

Financial Impact of COVID-19 on Dental Care for Pediatric Patients: A Dental Claims Review

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Abstract

Purpose: The purpose of this study is to quantify the impact of the COVID-19 pandemic on private dental insurance claims for pediatric dental care.

Methods: Commercial dental insurance claims for patients in the United States ages 18 and younger were obtained and analyzed. The claims dates ranged from January 1, 2019 to August 31, 2020. Total claims paid, average paid amount per visit, and number of visits were compared between provider specialties and patient age groups from 2020 to 2019.

Results: Total paid claims and total number of visits per week were significantly lower in 2020 compared to 2019 from mid-March to mid-May ($P < .001$). There were generally no differences from mid-May through August ($P > .15$), with the exception of significantly lower total paid claims and visits per week for ‘other’ specialists in 2020 ($P < .005$). Average paid amount per visit was significantly higher during the COVID shutdown period for 0-5 year-olds ($P < .001$), but significantly lower for all other ages.

Conclusion: Dental care was greatly reduced during the COVID shutdown period and was slower to recover for ‘other’ specialties. Younger patients ages 0-5 had more expensive dental visits during the shutdown period.

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Introduction

On December 8, 2019, the first case of an unknown respiratory illness was reported in Wuhan City in the Hubei Province of China. Symptoms of this disease include fever, cough, dyspnea, chest pain, and fatigue.¹ Isolation of a throat swab from an infected patient revealed the responsible pathogen to be a novel coronavirus, SARS-CoV-2. After a growing number of cases, the China Health Authority subsequently notified the World Health Organization (WHO) of this disease, later named COVID-19.² As cases continued to rise, on March 11, 2020 the WHO declared COVID-19 to be a pandemic and global health emergency.³ As a result of the spread of the virus, public policies were put in place. These included limiting social gatherings, school closures, home isolation, hand hygiene, and facemask regulations.¹

Given the large amount of person to person contact and aerosol-generating procedures, dentistry was one of many professions that saw changes in guidelines to providing care. On March 16, 2020, the American Dental Association (ADA) released a statement recommending all dentists to postpone elective procedures to mitigate the spread of the disease. Urgent dental care was still permitted including treatment of pericoronitis, pain from pulpal inflammation, trauma with avulsion or luxation, and tooth fracture.⁴ Though the ADA allowed these guidelines to expire on April 30, 2020, states still imposed their own limitations. On May 4, 2020, 27 states opened for delivery of elective dental care, including routine exams, prophylaxes, and restorative dentistry.⁵ Eventually, practices began providing routine care, but with many changes in personal protective equipment (PPE). These changes included use of an N95 or higher equivalent respirator during dental treatment, wearing of goggles or a face shield, generalized use of facemasks, limiting the number of people in the office, and emphasizing universal precautions

and hand hygiene.^{6,7} Most dentists implemented these new safety precautions, with one survey having 98.9% of respondents adding safety products and 96.6% increasing PPE.⁸

Limiting dental care and increasing PPE costs would logically decrease revenue for dental offices across the country. But dentists were not the only ones financially impacted by the pandemic. A survey by the U.S. Census Bureau in fall of 2020 found that close to half of all U.S. households experienced some form of income loss since March 2020. Most of those households had children and were already in lower income brackets.⁹ In April 2020, the unemployment rate was 14.7%, with a loss of over 20.5 million jobs. Many American families, especially those with private medical and dental insurance, obtain their insurance through their job. Income level and dental insurance status are two important factors that drive utilization of dental care.^{10,11} The COVID-19 pandemic brought about numerous changes that affected the economics of the dental industry and impacted patient access to care. Studies assessing qualitative changes, such as patient care modifications, provider attitudes, and public policies, have already been published.^{8,12,13} Starting March 2020, the ADA conducted weekly polls for its dentist members that summarized dental practices status and patient volume.⁵ Additional surveys have been published reporting dental staff's attitudes, concerns, and practice status due to the pandemic.^{8,13,14} Many dentists felt unprepared to deal with the new and fluctuating infection control guidelines.¹³ However, most practitioners had a positive outlook on their post-pandemic practice growth. One survey of dentists showing 81.5% of respondents anticipated the same or greater monthly collections in 2022.⁸

Though COVID-19's qualitative impact on the field of dentistry is important, our study focused on cost of dental visits, number of dental visits, and practice income. Dental claims are indirect and quantitative ways to evaluate performance of a dental office. Each dental claim

represents a patient visit and amount paid by insurance. The purpose of the present study was to evaluate financial changes caused by the COVID-19 pandemic by examining cost per dental visit, changes in overall dental claims paid, and effects on different age groups and specialties among the pediatric population caused by the COVID-19 pandemic.

Materials and Methods

This project was granted exempt status by the Institutional Review Board at Indiana University, Indianapolis, Ind., USA (study no. 1508889495). The data were obtained from a commercial dental insurance claims data warehouse (P&R Dental Strategies, LLC). This data warehouse encompasses a large number of commercial dental insurances claims, including over 50 commercial insurance plans with multiple insurance carriers in the United States. Paid commercial insurance claims from all 50 states were accessed for claims made from January 1, 2019, through August 31, 2020. The patient population data were for patients 18 years and younger. Due to the large sample size, a 5% random sample of all data was extracted from the data warehouse. The data collected included provider unique identifier, patient unique identifier, patient age and gender, date of service, date of submission, date of payment, CDT code, allowed amount, paid amount, provider specialty, provider age, and provider zip code. Data pertained to each CDT code submitted for the patient visit and were combined to reflect the total numbers of claims and total claim amounts per patient visit. Data collected were appropriately de-identified.

Number of visits and total paid claims were summarized for each week. Data were then split into 4 time periods within 2019 and 2020: January through mid-March (henceforth designated the “pre-COVID” timeframe), mid-March through mid-May (“COVID shutdown”

period, encompassing the majority of dental practice closures due to ADA guidelines and local mandates), mid-May through August (considered the “early recovery” period, when many dental offices started to see routine patients again due to guidelines being lifted), and September through December (“later recovery” period). Number of visits and total paid claims were compared between time periods and between years using generalized linear models with a negative binomial distribution and a gamma distribution, respectively. Average paid amounts per visit were compared using the individual visit data by generalized linear models with a Tweedie distribution. Analyses were performed using all data, then repeated for subsets by age (0-5 years, 6-12 years, 13-18 years), and by provider specialty (general practice dentist, GP; pediatric dentist, PD; orthodontist, Ortho; other specialty or unknown, Other). A 5% significance level was used for all tests.

Results

The data analyzed in this study included 10,718,936 total number of CDT claim codes from P&R data warehouse for the 24-month span from January 2019 to December 2020. In this dataset, 3,106,671 dental visits, 901,261 patients, and 169,397 providers were represented. Due to the large number of claims in the P&R warehouse, we resorted to random sample of 5% of all claims. The dataset included claims information from patients ages 0-18 in all 50 states. Total claims paid and number of dental visits were further subdivided by provider specialty (general dentist, pediatric dentist, orthodontist, and other) as well as patient age group (0 to 5, 6-12, and 13-18).

Total Claims Paid

Total paid claims per week were significantly lower in 2020 compared to 2019 during the Covid shutdown period ($P < .001$) (**Figure 1**). The total paid amount of insurance claims for the COVID shutdown period for all providers and all patient ages in our dataset was \$11,470,000 in 2020 and \$48,790,000 in 2019. This indicated that total paid amount in 2020 was 23.5% of the total paid amount in 2019.

Number of Visits Based on Provider Specialty

The total number of dental visits -- regardless of provider specialty or patient age-- in this dataset from mid-March to mid-May in 2019 was 292,194. That period during the COVID shutdown period of 2020 had 83,116 visits, which is 28.4% the volume of the previous year. When provider specialties are considered, all providers except for orthodontists saw a statistically significant decrease in the number of visits during the COVID shutdown period of 2020 when compared to 2019 ($P < 0.005$) (**Figure 2**). Our data indicates that orthodontists did not have a significant change in the number of visits per week ($P = .728$) when comparing mid-March to mid-May of 2020 to 2019.

Average Paid Amount Per Visit

The average cost per visit during the COVID shutdown timeframe for all providers and all patient ages averaged \$138 per visit. This value in 2019 was \$167. This represents a \$29 decrease in average amount paid per visit from 2019 to 2020. When patient age is taken into account, average paid claim amount per visit was significantly lower for all age groups, except 0–5-year-olds ($P < .001$) (**Figure 3**). This age group saw the average paid amount per visit increase during the COVID shutdown ($P < .001$) with the average cost per visit being \$164 compared with \$143 in 2019 for all providers, regardless of specialty.

Early Recovery Period

Our data indicates that there were generally no differences in total claims paid and total visits per week during the early recovery period of 2020, when compared to the same timeframe in 2019 ($P>.15$), with the exception of significantly lower total paid claims per week and total number of visits per week for ‘other’ specialties (not GP, PD, or Ortho) in 2020 ($P<.005$).

Discussion

This is the first quantitative study focusing on the financial effects of the COVID-19 pandemic on the privately insured pediatric population subdivided by age groups and specialists. There have been several articles published in recent months that have investigated the effect of the COVID-19 pandemic on dentistry. Multiple reports that analyzed dental insurance trends have found that there was a sharp decrease in total number of dental visits as well as treatment rendered during the period of the spring shutdown of 2020 among privately insured individuals.^{15,16} We found a sharp decrease in number of visits per week and total claims paid during the COVID shutdown period. Our report is consistent with data presented in recent publications.

Total claims paid per week and total visits per week during the period of the COVID-19 shutdown was drastically lower for privately insured pediatric dental patients compared with the same period in 2019. This closely reflects the effect of guidelines placed on dentists to limit treatment to only dental emergencies.^{4,17} Reducing patient volume meant less income for dental practices nationwide. Even with the sharp decline in insurance claims paid and patient visits, the majority of dentists were optimistic for continued practice growth following the pandemic.^{8,18} Our findings show that total claims paid during the COVID shutdown period dropped to only

23.5% of the 2019 amounts. As 2020 progressed, the total claims paid in the early recovery period increased to 91.1% of the 2019 values. The later recovery period of 2020 showed total claims paid representing 96.8% of 2019.

Despite the ADA recommendation that only urgent dental needs be addressed during the shutdown period, our data showed that orthodontists did not see a significant decrease in the number of patient visits during this time. Guidelines published in the American Journal of Orthodontics and Dentofacial Orthopedics reiterated only urgent treatment be provided and recommended any routine appointments be postponed and that aerosolization procedures be minimized.¹⁹ Patient compliance and proper coordination of orthodontic treatment with patient growth can be important factors in the successful outcomes of orthodontic treatment.²⁰

Orthodontists who were included in our data set may have continued to see patients regularly perhaps to avoid prolonged treatment times and unfavorable case outcomes.²¹ Many orthodontic procedures do not produce aerosols, including replacing archwires, activating appliances, and changing elastics.²² It is important to note that orthodontic claims are not necessarily reflective of actual patient visits. Orthodontic insurance claims are unique in the dental industry, as they are often not associated with an actual office visit. Many providers are reimbursed monthly or quarterly by insurance throughout the course of orthodontic treatment. Our results should be interpreted with caution in regard to orthodontists, as our data likely do not reflect the actual office visit trends.

Our findings showed a significant increase in the claims paid per visit for patients between ages 0-5 years old during the COVID shutdown period, whereas that number decreased for all other age groups when compared to the previous year. This finding suggests that when a child 5 years old or younger had a dental visit, a greater amount of treatment was being provided

per visit. As only emergency treatment was recommended to be provided per ADA guidelines, we can infer that younger patients had greater emergent treatment needs during the shutdown period. This could be due to the differences across dentitions and the more time-sensitive consequences of delaying care for the pediatric population. The enamel of primary teeth is less mineralized than the enamel of permanent teeth and caries is known to progress more quickly in the primary dentition.²³ Primary teeth also have larger pulp horns than permanent teeth, which can lead to quicker pulpal involvement of carious lesions. Early childhood caries has been well documented to reducing the quality of life in children.^{24, 25, 26} Dentists may have been more likely to provide definitive treatment to children in order to alleviate pain in a vulnerable patient population. In addition, dentists may have had to utilize sedation modalities in order to provide treatment for this age group. Behavioral considerations for children ages 0-5 often make conventional dental treatment more challenging. Sedation fees would have naturally increased the cost per visit. Our data suggest that practitioners were cautious with delays in dental care for patients ages 5 and younger.

Though visits per week and total claims quickly increased back to pre-COVID levels for pediatric dentists and general dentists in the early recovery period following the COVID-19 shutdown, this was not seen for other specialists. Those specialists include oral surgeons, periodontists, endodontists, and prosthodontists. Their recovery was more gradual. This may be due to the fact that the “other” specialists are largely reliant on the initial referral from a patient’s primary provider, therefore it is logical that they would see a slower and more gradual post-shutdown recovery. Pediatric dentists, on the other hand, are considered to have the dual role of providing both primary and specialty care services.²⁷ This is likely why they saw the same recovery trends as general dentists as opposed to their “other” specialist counterparts.

This study does have limitations that must be considered. One limitation is that the P&R database encompasses only private dental insurance claims, therefore any fee for service patients as well as those covered public insurance like Medicaid are not included in the sample. This may skew our patient sample towards patients whose parents have higher paying full time jobs that come with dental insurance, but leave out the patients in lower socio-economic demographics. In addition, with many Americans experiencing work furloughs or job loss during the pandemic, some patients who had been included in the 2019 dataset may not remain in the 2020 dataset as a result of loss of job-provided dental insurance. As mentioned previously, the unique method of insurance reimbursement of orthodontic claims made it difficult to accurately track insurance trends for orthodontist throughout our study. Another limitation to consider is that of National Provider Identifier (NPI) number. This study used provider NPI number to differentiate between trends among specialists for our data set. Most providers have an NPI classification designating them as a specialist, which differentiates them from other specialists as well as general dentists. However, not every state issues a different type of license to practice as a specialist. In addition, not every dentist changes their license type after specializing. In cases like those listed, provider specialty would not be accurately represented in the categorization we used. Though our study encompasses a wide range of providers, it does not differentiate between the regional trends of COVID case surges and varying local mandates. On May 4, 2020, only 27 states had opened for elective dental treatment. This number increased to 48 states by June 1, 2020.⁵ The present state of knowledge would benefit from further quantitative research exploring how different regions of the United States performed during the COVID-19 pandemic.

Conclusions

The following conclusions can be made:

1. Total claims paid per week and total visits per week during the period of the COVID-19 shutdown were drastically lower than the same timeframe in 2019.
2. There was a significant increase in the claims paid per visit for patients between ages 0-5 years old during the shutdown period, whereas that number decreased for all other age groups when compared to the previous year.
3. Claims filed by oral surgeons, periodontists, endodontists, and prosthodontists were slower to recover from the COVID-19 shutdown when compared to general dentists and pediatric dentists.

Figures

Figure 1. Total paid claims per week compared between provider specialties (see attached)

Figure 2. Number of patient visits per week compared between specialties (see attached)

Figure 3. Average paid amount per visit compared between age groups (see attached)

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