

## Scientific Research Report

## Infection Prevention Strategies Concordance in Canadian Dental Schools During the COVID-19 Pandemic

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## ABSTRACT

**Objective:** The aim of this research was to identify variation in specific infection prevention and control (IPC) strategies across all dental schools in Canada and to evaluate the concordance concerning COVID-19 pandemic-related IPC strategies reported by clinic directors or IPC officers (CDs/IPCOs) and those reported by students, staff, and faculty in the schools.

**Method:** A cross-sectional analysis within a prospective cohort study. Participants in the cohort study reported IPC strategies used in their schools during April or May 2021. Independently, CDs/IPCOs reported IPC strategies in school protocols in July 2021.

**Results:** Of the 600 participants recruited, 332 participants who were involved in the provision of in-person dental care were further analysed. Of the 16 IPC strategies investigated, only 3 were reported by CDs/IPCOs to be used at all schools, and another 8 strategies were used by 8 or 9 of 10 or by 1 of 10 schools, indicating that concordance across schools was good for 11 of 16 strategies. Agreement between study participants and the CDs/IPCOs varied considerably by strategy (ranging between 50% and 100%) and by school (ranging between 42.9% and 97.2%). The strategies with the highest mean agreement percentage across schools were “screening or interviewing patients before appointment for COVID-19-related symptoms” (92.7%) and “checking the temperature of the staff members at least once a day using a thermometer” (91.5%).

**Conclusions:** The level of agreement in the use of strategies between participants working in clinics and CDs/IPCOs varied considerably by strategy and by school. Given the low COVID-19 infection rates in dental schools and the reported differences in IPC protocols, key strategies should be identified. During the pandemic, IPC protocols in Canadian dental schools evolved rapidly. Comparing different strategies might help develop a unified standard IPC protocol.

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## Introduction

At the end of 2019, an outbreak of COVID-19 spread globally. This disease is transmitted by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), an enveloped single-stranded RNA virus.<sup>1</sup> Respiratory viruses can be transmitted

from one person to another via direct or indirect (via intermediate objects) contact or through air via droplets or aerosols.<sup>2-4</sup> The airborne transmission route has been demonstrated as the dominant path for SARS-CoV-2 infection,<sup>3</sup> suggesting that any activity generating droplets or aerosols increases the likelihood of infection. Indeed, interventions that protect against this transmission, especially face covering and reduced contact with infected and potentially infected people, reduced the number of infections.<sup>3</sup>

Due to the nature of their work, health care providers are at higher risk to be infected with SARS-CoV-2 compared to

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the general population. Amongst health care providers, apart from professionals treating those diagnosed with COVID-19, dentists and dental hygienists are potentially at high risk for infection as they are in close contact with their patients, treating areas inside the mouth and using aerosol-generating procedures (AGPs). Moreover, asymptomatic patients with COVID-19 may transmit the virus to others,<sup>5,6</sup> increasing concern amongst dental professionals. In order to reduce the infection rate in the general population, the World Health Organization (WHO)<sup>7</sup> generated infection prevention and control (IPC) protocols that include maintenance of social distancing and usage of personal protective equipment (PPE). More specifically for dental professionals, the relevant licensing authorities provided guidelines aimed to protect clinicians, staff, and patients from acquiring the virus. In Canada, health professional licensing bodies exist at the provincial level, and there are different bodies for different professions (eg, dentists and dental hygienists). On top of this, dental professionals and dental schools are subject to their provincial government public health guidelines, and the schools are subject to the guidelines of their universities. In short, in Canada during the pandemic, there have been and continue to be multiple guidelines from multiple sources that vary over time and across the country.

Dental schools were one of the few units within universities that had to resume in-person training and practice early during the pandemic so as to enable students to progress in their learning. However, at the beginning of the pandemic and for many months, little was known about the SARS-CoV-2; thus, IPC protocols were not evidence-based. As the pandemic progressed and more knowledge was gained, those IPC protocols were regularly revised. Hence, dental schools had to rapidly adjust and evaluate the ways to follow these protocols in order to ensure the safety of students, staff, and patients.

Moreover, multiple layers of authorities providing IPC guidelines and their regular revision led to potentially conflicting guidelines and confusion amongst students and staff. Given this complex situation, as a part of an ongoing study assessing the COVID-19 experience in all 10 dental schools in Canada, the analyses reported in this paper aimed to (1) identify the variation in specific IPC strategies across schools and (2) evaluate the concordance concerning COVID-19 pandemic-related IPC strategies reported by clinic directors or IPC officers (CDs/IPCOs) and those reported by students, staff, and faculty.

## Materials and methods

As part of an ongoing, prospective cohort study aiming to assess the incidence of COVID-19-positive cases in all 10 Canadian dental schools, we recorded the IPC protocols in the schools and gathered data from participants concerning IPC strategies. The study included all 10 dental schools across Canada, located in 9 cities and 7 provinces. All students (including undergraduate and graduate students and residents) and employees (including academic and support staff) were invited to participate in this study. Participants were recruited during April and May 2021. As part of the baseline

data, participants answered questions regarding IPC strategies in their dental school, which provided the point of view of the “end users.” The IPC-related questions in the baseline questionnaire are presented in the Appendix. In the analyses reported in this paper, only the responses of participants involved in clinical care were included.

Separately, in July and August 2021, the CD/IPCO at each dental school completed questionnaires concerning the IPC protocols and strategies in their dental school. Items in this questionnaire were the same as those in the study participant baseline questionnaire.

Descriptive statistics were used to describe strategies in different schools according to CDs/IPCOs and participants. Values and percentages were calculated in Microsoft Excel.

## Results

### Participants' report

Overall, 600 participants (8.77% response rate out of the total potential population) were recruited to the study from all 10 dental schools across Canada (Table 1). The majority of the participants were female and half of them were students (Table 1). Of the participants, 332 (55.3% of the sample) reported that they were involved in providing in-person dental care on campus. Many of the participants who worked in the clinic wore a surgical mask, eyeglasses or goggles, and a facial visor for all procedures performed (Table 2). Interestingly, less than half used N-95 masks for AGPs. In addition to using surgical or N-95 masks, eye protection, and facial visors, some of the participants reported that they wore gowns and scrub caps and double-masked when possible.

Regarding IPC strategies used beyond those involved directly in clinical patient care, 97.2% of participants stated that they use a screening process for COVID-19-related symptoms amongst patients before their appointment, whilst 73% indicated that the staff was screened too. Most of the participants also reported that patients were encouraged to wear masks or face coverings at all times (93.3%) or in waiting areas (7.8%) and that surfaces frequently touched by patients were disinfected at least once a day (95.7%).

### CDs'/IPCOs' report

According to the responses of CDs/IPCOs, 3 schools reported discontinuing scaling treatments as a response to the pandemic; 4 schools reported continuing with all procedures, but the clinic added protective measures to reduce the risk of infections, mainly during AGPs. One school did not stop any treatments but stated that any treatment requiring an AGP had to be performed in an enclosed room. The CD/IPCO in another school reported that at the beginning of the pandemic, AGPs were limited to enclosed rooms and physical barriers were installed in open rooms. In another school, high vacuum suction was used in cases of AGPs.

In order to protect the clinic staff, students, and patients, most schools mandated usage of surgical masks and eyeglasses or goggles in all procedures (Table 2). Interestingly, in half of the school clinics, the use of N-95 (or higher) masks

**Table 1 – Participant characteristics.**

|                                   |                            | Participants in main study sample, N = 600 |      | Participants involved in the provision of dental care, n = 332 (55.3%) |      |
|-----------------------------------|----------------------------|--|------|--|------|
|                                   |                            | n  | (%)  | n  | (%)  |
| Sex                               | Female                     | 411  | 68.5 | 240  | 72.3 |
|                                   | Male                       | 179  | 29.8 | 92   | 27.7 |
|                                   | Other/prefer not to answer | 10   | 1.7  | -  | -    |
| Primary role in the dental school | Employees                  | 250  | 41.7 | 124  | 37.3 |
|                                   | Students                   | 313  | 52.2 | 201  | 60.5 |
|                                   | Other/prefer not to answer | 37   | 6.2  | 7  | 2.1  |
| Schools                           | A (11.58% response rate)   | 60   | 10   | 43   | 13   |
|                                   | B (5.21% response rate)    | 62   | 10.3 | 42   | 12.7 |
|                                   | C (6.79% response rate)    | 50   | 8.3  | 35   | 10.5 |
|                                   | D (15.26% response rate)   | 74   | 12.3 | 59   | 17.8 |
|                                   | E (34.55% response rate)   | 76   | 12.7 | 28   | 8.4  |
|                                   | F (17.86% response rate)   | 60   | 10   | 28   | 8.4  |
|                                   | G (7.10% response rate)    | 103  | 17.2 | 52   | 15.7 |
|                                   | H (10.55% response rate)   | 63   | 10.5 | 18   | 5.4  |
|                                   | I (5.17% response rate)    | 39   | 6.5  | 22   | 6.6  |
|                                   | J (2.35% response rate)    | 13   | 2.2  | 5  | 1.5  |

was not mandatory, not even during AGPs (Table 2), yet many participants chose to wear them in the clinic during AGPs and non-AGPs (Table 2).

All schools reported screening patients before each appointment for COVID-19–related symptoms (Table 3). In case of patients with symptoms or who tested positive for COVID-19, most schools agreed to treat those patients once the symptoms had ceased without the requirement for additional tests (Table 4). The majority of schools also screened their own staff daily for COVID-19 symptoms (Table 3). In addition, 9 of 10 schools instructed patients to wear a mask or face covering at all times (except when actively undergoing treatment), and physical barriers in areas of frequent staff–patient interaction were installed in all clinics. Moreover, all schools had a structured plan in case of an outbreak in the clinic (Table 3).

### Concordance and discordance

Agreement between study participants and the CDs/IPCOs varied considerably by strategy and by school. With regards to PPE, the highest levels of agreement across schools were in wearing routine surgical masks and wearing eyeglasses or goggles, with values of 76.2% and 76.9%, respectively (Table 2). The lowest level of agreement between participants and CDs/IPCOs across all schools was regarding wearing facial visors (63.2%), mainly due to participants being more prudent than instructed by the school. In 3 schools, wearing facial visors was mandatory only during AGPs, yet many participants reported that they wore facial visors during all procedures (agreement levels ranged between 3.7% and 39.5%). In another school, wearing facial visors was not mandatory, yet 100% of the participants responded that they wore them during AGPs and thus the agreement level was 0%. The “overcompliance,” as reflected by the adoption of stricter measures than recommended, in these 4 schools reduced the total level of agreement across schools. However, discordance was not always due to overcompliance but was also recorded

when the participants did not adopt the mandated strategy. In one of the schools, the majority of the participants (72.2%) did not wear N-95 (or higher) masks at all even if they were required for AGPs (Table 2).

As for general IPC strategies, the highest level of agreement (97.2%) was for screening patients before appointment for COVID-19–related symptoms (Table 3). On the other hand, the agreement about the frequency of disinfecting of surfaces frequently touched by patients (eg, doorknobs, switches) was the lowest (42.9%, Table 3). Similar to the “overcompliance,” or the adaption of stricter strategies, as seen in PPE results, in 4 schools where disinfection was mandated more than once a day but not after every patient, the majority of the participants disinfected frequently touched surfaces after every patient, again bringing the level of agreement down but with “overcompliant” strategies.

Finally, in 2 schools, the majority of participants replied that the clinic does not have separate entrance and exit doorways whilst the CDs/IPCOs reported that they did (Table 3). In one of these schools, the participants did not report that staff members are screened and interviewed for COVID-19–related symptoms, whilst CDs/IPCOs did.

### Discussion

This study aimed to identify specific IPC strategies with substantial concordance and discordance across schools, plus levels of concordance on such strategies reported by participants and CDs/IPCOs within schools. Of the 16 IPC strategies about which participants were questioned, only 3 were reported by CDs/IPCOs to be used at all schools, and another 8 strategies were used by 8 or 9 of 10 or by only 1 of 10 schools, indicating that concordance across schools was good for 11 of 16 strategies. Agreement between study participants and the CD/IPCO varied considerably by strategy (ranging between 50% and 100% of participants giving the same response as the CD/IPCO) and by school (ranging between 42.9% and 97.2%).

**Table 2 – Participants' report on the use of protective measures and concordance with CDs/IPCOs.**

|  |                        | Routine surgical mask | N-95 (or higher) mask | Eyeglasses or goggles | Facial visor       | % agreement between CD/IPCO to participants in each school |             |
|--|------------------------|-----------------------|-----------------------|-----------------------|--------------------|--|-------------|
| School A                                   | CD/IPCO guidelines:    | For all procedures    | For AGPs only         | For all procedures    | For all procedures | 74.8   |             |
|  |                        | <b>100</b>            | 60.7                  | <b>70.4</b>           | <b>92.9</b>        |  |             |
|  | Participants' response | All                   | 0                     | <b>35.7</b>           | 18.5               |  | 7.1         |
|  |                        | AGPs                  | 0                     | 0                     | 0                  |  | 0           |
| Non-AGPs                                   |                        | 0                     | 3.6                   | 11.1                  | 0                  |  |             |
|  | None                   | 0                     |                       |                       |                    |  |             |
| School B                                   | CD/IPCO guidelines     | For all procedures    | For none              | For all procedures    | For all procedures | 87.8   |             |
|  |                        | <b>96.6</b>           | 22.7                  | <b>96.6</b>           | <b>89.7</b>        |  |             |
|  | Participants' response | All                   | 0                     | 9.1                   | 0                  |  | 6.9         |
|  |                        | AGPs                  | 0                     | 0                     | 0                  |  | 0           |
| Non-AGPs                                   |                        | 0                     | 0                     | 0                     | 0                  |  |             |
|  | None                   | 3.4                   | <b>68.2</b>           | 3.4                   | 3.4                |  |             |
| School C                                   | CD/IPCO guidelines     | For all procedures    | For none              | For non-AGPs only     | For AGPs only      | 50   |             |
|  |                        | <b>96.3</b>           | 0                     | 96                    | <b>96.3</b>        |  |             |
|  | Participants' response | All                   | 3.7                   | 0                     | 0                  |  | <b>3.7</b>  |
|  |                        | AGPs                  | 0                     | 0                     | 0                  |  | 0           |
| Non-AGPs                                   |                        | 0                     | <b>100</b>            | 4                     | 0                  |  |             |
|  | None                   | 0                     |                       |                       |                    |  |             |
| School D                                   | CD/IPCO guidelines     | For all procedures    | For none              | For all procedures    | For all procedures | 91.7   |             |
|  |                        | <b>98.2</b>           | 0                     | <b>96.3</b>           | <b>72.2</b>        |  |             |
|  | Participants' response | All                   | 0                     | 0                     | 1.9                |  | 24.1        |
|  |                        | AGPs                  | 1.8                   | 0                     | 1.9                |  | 0           |
| Non-AGPs                                   |                        | 0                     | <b>100</b>            | 0                     | 3.7                |  |             |
|  | None                   | 0                     |                       |                       |                    |  |             |
| School E                                   | CD/IPCO guidelines     | For all procedures    | For AGPs only         | For none              | For all procedures | 62.2   |             |
|  |                        | <b>42.9</b>           | 5                     | 65                    | <b>85.7</b>        |  |             |
|  | Participants' response | All                   | 0                     | <b>95</b>             | 5                  |  | 14.3        |
|  |                        | AGPs                  | 57.1                  | 0                     | 5                  |  | 0           |
| Non-AGPs                                   |                        | 0                     | 0                     | 25                    | 0                  |  |             |
|  | None                   | 0                     |                       |                       |                    |  |             |
| School F                                   | CD/IPCO guidelines     | For all procedures    | For AGPs only         | For all procedures    | For all procedures | 76.5   |             |
|  |                        | <b>72</b>             | 9.5                   | <b>92</b>             | <b>80</b>          |  |             |
|  | Participants' response | All                   | 0                     | <b>61.9</b>           | 0                  |  | 16          |
|  |                        | AGPs                  | 20                    | 4.8                   | 4                  |  | 4           |
| Non-AGPs                                   |                        | 8                     | 23.8                  | 4                     | 0                  |  |             |
|  | None                   | 0                     |                       |                       |                    |  |             |
| School G                                   | CD/IPCO guidelines     | For non-AGPs only     | For AGPs only         | For all procedures    | For AGPs only      | 57.3   |             |
|  |                        | 82.2                  | 7.3                   | <b>88.9</b>           | 46.5               |  |             |
|  | Participants' response | All                   | 0                     | <b>82.9</b>           | 4.4                |  | <b>39.5</b> |
|  |                        | AGPs                  | 17.8                  | 0                     | 2.2                |  | 0           |
| Non-AGPs                                   |                        | 0                     | 9.8                   | 4.4                   | 14                 |  |             |
|  | None                   | 0                     |                       |                       |                    |  |             |
| School H                                   | CD/IPCO guidelines     | For all procedures    | For none              | For all procedures    | For AGPs only      | 100  |             |
|  |                        | <b>100</b>            | 0                     | <b>100</b>            | <b>100</b>         |  |             |
|  | Participants' response | All                   | 0                     | 0                     | 0                  |  | 0           |
|  |                        | AGPs                  | 0                     | 0                     | 0                  |  | 0           |
| Non-AGPs                                   |                        | 0                     | 0                     | 0                     | 0                  |  |             |
|  | None                   | 0                     | <b>100</b>            | 0                     | 0                  |  |             |
| School I                                   | CD/IPCO guidelines     | For all procedures    | For AGPs only         | For all procedures    | For AGPs only      | 58.2   |             |
|  |                        | <b>85</b>             | 0                     | <b>90</b>             | 65                 |  |             |
|  | Participants' response | All                   | 0                     | <b>27.8</b>           | 0                  |  | <b>30</b>   |
|  |                        | AGPs                  | 15                    | 0                     | 10                 |  | 0           |
| Non-AGPs                                   |                        | 0                     | 72.2                  | 0                     | 5                  |  |             |
|  | None                   | 0                     |                       |                       |                    |  |             |
| School J                                   | CD/IPCO guidelines     | For all procedures    | For none              | For all procedures    | For none           | 57.5   |             |
|  |                        | <b>80</b>             | 0                     | <b>100</b>            | 0                  |  |             |
|  | Participants' response | All                   | 0                     | 50                    | 0                  |  | 100         |
|  |                        | AGPs                  | 20                    | 0                     | 0                  |  | 0           |
| Non-AGPs                                   |                        | 0                     | <b>50</b>             | 0                     | 0                  |  |             |
|  | None                   | 0                     |                       |                       |                    |  |             |
| % of agreement across schools for each PPE |                        | 76.2                  | 73.5                  | 76.9                  | 63.2               |  |             |

Reported in percentages in each dental school.

All: for all procedures; AGPs: for AGPs only; non-AGPs: for non-AGPs only; none: not required for any procedure.

AGP, aerosol-generating procedure; CD/IPCO, clinic directors or infection prevention and control officers; IPC, infection prevention and control; PPE, personal protective equipment.

Bold items represent concordance with the CD/IPCO recommendations.

**Table 3 – Participants' report on IPC strategies and concordance with CDs/IPCOs.**

|   |                         | Schools   |              |              |              |              |              |              |              |              |              | Total % of agreement across schools per strategy |
|---|-------------------------|---|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--|
|   |                         | A   | B            | C            | D            | E            | F            | G            | H            | I            | J            |  |
| Separate entrance and exit doorway  | CD/IPCO guidelines      | Yes   | No           | No           | No           | Yes          | No           | Yes          | Yes          | Yes          | Yes          | 56.7   |
|   | % participants agreeing | 60.7  | 71.4         | 32.1         | 49.1         | 31.8         | 64.3         | 68.9         | 53.8         | 81           | 20           |  |
| Screening or interviewing patients before appointment for COVID-19–related symptoms   | CD/IPCO guidelines      | Yes   | Yes          | Yes          | Yes          | Yes          | Yes          | Yes          | Yes          | Yes          | Yes          | 97.2   |
|   | % participants agreeing | 100   | 97.1         | 100          | 100          | 95.5         | 100          | 100          | 100          | 100          | 85.7         | 40   |
| Screening or interviewing staff members for COVID-19–related symptoms                 | CD/IPCO guidelines      | Yes   | Yes          | Yes          | Yes          | Yes          | Yes          | Yes          | Yes          | No           | Yes          | 74.1   |
|   | % participants agreeing | 71.4  | 82.9         | 96.4         | 54.4         | 81.8         | 82.1         | 84.4         | 84.6         | 57.1         | 0            |  |
| Checking the temperature of the patients using a thermometer before the appointment   | CD/IPCO guidelines      | Yes   | Yes          | Yes          | No           | Yes          | Yes          | Yes          | No           | Yes          | No           | 74.5   |
|   | % participants agreeing | 71.4  | 97.1         | 92.9         | 100          | 95.5         | 57.1         | 46.7         | 76.9         | 4.8          | 80           |  |
| Checking the temperature of the staff members at least once a day using a thermometer | CD/IPCO guidelines:     | No  | No           | No           | No           | Yes          | No           | No           | No           | No           | No           | 91.5   |
|   | % participants agreeing | 92.9  | 80           | 89.3         | 100          | 90.9         | 85.7         | 91.1         | 84.6         | 100          | 100          |  |
| Insisting or encouraging patients to wear masks or face coverings                     | CD/IPCO guidelines      | Only in the waiting area and areas close to where dental care is provided | At all times | At all times | At all times | At all times | At all times | At all times | At all times | At all times | At all times | 86.2   |
|   | % participants agreeing | 7.1   | 94.3         | 92.9         | 98.2         | 95.5         | 92.9         | 91.1         | 100          | 100          | 80           |  |

(continued on next page)

**Table 3 (Continued)**

|   |                         | Schools  |  |  |                     |                     |  |                     |                     |       |                     | Total % of agreement across schools per strategy |
|---|-------------------------|--|--|--|---------------------|---------------------|--|---------------------|---------------------|-------|---------------------|--|
|   |                         | A  | B  | C  | D                   | E                   | F  | G                   | H                   | I     | J                   |  |
| Disinfecting of surfaces frequently touched by patients (eg, door-knobs, switches)                        | CD/IPCO guidelines      | More than once per day but not after every patient | More than once per day but not after every patient | More than once per day but not after every patient | After every patient | After every patient | More than once per day but not after every patient | After every patient | After every patient | Never | After every patient | 42.9   |
|   | % participants agreeing | 17.9   | 20   | 17.9   | 71.9                | 63.6                | 25   | 68.9                | 61.5                | 0     | 60                  |  |
| Preprocedural mouthwash rinse   | CD/IPCO guidelines      | Yes  | No   | Yes  | Yes                 | Yes                 | Yes  | No                  | Yes                 | Yes   | Yes                 | 73   |
|   | % participants agreeing | 92.9   | 74.3   | 96.4   | 94.7                | 95.5                | 82.1   | 31.1                | 76.9                | 95.2  | 60                  |  |
| Installation of special air filtering or purification unit  | CD/IPCO guidelines:     | Yes  | No   | No   | No                  | Yes                 | No   | No                  | Yes                 | Yes   | No                  | 82.3   |
|   | % participants agreeing | 82.1   | 80   | 96.4   | 98.2                | 81.8                | 28.6   | 82.2                | 84.6                | 95.2  | 80                  |  |
| Use of extra oral aerosol suction device during procedures  | CD/IPCO guidelines      | No   | Yes  | No   | Yes                 | No                  | Yes  | No                  | Yes                 | Yes   | No                  | 57.8   |
|   | % participants agreeing | 71.4   | 60   | 25   | 28.1                | 59.1                | 78.6   | 73.3                | 61.5                | 38.1  | 20                  |  |
| Installation of physical barriers in areas of frequent staff-patient interaction (eg, plexi-glass frames) | CD/IPCO guidelines      | Yes  | Yes  | Yes  | Yes                 | Yes                 | Yes  | Yes                 | Yes                 | Yes   | Yes                 | 72.3   |
|   | % participants agreeing | 78.8   | 62.9   | 42.9   | 75.4                | 63.6                | 82.1   | 77.8                | 84.6                | 90.5  | 60                  |  |
| Plan in place for contact tracing in case of an outbreak at your clinic                                   | CD/IPCO guidelines      | Yes  | Yes  | Yes  | Yes                 | Yes                 | Yes  | Yes                 | Yes                 | Yes   | Yes                 | 62.4   |
|   | % participants agreeing | 39.3   | 74.3   | 78.6   | 47.4                | 77.3                | 64.3   | 66.7                | 84.6                | 57.1  | 40                  |  |
| Mean % of agreement between CD/IPCO to participants in each school for all strategies                     |                         | 65.5   | 74.5   | 71.7   | 76.5                | 77.7                | 70.2   | 73.5                | 79.5                | 67.1  | 53.3                |  |

Reported in percentages in each dental school.

CD/IPCO, clinic directors or infection prevention and control officers; IPC, infection prevention and control.

**Table 4 – Protocols for patients suspected of having or testing positive for COVID-19 in the 10 dental schools in Canada (number of schools) as reported by the IPC officers.**

|  | Do not see until symptoms have ceased | See once symptoms are resolved and a negative COVID-19 test provided | In case of not seeing patients with symptoms: |                                  |
|--|---------------------------------------|--|---|----------------------------------|
|  |                                       |  | Refer them to another clinic                  | See them for emergency care only |
| Protocol towards patients who have symptoms that may indicate COVID-19 | 7                                     | 3  | 2   | 3                                |
| Protocol towards patients who have been diagnosed with COVID-19        | 6*                                    | 4  | 1   | 1                                |

\* Three schools indicated that they saw the patient only after 14 days of isolation since the positive test result. IPC, infection prevention and control.

According to the Canadian Institute for Health Information, there was an increase in the prevalence of positive cases in Canadian health care workers during 2021, and during June 2021, health care providers accounted for 6.8% of COVID-19 cases.<sup>8</sup> However, this increase in prevalence was slower compared with the increase in non-health care providers,<sup>8</sup> suggesting that various IPC protocols implemented in clinics and hospitals appear to be beneficial. It is also important to understand that infection rates across Canada have varied significantly with time and in different provinces, so the schools in our study were working in different infection-rate environments and under the jurisdiction of different provincial dental regulatory authorities and public health agencies.

Reports on the prevalence of infection amongst dentists in Europe showed higher rates of positive cases in areas where dental staff had inadequate PPE.<sup>9–11</sup> On the other hand, lower infection rates were reported in studies in the United States<sup>12,13</sup> and Canada,<sup>14</sup> where the vast majority of the study participants followed enhanced infection protection and control protocols and used advanced PPE.<sup>12,13</sup> Similar to observations in these North American studies, our study showed high compliance to the IPC protocols. Whilst a few cases of discordance in our study were due to low compliance, most cases of discordance were due to “overcompliance,” where participants reported adopting more stringent strategies than mandated. Thus, the agreement level was reduced because participants used higher levels of protective measures than those mandated. For example, whilst half of schools did not require the use of N-95 masks at all, many participants reported the use of this type of mask. Also, the majority of participants reported wearing facial visors during all procedures, even though it was mandatory during all procedures in only half of the schools. Moreover, more than half of the participants disinfected surfaces frequently touched by the patients after every appointment regardless of whether it was mandatory.

The “overcompliance” that led to discordance in many cases can be a result of miscommunication between the CDs/IPCOs and the students and the staff, so the participants choose to behave “on the safe side” without knowing the protocols. However, it might be that there was

good communication and the participants “overcomplied” in order to protect themselves and their families. Miscommunication might be supported by the fact that only a minority of participants knew about the existence of a contact tracing plan in their school in the case of an outbreak of COVID-19. Whilst the IPC officers are the ones to plan and implement such a plan in the case of an outbreak, it could be beneficial to communicate the plan with staff and students more effectively. In general, effective communication during times of rapid changes is a challenge that needs to be taken into consideration in institutions like dental schools.

The evidence base for COVID-19–related IPCs in dental care is still lacking,<sup>15</sup> and so far there is no consensus on what is the best evidence-based protocol,<sup>16,17</sup> particularly when considering the need to also use equipment efficiently so as to keep costs and public health under control. Whilst it is still unclear what specific PPE is the most efficient to use, and probably different disciplines within dentistry will need specific guidelines, as the risk of being infected with SARSCoV-2 amongst health care workers in general decreases with adequate PPE use.<sup>18,19</sup> One crucial element of PPE that should probably be maintained is a surgical mask, as wearing such a mask in public has been shown to be the most efficient way to prevent transmission between people.<sup>3</sup> The additional benefit of using an N-95 mask over the surgical mask is still controversial<sup>20,21</sup>; hence, it is reasonable that in some dental schools this mask was not considered mandatory for providing dental treatments. In addition, reducing the risk for exposure to COVID-19–positive patients can be beneficial and relatively easily done by screening patients as well as clinical staff before appointments. Both procedures have been reported as routine by our study participants and CDs/IPCOs.

The main limitation of the current study is that data were collected from the participants 1 to 2 months prior to the same data being collected from the CDs/IPCOs, although the time of collection from the latter group was during the summer when clinics were closed, so protocol changes were not occurring. Nevertheless, it is plausible that protocols could be changed, leading to lower levels of agreement between

participants and CDs/PCOs. Also, the results might be affected by social-desirability bias, meaning that the participants responded with what they believed they should be doing rather than what they were actually doing. Thus, they might tend to report higher standards of care in the clinic. Another limitation is a small number of participants in some of the schools and the selection bias that occurred in recruiting participants to this study.

## Conclusions

Different IPC strategies were in place at the 10 dental schools across Canada. The level of agreement in the use of strategies amongst students, staff, and faculty working in clinics and CDs/PCOs varied considerably by strategy and by school, although much of the discordance was due to participants adopting stronger strategies than mandated by school protocols. Given the reported differences in IPC protocols and the low COVID-19 infection rates in dental schools in 2021, key strategies that reduce infection vs those that are not efficient should be identified. Better coordination between the different levels of regulatory bodies will result in IPC measures that are easier to comply with and follow. Moreover, improvement of communication in dental schools should be considered.

## Conflict of interest

None disclosed.

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## APPENDIX 1

Infection prevention and control (IPC)-related questions in the baseline questionnaire:

1. What was your assigned sex at birth?

Choose one of the following answers

- Female
- Male
- Prefer not to answer
- Prefer to self-describe

2. Please indicate the dental school at which you work/study.

Please choose only one of the following:

- Dalhousie University
- Université Laval
- Université de Montréal
- McGill University

- University of Toronto
- Western University
- University of Manitoba
- University of Saskatchewan
- University of Alberta
- University of British Columbia

3. What is your primary role in the dental school at which you work/study?

Please choose only one of the following:

- Dental student
- Dental hygiene student
- Resident (general practice resident or resident in specialty training)
- Graduate student in MSc or PhD programme focused on research training (ie, not clinical or professional training)
- Academic staff
- Support staff (eg, administrative staff, clinical staff, laboratory staff)
- Other \_\_\_\_\_

4. From the list below, please choose the infection prevention and control (IPC) procedures and amenities in place at the dental school or hospital clinic where you provided or participated in care during the last month:

- Separate entrance and exit doorways
- Screening or interviewing patients before appointment for COVID-19-related symptoms
- Screening or interviewing staff members for COVID-19-related symptoms
- Checking the temperature of the patients using a thermometer before the appointment
- Checking the temperature of the staff members at least once a day using a thermometer
- Insisting or encouraging patients to wear masks or face covering:
  - At all times
  - Only in the waiting area
  - Only in areas close to where dental care is provided
- Disinfecting of surfaces frequently touched by patients (eg, doorknobs, switches):
  - After every patient
  - More than once per day but not after every patient
  - Once a day only
  - Never
- Preprocedural mouthwash rinse
- Installation of special air filtering or purification unit
- Use of extra oral aerosol suction device during procedures
- Installation of physical barriers in areas of frequent staff-patient interaction (eg, plexiglass frames)
- Plan in place for contact tracing in case of an outbreak at your clinic
- Prefer not to disclose
- Do not know



5. Please specify the types of facial protection you used at the dental school or hospital clinic where you provided or participated in care during the last month. Please choose the appropriate response for each item:

|                       | For all procedures | For AGPs only | For non-AGPs only | For none |
|-----------------------|--------------------|---------------|-------------------|----------|
| Routine surgical mask |                    |               |                   |          |
| N-95 (or higher) mask |                    |               |                   |          |
| Eyeglasses or goggles |                    |               |                   |          |
| Facial visor          |                    |               |                   |          |

AGP, aerosol-generating procedure.

6. Did you use any other form of facial covering during the provision of in-person care during this period?

Please choose only one of the following:

- No
- Yes (please specify below)

Make a comment on your choice here: \_\_\_\_\_

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