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*A year of research and collaboration  
supporting the phased reopening of  
primary oral health care service delivery in  
Nova Scotia during the COVID-  
19 pandemic:  
March 2020 to March 2021*

*Dalhousie Faculty of Dentistry*

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*Funded by the Nova Scotia Health COVID-19 Rapid Response Initiative*



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## Executive Summary

The timing of this report marks just over one year since the province of Nova Scotia, in response to the COVID-19 global pandemic, announced the closure of all but emergency oral health services in March 2020. Oral health providers were among the first to appreciate the gravity of the situation. The transmission of COVID-19 through respiratory droplets meant that aerosol generating procedures (AGPs) used for routine oral health care posed a risk to oral health care providers and to those seeking care. It was generally accepted that standard precautions for infection prevention and control (IPC) were going to be insufficient.

A collaboration evolved amongst regulators of oral health professions, oral health profession member organizations and practitioners, the Nova Scotia Department of Health and Wellness (NSDHW), dental educators and researchers to address the complexities of shutting down oral health services, to guide the anticipated phased reopening and to prepare for possible subsequent pandemic waves. Through a *Nova Scotia Rapid Response COVID-19 Health Research Coalition* research grant, our small team of clinicians and researchers supported regional and national oral health care initiatives through the following objectives:

***Objective I: Expand and strengthen knowledge translation/exchange both regionally and nationally:*** Regional networking resulted in concrete program evaluation and dissemination of return-to-work strategies for Nova Scotia oral health care providers. Nationally, resources are shared and exchanged through our Association of Canadian Faculties of Dentistry network. Investigators represent Nova Scotia and Dalhousie University in three national initiatives (funded by the Canadian Institutes of Health Research and the Canadian Immunity Task Force) exploring COVID-19 related experiences of oral health providers, educators, students and related staff.

***Objective II: Explore Nova Scotia oral health care providers' uptake of Return to Work (RTW) guidelines:*** The influence of evidence-based guidelines and related education on RTW practices of NS dentists, Registered Dental Assistants and Registered Dental Hygienists during a phased return to work plan was explored through surveys undertaken at two critical RTW phases. The provincial multi-stakeholder coalition was effective in establishing and communicating comprehensive guidelines and web-based education to ensure a phased and unified re-integration of oral health services in NS in the early months of the pandemic.

***Objective III: Catalogue current best evidence of COVID-19 relevant to oral health care delivery:*** A standardized search strategy, summarized and disseminated weekly, led to the creation of a catalogue of over 600 articles and online documents to guide safe responses to COVID-19. Most were single studies, narrative reviews, and editorials from experts. A small number of systematic reviews consistently summarized weak evidence to support queries.

***Objective IV: Compare RTW protocols to inform local policy and procedures:*** Over fifty protocols from relevant provincial, national and international jurisdictions and institutional jurisdictions were reviewed. Differences in timing of re-opening and high variability in community rates of COVID-19 infection and risk made it challenging to systematically compare protocols. Protocols specific to clinical teaching settings demonstrated inconsistent interpretation of evidence in the application of evolving standards.

## **Project Summary**

### **1. Background**

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On March 20th, 2020 Nova Scotia's Chief Medical Officer mandated the closure of all dental clinics in the province except for designated centres to provide emergency services (PDBNS 2020a and PDBNS 2020c). The onset of Coronavirus Disease 2019 (COVID-19) had compromised the safe delivery of oral health care in Nova Scotia.

#### **1.1 Statement of the problem**

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COVID-19 refers to the 2019 outbreak of Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2), a novel virus transmitted through respiratory droplets. Oral health care providers (OHCP) in emergency settings at the outset of the pandemic avoided performing aerosol generating procedures (AGPs) whenever possible to minimize the risk of respiratory droplet pathogen transmission (Harrel and Molinari 2004; Peng 2020). Most routine procedures in a dental office are AGPs therefore only the most basic dental services (management of pain, infection, bleeding and dental trauma) were available to Nova Scotians.

Associations between oral health and general health are well documented and the ban of routine dental care would have long-term negative effects on the population. Because Eastern Canada was among the last geographic areas to be affected by the pandemic, other parts of the world were beginning to re-open oral health care services as we were closing. At the same time, it was well known that AGP procedures posed a risk to OHCPs and patients and that standard precautions (SP) for infection prevention and control (IPC) were likely insufficient (Meng 2020). Standards and protocols to advance services beyond non-aerosol generating procedures (NAGP) were critical. In the face of unknown standards for returning to routine oral health care that includes safe AGP procedures, our collaborators, particularly the Provincial Dental Board of Nova Scotia (PDBNS), regulator for registered dentists and dental assistants (RDAs), and the College of Dental Hygienists of Nova Scotia (CDHNS), regulator for registered dental hygienists (RDHs), identified concerns and tensions amongst dental professional member groups in Nova Scotia.

#### **1.2 Initial advisories for enhanced infection prevention and control protocols**

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The overall evidence to support safe practice has remained varied, vague and impracticable throughout the pandemic. Similar to other jurisdictions at the outset, the Dalhousie Faculty of Dentistry (FOD) emergency clinic care protocols initially established for the COVID-19 pandemic were informed by existing foundational evidence and policy recommendations from the World Health Organization (WHO) (WHO, 2008; WHO, 2020), the Center for Disease Control and Prevention (CDC

2003; CDC, 2020); the Canadian Agency for Drugs and Technologies in Health (CADTH) (Tran et al. 2011) and European Centre for Disease Prevention and Control (2020). The American Dental Association (ADA) recommended that “dentists are urged to use the highest PPE [Personal Protective Equipment] available when treating patients to reduce risk of exposure” (Burger, 2020).

### **1.3 Enhanced infection control standards increase costs of practice and strain supply of personal protective equipment**

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Enhanced PPE standards (including N95 respirator masks and face shields), together with requisite air quality exchanges and flow, are largely unattainable in conventional practice settings and available within only a small number of operatories at the FOD Clinic. In Nova Scotia (NS), compliance with these IPC standards precluded the provision of routine dental care due to the increased costs and inadequate PPE supply. These problems would be alleviated by reliable, cost-effective point of care testing for COVID-19 feasible for every patient - or - a vaccine available that would eliminate risk for community transmission of COVID-19. While the safety of the public and health care providers is foremost, this was an impracticable solution.

### **1.4 Gaps in evidence to inform new infection prevention and control protocols**

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The seminal and widely cited CADTH study (Tran et al. 2011), systematically reviewed AGPs and risk of transmission of acute respiratory infections (ARI) to HCWs (health care workers). They found very low-quality evidence that “some procedures potentially capable of generating aerosols have been associated with increased risk of SARS transmission of SARS-CoV from infected patients to HCWs.” They further noted that their systematic review does not: delineate risk of AGP transmission on the basis of specific procedures, address the presence of viable microbes responsible for ARIs within aerosols created by specific procedures, or address the risk of transmission of airborne pathogens. Routine AGP dental procedures do not appear in the findings. The very low-quality evidence and limitation of existing studies to tertiary care suggested that very little was known about the clinical relevance of routine dental AGPs and accompanying risks of OHCPs. Moreover, the best available evidence suggested gaps in research that had relevance to the re-introduction of oral health care services, and was a focus of this research.



## Objectives and Methods Overview

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At the outset of the provincial closure, members of this project team (BC, CL, JB, FK, BD) took a leadership role in partnering with NS Department of Health and Wellness, provincial oral health profession regulators and member organizations, and other dental educators and researchers to address the complexities of shutting down services and determine standards and processes for the provision of interim emergency services and the eventual return to provision of routine care

Addressing the immediate public need for continued oral care, the project team collaborated with partners and stakeholders to:

- establish an emergency clinic at the Dalhousie FOD,
- create triaging and health service protocols for dental practice
- identify PPE requirements,
- establish standards for safe oral care procedures,
- develop training of OHCPs in eight emergency clinics throughout the province and
- disseminate these measures to other jurisdictions throughout Canada through the Association of Canadian Faculties of Dentistry (ACFD).

We realized that we were moving towards a time when the COVID-19 pandemic would wane, that the FOD clinic and dental practices in the province would be allowed to reopen and that there were already predictions that this would be followed by future waves of COVID-19 as yet unpredictable in scope.

In consultation with collaborators, we took a multi-pronged approach to identify changes in practice required to ensure a safe return to delivery of routine oral healthcare services to the Dalhousie University FOD teaching clinic and to dental practices throughout NS. Our primary focus centred on contributing to policy and procedure requirements for the benefit of Nova Scotian oral health professions and members of the public.

Members of the research team (JB, CL, JB, FK, BC) were also members/consultants of an interprofessional team of experts (known as the Phoenix group) tasked with developing Guidelines to inform return to work (RTW) in NS. Implementing the most appropriate, evidence-based infection control protocols and personal protective equipment (PPE) requirements to enable NS OHCPs and allied laboratory dental technicians to provide care and service within a safe environment was critical.

A reopening plan consisting of three distinct phases was developed: Phase 1 - Emergency Action Plan (PDBNS, 2020b); Phase 2 - Emergency and Urgent Care (Albert et al. 2020a); and Phase 3 - Comprehensive care (Albert et al. 2020b). RTW Guidelines provided the foundation on which the Department of Health and Wellness based return-to-work decisions for dentistry. Dissemination of RTW-Guidelines included frequent website or email communiques and interdisciplinary education webinars to OHCPs from their regulators and associations.

Our research team quickly realized that we would have to be flexible in modifying our objectives to consider regional rates of COVID-19, other COVID-19 initiatives throughout the country, real-time challenges being faced by OHCPs in NS, and the needs identified by our collaborators.

## **2. Objective I: Expand and strengthen knowledge translation/exchange**

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The strong network of researchers and collaborators (DHW; dentistry and dental hygiene regulators and associations, Nova Scotia Health Authority, and IWK Health Centre) who came together at the start of the pandemic expanded to include additional relevant stakeholders, policy-makers and content experts to meet the project's aim.

The ACFD, a key national stakeholder, is committed to integrating national priorities with project aims to minimize duplication of efforts amongst Canadian Faculties of dentistry. This collaboration was facilitated by team members to ACFD's Clinical Affairs (BC) Research (MM) and Deans' (BD) Committees.

A communication strategy (through email, shared drives and virtual interfaces) was established to ensure priorities and guidance for RTW were stakeholder-informed. Collaborators and their constituents, health policy-makers, content experts and health advocates were invited to health services and strategic planning meetings/workshops to review findings and advance evidence-informed recommendations.

### **2.1. Approach**

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By email and organization websites, RTW protocols were collected from Canadian dentistry and dental hygiene regulators and associations, and dental educational institutions. ACFD created a shared online information portal to collect these protocol-documents, arranged by province and institution, to which all members were encouraged to contribute and view. A COVID-19 RTW Summary Microsoft Excel workbook was created and continually updated to assist side-by-side comparison of 20 main parameters of interest (detailed in section 5.2). The research team also provided ACFD with a bibliography of systemic reviews collected up to August 17, 2021.

### **2.2. Results and discussion**

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Most dentistry and dental hygiene regulators and associations made RTW protocols easily accessible via their websites or by direct request. RTW protocols were collected from five of ten dental educational institutions, and four institutions allowed theirs to be posted to the ACFD website for member access. Some institutions did not have formal public protocols to share due to the pace of pandemic reopening changes. At time of writing, 120 documents were posted on the shared ACFD portal including the bibliography of systematic reviews and RTW protocol summary of July 30, 2020.

## 2.3. Summary

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Knowledge exchange at both national and provincial levels shaped approaches taken for Objectives II, III and IV. Provincially, the research team established a concrete collaborative partnership with registrars of both the College of Dental Hygienists of Nova Scotia and the Nova Scotia Provincial Dental Board to develop and meet the aims of *Objective II*, to explore oral health care providers' uptake of NS RTW-Guidelines. Nationally, the research team engaged with ACFD to meet the aims of: *Objectives III*, to collect, catalogue and share the most up-to-date relevant information with national institutional members who were concurrently developing their own RTW protocols across Canada and *Objective IV*, to access other dental educational institution protocols and their supporting evidence to inform the development of FOD clinical protocols in real-time. Additionally, networking helped establish PIs McNally and Rock as co-investigators on, and contributors to, several national initiatives including: CIHR funded *COVID-19 incident rates among Canadian Dentists as they return to work: a cohort study* (PIs: Madathil S, Allison P, Siqueira W) and CITF funded *COVID-19 experience in Canadian Dental Schools* (PI: Allison P.)

## 3. Objective II: Oral health care providers' uptake of NS RTW-Guidelines

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(Section 3 adapted from McNally et al. 2021)

### 3.1. Method

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As described above, the research team established a collaborative partnership with registrars of both the College of Dental Hygienists of Nova Scotia and the Nova Scotia Provincial Dental Board. Through multiple surveys and frequent stakeholder knowledge exchange, we set out to explore the influence of evidence-based guidelines and related education on RTW practices of NS dentists, RDAs and RDHs during a phased return to work plan. Our purpose was to gather and report baseline data through surveys rolled out at two critical RTW phases and to determine whether the integrated provincial multi-stakeholder approach to RTW in NS was effective in establishing and communicating comprehensive guidelines to ensure a successful re-integration of oral health services following the initial COVID-19 provincial shut down.

Two voluntary, anonymous surveys of all practicing dentists, RDHs and RDAs in Nova Scotia to coincide with "return to work" phases established by the NS Department of Health and Wellness. regarding their preparedness for returning to dental practice. The NS-RTW surveys aimed to determine OHCPs' uptake of the new IPC protocols developed by their regulators, their confidence in the protocols to protect them and their patients from COVID-19 disease transmission in the dental clinic, and their concerns about PPE supply and cost issues. The surveys were not designed to quiz OHCPs' memorization of new IPC protocols.

Survey 1 was made available starting on the date of Phase 2 reopening of dental clinics for *emergency and urgent care* on 5 June 2020 and ran for 15-days until 19 June 2020 inclusive. Survey 2 was released on 20 July 2020, the day of Phase 3 reopening of *comprehensive dental care*. It ran for 15 days until 4 August 2020.

Survey 1 and Survey 2 questions (Appendix 1- Table 1) were modified from existing surveys (Gerbert, 1987; Goulia et al. 2010; Naghavi et al. 2012; Ramich et al. 2017; Dost et al. 2020; Jin et al. 2020) and developed in response to regulator and stakeholder input. Both surveys were prepared using the online SurveyMonkey platform and regulators invited their members to participate via an emailed online link. The program evaluation and quality improvement aim of the surveys did not require institutional ethics review. The surveys began by informing potential participants of the purpose of the survey, how their responses would be used and stored, and consent was obtained by the participant choosing to open the link to begin the survey, (Appendix 1- Survey 1 and Survey 2 Invitation & Consent Agreements).

Survey 1 contained 23 questions. The first 6 questions collected demographic information and the next 16 questions used a five-point Likert scale from strongly agree to strongly disagree. A 23<sup>rd</sup> question explored COVID-19 information sources with multiple answers possible.

Survey 2, a comprehensive follow-up to the first survey, posed 46 questions that sought additional info on the specific PPE protocols used. The first 6 questions collected demographic information and question 7 asked if the respondent participated in the first survey. Questions 8-42 used the five-point Likert scale from strongly agree to strongly disagree. Questions 43-46 allowed multiple answers were to assess the respondents' IPC and PPE practices before and during the COVID-19 pandemic for both NAGPs and AGPs.

The Likert-style questions of Survey 1 and 2 covered six subject domains (Appendix 1-Table 1):

1. Perceived risks upon returning to work
2. Workplace preparedness for returning to work
3. Individual preparedness for returning to work
4. Trust in IPC and PPE effectiveness and availability
5. Financial concerns about practicing during the pandemic
6. IPC protocols and PPE practices

Survey 2 question 25 was excluded because its meaning was unclear. Survey data was analyzed using SPSS® Version 25.0 software (Armonk, NY: IBM Corp). Threshold for significance was set at  $P < 0.05$ , and all statistical tests were two-tailed. Missing data was handled through a complete-case analysis method. A descriptive analysis was performed to report absolute and relative frequencies of responses to each question. A comparison of survey responses and type of oral health profession was assessed using a Chi Square analysis (or a Fisher's Exact test when more than 20% of cells contained expected frequencies of  $<5$ ). Responses to questions in Survey 1 and Survey 2 were compared using a McNemar's test. A comparison of the use of PPE and IPC before and during the pandemic was performed using a two sample Z-test.

### **3.2. Results and Discussion**

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Province-wide education Webinars organized by dental professions regulators (May 29, 30 & June 17) hosted 3541 attendees. Overall response to Survey 1 was 41% (881/2156) representing 44% (246/560) of dentists, 45% (363/800) of RDAs and 34% (270/796) of RDHs. Response to Survey 2 was 26% (571/2177) representing 32% (182/571) of dentists, 32% (253/802) of RDAs and 17% (135/804) of

RDHs. Although 310 fewer participants completed Survey 2, 91% had also participated in Survey 1 indicating strong engagement.

### 3.2.1. Demographic Information

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Demographic responses (Appendix 1-Table 2) for 881 participants in Survey 1 indicate that 28% were dentists, 41% registered RDAs, and 31% registered RDHs. Respondents were primarily employees (70%) followed by practice owners (19%). Of practice owners, 162 were dentists and 4 were RDHs. Of the 571 respondents for Survey 2, 32% were dentists, 44% registered RDAs, and 24% registered RDHs. Respondents were primarily employees (67%) followed by practice owners (21%).

### 3.2.2. Perceived risks upon returning to work

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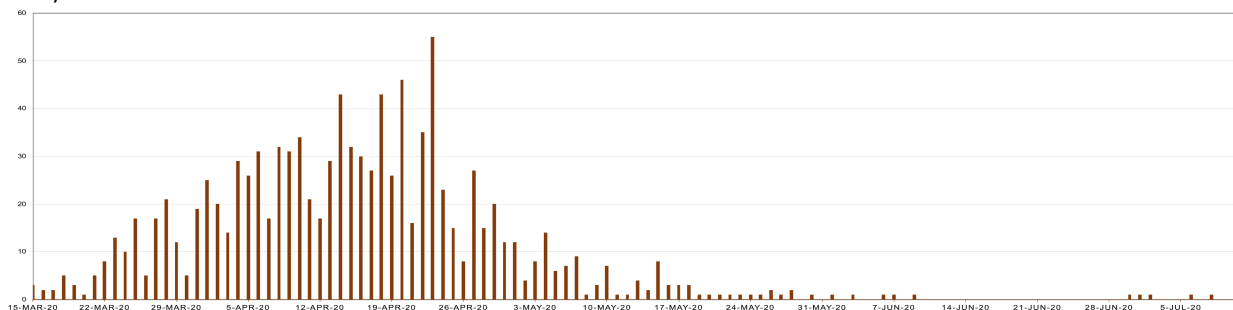
The majority of respondents perceived that returning to work would increase their risk for contracting COVID-19; with 75% (Survey 1) and 73.5% (Survey 2) either agreeing/strongly agreeing with this statement (Appendix 1-Table 3). Only 12.5% (Survey 1) and 14% (Survey 2) disagreed/strongly disagreed that an increased risk due to dental procedures would accompany return to work. Similarly, 71% of Survey 1 and 69% of Survey 2 respondents considered their families to be at higher risk with their return to work.

RDAs (84% Survey 1, 79% Survey 2) and RDHs (88% Survey 1, 89% Survey 2) perceived more risk to themselves than did dentists (49% Survey 1, 55% Survey 2). Remarkably, at the time of Survey 1, RDAs and RDHs were more likely to perceive themselves to be at risk compared to dentists (OR: 6.25; 95% CI 4.5 – 8.7,  $P < 0.001$ ). Likewise, RDAs and RDHs perceived more risk to their families than did dentists in both Survey 1 (OR: 5.1; 95% CI 3.7 – 7.0,  $P < 0.001$ ) and Survey 2 (OR: 3.2; 95% CI 2.2 – 4.7,  $P < 0.001$ ). Since a significantly higher proportion of RDAs and RDHs identified as female (99% and 97% respectively) compared to dentists (48%), gender was assessed for collinearity and was ruled out as a confounding factor.

Despite the overall perception of increased risk to themselves and those close to them, only 39% of Survey 1 respondents perceived that friends and family would distance themselves after the respondent returned to work. This proportion dropped significantly (to 16%) in Survey 2 ( $P < 0.001$ ). There were significant differences between professions regarding distancing of family and friends. In Survey 1, 16% of dentists expected family and friends to distance themselves upon the dentists return to work, compared to 48% of RDAs and 50% of RDHs (OR: 4.7, 95% CI 3.3 – 7.0;  $P < 0.001$ ). In Survey 2, 8.5% of dentists reported actual distancing of their family and friends, compared to 21% of RDAs and 17% of RDHs (OR: 2.7, 95% CI 1.5 – 4.8;  $P < 0.001$ ).

One third of respondents (33%) in Survey 1 anticipated that patients would be reluctant to continue in their care due to high risk. Yet, only 15% of Survey 2 respondents agreed/strongly agreed that there was a decrease in patients requesting routine appointments once comprehensive dental care reopened (63% disagreed). Several possible explanations for this positive trend include: care needs that were not addressed during the shut-down, a desire to address routine and elective care needs before a “second wave” and the public’s confidence in established IPC protocols. Patient confidence in seeking care could also be attributed to the low number of cases (1066 since first reported case on March 15, 2020) of community spread in NS at that time (Figure 1; Government of Nova Scotia, 2020).

Figure1. Daily COVID-19 Cases reported in Nova Scotia from March 15, 2020 to July 11, 2020 (Government of Nova Scotia, 2020).



A majority of RDAs (64%) and RDHs (68%) reported that patients had expressed concerns about COVID-19 in the dental office in Survey 2. Fewer than half (45%) of dentists reported the same (OR: 2.3, 95% CI 1.6 – 3.3;  $P < 0.001$ ). The majority (85%) of Survey 2 respondents reported fewer escorts, parents, and guardians in the operatory. These results were affirming to provincial oral health profession regulators’ who expressly promoted the importance of minimizing unnecessary attendees in dental operatories.

### 3.2.3. Workplace preparedness for returning to work

Of Survey 1 respondents, 82% considered the RTW-Guidelines for Phase 2, emergency and urgent care, helpful in guiding their return to work (Appendix 1-Table 4). This increased to 89% in Survey 2. Only 7% (Survey 1) and 2% (Survey 2) disagreed. All three professional groups had high rates of agreement with this statement (75% or higher) with dentists the highest (92% Survey 1 and 96% Survey 2).

Overall, 88% of Survey 1 respondents agreed/strongly agreed that these guidelines were used by their workplace to develop a Phase 2 site-specific reopening plan. This percentage was higher for dentists (97%), than RDAs (84%) and RDHs (85%) ( $P < 0.001$ ). Just over 93% of individuals who completed Survey 1 agreed that protocols and guidelines had been developed at their workplace for screening and managing suspected/confirmed COVID-19 patients. Here again dentists reported higher rates of agreement with this statement (98%) than RDAs (93%) and RDHs (90%) ( $P = 0.002$ ). However, by Survey 2, all three groups reported similarly high rates of agreement (97%, 94%, 97% respectively) with this statement ( $P = 0.28$ ). In addition, in Survey 2, respondents were asked whether their workplace had protocols in place for pre-screening for COVID-19 symptoms during appointment scheduling (96% agreed/strongly agreed), and for re-screening before entry into the clinic (93% agreed/strongly agreed).

At Survey 2, 81% of dentists agreed/strongly agreed that initial preparations at their workplace were adequate to prevent spread of COVID-19. Significantly fewer RDAs (62%) and DH (65%) agreed/strongly agreed with this statement (OR: 2.5, 95% CI 1.6 – 3.8;  $P < 0.001$ ).

### 3.2.4. Individual preparedness for returning to work

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A high proportion of respondents reported comfort with their understanding of COVID-19 symptoms and risk at both surveys (93.5%) with slight differences among professions (Appendix 1-Table 5). Survey 1 (91%) and Survey 2 (94%) respondents strongly agreed/agreed they were comfortable with their understanding of safety and IPC protocols. Dentists' comfort with their understanding of protocols (99% strongly agreed/agreed for both surveys) was significantly higher than RDAs or RDHs who reported respectively: 87% and 88% for Survey 1 (OR: 11.6, 95% CI 3.6 – 37.0;  $P < 0.001$  and 92% and 88% for Survey 2 (OR: 7.5, 95% CI 1.8 – 31.9;  $P = 0.001$ ).

Most respondents agreed they were comfortable with their training and education on COVID-19 safety and IPC protocols (76% in Survey 1 and 86% in Survey 2). Dentists were more likely to agree with this statement than the other professions: 94% (Survey 1) compared to 69% RDAs and 69% for RDHs (OR: 6.8; 95% CI 4.0 – 11.9;  $P < 0.001$ ). Comfort with education and training remained constant between Survey 1 and Survey 2 ( $P = 0.408$ ). However, it significantly increased for RDAs and RDHs from Survey 1 to Survey 2 ( $P = 0.014$  and  $P = 0.003$ , respectively). Given employment lay-offs during the initial shut-down, it is likely that more training occurred following Phase 2 return to the workplace (i.e. between surveys).

Survey 1 (85%) and Survey 2 (87%) respondents strongly agreed/agreed they had the skills needed to effectively treat patients during the COVID-19 pandemic. Of dentists, 98% in Survey 1 and 93% in Survey 2 strongly agreed/agreed that they had the necessary skills. RDAs reported strongly agreeing/agreeing at 81% for Survey 1 and 84% for Survey 2, and RDHs strongly agreed/agreed at 80% for Survey 1 and 84% for Survey 2. Dentists' rate of agreement was significantly higher than that of RDAs and RDHs in both surveys (OR: 24.8, 95% CI 9.9 – 61.8;  $P < 0.001$  (Study 1) and OR: 2.7, 95% CI 1.4 – 5.1;  $P = 0.033$  (Study 2)).

The majority of OHCPs (84% of Survey 1 and 83% of Survey 2 respondents) strongly agreed/agreed that they would get a vaccine for COVID-19 if and when one became available. Approximately 90% of dentists in both surveys agreed they would be vaccinated, but significantly fewer RDAs (79% for Survey 1 and 78% for Survey 2) and RDHs (85% for Survey 1 and 81% for Survey 2) strongly agreed/agreed they would be vaccinated. Dentists were greater than two and a half times more likely to report accepting a vaccine than RDAs (OR 2.7, 95% CI 1.5 – 4.8;  $P < 0.001$ ), and twice as likely as RDHs (OR 2.2, 95% CI 1.1 – 4.3;  $P = 0.02$ ).

### 3.2.5. Financial concerns about practicing during the pandemic

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Both surveys assessed financial concerns associated with returning to practice (Appendix 1-Table 6). Dentists were more likely to acknowledge a significant financial burden to their office/workplace than RDAs and RDHs, both in Survey 1 (89% vs 60% and 70% respectively) and in Survey 2 (72% vs. 50.5% and 63%). In Survey 1, 71.5% of all OHCPs agreed that the requirements for enhanced standard precautions when performing AGPs would be a significant financial burden to their office/workplace. This dropped to 61% by Survey 2 (OR: 1.6, 95% CI 1.3 – 2.0;  $P = 0.003$ ), which suggests that the financial impact of enhanced precautions may have been somewhat less than anticipated. It could also be reflective of government funded PPE made available at no cost to dental practices, a program that was in effect at the time of Phase 3 RTW.

Dentists reported much higher rates of agreement that enhanced standard precautions caused a significant personal financial burden than did RDAs and RDHs, both in Survey 1 (78% vs 20% and 22% respectively ( $P < 0.001$ )) and Survey 2 (63% vs 11% and 6.5% ( $P < 0.001$ )). Over the two surveys a total of 155 RDAs and RDHs skipped this question or selected 'not applicable,' compared to only 17 dentists. A significantly higher proportion of dentists (76%) reported that their personal income had been reduced since returning to work during the COVID-19 pandemic compared to RDAs and RDHs (OR: 14.7; 95% CI 9.4 – 22.9;  $P < 0.001$ ).

In Survey 2, 35% of respondents agreed the added cost of enhanced standard precautions affected their PPE choices with dentists (44%) were more likely to indicate agreement than RDAs (33%) or RDHs (27%) ( $P < 0.001$ ). Nearly 40% of respondents in Survey 2 indicated that the additional cost of enhanced standard precautions was being passed along to patients. RDHs (47.5%) were more likely to indicate this than dentists (36%) or RDAs (38%) ( $P < 0.001$ ).

### 3.2.6. Confidence in IPC protocols and PPE effectiveness & availability

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Most dentists in Survey 2 agreed that they were confident that the COVID-19 safety and IPC protocols protect OHCPs (91%) and patients (96%) from COVID-19 (Appendix 1- Table 7). However, RDAs and RDHs had significantly lower rates of agreement, particularly regarding protection of OHCPs (59% and 58% agreement respectively (OR: 6.8, 95% CI 4.0 – 11.7;  $P < 0.001$ ). Lower confidence of IPC protocol effectiveness experienced by some OHCPs could be the reflective of concerns described above regarding uncertainty around transmission modes and inconsistent prevention strategies publicized in the early days of the pandemic.

In Survey 1 fewer than half (41%) of the OHCPs agreed that there would be adequate supply of PPE once they returned to work, 30% disagreed, and 29% were neutral. RDAs were more likely to agree (47%) than dentists (42%) or RDHs (34%) ( $P < 0.004$ ). Survey 2 found 52.5% of OHCPs agreed their preferred PPE items were available for purchase when needed, while 29% disagreed. There were no significant differences among the professions ( $P = 0.175$ ). Most Survey 2 respondents (65%) agreed that the availability of specific products influenced their choice of PPE; dentists were more likely to agree (75%) than RDAs (56%) and RDHs (67%) ( $P < 0.001$ ).

### 3.2.7. IPC protocols and PPE use practices

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This domain was only covered in Survey 2 to determine OHCP IPC protocols and their use of PPE before and during the pandemic (Appendix 1-Table 8). The results clearly show changes in PPE practices during the COVID-19 pandemic. Prior to the pandemic, the majority of OHCPs of all groups did not wear a mask preoperatively or when taking a medical history (dentists 67%, RDAs 57% and RDHs 81%). During the pandemic 98% of dentists, 96% of RDAs and 95% of RDHs indicated they always wear a mask preoperatively.

Sixty-three percent of respondents strongly agreed/agreed that they knew and strictly followed PPE donning and doffing procedures before the pandemic. Dentists reported lower rates of agreement (54.5% donning; 56% doffing) pre-pandemic than RDAs (69% donning; 67% doffing) and RDHs (64% donning; 68% doffing). During the pandemic, 97% of all OHCPs indicated that they knew and strictly followed PPE donning (dentists 98%, RDAs 96%, RDHs 98.5%) and doffing (dentists 98%, RDAs 96%, RDHs 97%) procedures. Dentists (98%) strongly agreed/agreed that their coworkers knew the correct



PPE to wear and strictly followed correct procedures to don and doff; RDAs and RDHs were less certain (85% and 78% respectively). Interestingly, only 1% of dentists, 8% of RDAs and 12% of RDHs disagreed/strongly disagreed.

NS practices were not required to make major infrastructure changes, such as air filtration upgrades, changes to existing office designs to enclose operatories nor to observe air changes per hour (ACH) “settling times”. Survey 2 documented 63% of OHCPs did not restrict AGPs to enclosed operatories only, and 65% did not observe settling times after AGPs before operatory disinfection.

### 3.2.8. Information sources

Figure 2 and Table 1 summarize participants’ sources of information regarding COVID 19; 78% indicated they obtained information from the PDBNS resources and 71% from public health announcements. The CDHNS was the most cited resource for RDHs (89% of respondents).

Figure 2: Survey 1 responses to Question 23 indicating participants’ main sources of information regarding COVID-19 (McNally et al. Forthcoming 2021).

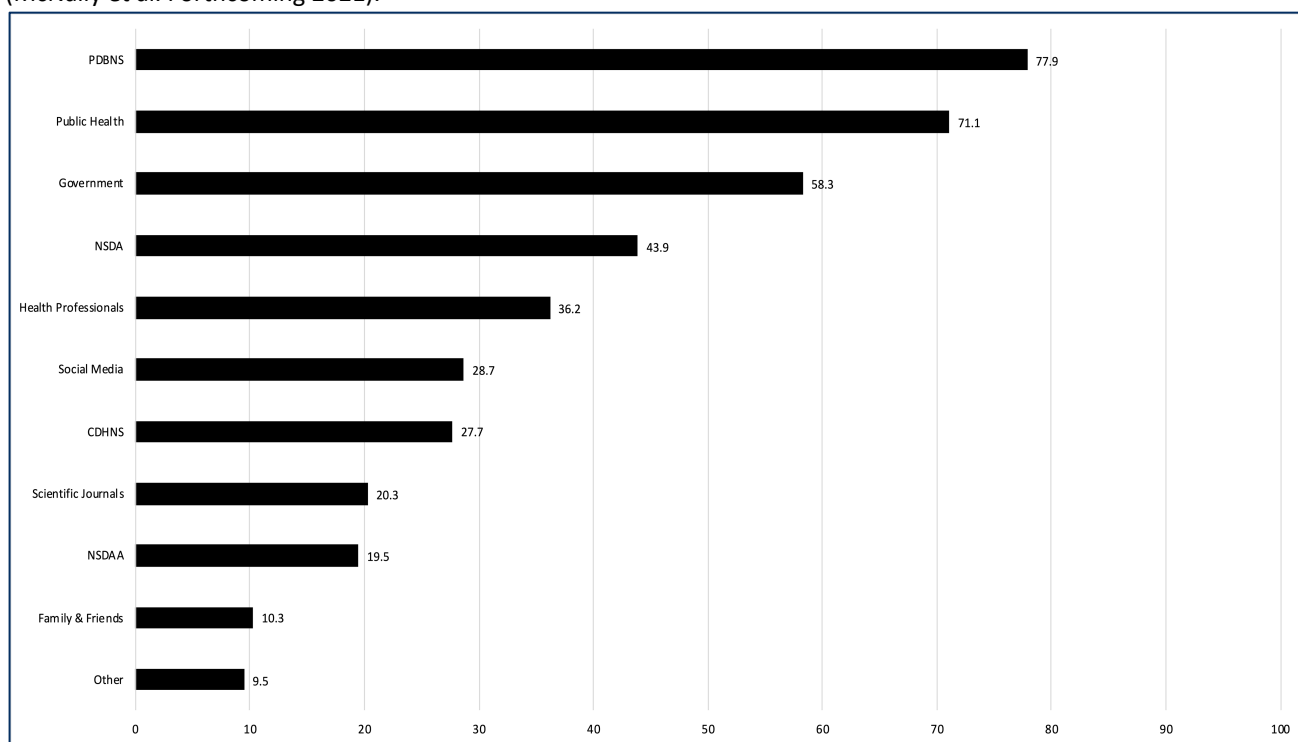


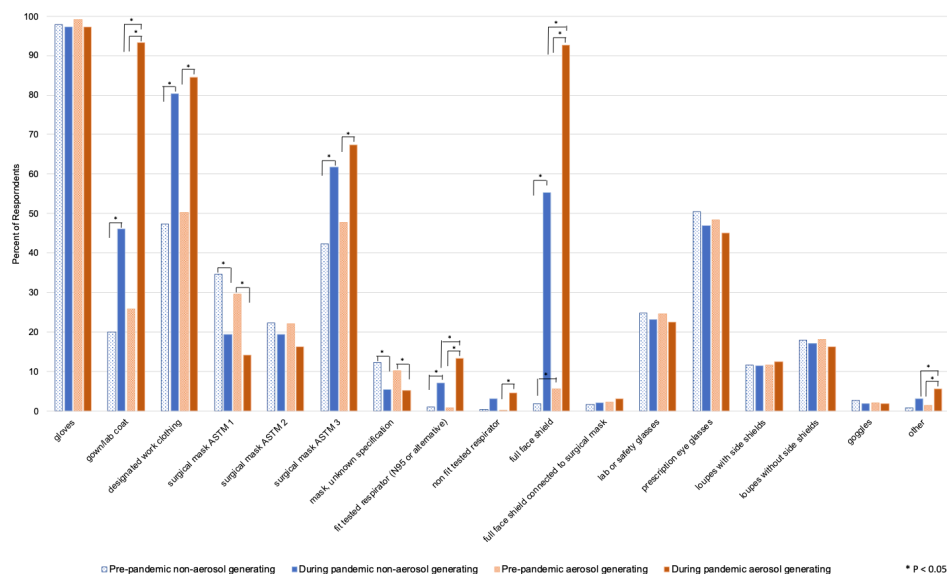
Table 1. Survey 1 responses to Question 23 indicating participants’ main sources of information regarding COVID-19. (McNally et al., 2021).

INFORMATION SOURCE	N	%
PDBNS (Provincial Dental Board of Nova Scotia)	686	(77.9)
CDHNS (College of Dental Hygienists of Nova Scotia)	244	(27.7)
NSDA (Nova Scotia Dental Association)	387	(43.9)
NSDAA (Nova Scotia Dental Assistants Association)	172	(19.5)
Social Media	253	(28.7)
Public Health	626	(71.1)
Government	514	(58.3)
Health Professionals	319	(36.2)
Scientific Journals	179	(20.3)
Family & Friends	91	(10.3)
Other	84	(9.5)

### 3.2.9. PPE use before and after pandemic

Figure 3 illustrates Survey 2 responses to summarize changes in PPE and IPC practices for AGP and NAGPs before and during the pandemic. The use of gowns or lab coats during AGPs during the pandemic increased from 26% to 93%. During the pandemic, 84% of OHCPs wore designated work clothing at the workplace, changing into “street clothes” when leaving the practice. Pre-pandemic, 50% of respondents indicated following this practice. Full face shields for AGPs rose from 6% to 93% during the pandemic. N95 respirators use during AGPs increased from less than 1% to 13%.

Figure 3. Summary of Survey 2 respondents’ PPE and IPC practices before and during the COVID-19 pandemic (McNally et al. 2021)



### 3.2.10. Findings of similar survey studies

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Appendix 1 Table 9 summarizes studies published during the first ten months of the pandemic that explored work experiences of OHCPs using similar parameters to our study. Twenty-four surveys queried perceived risks, knowledge confidence in, and implementation of COVID-19-specific IPC and PPE protocols, financial impacts, information sources and/or education received. These studies were contextually different from ours due to differing aims, timing of questionnaires, timing of pandemic peaks in different locations, and evolving guidelines. Unlike NS, many jurisdictions did not have mandated practice closures.

Three surveys compared PPE and IPC of dentists before and after the pandemic and found dentists modified (Bellini et al. 2020) or increased their PPE use, (Al-Khalifa et al. 2020; Consolo et al 2020; Sinjari et al. 2020). Others explored information sources influencing clinicians finding that OHCPs looked to professional associations or government for guidance (Ahmadi et al. 2020; Al-Khalifa et al. 2020; Bellini et al. 2020; De Stefani et al. 2020; Stangvaltaite-Mouhat et al. 2020) and online for information from WHO, CDC, ADA, medical websites and/or social media (Duruk et al. 2020; Kamate et al. 2020).

Studies addressing training support or knowledge exchange between practitioner, professional regulators and public health institutions mainly observed that communication and coordination needed improvement (de Stafani et al. 2020; Mustafa et al. 2020; Sarfaraz et al. 2020; Tysiąc-Miśta 2020; Vieira-Meyer et al. 2020).

Most studies surveyed only dentists, Bontà et al. (2020) surveyed only dental hygienists, while three studies surveyed dentists, dental hygienists and dental assistants, (Ahmed, N. et al. 2020; Chaudhary et al. 2020; Stangvaltaite-Mouhat et al. 2020). No studies compared responses amongst the three professions to expose differences in their pandemic experiences. Our study appears to be the only one to include consecutive surveys before and after reopening demonstrating that confidence in available education and resources improved across all three professions and was key to preparedness.

### 3.3 Summary

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This study attempted a census sample, versus convenience or probability sampling, resulting in very high response rates free from selection bias and with a low margin of error for both Survey 1 (2.54) and Survey 2 (3.52). Survey fatigue of less than 50% (35.2%) between the two surveys, although acceptable, was not surprising given the urgency experienced by professionals who had not been working for over ten weeks as well as the frequency of competing requests for registrant input, feedback and webinar participation amongst the professions. The preoccupation and time constraints brought on by the demands of having returned to work after a ten-week absence and immediately prior to the distribution of Survey 2, also likely contributed to lower participation on the second survey. Volunteer bias was mitigated by the large response rate and low margin of error and response bias was mitigated by wording questions with a mixture of positive and negative responses. Studies seeking self-report data inherently risk recall bias and closed questions leave little opportunity for respondents to elaborate on reasons for responses. However, overall interpretation of findings was

enhanced by input of regulators and by team members and contributors who are also clinicians involved in the RTW lived experience.

This survey study reflects three unique characteristics among the international oral health research community: 1) the inclusion of the broader clinical team, namely dentists, dental assistants and dental hygienists within the same study; 2) the circulation of surveys at two critical RTW phases that provide insight both before and shortly into the RTW; and 3) the investigation is framed within an inter-professional and multi-stakeholder knowledge exchange network.

Interestingly, a separate study undertaken in NS (Noushi et al 2021), and that preceded the roll-out of the phased NS RTW-Guidelines described in our study, highlights observations of NS dentists concerning the provision of care during the pandemic. While some dentists were concerned about the impact on patients arising from the mandated closure, others had concerns about rising costs, PPE availability and the unknowns and inconsistency of best-evidence related to AGPs. Our findings, gathered 6 and 9 weeks later, suggest that the integrated provincial multi-stakeholder collaboration – through the establishment and communication of comprehensive guidelines and accompanying web-based education - was effective in instilling confidence amongst dentists, dental assistants and dental hygienists returning to work and in establishing a successful and unified re-integration of oral health services in NS following the initial COVID-19 provincial shut-down. This lays an important foundation for responses to subsequent waves of COVID-19 and may serve as an example for collaboratively responding to public health threats in other settings.

In the eight months following the Phase 2 RTW, the leadership and communication processes that had developed amongst representatives of the NSDHW, regulators of the oral health professions and oral health professions member organizations have remained active enabling consistent mobilization for real-time decision-making and for planning next steps. Findings from this work have created a level of confidence, particularly amongst regulators, that registrants are engaged with, and informed by, government sanctioned guidelines. Responses regarding financial burden, PPE and IPC practices have helped to focus advocacy amongst the oral health professions for government sponsored support to offset direct financial burdens as well as to ensure a ready supply of required PPE. Baseline findings are informing website resource content (e.g. frequently asked questions), follow-up survey initiatives and contributing to ongoing updates of provincial IPC guidelines, particularly in the prospective adoption of COVID-19 legacy PPE and procedures tailored to AGP and non-AGP procedures.

Dissemination of results to participants includes: summary report disseminated to NSDHW and posted to CDHNS and PDBNS websites, oral health professions newsletters, NS continuing education events, presentation and through one-on-one stakeholder debriefs.

## 4. Objective III: Catalogue current best evidence on COVID-19 relevant to oral health care delivery

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### 4.1. Method

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For the duration of this research project, the team gathered evidence specific to controlling COVID-19 transmission in dental practice, especially during AGPs. During the initial months, the findings helped inform RTW guidelines for all phases of reopening and subsequently provided a comprehensive catalogue of the most current information for decisions-makers.

Focused literature reviews were conducted to respond to the following general questions:

- For OHCPs, do standard IPC procedures instantiated in dental practices over the past twenty years, reduce the risk of ARI's and/or similarly transmitted influenza-like illnesses (ILI) such as seasonal flus?
- What clinically relevant ARI/ILI transmission prevention measures exist for routine dental AGPs?
- Do our current SPs provide protection for OHCPs or is a higher IPC protocol required due to the unique characteristics of SARS-CoV-2?

Research questions were developed, and arranged in PICO format: Problem/patient, Intervention, Comparison and Outcome. The initial focus of our search was on specific PPE protective against droplet and airborne viral infection. The following initial questions were excluded because they were too narrow and no useful results were found:

- For health care workers (HCW) performing AGPs, are (ASTM 3, 2 or 1) masks as effective as N95 respirators in protecting them from Coronavirus or SARS-CoV-2 infection?
- For HCWs performing AGPs, can (ASTM 3, 2 or 1) masks worn with face shields be as effective as N95 respirator in protecting them from Coronavirus or SARS-CoV-2 infection?
- For dental clinics, is it necessary to enclose or partially enclose operatories to prevent viral, Coronavirus or SARS-CoV-2 infection?

Research on COVID-19 was just emerging in the spring of 2020. Systematic reviews were not yet available. Broader questions had to be developed regarding IPC measures:

- For HCWs or OHCPs, what is known about the risk of viral, Coronavirus or SARS-CoV-2 infection via aerosols and/or AGPs in their workplace?
- What evidence exists pertaining to AGPs, aerosols, Coronavirus and/or SARS-CoV-2 related to dentistry?
- For dental clinics, what IPC protocols are recommended for protecting clinicians, staff and patients from COVID-19?
- What evidence exists regarding the effectiveness of masks, N95 respirators and/or face shields to provide protection against viral, Corona or SARS-CoV-2 infection?
- In health care settings, what is the risk of SARS-CoV-2 infection transmission by pre- or a-symptomatic individuals?
- For HCWs or OHCPs, what is their perceived risk in the health care setting of contracting COVID-19?

Underlying concepts in each question were identified and keyword terms and PubMed Medical Subject Headings (MeSH) were compiled, Appendix 2- Literature Concepts and Search Terms. Additional terms for dentistry and COVID-19 were included as recommended by librarian N. Clairoux, Université de Montréal, in her post March 16, 2020 to ADEA Discussions. Literature searches were built for each research question by combining concepts with Boolean operators “OR” and “AND” to either broaden or narrow the search respectively, Table 2.

Table 2. Research questions and literature searches.

Research Question	Search - Concept Combination
1. For HCWs or Oral Health Care Providers (OHCP), what is known about the risk of viral, Corona or COVID-19 infection via aerosols and/or AGPs in their workplace?	HCP AND (Infectious Diseases OR Infectious Respiratory Diseases OR Coronavirus OR COVID-19) AND Disease Transmission AND (Aerosols OR AGPs) AND HCW
2. What evidence exists pertaining to AGPs, aerosols, Coronavirus and/or Covid-19 and dentistry?	(AGPs OR aerosols) AND COVID-19 AND Dentistry
	(AGPs AND aerosols) AND COVID-19 AND Dentistry
3. For dental clinics, what infection control protocols are recommended for protecting clinicians, staff and patients from COVID-19?	Infection Control AND COVID-19 AND Dentistry
4. What evidence exists regarding the effectiveness of masks, N95 respirators and/or face shields to provide protection against viral, Corona or COVID-19 infection?	(AGPs OR aerosols) AND mask
	Mask AND N95 respirator
	Mask AND N95 respirator AND Face Shield
5. In health care settings, what is the risk of COVID-19 infection transmission by pre- or asymptomatic individuals?	(HCP OR HCW) AND COVID-19 AND Asymptomatic Infections
6. For HCWs or OHCPs, what is their perceived risk in the health care setting of contracting COVID-19?	HCP AND Perceived Risk AND HCW AND (Infectious Diseases OR COVID-19) AND Survey
	HCP AND Perceived Risk AND HCW AND (Infectious Diseases OR COVID-19) AND Cross Infection Psychology AND Survey AND Occupational Diseases

Searches were saved in PubMed and Embase databases and set up for daily notifications of new studies. The results were browsed to identify studies pertaining our specific questions on SARS-CoV-2

(COVID-19) and dentistry. The Cochrane Database of Systematic Reviews was searched manually every week for new articles pertaining to the same.

## **4.2. Results and discussion**

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From March 2020 to February 2021 inclusive, over 600 articles and online documents were collected. Most articles related to COVID-19 were single studies, narrative reviews, and editorials from experts. Systematic reviews were sought, and 36 were found that pertained to our team's topics of interest. At the beginning of the pandemic, few studies were available relating directly to COVID-19, though many more were published as the project progressed. Appendix 3. Bibliography Nova Scotia COVID-19 Health Research Coalition Literature Collection groups the articles into 4 sections:

Appendix 3.1. Systematic Reviews related to COVID19 transmission, IPC/PPE, and dentistry

Appendix 3.2. Articles related to aerosols, AGPs and aerosol disease transmission and prevention measures

Appendix 3.3. Articles related to asymptomatic transmission of COVID-19 in health care setting

Appendix 3.4. Articles related to HCWs' or OHCPs' perceived risk of contracting COVID-19 at work during COVID-19 pandemic

A systematic review of the literature was not conducted by this research team as the Office of the Chief Dental Officer of Canada commissioned a systematic review from a research group at McGill University. Paul Allison, Raphael Freitas de Souza and Lilian Aboud of the Faculty of Dentistry, and librarian Martin Morris completed the study on 5 August, 2020. The report was published on the Canadian federal government public website: [Evidence to Support Safe Return to Clinical Practice by Oral Health Professionals in Canada During the COVID-19 Pandemic \(Allison et al. 2020\)](#). Recognizing that quality and level of evidence was generally weak, rather than repeating a systematic review, we maintained broad based literature searches over the course of 10 months, thematically cataloging evolving evidence for quick reference.

## **4.3. Summary**

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Our curated literature-base detailed in Appendix 3 has resulted in a substantial collection of the most current evidence to inform development of RTW policy and protocols throughout the COVID-19 pandemic as well as the RTW surveys described in Section 2.

## 5. Objective IV: Compare RTW Protocols to Inform Local Policy & Procedures

### 5.1. Method

Between May to September 2020, fifty Canadian RTW protocols were collected: 9 from dental educational institutions, 39 from provincial and territorial professional regulating authorities (regulators), and 2 from the Canadian Dental Association. Because New Zealand’s pattern of COVID-19 infection resembled that of NS, two RTW protocols were obtained from the New Zealand Dental Council to consider relevance to the local NS situation.

Protocols were compiled in an Excel workbook arranged in manageable groups within 9 worksheets. The workbook was arranged to allow side-by-side protocol comparison along 20 selected parameters of interest described in Table 3. RTW Protocol Parameter Descriptions. Text in the spreadsheets was copied directly from the original protocol documents and interpretation of uncertain meaning was avoided whenever possible. If the parameter was unclearly addressed or missing from the protocol, then “[not specified]” was recorded.

Table 3. Return to Work Protocol Parameter Descriptions

Parameter	Description &/or Rationale
Date of issue	ensures all doc versions and changes captured
Phase	of practice reopening
Type of health care allowed	emergency, urgent and/or comprehensive dental treatment permitted
Pre-screening protocol	description of procedure to determine COVID-19 infection status of patients seeking treatment
Management of immunocompromised patients and patients with co-morbidities	special procedures in place for patients considered at high risk for severe COVID-19 infection
<b>PPE and Operatory Requirements:</b>	
High Risk Patient Definition	patients whose conditions support strong suspicion of COVID-19 infection
Operatory High Risk Patients	structural design and/or ventilation requirements to support treatment of high risk patients
PPE High Risk Patients	required when treating high risk patients, often specified by procedure type and the probability of aerosol generation
Low Risk Patient Definition	patients whose conditions support low suspicion of COVID-19 infection
Operatory Low Risk Patients	structural design and/or ventilation requirements to support treatment of low risk patients
PPE Low Risk Patients	required when treating Low risk patients, often specified by procedure type and the probability of aerosol generation



General PPE	additional instructions for OHPs and staff
Management of scrubs, gowns	instructions for disposal and laundering, wearing of protective clothing outside clinic
Cleaning, disinfecting operatories	PPE worn and special procedures e.g. quarantine time required
<b>Management of Aerosols:</b>	
Treatment strategy	policy minimizing or restricting AGPs
Treatment protocols	clinical procedures to minimize aerosol generation e.g. use of rubber dam
Pre-operative mouth rinses	type and duration
Patient appointments	special scheduling to support physical distancing
Staff protocol	screening for COVID-19 symptoms
Reception desks	PPE and/ or structural design requirements e.g. Plexiglas barrier between staff and patients
Waiting area	procedures to support physical distancing and infection control of high traffic area

Every province entered different phases of health care reopening at different times. For this report, we chose to compare RTW protocols for phase 2 (or equivalent) only, because it was the period that captured the most dramatic change in dental practice from provision of emergent/urgent care to comprehensive care. Also, it was still early in the pandemic with much uncertainty and little definitive evidence available to enlighten protocol development, resulting in the widest range of differing protocols.

To make comparison more manageable, we evaluated protocols from four Canadian dental school clinical protocols, which accurately represented the range of COVID-19 IPC and PPE policies developed among the 10 Canadian dental schools and those of their respective provincial regulators. To avoid identification, settings are named Universities A, B, C and D and findings exclude governing regulator identities (Appendix 4 - RTW Oral Health Teaching Clinics' Protocols Summary).

## 5.2. Results and Discussion

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Most of the 20 selected parameters were the same or similar among educational institutions (and their respective provinces) across Canada. However, the following five parameters differed significantly indicating different approaches to controlling COVID-19 transmission:

1. types of treatment provided
2. operatory design and/or ventilation requirements
3. operatory cleaning and disinfection procedures
4. PPE for dental procedures
5. pre-procedural mouth rinses

### 5.2.1. Types of treatment provided

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During phase 2 practice in June 2020, all four dental school clinics pre-screened patients for signs and symptoms of COVID-19 and provided treatment for only those who were not suspected of being infected (Table 4). Low- and high-risk patients were not always defined. Since all patients were pre-screened to be at low risk, activity risk was more important and is what drove IPC requirements.

University A expanded dental care from emergent and urgent treatment to include non-essential care. University B was not clear on provision of the range of care provided, though its provincial regulator approved provision of all NAGPs and AGPs for patients. Both University C and University D restricted dental care to emergency and urgent problems.

Table 4. Types of treatment provided

School	Types of Treatment Provided
University A	emergent, urgent and non-essential treatment
University B	not specified
University C	dental emergencies/urgencies and essential care
University D	emergent or urgent care

### 5.2.2. Operatory design and/or ventilation requirements

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All schools and their provincial regulators recommended removal of cabinetry, equipment and decoration from operatories that is non-essential to patient care. The provincial dentistry regulator for University A required no particular operatory design when treating low risk patients (Table 5). Practices were “encouraged to consider engineering assessment to evaluate adequacy of existing filtration and ventilation with emphasis on establishing base fresh air exchanges per hour. Consideration could also be given to the strategic use of high efficiency air exchange units as well as increasing fresh air flow by opening windows, where possible.” University A protocols indicated the existence of enclosed operatories in its clinic, but not the criteria for their use, i.e. for which procedure types.

University D did not specify operatory design requirements for either NAGPs or AGPs. This policy agrees with that of its provincial regulator which did not require dental practices to make major infrastructure changes, such as air filtration upgrades or changes to existing office designs to enclose them.

University B and University C had the most stringent operatory design requirements, stipulating AGP operatories must be “isolated rooms from floor to ceiling with an entry or entries that must be closed”. Isolation rooms could be built with temporary materials as long as they were amenable to repeated disinfection. University B and University C specified only AGP operatories be enclosed, and regular (open) operatories be used for NAGPs. University B further required operatory air change per hour (ACH) of at least six.

Table 5. Operatory Design and/or Ventilation Requirements

School	Operatory Design
University A	no special requirements, air filtration and circulation assessment recommended
University B	enclosed operatories for AGPs, minimal air exchange 6 times/hour
University C	enclosed operatories for AGPs
University D	no special requirements

### 5.2.3. Operatory cleaning and disinfection procedures

In accordance with its provincial regulator, University D did not observe post-treatment settling time after any procedure prior to disinfecting operatories (Table 6). Though its regulator did not require doing so, University A opted to observe a 30-min post treatment settling time not specifying after which types of procedures.

University B required a settling time of 120 minutes after AGPs before cleaning, but the delay could be decreased if the number of ACHs in the room permitted. University B did not require an operatory settle time after NAGPs, but after AGPs, required the space be quarantined for a period of time specific to the air exchange rate in the operatory to a maximum of 2 hours. Also, operatory disinfection was finished by a Registered Dental Assistant with the use of a disinfecting fogger, or by wiping down walls with disinfecting wipes.

The provincial regulator of University C allowed cleaning and disinfection of the operatory immediately following a NAGP. Following an AGP, cleaning and disinfection of the operatory was to be delayed for three hours (180 minutes) to allow settling of the aerosol. On the contrary, University C required only a 15-minute wait after AGPs to enter operatories for disinfection.

Table 6. Operatory Cleaning and Disinfection Procedures

School	Aerosol Settling Period Prior to Operatory Disinfection
University A	30-mins after all procedures
University B	120-mins after AGPs, calculated quarantine $\leq$ 120 mins after non-AGPs
University C	15-mins after AGPs
University D	no delay required after any procedures

### 5.2.4. PPE for dental procedures

PPE requirements differed among provinces and schools mostly with respect to respiratory protection for operators (Table 7). This remains a contentious issue with lack of clear evidence about the risk level of COVID-19 transmission associated with aerosols and/or droplets, and the amounts of aerosol produced by the variety of dental procedures. Most policies tended toward a better-safe-than-sorry approach by stipulating N95 respirators to protect operators during AGPs. However, there was concern about availability of these masks from suppliers and discomfort with prolonged wearing.

The regulator of University A recommended standard precautions where there was low incidence and prevalence of COVID-19, and that additional PPE over and above that required for normal precautions was not necessary. University A Phase 2 protocol issued 25 June 2020 for Summer terms I and II did not specify the PPE required for any treatment, but the updated Phase 2 protocol of 24 August 2020 required eye protection (protective eyewear with multiple-use face shield), level 3 mask, gown and gloves.

University D recommended N95 respirator or alternative for AGPs but did not specify what the alternative would be. The regulator strongly recommended the use of a fit-tested N95 respirator for AGPs but suggested using a KN95, or a surgical mask with a full-face shield, as acceptable alternatives if an N95 respirator was not available.

University C required operators wear fit-tested N95 masks or ASTM Level 3 mask during AGPs. University B required operators wear fit-tested N95 masks, which is in keeping with the provincial regulator protocol. No schools required N95 respirators or equivalent for NAGPs, only ASTM level 2 or 3 masks.

Table 7. PPE for Dental Procedures

School	Operator Respiratory Protection during AGPs
University A	not specified, standard precautions according to provincial RA
University B	N95 respirator
University C	N95 respirator or ASTM Level 3 mask
University D	N95 respirator or alternative (surgical mask with face shield)

### 5.2.5. Pre-procedural mouth rinses

All 4 schools had patients use hydrogen peroxide mouth rinses prior to treatment (Table 8). University B used mouth rinse despite its provincial regulator recommending against the procedure declaring that there was no evidence to support the practice.

Table 8. Pre-procedural Mouth Rinses

School	Pre-procedural Mouth Rinse
University A	1.5% hydrogen peroxide
University B	1% hydrogen peroxide
University C	1% hydrogen peroxide
University D	1% hydrogen peroxide

## 5.3. Summary

Initially, we expected protocols within the same phases of reopening would be similar among educational institutions since all had access to the same body of scientific evidence to inform their development. However, we observed wide variation in dental school clinic protocols, consistent with

the findings of Brondani et al (2021) who compared provincial reopening protocols across Canada. Similar to the Brondani et al. (2021) review, we noted that most school protocol documents directly adapted CDC and WHO guidelines to the Canadian context, and referenced provincial oral health care regulators and government public health information sources. Few included references to scientific literature, perhaps intentionally to produce lean easy-to-read reference documents for faculty, staff and students. It is also likely that there was too little SARS-CoV-2-specific evidence to inform development of the protocols. Variable extrapolation from older studies of clinical oral care IPC measures against other respiratory and Corona viruses may have occurred (but not documented), which could explain the differing approaches among institutions.

## 6. Implications

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The multi-stakeholder collaboration created in response to the initial COVID-19 provincial shut-down has been effective in establishing and communicating comprehensive guidelines to ensure successful and unified re-integration of oral health services in NS. Survey results reveal that OHCPs look to and trust their regulators and government public health organizations to safely guide them back to practice during this challenging pandemic. Responses regarding financial burden, PPE and IPC practices have helped to focus advocacy amongst the oral health professions for government support for areas of highest need. Dissemination of survey results to participants and continued reciprocal communication should maintain OHPs' confidence in their respective professional organizations and encourage feedback from frontline clinical care settings.

Sharing information and expertise via initiatives such as the ACFD online information portal, generates exchange of ideas and debate necessary for an effective response to a global pandemic. Scant evidence specific to COVID-19 and oral health care practice resulted in differing interpretation among policy makers as demonstrated by the variety of approaches in RTW protocol guidelines across the country. Ideally the dental profession would arrive at universally accepted IPC protocols, but consensus is possible only after more relevant research is conducted. Continued research and literature review is required to address evidence gaps such as identifying risk levels of specific oral health care procedures and the appropriate IPC measures to control them.

Stronger together, leadership and communication processes that had developed nine months ago amongst provincial health representatives, regulators and response groups representing the professions remain intact. This collaboration enabled quick re-mobilization for the second wave of community spread in the fall of 2020 and is well-positioned to respond to changing needs and goals.

Dissemination of outputs and findings of this work includes: a manuscript summarizing survey findings accepted for publication (McNally et al 2021), this summary report disseminated to NSDHW and posted to CDHNS and PDBNS websites, oral health professions newsletters, and presentations at professional conferences (Kraglund, 2021), continuing education events (McNally and Rock, 2021) and through one-on-one stakeholder debriefs.

## 7. Abbreviations

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ACFD	Association of Canadian Faculties of Dentistry
ADA	American Dental Association
AGP	aerosol generating procedures
ARI	acute respiratory infections
CADTH	Canadian Agency for Drugs and Technologies in Health
CDC	Center for Disease Control and Prevention
CDHNS	College of Dental Hygienists of Nova Scotia
CIHR	Canadian Institutes of Health Research
CITF	COVID Immunity Task Force
COVID-19	Coronavirus Disease 2019
DHSC	Department of Health and Social Care
FOD	Faculty of Dentistry
HCP	health care providers
HCWs	health care workers
HVAC	heating, ventilation, and air conditioning;
IPC	infection prevention and control
NAGP	non-aerosol generating procedures
NS	Nova Scotia
NSDHW	Nova Scotia Department of Health and Wellness
OHCP	oral health care providers
PDBNS	Provincial Dental Board of Nova Scotia
PPE	personal protective equipment
RDAs	registered dental assistants
RDHs	registered dental hygienists
RTW	return to work
SARS-CoV-2	Severe Acute Respiratory Syndrome Coronavirus-2
SP	standard precautions
UP	universal precautions
WHO	World Health Organization

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## 9. Appendices

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### **Appendix 1 – RTW Surveys**

- Appendix 1 Table 1. Survey 1 and Survey 2 Questions
- Appendix 1 Survey 1 invitation and consent
- Appendix 1 Survey 2 invitation and consent
- Appendix 1 Table 2. Demographic Responses
- Appendix 1 Table 3. Perceived Risks Upon Returning to Work
- Appendix 1 Table 4. Workplace Preparedness for Returning to Work
- Appendix 1 Table 5. Individual Preparedness for Returning to Work
- Appendix 1 Table 6. Financial Concerns About Practicing During COVID-19 Pandemic
- Appendix 1 Table 7. Confidence in IPC and PPE effectiveness & availability
- Appendix 1 Table 8. Infection and Prevention Control (IPC) Protocols and Personal Protective Equipment (PPE) Use Practices
- Appendix 1 Table 9. Return to Work Survey Studies Compared

### **Appendix 2 - Literature Concepts and Search Terms**

### **Appendix 3 - Bibliography NS COVID-19 Health Research Coalition Literature Collection**

- Appendix 3.1. Systematic Reviews related to COVID19 transmission, IPC/PPE, and dentistry
- Appendix 3.2. Articles related to aerosols, AGPs and aerosol disease transmission and prevention measures
- Appendix 3.3. Articles related to asymptomatic transmission of COVID-19 in health care setting
- Appendix 3.4. Articles related to HCWs' or OHCPs' perceived risk of contracting COVID-19 at work during COVID-19 pandemic

### **Appendix 4 - Phase 2 Return to Work Oral Health Teaching Clinics' Protocols Summary**

Appendix 1 Table 1. Survey 1 and Survey 2 Questions.

Survey 1 Question Number	Survey 2 Question Number	Question
<b>Domain 1. Perceived risks upon returning to practice</b>		
7	8	Dental/DH/DA procedures will increase/have increased my risk for COVID-19 (Gerbert 1987, Goulia et al. 2010)
8	9	My family will be/is at greater risk because of my work. (Goulia et al. 2010).
9	10	Family/friends will/now distance themselves from me because of my work. (Goulia et al. 2010)
10	N/A	Patients will be reluctant to continue in my care due to the perceived “high-risk” environment created by dental procedures. (Gerbert 1987)
N/A	12	Though my office is open to provide comprehensive care, I notice a decrease in patient requests for routine treatment appointments. (Gerbert 1987)
N/A	11	I have heard patients express concerns about COVID19 in the dental office.
N/A	13	There is a reduced presence of escorts, parents and guardians in the operatory room.
12	N/A	Media and news coverage related to COVID-19 is stressful. (Jin et al. 2020)
<b>Domain 2. Workplace preparedness for returning to practice</b>		
13	N/A	The Emergency and Urgent Care “Return to Work Guidelines for the Oral Health Professions of Nova Scotia” (released May 31 <sup>st</sup> ) have been helpful in guiding return to practice. (Albert et al. 2020a)
N/A	14	“Return to Work Guidelines for the Oral Health Professions of Nova Scotia: Phase/Stage 3” has been helpful in guiding return to practicing comprehensive care. (Albert et al. 2020b)
14	N/A	My workplace has developed its site-specific reopening plan based on the Emergency and Urgent Care “Return to Work Guidelines for the Oral Health Professions of Nova Scotia” (released May 31 <sup>st</sup> ). (Albert et al. 2020a)
15	15	Protocols and guidelines for screening and managing suspected/confirmed COVID-19 patients have been developed at my workplace. (Dost et al. 2020)

## Appendix 1 - RTW Surveys

Survey 1 Question Number	Survey 2 Question Number	Question
N/A	18	The initial preparation at my workplace was enough to prevent the spread of COVID-19. (Goulia et al. 2010)
N/A	16	Before scheduling appointments in my workplace, patients are pre-screened using remote communications for COVID-19 symptoms, risk factors, underlying medical risk factors and the nature of the chief complaint
N/A	17	Before allowing patients entry into the clinic, staff rescreen them for COVID-19 symptoms, risk factors, underlying medical risk factors and the nature of the chief complaint.
<b>Domain 3. Personal preparedness for returning to practice</b>		
16	19	I am comfortable with my understanding of COVID-19 symptoms and risk factors.
18	20	I am comfortable with the education and training I have received on COVID-19 safety and infection control protocols.
17	21	I am comfortable with my understanding of safety and infection control protocols.
19	22	I have the skills I need to effectively treat patients during the COVID-19 pandemic. (Gerbert 1987)
11	26	I will get a vaccine to protect against COVID-19 when one becomes available. (Ramich et al. 2017)
<b>Domain 4. Financial concerns about practicing during COVID-19 pandemic</b>		
N/A	29	The additional cost of enhanced standard precautions when performing aerosol generating procedures influences my choice of PPE.
21	30	Requirements for enhanced standard precautions when performing aerosol generating procedures will be/has been a significant financial burden to my office/workplace. (Gerbert 1987)
22	31	Requirements for enhanced standard precautions when performing aerosol generating procedures will be/has been a personal financial burden.
N/A	32	In my workplace, extra costs for enhanced standard precautions when performing aerosol generating procedures have been charged to patients as extra fees.
N/A	33	My income has been reduced since returning to work during the COVID-19 pandemic



Appendix 1 - RTW Surveys

Survey 1 Question Number	Survey 2 Question Number	Question
<b>Domain 5. Confidence in IC and PPE effectiveness &amp; availability</b>		
N/A	23	I am confident that the COVID-19 safety and infection control protocols adequately protect oral health care providers.
N/A	24	I am confident that the COVID-19 safety and infection control protocols adequately protect patients.
N/A	25	If there is a second wave of COVID19 in my practice location, I will continue to work and change infection control protocols as required. (Naghavi et al. 2012)
20	N/A	There will be an adequate supply of Personal Protective Equipment available to protect me from COVID-19. (Jin et al. 2020)
N/A	27	My preferred PPE items are available to purchase when I need them. (Jin et al. 2020)
N/A	28	The availability of certain PPE items influences my choice of PPE.
<b>Domain 6. IPC Protocols and PPE use practices</b>		
N/A	34	Before the COVID-19 pandemic, I always wore a mask preoperatively/during a medical history.
N/A	35	During the COVID-19 pandemic, I always wear a mask preoperatively/during a medical history.
N/A	36	Before the COVID-19 pandemic, I knew and strictly followed the procedures for donning protective equipment. (Dost et al. 2020)
N/A	38	During the COVID-19 pandemic, I know and strictly follow the procedures for donning protective equipment. (Dost et al. 2020)
N/A	37	Before the COVID-19 pandemic, I knew and strictly followed the procedures for doffing protective equipment. (Dost et al. 2020)
N/A	39	During the COVID-19 pandemic, I know and strictly follow the procedures for doffing protective equipment. (Dost et al. 2020)
N/A	40	During the COVID 19 pandemic, my coworkers appear to know the correct PPE to wear and strictly follow the procedures for donning and doffing protective equipment.
N/A	41	I observe a settling time after aerosol generating procedures before disinfection of the operatory.
N/A	42	I perform aerosol generating procedures only in enclosed operatories.

**Appendix 1 Survey 1 invitation and consent:**



INVITATION TO PARTICIPATE

Informing “Return to Practice” During the COVID-19 Pandemic

You are invited to take part in a survey developed by researchers from the Faculty of Dentistry at Dalhousie University (led by Drs. Mary McNally, Leigha Rock and Blaine Cleghorn) in collaboration with the Provincial Dental Board of Nova Scotia and the College of Dental Hygienists of Nova Scotia. The arrival of the COVID-19 novel coronavirus approximately ten weeks ago resulted in the closure of most dental and dental hygiene offices in Nova Scotia. We are now in the process of rolling out a phased return to practice beginning June 5<sup>th</sup>, 2020 that includes modifications to standard practices to ensure safety for patients and oral health care providers. The aim of the survey is to gauge the knowledge and comfort of dental assistants, dental hygienists and dentists returning to practice. Findings from the survey will inform the ongoing phased return of routine oral healthcare services and planning for future potential “waves” of COVID-19.

This online survey is developed using password-protected SurveyMonkey software. No personal identifying information is being collected, therefore your responses are completely anonymous. You are welcome to skip questions you do not feel comfortable answering. If you decide you no longer would like to participate in the survey, feel free to close the browser. Once the survey is submitted, the information provided cannot be withdrawn. Research assistance for survey analysis will be provided by DDS3 student, Cody Muise. Responses will be analyzed and stored on a secure Dalhousie Faculty of Dentistry server under the supervision of M. McNally.

If you have any questions or concerns regarding the survey, you may contact Cody Muise ([cd377124@dal.ca](mailto:cd377124@dal.ca)) or the Research Development Office at the Dalhousie University Faculty of Dentistry ([rdodent@dal.ca](mailto:rdodent@dal.ca)).

Your consent to participate in this study is confirmed by clicking on the following link:

**Appendix 1 Survey 2 invitation and consent:**



INVITATION TO PARTICIPATE

Informing “Return to Practice” During the COVID-19 Pandemic

You are invited to take part in the voluntary ‘Return to Practice’ Survey 2.0 developed by researchers from the Faculty of Dentistry at Dalhousie University (led by Drs. Mary McNally, Leigha Rock and Blaine Cleghorn) in collaboration with the Provincial Dental Board of Nova Scotia and the College of Dental Hygienists of Nova Scotia. The arrival of the COVID-19 novel coronavirus approximately four months ago resulted in the closure of most dental offices in Nova Scotia. We continue in the process of a phased return to dentistry and dental hygiene practice in Nova Scotia that began on June 5<sup>th</sup>, 2020. This survey is a follow up to the survey circulated early in June. All dental assistants, dental hygienists and dentists are invited to complete this survey regardless of whether or not you filled out a previous survey. The aim of both surveys is to gauge the knowledge and comfort of members of the dentistry professions throughout the phased return to practice. Findings from the survey will inform the ongoing phased return of routine oral healthcare services and planning for future potential “waves” of COVID-19.

This online survey is developed using password-protected SurveyMonkey software. No personal identifying information is being collected, therefore your responses are completely anonymous. You are welcome to skip questions you do not feel comfortable answering. If you decide you no longer would like to participate in the survey, feel free to close the browser. Once the survey is submitted, the information provided cannot be withdrawn. Research assistance for survey analysis will be provided by DDS3 student, Cody Muise. Responses will be analyzed and stored on a secure Dalhousie Faculty of Dentistry server under the supervision of M. McNally.

If you have any questions or concerns regarding the survey, you may contact Cody Muise ([cd377124@dal.ca](mailto:cd377124@dal.ca)) or the Research Development Office at the Dalhousie University Faculty of Dentistry ([rdodent@dal.ca](mailto:rdodent@dal.ca)).

Your consent to participate in this study is confirmed by clicking on the following link:

Appendix 1 Table 2. Demographic Responses

Variables	Survey 1 (n=881)		Survey 2 (n=571)	
	n	(%)	n	(%)
<b>Age</b>				
<20	1	(0.1)	1	(0.2)
20-29	119	(13.6)	61	(10.7)
30-39	202	(23.0)	112	(19.7)
40-49	234	(26.7)	141	(24.8)
50+	322	(36.7)	253	(44.5)
<i>No response</i>	3		3	
<b>Gender</b>				
Female	738	(83.8)	474	(83.3)
Male	134	(15.2)	93	(16.3)
Other Gender Identity	1	(0.1)	0	(0.0)
Prefer not to say	8	(0.9)	2	(0.4)
<i>No response</i>	0		2	
<b>Number of Children</b>				
0	266	(30.2)	157	(27.5)
1	146	(16.6)	111	(19.5)
2	328	(37.3)	204	(35.8)
3	100	(11.4)	70	(12.3)
4 or more	40	(4.5)	28	(4.9)
<i>No response</i>	1		1	
<b>Care for Elder/Dependent Family Member</b>				
No	750	(85.4)	492	(86.3)
Yes	128	(14.6)	78	(13.7)
<i>No response</i>	3		1	
<b>Type of Employee</b>				
Associate	70	(7.9)	52	(9.1)
Employee	621	(70.5)	384	(67.3)
Other	24	(2.7)	13	(2.3)
Practice owner	166	(18.8)	122	(21.4)
<b>Profession</b>				
Dentist	246	(28.0)	182	(31.9)
Dental Assistant	363	(41.3)	253	(44.4)
Dental Hygienist	270	(30.7)	135	(23.7)
<i>No response</i>	2		1	
<b>Participated in Both Surveys</b>				
No	NA		53	(9.3)
Yes	NA		517	(90.7)
<i>No response</i>			1	

## Appendix 1 - RTW Surveys

### Appendix 1 Table 3. Perceived Risks Upon Returning to Work

□ survey 1 question, ■ Survey 2 question, □ Survey 1 and 2 question. \*Comparisons made using Chi-square analysis (or Fisher's exact test when more than 20) of cells contained expected frequencies of less than 5) for between professions comparisons; McNemar's test for comparisons between surveys; all statistical tests were two-tailed. Significant results indicated in red font.

Survey Question		Dentist				RDA				RDH				comparison between professions*	
		Survey 1 (N=246)		Survey 2 (N=182)		Survey 1 (N=363)		Survey 2 (N=253)		Survey 1 (N=270)		Survey 2 (N=135)		Survey 1	Survey 2
		n	%	n	%	n	%	n	%	n	%	n	%		
Dental/DH/DA procedures will increase/have increased my risk for COVID-19.	SA/A	120	(48.8)	99	(55.0)	304	(83.7)	198	(78.6)	238	(88.1)	119	(88.8)	<b>&lt;0.001</b>	<b>&lt;0.001</b>
	N	47	(19.1)	29	(16.1)	37	(10.2)	36	(14.3)	23	(8.5)	8	(6.0)		
	D/SD	79	(32.1)	52	(28.9)	22	(6.1)	18	(7.1)	9	(3.3)	7	(5.2)		
comparison between surveys*		0.437				0.24				0.456					
My family will be/is at greater risk because of my work.	SA/A	111	(45.7)	94	(51.9)	280	(78.0)	191	(76.4)	229	(85.1)	107	(79.9)	<b>&lt;0.001</b>	<b>&lt;0.001</b>
	N	45	(18.5)	31	(17.1)	50	(13.9)	39	(15.6)	20	(7.4)	15	(11.2)		
	D/SD	87	(35.8)	56	(30.9)	29	(8.1)	20	(8.0)	20	(7.4)	12	(9.0)		
comparison between surveys*		0.423				0.847				0.365					
Family/friends will/now distance themselves from me because of my work.	SA/A	40	(16.4)	15	(8.5)	172	(47.5)	52	(21.2)	132	(49.6)	23	(17.4)	<b>&lt;0.001</b>	<b>&lt;0.001</b>
	N	52	(21.3)	19	(10.8)	107	(29.6)	73	(29.8)	74	(27.8)	41	(31.1)		
	D/SD	152	(62.3)	142	(80.7)	83	(22.9)	120	(49.0)	60	(22.6)	68	(51.5)		
comparison between surveys*		<b>&lt;0.001</b>				<b>&lt;0.001</b>				<b>&lt;0.001</b>					
Patients will be reluctant to continue in my care due to the perceived "high-risk" environment created by dental procedures.	SA/A	66	(27.0)	--	--	103	(29.0)	--	--	119	(44.6)	--	--	<b>&lt;0.001</b>	N/A
	N	57	(23.4)	--	--	151	(42.5)	--	--	88	(33.0)	--	--		
	D/SD	121	(49.6)	--	--	101	(28.5)	--	--	60	(22.5)	--	--		
comparison between surveys*		N/A				N/A				N/A					
Though my office is open to provide comprehensive care, I notice a decrease in patient requests for routine treatment appointments.	SA/A	--	--	33	(19.1)	--	--	38	(15.8)	--	--	11	(8.7)	N/A	0.099
	N	--	--	32	(18.5)	--	--	58	(24.2)	--	--	28	(22.2)		
	D/SD	--	--	108	(62.4)	--	--	144	(60.0)	--	--	87	(69.0)		
comparison between surveys*		N/A				N/A				N/A					
I have heard patients express concerns about COVID19 in the dental office.	SA/A	--	--	79	(45.1)	--	--	158	(63.7)	--	--	88	(67.7)	N/A	<b>&lt;0.001</b>
	N	--	--	20	(11.4)	--	--	42	(16.9)	--	--	16	(12.3)		
	D/SD	--	--	76	(43.4)	--	--	48	(19.4)	--	--	26	(20.0)		
comparison between surveys*		N/A				N/A				N/A					
There is a reduced presence of escorts, parents and guardians in the operatory room.	SA/A	--	--	161	(91.0)	--	--	204	(82.9)	--	--	105	(81.4)	N/A	0.107
	N	--	--	7	(4.0)	--	--	16	(6.5)	--	--	11	(8.5)		
	D/SD	--	--	9	(5.1)	--	--	26	(10.6)	--	--	13	(10.1)		
comparison between surveys*		N/A				N/A				N/A					
Media and news coverage related to COVID-19 is stressful.	SA/A	199	(80.9)	--	--	268	(74.9)	--	--	210	(78.1)	--	--	0.316	N/A
	N	30	(12.2)	--	--	57	(15.9)	--	--	43	(16.0)	--	--		
	D/SD	17	(6.9)	--	--	33	(9.2)	--	--	16	(5.9)	--	--		
comparison between surveys*		N/A				N/A				N/A					

## Appendix 1 - RTW Surveys

### Appendix 1 Table 4. Workplace Preparedness for Returning to Work

□ survey 1 question, ■ Survey 2 question, □ Survey 1 and 2 question. \*Comparisons made using Chi-square analysis (or Fisher's exact test when more than 20) of cells contained expected frequencies of less than 5) for between professions comparisons; McNemar's test for comparisons between surveys; all statistical tests were two-tailed. Significant results indicated in red font.

Survey Question		Dentist				RDA				RDH				comparison between professions*	
		Survey 1 (N=246)		Survey 2 (N=182)		Survey 1 (N=363)		Survey 2 (N=253)		Survey 1 (N=270)		Survey 2 (N=135)		Survey 1	Survey 2
		n	%	n	%	n	%	n	%	n	%	n	%		
Return to Work Guidelines for the Oral Health Professions of Nova Scotia are/have been helpful in guiding return to practice.	SA/A	226	(91.9)	173	(96.1)	276	(76.5)	210	(84.0)	214	(79.6)	116	(87.2)	<b>&lt;0.001</b>	<b>0.003</b>
	N	12	(4.9)	7	(3.9)	54	(15.0)	32	(12.8)	31	(11.5)	14	(10.5)		
	D/SD	8	(3.3)	0	(0.0)	31	(8.6)	8	(3.2)	24	(8.9)	3	(2.3)		
comparison between surveys*		<b>0.043</b>				<b>0.016</b>				<b>0.037</b>					
My workplace has developed its site-specific reopening plan based on the Emergency and Urgent Care "Return to Work Guidelines for the Oral Health Professions of Nova Scotia".	SA/A	234	(96.7)	--	--	296	(84.3)	--	--	222	(85.1)	--	--	<b>&lt;0.001</b>	N/A
	N	8	(3.3)	--	--	31	(8.8)	--	--	26	(10.0)	--	--		
	D/SD	0	(0.0)	--	--	24	(6.8)	--	--	13	(5.0)	--	--		
comparison between surveys*		N/A				N/A				N/A					
Protocols and guidelines for screening and managing suspected/confirmed COVID-19 patients have been developed at my workplace.	SA/A	239	(98.0)	176	(97.2)	330	(92.7)	235	(94.0)	233	(90.0)	129	(97.0)	<b>0.002</b>	0.282
	N	3	(1.2)	3	(1.7)	8	(2.2)	6	(2.4)	14	(5.4)	3	(2.3)		
	D/SD	2	(0.8)	2	(1.1)	18	(5.1)	9	(3.6)	12	(4.6)	1	(0.8)		
comparison between surveys*		0.891				0.691				<b>0.039</b>					
The initial preparation at my workplace was enough to prevent the spread of COVID-19.	SA/A	--	--	145	(81.0)	--	--	155	(61.8)	--	--	85	(65.4)	N/A	<b>&lt;0.001</b>
	N	--	--	25	(14.0)	--	--	75	(29.9)	--	--	27	(20.8)		
	D/SD	--	--	9	(5.0)	--	--	21	(8.4)	--	--	18	(13.8)		
comparison between surveys*		N/A				N/A				N/A					
Before scheduling appointments in my workplace, patients are pre-screened using remote communications for COVID-19 symptoms, risk factors, underlying medical risk factors and the nature of the chief complaint.	SA/A	--	--	178	(98.3)	--	--	237	(95.6)	--	--	124	(93.9)	N/A	0.262
	N	--	--	2	(1.1)	--	--	6	(2.4)	--	--	3	(2.3)		
	D/SD	--	--	1	(0.6)	--	--	5	(2.0)	--	--	5	(3.8)		
comparison between surveys*		N/A				N/A				N/A					
Before allowing patients entry into the clinic, staff rescreen them for COVID-19 symptoms, risk factors, underlying medical risk factors and the nature of the chief complaint.	SA/A	--	--	175	(97.2)	--	--	228	(91.2)	--	--	117	(89.3)	N/A	0.075
	N	--	--	2	(1.1)	--	--	9	(3.6)	--	--	6	(4.6)		
	D/SD	--	--	3	(1.7)	--	--	13	(5.2)	--	--	8	(6.1)		
comparison between surveys*		N/A				N/A				N/A					

## Appendix 1 - RTW Surveys

### Appendix 1 Table 5. Individual Preparedness for Returning to Work

□ survey 1 question, ■ Survey 2 question, □ Survey 1 and 2 question. \*Comparisons made using Chi-square analysis (or Fisher's exact test when more than 20) of cells contained expected frequencies of less than 5) for between professions comparisons; McNemar's test for comparisons between surveys; all statistical tests were two-tailed. Significant results indicated in red font.

Survey Question		Dentist				RDA				RDH				comparison between professions*	
		Survey 1 (N=246)		Survey 2 (N=182)		Survey 1 (N=363)		Survey 2 (N=253)		Survey 1 (N=270)		Survey 2 (N=135)		Survey 1	Survey 2
		n	%	n	%	n	%	n	%	n	%	n	%		
I am comfortable with my understanding of COVID-19 symptoms and risk factors.	SA/A	243	(99.2)	178	(98.3)	328	(90.9)	228	(90.1)	248	(91.9)	124	(93.2)	<0.001	0.007
	N	2	(0.8)	1	(0.6)	17	(4.7)	17	(6.7)	15	(5.6)	4	(3.0)		
	D/SD	0	(0.0)	2	(1.1)	16	(4.4)	8	(3.2)	7	(2.6)	5	(3.8)		
comparison between surveys*		0.244				0.426				0.438					
I am comfortable with the education and training I have received on COVID-19 safety and infection control protocols.	SA/A	231	(93.9)	175	(96.7)	246	(69.1)	200	(79.1)	181	(69.3)	112	(84.8)	<0.001	<0.001
	N	9	(3.7)	4	(2.2)	61	(17.1)	34	(13.4)	46	(17.6)	10	(7.6)		
	D/SD	6	(2.4)	2	(1.1)	49	(13.8)	19	(7.5)	34	(13.0)	10	(7.6)		
comparison between surveys*		0.408				0.014				0.003					
I am comfortable with my understanding of safety and infection control protocols.	SA/A	242	98.8)	179	(98.9)	316	(87.3)	232	(92.1)	235	(87.7)	124	(92.5)	<0.001	0.027
	N	1	(0.4)	0	(0.0)	27	(7.5)	11	(4.4)	18	(6.7)	5	(3.7)		
	D/SD	2	(0.8)	2	(1.1)	19	(5.2)	9	(3.6)	15	(5.6)	5	(3.7)		
comparison between surveys*		0.660				0.166				0.324					
I have the skills I need to effectively treat patients during the COVID-19 pandemic.	SA/A	239	(98.0)	169	(93.4)	285	(80.5)	211	(84.1)	209	(79.5)	111	(84.1)	<0.001	0.033
	N	3	(1.2)	9	(5.0)	55	(15.5)	34	(13.5)	38	(14.4)	16	(12.1)		
	D/SD	2	(0.8)	3	(1.7)	14	(4.0)	6	(2.4)	16	(6.1)	5	(3.8)		
comparison between surveys*		0.050				0.425				0.484					
I will get a vaccine to protect against COVID-19 when one becomes available.	SA/A	216	(89.3)	163	(90.6)	284	(79.1)	196	(78.1)	228	(85.1)	109	(81.3)	0.009	0.01
	N	14	(5.8)	11	(6.1)	53	(14.8)	44	(17.5)	28	(10.4)	21	(15.7)		
	D/SD	12	(5.0)	6	(3.3)	22	(6.1)	11	(4.4)	12	(4.5)	4	(3.0)		
comparison between surveys*		0.713				0.458				0.266					

## Appendix 1 - RTW Surveys

### Appendix 1 Table 6. Financial Concerns About Practicing During COVID-19 Pandemic

□ survey 1 question, ■ Survey 2 question, □ Survey 1 and 2 question. \*Comparisons made using Chi-square analysis (or Fisher's exact test when more than 20) of cells contained expected frequencies of less than 5) for between professions comparisons; McNemar's test for comparisons between surveys; all statistical tests were two-tailed. Significant results indicated in red font.

Survey Question	Dentist				RDA				RDH				comparison between professions		
	Survey 1 (N=246)		Survey 2 (N=182)		Survey 1 (N=363)		Survey 2 (N=253)		Survey 1 (N=270)		Survey 2 (N=135)		Survey 1	Survey 2	
	n	%	n	%	n	%	n	%	n	%	n	%			
The additional cost of enhanced standard precautions when performing aerosol generating procedures influences my choice of PPE	SA/A	--	--	77	(44.0)	--	--	74	(32.7)	--	--	31	(26.5)	N/A	<b>&lt;0.001</b>
	N	--	--	29	(16.6)	--	--	74	(32.7)	--	--	27	(23.1)		
	D/SD	--	--	69	(39.4)	--	--	78	3(4.5)	--	--	59	(50.4)		
comparison between surveys*													NA		
Requirements for enhanced standard precautions when performing aerosol generating procedures will be/has been a significant financial burden to my office/workplace.	SA/A	214	(89.2)	127	(72.2)	203	(60.2)	107	(50.5)	179	(69.6)	71	(63.4)	<b>&lt;0.001</b>	<b>&lt;0.001</b>
	N	22	(9.2)	33	(18.8)	108	(32.0)	79	(37.3)	62	(24.1)	22	(19.6)		
	D/SD	4	(1.7)	16	(9.1)	26	(7.7)	26	(12.3)	16	(6.2)	19	(17.0)		
comparison between surveys*													<b>&lt;0.001</b>		
Requirements for enhanced standard precautions when performing aerosol generating procedures will be/has been a personal financial burden.	SA/A	188	(78.0)	107	(62.9)	62	(20.1)	23	(11.3)	55	(22.3)	7	(6.5)	<b>&lt;0.001</b>	<b>&lt;0.001</b>
	N	27	(11.2)	27	(15.9)	98	(31.8)	54	(26.6)	55	(22.3)	16	(14.8)		
	D/SD	26	(10.8)	36	(21.2)	148	(48.1)	126	(62.1)	137	(55.5)	85	(78.7)		
comparison between surveys*													<b>0.003</b>		
In my workplace, extra costs for enhanced standard precautions when performing aerosol generating procedures have been charged to patients as extra fees.	SA/A	--	--	64	(36.0)	--	--	83	(37.6)	--	--	57	(47.5)	N/A	<b>&lt;0.001</b>
	N	--	--	11	(6.2)	--	--	33	(14.9)	--	--	2	(1.7)		
	D/SD	--	--	103	(57.9)	--	--	105	(47.5)	--	--	61	(50.8)		
comparison between surveys*													NA		
My income has been reduced since returning to work during the COVID-19 pandemic	SA/A	--	--	135	(75.8)	--	--	35	(15.4)	--	--	23	(18.4)	N/A	<b>&lt;0.001</b>
	N	--	--	24	(13.5)	--	--	26	(11.4)	--	--	9	(7.2)		
	D/SD	--	--	19	(10.7)	--	--	167	(73.2)	--	--	93	(74.4)		
comparison between surveys*													NA		



## Appendix 1 - RTW Surveys

### Appendix 1 Table 7. Confidence in IPC and PPE effectiveness & availability

□ survey 1 question, ■ Survey 2 question, □ Survey 1 and 2 question. \*Comparisons made using Chi-square analysis (or Fisher's exact test when more than 20) of cells contained expected frequencies of less than 5) for between professions comparisons; McNemar's test for comparisons between surveys; all statistical tests were two-tailed. Significant results indicated in red font.

Survey Question		Dentist				RDA				RDH				comparison between professions*	
		Survey 1 (N=246)		Survey 2 (N=182)		Survey 1 (N=363)		Survey 2 (N=253)		Survey 1 (N=270)		Survey 2 (N=135)		Survey 1	Survey 2
		n	%	n	%	n	%	n	%	n	%	n	%		
I am confident that the COVID-19 safety and infection control protocols adequately protect oral health care providers.	SA/A	--	--	164	(90.6)	--	--	148	(58.7)	--	--	77	(58.3)	N/A	<0.001
	N	--	--	13	(7.2)	--	--	66	(26.2)	--	--	33	(25.0)		
	D/SD	--	--	4	(2.2)	--	--	38	(15.1)	--	--	22	(16.7)		
comparison between surveys*		N/A				N/A				N/A					
I am confident that the COVID-19 safety and infection control protocols adequately protect patients.	SA/A	--	--	173	(95.6)	--	--	180	(71.7)	--	--	92	(69.7)	N/A	<0.001
	N	--	--	3	(1.7)	--	--	48	(19.1)	--	--	24	(18.2)		
	D/SD	--	--	5	(2.8)	--	--	23	(9.2)	--	--	16	(12.1)		
comparison between surveys*		N/A				N/A				N/A					
There will be an adequate supply of Personal Protective Equipment available to protect me from COVID-19.	SA/A	103	(42.4)	--	--	167	(46.6)	--	--	89	(33.8)	--	--	<0.004	N/A
	N	58	(23.9)	--	--	99	(27.7)	--	--	92	(35.0)	--	--		
	D/SD	82	(33.7)	--	--	92	(25.7)	--	--	82	(31.2)	--	--		
comparison between surveys*		N/A				N/A				N/A					
My preferred PPE items are available to purchase when I need them.	SA/A	--	--	92	(53.5)	--	--	128	(54.5)	--	--	60	(47.2)	N/A	0.175
	N	--	--	24	(14.0)	--	--	44	(18.7)	--	--	31	(24.4)		
	D/SD	--	--	56	(32.6)	--	--	63	(26.8)	--	--	36	(28.3)		
comparison between surveys*		N/A				N/A				N/A					
The availability of certain PPE items influences my choice of PPE.	SA/A	--	--	132	(75.4)	--	--	134	(56.3)	--	--	85	(66.9)	N/A	<0.001
	N	--	--	20	(11.4)	--	--	65	(27.3)	--	--	26	(20.5)		
	D/SD	--	--	23	(13.1)	--	--	39	(16.4)	--	--	16	(12.6)		
comparison between surveys*		N/A				N/A				N/A					

**Appendix 1 Table 8. Infection and Prevention Control (IPC) Protocols and Personal Protective Equipment (PPE) Use Practices**

□ survey 1 question, ■ Survey 2 question, □ Survey 1 and 2 question. \*Comparisons made using Chi-square analysis (or Fisher's exact test when more than 20) of cells contained expected frequencies of less than 5) for between professions comparisons; McNemar's test for comparisons between surveys; all statistical tests were two-tailed. Significant results indicated in red font.

Survey Question		Dentist				RDA				RDH				comparison between professions*	
		Survey 1 (N=246)		Survey 2 (N=182)		Survey 1 (N=363)		Survey 2 (N=253)		Survey 1 (N=270)		Survey 2 (N=135)		Survey 1	Survey 2
		n	%	n	%	n	%	n	%	n	%	n	%		
Before the COVID-19 pandemic, I always wore a mask preoperatively/during a medical history.	SA/A	--	--	49	(27.4)	--	--	85	(34.3)	--	--	22	(16.5)	N/A	<b>&lt;0.001</b>
	N	--	--	10	(5.6)	--	--	23	(9.3)	--	--	3	(2.3)		
	D/SD	--	--	120	(67.0)	--	--	140	(56.5)	--	--	108	(81.2)		
comparison between surveys*		N/A				N/A				N/A					
During the COVID-19 pandemic, I always wear a mask preoperatively/during a medical history.	SA/A	--	--	175	(98.3)	--	--	238	(96.4)	--	--	123	(95.3)	N/A	0.583
	N	--	--	0	(0.0)	--	--	2	(0.8)	--	--	1	(0.8)		
	D/SD	--	--	3	(1.7)	--	--	7	(2.8)	--	--	5	(3.9)		
comparison between surveys*		N/A				N/A				N/A					
Before the COVID-19 pandemic, I knew and strictly followed the procedures for donning protective equipment.	SA/A	--	--	97	(54.5)	--	--	167	(69.3)	--	--	85	(63.9)	N/A	<b>0.036</b>
	N	--	--	31	(17.4)	--	--	30	(12.4)	--	--	16	(12.0)		
	D/SD	--	--	50	(28.1)	--	--	44	(18.3)	--	--	32	(24.1)		
comparison between surveys*		N/A				N/A				N/A					
During the COVID-19 pandemic, I know and strictly follow the procedures for donning protective equipment.	SA/A	--	--	174	(98.3)	--	--	236	(96.3)	--	--	130	(98.5)	N/A	0.484
	N	--	--	2	(1.1)	--	--	5	(2.0)	--	--	2	(1.5)		
	D/SD	--	--	1	(0.6)	--	--	4	(1.6)	--	--	0	(0.0)		
comparison between surveys*		N/A				N/A				N/A					
Before the COVID-19 pandemic, I knew and strictly followed the procedures for doffing protective equipment.	SA/A	--	--	99	(55.6)	--	--	160	(66.7)	--	--	90	(67.7)	N/A	<b>0.011</b>
	N	--	--	28	(15.7)	--	--	39	(16.3)	--	--	11	(8.3)		
	D/SD	--	--	51	(28.7)	--	--	41	(17.1)	--	--	32	(24.1)		
comparison between surveys*		N/A				N/A				N/A					
During the COVID-19 pandemic, I know and strictly follow the procedures for doffing protective equipment.	SA/A	--	--	175	(98.3)	--	--	236	(95.9)	--	--	127	(96.9)	N/A	0.683
	N	--	--	2	(1.1)	--	--	6	(2.4)	--	--	3	(2.3)		
	D/SD	--	--	1	(0.6)	--	--	4	(1.6)	--	--	1	(0.8)		
comparison between surveys*		N/A				N/A				N/A					
During the COVID-19 pandemic, my coworkers appear to know the correct PPE to wear and strictly follow the procedures for donning and doffing protective equipment.	SA/A	--	--	176	(98.3)	--	--	211	(84.7)	--	--	101	(78.3)	N/A	<b>&lt;0.001</b>
	N	--	--	1	(0.6)	--	--	19	(7.6)	--	--	13	(10.1)		
	D/SD	--	--	2	(1.1)	--	--	19	(7.6)	--	--	15	(11.6)		
comparison between surveys*		N/A				N/A				N/A					

## Appendix 1 - RTW Surveys

Survey Question		Dentist				RDA				RDH				comparison between professions*	
		Survey 1 (N=246)		Survey 2 (N=182)		Survey 1 (N=363)		Survey 2 (N=253)		Survey 1 (N=270)		Survey 2 (N=135)		Survey 1	Survey 2
		n	%	n	%	n	%	n	%	n	%	n	%		
I observe a settling time after aerosol generating procedures before disinfection of the operatory.	S/A	--	--	32	(18.4)	--	--	55	(22.5)	--	--	19	(15.1)	N/A	0.395
	N	--	--	26	(14.9)	--	--	40	(16.4)	--	--	18	(14.3)		
	D/SD	--	--	116	(66.7)	--	--	149	(61.1)	--	--	89	(70.6)		
comparison between surveys*		N/A				N/A				N/A					
I perform aerosol generating procedures only in enclosed operatories.	S/A	--	--	55	(31.4)	--	--	63	(26.0)	--	--	35	(29.4)	N/A	0.131
	N	--	--	7	(4.0)	--	--	24	(9.9)	--	--	13	(10.9)		
	D/SD	--	--	113	(64.6)	--	--	155	(64.0)	--	--	71	(59.7)		
comparison between surveys*		N/A				N/A				N/A					

Appendix 1 Table 9– Return to Work Survey Studies Compared

First Author Pub Date Location(s)	Sample N= Participants (%)	Survey Date Survey Extent	Subject Domains Queried
<b>Ahmadi</b> <b>03-12-20</b> <b>Iran</b>	N= 240 dentists (89.2) general (10.8) specialist	10-25 Jun 20 51 questions	demographics, awareness, trust and implementation of pandemic IPC protocols, availability/cost of PPE, personal financial impact, effects on personal life and financial status, attitudes/views on changes to practice management, services provided, quality of dental care for patients, continuation of dental care during pandemic, anxiety
<b>Ahmed, M.</b> <b>19-04-20</b> <b>multinational</b> <b>30</b> <b>countries</b>	N= 650 dentists	10-17 Mar 20 22 questions	anxiety of being infected and infecting family, awareness and implementation of CDC or WHO IPC COVID-19 guidelines. Specific IPC/PPE practices not investigated.
<b>Ahmed, N.</b> <b>05-20</b> <b>Pakistan</b>	N= 810 (49) dentists (27) physicians (24) techs, DHs, nurses, DAs	Feb-Mar 20 31 questions	demographic, knowledge of COVID-19, awareness and implementation of CDC guidelines, general IPC practices (not specific to dentistry) during "patient contact", training attendance.
<b>Al-Khalifa</b> <b>19-08-20</b> <b>Saudi</b> <b>Arabia</b>	N= 287 dentists (61.7) general (38.3) specialist	23-31 May 20 26 questions	demographics, adherence to Ministry of Health guidelines, perception of the COVID-19 pandemic, confidence in IPC measures, IPC/PPE practices before and after pandemic, preparedness and training/COVID-19 education received.
<b>Almas</b> <b>07-12-20</b> <b>Pakistan</b>	N= 343 dentists (58.6) specialist (41.4) general	Apr-May 20 22 questions	demographics, IPC measures practiced, patient screening and management, comfort treating COVID-free patients and COVID-19 positive patients, following CDC, WHO and ADA clinical guidelines, attending COVID-19 seminar, financial impacts
<b>Bakaeen</b> <b>30-09-20</b> <b>multinational</b> <b>49</b> <b>countries</b>	N= 1251 dentists (63.9) general (36.1) specialist	28 Mar- 10 Apr 20 25 questions	demographics, comfort with preventive measures and provision of treatment, understanding of benefits and use of N95 respirators, PPE availability, attitudes toward treating COVID-19 positive or suspect, patients, affect outbreak had on the workplace, financial impacts.
<b>Bellini</b> <b>22-09-20</b> <b>Italy</b>	N=1109 dentists	2-29 Apr 20 40 questions	demographics, pre- and post-pandemic PPE use and availability, pre- and post-pandemic IPC practices, staff training, Dental Association usefulness as information source, risk perceptions, anxiety
<b>Bontà</b> <b>31-10-20</b> <b>Italy</b>	N= 2788 dental hygienists	12-23 May 20 18 questions	demographics, IPC measures (before patient arrival, in waiting room, in operatory) and PPE used, COVID-19 course received, risk perceptions
<b>Cagetti</b> <b>01-06-20</b> <b>Italy</b>	N= 3599 dentists	10-17 Apr 20 17 questions	demographics, IPC measures (before patient arrival, in waiting room, in operatory) and PPE used, COVID-19 course received, risk perceptions

## Appendix 1 - RTW Surveys

First Author Pub Date Location(s)	Sample N= Participants (%)	Survey Date Survey Extent	Subject Domains Queried
<b>Chaudhary</b> <b>23-07-20</b> <b>Pakistan</b>	N= 583 clinical: dentists, DAs/DHs non-clinical: dental lab technician, cleaners, admin.	Mar-Jun 20 40 questions	demographic, risk of exposure and fear of getting infected, concerns about colleagues, risk to and perceptions of family/friends, being avoided because of the job, anxiety, workplace preparedness, IPC training received. Data shown for clinical and non-clinical groups separately and together. Data for clinicians combined, not available by profession.
<b>Consolo</b> <b>15-05-20</b> <b>Italy</b>	N= 356 dentists	2-21 Apr 20 40 questions	Generalized Anxiety Disorder-7 test (GAD-7), risk of COVID-19 infection, PPE/IPC practices pre-and post-lockdown, usefulness of professional associations for information, guidance and economic relief, training sessions in workplace, risk perceptions
<b>De Stefani</b> <b>08-05-20</b> <b>Italy</b>	N= 1500 dentists (83.8) other (16.2) orthodontist	11-18 Apr 20 29 questions	demographics, knowledge about COVID-19 infection transmission modalities and symptoms, comfort treating potentially infected patients, individual training and preparedness, information sources, risk perception
<b>Duruk</b> <b>13-05-20</b> <b>Turkey</b>	N= 1958 dentists (65) general (35) specialist	16-20 Mar 20 23 questions	demographics, risk perception for operators and family, PPE/IPC practices, information sources (Ministry of Health, professional organizations, social media), COVID-19 info. session attendance.
<b>Gambarini</b> <b>01-06-20</b> <b>Italy</b>	N= 500 dentists	Apr 20 8 questions	demographics, risk to operators and patients, risk of aerosol transmission, modification of treatment and procedure protocols
<b>Kamate</b> <b>31-03-20</b> <b>multinational</b>	N= 860 dentists	25 Dec 19- 20 Feb 20 24 questions	demographics, information sources, knowledge, risk perception, informing staff of WHO guidelines, general adoption of IPC protocols
<b>Martina</b> <b>18-06-20</b> <b>Italy</b>	N= 349 dentists (52.4) ortho. (47.6) other	1-6 May 20 31 questions	demographics, COVID-19 symptoms, perceived risk for operators during ortho procedures, care interruption for orthodontic and TMD patients, anxiety, fears of infection affecting health, family, income, social isolation and continuity of treatment
<b>Martinho</b> <b>12-10-20</b> <b>(pre-print)</b> <b>USA</b>	N= 454 endodontists	Jun-Jul 20 24 questions	demographics, COVID-19 knowledge, IPC/PPE practices, IPC/PPE effectiveness, perceived risks to operators, risk perception for operators, staff and family, patient hesitancy, treatments performed
<b>Mustafa</b> <b>03-12-20</b> <b>Saudi</b> <b>Arabia</b>	N= 269 dentists	17 Mar- 3 Apr 20 26 questions	demographics, IPC training attended, COVID-19 symptom knowledge, attitude, risk perception, IPC measures, comfort managing COVID-19 positive patients and Ministry of Health dental public health policy support. Specific PPE practices not investigated.

## Appendix 1 - RTW Surveys

<b>First Author Pub Date Location(s)</b>	<b>Sample N= Participants (%)</b>	<b>Survey Date Survey Extent</b>	<b>Subject Domains Queried</b>
<b>Sarfaraz 25-07-20 multinational 23 countries</b>	N= 385 dentists	14-20 May 20 17 questions	demographics, knowledge of disinfection of surfaces and hands, risk perception during dentistry, effectiveness of disinfection guidelines. Specific PPE practices not investigated.
<b>Singh Gambhir 06-05-20 India</b>	N= 215 dentists private	Mar 20 19 questions	demographics, personal and clinic hygiene practices, knowledge/awareness of COVID-19 symptoms and transmission, medical treatment, and IPC/PPE guidelines. Specific PPE practices not investigated.
<b>Sinjari 10-08-20 Italy</b>	N= 440 dentists	17 Apr 20 45 questions	types of urgencies, treatments performed, IPC/PPE practices before & during pandemic, PPE costs, risk perception for infection, financial concerns, support by health and professional membership organizations
<b>Stangvaltaite-Mouhat 12-08-20 Norway</b>	N= 1237 OHCPs (48) general & specialist dentists (19) DHs (33) DAs	4 May- 26 Jun 20 Extent varied according to clinic policy.	demographics, practice management, additional IPC/PPE practices and training received, perception of risk and workplace preparation, COVID-19 information availability and sources, psychological impact. Responses grouped according to participants' clinic policy for accepting or not accepting COVID-19 positive patients for treatment.
<b>Tysi�c- Mi�sta 30-06-20 Poland</b>	N= 875 dentists	6-16 Apr 20 Extent unspecified	demographics, continuation or suspension of dental practice during pandemic, (e.g., access to PPE and special equipment, adaptability of office structure to design requirements), risk perception, anxiety, assistance by Polish Ministry of Health and Polish Dental Association
<b>Vieira- Meyer 10-09-20 Brazil</b>	N= 4048 dentists (28.8) general (71.2) specialist	29 Mar- 4 Apr 20 15 questions	demographics, COVID-19 knowledge, confidence in IPC/PPE protocol effectiveness, continuation or suspension of dental practice during pandemic. Specific IPC and PPE practices not investigated.

## Appendix 2 – Literature Concepts and Search Terms

Concept	MeSH Terms	Keywords
Aerosols	aerosols	"air microbiology" OR "occupational exposure" OR "air pollution, indoor" OR "cross infection" OR "equipment contamination" OR splatter
AGP (Aerosol-generating procedure)	Nil	"aerosol generating procedure" OR "aerosol producing procedure" OR "aerosol-generating procedure" OR "aerosol-producing procedure" OR "aerosol-generating" OR "aerosol-producing" OR "aerosol generating" OR "aerosol producing"
PPE (personal protective equipment)	"Personal Protective Equipment" M OR "Analytical, Diagnostic and Therapeutic Technique* and Equipment Category"	"prevention and control" OR option* OR "Bacteria/*isolation & purification"
Mask	mask* OR "Personal Protective Equipment" OR "Surgical Attire" OR "Surgical Equipment" OR "protective device*"	("surgical mask*" OR "Cross Infection/prevention & control/transmission" OR "medical mask*" OR "Respiratory Protective Device*/standard*/statistic* & numerical data"
N95 respirator	"Respiratory Protective Device*"	"N95 respirator*" OR "Air-Purifying Respirator*" OR "air filter**" OR filter* OR "Respiratory Protective Device*/*standard*/statistic* & numerical data" OR "N95 mask*"
Face Shield	Nil	"face shield*"
Infection Control	"infection control" OR "Communicable Disease Control"	"Cross Infection/prevention & control/transmission" OR "Occupational Diseases/prevention & control"
Occupational Diseases	"Occupational Diseases / prevention & control" OR "Occupational Diseases / psychology"	nil
Perceived Risk	"Risk assessment" OR attitude OR perception	"risk perception" OR "personal risk" OR opinion OR comfort
Cross Infection Psychology	"Cross Infection / psychology" OR "Health Knowledge, Attitudes, Practice"	nil

## Appendix 2 – Literature Concepts and Search Terms

Concept	MeSH Terms	Keywords
Disease Transmission	""Disease Transmission, Infectious"" OR ""Infectious Disease Transmission, Patient-to-Professional"" OR ""Infectious Disease Transmission, Professional-to-Patient"" OR transmission ""Disease Transmission, Infectious"" OR ""Infectious Disease Transmission, Patient-to-Professional"" OR "Infectious Disease Transmission, Professional-to-Patient"" "	transmission
Infectious Diseases	"Disease Transmission, Infectious" OR "Communicable Diseases" OR "Communicable Diseases, Emerging" OR "Occupational Disease*"	"occupational illness*"
Infectious Respiratory Diseases	"Respiratory Tract Infection*" OR "Influenza, Human " OR "Influenza, Human/diagnosis" OR "Virus Diseases" OR "Virus Diseases, transmission"	nil
Coronavirus	""Coronavirus infections" OR influenza OR ""Coronavirus" OR ""Virus Diseases" OR "Virus Diseases, transmission" OR ""Influenza, Human"" OR ""Respiratory Tract Infections"" OR ""Influenza, Human/diagnosis"" OR ""SARS Virus"" OR ""Severe Acute Respiratory Syndrome"" "	
COVID-19	COVID-19 OR "severe acute respiratory syndrome coronavirus 2" AND 2019/12/1 : 2030/12/31[Date - Publication] OR	SARS-CoV-2 OR Virus OR "viral infection" OR influenza OR Covid-19 OR "2019 ncov" OR "sars cov 2" OR "wuhan"
Asymptomatic Infections	Asymptomatic Infections / epidemiology* OR Coronavirus Infections / epidemiology* OR Coronavirus Infections / pathology OR asymptomatic OR carrier OR "asymptomatic carrier" OR transmission OR "asymptomatic transmission" OR "presymptomatic transmission"	



## Appendix 2 – Literature Concepts and Search Terms

Concept	MeSH Terms	Keywords
HCP (Health care provider)	"health personnel" OR "dental staff" OR dentists OR nurses OR physicians OR "Allied Health Personnel" OR "Dental Assistants" OR "Dental Hygienists" OR "Dental Technicians" OR Denturists	"Healthcare Worker*" OR "health care provider*"
HCW (Health Care Workplace)	"health occupation" OR "dental office*" OR	"health care workplace" OR "health care setting*" OR "dental practice"
Dentistry	"Stomatognathic Diseases" OR "Dentistry" OR "Oral Health" OR "Dental Facilities" OR	((dentist* OR endodont* OR orthodonti* OR periodont* OR prosthodont*) OR (apicoectom* OR gingivectom* OR gingivoplast* OR glossectom* OR "mandibular advancement" OR alveolectom* OR alveoloplast* OR vestibuloplast* OR "root canal") OR (oral OR oropharyng* OR temporomandibular OR TMJ OR jaw OR jaws OR mandibular OR maxillofacial OR mandible* OR maxilla* OR "alveolar ridge" OR dental OR orthognathic OR tooth OR teeth OR occlusion OR malocclusion OR mal-occlusion OR odontolog* OR tongue* OR glossal OR buccal OR palatal OR palate OR palates OR labial OR lip OR lips OR gingiva* OR gingiviti*))))
Evaluation	nil	"Outcome Assessment, Health Care" OR evaluation OR comparison OR "Occupational Exposure/prevention & control/statistics & numerical data" OR option* OR effectiveness OR "Air Microbiology" "Air Pollution, Indoor" OR "Occupational Exposure"
Survey	"Surveys and Questionnaires"	Survey* OR questionnaire*

## Appendix 3 - Bibliography NS COVID-19 Health Research Coalition Literature Collection

### Appendix 3.1. Systematic Reviews related to COVID19 transmission, IPC/PPE, and dentistry

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10. Burton MJ, Clarkson JE, Goulao B, Glenny A-M, McBain AJ, Schilder AG, et al. Antimicrobial mouthwashes (gargling) and nasal sprays to protect healthcare workers when undertaking aerosol-generating procedures (AGPs) on patients without suspected or confirmed COVID-19 infection. *Cochrane Database of Systematic Reviews* [Internet]. 2020 [cited 2020 Jun 25];(5). Available from: <https://www-cochranelibrary-com.myaccess.library.utoronto.ca/cdsr/doi/10.1002/14651858.CD013628/full>
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## Appendix 3 - Bibliography NS COVID-19 Health Research Coalition Literature Collection

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### Appendix 3.4. Articles related to HCWs' or OHCPs' perceived risk of contracting COVID-19 at work during COVID-19 pandemic

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# Appendix 4 - Phase 2 Return to Work Oral Health Teaching Clinics' Protocols Summary

Return to Work Protocols	University A	University B	University C	University D
<b>Phase or Stage</b>	<b>Phase 2</b>	<b>[Not specified]</b>	<b>Phase 2</b>	<b>Phase 2</b>
<b>Type of oral health care allowed</b>	Oral care has expanded from emergent and urgent treatment to include non-essential treatment.	Urgent or emergency care only for high risk patients, defer all other care. Refer if unable to meet ACH, room and PPE requirements.  Routine dental care and urgent or emergency dental care for low risk patients.	Only dental emergencies/urgencies and essential care as defined by the [provincial regulator] will be attended to in our clinics. ONLY COVID Negative Screened Patients to be seen in [University C] Urgent Care [Dental Clinic].	Non-urgent dental treatment is not to be performed during Phase 2. If... It is determined that the patient has no more than one of the COVID-19 symptoms and none of the risk factors, and they fall into a treatment category that is <b>emergent or urgent</b> , the patient can be treated. People with COVID-19 who have ended home isolation can receive <b>emergency and urgent dental care</b> .
<b>Pre-screening Protocol</b>	Prior to booking an appointment, the patient must be screened for COVID-19 risk by using the Patient Screening and Consent Form. When the patient arrives for their appointment, their pre-screening responses must be confirmed and recorded in their record. Once arrived, have patient proceed to designated Temperature Screening Station. If the patient has symptoms of COVID-19 and may be infective, in-person assessment and treatment must be deferred or alternatively provide care by virtual means. If the patient is COVID-positive, treatment should be provided in a hospital or tertiary care facility.	Telephone protocols that systematically screen potential/existing patients for presence of, or risk for COVID-19. Patient triage protocols that ensure only symptom and risk-factor free patients are admitted into the dental clinic. 7-question screening criteria [provided] administered 24 hrs ahead of appt.	Phone screening will be done using the most current version of the [provincial public health authority] COVID 19 screening tool. Pre-op: record vitals	All patients will be screened for COVID-19 symptoms and risk factors over the phone. Confirm screening questions at door. Legal guardian should also be screened.
<b>Management of Immunocompromised patients and patients with co-morbidities</b>	Patients considered high risk for severe COVID-19 include those with pre-existing conditions ... should be deferred whenever possible.	[Not specified]	Patients who are determined over the phone to be unsuitable for care in our clinics due to extreme complexity, life threatening comorbidities (ASA 4) or infections with suspected sepsis or spreading to involve dangerous anatomical spaces will be directly referred to the OMFS resident on call.	[not specified]
<b>PPE &amp; operatory Requirements</b>				
<b>High Risk Patient - Definition</b>	[not specified]	[P] answers 'YES' to ANY of the screening questions.]	patient who is screened to be potentially positive, patients who screen positive for COVID 19	Patient responding YES to two or more of the COVID-19 symptoms or to any of the COVID-19 risk factors.
<b>Operatory HIGH RISK PATIENTS</b>	[not specified]	[No high risk patients accepted for treatment.]	[patients potentially positive or positive for COVID-19 not accepted for treatment]	[No high risk patients accepted for treatment.]
<b>PPE HIGH RISK PATIENTS</b>	[not specified]	[No high risk patients accepted for treatment.]	[patients potentially positive or positive for COVID-19 not accepted for treatment]	[No high risk patients accepted for treatment.]
<b>Low Risk Patient - Definition</b>	[not specified]	P] answered 'NO' to all screening questions; P] who recovered from COVID-19 infection [defined]	[COVID negative screened patients]	Patient answering NO to all the pre-screening questions or responds yes to only one of the COVID-19 symptoms. People with COVID-19 who have ended home isolation.
<b>Operatory LOW RISK PATIENTS</b>	Unnecessary equipment and items must be removed from the operatory. Countertops and touched surfaces should be clear to enable covering with barriers and/or thorough cleaning and disinfection	• Monitoring and management of the number of room Air Exchanges per Hour (AEH) for all clinical treatment areas • Addition, as needed, of HEPA filters/vacuums to ensure adequate hourly air exchange  • Non-AGPs performed in 32 designated chairs with patient placement arranged so as to maintain a staggered, every-second operatory distribution.  • AGPs performed in 16 designated dental operatories. All AGP operatories will be enclosed, will exchange the air at least 6 times per hour, and portable NOMAD X-ray units will be available for occasional use. • Specific air-handling systems added to all AGP operatories	AGPs: isolation rooms  Low risk procedures [non-AGPs]: regular operatory	Remove all non-essential items for direct patient care.
<b>Cleaning, disinfection of operatories</b>	Room preparation: Clean and disinfect the room and equipment according to the [University A] Infection Prevention & Control protocol. Record time dental treatment is completed. Disinfect the room after 30 minutes.	• Students must wear non-aerosol PPE during cleaning. • Operatory cleaning must be checked and approved by a Registered Dental Assistant. An Operatory Cleaning Log Sheet will be posted outside the operatory. <b>Non-AGPs:</b> • Operatories will be cleaned by students immediately after patient dismissal. • All surfaces should be disinfected according to regular college procedures in addition, walls must be disinfected using the disinfecting Optim 33B wipes. <b>AGPs:</b> • Operatories will be in quarantine for a period of time specific to the air exchange rate in the operatory (2-hour max) to allow aerosol to settle before cleaning. A quarantine sign specifying when the operatory will be safe to enter must be placed on the operatory door. • 2 cleaning times/day o All surfaces should be disinfected according to normal College of Dentistry procedures. And, if a disinfection spraying or fogging system is not available, walls must be disinfected using the disinfecting Optim 33B wipes.	PPE: • ASTM Level 2 - 3 mask • Eye protection • Gown/lab coat • Scrubs and dedicated footwear • Heavy duty gloves  Operatories must not be re-entered for disinfection for 15 minutes following the [AGP] procedure. DAs must wait 15 minutes after AGPs to enter ops.	[regulator] not recommending observing "settling times" based on air changes per hour (ACH) at present.  PPE after NAGP: Surgical mask (ASTM I, II or III) Eye/face protection Protective clothing (e.g. scrubs) Gloves  PPE after AGP: Surgical mask (ASTM I, II or III) Eye/face protection Gown/lab coat Gloves
<b>PPE LOW RISK PATIENTS</b>	[not specified, standard precautions recommended by provincial regulator]	<b>[PPE level based on activity risk, not patient risk.]</b>  <b>Non-AGPs:</b> Student operator and chair-side assistant are required to wear the following PPE during all times: • Clean set of scrubs for each appointment • Nitrile Gloves • Level 3 surgical mask • Eye protection (goggles), safety glasses or prescription glasses o Alternatively, a surgical mask with face-shield can be worn • Disposable long lab coat Donning and doffing location will be performed in the operatory  <b>AGPs:</b> • Clean set of scrubs for each appointment • Two (2) sets of Nitrile Gloves • NIOSH approved N95 (or KN95) respirator mask o Mask must be fit tested o No facial hair is allowed • Safety glasses or prescription glasses, no loupes allowed • Face-shield • Disposable long lab coat • Bonnet	<b>Non-AGPs:</b> • ASTM Level 2 or 3 mask • Eye protection OR face shield • Gown or lab coat • Gloves • Scrubs and dedicated footwear  <b>AGPs:</b> • Fit tested and seal checked N95 mask (or Health Canada Approved equivalent) OR ASTM level 3 Mask • Eye protection and/or Face shield • Surgical Cap/Bouffant • Isolation Gown • Gloves • Scrubs and dedicated footwear	<b>Non-AGPs:</b> Surgical mask ASTM I, II or III Eye/face protection Protective clothing (e.g. scrubs) Gloves  <b>AGPs:</b> Fit-tested N95 respirator or alternative Eye/face protection Gown/lab coat Gloves
<b>General PPE</b>	Conserve PPE through its judicious use. Where there is low incidence and prevalence of COVID-19, additional PPE over and above that required for normal precautions is not required.	<b>NAGPs:</b> Donning and doffing location will be performed in the operatory  <b>AGPs:</b> PPE donning will be performed in a separate designated area. Doffing starts inside the enclosed dental operatory [and completed] in a separate designated doffing area outside the operatory.	Door greeter/triage: • Level 1-3 mask • Eye protection • Gown/lab coat • Scrubs • Gloves  Non patient care areas, staff & visitors: Provide level 1-3 mask and/or maintain spatial distance of at least 2m	A full sleeve lab coat with elasticized cuffs can serve as a gown.
<b>Management of scrubs, gowns</b>	Change into separate set of street clothes and footwear before leaving work. Work clothing (e.g., scrubs) should be placed in a bag and laundered after every shift.		No clothing worn for patient care (scrubs) can be worn home including shoes. o Footwear that is smooth and impermeable such as OR Crocks that allow surface disinfection prior to removal are preferable.	• Different laundry bins for scrubs and lab coats should exist. • Scrubs should stay in the clinic and not be taken home by the staff. • Scrubs and gowns may be laundered on site. • PPE for laundering garments should include: o Gloves, disposable apron • When laundry services are not available (DHSC et al. 2020): o Scrubs and lab coats should be laundered separately from household linen. o The load should not exceed HALF of the machine capacity. o Scrubs and lab coats should be washed with the maximum temperature tolerated by the fabric.

# Appendix 4 - Phase 2 Return to Work Oral Health Teaching Clinics' Protocols Summary

<b>Management of aerosols</b>				
<b>Treatment Strategy</b>	Use of aerosol generating instruments MUST be kept to a minimum.		Follow protocols as established by the RCDSO for avoidance AGPs	Not performing AGPs whenever possible. Attempt to minimize the generation of aerosols.
<b>Treatment Protocols</b>	High-volume suction must be used to reduce aerosols at source. A rubber dam should be used whenever possible, with high-volume suction in procedures where the creation of droplets, splatter and spray may occur.	<b>AGPs:</b> Rubber dam with rubber dam sealer must be used in every possible procedure *The use of high-volume suction is required as aerosols are being produced, and a second high-volume dental evacuation suction will be activated for the entire duration of the dental appointment.	<ul style="list-style-type: none"> <li>o Rubber dam</li> <li>o HV suction</li> <li>o Gauze sponges to manage bleeding and secretions</li> </ul>	<ul style="list-style-type: none"> <li>o Rubber dam (whenever possible);</li> <li>o High volume suction;</li> <li>o 4-handed dentistry</li> </ul>
<b>Pre-operative mouth rinses</b>	The [regulator] states that the literature does not yet provide sufficient evidence to support a guideline for the use of a pre-procedural rinse as an efficacious means of reducing COVID-19 viral load in aerosols. OHCs may choose to offer such procedures but are encouraged to align their practices with evidence-informed guidelines related to COVID-19. Our clinic uses 1.5% hydrogen peroxide as a preprocedural rinse.	All patients rinse for 60 sec with 1% peroxide-based mouth rinse at start of all appts.	rinse with 15ml of 1% H2O2 for 30 seconds before AGPs	1% H2O2 rinse (timed 30 seconds)
<b>Patient appointments</b>	Urgent Care Clinic COVID-19 Protocol, DMD and Geriatric Programs: Allow extra time for appointments since an examination and x-rays have to be performed, not just treatment. Schedule appointments as EARLY as possible.	Be generous with appointment times to allow careful, unrushed attention to IPC procedures.	Appointments will be kept as short as possible to reduce exposure time	[not specified]
<b>Staff protocol (screen for COVID-19 symptoms)</b>	Must not provide in-person care and should not be in attendance at clinics or other practice settings where other staff and patients are present if they are exhibiting signs of COVID-19 or respiratory illness, including cough, runny nose or fever.	Student, staff and faculty screening protocols to ensure that only symptom and risk-factor free personnel access dental school infrastructure.	In the event a patient has developed signs or symptoms or has tested positive for COVID 19 in the 7 – 10 days following treatment, all staff and faculty members involved in that patient's care will be required to have testing performed and will self isolate until they have tested negative.	Staff should be screened for signs and symptoms of COVID-19, including temperature when they arrive each day.
<b>Reception desks</b>	On-site administrative staff who are screening patients must be behind a transparent barrier that prevents droplet transmission and allows for communication between staff and patients, or if this is not in place they must wear PPE.	[Not specified]	Admn staff: <ul style="list-style-type: none"> <li>• Level 1 to 3 masks</li> <li>• Hand sanitizer</li> <li>• Impervious barriers (plastic or glass) between patients/visitors and Staff</li> <li>• Gloves available if requested</li> <li>• Gowns available if requested</li> <li>• Maintain spatial distance of at least 2 m.</li> </ul>	Any staff not working in patient care areas (e.g. receptionists) or who do not have direct patient contact must wear a surgical mask at all times in the workplace if a physical barrier (e.g. plexiglass) is not in place or if physical distancing (2 metres) cannot be maintained.
<b>Waiting area</b>	Decrease cloth and fabric surfaces, and remove fabric covered chairs. Remove all unnecessary items from the waiting room, such as magazines and toys, and keep surfaces clear and clean. Separate waiting room chairs by at least 2 metres.	Front Office staff perform scheduled cleaning/decontaminating of waiting room area at least twice per day i. Removal of all extraneous materials from reception, preclinical, and clinical areas (including reading materials, toys and other objects) ii. Ensure sufficient 70% alcohol-based hand sanitizer and masks are available at entrances to the building, preclinics, and clinics*	[not specified]	The patient...upon initial entry to the building...proceeds directly to the operatory if possible, or to the waiting area.