

# Impact of the COVID-19 pandemic on the University of British Columbia Geriatric Dentistry Program: Clinical education and service

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## Abstract

**Background and Objective:** In Canada, the COVID-19 pandemic was associated with significant morbidity and mortality in older adults, particularly those in long-term care (LTC). Access to oral health services was limited during the pandemic due to public health restrictions. The aim of this paper was to describe the impact of the pandemic on the clinical education and service of the University of British Columbia (UBC) Geriatric Dentistry Program (GDP), which provides care to LTC residents.

**Methods:** Data were collected from UBC GDP AxiUm dental software records, including number of dental appointments in 2019 and 2020. Data on revenue in 2019 and 2020 based on clinical production were collected through financial summary reports. Data on the number of educational rotations were collected from summary reports from scheduling software.

**Results:** In 2020, significant reductions in clinical service, revenue, and productivity were observed in the UBC GDP relative to 2019. The number of GDP appointments for June-December 2020 was lower by 68%. The clinical productivity reduced by 67% for the same period. Expenses were slightly reduced. The overall number of LTC clinical rotations for students were only slightly lower for undergraduate students in 2020 than in 2019, and it increased for graduate students.

**Conclusion:** The COVID-19 pandemic and associated public health restrictions had a negative impact on the clinical service and productivity of the UBC GDP in 2020 relative to 2019. However, clinical educational rotations to LTC were slightly increased in 2020 relative to 2019. Dental care for LTC residents can be provided if rigorous administrative controls, engineering controls and personal protective equipment are employed.

## KEYWORDS

ageing, dementia, education, geriatric dentistry, institutionalized elderly, nursing homes

## 1 | INTRODUCTION

On 11 March 2020, COVID-19 was classified as a global pandemic by the World Health Organization.<sup>1</sup> COVID-19 is a disease caused by the novel coronavirus SARS-CoV-2 and is characterised by fever, cough, shortness of breath, fatigue, loss of appetite and loss of smell and/or taste.<sup>2</sup> In Canada, a robust public health response was employed to respond to the pandemic, including physical distancing, enhanced hand hygiene, respiratory etiquette and other measures.<sup>2</sup>

Despite the public health measures, the morbidity and mortality associated with the pandemic in older adults was high, particularly in those residing in Long-Term Care (LTC) facilities.<sup>3</sup> In Canada, the majority of COVID-19 related deaths occurred among LTC residents.<sup>3,4</sup> In LTC settings, public health authorities recognised the higher risk of morbidity and mortality and mandated a reduction in visitors and the temporary suspension of non-essential services during the early phases of the pandemic.<sup>2,4</sup> As a result, routine dental care provided in LTC facilities or in outpatient dental clinics was limited. Data published from a European, university-based dental clinic dedicated to the treatment of dependent older adults reported an 81% reduction in clinical activity in 2020 relative to an equivalent period in 2019.<sup>5</sup>

LTC residents are at higher risk of oral disease and face numerous barriers to receiving oral health care.<sup>6</sup> This is of increasing importance as Canada's population is ageing, with the number of older adults over age 65 expected to grow by 68% over the next 20 years.<sup>7</sup> This group of older adults is retaining more of their natural dentition as they age than previous generations, and oral diseases remain prevalent in this cohort.<sup>8</sup> While most older adults are functionally independent, a substantial proportion are frail or functionally dependent due to multimorbidity, functional decline and cognitive decline<sup>9,10</sup> with many requiring advanced support and care in a protective environment such as LTC facilities or Assisted Living (AL) facilities.<sup>8,4</sup> While LTC residents have higher rates of caries and other oral diseases than their community dwelling peers, Programs providing comprehensive dental care in LTC have been shown to improve oral health.<sup>11,12</sup>

The University of British Columbia (UBC) Geriatric Dentistry Program (GDP), as part of the UBC Faculty of Dentistry, has a mandate to provide clinical service, research, and education in geriatric dentistry, with a focus on frail and functionally dependent older adults residing in LTC facilities. The UBC GDP supports clinical geriatric dentistry education activities for undergraduate, graduate and post-graduate dental students in the Faculty of Dentistry. It provides clinical services to frail and functionally dependent older adults in 27 LTC facilities across two health authorities in British Columbia (BC). This dental care occurs at dental clinics housed within LTC facilities or on referral to the outpatient Oral Health Centre (OHC) geriatric clinic at the UBC Faculty of Dentistry.

The aim of this paper was to describe the impact of the COVID-19 pandemic on the clinical education and service of the UBC GDP. We

also aim to describe the phased approach taken by the UBC GDP upon reopening of clinical educational rotations and clinical services to allow for the safe provision of dental care for frail and functionally dependent older adults in LTC.

## 2 | MATERIALS AND METHODS

Data were collected from UBC GDP AxiUm dental software records. AxiUm is an academic dental management software used in numerous North American dental schools for clinical documentation, student management, and financial record-keeping.<sup>13</sup> The numbers of dental appointments in 2019 and 2020 were identified through AxiUm clinical schedules for the UBC GDP. Data on revenue in 2019 and 2020 based on clinical production were collected through financial summary reports generated through AxiUm. Data on expenditures and productivity were generated by the UBC GDP Program Manager. Expenditures include salaries for all clinical and administrative staff as well as operating costs such as clinical armamentarium.

Data on the number of educational rotations was collected from summary reports from the UBC undergraduate dental and dental hygiene Programs, graduate clinical specialty Programs and post-graduate hospital-based residency Programs through OSCAR (Objectives, Schedules, Competencies, Assessments, and Rotations) curriculum scheduling software Program. OSCAR is electronic software used for academic scheduling for all undergraduate, graduate and post-graduate dental students. Several UBC clinical training Programs have designated curricular didactic and clinical time allocated to geriatric dentistry, and clinical rotations are organised through the UBC GDP.

Data were presented with descriptive statistics, illustrating changes in number of dental appointments, clinical productivity, and number of educational rotations in 2020 relative to 2019. Ethical approval was granted through the UBC Behavioural Research Ethics Board (Approval: H21-00177).

## 3 | RESULTS

In 2020, reductions in clinical service, revenue, and productivity were observed in the UBC GDP relative to 2019. During the public health-mandated shut down, the number of dental appointments with the UBC GDP in April and May 2020 was reduced by 100% compared to 2019 for both LTC clinics and the outpatient OHC clinic (Table 1). Upon re-opening with public health restrictions in June-December 2020, the number of dental appointments at LTC clinics was reduced by 72% relative to the same period in 2019. The number of dental appointments from June to December 2020 at the outpatient OHC clinic was greater by 30%. Overall, the number of UBC GDP appointments for June-December 2020 was lower by 68%.

The clinical productivity for the UBC GDP in April-May 2020 was 60% lower than the same period in 2019 (Table 2). Clinical productivity was lower for June-December 2020, with a reduction of 67%

**TABLE 1** Number of appointments for the UBC Geriatric Dentistry Program during 2019-2020, expressed in percentages (%)

Period	Number of appointments at OHC		Number of appointments at LTC Dental Clinics		Number of total appointments for GDP	
	2019	2020	2019	2020	2019	2020
January-March	100	-17.7	100	-27.6	100	-27.1
April-May	100	-100	100	-100	100	-100
June-December	100	+30.8	100	-72.3	100	-68.3

relative to the same period in 2019. Expenditures for 2020 did not significantly change compared to 2019.

The overall number of clinical educational rotations in LTC for dental students from the UBC Faculty of Dentistry were only slightly decreased for undergraduate dental students and dental hygiene students in 2020 relative to 2019 and increased for graduate and post-graduate dental students (Table 3). Between April and May of 2020, LTC rotations were suspended for all dental students. From June to December of 2020, the number of LTC clinical rotations was unchanged for DMD students compared to 2019, with these rotations taking place September to December of the 2020/2021 academic year. For graduate and post-graduate rotations between June and December, the number of LTC clinical rotations increased from 11 in 2019 to 30 rotations in 2020. This increase was primarily due to a General Practice Residency (GPR) LTC rotation being introduced in June 2020.

Clinical rotations for DMD students are part of their third- and fourth-year courses in dental geriatrics. Clinical rotations for graduate prosthodontic specialty students are part of a graduate level geriatric dentistry course. Clinical rotations for GPR residents are scheduled off-service rotations, which occur longitudinally throughout the academic year. In GDP rotations, DMD students, graduate prosthodontic specialty students, and GPR residents provide supervised direct patient care for LTC residents in teaching dental clinics at two LTC facilities and in the outpatient geriatric clinic at UBC. Each clinical rotation has one to two dental students present at a time, with a supervising faculty member and dental assistant. The in-house teaching clinics in LTC have one dental operator, equipped with an overhead sling for transfer of non-ambulatory patients and provides no-cost care for residents of the facility.

## 4 | DISCUSSION

The UBC GDP experienced reductions in clinical service and productivity in 2020 relative to 2019 due to the COVID-19 pandemic. The

**TABLE 2** Revenue and expenditure for the UBC Geriatric Dentistry Program during 2019-2020, expressed in percentages (%)

Period	Revenue		Expenditures	
	2019	2020	2019	2020
January-March	100	-27.1	100	-17.7
April-May	100	-33.0	100	-6.1
June-December	100	-67.5	100	-9.6

reductions in clinical productivity are similar to those reported in a European geriatric dental clinic.<sup>5</sup> This was expected, as public health measures were similar worldwide, with a focus on reducing the risk of viral transmission especially among older adults. This study provided a broad overview of the impact of the COVID-19 pandemic on the service and educational arms the UBC GDP. One weakness of this study is that it did not examine changes in oral health status of GDP patients related to the pandemic. Furthermore, this study did not characterise the types of dental procedures provided in 2020 relative to 2019.

Dental care for frail and functionally dependent older adults, such as those residing in LTC, continues to be an important service to optimise quality of life.<sup>6,11,12</sup> The goals of treatment in this group are to eliminate oral sources of pain and odontogenic infection, control inflammation and maintain a level of comfortable oral function.<sup>8</sup> Providing these services in dental clinics housed within LTC facilities, at bedside, or in a specialised ambulatory clinic increases access to care.<sup>11</sup> This is important because a lack of mobility and functional dependency are one of many barriers to care for older adults.<sup>14</sup> During the COVID-19 pandemic, many Canadian LTC facilities faced challenges with regards to adequate staffing, which may have contributed to decreased care hours per patient.<sup>3</sup> Decreased frequency of oral hygiene assistance for dependent LTC residents over the pandemic may be linked to an increase in biofilm-mediated oral diseases and rapid oral health deterioration.<sup>15</sup> Furthermore, decreased access to dental care for LTC residents during the pandemic was noted as many facilities enacted strict rules preventing residents from leaving facilities. The presence of LTC dental clinics would eliminate the need for residents to leave the facility for dental care and greatly improve access to dental services.

In Canada, geriatric dentistry is recognised as an important component of dental and dental hygiene Programs and many educational Programs have dedicated clinical and didactic time allocated in their curricula.<sup>16</sup> Exposure of dental students to older adults, specifically those in LTC, is a valuable clinical training opportunity allowing for the acquisition of knowledge and skills needed to treat frail and functionally dependent geriatric patients.<sup>17,18,19</sup> Furthermore, these clinical rotations reflect the evolving oral health needs of Canada's ageing society.<sup>12</sup> Both the delivery of clinical services and clinical educational experiences can occur safely during a pandemic, provided that rigorous engineering and administrative controls are employed and appropriate PPE is worn. During the pandemic, there were no reported incidents of COVID-19 transmission in GDP clinics among students, staff, or patients.

**TABLE 3** Clinical Education Rotations in LTC teaching clinics for dental students through the UBC Geriatric Dentistry Program in in 2019-2020

Period	Number of DMD student rotations		Number of Dental Hygiene rotations		Number of graduate and post-graduate rotations	
	2019	2020	2019	2020	2019	2020
January-March	31	26	10	5	7	6
April-May	19	0	0	0	5	0
June-December	22	22	0	0	11	30

Future studies should investigate whether changes in oral health status of LTC residents occurred due to pandemic-related restrictions and its after-effects and how geriatric dental services should prepare for potential future pandemics to avoid reductions in service as experienced in 2020.

#### 4.1 | Phased reopening of the clinical education and service in LTC

In response to the COVID-19 pandemic, the UBC GDP took a four-phased approach to reopening clinical service and clinical education rotations in alignment with guidelines from the Provincial Health Officer, provincial dental regulatory authority, UBC, multiple health authorities, and individual LTC facilities (Table 4).<sup>20,21</sup> These measures were designed to prevent cross-infection between LTC facilities, mitigate the risk of viral exposure for clinical staff, dental students, and patients, and allow for the safe provision of dental care in LTC and in outpatient facilities during a global pandemic.

In Phase I of the provincial public health plan (March 16-May 18, 2020), the provincial dental regulatory college suspended all elective and non-essential dental services.<sup>20</sup> Dental services were limited to essential and emergent treatment.<sup>21</sup> During this period, clinical staff and dental students were not permitted to enter LTC facilities. Clinical rotations with dental students, dental hygiene students and graduate prosthodontic students were halted. Essential and emergent treatment needs were primarily managed via teledentistry. For LTC patients requiring operative or surgical management during Phase I, treatment was conducted through an emergency COVID-19 clinic at the UBC OHC, staffed by faculty members and hospital dentistry residents in the UBC General Practice Residency (GPR) Program. As such, LTC residents requiring dental treatment were required to be transferred out of their facility during this phase.

In Phase II of the provincial public health plan (May 15- June 23, 2020), the provincial dental regulatory authority allowed for the resumption of select clinical services in accordance with new guidelines, focusing on engineering controls, administrative

**TABLE 4** Provincial Restart Plan and Guidance Documents from Regulatory Health Agencies

Phase of BC Restart Plan	Period	Guidance documents
1	March 12, 2020-May 18, 2020	-
2	May 19, 2020-June 23, 2020	May 15, 2020: 1. CDSBC: Transitioning Oral Healthcare to Phase 2 <sup>a</sup> 2. BC CDC: COVID-19 IPC Guidelines for Community-Based Allied Health Care Provider Clinic Settings <sup>b</sup>
3	June 24, 2020- ongoing	June 30, 2020: 1. BC CDC: Interim Guidance: Infection Prevention and Control measures for Health Care Workers in Acute Care Facilities <sup>c</sup> August 18, 2020: 1. CDSBC: Transition Oral Healthcare to Phase 3 <sup>d</sup>
4	Conditional on global availability of vaccine or treatment	-

<sup>a</sup>College of Dental Surgeons of British Columbia. Transitioning Oral Healthcare to Phase 2 of the COVID-19 Response Plan. 2020. Accessed 25 March, 2021.

<sup>b</sup>British Columbia Ministry of Health. COVID-19: Infection Prevention and Control Guidance for Community-Based Allied Health Care Providers in Clinic Settings. 2020. Accessed 25 March, 2021. [www.bccdc.ca/Health-Professionals-site/Documents/COVID19\\_IPCGuidelinesCommunityBasedAlliedHCPsClinicSettings.pdf](http://www.bccdc.ca/Health-Professionals-site/Documents/COVID19_IPCGuidelinesCommunityBasedAlliedHCPsClinicSettings.pdf)

<sup>c</sup>BC Centre for Disease Control. Interim Guidance: Infection prevention and control measures for Health Care Workers in Acute Care Facilities. 2020. Accessed 25 March 2021. [www.bccdc.ca/Health-Professionals-Site/Documents/COVID19\\_HomeCommunityCareIPCGuidance.pdf](http://www.bccdc.ca/Health-Professionals-Site/Documents/COVID19_HomeCommunityCareIPCGuidance.pdf).

<sup>d</sup>College of Dental Surgeons of British Columbia. Oral Health Care During Phase 2 and 3 of the Covid-19 Response. 2020. Accessed 25 March, 2021. [www.cdsbc.org/Documents/covid-19/COVID-19-oral-healthcare-Aug18.pdf](http://www.cdsbc.org/Documents/covid-19/COVID-19-oral-healthcare-Aug18.pdf).

controls, and personal protective equipment.<sup>20,22</sup> In early June 2020, the UBC GDP, adopting these published guidelines, was requested to return to the provision of in-house dental services by one LTC facility that had a long-standing clinical educational affiliation. The ability to examine, prevent, and treat oral diseases for LTC residents without the need for patients to leave the facility was beneficial with regards to risk mitigation related to COVID-19. The initial reopening of clinical services in LTC was limited to one facility where one hospital dentistry resident in the GPR Program, supervised by the GPR Program Director, provided service. This was intentional so LTC patients would be served by the most appropriately trained clinicians. This also served as a unique clinical rotation in the GPR Program, emphasising the importance of layers of protection formed by the hierarchy of controls, including personal protective equipment (PPE), engineering controls, administrative controls. The PPE used included single-use surgical gowns, level 3 surgical masks, face shields, surgical caps, eye protection, and gloves.

Engineering controls included judicious use of high-volume suction for all aerosol generating procedures and all clinical procedures being pre-planned to avoid generating aerosol whenever possible. For example, most restorative procedures conducted in LTC during this time were conducted using atraumatic restorative technique, employing spoon excavators and application of glass ionomer cement. The use of silver diamine fluoride was also encouraged as its effectiveness in LTC patients has previously been reported.<sup>23,24,25</sup> For minor oral surgical procedures, exodontia techniques avoiding aerosol generating procedures such as troughing of alveolar bone or sectioning of teeth were used, whenever possible. Dental hygiene procedures were conducted using hand scalers and avoided the use of magneto strictive or piezoelectric instrumentation. Adjustments of removable prostheses were conducted with high-volume suction. Pre-procedural mouth rinses with hydrogen peroxide or other agents were not employed as many of our LTC patients were not cooperative secondary to cognitive disorders. Furthermore, the available evidence for the efficacy of pre-procedural rinses in preventing SARS-CoV-2 transmission is poor.<sup>20</sup> LTC residents requiring transfer from their wheelchair into the dental operator chair using our in-room overhead sling were transferred using a freshly laundered sling changed between each patient.

Administrative controls included daily screening and documenting COVID-19 symptoms of all staff and dental students upon entry into a LTC facility, daily temperature checks, increased appointment lengths to allow for thorough operator disinfection, and cancellation of all appointments if the LTC facility had a reported COVID-19 outbreak.<sup>4</sup> GDP staff and dental students also employed guidelines from the BC Centre for Disease Control, including a COVID-19 Entrance Screening Tool for Healthcare Facilities, COVID-19 Patient Screening Tool for Direct Care Interactions, COVID-19 Health Care Worker Self Check and Safety Checklist, and a Point-of-Care Risk Assessment.<sup>4</sup> As many cognitively impaired LTC residents could not answer COVID-19 screening questions, dental students and attending staff reviewed medical records on-site to note any recent

respiratory or atypical symptoms documented by the care aides, nurses, and physicians in the preceding 14 days. Throughout all phases, dental appointments for patients with suspected or confirmed COVID-19 were postponed or cancelled. For dental emergencies in these patients, teledentistry was employed to triage the patient's chief complaint.

In LTC educational rotations prior to the pandemic, limited examinations for palliative patients or those who could not be safely transferred to the in-house dental clinic were conducted bedside with GDP staff moving between rooms on wards. Dental hygiene students also conducted bedside oral hygiene, moving room to room, prior to the pandemic. These activities, however, were halted during the pandemic to prevent potential cross-infection between LTC residents. Dental services for other LTC facilities affiliated with the GDP, which did not have a dental clinic on site were offered services through the outpatient UBC OHC geriatric clinic.

In Phase III of the provincial public health plan (June 24, 2020 onwards), the GDP continued with the PPE, engineering controls, and administrative controls tested in Phase II, with a mandate to protect LTC patients and provide efficient care delivery.<sup>4</sup> In September 2020, clinical education rotations were re-started at one other LTC facility with a long-standing educational affiliation with the GDP. This facility hosted once per week clinical educational rotations for undergraduate DMD students, providing them the valuable experience of providing clinical dentistry for LTC patients during a global pandemic. LTC rotations for graduate prosthodontic students were also re-instated, reflecting the increased rotations observed between June–December 2020 (Table 3). Furthermore, clinical services provided by attending staff were resumed at several other LTC facilities with in-house dental clinics as well as the outpatient OHC geriatric clinic and outpatient IV Sedation clinic at the Faculty of Dentistry Oral Health Centre. During this period, dental hygiene students provided oral hygiene educational presentations to LTC care staff via virtual platforms. During all phases, the UBC GDP did not report any cases of COVID-19 transmission amongst clinical staff or LTC patients.

Phase IV of the provincial public health plan is conditional on global availability/administration of a vaccine and/or treatment, a process that began in late 2020 in BC.<sup>4</sup> Of those first to receive the vaccine in BC were health care workers and residents/staff of LTC facilities, similar to other jurisdictions around the world.

## 5 | CONCLUSION

The UBC Geriatric Dentistry Program, which serves frail and functionally dependent older adults in LTC, experienced reductions in clinical service and productivity in 2020 relative to 2019 due to the effects of the COVID-19 pandemic. However, clinical education rotations for dental students attending in-house LTC facility dental clinics were increased in 2020 compared to 2019, due to the judicious employment of administrative controls, engineering controls, and personal protective equipment.



## CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest.

## AUTHOR CONTRIBUTIONS

NT designed the study, performed data analysis, and wrote the manuscript. CW designed and critically revised the manuscript. ST collected data for this study. All authors approved the final version of the manuscript.

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