



NURSING EDUCATION GUIDELINES ON ELECTRONIC PRESCRIBING





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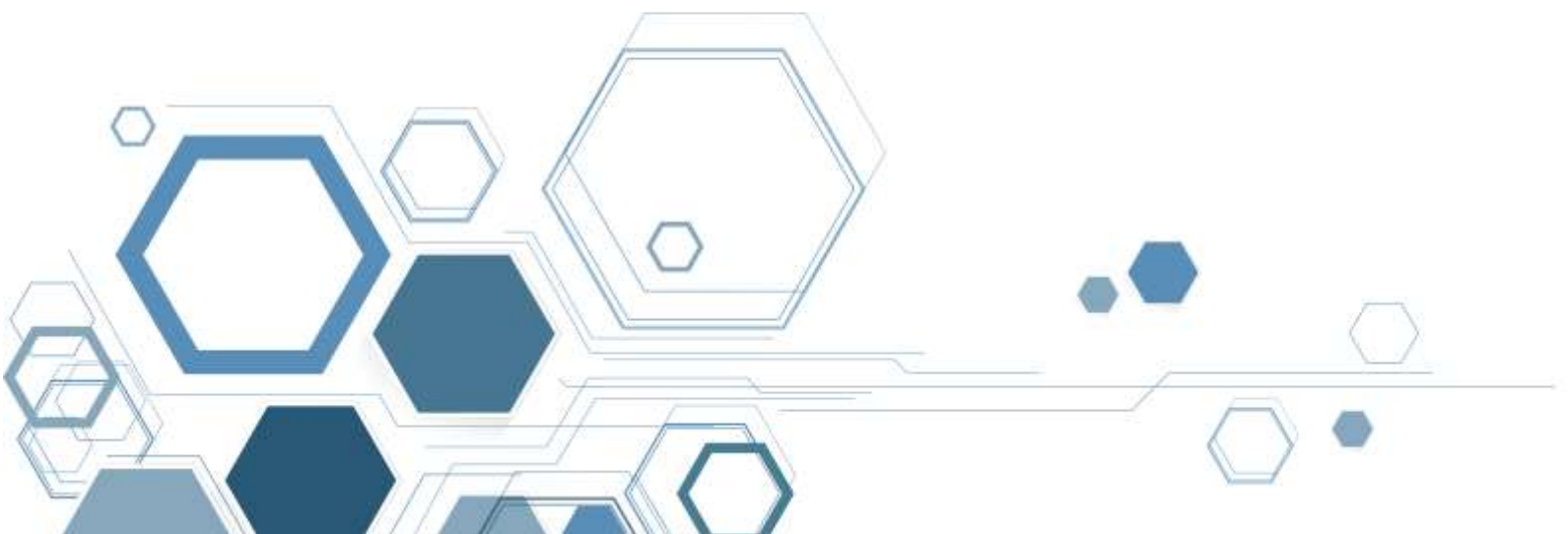


PREAMBLE

Innovations in technology have helped to improve health care globally. Traditionally, a technological innovation in health care referred to equipment, device invention, or improvement. More recently, information and communication technologies have shown great promise for improving health outcomes by creating a more efficient and safer health system. Medication errors causing harm are common and preventable (Canadian Institute for Health Information & Canadian Patient Safety Institute, 2016) and it has been recognized they could be avoided by employing technology in the prescribing process (Government of Canada, 2010; Institute for Safe Medication Practices, 2000). The Institute for Safe Medication Practices (ISMP) have recognized that the adoption of electronic prescribing (e-prescribing) should be well-thought out and requires proper planning, design, evaluation, and re-design. They also suggest that e-prescribing is a beneficial tool only when it is used appropriately (2000). As e-prescribing is now being implemented in Canada it is important that health care professionals become engaged in the adoption process.

Nurses are the largest group of health professionals in Canada which makes them critical to the adoption and use of e-prescribing in Canada. All regulatory categories of nurses across Canada will be significant users of an e-prescribing system, as prescribers or in carrying out medication management activities and client education. To understand the benefits of this technology it is critical that nurses have access to resources that will enable them to gain information about e-prescribing, be engaged in the adoption process and contribute to the improvement of the supporting systems, tools and processes.

The Canadian Association of Schools of Nursing (CASN) with support from Canada Health Infoway (Infoway) has developed e-prescribing guidelines as an educational tool for current and future nurses. These guidelines provide evidence-informed and consensus-based recommendations that will prepare nurses to participate in the planning and implementation of e-prescribing in an organization, and to be safe and effective users of the e-prescribing system.





PURPOSE, SCOPE, AND USE OF THE GUIDELINES

Purpose

The purpose of this document is to provide e-prescribing educational guidelines to prepare nurses for the implementation of e-prescribing within a health care organization and to support them to become safe and effective users of the e-prescribing system.

The objectives of the educational guidelines are to:

- provide nurse educators with the best available evidence and information about e-prescribing to support the inclusion of content related to e-prescribing in nursing curricula;
- inform nurses about the benefits and risks of e-prescribing, and about safe and effective use of an e-prescribing system;
- encourage nurses to participate in the planning and implementation of e-prescribing in their health care organization;
- advocate for optimal e-prescribing through continuous quality improvement and evaluation of the e-prescribing system.

Scope

CASN's mandate is to promote excellence in nursing education and the primary intent in developing the guidelines is to provide recommendations to better prepare future nurses for e-prescribing. Thus, the principle target audience for this document is nurse educators. The guidelines, however, may also benefit nurses or other health care professionals working in a variety of settings who are looking for information on e-prescribing.

This document is not intended to replace information contained in jurisdictional entry-level competencies or practice standards. It is also not a comprehensive resource on e-prescribing and does not provide information on how to prescribe, or how to manage medication activities.

Use of the Guidelines

The guidelines have been developed to serve the following functions:

- Assist nurse educators develop course content on e-prescribing;
- Provide nurse educators with a supplementary resource on medication management activities;
- In conjunction with the *Entry-to-Practice Nursing Informatics Competencies* (CASN, 2012), provide curricular direction in preparing the next generation of nurses to work in technology-enabled environments;
- Assist health care organizations implementing an e-prescribing system to revise existing policies and procedures and create new ones;
- Provide direction on e-prescribing to nurses or other health professionals in practice settings;
- Offer a reference to other health professions developing discipline-specific guidelines or policies related to e-prescribing.



ELECTRONIC PRESCRIBING AND OTHER KEY TERMS

Electronic prescribing (e-prescribing) refers to the secure electronic creation and transmission of a prescription between an authorized prescriber and a client's pharmacy of choice by using a clinical Point of Service (POS) solution in a manner which integrates clinical workflow and software (Canadian Medical Association and Canadian Pharmacists Association, 2012). E-prescribing requires an authorized prescriber to create a prescription within an Electronic Medical Record (EMR) or other stand-alone application. The prescription is then (securely) transferred digitally to a client's pharmacy of choice in the Pharmacy Practice Management System (PPMS) where it is accessible to pharmacists (see Figure 1).

It is important to note that other forms of prescription transmission via electronic equipment are not e-prescribing. For example, the creation of a prescription within an EMR that is then faxed or sent as a digital image examples of facsimile transmissions (Saskatchewan College of Pharmacy Professionals, 2016). E-prescribing is unique because the prescription is transmitted as data.

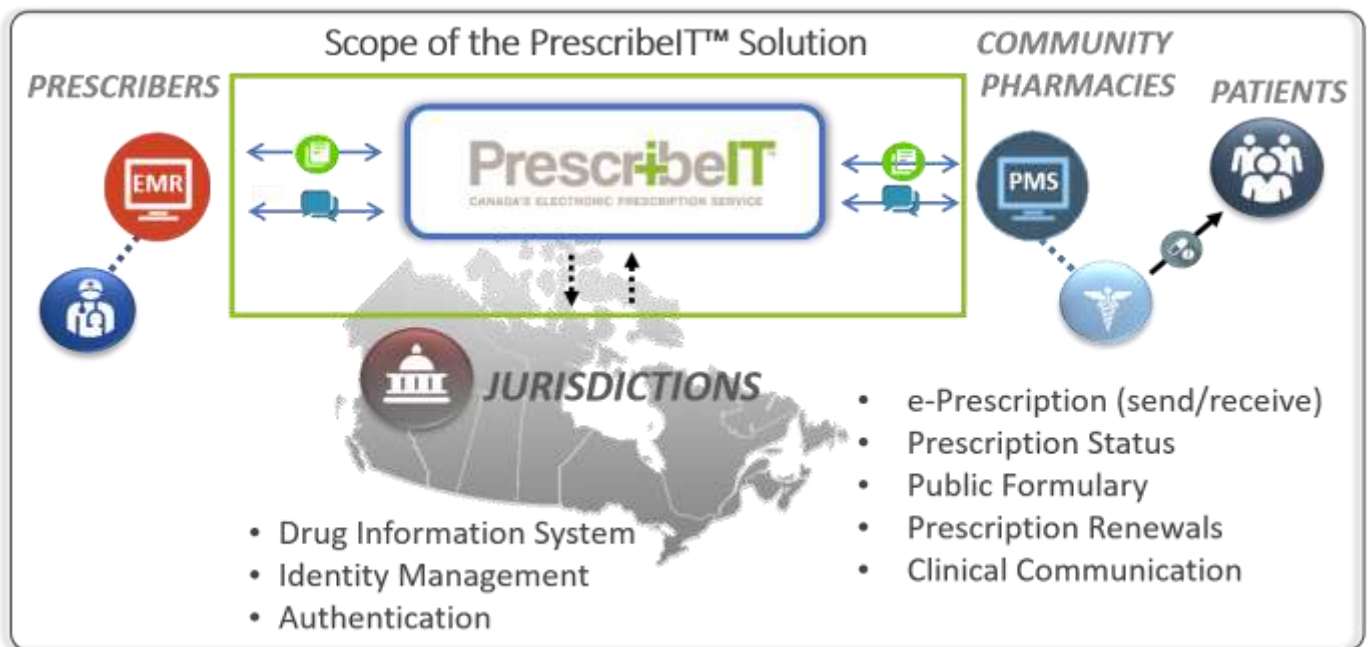
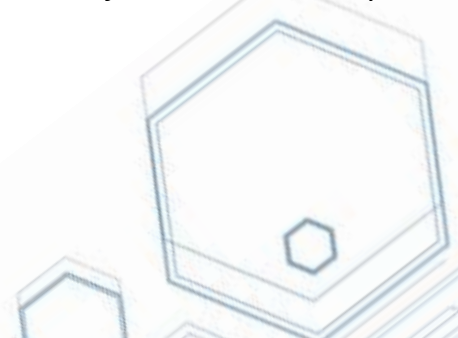


Figure 1. Image depicting the electronic transfer of a prescription (PrescribelT™, 2018).

Nurse: Regulated health care professionals with different nursing designations who are licensed to practice by a provincial nursing regulatory authority.

Prescriber: A person who is authorized under the laws of a province or territory of Canada to give a prescription within the scope of his or her practice of a health discipline (Drug and Pharmacies Regulation Act of 1990, 2017).

Please note that additional definitions for other terms used in this document can be found in the Glossary of Terms.





METHODS

The e-prescribing recommendations were developed using a modified Delphi approach. This methodology incorporates a multi-step iterative process which includes stakeholder input into the consensus-building among a panel of experts. As a first step, CASN struck an Advisory Committee of nursing experts with representation from across Canada to guide the development of the recommendations. An environmental scan of existing and related resources, standards, and competencies served as a starting point to develop a background document. The document outlined the current state of e-prescribing in Canada as well as the benefits and challenges of e-prescribing experienced by nurses and other health professionals in countries where e-prescribing is more widely used. Using this background document, the Advisory Committee engaged in an iterative process of review and revisions to develop a first consensus based draft of e-prescribing recommendations.

An in-person stakeholder forum was held in June 2018 to review this initial consensus-based draft, attended by 38 stakeholders in nursing education, practice, and policy from across Canada. Several of the attendees had direct e-prescribing experience. A world café format was used at the forum, which allowed for an in-depth review of each recommendation from a diversity of perspectives. The stakeholder feedback was collated, analyzed, and used by the Advisory Committee to review and revise the initial recommendations. CASN sought feedback on the second draft of the recommendations using an online validation survey to obtain final stakeholder input. Respondents were asked to rate the importance of each recommendation using the following scale: “very important”, “important”, “moderately important”, “slightly important”, “not important”, or to indicate if they had no opinion on the recommendation. For the Advisory Committee to consider that consensus had been reached on a statement, it was determined that the statement must be rated as “very important” or “important” by at least 75% of respondents. The data indicated a high level of agreement with all the recommendations and none of the recommendations fell below this threshold. The respondents were also asked open ended questions to assess whether any recommendations should be added, changed, or removed. The Advisory Committee reviewed this input, made minor revisions based on it, and reached a consensus on a third draft. The recommendations were reviewed by nurse educators attending CASN’s Graduate Studies Forum on November 19, 2018. No further changes were proposed and the Advisory Committee formally adopted the third draft as the final set of recommendations.





CONTEXT

Introduction

Medication therapy is a commonly used health intervention around the world. Prescribed and administered correctly, medications leads to better health. Preventable errors, however, involving the inappropriate or incorrect use of medication can cause harm (Canadian Patient Safety Institute, 2016). In 1999, the Institute of Medicine's (IOM) report, *To Err is Human*, raised awareness about the prevalence and the serious consequences of medication errors. It estimated that they were responsible for approximately 7,000 deaths a year in the United States (IOM, 2000). The British Medical Journal recently revealed that since the publication of the IOM report, multiple deaths from medical errors in hospitals in the United States have occurred and this has become their third leading cause of death. Studies conducted over the last fifteen years indicate that harm from medication errors is a common occurrence in Canada as well. In 2007, the Canadian Institute for Health Information (CIHI) estimated that 1 in 10 adults with health problems had received an incorrect medication or incorrect dosage of medication (2007). During a 14 month period between 2011 and 2012, Ontario hospitals reported 36 critical incidents (defined as incidents causing severe harm or death) related to medication errors (Institute for Safe Medication Practices - Canada, 2013). Moreover, studies indicate that medication errors causing harm or death are underreported in many countries including Canada (Makary & Daniel, 2016). They are also under-recognized because they can be categorized in a number of ways (CIHI & CPSI, 2016). There has been increasing global concern about the serious impact of medication errors on health, and recently, the World Health Organization (WHO) launched a campaign titled, *Medication Without Harm*, to reduce preventable medication incidents causing harm by 50% (WHO, 2017).

Medication errors may occur at any in point in the prescribing, order entry, dispensing, administration and monitoring phases of this health intervention (WHO, 2016). The prescription of a medication is a common source of errors (Elden & Ismail, 2016; Velo & Minuz, 2009). The number of harmful incidents and preventable deaths related to prescription phase medication errors prompted the ISMP to call for technology to be integrated in practice to improve medication safety, including the use of e-prescribing (2000). Since then, a number of national organizations in Canada have recognized the potential for e-prescribing systems to improve medication safety (CIHI, 2007; Canadian Medical Association & Canadian Pharmacists Association, 2012; Canadian Medical Protective Association, 2016).





E-Prescribing in Canada

E-prescribing systems have been implemented to a varying extent in countries around the globe. They are mandated by different legal structures, have diverse functionalities and unique implementation plans. In some countries the use of e-prescribing is nearing 100% (e.g., Denmark, Sweden, Estonia). In Finland, e-prescribing has become mandatory (Deetjen, 2016; Samadbiek, Ahmadi, Sadoughi, & Garavand, 2017). In comparison, Canada has fallen behind other developed countries in its use of digital health solutions including e-prescribing (The Commonwealth Fund, 2018).

In 2007, Health Canada determined that the regulations of the Food and Drugs Act, the Controlled Drugs and Substances Act, and the Personal Information Protection and Electronic Documents Act did not need to be modified for an e-prescribing system to be implemented. As a result, there are no regulatory impediments to e-prescribing in Canada and e-prescribing can be adopted if they achieve the same objectives as written prescriptions (Government of Canada, 2010). While there are no federal impediments to e-prescribing, the provinces and territories are responsible for their implementation (CPhA & Canadian Association of Chain Drugstores, 2009).

Over the years a variety of health care organizations have advocated for the implementation and adoption of e-prescribing. In 2009, the National e-Pharmacy Task Force created principles and proposed security standards for e-prescribing based on the regulatory requirements that must be achieved, and in 2012 the Canadian Pharmacists Association (CPhA) and the Canadian Medical Association (CMA) released a joint statement with a vision for e-prescribing to be adopted across Canada by 2015.

Despite these calls to action, progress towards e-prescribing was slow across the country. Several factors have inhibited progress, many related to digital willingness. At the time when Health Canada began exploring legal regulations required for e-prescribing, EMR adoption was at 23% (Infoway, 2016). Issues noted by the CMA include the lack of functionality in EMRs, the lack of interoperability between EMRs and pharmacy practice management systems, the lack of a fully functional drug information system, and concerns about signature authentication. Additionally, there was a lack of government leadership and incentives for organizations to adopt e-prescribing (Simpson, 2016). The literature around e-prescribing adoption at the national level suggests that there is not a particular implementation model for e-prescribing that guarantees success, but some factors that lead to better outcomes have been identified





including digital maturity, strong system design, data standards, good leadership, and readiness by the public and the workforce (Deetjen, 2016; Samadbiek et al., 2017). Until recently, many of these success factors were not present in Canada.

In recent years, greater progress has been made towards the actualization of e-prescribing in Canada. The adoption of various digital health solutions has increased across the country (Commonwealth Fund, 2018). EMR adoption rose by 50% in a decade (Infoway, 2016) and by 2016, 4 in 10 prescriptions were being generated in an EMR (Infoway, 2017). Additionally, greater national leadership around e-prescribing has emerged: The Government of Canada has been promoting safer prescribing practices through promoting the development of a multi-jurisdictional e-prescribing service (Canadian Centre on Substance Use and Addiction, 2016).

The Government of Canada funded Infoway, a not-for-profit organization, to work with Health Canada, the provinces and territories, and industry stakeholders to create, operate, and maintain a financially self-sustaining, multi-jurisdiction e-prescribing service. Infoway created PrescriberIT™, a service that allows the secure transfer of prescriptions between primary care settings and pharmacies, secure messaging between pharmacists and prescribers (including renewal requests), and is integrated with provincial drug information systems (DIS) and the public drug formulary. PrescriberIT™ connects EMRs or stand-alone applications already in use with the PPMSs being used by local pharmacies (Infoway, 2018a). In addition, PrescriberIT™ is committed to protecting an influence-free dispensing and prescribing environment and safeguards prescription data from commercial use. According to PrescriberIT™, client choice is a critical component of e-prescribing. Thus, if a client's pharmacy of choice is not equipped for e-prescribing, the prescriber can still print prescriptions for the client (Infoway, 2018b). In cases where prescriptions can be transferred electronically to the pharmacy of choice but the client requests a non-authoritative copy of the prescription, they can be provided with a printed summary of the prescription information. These receipts, however, cannot be used to obtain the prescribed medication. While the Government of Canada is promoting the adoption of e-prescribing, it is not mandatory in Canada nor is the use of the PrescriberIT™ service.





E-Prescribing Implementation: Benefits, Challenges, and Lessons Learned

As the use of e-prescribing increases around the world, research is emerging detailing the results of its implementation. Benefits, risks and challenges have been identified. This research is valuable for Canadian organizations planning to implement e-prescribing, as it contains lessons learned that will help alleviate some of the implementation challenges and reduce some of the risks of e-prescribing.

Improved medication safety through the reduction of medication errors is the most compelling reason to implement an e-prescribing system. E-prescribing eliminates errors attributed to hand written prescriptions such as dispensing and/or administering the incorrect drug or incorrect dosage as a result of an illegible hand written prescription (Ahmed, Garfield, Jani, Jheeta, & Franklin, 2016; Hinojosa-Amaya, Rodriguez-Garcia, Yeverino-Castro, Sanchez-Cardenas, Villareal-Alarcon, Galazara-Delgado, 2016; Kauppinen, Ahonen & Timonen, 2017; Phillips, Shea, Leung, & MacDonald, 2015). When digitally created prescriptions are transferred to a pharmacy by fax or email, they must be manually entered into a pharmacy management system which adds a point where an error may occur (Infoway, 2018c). Research indicates reduced error rates due to the elimination of hand written prescriptions in Sweden, Estonia, and the United Kingdom where e-prescribing is used widely (Deetjen, 2016). Two teaching hospitals in Australia found that e-prescribing significantly reduced the rate of errors resulting from incomplete, illegal and unclear medication orders (Westbrook et al., 2012). Franklin et al. (2007) reported that prescribing, and administration errors decreased by 50% following the implementation of an e-prescribing system in a hospital in the United Kingdom.

Where e-prescribing is part of a larger digital health system, prescribers may have access to a client profile and decision support tools. This has been another factor linked to the prevention of prescribing errors. For example, client profiles allow prescribers to see what drugs a client has previously been prescribed or is allergic to, reducing the risk for harmful interactions or allergic reactions (Ahmed et al., 2016; Gandhi et al., 2005; Qureshi et al., 2005; Weingart et al., 2009). In addition, systems may be equipped with clinical alerts that appear to the prescriber with information about drugs, dosages, allergies, interactions or other important information.

Time savings is often cited as a reason to implement e-prescribing but the findings in the literature are mixed. Studies have shown that implementing e-prescribing results have increased staff time (Franklin et al., 2007), resulted in no change in staff time (Van Wilder, Bell, & Franklin, 2016), and created time savings (Phillips et al., 2015; Schade, Sullivan, de Lusignan, & Madeley, 2006). Though time may or may not be saved, e-prescribing appears to result in greater efficiencies and better workflow. Reasons for these improvements include having client information in one location, drug formulary information that is





readily available, decreased need for clarification calls between prescribers and pharmacists, and faster processes for refilling prescriptions (Bramble et al., 2013; Lapane, Waring, Dubé, & Schneider, 2011; Phillips et al., 2015). Studies that included a qualitative evaluation of e-prescribing by nurses found that e-prescribing allowed them to be more efficient due to increased safety of the system (Barber, Cornford, & Klecun, 2007; Bramble et al., 2013; National Health Service, 2009). According to Barber et al. (2007) nurses “saw a future in this system, with a better, more careful and error free regimen of care, with time saved becoming available for more creative nursing activity” (p.276).

The use of e-prescribing may decrease some security issues that are associated with current prescribing processes (Infoway, 2016). Hand written prescriptions can be lost or stolen, potentially resulting in privacy breaches or prescription fraud. Prescriptions that are faxed pose security issues, including being sent to the incorrect recipient, resulting in a privacy breach. Newer fax machines and photocopiers make it possible for the fax point of origin and number to be manipulated, making it harder to detect prescription fraud (Ontario College of Pharmacists, 2013). The transfer of a prescription as data can increase security benefiting both clients and clinicians.

Clients may find they benefit from the convenience of the e-prescribing system. Schleiden, Odukuya, and Chui (2015) found that 84% of the adults over 50 they interviewed preferred e-prescribing to paper prescriptions. The participants reported that they saved time by making shorter trips to the pharmacy and did not have to make additional trips to their clinic or pharmacy to replace lost or damaged prescriptions. A small study of 12 clients reported similar satisfaction related to convenience and a number of the participants also noted an improvement in safety with the elimination of hand written prescriptions (Frail, Kline, & Snyder, 2014). In Finland, which has implemented a mandatory national e-prescribing system, there is widespread satisfaction with this service amongst the general public (Lamsa, Timonen, & Ahonen, 2017). Similarly, positive attitudes towards e-prescribing amongst the general public in Sweden have also been reported (Deetjen, 2016).

Studies assessing a reduction in medication errors as a result of e-prescribing indicate that use of this system is promising. However, new types of technology-induced errors may emerge, especially in the early phases of implementation. Ahmed et al. (2016) reviewed the impact of e-prescribing on client safety in hospital settings and discovered different types of errors had emerged. These included making incorrect selection from drop down menus and putting in incorrect or conflicting information in free text fields. Clinical alerts may be present when e-prescribing is integrated with an electronic record. While this can contribute to increased safety, it has been reported that the high frequency of alerts and their generic nature can lead to alert fatigue, a term used to describe health care professional de-sensitization





to clinical alerts. Alert fatigue can result in overriding alerts that could prevent a medication error (e.g. drug allergies or interactions) (Ahmed et al., 2016; Bramble et al., 2013). Different approaches have been suggested to deal with these new types of errors including smaller lists of drop down items, minimizing the amount of free text, designing order sentences (pre-written medication orders), creating care sets (combinations of orders for a clinical situation), and integrating maximum dose checks and dose calculators into the software (Ahmed et al., 2016; Lanham, Cochran, & Klesper, 2015). It has also been suggested to tailor alerts or design alert hierarchies to reduce alert fatigue (Ahmed et al., 2016; Bramble et al., 2013).

Work arounds are another potential safety issue that arise in the use of technologies. Work arounds are deviations from an intended work process to overcome an obstacle in order for a health care practitioner to meet a work demand (Patterson, 2018). When examining the implementation of e-prescribing in a rural ambulatory care practice, Abbott, Fuji, and Galt (2015) found that nurses developed work arounds because the system design did not fit well into their work flow. Work arounds may be unavoidable; however, they can become problematic when the underlying issue is not reported or addressed. Organizations should define procedures for cases in which workarounds are being used as a band aid solution. The need for work arounds may be reduced with a thoughtful selection of the design process for the e-prescribing system.

Clients may also experience some challenges as a result of e-prescribing implementation. Confusion around e-prescribing may lead clients to believe that their prescription will be ready to be picked up at the pharmacy upon arrival (automatically filled) which can cause frustration. Additionally, e-prescriptions may accidentally be transferred to an incorrect pharmacy (ISMP Canada, 2018). In research conducted on the satisfaction of e-prescribing, clients who preferred paper prescriptions felt they lacked information or control about the medications they were being prescribed (ISMP Canada, 2018; Lamsa et al., 2017; Schleiden et al., 2015). This may be mitigated by providing clients with a print out of their prescription information and reviewing the plan of care with the client.

The ISMP has stated “there are no perfect solutions for any area of human endeavor, and computerized medication management systems certainly are not a panacea” (2000). Although e-prescribing brings



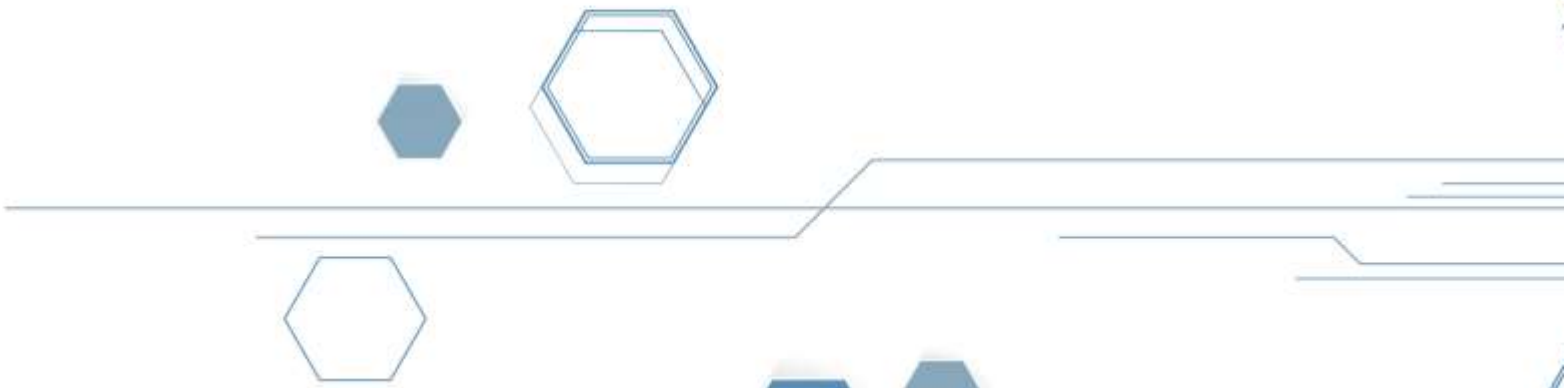


some new risks and challenges, many organizations, communities, and countries are adopting this technology because of the potential benefits to the public and health care professionals.

As e-prescribing implementation becomes a reality in Canada, it is important for nurses and other health professionals to benefit from the lessons learned by other organizations that have already implemented an e-prescribing system. Research indicates that thorough planning for e-prescribing implementation is critical for successful adoption (Gagnon, Nsangou, Payne-Gagnon, Grenier, & Sicotte, 2014). The Australian Commission on Safety and Quality in Health Care (2017) concluded that proper planning for the implementation of electronic medication management systems lessened the safety risks that can occur when these systems are implemented. There is evidence as well, that health care professionals should be involved in the software design process to ensure it is user-friendly, free of technical errors, and fits into their workflow (Gagnon et al., 2014). In Quebec, for example, an e-prescribing network had low rates of adoption due to issues with the system and problems with interoperability (Gagnon, Payne-Gagnon, Sicotte, Langue-Dube, & Motulsky, 2013). Successful adoption of e-prescribing is also challenged if the technology is well-designed but does not fit into the work flow of health care professionals. Nurses should be consulted in the system design and updates to ensure the e-prescribing process meets their needs. Often, however, they are not included in the consultations. As a result, the European Federation of Nurses Associations (2015) has recommended that nurses take a proactive approach in engaging with e-prescribing implementation initiatives to ensure the system fits nursing requirements. A survey conducted with Canadian nurses indicated some progress is needed in this area as it found that while 70% of nurses in supervisory roles were consulted only 56% of all nurses, provided input on decisions about the introduction of electronic tools (Infoway, Canadian Nurses Association, and Canadian Nursing Informatics Association, 2017).

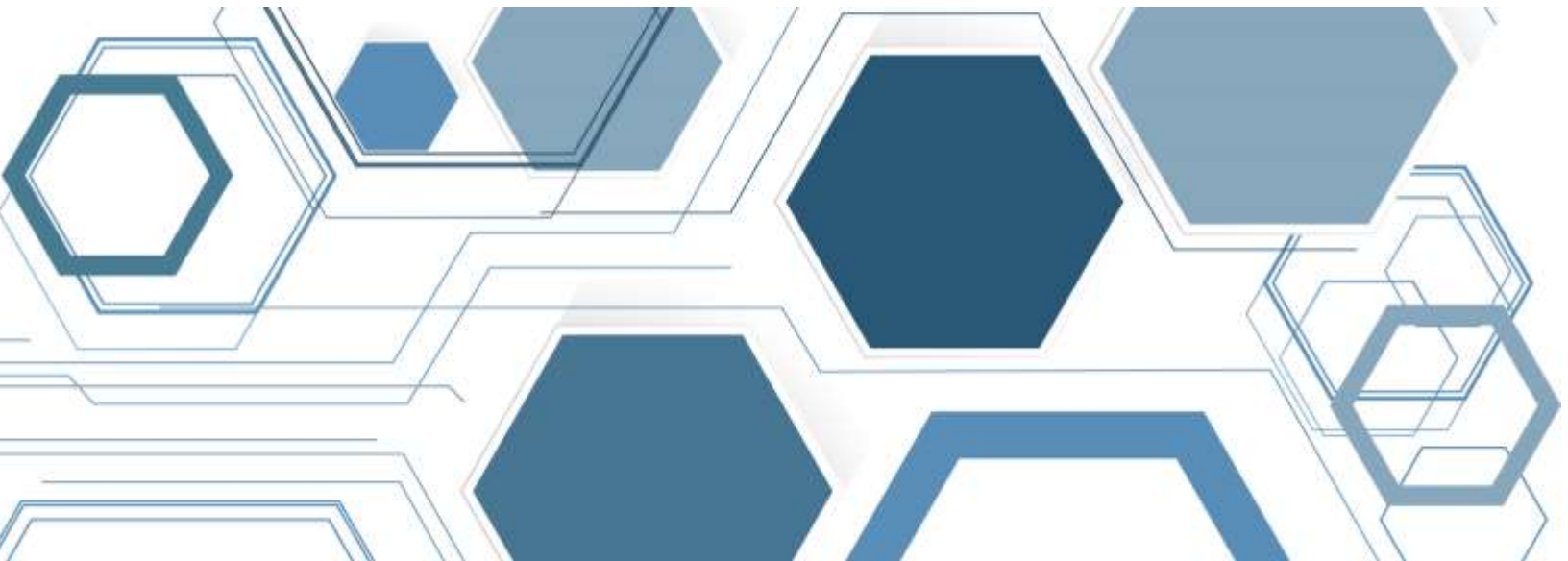
Insufficient training has also been associated with sub-optimal use of the system. It is crucial to have efficient ongoing education and training to improve the e-prescribing implementation process. (Brown et al., 2017; Gagnon et al., 2014; Villaseñor, Walker, Fetters, & McCoy, 2017). More research, however, is needed to determine the most effective approaches to use (Brown et al., 2017). Exposure to e-prescribing prior to implementation can improve attitudes about the usefulness of the system and decrease perceived barriers (Gagnon et al., 2014; Villaseñor et al., 2017).







Nursing Education Guidelines on E-Prescribing





RECOMMENDATIONS FOR ALL NURSES:

Domain 1

Client-Centered Care

- a. Informs the client when e-prescribing is in use and documents the client's pharmacy of choice.
- b. Discusses the roles and responsibilities of health care professionals and the client related to e-prescribing.
- c. Reviews the client's information in the EMR to ensure it is accurate, complete, and up to date to support full functioning of e-prescribing clinical decision support tools.
- d. Reviews the plan of care with the client and offers prescription information in the form of a prescription receipt.





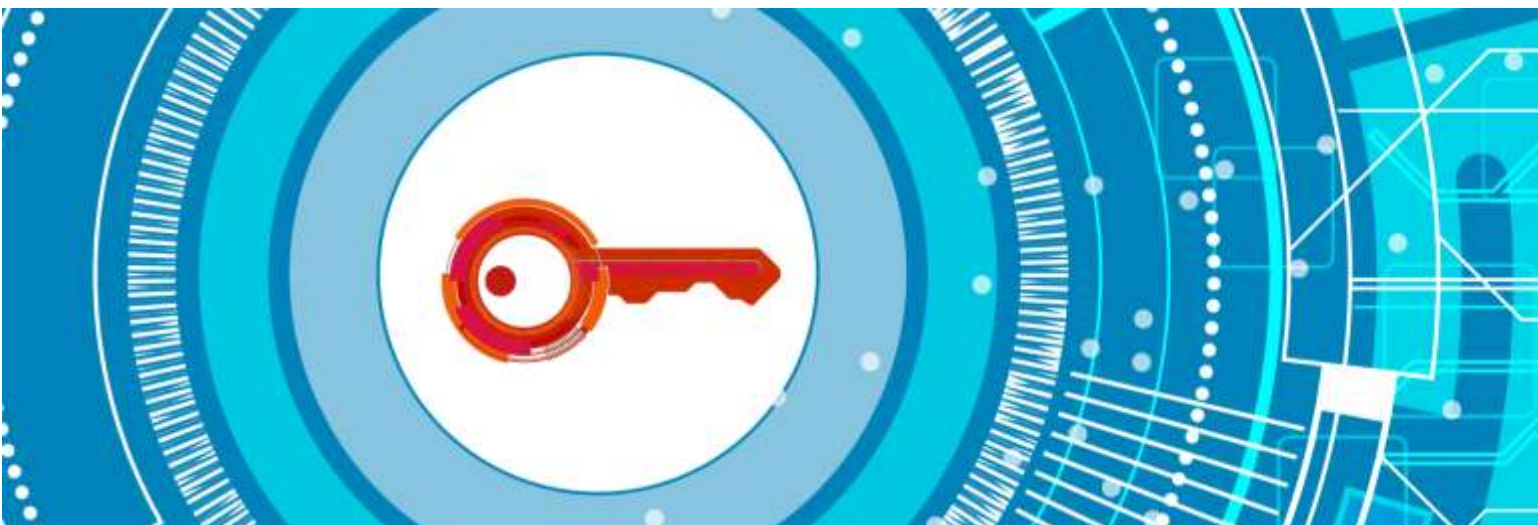
Domain 2

Advocacy and Leadership

- a. Participates in the acquisition and development of digital health solutions that allow for e-prescribing and plans e-prescribing implementation with other members of the health care team.
- b. Contributes to client safety, quality improvement, and evaluation activities related to e-prescribing.



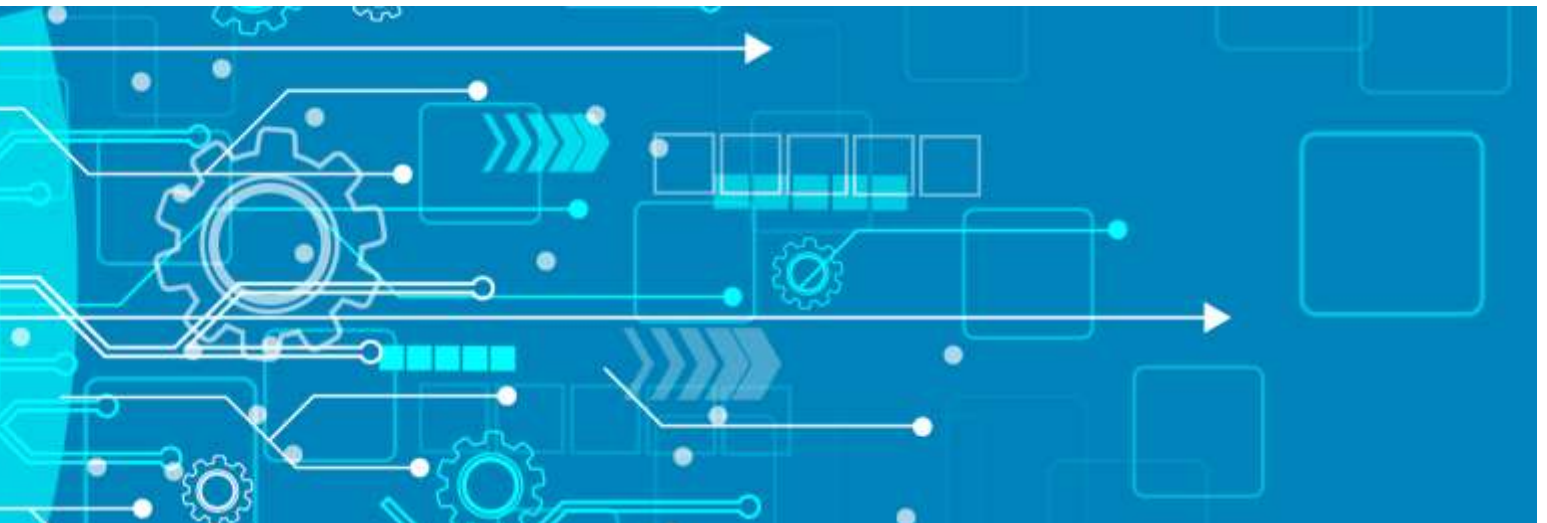
- a. Practices in accordance with relevant legislation, nursing scope of practice, professional standards, and organizational policies for e-prescribing.
- b. Engages in continual learning that promotes optimal and consistent use of the digital health solutions that allow e-prescribing.
- c. Reports, and advocates for the resolution of errors or issues with the e-prescribing system, recognizing the legal and ethical risk of using work arounds.
- d. Engages in training and planning for a system outage and responds appropriately in the event that e-prescribing is not available.
- e. Participates in a collaborative intra- and inter- professional dialogue to understand their roles and responsibilities related to e-prescribing.
- f. Adheres to security, privacy, and confidentiality measures in place during the e-prescribing process.





RECOMMENDATIONS FOR NURSES WITH PRESCRIBING AUTHORITY:

- a. Prepares electronic prescriptions in accordance with jurisdictional regulatory standards, provincial or territorial policies, being mindful of clinical practice guidelines for safe and effective care.
- b. Demonstrates that clinical judgement for safe prescribing must prevail in the e-prescribing process, remaining cognizant of errors that can occur when generating an e-prescription, and vigilantly reviewing the confirmation screen before sending the e-prescription.





GLOSSARY

Disclaimer: This glossary is a list of terms related to electronic prescribing in the context of nursing practice commonly used at the time of publication. It does not intend to provide an exhaustive list of terms related to electronic prescribing.

Term	Definition
Alert fatigue	Health care professionals become fatigue or desensitized to clinical alerts when they are confronted with a high number of alerts, many of which are inconsequential. This state may lead to accidentally ignoring clinical alerts that require action (Agency for Healthcare Research and Quality, 2018).
Clinical alerts	When clinical decision support systems are in use, prompts appear to health care professionals about clients and their conditions. In the context of e-prescribing, clinical alerts would likely include drug warnings, dosage, interactions, or allergies.
Clinical decision support	Tools that provide timely information about a client to a health care professional to inform decisions about the client's care. Clinical decision support can include reminders about preventative care, and alerts about potential harmful situations (Agency for Healthcare Research and Quality, 2018).
Controlled drugs and substances	"A controlled substance is any type of drug that the federal government has categorized as having a higher-than-average potential for abuse or addiction. Such drugs are divided into categories based on their potential for abuse or addiction. Controlled substances range from illegal street drugs to prescription medications" (Health Canada, 2018).
Controlled Drugs and Substances Act	"An Act respecting the control of certain drugs, their precursors and other substances and to amend certain other Acts and repeal the Narcotic Control Act in consequence thereof" (Controlled Drugs and Substances Act of 1996, 2017).
Digital health	Digital health refers to the use of information technology/electronic communication tools, services, and processes to deliver health care services or to facilitate better health (Canada Health Infoway, 2018c).
Drug	As defined by the Food and Drugs Act (1985), "drugs include any substance or mixture of substances manufactured, sold or represented for use in: a) the diagnosing, treating, mitigating or preventing a disease, disorder or abnormal physical state, or any of their symptoms, in human beings or animals, and b) restoring, modifying or correcting the body structure of human beings or animals or the functioning of any part of the bodies of human beings or animals".
Drug formulary	A formulary is "a list of drugs covered as benefits for eligible beneficiaries" (Patented Medicines Prices Review Board, 2017). Provincial and territorial governments maintain a formulary of drugs covered in provincial and territorial drug coverage plans.
Drug information system	"A system that enables authorized users to access, manage, share and safeguard a client's medication histories" (Canada Health Infoway, 2018d).
Drug Product Database	A database maintained by Health Canada of all drug approved for use in Canada (Health Canada, 2015).
Electronic health record (EHR)	A secure, integrated collection of a person's encounters with the health care system that contains a comprehensive client health history (Canada Health Infoway, 2018d).
Electronic medical record (EMR)	A computer-based client record used in a single clinical practice that details client demographics, medical and drug history, and diagnostic information (Canada Health Infoway, 2018e).
Electronic prescribing (e-prescribing)	e-Prescribing is the secure electronic creation and transmission of a prescription between an authorized prescriber and a client's pharmacy of choice, using clinical Point of Service (POS) solution, in a manner which integrates clinical workflow and software (Canadian Medical Association and Canadian Pharmacists Association, 2012). Entering a prescription into an EMR and faxing a printed copy of the prescription does not constitute e-prescribing.



Term	Definition
Facsimile transmission	The use of electronic equipment to transfer the digital image of a prescription (e.g. faxing). This term is used to differentiate the transmission of a prescription as data (e-prescribing) from other forms of prescribing using electronic equipment.
Food and Drugs Regulations	Contained in the Food and Drug Act, these regulations prescribe the standards of composition, strength, potency, purity, quality or other property of the article of food or drug to which they refer (Food and Drug Regulations, 2018).
Interoperability	Describes the extent to which systems and devices can exchange and interpret data. In healthcare, interoperability is achieved health information systems can exchange data and subsequently present the data to a user in a way that it can be understood within and across organizational boundaries (Healthcare Information and Management Systems Society, 2013).
Medication	Term used to describe drugs that are used in the prevention, diagnosis, cure, treatment, or relief of a symptom or disease. Generally, the terms drug and medication are used interchangeably (Buck & Picinbono-Larose, 2018).
Medication errors	A preventable drug event involving inappropriate use of a drug by a client or health care professional that may or may not cause harm (Lilley, Rainforth, Collins, Snyder, & Swart, 2017).
Medication management	“Patient-centred care that optimizes safe, effective, appropriate drug therapy. Care is provided through collaboration with patients and their healthcare teams” (Association of Faculties of Pharmacy of Canada, and Institute for Safe Medication Practices Canada, 2016; Canadian Pharmacists Association, Canadian Society of Hospital Pharmacists).
Nurses	Regulated health care professionals with different nursing designations who are licensed to practice by a provincial nursing regulatory authority.
Nurse Practitioner (NP)	Nurse practitioners (NPs) are registered nurses who have additional education and nursing experience, which enables them to: autonomously diagnose and treat illnesses, order and interpret tests, prescribe medications, and perform medical procedures (Canadian Nurses Association, 2018)
Personal Information Protection and Electronic Documents Act	“An Act to support and promote electronic commerce by protecting personal information that is collected, used or disclosed in certain circumstances, by providing for the use of electronic means to communicate or record information or transactions” (Personal Information Protection and Electronic Documents Act, 2000).
Pharmacology	The study or science of drugs. For nurses, pharmacology is important to understand how the drug affects the human body, therapeutic benefits, and potential toxicity (Lilley et al., 2017).
Pharmacy Practice Management System (PPMS)	Information management systems used by community pharmacies and pharmacists (National Association of Pharmacy Regulatory Authorities, 2013).
Point of service solution	: The software used to generate and send an e-prescription. Typically, this is done in an EMR, but this could be completed using a stand-alone application.
Practical Nurses	Members of a self-regulating profession that practice in the nursing category of licensed practical nurse or registered practical nurse. Practical nurses “work independently or in collaboration with other members of a health care team; assess clients and work in health promotion and illness prevention; assess, plan, implement and evaluate care for clients; and, work in a variety of practice settings, including hospitals, nursing homes, long-term care facilities, community health centres and clinics” (Canadian Institute for Health Information, 2018).



Term	Definition
Prescriber	A person who is authorized under the laws of a province or territory of Canada to give a prescription within the scope of his or her practice of a health discipline (Drug and Pharmacies Regulation Act of 1990, 2017).
PrescribeIT	A national e-prescribing service in Canada that will allow prescribers to send prescriptions electronically from their office computer system to the client's preferred pharmacy (Canada Health Infoway, 2017).
Prescription	As defined by the Food and Drug Regulations (1985), "an order given by a practitioner directing that a stated amount of any drug or mixture of drugs specified therein be dispensed for the person named in the order".
Registered Nurse (RN)	Registered Nurses (RNs) are "self-regulated health-care professionals who work autonomously and in collaboration with others to enable individuals, families, groups, communities and populations to achieve their optimal levels of health. At all stages of life, in situations of health, illness, injury and disability, RNs deliver direct health-care services, coordinate care and support clients in managing their own health. RNs contribute to the health-care system through their leadership across a wide range of settings in practice, education, administration, research and policy" (CNA, 2015).
Registered Psychiatric Nurses (RPNs)	"RPNs are autonomous professionals that work collaboratively with clients and other health care team members to coordinate health care and provide client-centered services to individuals, families, groups and communities. RPNs focus on mental developmental health, mental illness and addictions while integrating physical health care and utilizing bio-psycho-social and spiritual models for a holistic approach to care" (Registered Psychiatric Nurse Regulators of Canada, 2018).
Technology induced errors	Medical errors arising from the design and development of a technology; implementation and customization of a technology; and interactions between the operation of a new technology and the new work processes that arise from the technology's use (Borycki, Kushniruk, Keay, & Kuo, 2009).
Work arounds	Work arounds are deviations from an intended work process to overcome an obstacle in order for a health care practitioner to meet a work demand (Patterson, 2018). Work arounds do not address the underlying problem causing the issue.



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