ORIGINAL ARTICLE

Assessment of the infection prevention and control learning needs of Ottawa community-based healthcare providers

Geneviève Cadieux, PhD, MD, CCFP, FRCPC;[1] Abha Bhatnagar, RN, MScN;[1] Tamara Schindeler, RN, MPH;[2] Chatura Prematunge, MSc, CIC;[1] Donna Perron, RN, BScN, CIC;[1] Jacqueline Willmore, MPH[1]

[1] *Ottawa Public Health, Ottawa, Canada*
[2] *Queens University, Kingston, Canada*
at the time the work was conducted.

Corresponding author:
Geneviève Cadieux, Direction de santé publique de Montréal, CIUSSS du Centre-Sud-de-l'Île-de-Montréal, 1301 rue Sherbrooke Est, Montréal, QC, H2L 1M3
Tel: 514-528-2400 | genevieve.cadieux.ccsmtl@ssss.gouv.qc.ca

ABSTRACT

Background: Under the *Health Protection and Promotion Act* and Infection Prevention and Control (IPAC) Complaint Protocol, Ontario public health units are mandated to respond to IPAC complaints about community-based clinical offices. From 2015 to 2018, Ottawa Public Health noted a seven-fold increase in IPAC complaints involving medical and dental settings. In response, we sought to assess the IPAC learning needs of our community-based healthcare providers. Specifically, our objectives were to assess: 1) clinical practice characteristics, 2) current IPAC practices, 3) IPAC knowledge, 4) barriers/facilitators to adherence to IPAC best practices, and 5) preferred IPAC professional development activities.

Methods: An anonymous online survey targeting Ottawa community-based healthcare providers was disseminated through multiple methods including through Ottawa Public Health's (OPH) subscription-based e-bulletin to physicians. The short survey questionnaire included Likert-scale, multiple choice, and open-ended questions. Data collection began in August 2018; a descriptive analysis was conducted using data extracted on January 19, 2019.

Results: Our findings suggest that medical respondents may not be as aware of IPAC practices in their clinic as dental respondents were. Familiarity with IPAC best practice documents was also higher among dental respondents, as compared to medical respondents. IPAC knowledge-testing questions revealed that more medical than dental respondents knew the appropriate use of multi-dose vials, and that few medical respondents knew the IPAC best practices for point-of-care glucose monitoring equipment. Respondents recognized the importance of adhering to IPAC best practices to prevent healthcare-associated infections; however, lack of evidence and cost were self-reported barriers to adherence to IPAC best practices. Over half of all medical and dental respondents surveyed were interested in a voluntary audit of their IPAC practices to help meet their IPAC professional development needs.

Conclusions: Findings from this needs assessment helped describe current IPAC practices and knowledge, identify barriers and facilitators to adherence to IPAC best practices, and understand the learning preferences of Ottawa community-based healthcare providers. This information will be instrumental in planning future IPAC capacity-building activities and tailoring these activities to specific professional groups in Ottawa and potentially beyond.

KEYWORDS

Infection prevention and control; Community healthcare settings; Knowledge translation; Family medicine; Dentistry

INTRODUCTION

In 2015, the Ontario Ministry of Health and Long-Term Care amended the Infection Prevention and Control (IPAC) Practices Complaints Protocol [1] under the Health Protection and Promotion Act [2], and released the Infection Prevention and Control (IPAC) Lapse Disclosure [3] guidance document. These changes introduced a new requirement for local public health units to actively investigate public complaints related to IPAC practices in regulated healthcare professional settings and to publicly disclose lapses identified. Since 2015, Ontario public health units have noted a nearly six-fold increase in IPAC complaints [4].

From 2015 to 2018, the number of IPAC complaints to Ottawa Public Health (OPH) involving medical settings increased from four to 28 (a seven-fold increase) and those related to dental settings increased from zero to seven (a seven-fold increase); there were four times more complaints involving medical as compared to dental settings.

In response to this increase in IPAC complaints, OPH sought to better understand the IPAC learning needs of Ottawa community-based healthcare providers, with the goal of ensuring effective knowledge translation to them and preventing IPAC complaints and lapses in the future.

Acknowledgements: The authors would like to acknowledge the Ottawa community-based healthcare providers and clinic managers who volunteered their time to take part in this needs assessment.

Conflicts of interest: None.

Funding: None.

OBJECTIVES

The objectives of this needs assessment were to evaluate: 1) clinical practice characteristics, 2) current IPAC practices, 3) IPAC knowledge, 4) barriers/facilitators to adherence to IPAC best practices, and 5) preferred IPAC professional development activities of Ottawa community-based healthcare providers.

METHODS

An anonymous online survey targeting Ottawa community-based healthcare providers was disseminated through multiple methods including through OPH's website (*www.OttawaPublicHealth.ca/IPACsurvey*) and subscription-based e-bulletins to physicians, emails from the Ontario Medical Association District 8 Representative and the Ottawa Dental Society to their members, and a postcard mail-out to all Ottawa family physicians. Data collection began in August 2018 and the last survey dissemination attempt took place in October 2018. The online survey was hosted by CheckMarket® and was available in both French and English.

The survey collected information on respondents' clinical practice characteristics, current IPAC practices, IPAC knowledge, barriers/facilitators to adherence to IPAC best practices, and preferred IPAC professional development activities. Survey development was informed by existing literature on barriers/facilitators to adherence to practice guidelines in relation to behaviour change [5], and included Likert-scale, multiple choice, and open-ended questions. Descriptive statistical analyses were performed using Microsoft Excel and StataSE Release 14, 2015 on survey data extracted on January 19, 2019. Results from medical respondents (physicians, midwifes, nurses, and medical clinic owners/managers) and dental respondents (dentists, dental hygienists, dental assistants, and dental clinic owners/managers) were compared using two-sided adjusted Wald tests (α=0.05). A thematic analysis was performed on the answers to the open-ended question: 'What else would help increase adherence to IPAC best practices in your clinic?'

RESULTS

As of January 19, 2019, 361 individuals attempted the survey and 319 were included in the analysis. A total of 38 respondents were excluded because their main practice location was outside Ottawa or missing, three due to incomplete surveys and one because the respondent selected the wrong set of questions (medical vs dental) for his/her profession.

Given that survey dissemination to potential participants was completed primarily through third parties (regulated professional associations), estimation of a response rate is

TABLE 1: Clinical practice characteristics of survey participants

	Medical N=199)		Dental (N=120)		P value
	N	%	N	%	
Professional designation[1]					
Physician/dentist	117	58.8	71	59.2	0.84
Nurse (RN or RPN)/dental hygienist or assistant	40	20.1	14	11.7	0.03
Midwife	16	8.0	N/A	N/A	N/A
Clinic owner/manager	49	24.6	65	54.2	<0.001
Type of practice setting					
Group	174	87.4	47	39.2	<0.001
Solo	15	7.5	72	60.0	<0.001
Missing	10	5.0	1	0.8	0.02
Location of clinic[2]					
Central Ottawa	83	41.7	45	37.5	0.46
Western Ottawa	49	24.6	32	26.7	0.70
Eastern Ottawa	67	33.7	43	35.8	0.69
Years in practice					
<5 years	22	11.1	3	2.5	0.001
5-9 years	24	12.1	6	5.0	0.02
10-14 years	19	9.5	9	7.5	0.52
15-19 years	17	8.5	7	5.8	0.35
≥20 years	68	34.2	30	25.0	0.08
Missing	49	24.6	65	54.2	<0.001

[1] Respondents were instructed to select all that apply; several respondents who selected physician or dentist also selected clinic owner/manager.
[2] Based on Champlain Local Health Integration Network (LHIN) boundaries.

Return to TABLE OF CONTENTS

difficult. However, a response rate can be estimated for the subset physicians who selected 'family physician' as their professional designation. Of the 1,213 family physicians identified from the College of Physicians and Surgeons of Ontario registry that were mailed a postcard by Ottawa Public Health inviting them to take the survey, 95 participated (7.8% response rate). Characteristics of respondents are presented in Table 1.

Table 2 summarizes current IPAC practices in participants' clinics. The majority of medical respondents reported having some reusable medical equipment and tabletop sterilizers in their clinic, yet 13.3% did not know who performed the reprocessing and 31% reported that reprocessing was performed by someone without any certification. A greater proportion of dental respondents than medical respondents reported that reprocessing was performed by a person with some form of certification (43.2% vs 29.2%, p=0.02) (Table 2).

With respect to respondents' familiarity with key IPAC guidance documents (Table 3), dental respondents generally reported higher familiarity with their profession-specific IPAC guidance documents than medical respondents (58.9% vs 97.9%, p<0.001). Furthermore, dental respondents were more likely to be familiar with Ontario best practices for reprocessing medical equipment [7] than medical respondents (95.6% vs 68.1%, p<0.001).

Respondents were asked three IPAC knowledge-testing multiple-choice questions. Nearly all respondents (156/166 or 94.0% of medical respondents and 86/91 or 94.5% of dental respondents) correctly identified that none of the following: a one-way dirty-to-clean flow, a clean area for medication preparation, a soiled area for specimen testing or a designated hand-washing sink were present on the provided photo

TABLE 2: Current IPAC practices

	Medical		Dental		P value
	N	%	N	%	
Which of the following are used at the clinic where you work most of the time? (Select all that apply.)	(N=195)		(N=111)		
Reusable medical equipment (e.g. scissors, forceps/pickups, needle-drivers, vaginal specula, carpule syringes, dental burs)	145	74.4	92	82.9	0.07
Tabletop sterilizer (e.g., autoclave)	127	65.1	107	96.4	<0.001
Liquid sterilants (e.g., high-level disinfectants such as 2% glutaraldehyde, 6% hydrogen peroxide, OPA)	77	39.5	67	60.4	<0.001
Ultrasonic cleaner	13	6.7	96	86.5	<0.001
Multi-dose vials (e.g., local anaesthetic, vitamin B12)	133	68.2	28	25.2	<0.001
Non-safety engineered needles (please refer to picture provided in the survey)	31	15.9	50	40.0	<0.001
None of the above	25	12.8	2	1.8	<0.001
Who performs equipment reprocessing (i.e., cleaning, disinfection, sterilization) at the clinic? (Select all that apply.)[1]	(N=152)		(N=99)		
Designated individual(s) with an up-to-date Canadian Standards Association (CSA) certification as a 'Certified Medical Device Reprocessing Technician'	15	7.7	9	8.1	0.84
Designated individual(s) who completed the Public Health Ontario certificate for 'Reprocessing in Community Health Care Settings'	42	21.5	39	35.1	0.06
Designated individual(s) without certification	61	31.3	21	18.9	0.001
Each healthcare provider is responsible for reprocessing the equipment that they use	8	4.1	35	31.5	<0.001
No specific individual is designated to perform reprocessing	5	2.6	7	6.3	0.20
I do not know	26	13.3	5	4.5	0.002
Other	9	4.6	11	9.9	0.16

[1] This question was only asked of respondents who selected at least one of the following answers to the question 'Which of the following are used at the clinic where you work most of the time? (Select all that apply.)':
- Reusable medical equipment (e.g. scissors, forceps/pickups, needle-drivers, vaginal specula, carpule syringes, dental burs),
- Tabletop sterilizer (e.g., autoclave),
- Liquid sterilants (e.g., high-level disinfectants such as 2% glutaraldehyde 6% hydrogen peroxide, OPA), and/or
- Ultrasonic cleaner (dental offices).

TABLE 3: Familiarity with IPAC guidance documents[1]

	Medical		Dental		P Value
	N	%	N	%	
Familiarity with the Provincial Infectious Diseases Advisory Committee (PIDAC)'s Infection Prevention and Control for Clinical Office Practice [6]	83/141	58.9	57/94	60.6	0.79
Familiarity with PIDACs Best Practices for Cleaning, Disinfection and Sterilization of Medical Equipment/Devices [7]	79/116	68.1	86/90	95.6	<0.001
Familiarity (among dental respondents) with the Royal College of Dental Surgeons of Ontario (RCDSO)'s Standard of Practice: Infection and Prevention and Control in the Dental Office [8]	N/A	N/A	93/95	97.9	<0.001[2]
Familiarity (among nurses) with the College of Nurses of Ontario (CNO)'s Infection Prevention and Control Practice Standard (replaced by the PIDAC best practices in December 2018)	28/34	82.4	N/A	N/A	N/A

[1] Defined as strongly agree or agree with the statement: I am familiar with _.
[2] Compared to medical respondents' familiarity with the Provincial Infectious Diseases Advisory Committee (PIDAC)'s Infection Prevention and Control for Clinical Office Practice.

(see Appendix I). A higher proportion of medical respondents (84.2% or 139/165) correctly answered the question about the appropriate use of multi-dose vials compared to dental respondents (50.6% or 46/91) (p<0.001). Only 8.5% (14/164) of medical respondents answered the question about IPAC best practices for point-of-care glucose monitoring equipment correctly; this question was not asked of dental respondents. Seventy-eight percent (71/91) of dental respondents answered the question about the proper placement of dental instruments into a sterilization pouch/cassette correctly; this question was not asked of medical respondents.

Results in Table 4 suggest that both medical and dental respondents recognize the importance of IPAC best practices in preventing healthcare-associated infections. The two most frequently self-reported barriers to adherence to IPAC best practices were lack of evidence and cost. This finding was similar for both medical and dental respondents.

Respondents' preferred continuing professional development activities related to IPAC were those that are completed independently (i.e., review of published materials and online course) (Table 5). Although the least popular option, as many as half of medical and dental respondents were interested in a voluntary audit of their IPAC practices by an IPAC expert.

Respondents were asked an open-ended question about what else would help increase adherence to IPAC best practices in their clinical office. Of the 68 responses received, 43 (63.2%) were from medical respondents and 25 (36.8%) were from dental respondents. The most common answer themes among medical respondents were financial assistance or funding (30.2%), training (18.6%), regular communication (e.g., IPAC updates, common mistakes) (14.0%), audits (14.0%), expert IPAC consultation as needed (11.6%), and modification of existing IPAC best practices (11.6%) (e.g., more applicable to their practice, more evidence-based). Among dental respondents, the most common answer themes were: modification of existing IPAC best practices (28.0%) (e.g., more applicable to their practice, more evidence-based, clearer), training (24.0%), regular communication (16.0%) (e.g., IPAC updates, common mistakes), audits (16.0%), and expert IPAC consultation as needed (16.0%).

DISCUSSION

We completed an assessment of the IPAC learning needs of Ottawa community-based healthcare providers. Our findings suggest that medical respondents may not be as aware of IPAC practices in their clinic as are dental respondents. Familiarity with IPAC best practice documents was also higher among dental respondents, as compared to medical respondents. IPAC knowledge-testing questions revealed that more medical than dental respondents knew the appropriate use of multi-dose vials, which may be partially explained by the fact that more medical than dental respondents reported using multi-dose vials. IPAC knowledge-testing questions also revealed that few medical respondents knew the IPAC best practices for point-of-care glucose monitoring equipment. Respondents recognized the importance of adhering to IPAC best practices to prevent healthcare-associated infections. However, lack of evidence and cost were self-reported barriers to adherence to IPAC best practices. Independent review of resources was the preferred IPAC professional development activity; although the least popular option, as many as half of all medical and dental respondents surveyed were interested in a voluntary audit of their IPAC practices to help meet their professional development needs. The most common answer themes to an open-ended question about 'what else would help increase adherence to IPAC best practices in your clinic' were financial assistance or funding for medical respondents (30.2%) and modifications to existing IPAC best practices for dental respondents (28.0%) (e.g., more applicable to their practice, more evidence-based, clearer); these themes are consistent with the self-reported barriers of cost and lack of evidence.

Return to TABLE OF CONTENTS

The differences in IPAC self-reported practices, knowledge, barriers/facilitators, and preferred professional development activities observed between medical and dental respondents may be related to a variety of factors; future research may seek to identify these factors. One such factor may be the level of awareness about IPAC among medical and dental healthcare providers. IPAC awareness may increase following heavily mediatized IPAC lapses, such as the one that occurred in Ottawa in July 2018 (*www.OttawaPublicHealth.ca/Lapse*). Another factor is likely to be knowledge translation (KT) efforts to date; for example, the Royal College of Dental Surgeons of Ontario conducted a large-scale promotion and KT of its new IPAC Standard throughout Ontario in 2018.

To our knowledge, this is the first published assessment of the IPAC learning needs of community-based healthcare providers. A strength of this needs assessment was grounding the development of the questionnaire on existing literature about physician adherence to practice guidelines in relation to behaviour change. Unfortunately, the response rate to this survey was low and selection bias may be present as a result; a future needs assessment may consider compensating participants for their time to increase the response rate. The survey did not assess if respondents had previously been investigated by Ottawa Public Health following an IPAC complaint against their clinic; if previously-investigated respondents were more or less likely to participate in the survey than those who have not been previously investigated, our results could over- or under-represent previously investigated respondents. A majority of respondents were either physicians or dentists; therefore, our findings likely reflect primarily those perspectives. Respondent characteristics suggest that respondents practiced in a variety of settings and locations and had a range of practice experience. The ability to analyse and contrast responses from medical respondents to those of dental respondents is another strength of this needs assessment, as the needs of these two groups may differ.

TABLE 4: Barriers/facilitators to adherence to IPAC best practices.[1]

	Medical (N=169)		Dental (N=93)		P value
	N	%	N	%	
Adherence to IPAC best practices reduces the risk of infection for my patients, myself, and clinic staff.	147	87.0	86	92.5	0.15
Failure to adhere to IPAC best practices increases the risk of a complaint being submitted to public health or to my regulatory college.	142	84.0	81	87.1	0.49
It is my responsibility to ensure that IPAC best practices are implemented in my practice.	140	82.8	83	89.2	0.14
I apply infection prevention and control (IPAC) best practices in my day-to-day work.	144	85.2	89	95.7	0.003
IPAC best practices are applicable to my practice.	135	79.9	79	84.9	0.30
The benefits of adhering to IPAC best practices outweigh the costs.	121	71.6	59	63.4	0.18
IPAC best practices are evidence-based.	111	65.7	56	60.2	0.38

[1] Defined as strongly agree or agree with the statement

TABLE 5: Preferred[1] IPAC professional development activities

	Medical (N=155)		Dental (N=91)		P value
	N	%	N	%	
Independent review of resources available online (e.g., PIDAC's Infection Prevention and Control for Clinical Office Practice)	115	74.2	77	84.6	0.045
Independent completion of an online course (e.g., Public Health Ontario (PHO)'s IPAC Core Competencies Course) [9]	98	63.2	74	81.3	0.002
Telephone consultation with an expert about a specific IPAC question or issue, on an as-needed basis	102	65.8	59	64.8	0.88
In-service training on IPAC-related job-specific tasks (e.g., reprocessing)	101	65.2	59	64.8	0.96
Self-audit or voluntary peer-audit of my IPAC practices	96	61.9	63	69.2	0.24
Voluntary audit of my IPAC practices by an IPAC expert	80	51.6	46	50.5	0.87

[1] Defined as likely or very likely to take part in the following activity to help meet your IPAC professional development needs

Findings from this needs assessment have helped describe current IPAC practices and knowledge, identify barriers and facilitators to adherence to IPAC best practices, and understand the learning preferences of Ottawa community-based healthcare providers. This information will be instrumental in planning future IPAC capacity-building activities and tailoring these activities to specific professional groups in Ottawa, and potentially beyond. In particular, the willingness of our survey participants to undergo voluntary IPAC audits of their practice suggests that IPAC audits or inspections of community-based healthcare settings may be an acceptable means of addressing gaps in IPAC practices in these settings.

These gaps in adherence to IPAC best practices are likely not unique to Ottawa; they are thought to exist in a majority of Ontario community-based healthcare settings that are not routinely inspected. A nearly six-fold increase in IPAC complaints has been observed in Ontario over the past four years; this is likely a reflection of increased public and health professional awareness and reporting of existing IPAC deficiencies, rather than worsening of IPAC practices over time. Ontario's current complaint-based approach is unlikely to lead to significant wide-scale improvement in IPAC practices in community-based healthcare settings. An upstream preventive approach combining additional formal training during school/residency and CPD as well as greater oversight and accountability for health professionals' IPAC practices (e.g., through routine IPAC inspections) will likely be required to effect this change.

REFERENCES

1. Infection Prevention and Control Complaint Protocol, 2019, Ontario Ministry of Health and Long-Term Care. Retrieved from: http://www.health.gov.on.ca/en/pro/programs/publichealth/oph_standards/docs/protocols_guidelines/IPAC_Complaint_Protocol_2019_en.pdf Retrieved on: 2019-04-22.
2. Health Protection and Promotion Act, R.S.O. 1990, c. H.7, Ontario, (1990). Retrieved from: https://www.ontario.ca/laws/statute/90h07 Retrieved on: 2019-04-22.
3. Infection Prevention and Control Disclosure Protocol, 2019, Ontario Ministry of Health and Long-Term Care. Retrieved from: http://www.health.gov.on.ca/en/pro/programs/publichealth/oph_standards/docs/protocols_guidelines/Infection_Prevention_and_Control_Disclosure_Protocol_2019_en.pdf Retrieved on: 2019-04-22.
4. Cadieux G, Brown C, Sachdeva H. Public Health Investigation of Infection Prevention and Control Complaints in Ontario, 2015-2018. Can Commun Dis Rep 2019;45(11):in press.
5. Cabana MD, Rand CS, Powe NR, Wu AW, Wilson MH, Abboud PA, et al. (1999). Why don't physicians follow clinical practice guidelines? A framework for improvement. *JAMA, 282*(15), 1458-1465. DOI:10.1001/jama.282.15.1458
6. Provincial Infectious Diseases Advisory Commitee (PIDAC). Infection Prevention and Control for Clinical Office Practice. 2015. Retrieved from: https://www.publichealthontario.ca/-/media/documents/bp-clinical-office-practice.pdf?la=en Accessed on: 2019-04-22.
7. Provincial Infectious Diseases Advisory Commitee (PIDAC). Best Practices for Cleaning, Disinfection and Sterilization of Medical Equipment/Devices In All Health Care Settings, 3rd edition. 2013. Retrieved from: https://www.publichealthontario.ca/-/media/documents/bp-cleaning-disinfection-sterilization-hcs.pdf?la=en Retrieved on: 2019-04-22.
8. Royal College of Dental Surgeons of Ontario. Standard of Practice: Infection Prevention and Control in the Dental Office. 2018. Retrived from: https://az184419.vo.msecnd.net/rcdso/pdf/standards-of-practice/RCDSO_Standard_of_Practice_IPAC.pdf Accessed on: 2019-04-22.
9. Public Health Ontario. IPAC Core Competencies. 2019. Online module retrieved from: https://www.publichealthontario.ca/en/education-and-events/online-learning/ipac-courses

Return to TABLE OF CONTENTS