

BMJ Open Research outcomes of linked prescription drug monitoring program data: a scoping review protocol

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ABSTRACT

Introduction The objective of this scoping review is to describe the extent and nature of research studies based on linked prescription drug monitoring program (PDMP) data; defined as PDMP data linked to other clinical, administrative or public health data sets. The population is prescribed and dispensed controlled substances. The concept is analysis of linked PDMP data to other clinical, administrative or public health data sets. The context is the USA.

Methods and analysis The scoping review will be conducted with guidance from the latest version of the JBI Manual for Evidence Synthesis, using the framework as outlined by Arksey and O'Malley. Search strategies will be peer-reviewed according to the Peer Review of Electronic Search Strategies (PRESS) guidelines. For transparency and reproducibility, we will adhere to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews reporting guidelines in reporting results. Two reviewers will independently review screen titles and abstracts, then independently review full text to select papers or studies for inclusion. When consensus cannot be reached with discussion, a third reviewer will resolve the conflicts. From our included studies, we will extract variables describing aspects of population, concept and context (USA).

Ethics and dissemination Ethical approval was not required for this review. This scoping review entails analysis of previously published, peer-reviewed research. We intend to publish findings in a peer-reviewed journal.

INTRODUCTION

The rationale of this scoping study is to understand the impacts of linked data from prescription drug monitoring programs (PDMP) on the epidemic of opioid misuse and overdose deaths in the USA. Every state, with the exception of Missouri, currently has a PDMP.

Prescribed controlled substances are commonly abused in the USA. Over the past 20 years, the USA has experienced an epidemic of controlled substance misuse and abuse, and a corresponding increase in overdose deaths.¹ In fact, most overdose deaths in the USA are caused by controlled substances, including opioids, benzodiazepines and

Strengths and limitations of this study

- We will conduct the scoping review according to the JBI Manual for Evidence Synthesis to enhance rigour, transparency and reproducibility.
- The methods entail a comprehensive, peer-reviewed search of databases and potential sources of unindexed evidence, to ensure high recall of relevant studies.
- The review may not include relevant studies currently in progress, or those with unreported findings.
- We will analyse the results quantitatively and qualitatively.

antidepressants.² To address the epidemic of controlled substance misuse and overdose deaths, nearly all states and some territories of the USA have established PDMPs, databases that track the prescribing and dispensing of controlled substances.² The information contained within PDMPs is invaluable to prescribing providers who wish to ensure patients receive appropriate pain management, avoid safety issues or identify drug-seeking behaviour. In fact, many states require providers to check the PDMP before prescribing a controlled substance to a patient. Most PDMPs participate in data sharing via a national network, the National Association of Boards of Pharmacy's Prescription Monitoring Programme InterConnect system, in order to obtain more complete information on a patient's prescribing history.³

In addition to its considerable clinical value, PDMP data are important for surveillance and research. PDMP data have been used to conduct varied research related to prescribed controlled substances, including topics in epidemiology, addiction and health services research. However, the use of PDMP data for research is tightly controlled due to privacy-related concerns.⁴ Highly summarised and aggregated, deidentified data pose lower risks related to privacy and confidentiality. However, more complex analyses that require

the linkage of PDMP data to other meaningful sources of data, such as electronic health records, claims data or death records, requires the use of patient identifiers, and so poses higher risks related to breach of privacy and confidentiality. Although these risks can be mitigated through robust data security practices and systems of oversight, some states severely restrict these types of analyses.⁴

The purpose of our review is to describe the extent and nature of research studies based on linked PDMP data to other large clinical, public health and administrative data sets. With an overarching goal of assessing the scope of research based on PDMP data linked to other sources of relevant clinical and administrative data, the focus of this scoping review is to describe the extent and nature of published research based on linked PDMP data (eg, PDMP data linked to other clinical, public health and administrative data sets). The population is prescribed and dispensed controlled substances. The concept is analysis of linked PDMP data to other clinical, administrative or public health data sets. The context is the USA.

We searched eight sources for existing protocols or reviews and did not find any publication with our proposed focus. Sources searched on 7 June 2021 included PROSPERO (www.crd.york.ac.uk/PROSPERO), PubMed (pubmed.gov), Epistemonikos (www.epistemonikos.org), Cochrane Library (www.cochranelibrary.com), CINAHL Complete (Ebscohost), JBI Evidence Synthesis journals (www.jbisrir.com), International Journal of evidence-based health, JBI (onlinelibrary.wiley.com/journal/17441609), Trip (tripdatabase.com).

METHODS

We will conduct our scoping review with guidance from the latest version of the *JBI Manual for Evidence Synthesis*.⁵ Using the framework as outlined by Arksey and O'Malley, we will conduct our scoping review with Arksey's five stages: (1) identifying the research question, (2) identifying relevant studies, (3) study selection, (4) charting the data and (5) collating, summarising and reporting the results.⁶ For transparency and reproducibility, we will adhere to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews reporting guidelines in reporting results.^{7,8} We will use Covidence (Veritas Health Innovation,) an online systematic reviewing platform to screen and select studies. Citation management and duplicate detection and removal will be accomplished with EndNote (Clarivate Analytics). We will use Microsoft Excel with version tracking, stored on a protected cloud server, to document data extraction.

Literature searching

An information specialist (MMM) will develop and translate search strategies for the online databases using a combination of keywords and controlled subject headings unique to each database. Peer review of the strategies will be conducted by library colleagues using the Peer Review of Electronic Search Strategies (PRESS) guidelines.⁹

Electronic databases will include Medline(Ovid) 1946–2021, Embase (embase.com) 1974–2021, CINAHL Complete (Ebscohost) 1937–2021, APA PsycINFO (Ebscohost) 1872–2021, International Pharmaceutical Abstracts (Ovid) 1970–2021, Scopus (scopus.com) 1970–2021 and Web of Science Core Collection (Clarivate Analytics) 1900–2021. References of included studies will be checked for additional publications. No preprint servers will be searched. We will specifically examine conference proceedings from meetings of the following professional organisations:

- ▶ American Public Health Association <https://www.apha.org/>.
- ▶ Society of Behavioural Medicine <https://www.sbm.org/>.
- ▶ American Society of Addiction Medicine <https://www.asam.org/>.
- ▶ American Psychiatric Association <https://www.psychiatry.org/>.

We will also examine materials found on the following federal and organisational web sites:

- ▶ Centers for Disease Control and Prevention <https://www.cdc.gov/drugoverdose/pubs/index.html>.
- ▶ Substance Abuse and Mental Health Services Administration <https://www.samhsa.gov/>.
- ▶ National Institute on Drug Abuse <https://www.drugabuse.gov/drug-topics/publications>.
- ▶ Prescription Drug Monitoring Program Training and Technical Assistance Center <https://www.pdmpassist.org/>.
- ▶ PDMP Works <https://pdmpworks.org/>.
- ▶ National Association of Boards of Pharmacy (NABP) Prescription Monitoring Program (PMP) Interconnect <https://nabp.pharmacy/members/pmp-interconnect/>.

The full search protocol for both the biomedical and grey literature are available online supplemental files 1 and 2.

Study selection (eligibility criteria)

Two reviewers (CT and MC) will independently screen titles and abstracts, then independently review full text to select papers or studies for inclusion. When consensus cannot be reached with discussion, a third reviewer (CS) will resolve the conflicts.

Inclusion criteria

The review will include studies of any topic based on retrospective, joint individual-level analysis of PDMP data and data from other clinical, public health and administrative data sets. Any type of study whether observational or interventional is eligible, and the focus of the study can be at the individual, group, or system level. Examples of databases to which the PDMP include but should not be limited to the following:

- ▶ Birth and death registries.
- ▶ Social services databases (child care subsidies, Women Infants and Children).

Table 1 Data extraction variables with analysis method

Variable	Analysis
Title	N/A
Authors	N/A
Year of publication	Frequency analysis
Study population/sample size	Descriptive statistics (range, mean, median)
Prescription Drug Monitoring Program (PDMP)	Frequency analysis
PDMP variables of interest	Frequency analysis
Other data sets/sources (ODS)	Frequency analysis
ODS variables of interest	Frequency analysis
Specific controlled substances (if applicable)	Frequency analysis
Method of linkage (if described)	Frequency analysis
Identifiers used for linkage (if described)	Frequency analysis
Study-specific or existing linkage?	Frequency analysis
Aim or purpose	Inductive thematic analysis
Research Question addressed using linked data	Inductive thematic analysis
Study design/methodology	Inductive thematic analysis
Individual level, population level or other?	Frequency analysis
Geographical location of study	Frequency analysis

N/A, not available.

- ▶ Public health databases (immunisations, newborn hearing, developmental, cancer registry, violence and injury).
- ▶ Claims Databases, including private pay, third party and Centers for Medicare & Medicaid Services (CMS).
- ▶ Professional licensing databases.
- ▶ Electronic health records.

Exclusion criteria

Given the focus on US PDMPs, which grew substantially in number during the years 2000–2010, this review will be limited to English language publications after the year 2000. It will be limited to primary studies and exclude reviews or meta-analyses.

Quality assessment

In compliance with scoping review methodology, no formal quality assessment of included studies will be conducted as our goal is to rapidly map the literature.

Data extraction: charting the data

From our included studies, we (MC and CT) will extract variables (see [table 1](#)) describing aspects of population (prescribed and controlled substances), concept (analysis of linked PDMP data) and context

(USA). We selected these variables in order to facilitate article tracking and discern the elements of PDMP data linked to other large clinical, public health and administrative data sets. If we identify a need to modify the variables after data extraction has begun, the proposed revision will be reviewed by an analysis team (MC, CT and CS) and adopted only if consensus is reached.

Analysis of evidence

We will conduct an initial manual data review with the analysis team (MC, CT and CS) to identify and resolve any needs for categorisation or standardisation of nomenclature. We will conduct frequency analysis to describe the type and distribution of variables as indicated in [table 1](#), as well as a summary list of articles and their characteristics. We will convene one to three sessions of inductive thematic analysis to characterise the research topics, research questions and to discuss relative strength of evidence of the topics and questions.

Presentation of results

First and foremost, we will present the results of the study selection procedure as a figure that depicts the process, overlaid with numbers. We will present characteristics of included studies in a table. We will use graphs and a table to present the results of frequency analyses and strength of evidence. We will present the results of inductive thematic analysis through narrative text.

ETHICS AND DISSEMINATION

Ethical approval was not required for this review. This scoping review entails analysis of previously published, peer-reviewed research. We intend to publish findings in a peer-reviewed journal. Patients or the public were not involved in the design, conduct, or reporting, or dissemination plans of our research. We do not plan to involve patients or the public.

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Contributors All authors (MC, CS, CT and MMM) contributed to the conception of the work, drafting and final approval of the manuscript, and agree to be accountable for all aspects of the work. MMM, a librarian and information specialist, led the design of the search protocol with input from all other authors.

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Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

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REFERENCES

- 1 Hedegaard H, Minino AM, Warner M. Drug overdose deaths in the United States, 1999-2017. *NCHS Data Brief* 2018;329:1-8.
- 2 U.S. Department of Justice Drug Enforcement Administration. 2019 drug enforcement administration national drug threat assessment. 152. U.S. Department of Justice, 2019.
- 3 National association of boards of pharmacy. PMP interconnect 2020, 2021. Available: <https://nabp.pharmacy/members/pmp-interconnect/> [Accessed 16 Dec 2021].
- 4 The Pew Charitable Trusts. *Issue brief: policy changes could bolster prescription drug monitoring*, 2020.
- 5 JBI. *JBI manual for evidence synthesis*. JBI, 2020.
- 6 Arksey H, O'Malley L. Scoping studies: towards a methodological framework. *Int J Soc Res Methodol* 2005;8:19-32.
- 7 Peters MDJ, Godfrey C, McInerney P. Chapter 11: Scoping Reviews (2020 Version). In: Aromataris E, Munn Z, eds. *JBI manual for evidence synthesis*. JBI, 2020.
- 8 Tricco AC, Lillie E, Zarin W, et al. PRISMA extension for scoping reviews (PRISMA-ScR): checklist and explanation. *Ann Intern Med* 2018;169:467-73.
- 9 McGowan J, Sampson M, Salzwedel DM, et al. PRESS Peer Review of Electronic Search Strategies: 2015 Guideline Statement. *J Clin Epidemiol* 2016;75:40-6.