E-prescribing on Opioid-related Experiences and Outcomes: A Rapid Scoping Review

Objectives

The objectives of this rapid review were to: 1) examine how e-prescribing has been used clinically for opioids; 2) examine the effects of e-prescribing on clinical outcomes, the patient/clinician experience, service delivery, and policy related to opioids; and 3) identify current gaps in the literature to inform future studies and/or recommendations for e-prescribing and opioids.

Background

Electronic prescribing (e-prescribing) is an approach designed to assist in facilitating safe and appropriate prescriptions for patients. E-prescribing is described as a secure solution for electronic creation and transmission of prescriptions between registered providers and patient's preferred pharmacies while utilizing clinical point-of-service solutions to integrate clinical workflow and software.[1] It is unknown to what extent e-prescribing can influence the safe and appropriate use of opioids and their specific clinical outcomes. To address this gap in knowledge, a rapid scoping review was completed for Canada Health Infoway to answer: *What direct impacts of e-prescribing have been experienced related to opioids?*

Methods

Protocol and registration
A rapid scoping review was completed by following the JBI 2020 scoping review methodology[2] and the World Health Organization guide.[3] The protocol was registered with OSF Registries (https://osf.io/9zpcg/).

Eligibility criteria
The search criteria were as follows: 1) e-prescribing programs targeted to opioid use, including those that were complemented or accompanied by clinically focused initiatives, and 2) a primary search study of experimental, quasi-experimental, observational, qualitative, and/or mixed methods design. An additional criterion of an ambulatory component of e-prescribing (e.g., e-prescribing occurred upon discharge from acute care) was added at the full-text stage.

Information Sources and Search
A comprehensive literature search was conducted by an expert librarian from the inception of selected databases (MEDLINE [Ovid], EMBASE [Ovid], and Scopus [Elsevier]) until November 16, 2022. Grey literature with searched using Google and ProQuest Theses and Dissertations via a string of key terms.

Evidence Selection, Extraction and Synthesis of Results
All articles were double screened by trained reviewers using the inclusion criteria. All grey literature was manually searched by single reviewer. Articles were first title and abstract screened, before moving to full-text screening, when the inclusion of an ambulatory component for e-prescribing was added. Data extracted included study characteristics, population characteristics (adapted from Cochrane Progress-Plus equity variable recommendations),[4] outcomes, and overall study findings. Data analysis of synthesized experiences and outcomes used a descriptive approach.

Results and Interpretation

There were a limited number of studies that met the inclusion criteria of the review. Upon completion of screening, only 32 full text articles and 2 grey literature documents (n=34) met the eligibility criteria.

Objective 1: To examine how e-prescribing has been used clinically for opioids
Of the studies available, few were from the perspective of an e-prescribing setting, with most cases of e-prescribing being initiated within acute care or affiliated outpatient clinics. The two main data systems used within an acute care setting were the Computerized Physician Order Entry system and the Electronic Prescribing for Controlled Substances system. Only a single study provided evidence on e-prescribing in a primary care setting. There was minimal reporting of clinician characteristics, clinical populations, and socio-demographic information.

Objective 2: To examine the effects of e-prescribing of opioids on opioid-related clinical outcomes, patient/clinician experience, service delivery, and policy
The main outcomes identified were opioid prescribing rates, alerts (e.g. adverse drug events, drug-drug interactions), quantity and duration of opioid prescriptions, adoption of e-prescribing technology, attitudes towards e-prescribing, and potential challenges with the implementation of e-prescribing into clinical practice. However, most of the outcomes were focused on prescription-level metrics such as prescription rates, prescription errors, and discontinuation rates.

The review identified a large variation in the effects of e-prescribing on clinical outcomes, experiences, service delivery, and policy related to opioids. Given the variation in results, there may be promising evidence regarding e-prescribing reducing the occurrence of prescriber error. In several studies, it appeared that the use of alerts and order sets in an e-prescribing system had a favourable effect, with reductions in errors, dose and prescription of opioids.[6] From the grey literature report, mandatory national use of e-prescribing systems for controlled substances was projected to have approximately $53 billion annual savings in the United States.[7] However, the extent to which these findings can be generalized to the Canadian care system are unknown.

Objective 3: To identify any gaps in the literature to inform future studies and/or recommendations
While current evidence does show promise towards the impact of error reduction and interaction identification, there remains important implementation and outcome considerations for further exploration.

Implementation Considerations
More work is needed to understand implementation considerations for e-prescribing to inform adoption and larger scalability. There are well established factors that influence implementation of interventions and their effectiveness (see Table 1 below).

Table 1. Suggested Implementation Considerations for Future Work

Domain Area*	Example for E-Prescribing
Intervention Characteristics	Types of system, components/features of e-prescribing technology, adaptability, and complexity of implementation, cost for implementing systems
Inner Setting	Characteristics of settings (hospitals, primary care, pharmacies)
Outer Setting (Environment)	Patient needs, resources, health system model
Characteristics of Key Users	Knowledge, attitudes, demographics, and social location of key stakeholders
Implementation Process	Strategies that may influence implementation such as quality and extent of planning, engagement of stakeholders, impact on workflow

*Based on the Consolidated Framework for Implementation Research (CFIR)[8]

Outcome Considerations

Overall, there was a lack of consistency in the types of outcomes being reported and it is unclear whether the outcomes reported align with established quality indicators (e.g., consideration of dose within clinical context of acute or chronic care). Some outcomes that may present with issues include non-adherence and discontinuation of medication, given that the adverse effects these outcomes can have on patient well-being are detrimental. Finally, there was an absence of studies exploring perceptions of e-prescribing for opioids from different stakeholder groups (e.g., clinicians, prescribers, patients) from a qualitative perspective, which would also inform meaningful outcomes and potential indicators of quality e-prescribing.

Recommendations for Future Research

Below are recommendations to consider for future research:

1. Examine the impact of e-prescribing of opioids in the community and primary care settings.
2. Explore and examine the perspectives, experiences, and healthcare outcomes on a wide range of stakeholders (prescribers, clinicians, pharmacists, patients, case managers, etc.) through a mixed-method and/or qualitative lens.
3. Create, implement, and evaluate a common set of quality control indicators that can be applied consistently across studies assessing e-prescribing.

Conclusions

While relatively few studies were identified, this scoping review highlights initial promising results with e-prescribing and opioid therapy management. E-prescribing including key features such as alerts and dose order sets may reduce prescribing errors. A key aspect for consideration is how e-prescribing might be used and related outcomes based on whether newly initiated or chronic. Among new prescriptions, there may be potential to decrease initiation, quantities, and doses as per guidelines to minimize short and long term risks. Conversely, there may be important and different considerations with e-prescribing for people who are taking opioids on a chronic basis to minimize disruptions with access and/or sudden dose changes. These important nuances were missed from the research reviewed and highlight gaps in the literature. It is important that future work explores the experience of prescribers, pharmacists, and patients using e-prescribing for opioid therapy management, with an emphasis on prescribers in the community and primary care. Integrating the thoughts, perceptions, and beliefs of these parties into the literature is important as they are directly impacted by technology use in healthcare. Developing a common set of quality indicators for e-prescribing with opioids will help inform future research and build a stronger evidence base. Furthermore, understanding implementation considerations will be of importance as the technology is adopted and integrated into clinical practice and health systems.

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