

Health care-associated infections in Canadian hospitals: still a major problem

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Health care-associated infections account for a large proportion of hospital harms that increase lengths of stay and other burdens on the health care system.¹ Yet, most are preventable. Therefore, it is encouraging that Mitchell and colleagues, on behalf of the Canadian Nosocomial Infection Surveillance Program (CNISP), in linked research, report a decline in the prevalence of health care-associated infections in Canadian acute care hospitals over time.² These declines are important, both to patients and the health care system. They attest to the investments governments and health care facilities have put into infection prevention and control efforts over the last decade. Although the specific factors that led to the observed reduction in health care-associated infection rates are unknown, we agree with Mitchell and colleagues' speculation that these improvements were likely due to multiple interventions, including efforts to improve hand hygiene, implementation of quality of bundles aimed at reducing specific infections, and antimicrobial stewardship.² However, this is not the end of the story, as health care-associated infections are still far too common, and infections caused by antimicrobial-resistant organisms still present a major, and possibly growing, problem for Canadian health care institutions.

Mitchell and colleagues, in a series of prevalence studies conducted at multiple Canadian hospitals in 2002, 2009 and 2017, found that a trend toward a rising prevalence of health care-associated infections observed between 2002 and 2009 (from 9.9% to 11.3%) had reversed in 2017 (7.9%).² Prevalence reduced for all health care-associated infections assessed — including urinary tract infection, pneumonia, surgical site infection, bloodstream infection and *Clostridioides difficile* infection. The reduction was most impressive in the intensive care unit (ICU) setting, where health care-associated infections are most common, with the observed prevalence declining from 20.1% and 17.8% in 2002 and 2009, respectively, to 12.6% in 2017.

The linked research also touches on the issue of antimicrobial resistance. Increasing antimicrobial resistance is a global health crisis, and combating antimicrobial resistance is a priority for the federal, provincial and territorial governments.³ Mitchell and colleagues found that antimicrobial-resistant organisms were

KEY POINTS

- Alongside an overall decline in health care-associated infections in Canadian hospitals, infections caused by antimicrobial-resistant organisms, while low in prevalence, are rising.
- Antimicrobial-resistant pathogens to watch are carbapenamase-producing *Enterobacteriaceae* and *Candida auris*.
- A rise in vancomycin-resistant *Enterococci* (VRE) infections over time may be linked to recent discontinuation of targeted VRE control strategies in some hospitals in Canada.
- Continued efforts by hospitals to reduce health care-associated infection and antimicrobial resistance, including surveillance, reporting metrics and targeted control programs, are needed.

responsible for about 9% of the infections that were identified: methicillin-resistant *Staphylococcus aureus* (MRSA) accounted for 4.6%, extended-spectrum β -lactamases for 2.8%, vancomycin-resistant *Enterococci* (VRE) for 0.6% and carbapenamase-producing *Enterobacteriaceae* for 0.1%.² Although these rates are low, there are some concerning trends. The proportion of health care-associated infections caused by antimicrobial-resistant organisms was stable or increasing for all pathogens, and carbapenamase-producing *Enterobacteriaceae*, which are emerging antimicrobial-resistant pathogens, were identified for the first time in the 2017 survey. Although infections from carbapenamase-producing *Enterobacteriaceae* were few, the rate of colonization and infection associated with these organisms is rapidly increasing in hospitals in Canada.⁴ We anticipate that the next prevalence study by CNISP will identify another important antimicrobial resistance threat — *Candida auris*. *Candida auris* is a multidrug-resistant fungus, which can cause invasive disease and is known to spread rapidly in hospitals.⁵

It is particularly concerning to note a rise in VRE infections over time in the linked research — from 0.3% to 1%² — a trend also identified in the 2017 report from the Canadian Antimicrobial Resistance Surveillance System.⁶ The rising rates may reflect an increasing heterogeneity in infection-control practices with respect to this

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particular antimicrobial-resistant organism in Canada. Beginning in 2012, some hospitals discontinued their practice of admission screening and use of contact precautions for patients colonized and infected with VRE.⁷ We (J.J. and G.G.) conducted a 6-year (2009–2015) cohort study of all Ontario acute care facilities to evaluate the impact of this change in practice and found that in hospitals that changed their VRE control strategy, there was a significant increase in the rate of rise of VRE bloodstream infections per year, whereas there was no change in rate in hospitals that continued screening.⁷ Since the end of our study in 2015, rates of VRE bloodstream infection have doubled in Ontario, with the increase seen primarily at hospitals that discontinued VRE screening, while VRE bloodstream infection rates have remained stable at hospitals that continue to screen.⁸ Despite being observational evidence, the temporal association of this observed rise with the change in the control strategy for VRE, and the stability of VRE bloodstream infection rates at hospitals that continue to screen, represent compelling evidence to support continuation of VRE admission screening and use of contact precautions as a strategy to limit VRE transmission and prevent VRE infection.

Minimizing the spread of antimicrobial-resistant organisms in Canadian hospitals is essential to reducing the effect of health care-associated infections because morbidity, mortality and costs of health care-associated infections all rise substantially when infection is due to drug-resistant pathogens. The Canadian Medical Association recently codeveloped a policy with the Association of Medical Microbiology and Infectious Disease Canada to support the prevention of antimicrobial resistance.⁹ Consistent with this policy is the need to perform surveillance, ensure reporting metrics for antimicrobial-resistant organisms and have control programs in place to prevent any new antimicrobial-resistant infection effectively.⁹

Thus, although the improvements reported in the linked study are impressive, they are a promising first chapter and not the end of the story. One in 12 patients admitted to Canadian health care facilities in this study (and 1 in 8 patients in an ICU) developed an infection that was not part of their presenting medical illness but was acquired as a result of the care they received. There are many strategies that can prevent health care-associated infections that have not yet been implemented in all facilities or for which compliance remains limited. Compliance with hand hygiene is not near 90% when measured accurately, medical equipment is cleaned and disinfected inconsistently between patients, high-touch environmental surfaces are frequently missed when rooms are cleaned and disinfected, and overuse of antimicrobial agents remains a pressing concern.^{10,11} Understaffing (both of nurses and environmental cleaners) is a long-term problem, and

facilities have not yet moved to single rooms for all patients.^{11,12} We believe that targeted control programs, including screening and additional precautions for antimicrobial-resistant pathogens such as MRSA, VRE, carbapenemase-producing *Enterobacteriaceae* and *C. auris*, will be necessary to delay or reverse the rising tide of antimicrobial resistance.

Without ongoing efforts to improve and reduce health care-associated infections and antimicrobial resistance and without frequent measurement of our performance as a country, it is likely that the gains seen in this study will not be sustained and that Canada's antimicrobial resistance problem may become unmanageable. We look forward to seeing continuing reductions in health care-associated infection rates and hope for a reversal in the trend toward rising prevalence of antimicrobial-resistant pathogens, when this pan-Canadian study is repeated.

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