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Volume 15, Number 4, 2024

URI: <https://id.erudit.org/iderudit/1113601ar>  
DOI: <https://doi.org/10.36834/cmej.76071>

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Publisher(s)

Canadian Medical Education Journal

ISSN

1923-1202 (digital)

[Explore this journal](#)

Article abstract

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Cite this article

Jattan, A. & Suss, R. (2024). Patient safety: A flipped classroom curriculum for family medicine residents. *Canadian Medical Education Journal / Revue canadienne de l'éducation médicale*, 15(4), 120–123.  
<https://doi.org/10.36834/cmej.76071>

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## Patient safety: a flipped classroom curriculum for family medicine residents

### Sécurité des patients : Un nouveau programme d'enseignement en classe inversée pour les résidents en médecine familiale

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Published ahead of issue: Mar 25, 2024; published: Aug 30, 2024. CMEJ 2024, 15(4) Available at <https://doi.org/10.36834/cmej.76071>

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### Implication Statement

Addressing patient safety incidents is a complicated and challenging issue for physicians. At present, there is little training in residency programs to help prepare learners to tackle situations where harm arises as a result of healthcare delivery. In response to new accreditation mandates, we piloted a flipped classroom patient safety curriculum to help train family medicine residents to identify and address patient safety incidents in practice. Family medicine programs could consider similar case-based training for their learners to help prepare them to respond to these events and address contributory factors.

### Énoncé des implications de la recherche

La gestion des incidents liés à la sécurité des patients est une question complexe et difficile pour les médecins. À l'heure actuelle, les programmes de résidence offrent peu de formation pour préparer les apprenants à faire face à des situations où un préjudice survient à la suite d'une prestation de soins de santé. En réponse aux nouveaux mandats d'agrément, nous avons piloté un programme de formation en classe inversée sur la sécurité des patients pour aider les résidents en médecine familiale à identifier et à traiter les incidents liés à la sécurité des patients dans la pratique. Les programmes de médecine familiale pourraient envisager une formation similaire basée sur des cas cliniques pour leurs apprenants afin de les préparer à répondre à de tels incidents et à tenir compte des facteurs contributifs.

## Introduction

Recognizing and responding to harm caused by healthcare delivery, or addressing patient safety, remains a challenge and a necessity for all physicians. In the developed world, it is estimated that one in ten patients receiving hospital care are involved in a patient safety incident.<sup>1</sup> However, medical residents have suggested that there is little, if any, training on how to respond to these events.<sup>2</sup> In response to this gap in training, the College of Family Physicians of Canada (CFPC) has mandated that patient safety training be included in all family medicine training programs. More specifically, it has been mandated that all residents are trained in how to respond to patient safety incidents (PSIs) and that they can contribute to solutions to address contributory factors.

## Curriculum

Here at the University of Manitoba, we developed a novel flipped classroom patient safety curriculum to educate our learners and satisfy accreditation mandates. A flipped classroom model allows for learners to prepare for an in-person session by reviewing core material that would typically be presented via more didactic methods. This allows for more active learning in the face-to-face session. Meta-analysis has suggested that this hybrid approach allows for the targeting of higher-level learning outcomes.<sup>3</sup>

To evaluate this curriculum, we surveyed graduating residents who experienced the first year of our patient

safety curriculum. Ethical approval was obtained from the University of Manitoba Research Ethics Board.

## Online learning

The online learning is based on the Canadian Incident Analysis Framework.<sup>4</sup> This framework is used to guide those who are involved in analyzing and responding to patient safety incidents. This guide involves a six-step incident analysis process, which includes strategies on developing robust patient safety systems, the immediate response and analysis of a PSI, implementing recommendations to address a PSI and closing the loop. Through reading selected passages in this framework (Appendix A), learners gain the foundational knowledge on how to determine the causative factors leading to a PSI and how to develop recommendations of varying leverage. This preparatory work on average takes learners one hour.

## In-person seminar

It is through this foundational knowledge that learners then attend an in-person classroom session led by faculty. It is during this three-hour session that learners divide into small groups and work through three separate PSIs. As an example, one incident involves a misfiled PAP smear report and is detailed below:

### Case example

*You are reviewing your clinical results folder when you see a pap smear report on your 47-year-old patient Mary Lou Hoo. The report is suspicious for malignancy and recommends urgent colposcopy. Mary Lou has always been very meticulous in attending for preventative health care, so you are surprised that her previous pap smear did not show anything. When you look through her record you see that her pap smears have been consistently normal and therefore, she has only been getting them every three years. Six years ago, she had a normal smear. Three years ago, the report indicated that the sample was inadequate and recommended that the test be repeated. That repeat smear did not occur until she returned for care a few weeks ago. The inadequate sample was performed by a second-year family medicine resident in your practice who has since graduated. The pap smear report was filed in the Electronic*

*Medical Record (EMR) after being electronically signed by your medical colleague while you were away on holiday. No plan was documented. The patient had been scheduled to return to discuss her cholesterol results but since her lipid levels were very low risk you cancelled the follow-up appointment with the intention of letting her know the results at her next visit. You did not know about the inadequate sample until today.*

Small groups are tasked with creating a constellation diagram (see Figure 1 for an example relating to the case above) for each case by identifying causative factors within pre-specified categories and then by adding potential ways to mitigate those factors (i.e. findings). The key core concept that we try to convey is that cause and effect are seldom linear and that a PSI often results from a web of causative factors interacting together. From this constellation diagram, learners will develop recommendations to address some of the causative factors.

Once small groups have worked through these cases, they re-convene as a larger group to discuss their constellation diagrams and recommendations. Learners are steered to look beyond low leverage interventions such as staff education sessions, to medium and high leverage options. A low leverage intervention requires ongoing extra time, effort, or attention from providers to take the desired action. Medium leverage interventions make the right choice a bit easier than before; and high leverage interventions make the right action easier than the wrong action. In this case, a high leverage option could be changing the office supplies from spatulas to endocervical brushes, which more consistently provide adequate samples. This would make the right choice the only choice. A medium leverage change could be to recruit patients to double check their results by instituting an EMR-based patient messaging system. This would make it easier to share normal results with patients and, therefore, enable them to confirm that the result was received and assessed. Sending patients EMR messages involves extra work, but doing it within the EMR is much less work than doing it by phone, so this change would be medium leverage.

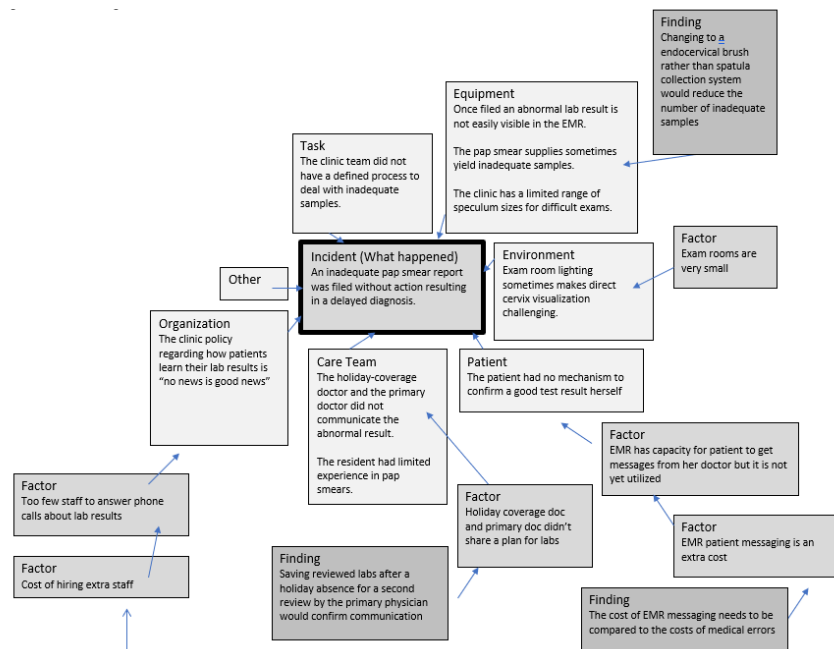


Figure 1. Example constellation diagram for case of a misfiled pap smear report

## Conclusions

Forty residents received the seminar following implementation and were sent an anonymous online survey at the end of the academic year consisting of closed-ended feedback questions along with knowledge testing questions. Feedback was uniformly positive with 95% of responding residents (50% response rate) agreeing that the session was valuable and that the educational format was appropriate. Additionally, 80% of graduates were able to identify a high leverage recommendation when presented with a case example.

Given the limited time in the already crowded academic curricula, there are other strategies for integration of patient safety throughout training. American programs have demonstrated novel ways to incorporate patient safety training outside of the classroom setting including having patient safety chief residents and more involved faculty training.<sup>5</sup> Faculty development workshops have been shown to increase the recognition and reporting of patient safety incidents.<sup>6</sup> However, ultimately, we hope that this curriculum provides a platform for which other institutions can develop their own patient safety curricula such that future learners are prepared to identify and respond to PSIs throughout their career

**Conflicts of Interest:** None

**Funding:** None

**Edited by:** Marcel D'Eon (editor-in-chief)

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## Appendix A: Canadian Incident Analysis Framework pre-reading

The following sections of the Canadian Incident Analysis Framework are what we have designated as the pre-reading for our family medicine residents:

*Executive Summary: Page 7*

*Terminology: Page 8*

*Patient and Family Perspective: Page 14-16*

*System Thinking and Human Factors: Page 20*

*Leading Practices: Page 24-25*

*Incident Analysis Framework as Part of Incident Management: Page 26-27*

*Before The Incident: Page 29*

*Immediate Response: Page 30-31*

*Prepare for Analysis: Page 34-35*

*Analysis Process: Page 36 (Concise Analysis Only)*

*Concise Analysis: Page 46-50*

*Recommended Actions: Page 56-59*

*Incident Analysis Guiding Questions: Page 89-91*

*Creating a Constellation Diagram: Page 93-98*