

Prescription Drug Monitoring Programs and Overdoses: Advancing the Next Generation of Research

 See also Hughes et al., p. 1573.

A decade of public health research investigating the impacts of prescription drug monitoring programs (PDMPs) on overdoses has generated a cacophony of divergent findings. PDMPs are databases used to monitor and regulate the prescribing and dispensing of controlled substances and are a policy lever that 49 states and Washington, DC, have implemented to combat opioid-related harms. Several studies—including the Hughes et al. study (p. 1573) appearing in this issue—have shown that PDMPs are associated with a decrease in opioid overdoses, a finding aligned with their purpose; others, however, have reached the opposing conclusion or have revealed no association. If public health is to fulfill its mission of promoting population health by guiding policy, we have provided a mercurial compass for PDMPs thus far. This mission is particularly vital now, as the COVID-19 pandemic threatens to exacerbate vulnerability to overdoses.¹

The contradictory findings regarding PDMPs originate, in part, in the challenges of conceptualizing and analyzing laws as social determinants of health. Recent research has recognized that states have enacted highly heterogeneous PDMP laws, with

some mandating their use and others not doing so, some requiring daily updates and others permitting significant lags, and some requiring that law enforcement have a warrant to access data and others not having this requirement in place.² This editorial identifies additional select guideposts for future analyses of PDMPs drawing on principles of public health law research developed by Wagenaar and Burris.³

OUTCOME MEASURES

With rare exception, studies of PDMPs and overdoses have conceptualized and operationalized their outcomes as some permutation of overdose mortality, probably because vital statistics data enumerating overdose deaths are widely available (although perhaps overdoses are misclassified). PDMPs, however, would primarily affect overdose occurrence rather than the fatality rate among overdose victims. Multiple factors influence fatality rates among overdose victims, including the pharmacokinetics of the ingested substances, the victim's physiological responses and comorbidities, the presence of bystanders who are aware of the event, and the capacity of

bystanders and emergency medical service (EMS) personnel to respond effectively.

Each of these factors holds multiple possible futures for the victim. If bystanders are present, they may (or may not) have sufficient doses of naloxone to reverse the overdose, and they may (or may not) summon EMS personnel. If summoned, EMS personnel may (or may not) arrive in time and may (or may not) be required to delay care until the police arrive. For the vast majority of overdose victims, these various factors coalesce to form a bridge to survival: before fentanyl saturated the market, it was estimated that more than 95% of overdose victims survived. The low fatality rate among overdose victims, coupled with the number of variable factors linking overdose occurrence to death, obscures relationships between PDMPs and overdose mortality.

Future research on PDMPs and overdose should also expand to encompass nonfatal overdoses as outcomes. Nonfatal overdoses matter in and of themselves; they

generate significant suffering, including serious multisystemic sequelae (e.g., cognitive impairment; pulmonary, muscular, and cardiovascular complications; and renal failure) and psychological trauma, and mark vulnerability to a future fatal overdose. The challenge resides in accessing valid data on such outcomes to systematically study the impact of state laws.

IMPLEMENTATION

As Wagenaar and Burris argue,³ the health impacts of a law “on the books” depend largely on whether and how it is implemented “on the streets.” To illustrate, heroin possession has been illegal outside of highly circumscribed instances since 1924. However, the scale up of the war on drugs 60 years later transformed the enforcement of drug-related laws, dramatically increasing arrest and incarceration rates for drug-related offenses and catalyzing racialized mass incarceration. Little research, however, has explored whether and how variations in PDMP implementation shape overdoses.

Future research could examine the nature and consequences of heterogeneities in PDMP implementation, culling data from the laws themselves (some of which explicitly describe

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enforcement) and associated funding allocations, case law, investigations by relevant state boards (e.g., state medical boards), and surveys of prescribers and pharmacists. Melding implementation science theories and methods to analyze the interface of PDMPs and prescriber and pharmacist practices is a vital next step, although it will require advancing implementation science so that it more rigorously and comprehensively conceptualizes and measures the external environment and the processes through which it shapes implementation outcomes.⁴

RISK ENVIRONMENTS

The risk environment model posits that laws are part of the broader macro-level political environment and that they may shape the health of people who use drugs by interacting with features of the social, economic, physical, and health care—criminal justice intervention environments that operate at the macro, meso, and micro levels, as well as with other features of the political environment.^{5,6} PDMP impacts on overdoses may thus depend on these other risk environment features.

To illustrate, the beneficial impacts of North Carolina's PDMP on overdoses reported in this issue may have occurred in part because the state's robust user unions, Good Samaritan Laws, and naloxone access laws helped people living with an opioid use disorder survive any changes in local drug markets that the evolving state PDMP precipitated. These and other variations in risk environments (e.g., spatial access to substance use disorder treatment, Medicaid expansion) might explain heterogeneous past PDMP findings, and they

merit future exploration to enhance understanding of the specific contexts in which particular PDMP stipulations harm or advance public health.

HEALTH EQUITY

For more than a century, US drug-related laws have generated health inequities by sustaining White supremacy and other forms of discrimination. A next step for research on PDMPs and overdoses could recognize this potent historical and contemporaneous fact and explore whether and how PDMPs might generate inequities in overdoses, whether by race/ethnicity, gender, rurality, or other socially defined characteristics. This advance will require combining several suggestions from this editorial, including investigating inequalities in the implementation of specific PDMP stipulations and in risk environments. When overdose mortality is the outcome, investigators should consider whether case fatality rates vary systematically by the victim's social position (e.g., gender, race/ethnicity), perhaps traveling with systematic population-level differences in comorbidities, naloxone access, and willingness to summon EMS personnel and, by extension, the police.

Drug-related laws are evolving as rapidly as the overdose epidemic itself. Generating a larger body of evidence, including research guided by the recommendations outlined here, to accurately identify stipulations of PDMP laws that promote or damage the public's health is a vital step toward ending drug-related suffering. **AJPH**

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CONFLICTS OF INTEREST

The author reports no conflicts of interest.

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