



Public health investigation of infection prevention and control complaints in Ontario, 2015–2018

G Cadieux^{1*}, C Brown², H Sachdeva³

Abstract

Background: Following an update to the provincial *Infection Prevention and Control Complaint Protocol* in 2015, Ontario public health units have been mandated to investigate infection prevention and control (IPAC) complaints in various settings, including those where regulated health professionals work. No surveillance system exists for IPAC complaints; therefore, little is known about their occurrence. Anecdotal evidence suggests a recent increase in IPAC complaints resulting in increased demand on public health resources.

Objectives: To describe the occurrence of IPAC complaints and lapses in Ontario in 2015–2018 and the public health response to these.

Methods: Ontario public health units were surveyed about the occurrence and key challenges of IPAC complaint investigations through closed- and open-ended questions. The survey was disseminated through the Council of Ontario Medical Officers of Health listserv. Data collection spanned February 4–28, 2019. Descriptive statistical analyses and thematic analysis of free-text responses were performed.

Results: Twenty-one public health units responded for a 60% response rate; fewer responding health units had a population size of less than 100,000. A nearly six-fold increase in IPAC complaints was found, from a total of 79 complaints in 2015 to 451 in 2018. IPAC lapses nearly tripled, with 61 identified in 2015 and 168 in 2018. Whereas variation in the number of IPAC complaints and lapses among public health units was noted, the most common IPAC lapse involved inadequate reprocessing of reusable equipment. Key challenges in investigating IPAC complaints included lack of staff expertise/training, increased workload and costs, interjurisdictional inconsistencies and lack of guidance.

Conclusion: IPAC complaints and lapses have increased in Ontario since 2015 when the Ministry of Health and Long-Term Care changed the IPAC complaint protocol. Public health units identified lack of expertise, increased workload, interjurisdictional inconsistencies and lack of guidance as challenges. Further research to confirm these findings, identify best practices to address these challenges as well as interventions to prevent IPAC lapses would be useful. Prospective surveillance of IPAC complaints, like for reportable diseases, would also be useful.

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Introduction

Recent public health investigations of complaints about infection prevention and control (IPAC) practices (hereafter: IPAC complaints) involving Ontario community health care settings have found significant deviations from best practices for reprocessing medical equipment, leading to large-scale patient notification and testing (1–3). Unlike for provincially

notifiable diseases, no provincial surveillance system exists for IPAC complaints and lapses. However, anecdotal evidence suggests increased demands on public health unit resources due to an increase in the number of IPAC complaints and lapses over the past few years, as well as increasing complexity of IPAC

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Affiliations

¹ Ottawa Public Health, Ottawa, ON (when this study was conducted)

² School of Epidemiology and Public Health, University of Ottawa, Ottawa, ON

³ Toronto Public Health, Toronto, ON

*Correspondence: genevieve.cadieux.ccsmtl@ssss.gouv.qc.ca



investigations (e.g. involving a wide range of health care and personal service settings, and novel procedures and equipment).

The objective of this article is to describe the occurrence of IPAC complaints and lapses in Ontario community settings from 2015–2018 and the public health response to these.

Background

The *Health Protection and Promotion Act* (HPPA) (4) defines the organization of public health units in Ontario. There are currently 35 public health units in Ontario: 21 independent of local municipal government, seven regional health departments and seven health units tied into a single-tier or other municipal administration (5). Mandatory public health programs and services are defined in the *Ontario Public Health Standards* (OPHS) (6) and related Protocols and Guidelines. The *Infection Prevention and Control Complaint Protocol* (7), which was updated in 2015, mandates public health units to investigate complaints related to IPAC in a variety of settings including, but not limited to, personal service settings (e.g. nail salons, barber shops, tattoo parlours) as well as facilities in which regulated health professionals (e.g. nurses, physicians, dentists) operate. For example, of 61 IPAC complaints investigated by Ottawa Public Health in 2018, 28 (46%) involved medical clinics, seven (11%) involved dental clinics and 26 (43%) involved other settings (e.g. personal service settings, allied health providers) (*Personal communication, Jacqueline Willmore, Ottawa Public Health, July 8, 2019*).

The *Infection Prevention and Control Complaint Protocol, 2019* (7) mandates public health units to receive IPAC complaints, assess them and take steps to reduce the risk of infectious disease transmission. Response to a complaint typically involves an inspection by a public health inspector and/or nurse. They use audit tools and other resources from Public Health Ontario (PHO) (8) and various best practice documents, including from the Provincial Infectious Disease Advisory Committee (PIDAC) (9,10), to assess deviations from IPAC best practices. The *Infection Prevention and Control Complaint Protocol* defines an IPAC lapse as a “failure to follow IPAC practices resulting in a risk of transmission of infectious diseases to clients, attendees or staff through exposure to blood, body fluids, secretions, excretions, mucous membranes, non-intact skin, or contaminated equipment and soiled items” (7). Only a small portion of IPAC complaints made to public health units turn out to be IPAC lapses; the majority involve deviations from or failure to adhere to IPAC best practices, and, based on a risk assessment, they do not represent sufficient risk of infection transmission to be considered a lapse. PHO is available to support public health units with complex risk assessments.

If the medical officer of health or designate determines that an IPAC lapse occurred, it must be publicly disclosed on the public health unit’s website, as per the *Infection Prevention and Control Disclosure Protocol* (11). If an operator (e.g. person operating a personal service or health care setting) does not cooperate

with the IPAC complaint investigation or implement corrective measures within the agreed upon timeframe, action may be taken under the HPPA. For example, if the medical officer of health or a public health inspector is of the opinion that a health hazard exists, a section 13 order may be used to cease a practice or the provision of a service, or close a premises.

Methods

Study context, design and population

A survey about the occurrence of IPAC complaints and lapses in Ontario community settings from 2015–2018 and the public health response to these was conducted to inform discussions during an all-day workshop about “Investigating Infection Prevention and Control Lapses in Regulated Health Settings” held at the Ontario Public Health Conference in March 2019. The study population comprised Ontario’s 35 public health units. The survey was disseminated through the Council of Ontario Medical Officers of Health listserv on February 4, 2019, with reminders on February 12 and 25, 2019. The data collection period ended on February 28, 2019. Respondents needed to have access to their public health unit’s IPAC complaint records to complete the survey. Responses were entered directly into an online CheckMarket® form. Data were then extracted to a Microsoft Excel file (2010; Redmond, Washington, United States). Demographic characteristics of public health units (i.e. population size, population density per square kilometre) based on the 2016 census were obtained from Statistics Canada (12).

Survey instrument

The survey comprised a mix of closed- and open-ended questions. Respondents were asked to select their public health unit and provide for each year between 2015–2018: the number of IPAC complaints received and investigated; the number of IPAC lapses; the number of lapses where patient notification took place; the number of exposed patients notified; the number of lapses where hepatitis B virus (HBV), hepatitis C virus (HCV) or human immunodeficiency virus (HIV) transmission was suspected to have occurred; and the number of HPPA section 13 orders issued. Respondents were asked to identify the method(s) used to notify patients for each of their two most recent IPAC lapses. Respondents were also asked to select from a list based on the PHO audit tool (5) the three most common types of deviations from IPAC best practices cited as the reason for an IPAC complaint, observed during IPAC complaint investigations and identified in IPAC lapses. Finally, respondents were asked to describe the three main challenges faced by their public health unit with respect to IPAC complaint investigation. The validity of the survey instrument was assessed by members of the Ontario Public Health Conference full-day workshop organizing committee. (The survey instrument is available upon request from the corresponding author.)

Analysis

A descriptive analysis of quantitative data was performed using Microsoft Excel 2010, and open-ended responses were summarized through a thematic analysis. Given that the number of responses was higher for 2018 than for 2015, a sensitivity analysis was performed to assess if the time trends observed were due to missing data. Results from respondents who provided data for all years from 2015–2018 were compared with results from all respondents, including those with missing data.

Results

Twenty-one (60%) of 35 Ontario public health units participated in the survey. **Table 1** describes the characteristics of participating and non-participating public health units. Compared to non-participating public health units, fewer participating public health units had a population size below 100,000 and a population density above 300/km².

Table 1: Characteristics of participating and non-participating Ontario public health units (based on 2016 census data)

Characteristic	Participating public health units (N=21)		Non-participating public health units (N=14)		All Ontario public health units (N=35)	
	n	%	n	%	n	%
Population size						
<100,000	2	9.5	3	21.4	5	14.3
100,000–174,999	7	33.3	5	35.7	12	34.3
175,000–499,999	7	33.3	2	14.3	9	25.7
≥500,000	5	23.8	4	28.6	9	25.7
Population density per km²						
<10	5	23.8	3	21.4	8	22.9
10–39.9	6	28.6	4	28.6	10	28.6
40–299.9	6	28.6	3	21.4	9	25.7
≥300	4	19.0	4	28.6	8	22.9

Abbreviations: <, inferior to; ≥, superior or equal to

Overall, the number of IPAC complaints increased 5.7-fold among participating Ontario public health units, from 79 in 2015 to 451 in 2018 (**Table 2**). The number of IPAC lapses increased 2.8-fold from 61 in 2015 to 168 in 2018; however, the proportion of IPAC complaints that were determined to be lapses decreased from 77% in 2015 to 37% in 2018 (**Table 2**). Of note, the number of public health units reporting this information was higher for 2018 (21/35, 60%) than 2015 (14/35, 40%). To assess whether observed increases in the number of IPAC complaints and lapses could be attributed to more public health units reporting data for 2018 than for 2015, a sensitivity analysis was performed. Among the 14 public health units that reported data for all four years, a 5.1-fold increase in IPAC complaints (from 79 in 2015 to 405 in 2018) and a 2.6-fold increase in IPAC lapses (from 61 in 2015 to 157 in 2018) was noted; these results are nearly identical to those including the public health units with missing data.

Table 2 also shows that approximately 90% of all IPAC complaints involved at least one inspection by the public health unit; this proportion was stable over time. From 2015–2018, 15 (2.8%) of 538 IPAC lapses were assessed to pose a risk of infection transmission sufficient to require individual notification and testing. Patients were most frequently notified via a letter (7/10 public health units), press release or public service announcement (6/10 public health units) and/or through a posting on the public health unit's website (6/10 public health units). The number of IPAC lapses with suspected HBV or HCV transmission was low (4/538 lapses; 0.7%), and there was no suspected HIV transmission. The proportion of IPAC lapses where an HPPA section 13 order was issued decreased over time, from 23% in 2015 to 10% in 2018.

There was wide variation in the number of IPAC complaints and lapses investigated between public health units (**Table 3**). This was not explained solely by the size of public health units' population; the number of IPAC complaints per 100,000 population ranged from 0.9 to 62.1 (median: 9.4; mean: 12.9).

Table 2: Total number of IPAC complaints and lapses investigated by participating Ontario public health units, 2015–2018

Complaint and lapses	2015 (N=14 PHUs)		2016 (N=16 PHUs)		2017 (N=19 PHUs)		2018 (N=21 PHUs)		Total: 2015–2018	
	n	%	n	%	n	%	n	%	n	%
Total number of IPAC complaints ^a received	79	100.0	189	100.0	366	100.0	451	100.0	1,085	100.0
with ≥1 inspection	71	89.9	170	89.9	340	92.9	414	91.8	995	91.7
Total number of IPAC lapses	61	77.2	108	57.1	201	54.9	168	37.3	538	49.6
with patient notification	2	3.3	1	0.9	6	3.0	6	3.6	15	2.8
with suspected transmission of HBV or HCV	1	1.6	0	0	2	1.0	1	0.6	4	0.7
with an HPPA section 13 order	14	23.0	16	14.8	25	12.4	17	10.1	72	13.4
Total number of patients notified	570	–	N/S	–	703	–	5,112	–	6,385	–

Abbreviations: HBV, hepatitis B virus; HCV, hepatitis C virus; HPPA, *Health Protection and Promotion Act*; IPAC, infection prevention and control; N/S, not specific; PHU, public health unit; –, not applicable; ≥, superior or equal to

^a Complaints include any method through which a health unit may have become aware of IPAC deviations from best practices, including through a complaint by a client/patient or an employee/service provider, a reportable disease case or outbreak report, or a routine inspection of a personal service setting



Table 3: Number of IPAC complaints and lapses investigated per participating Ontario public health unit, 2015–2018

Complaints and lapses	2015 (N=14 PHUs)			2016 (N=16 PHUs)			2017 (N=19 PHUs)			2018 (N=21 PHUs)			Total: 2015–2018		
	Median	Mean	Range	Median	Mean	Range	Median	Mean	Range	Median	Mean	Range	Median	Mean	Range
Number of IPAC complaints ^a received	2	6	3–36	5	12	0–71	5	19	0–90	9	21	1–130	13	52	2–278
with ≥1 inspection	1	5	0–36	3	11	0–71	5	19	0–89	8	20	1–130	12	47	2–274
Number of IPAC lapses	0	5	0–36	0	7	0–71	1	11	0–89	1	8	0–95	2	26	0–274
with patient notification	0	0	0–1	0	0	0–1	0	0	0–1	0	0	0–2	0	1	0–3
with suspected transmission of HBV or HCV	0	0	0–1	0	0	0	0	0	0–1	0	0	0–1	0	0	0–1
with an HPPA section 13 order	0	1	0–12	0	1	0–11	0	1	0–11	0	1	0–4	1	3	0–31
Number of patients notified	0	48	0–540	0	0	0–N/S	0	47	0–500	0	301	0–4,600	0	304	0–5,140

Abbreviations: HBV, hepatitis B virus; HCV, hepatitis C virus; HPPA, Health Protection and Promotion Act; IPAC, infection prevention and control; N/S, not specified; PHU, public health unit; ≥, superior or equal to

^a Complaints include any method through which a health unit may have become aware of IPAC deviations from best practices, including through a complaint by a client/patient or an employee/service provider, a reportable disease case or outbreak report, or a routine inspection of a personal service setting

The types of deviations most frequently cited as the reason for the complaint were readily observable by clients/patients: dirty equipment (inadequate reprocessing of medical equipment), dirty environment (inadequate environmental cleaning) and lack of hand hygiene (Table 4). Inadequate reprocessing of reusable equipment and inadequate or nonexistent IPAC policies and procedures were the most common deviations identified during complaint investigation. The most frequent deviations

Table 4: Top three most frequent deviations from best practices^a identified by participating Ontario public health units (N=21)

Top three most common types of deviations from IPAC best practices	Number of public health units	
	n	%
Cited as the reason for initial complaint:		
Reprocessing of medical equipment/devices used to provide patient/client care	20	95.2
Environmental cleaning in the health care environment where care is provided	10	47.6
Hand hygiene	7	33.3
Identified during complaint investigation:		
Reprocessing of medical equipment/devices used to provide patient/client care	16	76.2
General Policies and Procedures	10	47.6
Environmental cleaning in the health care environment where care is provided	6	28.6
Education	6	28.6
Identified in a lapse:		
Reprocessing of medical equipment/devices used to provide patient/client care	18	85.7
Injectable medication vials or solutions	6	28.6
Personal protective equipment (PPE)	4	19.0

Abbreviation: IPAC, infection prevention and control

^a Based on the Public Health Ontario IPAC checklist for clinic office practice: Core Elements (8)

identified in IPAC lapses were related to reprocessing of reusable equipment; use of multidose vials or solutions; and personal protective equipment.

Table 5 describes the themes identified from respondents' responses to the question "describe the three main challenges faced by your health unit with respect to IPAC complaint investigations." The top three themes identified were lack of

Table 5: Key challenges of IPAC complaint investigation reported by participating Ontario public health units (N=20)

Themes identified	Public health units	
	n	%
Lack of expertise/training among public health unit staff	12	60.0
Increased workload and/or costs resulting from IPAC complaint investigations	11	55.0
Inconsistencies in IPAC complaint investigations between public health units	7	35.0
Lack of guidance for IPAC complaint investigation and lapse disclosure	6	30.0
Lack of support from and/or unclear role of healthcare professional regulatory colleges	6	30.0
Performing/obtaining risk assessments for IPAC lapses	5	25.0
Managing operators of premises targeted by an IPAC complaint investigation	5	25.0
Legal issues ^a	3	15.0
Public disclosure of IPAC lapses and public perception ^b	3	15.0

Abbreviation: IPAC, infection prevention and control

^a Examples of legal challenges included: "legal liability of complaint disclosure and patient notifications (e.g. Medical Officer of Health goes in a different direction from Public Health Ontario [PHO] risk assessment, health unit assessing 'high risk' items in PHO checklists as lower risk than described in the checklist in the context of the overall investigation)" and "legal liabilities taken on by public health units for patient notifications"

^b An example of challenges related to public disclosure was: "managing public disclosure—how much detail, timing of media release, wording (frequently asked questions)"



expertise/training among health unit staff (60%); increased workload and/or costs resulting from IPAC complaint investigations (55%); and inconsistencies in IPAC complaint investigations between public health units (35%). According to one respondent, the latter was “particularly an issue when the healthcare provider has offices in different health units.” A lack of clear guidance for IPAC complaint investigation and lapse disclosure was identified as a challenge by 30% of respondents. Examples included “defining medi-spas and determining a consistent approach to IPAC lapse medi-spa investigations” and “lack of guidance for determining disclosure and/or patient notification.”

Discussion

Our survey of Ontario public health units was the first to show a nearly six-fold increase in the number of IPAC complaints and a nearly three-fold increase in the number of IPAC lapses in community health care and personal service settings from 2015 to 2018. A small proportion (2.8%) of IPAC lapses were assessed to pose a risk of infection transmission sufficient to require patient notification and testing for HBV, HCV and HIV. There was a wide variation in the number of reported IPAC complaints and lapses between public health units; this variation was not explained solely by population size. The most common IPAC lapses investigated by public health units had to do with inadequate reprocessing of reusable equipment. The most common challenges of IPAC complaint investigations reported by public health units included lack of staff expertise/training, increased staff workload and costs, inconsistencies between public health units, and lack of clear guidance to support consistent investigations and follow-up.

We are not aware of any other published research describing time trends in IPAC complaints or lapses in community health care or personal service settings in Canada or elsewhere. Data on health care–associated HBV and HCV outbreaks from the Centers for Disease Control and Prevention (CDC) suggest that in health care settings—excluding hospitals—the number of health care–associated HBV outbreaks was highest in 2010 (linked to IPAC lapses in point-of-care glucose monitoring in long-term care settings), and the number of health care–associated HCV outbreaks was highest in 2015 (related to IPAC lapses in outpatient hemodialysis services) (13). These data, however, only reflect IPAC lapses associated with HBV or HCV outbreaks (i.e. two or more cases) and only in health care settings. The occurrence of IPAC lapses in community health care and personal service settings is likely influenced by several factors, including the increasing complexity and diversity of services provided, the entry on the market of new types of reusable devices requiring reprocessing, and the capacity of regulatory bodies, training programs and service providers to quickly adapt to these changes to ensure the safe provision of services. A possible explanation for the observed increase in IPAC complaints in

Ontario is increased awareness and reporting of IPAC issues by clients/patients and employees/service providers; this increased awareness may be related to a few highly mediated IPAC lapses (1–3).

A strength of this survey was the ability to look at trends in IPAC complaint and lapse occurrence over time. Although the survey instrument underwent validity testing, it did not have a formal reliability assessment. Our survey participation rate was fairly high, but fewer public health units with low population size or very high population density participated; therefore, our findings may not be representative of all Ontario. Another limitation of our study was missing data for some public health units for some years between 2015–2017; however, a sensitivity analysis demonstrated that our finding of an increase in IPAC complaints and lapses over time held true when the analysis was limited to those public health units that provided data for all years. Our survey instrument did not collect data on IPAC complaints involving community health care settings separately from those involving personal service settings. Our survey was limited by the lack of detailed guidance for investigating IPAC complaints; therefore, the data collected through this survey reflects variation in the interpretation and application of Ontario’s *Infection Prevention and Control Complaint Protocol* (7) and *Infection Prevention and Control Disclosure Protocol* (11). Furthermore, our survey is based on IPAC complaints and therefore likely underestimates the true burden of deviations from IPAC best practices and IPAC lapses.

Further research is needed to confirm our findings and to assess whether the increase in IPAC complaints and lapses observed in Ontario is also present in other provinces. Ideally, the occurrence of IPAC complaints and lapses would be routinely monitored through a provincial surveillance system similar to that used for notifiable diseases; such a system would assist public health in fulfilling its health protection mandate and also enable research. Our survey highlights that lack of training/expertise, increased workload, interjurisdictional inconsistencies and lack of clear guidance are important challenges that public health units face when investigating IPAC complaints.

Public health IPAC communities of practice have been set up in Ontario to assist with some of these challenges. In addition, since 2018, a Council of Ontario Medical Officers of Health working group has been examining ways to improve operational consistency for health units investigating IPAC complaints. In that context, we conducted an environmental scan of guidance documents on the public health investigation of IPAC lapses. We found explicit guidance from only two public health jurisdictions. Guidance from Québec was limited to lapses in medical device reprocessing, applicable to hospital settings, and used a quantitative or semi-quantitative risk assessment approach (14,15). In contrast, guidance from the CDC was applicable to a broader range of situations and used a qualitative



risk assessment approach (16). (Full scan results available upon request). More research is needed to identify the best methods for IPAC complaint investigation and IPAC lapse management; research findings should inform the development of clear and consistent guidance documents and tools. Research is also needed to identify effective interventions to prevent or reduce the occurrence of IPAC lapses in community settings.

Conclusion

IPAC complaints and lapses have increased in Ontario since 2015. Public health units identified lack of expertise, increased workload, interjurisdictional inconsistencies and lack of guidance as IPAC complaint investigation challenges. Further research to confirm these findings, identify best practices to address these challenges as well as interventions to prevent IPAC lapses would be useful. Prospective surveillance of IPAC complaints, like for reportable diseases, would also be useful.

Authors' statement

GC developed and analyzed the survey, contributed to the environmental scan, and was the primary author of the manuscript. CB completed the environmental scan and provided feedback on the manuscript. HS oversaw the environmental scan and provided feedback on the manuscript.

Conflict of interest

None.

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