The Institute for Safe Medication Practices Canada (ISMP Canada) is an independent national not-for-profit agency established for the collection and analysis of medication error reports and the development of recommendations for the enhancement of patient safety.

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Importance of Knowledge Translation in Enabling Medication Safety

In the quest to optimize patient safety, the ultimate goal is a healthcare system in which patients are free of any harm caused by system faults or human error. Identification of potential problems in patient care through the reporting and analysis of actual and potential adverse events represents a starting point, but success lies in the development of sound and workable interventions that can be broadly and effectively implemented in the field. It is well recognized that gaps exist within healthcare between the availability of knowledge in academic discourse and its application in clinical practice. A similar gap can also be found between knowledge about safety interventions and their application. Fresh approaches to narrowing the gap between what is known and what is done, sometimes called the "know–do gap", are needed. Strategies to close this gap must promote the use of best available evidence and research and must emphasize field experience and problem-solving.[1] The Canadian Institutes of Health Research (CIHR) defines knowledge translation as "a dynamic and iterative process that includes the synthesis, dissemination, exchange and ethically sound application of knowledge to improve the health of Canadians, provide more effective health services and products and strengthen the healthcare system".[2] This bulletin explores the significance of knowledge translation in the medication safety arena and highlights two ISMP Canada initiatives through the lens of the knowledge-to-action framework adopted by the CIHR.

CIHR's Knowledge-to-Action Framework

Graham et al. have developed a knowledge-to-action framework (Figure 1)[3] that articulates the process and flow of knowledge translation. The framework describes two concurrent cycles: knowledge creation and action.

The knowledge-creation cycle begins with the generation of knowledge though individual scientific studies. This stage is followed by the synthesis of knowledge through systematic reviews or meta-analyses. The knowledge is then further distilled into products or tools, such as

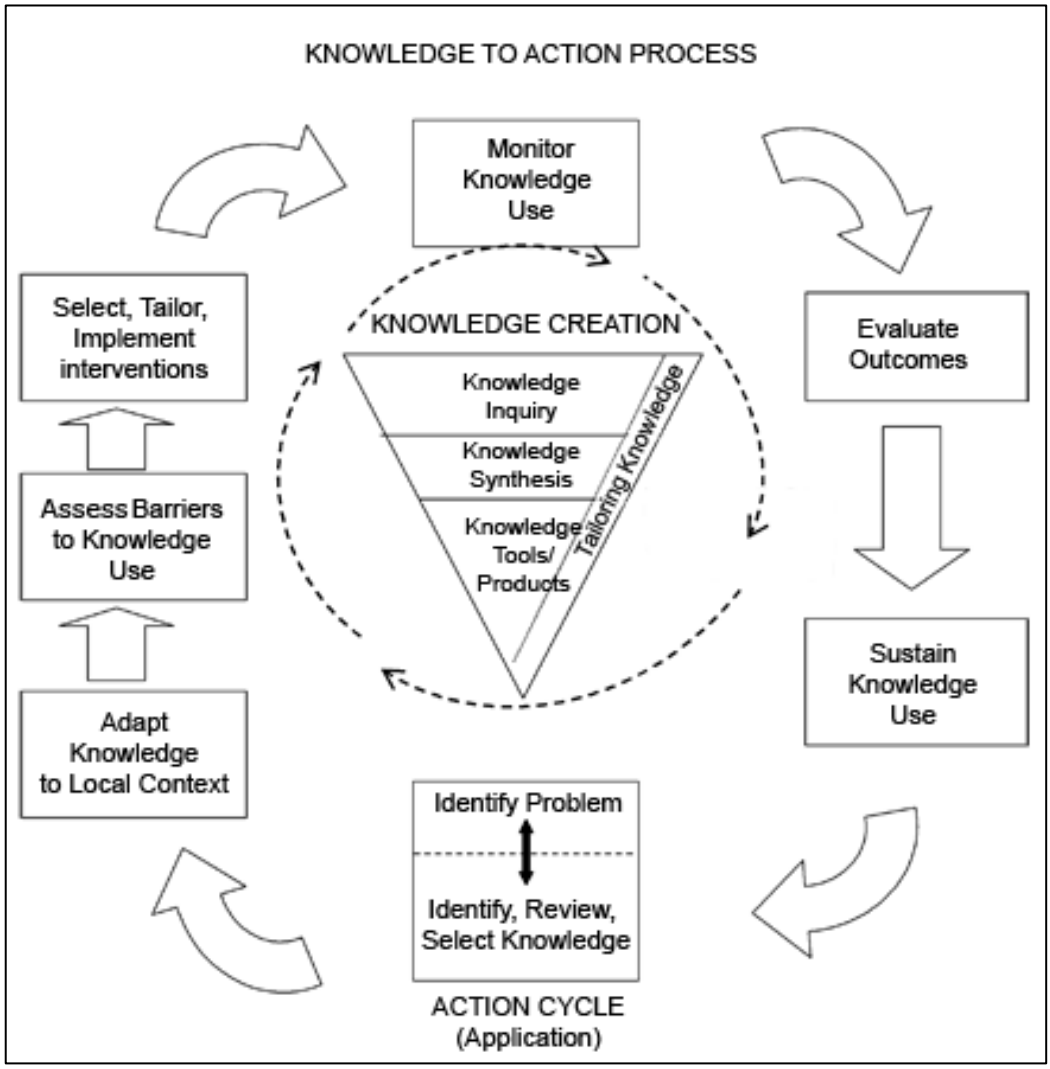

Figure 1: Process of translating knowledge to action.
Reproduced, with permission, from Graham ID, Logan J, Harrison MB, et al. Lost in knowledge translation: time for a map? J Contin Educ Health Prof. 2006;26(1):13–24.

clinical guidelines or decision aids.

The action cycle usually begins with (1) the identification of a problem that may be solved by existing knowledge or the selection of relevant knowledge for application. The next important step is to (2) adapt the knowledge or the knowledge tool to the local context, to ensure its relevance and its adoption by local practitioners. The local context consists of the unique cultural, political, and financial environment of different organizations.

Other components in the action cycle are:

(3) assessing barriers to and facilitators of knowledge use;

(4) selecting, tailoring, and implementing interventions to address barriers to knowledge use;

(5) monitoring knowledge use;

(6) evaluating outcomes of knowledge use;

(7) developing mechanisms to sustain knowledge use.

Knowledge products resulting from the synthesis and distillation of the knowledge-creation cycle can be applied at all stages in the action cycle.

The following medication safety initiatives illustrate the ongoing application of the "knowledge to action process".

1. Venous Thromboembolism Prophylaxis

Venous thromboembolism (VTE) is one of the most preventable complications of a hospital stay. There is substantial evidence that appropriate prophylactic use of anticoagulants reduces the incidence of VTE.[4] Following publication of the American College of Chest Physicians' evidence-based clinical practice guidelines for the prevention of VTE, researchers at Sunnybrook Health Sciences Centre, in collaboration with ISMP Canada, engaged in a patient safety project with the goal of increasing the rate of adoption of these guidelines. An initial phase of the project involved the design of the National Anticoagulant Safety Survey, which was sent to hospitals across Canada. The goal of the survey was to determine whether a gap existed between knowledge and practice, and if so, to determine the magnitude of the problem. Analysis of the survey findings confirmed a considerable gap between knowledge and action. Because the issue was deemed highly relevant to healthcare safety, a process was launched to identify and overcome barriers to the adoption of these clinical practice guidelines in acute care hospitals.

With support from the Ontario Ministry of Health and Long-Term Care (MOHLTC), a pilot project involving 8 hospitals was launched in 2006. This pilot project was designed as a cluster randomized controlled trial to assess the effectiveness of a knowledge translation intervention to improve the prescribing of appropriate thromboprophylaxis. Experts met with the clinicians at each of these hospitals to identify potential barriers at the local level. The most important barriers that were identified were "fear of bleeding" and "lack of high-level support to engage in change". Multiple intervention strategies were tailored to address these barriers, including increased awareness through grand rounds; use of audit and feedback; and use of enabling strategies such as preprinted order forms and reminders (including the involvement of pharmacists). The hospitals were encouraged to monitor their implementation of the interventions, while the project team provided support and conducted the audit and feedback. Chart audits were conducted at baseline (to assess the knowledge gap) and after each of the two intervention phases, at approximately 18-month intervals (to determine progress). The results of the follow-up audits were positive. Adherence with guidelines for VTE prophylaxis for patients who had undergone hip fracture increased from 79% to 89%, the rate for patients who had undergone major general surgery increased from 43% to 67%, and the rate for medical patients increased from 31% to 64%. Researchers are currently determining the statistical significance of these changes. In addition, an evidence-based self-assessment tool for thromboprophylaxis and anticoagulant use is being developed to allow hospitals to monitor and evaluate their own progress. Efforts will continue to assess the impact of the VTE prophylaxis initiatives on patient, provider, and system outcomes.

2. Antimicrobial Stewardship Program

There is a correlation between appropriate use of antimicrobials and reduced occurrence of antibiotic-resistant organisms.[5] Antimicrobial stewardship programs have demonstrated success in optimizing antimicrobial use (the knowledge to be implemented), but the implementation of such programs in hospitals (the action cycle) has not been widespread. In early 2008, the Ontario MOHLTC provided support to ISMP Canada to lead a provincial initiative on antimicrobial stewardship.[6] The project consists of several phases. In the first phase, the project team conducted a comprehensive survey of all Ontario hospitals to gather information about the use and misuse of antimicrobials (antibiotics) and the level of stewardship being implemented locally (i.e., to identify the magnitude of the gap between knowledge and practice). Analysis of the resulting data revealed gaps between the evidence-based use of antimicrobials and current practice.

In the second phase, the project team convened an international consensus forum to determine and prioritize

interventions that were considered appropriate and effective. The following 6 interventions were selected:

- Implement an antimicrobial stewardship program.
- Develop and implement a scorecard for antimicrobial stewardship activities.
- Conduct a prospective audit, with intervention and feedback at the level of individual patients and prescribers.
- Conduct the education and training needed to build antimicrobial stewardship capacity.
- Collect data and feedback at the institutional or program level.
- Develop and implement strategies to tailor antimicrobial therapy, including de-escalation, streamlining, and switching from IV to PO administration.

During the third phase, 8 to 10 hospitals representing different settings will be recruited for a pilot project to test whether the 6 interventions produce changes in practice and if so, to measure the extent of change. A task force has been struck to choose and agree on appropriate ways to measure the use of antimicrobials. The findings of the project and its evaluation will help the project team to develop a strategy to enhance uptake of the stewardship program across the province.

In summary, the process of enabling the adoption and use of evidence-informed safe clinical practices to achieve better patient outcomes is the essence of knowledge translation. As medication safety issues continue to be identified, collaboration among practitioners, knowledge translation experts, and patient safety organizations will be key to ensuring that credible knowledge is translated into safer practices. Strategies to decrease the "know–do gap" need to include interactive communication and direct engagement of key stakeholders to identify the barriers to change and to allow necessary adjustments to proposed intervention strategies. Adopting knowledge translation principles in large- and small-scale intervention projects will not only help to close the gap between knowledge and practice, but will also provide a robust mechanism for evaluating the outcomes of the projects. In addition, engaging in patient safety activities such as these will increase our understanding of what really works to promote the adoption of evidence-based knowledge and will contribute to the enrichment and advancement of knowledge translation.

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On page 4, read about the labelling and packaging of neuromuscular blocking agents.

Neuromuscular Blocking Agents: Another Manufacturer Changes Labelling and Packaging to Increase Safety

In 2006, ISMP Canada described a collaborative initiative involving clinical experts and pharmaceutical manufacturers of neuromuscular blocking agents (in alphabetical order: Abbott Laboratories, Hospira Healthcare Corporation, Organon Canada [now Schering-Plough Canada Inc., a subsidiary of Merck], and Sandoz Canada Inc.). The intent of the initiative was to identify opportunities to reduce the risk of accidental administration of neuromuscular blocking agents.[1] Medication incidents involving inadvertent administration of these agents have been described in previous issues of the ISMP Canada Safety Bulletin.[2,3]

The initiative led to an agreement on potential strategies for improving the labelling and packaging of neuromuscular blocking agents, within manufacturers' limitations.[1] Several manufacturers (Abbott, Hospira, and Sandoz) made changes immediately or shortly thereafter. The distinct labelling and packaging features used for neuromuscular blocking agents have since been reported to have prevented a medication error.[4]

This type of collaboration between industry and experts, along with work in healthcare facilities to implement safeguards within their medication-use systems, represents a multipronged approach to improving safety with neuromuscular blocking agents. The Operating Room Medication Safety Checklist available from ISMP Canada provides specific guidance for managing the storage and use of neuromuscular blocking agents.[5]

ISMP Canada is pleased to report that Merck recently changed the labelling and packaging of the neuromuscular blocking agent rocuronium (Zemuron). In addition to continuing to provide a peel-off label that can be added to a parenteral syringe, safety features now include a warning on the vial cap and a bar code, as illustrated in Figures 1 and 2.

Figure 1: Revised labelling and packaging for rocuronium (Zemuron) includes a warning on the vial cap, and a bar code.

Figure 2: New vial cap for rocuronium (Zemuron) has red colour with "Paralyzing Agent" printed in white lettering.

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ISMP Canada is a national voluntary medication incident and 'near miss' reporting program founded for the purpose of sharing the learning experiences from medication errors. Implementation of preventative strategies and system safeguards to decrease the risk for error-induced injury and thereby promote medication safety in healthcare is our collaborative goal.

Medication Incidents (including near misses) can be reported to ISMP Canada:
(i) through the website: http://www.ismp-canada.org/err_report.htm or (ii) by phone: 416-733-3131 or toll free: 1-866-544-7672.
ISMP Canada can also be contacted by e-mail: cmirps@ismp-canada.org. ISMP Canada guarantees confidentiality and security of information received, and respects the wishes of the reporter as to the level of detail to be included in publications.

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