We Need a Taxonomy of State-Level Opioid Policies

Sean Grant, DPhil[1,2]; Rosanna Smart, PhD[2,3]; Bradley D. Stein, MD, PhD[2,4]

[1]Department of Social & Behavioral Sciences, Indiana University Richard M. Fairbanks School of Public Health, Indianapolis

[2]RAND-USC Schaeffer Opioid Policy Tools and Information Center, RAND Corporation, Pittsburgh, Pennsylvania

[3]Economics, Sociology, and Statistics Department, RAND Corporation, Santa Monica, California

[4]University of Pittsburgh School of Medicine, Pittsburgh, Pennsylvania

The opioid crisis is an unprecedented national emergency. Societal costs from misuse of, addiction to, and overdose from prescription opioids, heroin, and synthetic opioids over the last 2 decades account for hundreds of thousands of deaths and billions of dollars in economic burden.[1] States have responded with wide-ranging policies that vary substantially in their key components and the opioid-crisis aspects targeted. Even nominally identical policies, such as prescription drug monitoring programs, differ in design details across states and over time. These details matter for explaining differential results on key outcomes.[2] Consequently, it is critical to identify the most effective policy components and how best to implement them.

The lack of a standardized nomenclature to classify state-level opioid policies is a substantial barrier to understanding their effectiveness. For example, a recent study found that state laws allowing pharmacist-direct dispensing of naloxone were associated with significant reductions in fatal overdoses, but no such association was observed for other pharmacy naloxone access laws.[3] The bespoke categorization of naloxone access laws as either providing pharmacists direct or indirect authority to dispense naloxone was subsequently challenged as an oversimplification, given that heterogeneity in

==========
This is the author's manuscript of the work published in final edited form as:

Grant, S., Smart, R., & Stein, B. D. (2020). We Need a Taxonomy of State-Level Opioid Policies. JAMA Health Forum, 1(2), e200050. https://doi.org/10.1001/jamahealthforum.2020.0050

implementation of indirect authority across states is strongly associated with naloxone accessibility.[4] Both groups agreed that the specifics of naloxone access laws substantially influence their effectiveness but disagreed on how best to categorize policies. These distinctions are not purely semantic. Different empirical findings could arise from different classification approaches (rather than true differential results), limiting our ability to distinguish particular policy characteristics associated with effectiveness. Inconsistently operationalizing state-level opioid policies, if left unaddressed, will hinder our ability to identify optimal implementation strategies.

Similar to state-level opioid polices, behavior change interventions vary widely in the type and range of components implemented (even when targeting the same outcome among similar populations) and the terminology describing these components (even when implementing the same component across contexts). Absent standardized definitions, behavioral scientists had difficulty identifying the most effective components and faithfully replicating behavior-change interventions in new contexts. To address this problem, behavioral science leaders have developed a taxonomy, an internationally shared language for precisely characterizing the active content of interventions.

A taxonomy is a formal system for classifying multifaceted, complex phenomena according to a set of explicit conceptual domains and dimensions.[5] For example, the Behavior-Change Technique (BCT) Taxonomy—created by engaging an international group of 400 experts from 12 countries in an iterative, Delphi-like rating process—resulted in an extensive, hierarchically structured categorization of 93 BCTs clustered into 16 groups.[6] The BCT Taxonomy has improved scientific methods for specifying key components of behavior-change interventions—thereby facilitating replication, research synthesis, and real-world implementation. The BCT Taxonomy demonstrates the feasibility of achieving standardized definitions that improve the description, measurement, and evaluation of real-world solutions to public health issues. Research on the outcomes of state opioid policies is fraught with contradictions, including disagreements about dates when policies are effective, how policies should be classified, and which

aspects of policy are important to consider.[2-4] A taxonomy's shared structure and standardized vocabulary has the potential to increase clarity when categorizing and evaluating heterogenous state-level opioid policies.

Consistent with recommendations for developing taxonomies in health research,[5] a taxonomy for state-level opioid policies can be organized at the highest taxonomic level according to broad domains, such as opioid prescribing, treatment for opioid use disorder, and harm reduction. Within a domain (eg, harm reduction), policies are then categorized at increasing levels of granularity: classes within a domain (eg, naloxone access laws), families within a class (eg, pharmacy channels), mechanisms within a family (eg, distribution mechanisms), and techniques within a mechanism (eg, statewide orders). This preliminary approach could serve as the foundation for further development and refinement of a taxonomy agreed on by experts.

Creating a taxonomy for state-level opioid policies would yield several benefits. This taxonomy could underpin the development of coding manuals to categorize policies at multiple levels, allowing researchers to better describe policies, examine whether differences in distinct policy components influence effectiveness, and synthesize evidence on which combination of components and implementation approaches enhance effectiveness.[6] With more precise and consistent policy classifications in the research literature, policymakers can make more informed policy decisions targeting outcomes in specific contexts. For example, the National Institute on Alcohol Abuse and Alcoholism's Alcohol Policy Information System (https://alcoholpolicy.niaaa.nih.gov/) provides insight into the nature, scope, and issues addressed by a full range of state-level alcohol policies. An Alcohol Policy Taxonomy (https://alcoholpolicy.niaaa.nih.gov/resource/alcohol-policy-taxonomy/13) served as the foundation for selecting alcohol-relevant policies to include in the Alcohol Policy Information System. Similarly, the National Institute on Drug Abuse could support the development and hosting of an opioid policy information system (built on an opioid policy taxonomy) that provides a user-searchable

database of authoritative, detailed, and comparable information on state-level opioid policies to facilitate research and policy decision-making.

Recent computer science advances can further optimize the value of taxonomies through the development of ontologies, which systematically structure entities of interest in a scientific domain and organize the evidence about these entities using a controlled, well-defined vocabulary in a computationally accessible format. For example, the BCT Taxonomy has enabled the development of an ontology linking effect sizes for specific behaviors with intervention content, implementation, and mechanisms of action moderated by context. This ontology forms the foundation of an artificial intelligence knowledge system intended to automatically annotate intervention evaluation reports, anticipate effect sizes for particular interventions and contexts, and provide a user-interface for queries from researchers and practitioners.[7] Through automatic extraction, synthesis, and interpretation of findings, sophisticated methods of computer-automated inference could facilitate more efficient synthesis of state-level opioid policy evidence and enhance uptake of accessible evidence by policymakers.

Developing a state-level opioid policy taxonomy will not happen overnight. However, even in early stages, grounding scientific analyses in a consistent and coherent system of classification facilitates critical thinking by researchers and policymakers about the mechanisms by which policies may work, given complex interactions between law, populations, and context. Over time, developing and using such a taxonomy can facilitate the design and implementation of more effective state-level policies—an essential tool in addressing the opioid crisis.

Article Information

Corresponding author: Sean Grant, DPhil, Department of Social & Behavioral Sciences, Indiana University Richard M. Fairbanks School of Public Health, 1050 Wishard Blvd, RG 6046, Indianapolis, IN 46202 (spgrant@iu.edu).

Conflict of Interest Disclosures: Dr Grant's spouse is a salaried-employee of and owns stock in Eli Lilly and Company and Dr Grant has accompanied his spouse on company-sponsored travel. No other conflicts were reported.

Funding/Support: This article was supported by the National Institute on Drug Abuse (grants P50DA046351 [Drs Grant, Smart, and Stein] and R21DA04595 [Dr Smart]).

Role of the Funder/Sponsor: The funder had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

References

1. Florence CS, Zhou C, Luo F, Xu L. The economic burden of prescription opioid overdose, abuse, and dependence in the United States, 2013. *Med Care*. 2016;54(10):901-906. doi:10.1097/MLR.0000000000000625

2. Pardo B. Do more robust prescription drug monitoring programs reduce prescription opioid overdose? *Addiction*. 2017;112(10):1773-1783. doi:10.1111/add.13741

3. Abouk R, Pacula RL, Powell D. Association between state laws facilitating pharmacy distribution of naloxone and risk of fatal overdose. *JAMA Intern Med*. 2019;179(6):805-811. doi:10.1001/jamainternmed.2019.0272

4. Hill LG, Reveles KR, Evoy KE. State-level approaches to expanding pharmacists' authority to dispense naloxone may affect accessibility. *JAMA Intern Med*. 2019;179(10):1442-1443. doi:10.1001/jamainternmed.2019.3653

5. Bradley EH, Curry LA, Devers KJ. Qualitative data analysis for health services research: developing taxonomy, themes, and theory. *Health Serv Res*. 2007;42(4):1758-1772. doi:10.1111/j.1475-6773.2006.00684.x

6. Michie S, Wood CE, Johnston M, Abraham C, Francis JJ, Hardeman W. Behaviour change techniques: the development and evaluation of a taxonomic method for reporting and describing behaviour change interventions (a suite of five studies involving consensus methods, randomised controlled trials and analysis of qualitative data). *Health Technol Assess*. 2015;19(99):1-188. doi:10.3310/hta19990

7. Michie S, Thomas J, Johnston M, et al. The Human Behaviour-Change Project: harnessing the power of artificial intelligence and machine learning for evidence synthesis and interpretation. *Implement Sci*. 2017;12(1):121. doi:10.1186/s13012-017-0641-5