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Prescription Monitoring Programs in Canada: Best Practice and Program Review

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Executive Summary

Prescription psychotropic medications are important therapeutic options in clinical practice and can bring significant improvements to the quality of life of patients. However, some of these medications also have the potential to cause significant harms. The involvement of the healthcare system in both contributing to and helping to solve the problem makes this very different from the issues with other substances of abuse. In 2013, a pan-Canadian strategy called *First Do No Harm: Responding to Canada's Prescription Drug Crisis* was launched. The 10-year strategy focuses on opioids, sedative–hypnotics and stimulants and includes 58 recommendations across a number of domains (CCSA 2013). The use of prescription monitoring programs (PMPs) is endorsed as one important component of the overall strategy.

The purposes of PMPs have been articulated in many ways, but the common themes are:

- To enhance patient care and assist in the safe use of controlled prescription drugs by monitoring outpatient prescription dispensing information;
- To help reduce the harms resulting from the use of controlled prescription drugs; and
- To assist in reducing the diversion of controlled prescription drugs.

The objectives of this review are: 1) to outline the diversity of current practices in PMPs, 2) to examine the evidence for effectiveness of PMPs, and 3) to identify which best practices out of those previously proposed in the literature, have the most supporting evidence at this point in time.

PMPs cover a range of features and practices. Different PMPs may vary in models of administrative oversight, specific drugs targeted for monitoring, methods of data collection, types of interventions, and level of information sharing. There is limited supporting research evidence for many aspects of PMPs at this time; however, the volume of research reports is increasing each year, providing a growing evidence base in this area. Although established and accepted best practice recommendations do not currently exist, the following recommendations encompass practices which are supported by considerable and consistent evidence based on the findings of this review.

Best Practice Recommendations

1. Include all prescription drugs that have been, or could be, associated with misuse and addiction.
2. Ensure unique identifiers are collected to link patient, prescriber and pharmacist records.
3. Make up-to-date, full patient profiles available, confidentially, in real time to clinicians at point of care.
4. Send proactive, unsolicited reports to stakeholders.
5. Standardize data collection methods to optimize sharing across jurisdictions and analyze trends.
6. Incorporate robust safeguards to protect patient privacy.
7. Evaluate the impact of the program to detect both intended and unintended consequences.
8. Make available encrypted information in PMPs to public or private entities for statistical, research or educational purposes.

There are currently seven provinces operating some form of a PMP (British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Nova Scotia, Newfoundland and Labrador), two provinces with programs in development (New Brunswick and Prince Edward Island), and one territory (Yukon) that is linked in with the Alberta program.

As programs across Canada continue to be developed and expanded, further work is needed to ensure that best practices are implemented, to evaluate the impact of various features of PMPs, and to establish the overall value of PMPs in promoting the safe and effective use of prescription products that are associated with significant harms.

By presenting the best available evidence for PMP program features and practices at the present time, this review provides Canadian jurisdictions with valuable information to assist in implementing the recommendations of the First Do No Harm strategy with respect to PMPs. Jurisdictions interested in initiating or enhancing a PMP can use the information in this report to evaluate their own programs and to consider implementation of additional features based on the best available evidence. It is hoped that this review will also strengthen efforts in information sharing and standardization of data collection across jurisdictions in Canada, in order to more effectively reduce the harms of controlled prescription drugs on a national level.

Introduction

Background

Prescription psychotropic medications are important therapeutic options in clinical practice and can bring significant improvements to the quality of life of patients. However, some of these medications also have the potential to cause significant harms. Prescription opioids (e.g., morphine, oxycodone, codeine) have pharmacological properties that can lead to addiction and are associated with a significant risk of overdose death. Other prescription psychotropic medications with properties that can to lead to misuse and cause addiction include sedative–hypnotics (e.g., diazepam, alprazolam, lorazepam) and stimulants (e.g., methylphenidate, dextroamphetamine).

The harms associated with prescription drug misuse have been increasingly recognized as a problem in Canada over the last decade, particularly in relation to opioids. Canada is the second largest consumer of prescription opioids in the world (International Narcotics Control Board, 2013), a large percentage of youth report using prescription opioids for non-medical purposes (Boak, 2013), and there have been significant increases in the number of people seeking treatment for addiction to prescription drugs (Fischer 2010). There have also been an increasing number of overdose deaths associated with prescription opioids (Dhalla, 2009; Madadi, 2013), with increased risk linked to higher prescribed daily doses (Gomes, 2011).

The fact that these medications are necessary for therapeutic purposes differentiates them from other substances of abuse, and suggests that different approaches and different solutions are required. In 2013, a pan-Canadian strategy called *First Do No Harm: Responding to Canada's Prescription Drug Crisis* was launched. Development of this 10-year strategy involved extensive collaboration across different jurisdictions, perspectives and areas of expertise. The strategy focusses on opioids, sedative–hypnotics, and stimulants, and includes 58 recommendations from a number of domains (Canadian Centre on Substance Abuse, 2013). The use of prescription monitoring programs (PMPs) is endorsed as one important component of the overall strategy. Specific recommendations include establishing research to evaluate best practices and impacts of PMPs, and sharing of best practice information across jurisdictions.

PMPs have been implemented in seven provinces in Canada and in forty-nine states in the United States (Garcia, 2013). In Australia, the federal government is implementing a system for the Electronic Recording and Reporting of Controlled Drugs (Nicholas, 2013). These programs are quite varied in their administration and scope, but all are designed to exert controls on the prescription of products with pharmacological properties that can lead to misuse and addiction.

The purposes of PMPs have been articulated in many ways, but the common themes are:

- To enhance patient care and assist in the safe use of controlled prescription drugs by monitoring outpatient prescription dispensing information;
- To help reduce the harms resulting from the use of controlled prescription drugs; and
- To assist in reducing the diversion of controlled prescription drugs.

Objective of Review

The objectives of this review are: 1) to outline the diversity of current practices in PMPs, 2) to examine the evidence for effectiveness of PMPs; and 3) to identify which best practices out of those previously proposed in the literature, have the most supporting evidence at this point in time.

Methods

In 2012, the Prescription Drug Monitoring Program Center of Excellence (PDMP COE) at Brandeis University in Massachusetts produced a comprehensive review entitled *Prescription Drug Monitoring Programs: An Assessment of the Evidence for Best Practices* (Clark, Eadie, Kreiner & Strickler, 2012). This document summarized the evidence up to 2012 supporting proposed best practices for PMPs. The current report updates the evidence that has become available subsequent to the Clark et al. (2012) review. Based on the overall amount and consistency of the evidence available, as well as consensus opinion, this report identifies best practices from the literature with the most supporting evidence.

Information Sources

A search from 2012 to 2013 was conducted in October 2013 using PubMed, PsycINFO, Project Cork and Google Scholar to identify articles about the effectiveness of PMPs. The following search terms and their variations were used: prescription drug monitoring, prescription monitoring, doctor shopping, multiple prescribers, unsolicited reporting, proactive reporting and controlled substance monitoring. Additional searches were also conducted to identify more current articles from authors listed in the Clark et al. (2012) review. The journals *Research in Social and Administrative Pharmacy* and *Pain Medicine* were searched as well. Grey literature sources included individual PMP websites, PMP organization websites and Google.

A second search was conducted in May 2014 using similar search terms in PsycINFO, in Process Medline and Medline from 2013 to 2014 to ensure that any new relevant articles were also included. For both searches, the author screened and reviewed the abstracts and summaries identified to determine their relevance for inclusion and the full text articles were retrieved and reviewed. Appendix 1 includes the details for these search strategies.

Information on the features and practices of the PMPs in Canada was obtained by reviewing program websites and telephone interviews conducted with key contacts from each program. Appendix 2 includes the list of contacts.

Prescription Monitoring Program Practices

PMPs cover a range of features and practices. Different PMPs may vary in models of administrative oversight, specific drugs targeted for monitoring, methods of data collection, types of interventions, and level of information sharing. These programs are housed variably in government departments of health, physician or pharmacy regulatory or licensing authorities, and less commonly in law enforcement, substance abuse and consumer protection agencies (Heins, 2013). The following sections have been structured to provide an overview of the key components of a PMP:

- What information is collected;
- How it is used; and
- How it can be evaluated.

Where there is evidence available to support a practice, it has been indicated. The information and evidence presented builds on that contained in the Clark et al. (2012) review, although the organization of the information has been adjusted to provide descriptive overviews and to discuss related features together. The Clark et al. (2012) review suggests 40 proposed best practices for PMPs. These practices were identified based on limited evidence, with most relying on experience or perception as applied to U.S. settings (Table 1).

Table 1: Levels of Evidence Summary for Candidate Best Practices (Clark et al., 2012)

Level of Evidence	No. of Recommendations Associated with Each Level
Randomized controlled trial or meta-analysis	0
Observational study with comparison groups	2
Observational study without comparison group	6
Case study or written documentation of expert opinion	6
Accumulated experience or key stakeholder perceptions	26

Each of the 40 proposed best practices has not been discussed individually since the evidence for many is limited, although a full list has been provided in Appendix 3. Key evidence to support particular practices has been included in this report with an emphasis on published reports. If these reports were also included in the Clark et al. (2012) review, they are identified as such in order to be explicit in which references provide updated evidence. In addition to the Clark et al. (2012) review, there have been other reports that also provide recommendations for PMP best practices (Brushwood, 2003, Alliance of States with Prescription Monitoring Programs, 2010, cited in Clark et al., 2012; Perrone, 2012a, cited in Clark et al.; 2012, Nicholas, 2013). These authors address many of the same concepts, but their recommendations are more broadly stated (Appendix 4).

A synthesis of this information is provided at the end of this section in the form of a summary of 8 overall best practices recommended for consideration in PMPs in Canada at this time. A description of PMPs that currently exist in Canada is found in Appendix 5 and a Synopsis of Key PMP Features is found in Appendix 6.

Prescription Data Collection

The foundation of PMPs is the data that are collected. This section considers what data are collected, how they are collected and quality assurance of the data.

Data Collected

Drugs Targeted

There are a number of prescription drugs that have the potential to cause addiction and overdose-related harms. Drugs targeted for monitoring vary from program to program. In Canada, most PMPs base their decisions on drugs listed in the *Controlled Drugs and Substances Act* (CDSA). These drugs include opioids, barbiturates and stimulants. Drugs that are more variable in their inclusion are codeine, tramadol, benzodiazepines, zopiclone and cannabinoids. In the United States, it is most common to include drugs under the *Controlled Substances Act*, Schedule II (drugs with a high abuse potential), whereas other schedules (e.g., products with hydrocodone or codeine in combination with other drugs and benzodiazepines) may or may not be included.

There is a report suggesting that US states collecting data on all classes of controlled substances had lower rates of doctor shopping (PDMP COE (2010). Unpublished analysis of PDMP performance measure data collected by the Bureau of Justice Assistance (cited in Clark et al., 2012). There is also evidence that implementing restrictions targeting certain drugs (e.g., requiring the use of special prescription pads) can lead to increased prescribing of other drugs that are not targeted. For example, the implementation of the New York State Benzodiazepine Triplicate Prescription Program caused a dramatic decline in benzodiazepine prescribing, but also an increase in prescribing of other psychotropic agents such as the older, less safe meprobamate and chloral hydrate (Weintraub, 1991, Zullich, 1992). This is a good example of the need to evaluate the impact of PMPs for both intended and unintended consequences.

Identifiers

All PMPs collect identifying information on the prescriber, pharmacist and patient involved with each prescription transaction. Some programs also identify the person picking up the prescription. Identifiers are needed both to link records within the database to each other to track trends, as well as to be able to intervene with individuals when questionable activity is detected. In Canada, most programs require the use of identifiers associated with the provincial healthcare system, which allows linking and tracking. In the United States, a combination of information (e.g., name, date of birth, address) is usually required to ensure correct linking of prescriptions to individuals. The best mechanism for ensuring correct linkage has not been established.

Method of Payment

Some people avoid using drug insurance plans to pay for some of their prescriptions to avoid detection by the plan if they are purposely seeking out medication from multiple providers to obtain more drugs (i.e., doctor shopping). Including the method of payment in PMP databases could help detect patients exhibiting this type of behaviour. The effectiveness of this approach has not been evaluated. If the program is already effectively linking patient's prescription records based on reliable patient identifiers, there may be little additional benefit.

Collection Method

Multiple Copy Paper Prescriptions

Originally, PMPs were primarily focused on the use of multiple copy prescription pads. These programs require that prescribers use special paper prescription pads to produce a valid prescription. This requirement is still in place in several jurisdictions, with or without electronic submissions. Each paper prescription has two or three copies, where in addition to the pharmacy copy, another copy might stay with the prescriber or be submitted to the PMP for tracking purposes. In addition to tracking prescription information, requiring the use of these special prescription pads introduces barriers to forging prescriptions and they serve as a reminder to prescribers of the monitoring program each time they write a prescription. Another control feature used in some PMPs is to include serial numbers on the special paper prescription pads, which increases the difficulty of forging or copying the prescriptions. In a study comparing rates of drug overdose deaths in states with and without PMPs, states using serialized prescription forms as part of their program had smaller increases in overdose deaths compared to states without this feature (Paulozzi, 2011, cited in Clark et al., 2012).

Electronic Submissions

Community pharmacies routinely use computer software programs to process and document prescription transactions, and to submit claims to prescription insurance plans. This capability has allowed for the electronic submission of prescription data to PMPs, which can significantly improve the timeliness of data collection. The timing requirements for data transfer vary across programs, from immediate submission, to end-of-day transfer, weekly transfer or less frequently. Shorter time requirements for submission allow the monitoring program to remain up-to-date, so that anyone accessing the data will be provided with complete information to support their clinical decision making and other interventions. Consideration is also being given to integrating electronic prescribing for monitored drugs with PMPs as the capabilities develop.

Quality

Effective use of the data collected in PMPs requires that the data are both timely and accurate. Systems to ensure the accuracy of the information and the ability to correct errors in a timely manner help maintain the quality of the data. Data quality standards have not been established and procedures to improve data quality vary amongst PMPs.

Access

Prescription monitoring data will only be effective if it is used, so providing appropriate access to the information is important. Appropriate access includes considering who should have access, the processes for making this determination and how the data is made available. Most programs allow access in some manner to clinicians, licensing regulatory bodies for prescribers and pharmacists, and law enforcement personnel. Clinicians within the patient's circle of care are able to access data to varying degrees. The procedure for this also varies from receiving information electronically to reports sent via fax or mail. In some programs, regulatory and enforcement personnel are the data holders, whereas in other jurisdictions the program establishes the procedures for allowing access to other such stakeholders.

Standardization of data collection facilitates sharing and integration into other electronic systems. Although standardization of electronic systems is technically feasible, many PMPs were developed in isolation, making standardization challenging. In Australia, there has been a lack of coordination of systems, which allows for "medication shopping" across jurisdictions (Nicholas, 2013). In the United States, several states have enacted legislation allowing clinicians in other states access to prescription monitoring data to facilitate cross border activity detection. The National Association of Boards of Pharmacy (NABP) has developed InterConnect, a system to facilitate interstate data sharing while allowing PMPs to maintain control and autonomy over their data exchanges. Currently 26 states have agreements with NABP to participate in InterConnect (National Association of Boards of Pharmacy, 2014). In Canada, there are currently no cross-jurisdictional agreements in place.

Interventions

PMP data can be used to actively intervene in situations that appear to be problematic. Interventions can be made by clinicians, who can request reports on specific patients when providing patient care. Interventions can also be initiated by the PMP, through generation and distribution of reports according to procedures established by the monitoring program for detection of prescribers, pharmacists or patients with potentially problematic prescription patterns.

Clinician Interventions

Information on patients' previous prescriptions for monitored drugs could influence clinical decision-making by prescribers and pharmacists. For example, the information could be used to decide whether to prescribe a monitored drug or to modify how the medication is prescribed or dispensed (e.g., doses, quantities, monitoring parameters). PMPs vary in their ability to provide clinicians with patient profiles at the point of care. The impact of the PMP depends on clinicians taking advantage of the available information and the ability of clinicians to use prescription data to assess risk and manage patients.

There are published reports suggesting that healthcare providers are not accessing information available through their PMP (Ulbrich, 2010, cited in Clark et al., 2012; Talbert, 2011, Fleming, 2013). Recent papers have investigated factors that could increase the use of PMP data, including easier access to the data (Perrone, 2012b, Fleming, 2013, Green, 2013, Bell, 2013) and use by attending physicians that increased use amongst residents (Feldman, 2012). Requests for patient profiles are higher in jurisdictions with electronic access, when compared to those that send profiles by mail or fax (Fleming, 2013; Green, 2012,). The integration of the PMP into the electronic health record might improve the clinical workflow (Abedtash, 2013). Several states, including Kentucky, Massachusetts, New York, Tennessee and West Virginia, have passed legislation that makes consulting the PMP databases mandatory (Garcia, 2013).

Inappropriate use and interpretation of PMP data could be detrimental to the care of patients; however, the clinical interpretation of prescription monitoring data has received only initial research attention. One small study evaluating how emergency physicians interpreted fictitious PMP reports found that access to reports would influence prescribing, but there was only a moderate level of agreement among the physicians in assessing drug-seeking behaviour based on the reports (Grover, 2012). In another study, exposure to PMP data by emergency physicians assessing drug-seeking behaviour changed their planned prescribing in almost 10% of patients (Weiner, 2013). In evaluating patients in a university-based pain management clinic, the addition of information from the PMP, as well as point-of-care urine screening, contributed significantly to identifying information that differed from that gathered by patient interview and review of the medical record alone. The authors suggest

this provides an opportunity for further clarification with the patient and could help identify patients at higher risk of medication misuse (Hamill-Ruth, 2013). In another study, since the implementation of a PMP program most pharmacists (77%) indicated they had requested a patient's PMP history and 13% indicated a perceived decrease in dispensing, while 15% indicated an increase (Wixson, 2012). The study does not provide an explanation for the perceived increase. It could be that the additional information the PMP provides about a patient's prescription history gives some reassurance to clinicians in using monitored drugs as therapeutic options. A survey of pharmacists reported that pharmacists were using PMP data to screen for abuse and doctor shopping (Green, 2013).

Allowing clinicians' access to real-time patient PMP data at the point of care can influence clinical decision making. More clinician education and research could help to optimize these opportunities.

Program Interventions

Unsolicited Reports

Many PMPs intervene by providing proactive, unsolicited information and reports to prescribers, pharmacists and patients. The purpose of these interventions can be educational, to encourage behaviour modification, or punitive, with legal or regulatory consequences. In the United States, to be eligible for funding, PMPs must provide unsolicited reports to medical practitioners. Reports cited by the PDMP COE suggest that the use of unsolicited reports has been associated with declines in levels of questionable prescription activity and increases in requests for data, and has resulted in activities such as discussing the report with patients, brief interventions and referrals to substance abuse treatment (Clark et al., 2012).

A recent, randomized, controlled study conducted by a managed care organization in the United States evaluated an intervention that provided personalized PMP data to prescribers of patients who received opioid prescriptions from three or more prescribers at three or more pharmacies in a three-month period. Compared to control patients, whose prescribers received a generic letter only, patients included in the intervention group demonstrated reductions in the number of prescribers (24%), dispensing pharmacies (16%) and filled opioid prescriptions (15%) over a one-year period. No evaluation of the clinical outcomes related to the reductions was performed (Gonzalez, 2012).

In addition to allowing clinicians' access to PMP data, proactively using the data to prompt clinicians to action could be an effective component of the program.

Questionable Activity Criteria

Although many programs send unsolicited reports and alerts to individuals, the optimal criteria for use in detecting prescription activity of concern by patients, prescribers and pharmacists has not been determined. Furthermore, there is considerable variability in the criteria used by PMPs to assess questionable activity. It is important to establish criteria and thresholds that are able to reliably detect activity that is likely associated with harms without identifying patients whose prescription activity is not problematic upon further inquiry. Establishing the level of prescriber or pharmacy activity that is suggestive of abuse is also challenging, and currently the main criteria appear to be based on outliers amongst peers on prescribing rates.

There are a few published papers reporting criteria that might suggest higher risk of harm, but evaluative research data is lacking. Emerging from these reports are criteria associated with an individual's prescription patterns that might suggest risk of harm. These criteria include number of prescribers, pharmacies and prescriptions, prevalence of early refills, overlapping prescriptions,

escalating or high doses, and type of monitored drugs, as well as demographic factors such as gender and age (Gomes, 2011; Hall, 2008; Pauly, 2011; Paulozzi, 2012; Peirce, 2012; Wilsey, 2011; White, 2009; all cited in Clark et al., 2012). In another initiative, a company in the United States is developing a software program to specifically examine PMP data in order to stratify physicians on how risky their prescribing patterns are (Kuehn, 2014).

One study developed and evaluated an opioid misuse score. The score was calculated using a combination of criteria from prescription data, including the days supplied of short-acting opioids, days supplied of long-acting opioids, number of opioid pharmacies and number of opioid prescribers. The resulting score was subsequently found to predict the likelihood of receiving a diagnosis of opioid abuse or dependence during follow-up (Sullivan, 2010).

Further evaluative work is needed to establish reliable indicators of problematic prescribing and use of monitored drugs from PMP databases.

Stakeholder Interventions

Other stakeholders interested in the information housed within a PMP database include law enforcement investigators, licensing boards and drug plan insurers. Appropriate policies and procedures are required to address privacy concerns for sharing data, including a framework for determining the type and level of access allowed and the conditions required to permit access.

Program Evaluation

Evaluating the overall impact of PMPs is important to ensure the desired outcomes are achieved. There have been a number of approaches taken to evaluate program outcomes, ranging from shorter term outcomes such as the impact on prescribing practices and user satisfaction, to longer term outcomes such as rates of harmful consequences from prescription products. Attribution to the PMP for these outcomes can be challenging to establish since there might be many influencing factors (e.g., other interventions also targeting this problem). Very little research has been published in this area.

Impact Evaluation

The following sections outline several possible outcomes from PMPs that have been or could be used to evaluate the impact of programs.

Changing Prescribing Patterns

Describing decreases in the prescribing of controlled substances might not reflect the overall positive impact of a PMP. As the previously mentioned example of the New York State Benzodiazepine Triplicate Prescription Program shows, the introduction of a program can be associated with reductions in targeted prescription benzodiazepines, but increases in less scrutinized, lower-scheduled sedative-hypnotics (Hartzema, 1992; Weintraub, 1991). Another study evaluating the impact of a PMP on prescribing benzodiazepines suggests that prescribing did not change overall (Wixson, 2013). An evaluation of changes in prescribing—both decreases and increases—is important to assess both intended and unintended consequences of PMPs on prescribing patterns.

Reducing Questionable Activity

If certain types of questionable prescription activity are associated with an increased risk of harms, then documenting a reduction in these types of activity could be an indicator of success of the PMP. Evaluation of the Nevada PMP indicated that people who were the subject of unsolicited reports to their prescribers had reduced amounts of monitored drugs prescribed to them, and they visited fewer prescribers and pharmacies (Clark et al., 2012). Similarly, an evaluation of the Wyoming program suggests that unsolicited reports provided to prescribers prompted more requests for data and a subsequent reduction in the number of people who met their criteria for doctor shopping (Clark et al., 2012). A Canadian study evaluated the impact of the British Columbia PharmaNet system on the rates of potentially inappropriate prescriptions for opioids and benzodiazepines, and found a significant decrease six months after the centralized prescription network was implemented (33% reduction for opioids, 49% reduction for benzodiazepines) (Dormuth, 2012). As mentioned previously, more research is needed to establish the optimal criteria to use to reflect questionable activity. In addition, standardization of these criteria would be helpful to effectively compare the impact of program interventions.

Reducing Diversion

One of the primary purposes of PMPs is to reduce diversion of prescription products from their intended distribution path and use. Success in achieving this purpose has been reported in a U.S. government report in which several states indicated their PMP reduced rates of diversion of prescription drugs to the illicit market (Government Accountability Office, 2002, cited in Clark et al., 2012). In France, the implementation of a PMP for high-dose buprenorphine users resulted in a significant reduction in doctor shopping (Pradel, 2009, cited in Clark et al., 2012). Evaluating success in reducing diversion is important as PMPs evolve and practices change, such as the reduced emphasis on multiple-copy prescription pads with the advent of electronic prescription systems and the potential impact of introducing electronic prescribing into community settings.

Reducing Abuse and Addiction

One of the most important outcomes of PMPs is the impact on reducing health-related harms such as prescription drug use disorders. There is very little research in this area. In a comparison of states with and without a PMP, states with a PMP appeared to have a decreased rate of admissions related to prescription opioid treatment (Reisman, 2009, cited in Clark et al., 2012). It is also important to monitor for unintended consequences such as increases in rates of addiction to other substances.

Reducing Overdose Deaths

Reducing overdose deaths is one of the most important goals in reducing the harms from prescription drugs. As mentioned previously, in a US study comparing rates of drug overdose deaths in states with and without PMPs, there were no differences in the rates of drug overdose mortality, although states using serialized prescription forms as part of their program had smaller increases in overdose deaths compared to states without this feature (Paulozzi, 2011, cited in Clark et al., 2012). This evidence demonstrates the difficulties in conducting this type of evaluation, where comparing states simply on the basis of whether they have PMPs may not be valid if the programs within the states are very different in their scope and interventions.

Measuring Unintended Consequences

Reducing Access for Therapeutic Use

One of the key differences in addressing the problem of prescription drug abuse compared to other substances of abuse is the need to have the drugs accessible for therapeutic use. The New York State Benzodiazepine Triplicate Prescription Program significantly decreased benzodiazepine prescribing, but further analysis determined that the greatest impact was on non-problematic benzodiazepine use (Ross-Degnan, 2004; Simoni-Wastila, 2004). In a program implemented by the Washington State Health Care Authority to manage the problem of non-essential use of emergency services by Medicaid recipients, seven best practices were developed, one of which was enrolling providers in the state PMP for emergency departments. Preliminary results suggested this program was saving the state more than 10% in Medicaid fee-for-service emergency costs, while at the same time indicating that people are still able to get care and that care is safer (Brooks, 2013). The potential for reducing therapeutic access should be assessed as an outcome of any intervention.

Increasing Use of Other Drugs of Abuse

The impact of interventions to reduce prescription drug abuse can also include the shift from use of prescription products to other substances of abuse. This shift has been detected recently in the evaluation of the impact of the introduction of an abuse deterrent prescription opioid formulation. There was a decrease in calls to poison centers for the new formulation product, but an increase in calls for other prescription opioid products and heroin (Coplan, 2014). Tracking parallel trends in other substances of abuse along with prescription products might help in determining if the impact is a decrease in problems or a shift to problems with other substances.

Program User Satisfaction

Evaluating stakeholder satisfaction with PMPs can be informative for programs in streamlining their processes, as well as providing information on the impact the program is having on individuals. The primary stakeholders include patients, prescribers, pharmacists, other clinicians, regulatory authorities, enforcement agencies and governments. One published study evaluated patient experiences with a PMP. According to this report, most patients were not affected by the program; however, patients with chronic non-cancer pain were more likely to discuss their PMP reports with their physician and were more likely to indicate that a PMP report prevented them from obtaining a controlled substance prescription (Goodin, 2012).

Program Administration

The administrative efficiency of running the program should be evaluated. It has been recommended that funding for PMPs should be made secure and stable, possibly through legislation (Clark et al., 2012). With multiple stakeholders interested in PMP administration and outcomes, the relationship between parties should be transparent and consideration should be given to collaborative decision making in the oversight of the program.

Using PMP Data for Epidemiological Analyses

Prescription databases are a valuable source of information for pharmacoepidemiological analyses to characterize prescribing patterns, to monitor trends and to detect the impact of other interventions (e.g., new prescribing guidelines). For example, data from the Maine PMP was analyzed

to describe prescribing trends from 2006 to 2010. This epidemiological analysis showed a steady increase in the number of prescriptions for controlled substances, particularly for opioids and stimulants, with most individuals (83%) obtaining their medication from one or two prescribers and pharmacies (McCall, 2013).

In another recent publication, the relationship between the supply of prescription opioids in a community and the rate of prescription opioid abuse was evaluated. Data from the Indiana Scheduled Prescription Electronic Collection and Tracking system was used to determine the number of opioid prescriptions for each county in Indiana, which was shown to be significantly associated with the rate of abuse as estimated by the number of people in each county receiving treatment for prescription opioid abuse according to the Treatment Episode Data Set (Wright, 2014).

Best Practice Recommendations

Although there is limited supporting research evidence for many aspects of PMPs at this time, there is growing research attention in the area, and the number of research reports is increasing each year. There is currently no one set of best practice recommendations that have been firmly established. In synthesizing the information and evidence available, the following recommendations encompass practices with **considerable and consistent support** at this time (Brushwood, 2003, Alliance of States with Prescription Monitoring Programs, 2010, Clark et al., 2012, Perrone, 2012a, Nicholas, 2013).

1. Include all prescription drugs that have been, or could be, associated with misuse and addiction.
2. Ensure unique identifiers are collected to link patient, prescriber and pharmacist records.
3. Make up-to-date, full patient profiles available, confidentially, in real time to clinicians at point of care.
4. Send proactive, unsolicited reports to stakeholders.
5. Standardize data collection methods to optimize sharing across jurisdictions and analyze trends.
6. Incorporate robust safeguards to protect patient privacy.
7. Evaluate the impact of the program to detect both intended and unintended consequences.
8. Make available encrypted information in PMPs to public or private entities for statistical, research or educational purposes.

Conclusions

PMPs cover a range of features and practices. PMPs in Canada vary in models of administrative oversight, specific drugs targeted for monitoring, methods of data collection, types of interventions, and level of information sharing. Although there is limited supporting research evidence for many aspects of PMPs at this time, this report has identified the best practices from the literature with the most support based on evidence and consensus opinion at this point in time.

Most provinces are currently operating some form of a PMP (British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Nova Scotia, Newfoundland and Labrador), with two provinces having programs in development (New Brunswick and Prince Edward Island), and one territory (Yukon) that is linked in with the Alberta program. These programs have included aspects of best practices to varying degrees.

As these programs across Canada continue to be developed and expanded, further work is needed to ensure that the best practices are implemented. This work should include evaluating the various features of PMPs to determine their impact. This work should also establish the overall value of PMPs in promoting the safe and effective use of prescription products that are associated with significant harm, misuse and addiction.

By presenting the best available evidence for PMP program features and practices at the present time, this review provides Canadian jurisdictions with valuable information to assist in implementing the recommendations of the First Do No Harm strategy with respect to PMPs. Jurisdictions interested in initiating or enhancing a PMP, can use the information in this report to evaluate their own programs and to consider implementation of additional features based on the best available evidence. It is hoped that this review will also strengthen efforts in information sharing and standardization of data collection across jurisdictions in Canada, in order to more effectively reduce the harms of controlled prescription drugs on a national level.

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Appendix 1: Detailed Search Strategy

Databases

Database: PsycINFO <2002 to April Week 5 2014>

1. (doctor* adj shop*).ti,ab,kp. (37)
2. prescription drug monitoring.ti,ab,kp. (24)
3. multiple prescribers.ti,ab,kp. (8)
4. unsolicited reporting.ti,ab,kp. (0)
5. proactive reporting.ti,ab,kp. (1)
6. controlled substance monitoring.mp. (2)
7. prescription drugs/ (2240)
8. Analgesic Drugs/ (1505)
9. 7 or 8 (3680)
10. Monitoring/ (4217)
11. 9 and 10 (34)
12. 1 or 2 or 3 or 4 or 5 or 6 or 11 (90)
13. limit 12 to (all journals and yr="2013 -Current") (14)

Database: Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations <May 06, 2014>

1. doctor shopping.ti,ab. (12)
2. (doctor* adj shop*).ti,ab. (12)
3. prescription monitoring.ti,ab. (15)
4. (monitor* adj prescription*).ti,ab. (3)
5. 3 or 4 (18)
6. multiple subscribers.ti,ab. (0)
7. unsolicited reporting.ti,ab. (0)
8. proactive reporting.ti,ab. (0)
9. controlled substance* monitoring.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier] (3)
10. (controlled substance* adj monitor*).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier] (3)
11. opioid*.ti,ab. (3440)
12. monitoring.ti,ab. (26217)
13. 11 and 12 (121)
14. 1 or 2 or 5 or 6 or 7 or 8 or 9 or 10 or 13 (147)
15. limit 14 to yr="2013 -Current" (81)
16. from 15 keep 3-7,11-12,15-17,20-24,26,28,32-33,36-37,41,44-46,48,52,55,58,60-61,64-67,76-78,81 (39)

Database: Ovid MEDLINE(R) <2010 to April Week 4 2014>

1. doctor shopping.ti,ab. (43)
2. (doctor* adj shop*).ti,ab. (47)
3. prescription monitoring.ti,ab. (63)
4. (monitor* adj prescription*).ti,ab. (14)
5. 3 or 4 (77)
6. multiple subscribers.ti,ab. (0)
7. unsolicited reporting.ti,ab. (1)
8. proactive reporting.ti,ab. (0)
9. controlled substance* monitoring.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier] (5)
10. (controlled substance* adj monitor*).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier] (5)
11. Drug Monitoring/ (3789)
12. Prescription Drugs/ (2042)
13. Prescription Drug Misuse/ (292)
14. Analgesics, Opioid/ (6990)
15. Opioid-Related Disorders/ (2014)
16. 12 or 13 or 14 or 15 (10193)
17. 11 and 16 (104)
18. 1 or 2 or 3 or 4 or 6 or 7 or 8 or 9 or 10 or 17 (215)
19. limit 18 to yr="2013 -Current" (63)PsycINFO:

Index Terms: prescription drugs AND Index Terms: monitoring AND Year: 2012 TO 2013
Abstract: "prescription drug monitoring" AND Year: 2012 TO 2013
Title: prescription monitoring AND Year: 2012 TO 2013
Title: doctor shopping AND Year: 2012 TO 2013
Abstract: "doctor shopping" AND Year: 2012 TO 2013
Title: multiple prescribers AND Year: 2012 TO 2013
Abstract: "multiple prescribers" AND Year: 2012 TO 2013
Title: unsolicited reporting AND Year: 2012 TO 2013
Abstract: "unsolicited reporting" AND Year: 2012 TO 2013
Title: proactive reporting AND Year: 2012 TO 2013
Abstract: "proactive reporting" AND Year: 2012 TO 2013
Title: Controlled Substance Monitoring AND Year: 2012 TO 2013

PubMed: (2012–2013)

prescription monitoring[Title/Abstract]
("Drug Monitoring"[Mesh]) AND "Prescription Drugs"[Mesh]
("Drug Monitoring"[Mesh]) AND "Analgesics, Opioid"[Mesh]
doctor shopping[Title/Abstract]
multiple prescribers[Title/Abstract]
unsolicited reporting[Title/Abstract]
proactive reporting[Title/Abstract]
controlled substance monitoring[Title/Abstract]

Project Cork: (2012–2013)

Prescription monitoring (Title/abstract)
Control policy prescription drugs (Keyword)
Doctor shopping (Title/abstract)
Multiple prescribers (Title/abstract)
Unsolicited reporting (Title/abstract)
Proactive reporting (Title/abstract)
Controlled monitoring (Title/abstract)

Search Engines

Google Scholar: (2012–2013)

allintitle: prescription monitoring
allintitle: doctor shopping
allintitle: multiple prescribers
allintitle: unsolicited reporting
allintitle: controlled substance monitoring
allintitle: monitoring abuse
pharmanet
"Triplicate Prescription Program"
"Narcotics Monitoring System"
"New Brunswick Prescription Monitoring Program"

Google

Prescription Monitoring Program British Columbia
pharmanet review
Triplicate Prescription Program review
Prescription monitoring alberta
Ontario prescription monitoring
“Narcotics Monitoring System”
manitoba prescription monitoring
new brunswick prescription monitoring
"New Brunswick Prescription Monitoring Program"
quebec prescription monitoring
mauvais usage de médicaments sur ordonnance
prince edward island prescription monitoring
newfoundland prescription monitoring
prescription drug abuse prevention
yukon prescription monitoring
northwest territories prescription monitoring
nunavut prescription monitoring
"prescription monitoring" filetype:pdf
"prescription drug monitoring" filetype:pdf

Journals

Research in Social and Administrative Pharmacy: prescription drug monitoring programs
www.journals.elsevier.com/research-in-social-and-administrative-pharmacy/

Pain Medicine: prescription monitoring program
onlinelibrary.wiley.com/journal/10.1111/(ISSN)1526-4637

Websites

PDMP Centre of Excellence
www.pdmpexcellence.org/
including websites listed on the following page:
www.pdmpexcellence.org/web-links

Alliance of States with Prescription Monitoring Programs
pmpalliance.org/
including websites for individual states:
pmpalliance.org/content/state-pmp-websites

National Alliance for Model State Drug Laws
namsdl.org/

Appendix 2: Prescription Monitoring Program Sources

British Columbia
Suzanne Solven, Deputy Registrar, College of Pharmacists of British Columbia

Ailve McNestry, Deputy Registrar
Monitoring and Drug Programs, College of Physicians and Surgeons of British Columbia

Alberta
Susan Ulan, Senior Medical Advisor
College of Physicians and Surgeons of Alberta

Saskatchewan
Doug Spitzig
College of Physicians and Surgeons of Saskatchewan

Manitoba
Ronald Guse, Registrar
College of Pharmacists of Manitoba

Ontario
Winnie Chan, Senior Pharmacist
Ontario Public Drug Programs, Ontario Ministry of Health and Long-Term Care

Nova Scotia
Kevin Lynch, Manager
Nova Scotia Prescription Monitoring Program, Medavie Blue Cross

New Brunswick
Heidi Liston, Director
Pharmaceutical Services, New Brunswick Health

Prince Edward Island
Kathleen Brennan, Policy Analyst
Prince Edward Island

Grant Wyand
Drug Information System, Pharmacy Consultant Health PEI

Newfoundland and Labrador
Patricia Clark, Manager
Pharmaceutical Services, Department of Health and Community Services, NL

Appendix 3: Best Practice Recommendations from Clark et al (2012)

Listed below are the 40 best practices recommendations, with evidence hierarchy ratings, from:

Clark, T., Eadie, J., Kreiner, P., & Strickler, G. (2012). *Prescription Drug Monitoring Programs: An Assessment of the Evidence for Best Practices*. Waltham, MA: Prescription Drug Monitoring Program, Center of Excellence, Brandeis University. Retrieved from www.pdmpexcellence.org/sites/all/pdfs/Brandeis_PDMP_Report.pdf.

Evidence Hierarchy Rating Scale

The numbers following the recommendations indicate the ranking on the evidence hierarchy using the following rating scale:

Type 1: Published or formally documented studies or consensus statements:

1=Randomized controlled trial (RCT) or meta-analysis

2=Observational study with comparison groups

3=Observational study without comparison group

4=Case study or written documentation of expert opinion

Type 2: Anecdotally reported experience and perceptions:

5=Accumulated experience and/or key stakeholder perceptions

Recommendations

Data collection and data quality

1. Collect data on all schedules of controlled substances (3, 4)
2. Adopt a uniform reporting standard (4)
3. Collect data on non-scheduled drugs implicated in abuse (4)
4. Collect positive ID on person picking up prescriptions (5)
5. Collect data on method of payment (5)
6. Reduce data collection interval; real-time data collection (4)
7. Institute serialized prescription forms (2)
8. Integrate electronic prescribing with PDMP data collection (5)
9. Improve data quality (5)

Data linking and analysis

10. Link records to permit reliable identification of individuals (5)
11. Determine valid criteria for questionable activity (5)
12. Conduct periodic analyses of questionable activity (5)

13. Conduct epidemiological analyses (3)
14. Develop expert systems to guide analyses (5)
15. Record data on prescriber disciplinary status and patient lock-ins (5)

User access and report dissemination

16. Provide continuous online access to automated reports (3, 4)
17. Optimize reporting to fit user needs (5)
18. Integrate PDMP data with health information exchanges, electronic health records (5)
19. Send unsolicited reports (URs) and alerts (2, 3, 4)
20. Publicize use and impact of PDMP (5)

PDMP recruitment, utilization, and education

21. Enable access to data by appropriate users (4)
22. Proactively identify and conduct outreach to potential high end users (5)
23. Conduct recruitment campaigns (5)
24. Streamline certification and enrollment processing (5)
25. Mandate enrollment (5)
26. Conduct promotional campaigns (3)
27. Improve data timeliness and access (3)
28. Conduct user education (3)
29. Mandate utilization (5)
30. Institute financial incentives (5)
31. Delegate access (5)

Inter-organizational best practices

32. Enact interstate data sharing among PDMPs (4)
33. Collaborate with other agencies/organizations (4)

Evaluation of PDMPs

34. Conduct satisfaction and utilization surveys of end users (5)
35. Conduct audits of PDMP system utilization for appropriateness and extent of use (5)
36. Use PDMP data as outcome measures in evaluating program and policy changes (5)
37. Analyze other outcome data (e.g., overdoses, deaths, hospitalizations, ER visits) to evaluate the PDMP's impact (5)

Funding of PDMPs

38. Secure funding that is independent of economic downturns, conflicts of interest, and changes in PDMP policies (5)

39. Enact legislation to maintain sufficient funding over time (5)
40. Conduct periodic review of PDMP performance to ensure efficient operations and identify opportunities for improvement (5)

Appendix 4: Effective Characteristics of PMPs

Attributes of an Effective Electronic Prescription Monitoring Program

Brushwood, D.B. (2003). Maximizing the value of electronic prescription monitoring programs. *Journal of Law, Medicine & Ethics*, *31*, 41–54.

1. Comprehensiveness in data collected (all controlled substances)
2. Expert analysis of prescription data
3. Timely and meaningful feedback to physicians and pharmacists
4. Clear standards of practice
5. Periodic program review

Characteristics of an Ideal Prescription-Drug Monitoring Program

Perrone, J., & Nelson, L.S. (2012a). Medication reconciliation for controlled substances – An "ideal" prescription-drug monitoring program. *New England Journal of Medicine*, *336*(25), 2341–2343.

1. Ease of access
2. Standardized content
3. Real-time updates
4. Mandatory pharmacy reporting
5. Monitoring of prescribing of drugs in DEA Schedules 2-5 and 'drugs of concern'
6. Interstate accessibility
7. Confidentiality and security
8. Support for public health initiatives and research
9. Capability for strictly monitored access by nonprescribers

Characteristics of effective prescription coordination programs

Nicholas R., Roche A., Dobbin M., & Lee N. (2013). Beyond the paper trail: using technology to reduce escalating harms from opioid prescribing in Australia. *Australian & New Zealand Journal of Public Health*, *37*(2), 139–147

1. Its central aim should be to enhance the quality use of medicines rather than punitive or law enforcement aims.
2. Those with a clinical need for the monitored medicines must not have their access restricted.

3. Robust safeguards should be incorporated to protect patient privacy.
4. Encryption should be utilised in information transmission.
5. Information should be provided in real-time which can support the decision-making processes of prescribers, pharmacists and regulators.
6. Information on all relevant prescriptions – both PBS / Repatriation Pharmaceutical Benefits Scheme (RPBS) and non-subsidised medicines should be included.
7. Information on the prescribing and dispensing of all relevant medicines including Schedule 8 medicines, certain Schedule 4 medicines (particularly benzodiazepines) and certain non-prescription codeine-containing and other medicines subject to misuse should be generated and be accessible nationally.
8. Algorithms and criteria for detecting problematic prescription use and to support clinical decision-making should be incorporated.
9. Provide an audit trail of all who access it and be secure and password-protected.
10. Be subject to expert regulatory oversight.
11. Be implemented in conjunction with education programs for health practitioners and the broader community concerning its role in enhancing the quality use of medicines to avoid stigmatising the use of monitored medicines.
12. Be subject to review.

Appendix 5: Description of Canadian PMPs

There are currently seven provinces with some form of a PMP (British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Nova Scotia, Newfoundland and Labrador), two provinces with programs in development (New Brunswick and Prince Edward Island) and one territory (Yukon) that is linked with the Alberta program. Table 2 provides a descriptive **summary of some of the key features** of each of these programs.

Table 2: Descriptions of PMPs in Canada

British Columbia		
Program Name	Controlled Prescription Program (CPP)	Prescription Review Program (PRP)
Website	www.bcpharmacists.org/legislation_standards/drug_distribution/controlled_prescription_program.php	www.cpsbc.ca/programs/prp
Implementation Date	Before 1993	
Regulatory Framework	*Pharmacy Operations and Drug Scheduling Act*, Bylaw 4(6) and 4(8)	
Program Administrator	College of Pharmacists of BC	College of Physicians & Surgeons of BC
Institutional Associations	• College of Pharmacists of BC • College of Physicians & Surgeons of BC • College of Dental Surgeons of BC • BC Veterinary Medical Association • Ministry of Health Services (PharmaCare Program)	College of Physicians & Surgeons of BC
Data Holders	No separate data stream	PharmaNet
Description	• Two-part multiple prescription copies; serialized ▪ One copy for prescriber; one copy for pharmacist • Prescription valid for 5 days	• Practice quality assurance activity • Informed by PharmaNet database
Monitored Drugs	Alfentanil, Anileridine, Buprenorphine, Butalbital, Butrophanol, Codeine (all single ingredient and combinations > 60mg), Ethchlorvynol, Fentanyl, Hydrocodone, Hydromorphone, Levorphanol, Meperidine, Methadone, Methaqualone, Morphine, Oxycodone, Pentazocine, Propoxyphine, Sufentanil, Tapentadol	Not limited to CPP drugs, also look at benzodiazepines and opioids
Clinician Access to Patient Profiles	• Through PharmaNet — provincial drug information system. • Pharmacists — via dispensing system. • Prescriber — Can request access for specific patients in their care. • PharmaNet review is mandatory in walk-in clinics and methadone clinics.	
Reviews and Reports	• In response to complaints	• In response to complaints • Physicians requesting methadone exemption: review physician's controlled drug prescriptions in past 3 months • Physicians coming into CPP

British Columbia		
Questionable Activity Criteria	Not applicable.	• Patients with multiple opioids, high morphine equivalents • > 300 pills per dispense • Opioids plus benzos

Interventions		• Professional Quality Assurance Process
		  ▪ 1st, 2nd and 3rd letters sent to physicians
		  ▪ then attend interview and/or entire Prescription Review Committee
		• Risk Inquiry Committee

Alberta		
Program Name	Triplicate Prescription Program (TPP)	
Website	www.cpsa.ab.ca/services/Triplicate_Prescription_Program.aspx	
Implementation Date	1986	
Program Administrator	College of Physicians and Surgeons of Alberta (CPSA)	
Institutional Associations	• Alberta College of Pharmacists (ACP) • Alberta Dental Association and College (ADA+C) • Alberta Health and Wellness • Alberta Health Services (AHS) Opioid Dependency Program • Alberta Pharmacists Association • Alberta Veterinary Medical Association • College of Physicians & Surgeons of Alberta (CPSA) • Yukon Medical Council	
Description	Prescribers must register with the TPP to prescribe medications on the TPP list and must use the TPP prescription forms to prescribe monitored drugs. The TPP prescription forms are serialized three-part prescription forms that are valid for 72 hours once written. One copy stays with the prescriber, one copy with the pharmacy and one copy is forwarded to CPSA at least weekly. Prior to 2012, the CPSA copy information was entered into the TPP database. In 2012 the system was integrated with the Pharmaceutical Information Network in the Netcare system. Data entered from pharmacies is added to the TPP database by end of each day. Methadone and other compounded medicines are still entered manually into the TPP database since they are not captured optimally in Netcare. Information from veterinarians and dentists is also entered manually. The TPP has an agreement with Yukon for sharing cross-jurisdictional data.	
Monitored Drugs	• Buprenorhphine • Butorphanol • Dextropropoxyphene • Fentanyl/Sufentanil/Alfentanil • Hydrocodone • Hydromorphone • Meperidine • Methadone • Morphine • Oxycodone • Pentazocine • Tapentadol	• Methylphenidate • Butalbital • Ketamine In 2014/2015 there is a plan to add codeine, benzodiazepines, benzodiazepine receptor analogs, and other sedative-hypnotics for monitoring, but special prescriptions will not be required

Alberta	
Clinician Access to Patient Profiles	Practitioners (physicians, pharmacists, dentists, veterinarians) can request TPP patient profiles. Methadone prescribers are mandated to review profiles. Prescription information can also be accessed in real time through the Alberta Netcare Electronic Health Record by physicians and pharmacists. TPP data for methadone prescriptions and other compounded products might be more accurate, but it is not available in real-time because of the need for manual data entry.
Reviews and Reports	Reports are generated and analyzed on a monthly basis to monitor usage rates for the TPP medications. Currently, unsolicited reports are sent to prescribers and regulatory bodies for prescribers and pharmacists. Inquiries from stakeholders can be accommodated using aggregate data depending on inquiry. Patients can request their own profile. Health practitioners can request their own prescribing profile. A TPP atlas is produced regularly summarizing statistics from across the province. The atlas is available on the CPSA website and includes extensive information from the program, including prescribing trends and rates of questionable activity.
Questionable Activity Criteria	• Multi-doctoring (3 or more physicians in 3 months) • High quantity (1,000 or more doses of TPP medication at one time) • High risk: 600 mg morphine equivalents daily from > 2 physicians and > 2 pharmacies
Interventions	• Multi-doctoring: flagged monthly • High quantity: flagged monthly • High risk: flagged quarterly • Prescribers receive letters from TPP • Pharmacists receive notices about high-risk patients identified • Letters sent to regulatory bodies for nurse practitioners and pharmacists CPSA operates the Physician Prescribing Practices Program, which is a quality improvement program that provides educational support to physicians. Specific interventions have targeted high prescribers of opioids and benzodiazepines or meperidine, prescribers to high-risk patients, and high dose prescribers.
Evaluation of PMP	The TPP conducts audits of PMP system usage for appropriateness and extent of use. PMP data is used in evaluating program and policy changes. The TPP conducts periodic reviews of PMP performance to ensure efficient operations and identify opportunities for improvement The impact of the Physician Prescribing Practices Program has been evaluated, showing changes in prescribing trends.
Funding	Year to year funding through Alberta Health

Saskatchewan	
Program Name	Prescription Review Program
Website	www.cps.sk.ca/CPSS/Programs_and_Services/Prescription_Review_Program.aspx
Implementation Date	2006 – changed from triplicate prescription program
Program Administrator	College of Physicians and Surgeons of Saskatchewan
Institutional Associations	• College of Dental Surgeons of Saskatchewan • College of Physicians and Surgeons of Saskatchewan • Saskatchewan Registered Nurses Association • Saskatchewan College of Pharmacists
Description	• The Prescription Information Program captures Prescription Review Program medications • Updated daily • Quality reviewed through error reports • Saskatchewan College of Pharmacists monitors pharmacy compliance

Saskatchewan		
Monitored Drugs	• Anileridine • Buprenorphine • Butorphanol • Codeine • Fentanyl • Levorphanol • Hydrocodone • Hydromorphone • Meperidine	• Amphetamines • Anabolic Steroids • Barbiturates • Benzodiazepines • Diethypropion • Chloral Hydrate • Diethylpropion • Phentermine • Gabapentin
Clinician Access to Patient Profiles	All providers have access through the Prescription Information Program	
Reviews and Reports	• Conduct epidemiological analyses of prescription data • Customized reports available • Collaborate with Health Canada Non-Insured Health Benefits program	
Questionable Activity Criteria	• Early refills (pattern over time) • High dosages • Double doc (3 or more physicians in calendar month) • Long-term/chronic use of benzodiazepines • Methadone (using inappropriate drugs with methadone) • BEERS criteria for elderly (benzos, meperidine)	
Interventions	Unsolicited reports sent to prescribers, dispensers, and licensure boards	
Evaluation of PMP	Province conducts satisfaction surveys and audits	
Funding	Yearly requests to Saskatchewan Health	

Manitoba	
Program Name	Manitoba Prescribing Practices Program (M3P)
Website	www.napra.org/Content_Files/Files/Manitoba/current%20web%20site/Manitoba_Prescribing_Practices_Program_May2006.pdf
Implementation Date	1990
Regulatory Framework	*The Pharmaceutical Act* (C.C.S.M. c. P60), *Pharmaceutical Regulation*, amendment
Program Administrator	Manitoba Pharmaceutical Association (MPhA)
Institutional Associations	• Manitoba College of Physicians and Surgeons • Manitoba Dental Association • Manitoba Veterinary Association • Manitoba Medical Association • Manitoba Health Services Commission • Drug Control Unit of the Health Protection Branch
Description	• Triplicate prescription pads • Original copy of M3P form must be presented by patient • Prescription valid on day written plus 3 additional days • Pharmacist has authority and responsibility to ensure that duplicate prescription form authentic, accurate and appropriate • Duplicate copy of prescription remains in prescriber's office for their records • Copy of prescription no longer sent to College of Physicians and Surgeons (as of March 31, 2006) Pharmacist can refuse to fill prescription. The patient and prescriber must be advised, and it

Manitoba	
	must be documented on the prescription and on Drug Programs Information Network (DPIN) system as Drug Utilization only with appropriate intervention code specifying: consulted other sources, consulted prescriber or pharmacist decision. • All M3P prescriptions filled must be entered into DPIN system
Monitored Drugs	• All sales reportable narcotics (including Methadone) • All sales reportable controlled drugs • Butalbital • Nalbuphine • Phenobarb with codeine • Propoxyphene • Pentazocine • Phentermine • Diethylpropion • Butorphanol

Ontario	
Program Name	Narcotics Monitoring System (NMS)
Website	www.health.gov.on.ca/en/pro/programs/drugs/ons/monitoring_system.aspx
Implementation Date	In April 2012 pharmacies began submitting dispensing information all monitored drugs to NMS. Full program features still being developed.
Regulatory Framework	*Narcotics Safety and Awareness Act* (2010) gives Ontario Ministry of Health and Long-Term Care the right to collect information
Program Administrator	Ontario Ministry of Health and Long-term Care
Description	• Ontarians are required to show identification in order to be prescribed narcotic or controlled substance medication. Multiple identification options available. • Electronic submission associated with Health Network System adjudication of the Ontario Drug Benefit (ODB) program. • Data integrity checks conducted • The NMS as real-time Drug Utilization Review (DUR) capabilities, although not access to prescription profiles
Monitored Drugs	• Any controlled substance under federal *Controlled Drugs and Substances Act* • Tramadol • Tapentadol
Clinician Access to Patient Profiles	• No direct access to patient profile • System conducts real-time Drug Utilization Review ▪ Alerts sent to pharmacist at time of dispensing ▪ Information also sent to pharmacy on previous submissions: o The transaction date of the previous claim submitted prior to the claim currently being processed o The phone number of the pharmacy that filled the previous claim o The quantity dispensed for the previous claim o The drug identification number (DIN) of the previous claim
Questionable Activity Criteria	• Double doctoring: monitored drugs prescribed by 3 or more different prescribers in the past 28 days • Poly-pharmacy: obtained monitored drugs from 3 or more different dispensaries in the past 28 days • Refill too soon: a refill should not be required at this time • Fill/refill too late: a refill is overdue at this time • Duplicate drug other pharmacy: prior dispensing transaction exists for same patient, same

Ontario	
	DIN or interchangeable product, same date of service, different dispensary
Interventions	Pilot stage
Evaluation of PMP	Early evaluation underway through Canadian Institute for Health Research Population Health Intervention Research Funding.
Funding	Ministry of Health and Long Term Care
New Brunswick	
Program Name	The New Brunswick PMP (PMP)
Website	hps.gnb.ca/dis-e.asp
Implementation Date	Under development
Regulatory Framework	The *Prescription Monitoring Act* received Royal Assent on December 18, 2009
Program Administrator	Provincial government
Institutional Associations	• College of Physicians and Surgeons of New Brunswick • New Brunswick Medical Society • Nurses Association of New Brunswick • New Brunswick Dental Society • New Brunswick Pharmaceutical Society • New Brunswick Pharmacists' Association • New Brunswick Association of Optometrists
Description	• Will be a component of the electronic Drug Information System (DIS) • Integration of electronic prescribing with PMP data collection will be enabled, but not used initially • PDID — internally generated number to tie all identifiers to same person
Monitored Drugs	• All schedules of drugs in the federal *Controlled Drugs and Substances Act* • Tramadol • Tapentadol • Zopiclone
Clinician Access to Patient Profile	• Prescribers, pharmacists will have access to profile in real time • System initiated alerts as well Real-time monitored drug usage reviews will be automatically performed by system during prescribing and dispensing based on consolidated patient drug profile and prescriber information to alert pharmacists and prescribers to such conditions as multiple doctoring and multiple pharmacies for monitored drugs and breaches to Patient Monitoring Agreement.
Reviews and Reports	• Reporting program information to authorized health professionals and to licensing authorities • Customized reporting will be available • Integrate PMP reports with electronic health records, pharmacy dispensing systems
Questionable Activity Criteria	• Multi-doctoring or multi-pharmacy alert: 2 or more prescriptions for 1 or more monitored drugs from 2 or more physicians or 2 or more pharmacies in consecutive 30 day period • 500 or more units of monitored drug at one time alert • Early/partial refill (not defined yet) or duplicate drug (same DIN same day) alert • May adjust all above criteria once PMP in place and feedback received
Interventions	• College of Physicians can register physician with history of overprescribing with system to restrict what they can prescribe • If patient monitoring agreement in place, physician or pharmacist can register patient with PMP (if patient consents) to restrict who can prescribe to them and where they can pick up

New Brunswick	
	monitored drugs (building on what is being done in practice) • All reports will be done in real time, proactive not reactive, intended primarily for prescribers and dispensers at point of prescribing and dispensing • Real time system initiated alerts at time of prescribing and dispensing to prescribers and pharmacists based on criteria for questionable activity
Evaluation of PMP	• Will conduct satisfaction and usage surveys for quality assurance • Will conduct audits of PMP system usage for appropriateness and extent of use • Pharmacy reporting compliance rate, missing data will be audited
Funding	• Funding not secured in legislation

Nova Scotia	
Program Name	Nova Scotia PMP (NSPMP)
Website	www.nspmp.ca/
Implementation Date	1992 — triplicate prescription program 2007— electronic submission, the triplicate prescription pad replaced with a duplicate prescription pad
Regulatory Framework	*Prescription Monitoring Act* and *Regulations* Legislation established Prescription Monitoring Board to develop and operate NSPMP
Program Administrator	Medavie Blue Cross
Institutional Associations	• Doctors Nova Scotia • Nova Scotia College of Pharmacists • College of Physicians and Surgeons of Nova Scotia • Pharmacy Association of Nova Scotia • Nova Scotia Dental Association • Provincial Dental Board of Nova Scotia
Description	• Use two-copy serialized prescription forms (until Drug Information System in place) • Province will be transitioning to a Drug Information System in the next 12–18 months • Data collected at pharmacy at point of dispensing • Real time data collection • Pharmacies audited every 2 years for submission of prescriptions and accuracy
Monitored Drugs	Any drug that is a controlled drug under the federal *Controlled Drugs and Substances Act* (CDSA) and is listed in the Schedules of that Act except testosterone when compounded for topical application for local effect and benzodiazepines
Clinician Access to Patient Profiles	• Clinician initiated • Alert sent to pharmacy if patient has contract in place and goes to different physician or pharmacy Program can provide doctor, dentist or pharmacist with drug profile that identifies individual's prescriptions for drugs monitored by program that includes identification of prescribers prescribing drugs and pharmacies dispensing drugs. Providers can request profile from program and information will be faxed to them within minutes or registered providers can login to eAccess secure web application and generate profile independently.
Reviews and Reports	• Information sent to third-party payers through special request only • Information sent to prescribers in substance abuse treatment centres • Can investigate cases through complaint • Can send patient profile to community services, if patient requests • Conduct epidemiological analyses of prescription data • Can produce customized reports upon request

Nova Scotia	
	• Data Sharing for Research: The Program acts as a resource to researchers by providing statistical information and aggregate data on monitored drug use • Prescriber Peer Comparison Reports: This report is available to prescribers upon request. It provides a graphical representation of their individual prescribing pattern in relation to peers in their District Health Authority, as well as on a provincial basis
Questionable Activity Criteria	• Multiple prescriber report (3 or more physicians) every 30 days • Every methadone patient monitored through weekly reports • Specific drug usage review for different types of drugs every 56 days • High volume prescribers
Interventions	• Methadone Program Monitoring: The program can assist methadone clinics in monitoring patients to ensure no other monitored drugs are being obtained during their treatment. • Patient/prescriber agreement monitoring: In situations where a prescriber deems a patient agreement to be appropriate, the NSPMP will monitor a patient's profile to ensure adherence to the patient agreement. • Medical consultant: available as a resource to healthcare professionals, the Program and the Program's committees. If Program has reason to believe that doctor, dentist or pharmacist may be practicing in manner inconsistent with mandate of program, it may refer case on anonymous basis to program's Practice Review Committee (PRC) for review and PRC can choose whether to refer individual to their licensing authority for further review. Program can provide licensing authority with information regarding activities of member of that licensing authority and shall provide licensing authority with all relevant information. If program has reasonable grounds to believe patient has committed offence, they must provide to appropriate law enforcement authority all necessary information including individual's name, address, identification of drug or drugs in use, number of prescriptions dispensed, date of dispensing, and number of prescribers.
Evaluation of PMP	• Conduct user satisfaction surveys • Conduct audits of PMP use • Use PMP data as outcome measures
Funding	Funding through Nova Scotia Department of Health. Contract in place to 2017 with Medavie Blue Cross to administer the program

Prince Edward Island	
Program Name	To be determined
Implementation Date	Under development
Regulatory Framework	Passed legislation to move forward with PMP as part of *Narcotics Safety and Awareness Act*
Program Administrator	Provincial government
Description	• The province's Drug Information System (DIS) allows government to track all prescriptions issued in P.E.I. since 2009 • Real time data collection
Monitored Drugs	All controlled substances in federal *Controlled Drugs and Substances Act*
Clinician Access to Patient Profiles	Yes, through the DIS
Reviews and Reports	Under consideration
Questionable Activity Criteria	To be determined
Interventions	To be determined

Prince Edward Island	
Evaluation of PMP	Legislation in place to require mandatory compliance with DIS; other quality activities planned
Newfoundland and Labrador	
Program Name	Tamper Resistant Prescription Drug Pad Program (TRPP)
Website	www.health.gov.nl.ca/health/prescription/hcp_tamperresistantdrugpad.html
Regulatory Framework	*Pharmacy Act*, *Medical Act* and *Registered Nurses Act*
Institutional Associations	• Department of Health and Community Services • College of Physicians and Surgeons of Newfoundland and Labrador • Newfoundland and Labrador Medical Association • Newfoundland and Labrador Pharmacy Board • Pharmacists' Association of Newfoundland and Labrador • Newfoundland and Labrador Dental Board • Newfoundland and Labrador Dental Association • Newfoundland and Labrador College of Veterinarian • Royal Newfoundland Constabulary
Description	• Tamper resistant prescription pads • TRPP is **not** a monitoring program • No data collected • Prescription pad numbered, but no tracking done
Monitored Drugs	Determined by federal narcotic or controlled drug categories in consultation with pharmacy board
Interventions	If physicians or patients previously flagged by provincial drug program then can place restrictions on them with TRPP (provincial drug program only includes those who used program not cash or any other type of transaction)
Quebec	
Program Name	No PMP
Overview	Régie de l'assurance maladie du Québec (prescription drug insurance) Everyone in Quebec must have a public or private prescription drug plan and data is collected on all publically funded prescriptions. Regulatory college inspectors can request prescribing information.
Yukon	
Program Name	Triplicate Prescription Program (TPP)
Website	www.yukonmedicalcouncil.ca/pdfs/tpp_directive.pdf
Overview	Yukon is a participating member of the TPP with the College of Physicians and Surgeons of Alberta. Yukon follows the same TPP as Alberta, but reports to Yukon Medical Council specifically about Yukon.
Northwest Territories	
Program Name	No PMP
Nunavut	
Program Name	No PMP

Appendix 6: Synopsis of Key PMP Features

Prescription Data Collection Considerations

- What prescription dispensing data is collected?
    - Drugs targeted
    - Patient, prescriber and pharmacist Identifiers
- What is the method used to collect prescription data?
    - Multiple copy paper prescriptions
    - Electronic submissions
- What is the quality of the data? Is it accurate and complete?
- Who has access to the prescription data, for what purpose and under what circumstances?

Interventions Using Prescription Monitoring Data

- Clinician interventions
    - Do clinicians have access to the monitoring data?
    - Are clinicians accessing the monitoring data when available?
    - Are clinicians making appropriate clinical decisions based on the monitoring data?
- Program interventions
    - Does the program send unsolicited reports to patients, pharmacists and prescribers associated with questionable prescription activity?
    - What criteria is used to detect questionable activity?
- Stakeholder interventions
    - Does the program have an appropriate mechanism in place to share data with other stakeholders such as regulatory bodies and law enforcement?

Program Evaluation

- Is the impact of the program being evaluated on the following outcomes?
    - Changing prescribing patterns
    - Reducing questionable activity
    - Reducing diversion
    - Reducing abuse and addiction
    - Reducing overdose deaths
    - Measuring unintended consequences

- Is program user satisfaction being evaluated?
- Are the administrative features of the program being evaluated (e.g., efficiency and stability of funding)?

Using PMP Data for Epidemiological Analyses

- Is the prescription monitoring data being used as a source of information for epidemiological analyses?