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REVIEW ESSAYS

Frontline Enforcement in the Age of Information

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Sᴀʀᴀʜ Bʀᴀʏɴᴇ. *Predict and Surveil: Data, Discretion, and the Future of Policing.* New York: Oxford University Press, 2021.

Kᴀʀᴇɴ Lᴇᴠʏ. *Data Driven: Truckers, Technology, and the New Workplace Surveillance.* Princeton, NJ: Princeton University Press, 2023.

Eʟɪᴢᴀʙᴇᴛʜ Cʜɪᴀʀᴇʟʟᴏ. *Policing Patients: Treatment and Surveillance on the Frontlines of the Opioid Crisis.* Princeton, NJ: Princeton University Press, 2024.

Abstract

Legal institutions rely on monitoring and prediction technologies to enforce the law. Drawing on three recent books—*Predict and Surveil* by Sarah Brayne (2021), *Data Driven* by Karen Levy (2023), and *Policing Patients* by Elizabeth Chiarello (2024)—this review essay examines how the incorporation of these technologies brings about three shifts in the work of frontline enforcement. First, it broadens the categories of actors with the capacity to facilitate the formal enforcement of law. Second, it reorients enforcement to increasingly center on generating information for future use by institutional actors beyond the original information gatherer. Third, it increases the variety and frequency of agents' decisions about how much to engage with new tools. These shifts are likely to exacerbate a persistent challenge faced by frontline agents: navigating conflicting goals and flawed laws with inadequate resources and guidance.

Introduction

Frontline enforcement refers to organized efforts to apply and implement law in concrete, everyday situations. A broad range of legal institutions, including those focused on criminal justice, public health, and transportation safety, now use

monitoring and prediction technologies in deciding whether and how to enforce the law. An empirical picture of these technologies' interactions with frontline enforcement is beginning to emerge. This essay draws on three recent books to examine how frontline enforcement changes as such technologies are incorporated into the work of client-facing legal and law-adjacent professionals. I focus on three particular shifts. First, these technologies help spread enforcement capacity across more types of actors—a phenomenon often called "deputization." Second, they shift the focus of frontline enforcement toward collecting and generating information for future decisions that frontline and other institutional actors make—a shift that I call "anticipatory data collection." Third, they impose new demands on the judgment of frontline enforcement by requiring more decisions about whether and how much to engage with the technologies and their informational outputs—an effect I call "process decision proliferation." These changes are likely to intensify a long-standing challenge faced by frontline agents: how to navigate ambiguous and conflicting goals and values in the absence of adequate resources and guidance (Lipsky 1980; Maynard-Moody and Musheno 2003). I suggest that monitoring and prediction technologies tend to multiply the responsibilities of agents, including the number and nature of decisions they must make, without resolving the tensions inherent in enforcing laws that do not necessarily address fundamental social problems.

Technology in frontline enforcement

Frontline agents or street-level bureaucrats are usually defined as public service workers who regularly interact with members of the public and who exercise significant discretion in determining whether and how to allocate rewards and punishments to individuals (Lipsky 1980; Maynard-Moody and Musheno 2003). They include social service workers, counselors, educators, and police officers, all of whom are called upon to exercise reason and judgment when interacting with, and making decisions about, members of the public. Over the past several decades, the incorporation of information technologies in public-facing government agencies has brought substantial changes in the operation of street-level bureaucracies (Citron 2008; Brayne and Christin 2021; Levy, Chasalow, and Riley 2021). Some have described these types of organizations as becoming—or adopting the features of—"screen-level bureaucracies" in which the agencies and their officials routinely interact with citizens through computers (Bovens and Zouridis 2002, 177). Among these bureaucracies, some decisions "are no longer made at the street level by the worker handling the case" but, rather, programmed "in the design of the software" (177). Increasingly, frontline decisions are also influenced by outputs of algorithms trained on data to evaluate questions like the probability of a minor experiencing abuse or neglect (Eubanks 2018, 129). Some agencies may even become "system-level bureaucracies" in which "[t]he process of issuing decisions is carried out—virtually from beginning to end—by computer systems" (Bovens and Zouridis 2002, 180). A traffic enforcement agency, for example, may rely on photographs taken, tickets issued, and payments processed to resolve infractions without any intervention or professional judgment exercised by an official legal authority, such as a police officer or judge (179).

Several recently published books offer insights into the incorporation of monitoring and prediction technologies within frontline enforcement. Sarah Brayne (2021) studies classic street-level bureaucrats—police officers—in *Predict and Surveil: Data, Discretion, and the Future of Policing* and shows how the focus of policing has moved from reaction and explanation to prediction, as technologies that rely on the analysis of big data are incorporated into routine patrol and investigations work. Karen Levy (2023) sheds light on regulatory truck inspections in *Data Driven: Truckers, Technology, and the New Workplace Surveillance*, which examines the impact of electronic time-logging devices on commercial truck drivers and their relationships with employers and regulators. Levy's work suggests that the incorporation of such technologies, which were intended to address the problem of driver fatigue, may actually worsen safety outcomes. Finally, Elizabeth Chiarello's (2024) *Policing Patients: Treatment and Surveillance on the Frontlines of the Opioid Crisis* highlights how the introduction of prescription drug-monitoring databases in health care has helped to make drug law enforcement a core part of doctors' and pharmacists' work.

Each of these books documents how the introduction of monitoring and prediction tools has substantially changed the information environment for frontline agents. What information officials have—and what they lack—can influence whether they stop a potential or ongoing violation of law. It may also lead officials to decide that no violations have occurred, that forbearance is warranted even if laws were broken, or that ignoring the violation is more prudent. Finally, the scope or depth of the information that officials have can also influence whether they gather more information and evidence for purposes of future enforcement action. Given the centrality of information to the enforcement of formal law—as information is to many other dimensions of statecraft (Scott 1998)—it is critical to understand how technologies change agents' informational environment—for example, by foregrounding and identifying specific types of information while pushing other sources of information to the background.

Before discussing some of the ways in which monitoring and prediction technologies appear to be shifting frontline enforcement, I want to clarify the scope of this essay. I focus on enforcement instead of other forms of frontline work, such as directing people to resources, answering questions, and serving as a counselor because enforcement is especially information intensive and agents often lack enough time to gather reliable information. As Michael Lipsky (1980, 29) observed, faced with "high case loads, episodic encounters, and the constant press of decisions," street-level bureaucrats often do not know "whether an investment in searching for more information would be profitable." Monitoring and prediction technologies alter the types and scope of information available to frontline officials, and these types of shifts are likely to alter the decisions they make regarding whether and how to enforce the law.

Facilitating deputization

We tend to think of frontline legal actors as state actors whose official responsibility is to enforce the law. Monitoring and prediction technologies can broaden the types of actors with the capacity to contribute to the enforcement of law, including a host of actors who are not state employees but who are "state-adjacent" in their occupation

of the "liminal space between state and society" (Liu and Stern 2021). Technologies do so by facilitating "deputization"—a process that scholars have described as the formal and informal enlistment of non-state actors to help enforce law through the provision of information or data (Brayne, Lageson, and Levy 2023). Deputization tends to occur because non-state actors have more access to information, spaces, and people than state bodies have themselves, particularly when governments are obligated to effect new social policies without corresponding increases to their budgets (466−67). Technologies can further facilitate deputization by making private surveillance and enforcement easier to undertake. In health care, for example, Chiarello (2024, 113) shows how medical providers engage more in "legal gatekeeping" to prevent illegal activity after gaining access to monitoring databases. Such databases have been particularly transformative for pharmacists, who, just over a decade ago, resisted policing patients and viewed surveillance as conflicting with their professional duties to provide care (151).

Pharmacists are licensed health-care professionals with multiple—sometimes conflicting—responsibilities. Until about half a century ago, pharmacists were "so subject to physicians' power that they were barred from even telling patients what drugs they were taking" (Chiarello 2015, 91). Today, pharmacists "regularly consult with patients, manage certain chronic conditions, provide immunizations, and undergo a rigorous four-year postbaccalaureate training program" (91). They identify as health-care providers whose duty is "to heal the sick by dispensing medications and devices validated by medical science" (99). At the same time, as regulated professionals, pharmacists also have a responsibility to avoid "knowingly" dispensing drugs for non-medical purposes, as with cases of addiction or when drugs are diverted to someone other than the person to whom the drugs are prescribed (Chiarello 2024, 67). This responsibility was imposed by the Controlled Substances Act, which establishes legal standards for physicians and pharmacists.[1] Deciding whether to dispense medication under the "knowingly" standard can be difficult, especially when decisions could lead to criminal liability and substantial job repercussions. Those who dispense opioids to patients who are addicted and those who sell or give prescribed pills to others risk losing their professional licenses and being arrested (Chiarello 2024, 138).

Resolving this tension is particularly challenging for pharmacists. Unlike physicians, pharmacists do not know patients' diagnoses or have access to their medical charts (Chiarello 2024, 73). Pain conditions also lack diagnostic markers and are often subjective, making them difficult to observe visually (67−68). In addition, pharmacists must make decisions under tight time constraints. Many retail pharmacies have only a single pharmacist and technician at any given time, and they are often expected to dispense a prescription every three to four minutes (136). This is not enough time to determine why a patient may need opioids, which could require talking to patients and making multiple calls, such as to physicians, insurance companies, or other pharmacies (71).

Information databases can address both the informational uncertainties and time constraints that pharmacists face. Retail pharmacists now commonly have access to state databases created through prescription drug-monitoring programs (PDMPs), which are centralized databases to which pharmacies can report dispensed

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[1] Controlled Substances Act, May 1, 1971, 84 Stat. 1238.

medications as well as information about the patient, the prescriber, and the date(s) of the prescription (Oliva 2020; Boustead 2021). Hosting hundreds of millions of prescription records, PDMPs provide detailed information about patients, including the number of clinics, hospitals, and pharmacies from which a patient has acquired opioids as well as the types of opioids and doses that they have been prescribed (Chiarello 2024, 141). Accordingly, PDMPs provide database users with the ability "to track medical information for an individual over time and across providers" (Boustead 2021, 229). Some PDMPs also use algorithms to provide numeric scores indicating how likely prescribing opioids to the patient is to harm them (Chiarello 2024, 60). These databases were initially designed for law enforcement to track controlled substances distributed in their state (Chiarello 2023, 1137). Pharmacists and physicians were also given access to help track patients and make more informed decisions about whether to prescribe or dispense opioids (Chiarello 2024, 58–60).

Chiarello argues that PDMPs have enabled pharmacists to see the identification of patients abusing prescriptions as part of their responsibility to protect patient health. PDMPs do this by enabling pharmacists to question patients and document their interactions—tasks that were previously more time-consuming and socially difficult. For example, before the introduction of PDMPs, pharmacists relied on informal strategies to make dispensing decisions—such as paying attention to "red flags" or social cues that could signal non-medical drug use by patients, such as appearance, behavior, payment in cash, requests for drugs in specific colors or shapes, travel to a pharmacy far from home, and prescriptions from physicians known to over-prescribe (Chiarello 2024, 139). Patients who "looked bedraggled or had track marks on their arms were considered suspicious, as were patients who were overly friendly" (139). If a red flag or gut feeling was triggered, pharmacists might use other informal strategies to gather information before deciding whether to dispense—a process that was time-intensive and often risked angering physicians, employers, and patients. After the introduction of PDMPs, however, pharmacists could more readily use information from the database to interrogate patients about their drug use, document interactions defensively, and "let [patients] know they are being watched" and "discourage them from returning to the pharmacy" (143). Information that pharmacists learn from PDMPs helps to confirm or refute pharmacists' initial impressions of patients, allowing them "to dispense or refuse with a clear conscience" (142).

While PDMPs facilitate the deputization of frontline enforcement in pharmacies, their role should not be overstated. Like professionals in other fields, including bank tellers and social workers, pharmacists are legally obligated to engage in some enforcement-related work (see, for example, Gustafson 2009; Ball et al. 2015). The criminal legal system, in particular, imposes obligations on multiple areas of social and economic life to assist in the enforcement of laws considered particularly important, such as those regarding suspected child and elder abuse (Song 2021). In this instance, pharmacists are obligated under the Controlled Substances Act not to dispense prescription drugs that they believe in "good faith" are being abused or diverted (Chiarello 2024, 136). Pharmacists also face substantial cultural and political pressure to help stem deaths resulting from opioid overdose. By facilitating easier access to patient documentation and reporting, PDMPs have increased the degree to which pharmacists are willing and able to undertake frontline enforcement roles.

Anticipatory data collection

Typically, we picture frontline agents collecting data for their own immediate use when making decisions. The enforcement of building codes, for example, requires both the examination of physical and legal conditions of properties to make code-related decisions and the collection of information via forms; it may also involve looking at related data, such as addresses, property records, and the history of permits and violations (Ku and Gil-Garcia 2018, 5). Increasingly, however, frontline agents do not simply collect information to make case-specific decisions. They are also information collectors for future cases, generating information about clients, subjects, themselves, and their colleagues that they and other institutional actors may use at later points in time.

Consider the case of pharmacists who had difficulty assessing whether treatments were being dispensed for medical or non-medical reasons. With the introduction of PDMPs, pharmacists not only searched more often for historical records about patients but also actively generated new records for the future, as if preparing for potential investigations. Indeed, at "the extreme end of documentation," pharmacists may "closely track any dispensing exceptions made on [patients'] behalf" (Chiarello 2024, 142). For example, if a patient sought an early prescription due to travel, a pharmacist may require the patient to provide travel tickets or hotel reservations, which the pharmacist may copy and file in the patient's chart in preparation for a potential audit (142). This type of documentation of interactions and decisions may become relevant to employing pharmacies and criminal enforcement agencies evaluating whether pharmacists' dispensing activities are unusual as well as to future pharmacists at the same or different pharmacies making dispensing and reporting decisions.

This type of anticipatory shift has important impacts on institutions. Perhaps of most consequence is its expansion of the scope of collection and connection of information about people. In her study of the Los Angeles Police Department (LAPD), Sarah Brayne (2021) sheds light on several data-focused technologies and strategies used by the department, including Palantir Gotham and Operation LASER. Palantir Gotham is a privately developed government intelligence platform that provides officer users with a single interface to search across a "patchwork" of legacy data sources and systems (33). Before Palantir Gotham, department officers and analysts conducted separate, one-off searches to find license plate information, traffic citations, and criminal records; the Palantir platform made finding information more comprehensive by linking data points across previously separate systems and permitting those points to be accessed via a single search (32, 41). Operation LASER, short for Los Angeles' Strategic Extraction and Restoration Program, is not a specific software or tool but a policing strategy. One component of that strategy relies on information from daily patrols, traffic citations, crime and arrest reports, criminal history, custody forms, and parole compliance to generate "Chronic Offender Bulletins" (62). Officers are not supposed to use these lists as the "sole basis for probable cause" to detain identified persons; instead, officers are supposed to develop "situational awareness" about the listed persons and to make efforts to obtain more information about those persons during patrols (62).

For both Palantir Gotham and Operation LASER, the "fundamental building block" is the "field interview card" (FI card), which is a small, double-sided index card used by officers to record information for later entry into databases (Brayne 2021, 64). FI cards collect information such as names, addresses, physical characteristics, vehicle information, gang affiliations, and criminal history; they also include blank space for officers to provide additional information on the person who is the subject of the card, including individuals that the subject was with at the time of the encounter. Once completed, FI cards are manually entered into a computer system and tagged with the time, date, and location of the police contact.

Critically, the information collected in FI cards does not just enable an officer to make decisions during a particular stop or investigation. Instead, much of the information is accumulated for future use—sometimes by the original collecting officer but often by other institutional actors, such as managers, investigators, and sometimes outside agencies. These pieces of data "might seem innocuous at the time of collection," but they "can eventually be pulled together to create useful intelligence" (Brayne 2021, 64). For example, when future officers conduct a search on the Palantir Gotham platform for a partial license plate number, such as "67," they can access all FI cards that contain "67," along with crime reports, automated license plate readings, and border crossings containing those numbers (43). FI cards are also used to rank chronic offenders identified in bulletins generated by the department. Whenever a chronic offender comes into contact with the police, points may be added to a person's "risk" score on the list (66). Over time, this frontline-sourced data can become the basis for decision making by a longer chain of institutional actors. Commanders may consider this information when deciding which officers to assign to particular offenders or locations (67). Investigators may search and pull up information recorded in one of the specified or open fields on the FI card.

The contents of FI cards, which are searchable through Palantir Gotham, also make new groups of people the subjects of future monitoring, expanding the temporality and network of people about whom agencies have information. First, data collected via the FI cards—and recorded and analyzed via the "points system"—can become a part of "a feedback loop" in which "individuals with higher point values are more likely to be stopped, thus increasing their point value, justifying their increased surveillance, and making it more likely that they will be stopped again in the future" (Brayne 2021, 69). Second, FI cards facilitate the collection of individualized data not only about direct subjects who frequently attract police attention but also about the lives of people who populate those subjects' social worlds: "Regardless of whether or how well you know someone, being stopped with them is an indelible association" that can be "recalled instantaneously with a search in Palantir" (65). Over time, patrol officers' routine collection of data about individuals only briefly or incidentally connected to the subjects of direct interest results in a secondary network of surveilled people stemming out from the original subject of interest (53).

Information about subjects and their networks is not the only data that frontline agents generate. Agents using information technologies also make themselves the subjects of future analysis, often in ways that facilitate what Levy and Solon Barocas (2018) have called "refractive surveillance": the collection of information about one group of people that facilitates control over an entirely different group. In health care, for example, Chiarello (2024, 99) found that PDMPs can be a way for a "smart

criminal physician" to identify potential law enforcement investigators. Individuals who are addicted or divert medications often have extensive PDMP records because they frequently try to obtain opioids from different health-care providers. In contrast, undercover investigators often lack such records, so "running a report is a way to root out narcs" (99). One might also imagine data collected from FI cards being used to evaluate officers themselves. Such information may be used to measure, for example, the frequency with which certain officers visit specific locations, the number of contacts they make, and, potentially, the value of the information they collect in future investigations.

For some agents, being the subject of data collection is a source of concern. This arises from the fact that agents' use of monitoring technologies also facilitates more supervision of the agents themselves. Of classic street-level bureaucrats, Lipsky (1980, 50) observed that it is often difficult to evaluate whether agents are doing a good job because agents are responsible for enforcing often diverging social goals, and these divergent goals lead to agents' having substantial discretion to focus on one goal over another. When enforcement activities are documented more frequently and made more visible, agents' achievements and performance can be scrutinized—not just by managers but also by peers within and outside of their organizations (Hupe and Hill 2007; Hirata 2021). For example, pharmacists' dispensing decisions—as tracked on PDMPs—could be subject not only to oversight by their employers and criminal enforcement agencies but also to scrutiny by fellow pharmacists, who may form opinions of their colleagues' dispensing activities.

At the same time, some agents find reassurance in their increased ability to document decisions in ways that might shield them from discipline. Research on body-worn cameras shows that some officers and supervisors welcome body-worn cameras because recorded videos can be used to resolve civilian complaints or become a relevant source of evidence in investigations and prosecutions (Fan 2019; Koen, Willis, and Mastrofski 2019; Lum et al. 2019). Chiarello (2023, 1142) described a similar perspective among pharmacists, who have been under increased scrutiny by enforcement agencies: "Pharmacists believe that checking the PDMP protects them from legal consequences, especially if they closely document interactions with their patients" and thus engage in "defensive documentation" to protect themselves from potential prosecution. Regardless of whether anticipatory data collection is concerning or reassuring, agents' behaviors are likely to be shaped by their awareness of the systematic visibility of their decisions to supervisors, employers, colleagues, and other organizations, including enforcement agencies.

By shifting frontline responsibilities to encompass the collection of data that may be irrelevant to immediate decisions facing agents in a given encounter, anticipatory data collection may divert agents' energy and time away from carrying out the duties directly implicated in the situation at hand in favor of the maintenance of an up-to-date, finely grained database of information about subjects and themselves. Although information in that database is sometimes later directly useful to officers making future decisions in the field, anticipatory data collection also elevates the importance of creating data for non-officers, thus "externalizing" the knowledge held by individual agents into organizational information that is accessible by other agents and actors (Levy and Barocas 2018, 1179). In this way, anticipatory data collection appears to shift the remit of enforcement agencies away from purpose-driven

information collection—information gathered to determine whether a law has been violated or what Brayne (2017, 985) calls "explanatory" purposes—to information gathered explicitly for secondary uses. Frontline agents are both instruments and subjects in this shift.

Process decision proliferation

In addition to facilitating deputization and anticipatory data collection, the incorporation of monitoring and prediction technologies also increases the number of "process decisions" that agents must make. I define these types of decisions as those concerning whether and how much to engage with technologies and their informational outputs. Pharmacists, for example, must make process decisions concerning whether and how they will consult and use information about prescription and dispensing activities received from PDMPs. As Chiarello (2024, 141) reminds us, pharmacists still lack time to check PDMPs for every patient and thus tend to check the PDMP database about patients they consider suspicious based on "red flags." Police officers with obligations to complete FI cards must also make more process decisions, such as decisions about which interactions to document. Police officers may also have to decide when and how often they will visit locations that are predicted to give rise to crimes or whether and when to turn body cameras on and off. Outside the policing and pharmacy contexts, social workers must decide whether and how to respond to screening scores about potential child negligence and abuse (Eubanks 2018). Prosecutors and judges must also ask whether and how they will use risk scores that suggest the extent of the flight risk posed by an arrestee (Brayne and Christin 2021).

Levy's study of commercial trucking is particularly instructive in showing how the social nuances of incorporating monitoring technologies can present frontline agents with more process decision points—sometimes earlier and sometimes simply different—about whether and how to inspect trucks. Levy (2023, 55) focuses on the introduction of electronic logging devices (ELDs), which are digital systems that capture a range of information about truckers' activities, including speed, location, lane departures, vehicle maintenance, and driving hours. ELDs are small devices that are hardwired to a truck's engine and display tracked information on an interface inside the truck cab or, in more recent models, transfer such information to a separate device such as a tablet, in addition to the truck company's dispatch office (43). ELDs were mandated to help enforce hours-of-service regulations, which set driving limits for truck drivers in order to prevent fatigue-related accidents. These laws were seen as easy to flout when drivers tracked their own time using paper logbooks (41). But, as Levy shows, ELDs have also substantially altered how officers enforce a set of "dense and complicated" laws beyond those regulating service hours (90). These shifts include changes in how inspectors "corroborate multiple sources of evidence," "remain vigilant about their own safety," and "keep alert for signs of more serious wrongdoing, like human or contraband trafficking" (90).

Before the introduction of ELDs, truck inspectors had substantial time and physical space to undertake relatively thorough inspections, which could take multiple steps and last as long as thirty or forty minutes or even up to two hours (Levy 2023, 86). As part of the inspection process, an agent could

first approach the truck driver's cab; request that the driver pass the logbook down from the open window or door; ask the driver for additional documentation that is part of the inspection process (load paperwork, permits, a medical inspection card), and then depart for [the inspector's own] vehicle (parked nearby), or the weigh station scale house, for thorough inspection of the driver's paperwork. (86)

Inspectors could undertake this multi-step process with relative ease because they conducted it in their own spaces: inspectors typically reviewed truckers' paperwork in an agency vehicle or building. In these spaces, agents had their own laptops, printer, and other equipment, and they could run the truck driver's paperwork against multiple electronic databases—state and federal—to see, for example, if the truck was stolen or to determine whether the carrier had authority to operate in the particular state (86). Critically, officers could also review driving logs at their own pace. For example, they could "spread out supporting documents," "compare a driver's reported mileage against software that estimates mileages between cities," and "use a calculator to add up the multiple rows of numbers that must be checked to ensure the driver's compliance" (86). With time, space, and access to additional information sources, agents could pay "particular attention to the logic of the logs to see if the travel recorded by the driver is sensible" (81).

With the initial adoption of ELDs, inspectors' approach to determining whether truckers have driven excess hours appears to have changed substantially: "A key issue during the transition period—that is, when ELDs *could* be used for timekeeping but were not yet mandatory for all truckers—is that the interfaces electronic logs display for inspection were not standardized" (Levy 2023, 82). Dozens of different ELD models were used; while some displayed information in a traditional grid-graph format, others listed information chronologically or provided weekly and daily summaries in the form of a "countdown clock," and yet still others required a stylus or physical printouts (82). These variations made ELDs difficult for inspectors to navigate, interpret, and understand, and inspectors reported lacking knowledge about how the systems worked and feeling uneasy about inspecting electronic logs (82–83). Eventually, federal rules required ELDs to have a consistent graph-grid display because inspectors were used to seeing paper logbooks in which information was displayed that way (82).

ELDs also reduced inspectors' physical comfort during the inspections of logs. Some ELDs were "hardwired into the trucks" and "could not be separated and taken back to the officer's vehicle for close, isolated inspection" (Levy 2023, 87). Some were connected by cable, which required officers to conduct the inspection "outside the cab on the ground, possibly in inclement weather, and below the seated driver" (87). If there was no cable connection, the inspector needed to enter the truck's cab and complete the inspection inside the driver's space. This often required inspectors to sit in the driver's seat, which meant that, during inspections, drivers were often standing behind inspectors, "literally looking over his shoulder as the officer pokes at the ELD screen" (87). The truck cab spaces might also be dirty and filled with personal belongings and sometimes even pets, such as dogs. Requiring officers to enter this "small, unfamiliar, intimate space requires [them] to attenuate their attention from the ELD in order to keep an eye out for their own personal safety" (87).

These challenges prompted some inspectors to avoid engaging with ELDs, leading to what Levy believes were missed or inadequate inspections. After ELDs were introduced, Levy (2023, 86, 88) observed that inspections that previously took about thirty to forty minutes tended to take much less time, often five to ten minutes. As Levy notes, this difference could be interpreted as ELDs having their intended effect—namely, reducing time-intensive interrogations of hours-of-service records. However, this difference could also be attributed—at least in part—to officers reducing the thoroughness of their inspections because the process became more "technically difficult and socially uncomfortable for officers to negotiate" (88). By contrast, "officers did not appear to feel any pressure to hurry" paper-based inspections (86).

Levy's interpretation also draws on reports from drivers, who believed that their trucks were less likely to be inspected when ELDs were used. For example, some drivers reported that when they were pulled in for inspection, they would be "waived through"—meaning no inspection would be undertaken—when the agent saw an ELD system within the truck or when the driver reported that one was used (Levy 2023, 83). Some truckers even signaled their use of an ELD with a decal indicating that an ELD was on the truck; because the presence of decals was thought to help avert inspection, some truckers applied them even when their trucks did not use ELDs (84–85). Thus, while ELDs were supposed to help inspectors enforce driving-hour laws, Levy's research suggests that they may also have led inspectors to do fewer inspections or less thorough ones. While inspectors have long had discretion as to which trucks to inspect and which to waive through, the introduction of technologies gives rise to a wider variety of criteria and opportunities for making those decisions.

Over time, agents may not only have to make more process decisions, but they may also have to spend more time justifying those decisions. Pharmacists already engage in defensive documentation to track their dispensing decisions. One could imagine that, in the future, truck inspectors may be required to explain why they checked the ELDs of particular trucks but not those of others. Or LAPD officers may be required to document why they spent more or less time paying attention to particular persons on the chronic offender list. Some police departments already have policies for body-worn cameras that require officers to explain why they decided not to record an encounter (Fan 2019, 223). For the myriads of process decisions that agents must make, they may additionally need to allocate time to documenting why they made those decisions.

Implications for frontline enforcement

Like other street-level bureaucrats, pharmacists, police officers, and truck inspectors face challenges long recognized in scholarship: they are expected to carry out broad, numerous, and sometimes conflicting goals without sufficient resources and guidance (Lipsky 1980; Maynard-Moody and Musheno 2003). These tensions have several sources. First, ambiguous and conflicting goals are part of social life and institutional work. Police officers are asked to enforce the law, foster good community relationships, and "maintain order," even though those goals may often be at odds (Zacka 2018, 50). Likewise, social and health workers are required to provide care and resources to individuals, while also applying eligibility rules and reporting certain potentially illegal activities to law enforcement authorities (51, 107). Second, frontline

agents are supposed to strive for fairness, responsiveness, respect, and efficiency—values that are often difficult to instantiate simultaneously (51). Both of these challenges are compounded by ongoing resource limitations (52–53). Keeping these conditions in mind, I suggest that the three shifts in frontline enforcement discussed above are likely to heighten these tensions by altering the focus and work of enforcement, without clarifying the desirability of those shifts.

Greater deputization will likely alter the substantive focus of both state and non-state agents. For non-state agents, such as pharmacists, more capacity likely leads to them spending more time "policing" patients and documenting their interactions rather than dispensing medications, providing information to patients, or identifying potential health-care treatments for them. Indeed, pharmacists have begun to see policing patients—including entering and using data from PDMPs—as a core aspect of providing health care, for example, by reducing the risk of patient overdose and deaths by prescription opioids (Chiarello 2024, 152). But, as Chiarello reminds us, when pharmacists refuse to fill prescriptions, patients often turn toward illegal drugs like heroin and fentanyl; some also die by suicide after being denied pain medications (172, 190).

For state officials, such as local officers or federal investigators, pharmacists' increased documentation of potentially violative conduct facilitates agents conducting more complex investigations, including of physicians. Initially, prosecutions of physicians for prescribing opioids were "so rare as to be almost nonexistent" (Chiarello 2024, 88). PDMPs helped to reduce the time and resources required to investigate these types of cases by enabling agents to "look up the physician in the database or request access to information from the agency that controls it" (98). As a result, investigators could much more readily "obtain a physician's prescribing history, analyze prescribing patterns, and link findings to other databases" without having to travel from pharmacy to pharmacy on a "potentially fruitless" expedition to gather prescriptions (98). However, whether prosecuting doctors is desirable remains contested. While enforcement agents see prosecutions as efforts to keep the public safe by stopping dealers "who parade as physicians," pain management advocates see these types of actions as "destroy[ing] the lives of pain patients by ruining the livelihoods of compassionate physicians" (103–4). Agents themselves recognize the disruptive consequences of prosecuting physicians, who may run legitimate and criminal practices at the same time (106).

Shifting the work of frontline enforcement to include more anticipatory data collection responsibilities will likely also heighten the ambiguity in the priorities and strategies that agents carry with them. Brayne (2021, 69) found that the extent to which Operation LASER, the LAPD's person-based predictive policing strategy, was implemented varied significantly among the department's divisions. Some divisions used the point system described above to develop bulletins of chronic offenders, while other divisions developed their lists "simply by talking to patrol officers" (69). Opinions of Operation LASER also varied substantially. While one captain described the strategy as a "civil liberties nightmare," officers in that division started practicing person-based predictive policing two years later under new leadership (69). This type of variation across departments and time likely adds more complexity and further tension to police officers' responsibilities, which already include wide-ranging goals, strategies, and values.

Finally, the proliferation of process decisions will likely alter frontline agents' responsibilities—and allocations of time—without resolving or offering additional guidance on the goals and values that agents should prioritize in any matter. Truck inspectors, for example, reported "significant trepidation" about increasing automation, including the introduction of ELDs in the inspection process (Levy 2023, 80). The ELD mandate is focused on enforcing one set of time-and-hour driving regulations. However, inspectors' responsibilities also include examining the physical conditions of vehicles and identifying illegal trafficking and shipping. Inspectors worried that if they did not need to undertake the time-consuming process of paper inspections, identifying illegal trafficking would become more difficult:

> [S]ignificant trafficking busts (human- and drug-related) occur when an inspector detects "something hinky" in the course of a routine inspection, possibly as subtle as a trucker appearing unduly nervous or physically sweating during an inspection. Officers worry that if they do not have regular opportunities for close interaction with truckers, they will miss these signals. (80)

The breadth of inspectors' enforcement responsibilities suggests that, when they review electronic logs, it may still be prudent to take longer than the amount of time strictly necessary to inspect for potential violations of hour-and-wage laws. Thoughtful inspectors may very well be aware of the subtle shifts in the emphasis and dynamics of their work. However, awareness alone does not give clarity on whether the shifts in enforcement activity are desirable.

Collectively, the work of Brayne, Chiarello, and Levy suggests that it is critical to ask how monitoring and prediction technologies shift agents' approaches to enforcement. I have suggested three ways in which these shifts may exacerbate long-standing tensions in conflicting goals and values faced by frontline agents. At the same time, the introduction of monitoring and prediction technologies also appears to alleviate some resource-related dimensions of the tensions. The introduction of PDMPs, for example, has helped pharmacists resolve the conflict between caregiving and enforcement in a particular manner. PDMPs have given pharmacists access to informational resources that have made them more comfortable denying prescriptions that appear to be for non-medical uses, facilitating their "reframe and embrace" of enforcement as a way to protect patients' health (Chiarello 2024, 152).

The extent to which the tensions of frontline enforcement are exacerbated or abated will likely depend on several conditions—a critical one being individual agents' orientations toward their roles. Bernardo Zacka (2018) identifies three orientations that street-level bureaucrats may develop—and default to—over their careers: indifference, caregiving, and enforcement. Indifferent bureaucrats interact with private individuals with neutrality and impartiality to such an extent that they become too "withdrawn" (96)—in some cases, giving an "undifferentiated response" to people even when those peoples' circumstances warrant specialized consideration (102). Caregiving bureaucrats prioritize being responsive to the particularities of individual clients, often at the cost of expending undue public resources and undermining clients' autonomy (105). Enforcement-oriented frontline agents see

their role as protecting the "letter" and the "spirit" of the law as well as public resources and services by distinguishing, for example, between people who are "genuinely entitled to benefits and assistance" and those who are "extracting more than their fair share" (107). This orientation prioritizes the fairness of the overall system but can often treat people with disrespect and unwarranted suspicion; it can also require extensive investigative resources (108). While these orientations are ideal types, examining technologies alongside orientations can help us to see potential variation in the directions of technologies within frontline enforcement.

The social and organizational settings in which officials work will also shape how monitoring and prediction technologies interact with tensions in enforcement. As public administration scholars have long recognized, street-level bureaucrats work in "a range of relationships" (Hupe and Hill 2007, 285). In addition to interactions with clients and managers, agents also have relationships and contact with coworkers and peers in neighboring organizations and shared professions (Hirata 2021). Monitoring and surveillance technologies not only facilitate deputization of new frontline actors but also extend what we can think of as the "backline" of enforcement—those vendors, trainers, data analysts, technical analysts, and system designers who create databases, tools, and processes that substantially affect the information that frontline officials have at their disposal and the ways in which those officials collect additional information (Bovens and Zouridis 2002; Brayne 2021). As backline enforcement becomes more central to bureaucratic functioning, we will need a "wider lens" to examine how frontline agents work with backline actors and entities that are often less visible—and often not subject to the same levels of internal or external review (Raso and Adelmant 2024, 39, 45−46).

A third crucial mediating condition may be the types of resources that are available to frontline agents. Today, PDMPs prioritize enforcement activities among pharmacists because pharmacists lack other resources that enable them to treat patients. Chiarello (2023, 1155) points out that, to protect patients' health, pharmacists need more treatment tools, such as the authority to initiate medications for addiction treatment themselves. If these types of resources are made available, pharmacists may be more inclined to treat patients instead of denying them prescriptions or reporting them to the police, even if they see worrisome information from a PDMP database.

In addition to understanding these conditions, we also need to clarify our expectations for frontline agents trying to enforce laws and policies that are themselves flawed. In many ways, agents fail to address fundamental social problems because the underlying laws they enforce fail to address them. In the trucking context, for example, Levy (2023, 153) argues that the structural source of unsafe commercial truck driving is not the practice of cheating on logs but, rather, an economic system in which drivers cannot make enough money by driving a safe number of hours. Mandating ELDs to enforce driving-hour rules allows us—as a society, as employers, as lawmakers, and as regulators—to ignore fundamental problems of the industry: its pay structure, uncompensated time, dangerousness, and lack of worker protections (153).

Levy's (2023) point has also been observed with respect to other legal and technological interventions aimed at reform. In the criminal sentencing context, for example, federal guidelines were established to ensure more uniformity and

consistency in sentencing under the theory that the guidelines would control disparate sentencing across race by judges (see, for example, Rothschild-Elyassi 2021). Jessica Eaglin (2019, 530) reminds us, however, that these reform efforts overlooked the fact that differences in which Black men are charged also accounted for the substantial proportion of Black men who are incarcerated and that the more recent introduction of algorithmic risk assessments further reifies the guidelines' already narrow conception of the problem as one of judicial discretion. Likewise, in the employment context, Ifeoma Ajunwa (2020) has argued that algorithmic bias is not solely a technical problem but also a problem of employment laws that give too much deference to employers in discrimination claims. Reforms focused on the specific problem of "automated decision making" during hiring, then, also overlook the more fundamental problem of employment law that institutionalizes organizational prerogative, such as making hiring decisions based on the "cultural fit" of a candidate (1716). In this way, the ongoing tensions of frontline enforcement—exacerbated by monitoring and prediction technologies—are problems not only of enforcement but also of the law itself. Law often fails to address fundamental problems, so it sets up challenging—and sometimes impossible—situations for frontline agents to address.

What, then, should we expect of frontline agents whose responsibilities include enforcing laws that do not adequately address fundamental problems? Having context-specific responses to this answer will likely be important if we want to develop legal and governing systems in which frontline workers maintain what Zacka (2018, 97) describes as an "ecumenical" or "multifaceted" orientation toward decision making. Zacka argues that frontline agents should have discretion within the bounds of law and reason; discretion enables agents to pursue policy goals that "cannot be precisely codified because their meaning varies depending upon context and situation" (64). However, that discretion can be problematic when tensions inherent in the job result in agents' adopting a singular orientation for filtering and approaching all cases before them. Context-specific expectations for agents enforcing flawed laws may be particularly necessary as we now also set out to establish expectations for technologies intended to generate information that assists agents in carrying out those laws.

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