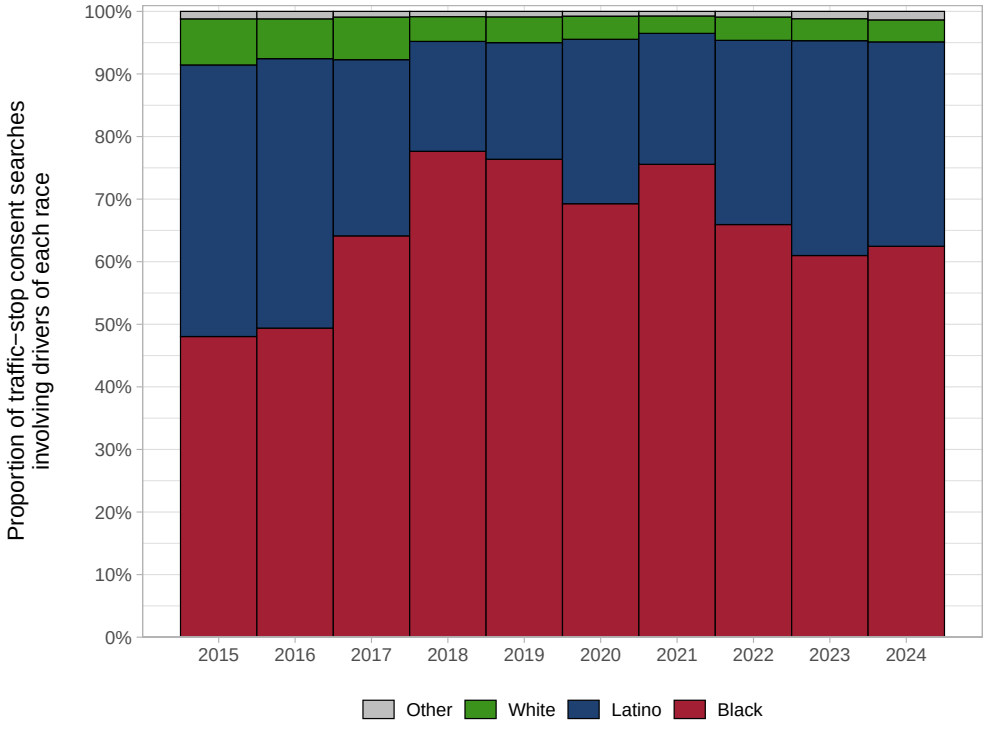


up an increasing share of CPD traffic-stop searches, rising from 60.0% to 71.2% over the same periods. However, Latino drivers make up a decreasing share, dropping from 33.0% to 24.4%. Year-by-year proportions are shown in Figure 12.

50. These large changes in CPD searches should be interpreted with three compounding factors in mind. (a) They are influenced by the gradually shifting demographics of Chicago drivers; however, analysis of collision data does not suggest any major swings in driver demographics that would explain the observed patterns in CPD searches whether in the composition of at-fault drivers or the general driving population (see e.g. Figure 4). Therefore, I assess that these patterns are largely due to the compounding impact of (b) CPD's disproportionately frequent stopping of minority drivers, described in the previous section, and (c) disproportionately high search rates among minority drivers who were stopped.

51. Patterns in CPD consent searches, which constituted the basis for 41% of traffic-stop searches over the past decade, are comparable if somewhat more muted. In the 2015–2019

Figure 13: Demographic composition of drivers involved in traffic-stop consent searches, by year.



five-year period, 5.4% of CPD traffic-stop consent searches involved white drivers; by 2020–2024, this share declined to 3.4%. Black drivers make up 65.2% (2015–2019) and 68.0% (2020–2024) of these consent searches; Latino drivers represent 28.3% (2015–2019) and 27.7% (2020–2024). Year-by-year proportions are shown in Figure 13.

52. From 2015 to 2024, the "hit rate" in IDOT-reported traffic-stop searches—i.e., the proportion in which contraband is discovered—has fluctuated considerably from a low of 12.3% in 2017 to a high of 55.5% in 2024. When considering weapons specifically, hit rates have ranged from 1.7% (2016) to 10.5% (2024). One possible explanation for the marked increase in hit rates is that CPD officers have become more discerning over time, e.g. by applying a higher standard in the decision to initiate a search. However, it is also possible that high hit rates arise from the selective nonreporting of searches that do not yield contraband; this would be consistent with the demonstrable nonreporting of stops noted in ¶ 22, as both could arise from failure to complete required data-collection forms.

53. Based on expert Chris Burbank's assessment that the purpose of CPD's pretextual traffic stops is to find weapons or other contraband (Burbank Decl. ¶¶ 17, 51), I examined the proportion of stops that reportedly do so. From 2015–2024, CPD's data indicate that 0.4% of traffic stops (4 out of every 1,000) lead to the reported discovery of any contraband; only 0.07% (7 out of every 10,000 stops) lead to the discovery of weapons, specifically.

54. Over the past decade, CPD-reported data suggests a significantly lower hit rate for searches of Black drivers, compared to white drivers. According to IDOT records, 28.7% of searches involving Black drivers led to the discovery of contraband. I estimate that on average, the hit rate is 5.8 percentage points lower than for contemporaneous searches involving white drivers: after accounting for temporal variation, the comparable hit rate among stops of white drivers is estimated to be 34.6%. This gap is consistent with CPD officers applying a lower standard of evidence when deciding whether to initiate searches of Black drivers, versus contemporaneous white drivers (Knowles et al., 2001; Anwar and Fang, 2006; Knox et al., 2020). These estimates are constructed to ensure that searches of Black drivers are only compared to searches of white drivers that occurred in the same year.[16]

55. Over the past decade, CPD-reported data also suggests a significantly lower hit rate for searches involving Latino drivers (29.4%), an estimated 4.0 percentage points lower than the hit rate would be among contemporaneous white drivers (33.4%)[17]—consistent with CPD officers also applying a lower standard of evidence in searching Latino drivers. I further estimate that CPD discovers weapons at lower rates in searches involving Latino drivers (a hit rate of 3.6%, compared to an estimated 4.9% in searches of white drivers).

56. Racial gaps in hit rates are magnified when considering consent searches

[16] Specifically, I conduct regressions using a linear probability model with year fixed effects and heteroskedasticity consistent standard errors. Reported estimates utilize weights designed to recover the average treatment effect on the treated.

[17] Note that the relevant comparisons for white hit rates differ slightly, because the distribution of Black and Latino searches over dates in 2015–2024 differ slightly; the relevant white comparison rate is constructed by comparing each minority search to the average white searches in the same year, which leads to slightly differing weights placed on different years.

specifically.[18] Among consent searches involving Black drivers, the average hit rate for all forms of contraband was 24.1%, an estimated 9.5 percentage points lower than the it would be among contemporaneous white drivers (33.4%). For searches involving Latino drivers, the average hit rate was 30.2%, 4.9 percentage points lower than for white drivers (35.2%).

57. Finally, I examined the use of protective pat downs during vehicular investigatory stops using data from ISRs, which report this information from 2016 onward. The precise number of such pat downs conducted is given in Table 5. Based on the linear trend in this data, pat downs during vehicular stops have slightly increased over time, despite fluctuations.[19]

Table 5: Number of protective pat-downs reported in ISRs involving vehicles, by year.

Year	Count
2016	13,642
2017	14,845
2018	19,483
2019	23,876
2020	17,383
2021	16,797
2022	17,525
2023	19,105
2024	17,815

58. Racial gaps in hit rates are also evident when considering protective pat downs conducted during investigatory stops that involved vehicles.[20] Among pat downs of Black individuals, CPD ISR data indicates that 7.2% led to the discovery of contraband, an estimated 2.5 percentage points lower than the rate would be among comparable white individuals (9.7%).

[18] I define a consent search as having occurred in a traffic stop if officers indicate that any search of vehicle, driver, or passengers was conducted by consent.

[19] The lack of 2015 data on pat downs precludes the comparison of five-year totals.

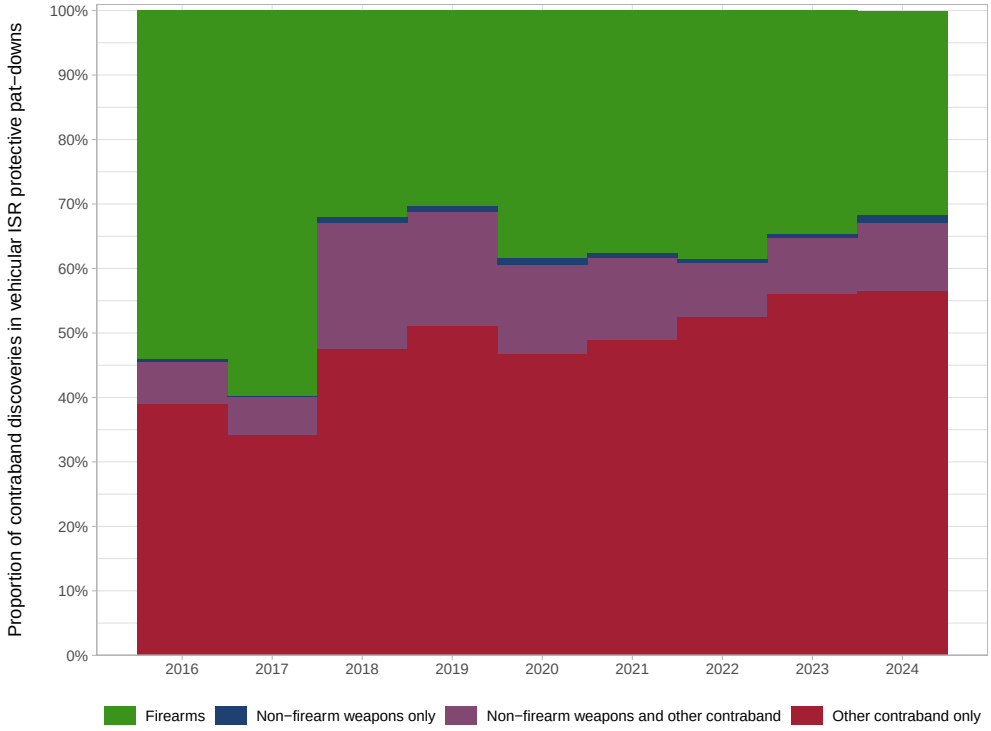
[20] Vehicular investigatory stops are identified using the procedure described in Footnote 6. I noted numerous data-quality issues in vehicular ISR data, many of which would lead to underestimates of hit rates in protective pat downs. To ensure that results are maximally accurate and favorable to the CPD, I correct these issues before conducting analysis. Most notably, officers are inconsistent in classifying objects such as scissors; screwdrivers; pocket, kitchen, or butter knives; and toy guns. In roughly half of observed cases, such objects are described as weapons, as opposed to "other contraband." In other instances, officers finding drugs or paraphernalia in textual descriptions, but apparently fail to select the corresponding checkboxes indicating the discovery of such contraband. For consistency, I reclassify these pat downs as "hits" of the relevant contraband types. However, I exclude several dozen cases in which ammunition alone (including magazines) is described as a weapon.

Among pat downs of Latino individuals, the hit rate was 6.3%, or 3.3 percentage points lower than comparable white individuals (9.6%).[21]

59. Despite CPD's definition of a protective pat down as "a limited search…of the outer clothing of a person for weapons" (Chicago Police Department, 2024), according to ISR data, these weapons represent a shrinking share of recovered contraband. From 2022 onward, more than half of all "hits" in protective pat downs involved only non-weapon contraband: for example, in 2024, 56.5% involved only alcohol, drugs, paraphernalia, and other miscellaneous objects. Non-firearm weapons also made up a non-trivial portion of pat down hits (11.7%). Among pat downs that reportedly discovered contraband, firearms were recovered only 31.8% of the time. The composition of discovered contraband from 2015–2024 is depicted in Figure 14.

[21] As noted in Footnote 17, the relevant comparison rates for white individuals varies slightly when analyzing Black and Latino pat downs; this is due to slight differences in the timing of when these pat downs occur and how white comparison rates are constructed to only compare pat downs taking place in the same year.

Figure 14: Types of contraband reportedly discovered during protective pat downs, by year. "Non-firearm weapons" include firearms and objects such as knives, scissors, screwdrivers, and toy guns; "other contraband" includes alcohol, drugs, paraphernalia, and other miscellaneous objects.



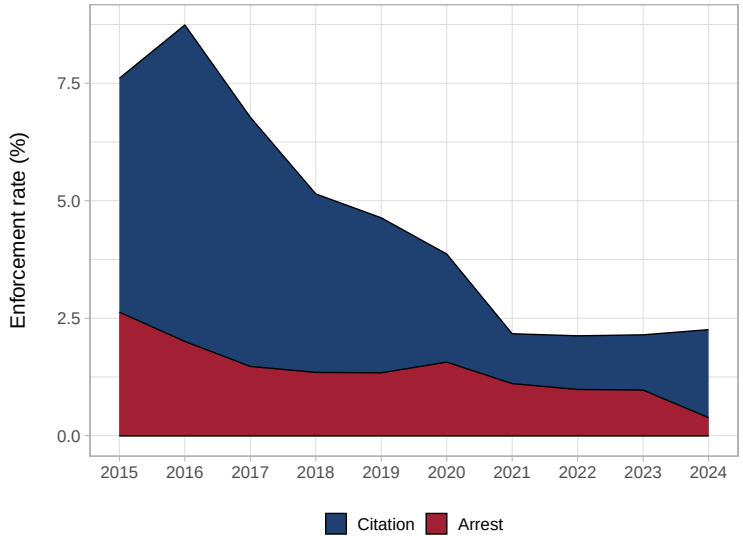
60. Because protective pat downs are supposed to be searches for weapons specifically, it is important to consider the hit rate at which they recover the intended object for which officers are searching. Among pat downs of Black people, CPD ISR data indicates that only 3.6% led to the discovery of weapons specifically, an estimated 1.6 percentage points lower than the rate would be among comparable white individuals (5.1%). Among pat downs of Latino people, the weapons-specific hit rate was 2.9%, or 2.1 percentage points lower than comparable white individuals (also 5.1%). These racial gaps in hit rates are consistent with CPD officers applying a lower standard of evidence when initiating pat downs of Black and Latino individuals during vehicular investigatory stops. When considering firearms specifically, hit rates remain lower for Latino individuals (1.6%, versus 2.5% for comparable white individuals), though they are slightly higher among pat downs of Black individuals (2.9%, versus 2.4% for comparable white individuals). As noted above, these firearm-specific figures should be interpreted with caution because pat downs target all weapons, not necessarily firearms specifically.

VIII. CPD TRAFFIC STOPS RESULT IN MINIMAL ARRESTS AND CITATIONS

61. One potential justification for CPD's traffic stop program would be if it improved the agency's ability to detect and take enforcement action against serious crimes. I do not find evidence to support this argument: analysis of OEMC dispatch and CPD enforcement data results show that, to the contrary, the rate of enforcement action in traffic stops has been markedly declining.[22] Precise estimates of enforcement rates in each year are reported in Table 6 and illustrated in Figure 15. In 2015, data supplied by Defendant indicate that 7.6% of traffic stops resulted in either an arrest or a citation; by 2024, that enforcement rate had fallen to 2.3%. This decrease is also evident when comparing the 2015–2019 five-year period (6.0% of traffic stops led to enforcement action) to the 2020–2024 five-year period (2.5%). These figures may

[22]To draw this conclusion, I linked OEMC traffic-stop dispatch records to data on subsequent enforcement actions taken by CPD. Specifically, CPD data on citations and arrests contains an event identification number corresponding to the OEMC dispatcher-logged events. Citation and arrest rates are determined by the proportion of OEMC traffic-stop events whose identification numbers appear in these CPD enforcement datasets.

Figure 15: Enforcement rate in traffic stops called in to OEMC, by year.



underestimate the true enforcement rate in traffic stops if CPD data management practices fail to accurately link citations and arrests to the originating dispatch event. However, the conclusion regarding a decline in enforcement rates would not be affected by any data linkage issues that affected the full 2015–2024 period, as estimated enforcement rates in earlier and later periods would be similarly depressed by this issue.

Table 6: Enforcement rate in traffic stops called in to OEMC, by year.

Year	Any Enforcement (%)	Arrest (%)	Citation (%)
2015	7.6	2.6	5.2
2016	8.7	2.0	7.0
2017	6.8	1.5	5.5
2018	5.1	1.3	3.9
2019	4.6	1.3	3.5
2020	3.9	1.6	2.5
2021	2.2	1.1	1.2
2022	2.1	1.0	1.3
2023	2.1	1.0	1.3
2024	2.3	0.4	1.9

62. According to CPD data, enforcement rates have declined so much that, despite the increasing number of traffic stops conducted, the total number of related citations in 2024 (9,669 citations associated with traffic stops, according to data supplied by Defendant) was less than half

the number in 2015 (20,102 citations associated with traffic stops). Similarly, the number of arrests arising from traffic stops in 2024 (1,931) was less than one fifth of the number of traffic-stop arrests made in 2015 (10,175).

63. As explained in Footnote 4, Defendant supplied noticeably incomplete data and failed to supply clarify issues or provide supplemental data in response to multiple requests. To ensure that the low enforcement rates estimated above were not an artifact of these data issues, I conducted a supplementary analysis using data on traffic stops reported by CPD to IDOT. These records reveal a similarly precipitous decline in the proportion of traffic stops leading to citation,[23] though IDOT data suggests enforcement rates that are generally higher (a decline from 69.6% in 2015 to 8.2% in 2024). (These values are likely to be overestimates, due to the unreported traffic stops described above.) Precise figures are given in Table 7.[24] Consistent with my previous findings, IDOT data indicates that enforcement rates have declined so much that CPD issued only 24,079 citations in 2024, nearly 60% fewer traffic citations than in 2015 (59,743)—i.e., less than half as many citations, despite making a substantially larger number of traffic stops.

Table 7: Citation rate in traffic stops reported to IDOT, by year.

Year	Citation (%)
2015	69.6
2016	34.2
2017	23.6
2018	12.8
2019	11.0
2020	8.6
2021	4.3
2022	3.4
2023	3.5
2024	8.2

64. The growth of CPD's traffic stop program does not appear to be driven by

[23] IDOT does not require reporting of arrests arising from traffic stops.

[24] The differences seen between estimates from this IDOT data and the previous OEMC data is consistent with my previous conclusion that numerous traffic stops are not reported to IDOT—if CPD officers tend not to report encounters that yield no enforcement action, then the number of traffic stops in the IDOT denominator will be artificially lowered, leading to the appearance of higher enforcement rates.

enforcement against injurious traffic violations. To draw this conclusion, I examined the reasons that officers gave for initiating traffic stops[25] to evaluate whether more injurious driving behaviors, such as speeding or other severe moving violations, frequently motivated traffic stops. I found that over the past decade, only 2.1% of all reported traffic stops were initiated for speeding offenses, and less than one quarter involved other injurious moving violations (defined as following too closely, lane violations, and sign/signal violations).[26] A detailed breakdown of stop reasons is given in Table 8.

Table 8: Reported reason for traffic stop in IDOT data, 2015–2024 (excludes 308 stops with unspecified or contradictory reported reasons).

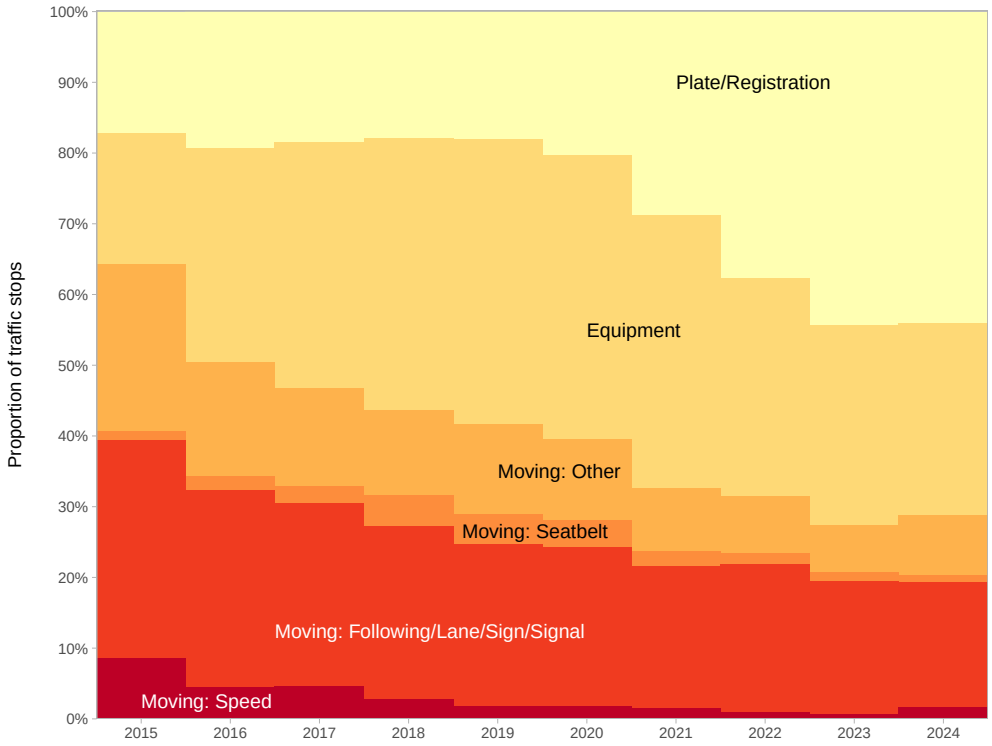
Reason	Count	Proportion (%)
Plate/Registration	1,032,891	28.0
Equipment	1,265,551	34.3
Moving: Other	398,442	10.8
Moving: Seatbelt	96,574	2.6
Moving: Following Closely	2,320	0.1
Moving: Lane Violation	133,340	3.6
Moving: Sign/Signal Violation	681,647	18.5
Moving: Speed	77,851	2.1

65. Moreover, CPD's traffic stop program appears to be focusing less and less on speeding and other injurious moving violations over time. Speeding stops represented 8.6% of all traffic stops in 2015, compared to only 1.6% in 2024. Similarly, other injurious moving violations (i.e., excluding seatbelt and unspecified offenses in this category) declined from 30.7% of traffic stops in 2015 to 17.7% in 2024. In contrast, plate/registration and equipment enforcement plays a far larger role than in the past: these represented 17.1% and 18.7% of traffic stops in 2015, respectively, compared to 44.1% and 27.1% in 2024. A fuller account of shifting traffic stop reasons is shown in Figure 16.

[25] Specifically, I examine the reason for the stop ("REASSTOP" in IDOT data) and, if this involved a moving violation, the specific violation type ("TYPEMOV") such as failure to signal.

[26] In computing these proportions, I omit 304 stops (less than 0.01% of IDOT stop records) with no reported reason, along with four stops with contradictory data that are described as "moving" but have "no moving violation" in the detailed description of moving violation type.

Figure 16: Reported reason for traffic stop in IDOT data, by year. Injurious moving violations other than speeding (following too closely, lane violations, and sign/signal violations) are aggregated for visual clarity.



66. For these reasons, I conclude that CPD's data is consistent with (though not dispositive of) Plaintiffs' claims that CPD's mass traffic stop program is not designed to further roadway safety, given that stops for all moving violations are diminishing and currently represent less than one-third of total traffic stops, and speeding stops specifically represented less than 2% of traffic stops in 2024.

67. I also conclude that the data shown above is consistent with expert Chris Burbank's conclusion that CPD's mass traffic stop program involves mostly pretextual traffic stops based on low-level equipment and licensing/registration violations, though the data that I analyze is not dispositive of pretextual intent. This is based on the facts that (a) CPD's own data indicates that these reasons were the stated justification for roughly half or more of all stops in every year from 2016 onwards and (b) in the last two years, they now represent the stated justification for over 70% of all stops made.

68. I further conclude that the data shown above is consistent with (though not definitive evidence in support of) expert Chris Burbank's conclusion that CPD's intent and instructions when initiating and implementing its mass traffic stop program were to increase total traffic stops but not to increase traffic citations. This is because according to CPD's own data, more than three times as many traffic stops took place in 2024 as in 2015, but traffic citation in 2024 are less than one eighth as likely to occur in a traffic stop as in 2015.

IX. Conclusion

69. As discussed above, my analysis and conclusions in this report are based on data supplied by the City of Chicago to Plaintiffs' counsel so far. The data was incomplete and suffered from a number of limitations described above. I understand that discovery in this matter is ongoing, and I may expand or modify my conclusions based on additional data and evidence supplied in discovery as this litigation progresses.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Executed on August 7, 2025

Dean Knox

References

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Ba, B., Ge, H., Kaplan, J., Knox, D., Komisarchik, M., Lanzalotto, G., Mariman, R., Mummolo, J., Rivera, R., and Torres, M. (2023). Political diversity in us police agencies. *American Journal of Political Science*.

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Knowles, J., Persico, N., and Todd, P. (2001). Racial bias in motor vehicle searches: Theory and evidence. *Journal of political economy*, 109(1):203–229.

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EXHIBIT A
Curriculum Vitae

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CONTACT INFORMATION

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EDUCATION

Massachusetts Institute of Technology — Cambridge, MA
Ph.D., Political Science — August 2011–May 2017
Committee: Adam Berinsky, Fotini Christia, Danny Hidalgo, Teppei Yamamoto (chair)

University of Illinois at Urbana-Champaign — Urbana-Champaign, IL
B.S., Nuclear Engineering — August 2004–May 2008

POSITIONS

Wharton School, University of Pennsylvania — Philadelphia, PA
Assistant Professor — July 2020–
Operations, Information, and Decisions Department; Statistics and Data Science (secondary)
Affiliations: Wharton AI & Analytics; Quattrone Center for the Fair Administration of Justice

Princeton University — Princeton, NJ
Assistant Professor, Department of Politics — July 2018–July 2020
Affiliations: Center for Statistics & Machine Learning; Center for the Study of Democratic Politics

Microsoft Research — New York, NY
Postdoctoral Researcher, Computational Social Science group — July 2017–June 2018

AWARDS, HONORS & FELLOWSHIPS

Science & NOMIS Foundation	Early career award for interdisciplinary research, 2021
Carnegie Corporation of New York	Andrew Carnegie fellow, 2021
American Association for the Advancement of Science	Annual meeting featured paper, 2021
Society for Political Methodology	Gosnell prize for excellence in political methodology, 2020
Society for Political Methodology	John T. Williams dissertation prize, 2016
Society for Political Methodology	Best poster at annual meeting, 2015
National Science Foundation	Graduate research fellowship, 2013–2016
Massachusetts Institute of Technology	Presidential graduate fellowship, 2012–2013
Foreign Policy magazine	Best writing in global political economy, 2010

STATISTICAL CONSULTING

American Civil Liberties Union	2020–
Department of Justice Civil Rights Division	2020–2024
NAACP Legal Defense Fund	2021–2022
Philadelphia Police Advisory Commission	2019–2022

JOURNAL ARTICLES

20. Dean Knox and Jonathan Mummolo. 2025. "New data fill longstanding gaps in the study of policing." *Science* (Perspective), Vol. 387, Iss. 6741.

19. Naijia Liu, Xinlan Emily Hu, Yasemin Savas, Matthew Baum, Adam Berinsky, Allison Chaney, Christopher Lucas, Rei Mariman, Justin de Benedictis-Kessner, Andy Guess, Dean Knox, and Brandon Stewart. 2025. "Short-term exposure to filter-bubble recommendation systems has limited polarization effects: Naturalistic experiments on YouTube." *Proceedings of the National Academy of Sciences*, Vol. 122, Iss. 8.

    Author contributions: "NL, XEH, YS, JdBK, AMG, **DK**, and BMS developed the research designs... NL, XEH, and YS gathered, classified, and experimentally manipulated recommendation networks, with support from RM and **DK**... NL and **DK** designed the video platform... NL, XEH, YS, CL, JdBK, AMG, **DK**, and BMS performed research... NL, XEH, YS, JdBK, AMG, **DK**, and BMS analyzed data"

18. Taylor Damann, Dean Knox, and Christopher Lucas. 2025. "A framework for studying causal effects of speech style: Application to U.S. presidential campaigns." *Journal of the Royal Statistical Society: Series A*.

17. Bocar Ba, Haosen Ge, Jacob Kaplan, Dean Knox, Mayya Komisarchik, Gregory Lanzalotto, Rei Mariman, Jonathan Mummolo, Roman Rivera, and Michelle Torres. 2025. "Political diversity in U.S. police agencies." *American Journal of Political Science*.

    Author contributions: "**DK** and JM designed the project with support from RM and JK ... JK conducted data processing and statistical analysis with support from **DK** and JM, with additional contributions from RR, GL and HG ... JM wrote the paper with support from JK, **DK**, and RM ..."

16. Justin Grimmer, Dean Knox, and Brandon Stewart. 2023. "Naïve regression requires weaker assumptions than factor models to adjust for multiple cause confounding." *Journal of Machine Learning Research*, Vol. 24, Iss. 182.

15. Guilherme Duarte, Noam Finkelstein, Dean Knox, Jonathan Mummolo, and Ilya Shpitser. 2023. "An automated approach to causal inference in discrete settings." *Journal of the American Statistical Association* (Theory & Methods), Vol. 119, Iss. 547.

14. Andrew Reece, Gus Cooney, Peter Bull, Christine Chung, Bryn Dawson, Casey Fitzpatrick, Tamara Glazer, Dean Knox, Alex Liebscher, and Sebastian Marin. 2023. "The CANDOR corpus: Insights from a large multimodal dataset of naturalistic conversation." *Science Advances* (Research Article), Vol. 9, Iss. 13.

    Author contributions: "Apart from AR and GC, the remaining authors are listed alphabetically ... **DK** and GC designed the section "Characteristics of good and bad conversationalists," with support from AR; **DK** also performed the analyses and wrote the Supplementary Materials, with support from GC, AR, AL, and PB. **DK**, GC, and AR are responsible for the section "A qualitative glance at the corpus—Topical, relational, and demographic diversity." AL and **DK** created the pipeline to process the raw data into analysis-ready data, with support from AR, SM, and GC ... GC drafted the initial manuscript. AR and **DK** provided edits to the initial manuscript ... GC handled the peer review process, with support from **DK** and AR."

13. Courtney Hilton, Cody Moser, Mila Bertolo, Harry Lee-Rubin, Dorsa Amir, Constance Bainbridge, Jan Simson, Dean Knox, Luke Glowacki, Andrzej Galbarczyk, Grazyna Jasienska, Cody Ross, Mary Beth Neff, Alia Martin, Laura Cirelli, Sandra Trehub, Jinqi Song, Minju Kim, Adena Schachner, Tom Vardy, Quentin Atkinson, Jan Antfolk, Purnima Madhivanan, Anand Siddaiah, Caitlyn Placek, Gul Deniz Salali, Sarai Keestra, Manvir Singh, Scott Collins, John Patton, Camila Scaff, Jonathan Stieglitz, Cristina Moya, Rohan Sagar, Brian Wood, Max Krasnow, Samuel Mehr. 2022. "Acoustic regularities in infant-directed speech and song across cultures." *Nature Human Behavior* (Article), Vol. 6.

    Author contributions: "CBH and SAM led analyses, with additional contributions from CJM, MB, **DK**, and MMK ... **DK** conducted code review."

    Selected coverage: *New York Times*, *The Guardian*, NPR

12. Fotini Christia, Elizabeth Dekeyser, and Dean Knox. 2022. "Evidence on the nature of sectarian animosity from a geographically representative survey of Iraqi and Iranian Shia pilgrims." *Nature Human Behavior* (Article), Vol. 6.

11. Dean Knox, Christopher Lucas, and Wendy K. Tam Cho. 2022. "Testing causal theories with learned proxies." *Annual Review of Political Science* (Invited), Vol. 25.

10. Dean Knox. 2021. "Revealing racial bias: Causal inference can make sense of imperfect policing data." *Science* (Essay), Vol. 374, Iss. 6568.

    Selected coverage: AAAS, *Science News*, *Penn Today*

9. Dean Knox and Christopher Lucas. 2021. "A dynamic model of speech for the social sciences." *American Political Science Review* (Manuscript), Vol. 115, Iss. 2.

Recognition: Gosnell Prize for Excellence in Political Methodology, "awarded for the best work in political methodology presented at any political science conference during the preceding year"

8. Bocar Ba, Dean Knox, Jonathan Mummolo, and Roman Rivera. 2021. "The role of officer race and gender in police-civilian interactions in Chicago." *Science* (Research Article), Vol. 371, Iss. 6530.

   Recognition: *Science* print edition cover article; featured paper, AAAS Annual Meeting

   Discussion: Phillip Atiba Goff. 2021. "Asking the right questions about race and policing." *Science* (Perspective), Vol. 371, Iss. 6530.

   Selected coverage: Associated Press (*Washington Post*, *L.A. Times*, *New York Post*, *U.S. News*, *NBC News*), *Scientific American*, *Science* (news), *USA Today*, *The Guardian*, *CNN*, *Science News*

7. Dean Knox, Will Lowe, and Jonathan Mummolo. 2020. "Administrative records mask racially biased policing." *American Political Science Review* (Manuscript), Vol. 114, Iss. 3.

   Selected coverage and impact: City of Chicago Office of Inspector General, Scientific American, FiveThirtyEight

6. Fragile Families Challenge Team. 2020. "Measuring the predictability of life outcomes with a scientific mass collaboration." *Proceedings of the National Academy of Sciences* (Research Report), Vol. 117, Iss. 15.

   Author contributions: "... MJS, IL, ATK, **DK**, and SM wrote the paper."

5. Dean Knox and Jonathan Mummolo. 2020. "Making inferences about racial disparities in police violence." *Proceedings of the National Academy of Sciences* (Letter), Vol. 117, Iss. 3.

   Related: public statement (endorsed by 871 researchers across 20 disciplines); PNAS editorial statement; retraction of Johnson et al. (2019)

4. Dean Knox and Jonathan Mummolo. 2020. "Toward a general causal framework for the study of racial bias in policing." *Journal of Political Institutions and Political Economy*, Vol. 1 (Invited).

3. Samuel Mehr, Manvir Singh, Dean Knox, Daniel Ketter, Daniel Pickens-Jones, Stephanie Atwood, Christopher Lucas, Nori Jacoby, Alena Egner, Erin Hopkins, Rhea Howard, Joshua Hartshorne, Mariela Jennings, Jan Simson, Constance Bainbridge, Steven Pinker, Timothy O'Donnell, Max Krasnow, and Luke Glowacki. 2019. "Universality and diversity in human song." *Science* (Research Article), Vol. 366, Iss. 6468.

   Author contributions: "... **DK** designed and implemented all analyses, with support from SAM and CL ... SAM, **DK**, and MS designed the static figures and SAM and **DK** created them..."

   Discussion: W. Tecumseh Fitch and Tudor Popescu. 2019. "The world in a song." *Science* (Perspective), Vol. 366, Iss. 6468.

   Selected coverage: Reuters, *Newsweek*, *Wall Street Journal*, *Forbes*, *Nature* (news), *Scientific American*, *Popular Science*, *The Times* of London, *El País*, *Le Monde*

2. Dean Knox, Teppei Yamamoto, Matthew Baum, and Adam Berinsky. 2019. "Design, Identification, and Inference in Patient Preference Trials." *Journal of the American Statistical Association* (Applications and Case Studies), Vol. 114, Iss. 528.

1. Dean Knox. 2012. "Nuclear security and nuclear emergency response in China." *Science & Global Security*, Vol. 20, Iss. 1.

In Progress

Dean Knox. "`ffgrep`: Scalable approximate string matching."

Max Goplerud, Dean Knox and Christopher Lucas. "The rhetoric of parliamentary debate: Measuring conflictual speech in New Zealand floor speeches."

Dean Knox, Jake Hofman, and Duncan Watts. "The structure and dynamics of diffusive conversations."

Dean Knox. "A new model for analyzing paths: Determinants and effects of U.S. Interstate routes."

Fotini Christia, Dean Knox, and Jaffar Al-Rikabi. "Networks of sectarianism: Experimental evidence on access to services in Baghdad."

Fotini Christia and Dean Knox. "Geographic segregation in Baghdad: Detecting out-group aversion in walking routes."

Other Writing

Jennifer Bourgeois, Anna Haensch, Saatvik Kher, Dean Knox, Gregory Lanzalotto, Tian An Wong. "How to Use Causal Inference to Study Use of Force." *CHANCE*, Vol. 37, Iss. 4.

Bocar Ba, Dean Knox, Rachel Mariman, Jonathan Mummolo and María Aránzazu Rodríguez Uribe. 2021. "Analysis of Philadelphia Police Department Civilian Complaint Process." Featured in Philadelphia Police Advisory Commission, *Collaborative Review and Reform of the PPD Police Board of Inquiry.*

Selected coverage: *Philadelphia Inquirer*, *NBC Philadelphia*

Dean Knox and Jonathan Mummolo. 2020. "A widely touted study found no evidence of racism in police shootings. It's full of errors." *Washington Post*, 15 July.

Dean Knox and Jonathan Mummolo. 2020. "It took us months to contest a flawed study on police bias. Here's why that's dangerous." *Washington Post*, 28 January.

Fotini Christia, Elizabeth DeKeyser and Dean Knox. 2016. "To Karbala: Surveying religious Shi'a from Iran and Iraq." Translated as "Ila Karbalā: dirāsa mashiyya 'an Shi'iat Iran Wāl-Irāq" *Dirāsāt Fikriyya, Dirasat Fikriya.* Nasr Al-Husaini, Aya Al-Raoof, Hasan Al-Asadi (trans.); Hasan Nadhem, Ali Hakam Saleh (eds.). Kufa University Press. 2018. Beirut, Lebanon.

Christia, Fotini, Elizabeth Dekeyser, and Dean Knox. 2016. "Shiites are participating in the world's largest pilgrimage today. Here is how they view the world." *Monkey Cage (Washington Post)*, 21 November 2016.

Christia, Fotini, Elizabeth Dekeyser, and Dean Knox. 2016. "Mapping Shiite opinion: Insights from the Arba'een pilgrimage." *Foreign Affairs*, 24 October 2016.

Jakobson, Linda and Dean Knox. 2010. "New foreign policy actors in China." Stockholm: SIPRI. Translated as "Chuugoku no atarashii taigai seisaku: Darega donoyouni kettei shite irunoka." 2011. Tokyo: Iwanami Shoten.

Jakobson, Linda, Paul Holtom, Dean Knox, and Peng Jingchao. 2011. "China's energy and security relations with Russia." Stockholm: SIPRI.

Book Chapters

Fotini Christia, Elizabeth Dekeyser, and Dean Knox. 2022. "Piety and religious communalism among Shiites in Iraq and Iran." *The Oxford Handbook of Politics in Muslim Societies*, eds. Melani Cammett and Pauline Jones. Oxford University Press.

Dean Knox. 2012. "The Comprehensive Test Ban Treaty: Foundations, context, and outlook." In *Handbook of Nuclear Proliferation*, ed. Harsh V. Pant. Routledge.

Grants

Claire Kelling, Dean Knox, Gregory Lanzalotto, and Tarak Shah. 2023. "National Institute of Statistical Sciences forum on police use of force." National Science Foundation. $20,000. Principal investigator.

Guilherme Duarte, Haosen Ge, Jacob Kaplan, Dean Knox, Gregory Lanzalotto, Rachel Mariman, and Jonathan Mummolo. 2022. "Statistical methodology for measuring racial bias in police traffic enforcement with incomplete information." Arnold Ventures. $1,205,813. Principal investigator.

Dean Knox. 2021. "Eliminating statistical barriers to evidence-based policing reforms." Andrew Carnegie Fellowship. $200,000. Principal investigator.

Christopher Lucas and Dean Knox. 2021. "Computational methods for speech analysis." National Science Foundation, Division of Social and Economic Sciences (Methodology, Measurement, and Statistics). $249,318. Principal investigator.

Dean Knox, Rachel Mariman, Jonathan Mummolo, Olga Russakovsky, and Brandon Stewart. 2021. "Computational analysis of police body-worn camera footage." Microsoft. $200,000. Principal investigator.

Dean Knox, Rachel Mariman, Jonathan Mummolo, Olga Russakovsky, and Brandon Stewart. 2021. "Computational analysis of police body-worn camera footage." Princeton Data-driven Social Science Initiative. $74,525. Principal investigator.

Guilherme Duarte, Dean Knox, and Jonathan Mummolo. 2021. "An automated solution to causal inference in discrete settings." Analytics at Wharton, The Wharton School of the University of Pennsylvania. $22,575. Principal investigator.

Dean Knox, Rachel Mariman, Jonathan Mummolo, Olga Russakovsky, and Brandon Stewart. 2021. "Making police-civilian interactions safer." Microsoft Azure Credits for Racial Equity Research. $75,000. Principal investigator.

Dean Knox, Rachel Mariman, Jonathan Mummolo, and María Aránzazu Rodríguez. 2020. "Reforming police misconduct investigations." Analytics at Wharton, The Wharton School of the University of Pennsylvania. $31,000. Principal investigator.

Naijia Liu, Matt Baum, Adam Berinsky, Justin de Benedictis-Kessner, Andy Guess, Dean Knox, Christopher Lucas, and Brandon Stewart. 2020. "Do online video recommendation algorithms increase affective polarization?" Facebook Foundational Integrity Research: Misinformation and Polarization Research Award. $100,000. Principal investigator.

Dean Knox, Jonathan Mummolo, Olga Russakovsky, and Brandon Stewart. 2020. "Making Police-Citizen Interaction Safer: Large-Scale Computational Analysis of Visual Law Enforcement Records." School of Engineering and Applied Science Innovation Research Grant, Princeton University. $150,000. Principal investigator.

Dean Knox. 2019. "A toolkit for the quantitative analysis of audiovisual speech data." Schmidt DataX Research Award. $100,000. Principal investigator.

Dean Knox and Andy Guess. 2019. "Do video personalization algorithms polarize users?" Innovative Ideas in the Social Sciences, Dean for Research, Princeton University. $50,000. Principal investigator.

Teaching

Wharton STAT/OIDD 4770/7770: Introduction to Data Science in Python. Fall 2022.
Princeton POL574: Statistical Machine Learning. Spring 2019, Spring 2020.
Princeton POL571: Probability. Fall 2018, Fall 2019.
Institute for Political Methodology summer camp. Summer 2015. Teaching assistant.
MIT 17.806: Machine Learning. Spring 2015. Teaching assistant.
MIT 17.802: Causal inference. Spring 2014. Teaching assistant.

Invited Talks

London School of Economics (Policing & Crime Workshop)	2024
University of Michigan (Statistics)	2023
University of California, Berkeley (Public Policy, Information)	2023
Stanford University (GSB Organizational Behavior)	2023
Massachusetts Institute of Technology (Sloan Organizational Behavior)	2023
École Polytechnique Fédérale de Lausanne (Biostatistics)	2023
ETH Zurich (Economics & Data Science)	2023
University of Maryland (AI & Analytics for Social Good Workshop)	2023

Harvard University (Applied Statistics)	2023
New York University (Politics)	2022
University of California, Los Angeles (Political Science)	2022
University of Washington (Center for Statistics and the Social Sciences)	2022
Stanford University (Political Science)	2022
University of Michigan (Data Science/Computational Social Science)	2021
Microsoft Research	2021
National Institute of Statistical Sciences (Police Use of Force Forum)	2021
Yale University (Political Science)	2021
Facebook	2021
New York University (Center for Data Science)	2021
Harvard University (Applied Statistics)	2021
Massachusetts Institute of Technology (Political Science)	2020
Stanford University (Political Science)	2020
University of California, Berkeley (Political Science)	2020
American Civil Liberties Union	2020
Japanese Society for Quantitative Political Science	2020
Wharton School, University of Pennsylvania (Operations, Information & Decisions)	2019
University of California, San Diego (Political Science)	2019
New York University (Politics)	2017
University of Southern California (Political Science)	2017
Brown University (Political Science)	2016
Duke University (Network Analysis)	2016
Emory University (Quantitative Theory & Methods)	2016
Michigan University (Political Science)	2016
New York University, Shanghai (Data Science)	2016
Pennsylvania State University (Political Science)	2016
Princeton University (Politics)	2016
Rochester University (Political Science)	2016
University of California, San Diego (Political Science)	2016

Service

National Institute of Statistical Science, Police Use of Force Forum	Co-organizer, 2023
Society of Political Methodology	Annual Meeting Program Committee, 2023
Wharton Decision Processes Seminar	Co-organizer, 2022–2023
UPenn Computational and Data-Dependent Research Working Group	Core Faculty, 2022–2023
Wharton Undergraduate Data Analytics Club	Faculty Advisor, 2020
Princeton Fellowship of Woodrow Wilson Scholars	Acting Director, 2019–2020
Princeton Quantitative Social Science Colloquium	Faculty Co-coordinator, 2018–2020
MIT Political Methodology Research Seminar	Student Coordinator, 2015
MIT Political Methodology Workshop Series	Organizer, 2014
MIT Political Economy Breakfast Series	Student Co-coordinator, 2014
MIT Political Science Graduate Student Research Design Group	Co-organizer, 2013–2014
Harvard-MIT-BU Chinese Politics Research Workshop	Co-organizer, 2012–2013

Advising

Guilherme Duarte (2025 Ph.D. expected, OID Department, Wharton).
Assistant Professor, Department of Government, Harvard University.

Naijia Liu (2022 Ph.D., Department of Politics, Princeton).
Assistant Professor, Department of Government, Harvard University.

Referee Service

Science, *Proceedings of the National Academy of Sciences (PNAS)*, *PNAS Nexus*, *Nature Human Behavior*, *Science Advances*, *Journal of the American Statistical Association*, *Annals of Applied Statistics*, *Journal of the Royal Statistical Society: Series C*, *Journal of Causal Inference*, *American Political Science Review*, *American Journal of Political Science*, *Journal of Politics*, *Political*

Analysis, *Political Science Research and Methods*, *Management Science*, *Manufacturing and Service Operations Management*, *Journal of Marketing Research*, *Economics & Politics*, *Sociological Methods and Research*, *Journal of Quantitative Criminology*, *PLOS One*, National Science Foundation (Methodology, Measurement, and Statistics)