COVID-19: Impact to dental utilization

Joanne Fontana, FSA, MAAA
Thomas Murawski, FSA, MAAA

Milliman

The economic ramifications of the COVID-19 pandemic are just starting to be felt and will likely intensify for some time to come.

For dental offices, whose production is closely tied to consumer disposable income,[1] an economic recession can cause major changes in patient traffic and the types of services sought. During the 2007-2010 global financial crisis, dentists saw a considerable drop in patient visits; in 2010 only 38.4% of Americans visited their general dentist,[2] compared with 58% in 2017, a more recent and stable economic time.[3] To some extent, dental industry experience from the global financial crisis can inform the potential impact to the industry of COVID-19, but there are important differences this time around—namely, the effect of the pandemic itself, which presents an entirely different set of utilization patterns.

This article explores the potential effects of the COVID-19 pandemic on the dental industry, considering changes in utilization of dental services that could result from the pandemic and its containment efforts as well as the economic ramifications that are already starting to occur and may last for some time to come.

While an economic downturn alone affects demand for dental services, this time the downturn is preceded by a period of depressed demand for services due to provider-driven, patient-driven, and broader community-driven efforts to limit the spread of COVID-19. As such, there is the potential for two phases of utilization impact, each with unique characteristics. First, we discuss the potential ramifications of the COVID-19 disease containment measures and behaviors themselves on dental procedure utilization, and then the possible impact of the economic effects of the pandemic.

Phase 1: Reduction in dental utilization during the COVID-19 pandemic

PROVIDER-DRIVEN REDUCTION IN DENTAL SERVICES

On March 16, 2020, the American Dental Association (ADA) released the following guidance to dental professionals: "In order for dentistry to do its part to mitigate the spread of COVID-19, the ADA recommends dentists nationwide postpone elective procedures for the next three weeks. Concentrating on emergency dental care will allow us to care for our emergency patients and alleviate the burden that dental emergencies would place on hospital emergency departments."[4] The ADA further defined what constitutes urgent or emergency dental services and left room for practitioners to use judgment in providing what they believe to be needed care. On April 1, 2020, the ADA issued updated guidance: "The current American Dental Association (ADA) recommendation for dentists to keep their offices closed to all but emergency care expires on April 6. The new interim recommendation from the ADA is that dentists keep their offices closed to all but urgent and emergency procedures until April 30 at the earliest."[5] Several states have echoed the ADA's recommendations with similar or more stringent limitations on dental services to be provided in the short term and/or more broadly closing nonessential businesses. In addition to reacting to ADA and state guidance, dentists are also choosing to reduce provided services or close their doors out of concern for the safety of their staffs and patients and to allow personal protective equipment (PPE) to be routed to more front-line hospital and medical personnel. The timing of these business decisions, the level of reduction in dental services offered, and the duration of such reductions are likely to vary by state and by individual provider based on the disease progression and response timing by states, attitudes toward business closure, and the personal situation of each dentist.

[1] Dental Economics (January 21, 2014). The Impact of the Financial Crisis on the U.S. Dental Industry.

[2] Guay, Albert H. & Blatz, Andrew (April 2019). The effect of the Great Recession on the demand for general oral health care and orthodontic care. JADA 2019: 150(4): 287-293. Retrieved April 8, 2020, from https://doi.org/10.1016/j.adaj.2018.11.019.

[3] ADA News (March 21, 2018). Survey: More Americans want to visit the dentist.

[4] ADA (April 1, 2020). ADA urges dentists to heed April 30 interim postponement recommendation, maintain focus on urgent and emergency dental care only. Press release. Retrieved April 8, 2020, from https://www.ada.org/en/press-room/news-releases/2020-archives/april/summary-of-ada-guidance-during-the-covid-19-crisis.

[5] Ibid.

Beginning on March 23, 2020, the ADA polled dentists to gather data on the impact of COVID-19. The results show that over 90% of responding dentists experienced a decrease in patient volume of over 75% over the past few weeks.[6]

PATIENT-DRIVEN REDUCTION IN DENTAL SERVICES

As of April 2, 90% of the nation or approximately 300 million people are under some form of "shelter in place" rules or recommendations,[7] and prevailing wisdom suggests that reducing exposure to and transmission of the virus involves not going out as much and limiting unneeded public interaction. In this environment, dentists are really like any other small business owner, subject to reduced office traffic because people simply are staying at home. Dental procedures, especially nonurgent routine care, are relatively easy to postpone, and people may consider these appointments nonessential at this time. Added to this is the fear of exposure to the virus in a dental office environment in which bodily fluids are a part of everyday practice. As the ADA survey confirmed, as of several weeks ago dental offices were already seeing decreases in the number of patients. Anecdotally, declines are especially pronounced for routine care, while appointments for higher-level services such as endodontics were somewhat less likely to be canceled.

Due to both provider and patient behaviors, for the duration of the COVID-19 outbreak it is likely that utilization of dental services will be depressed, with a larger impact on routine services such as oral exams, cleanings, and periodic x-rays, and a smaller impact on other services, especially those considered urgent or unable to be easily postponed. The magnitude and duration of the reduced utilization will likely vary widely by state, based on each state's timing and aggressiveness of COVID-19 containment measures, as well as by individual providers based on their own behavior and patient mix.

Phase 2: Reduction in dental utilization due to economic effects of the COVID-19 pandemic

In addition to the reduction in demand for dental services during the active weeks of the COVID-19 containment effort, there are likely to be concurrent and subsequent effects on dental utilization due to the economic effects of the pandemic. Furloughs, layoffs, and pay cuts have already begun and will likely continue in upcoming weeks. Rising unemployment correlates with a reduction in the number of people with access to employer-sponsored dental coverage—and having private dental insurance is a key predictor of one's use of dental services.[8] Utilization of dental services, more than other types of healthcare, tends to track with disposable income.[9] In addition to many people lacking dental insurance and paying for dental care entirely out of pocket, even those with dental insurance often foot a meaningful portion of the cost due to member cost sharing on procedures like prosthodontics, oral surgery, endodontics, and even restorations. When money is tight, people are more likely to spend on necessities and less on goods and services not viewed as immediate needs.

Studies on the effect of the 2007-2010 global financial crisis may help to shed light on dental usage patterns during a potential economic downturn. An April 2019 ADA study using historical Medical Expenditure Panel Survey (MEPS) data found that the percentage of people with general dentist visits "experienced a slow and steady decline" through the recession period. Visits to the orthodontist declined more sharply but rebounded after the recession more quickly than general dentist visits.[10] It stands to reason that orthodontics, for which consumers bear significant out-of-pocket costs and which can in many cases be postponed until convenient and affordable, would be more sensitive to economic conditions than general dentist visits. A Dental Economics article analyzing dental industry performance during the recession found that dentist production dropped considerably between 2008 and 2010, driven by fewer patient visits. However, while relatively expensive procedures like restorations were more likely to be postponed, routine hygiene procedures like cleanings actually increased during that period.[11] This could be due to people with private insurance taking advantage of no-cost or low-cost preventive and diagnostic services, because most plans fully

[6] ADA. COVID-19: Economic Impact on Dental Practices (Summary Results). Retrieved April 8, 2020, from https://surveys.ada.org/results/public/YWRhc3VydmV5cy1VUl81aUlYMUVTTUh2Y0NSVU4tNWU3Yjg1YTJlOTQ5N2QwMDE2MjdkZmRh#/pages/Page_e3fd2e25-9bbd-43ce-8252-51794094ac72.

[7] Della Cava, M. (April 2, 2020). 'This will blow over': In states without stay-at-home orders, Americans celebrate freedom as death toll climbs. USA Today. Retrieved April 8, 2020, from https://www.usatoday.com/story/news/nation/2020/04/02/states-without-stay-home-orders-residents-celebrate-freedoms/5105303002/.

[8] Blackwell, D.L., Villarroel, M.A., & Norris, T. (2019). Regional variation in private dental coverage and care among dentate adults aged 18–64 in the United States, 2014–2017. NCHS Data Brief, no 336. Hyattsville, MD: National Center for Health Statistics.

[9] Sikka, V. & Savin, G. (January 21, 2014). The Impact of the Financial Crisis on the U.S. Dental Industry. Dental Economics. Retrieved April 8, 2020 from https://www.dentaleconomics.com/money/article/16390429/the-impact-of-the-financial-crisis-on-the-us-dental-industry.

[10] Guay & Blatz, op cit.

[11] Sikka & Savin, op cit.

cover those procedures, while postponing dental care that would cost them money at the point of service. This is the opposite of the initial pandemic-related reduction in services, during which we expect a reduction in routine visits and less of an impact on higher-cost or urgent dental needs.

The length and depth of a potential economic downturn due to the COVID-19 pandemic is unknown at this point, but recovery is likely to differ across different swaths of the population. States have different virus outbreak timelines and different approaches to virus containment, as well as different approaches to mitigate its economic impacts, so it is likely that state economies will face different recovery timelines and patterns. Reinvigorated demand for dental care will depend on patient income, employment status, and dental benefits status. Reemployment timing will likely vary by industry. In addition, the demand elasticity for dental services is likely to vary among particular subsets of the population. For example, a National Institute of Health study showed that it takes larger decreases in wealth for older people to reduce consumption of dental services than younger people,[12] likely because they are already accustomed to paying for dental services out of pocket (as they're less likely to have insurance), because they have built up asset stores in advance of retirement, and because income in the form of Social Security payments will not vary with the economy.

Finally, in the months during and directly following the COVID-19 pandemic, there are a few factors that may mitigate a little of the expected decline in dental services. While teledentistry is still an emerging concept for many dental providers, using technology to triage patients, diagnose problems that may require a live visit, and generally keep in contact with patients can help to serve the population and maintain patient relationships during this time. Several states have already developed telehealth rules governing insurer coverage and reimbursement of services provided through that medium. Demand may also resurface from insured dental patients who have already satisfied their annual deductibles or spent considerable dental dollars during the current policy year and who may want to get remaining services completed before their benefits reset.

In this time of uncertainty, predicting the course and timing of the impact of the COVID-19 pandemic on the dental industry is difficult; however, using lessons from the 2007-2010 global financial crisis as well as the early indicators of patient behavior during the outbreak are instructive. Broadly, a decrease in dental services should be anticipated, with the initial stage focused toward a reduction in routine, preventive, nonurgent care followed by a period of reduction in utilization of higher-cost services consistent with recessionary times.

A FRAMEWORK: ILLUSTRATIVE IMPACT ON DENTAL COSTS

The circumstances around the COVID-19 outbreak are unprecedented and are rapidly evolving. At this time, there is more uncertainty and more that is unknown than there is available reliable data. As such, accurately predicting dental utilization over the upcoming months is impracticable. For the purposes of this article, we developed an illustrative scenario to model the potential impact given a set of broad assumptions to set a framework that can be used in further modeling. This framework should be reconstructed and adjusted as more information becomes available and the development of key assumptions can be more robust.

To model the potential impact of changes in consumer behavior on overall dental claims costs during Phase 1 (i.e., during the pandemic), we separated dental procedures into three categories according to degrees of immediacy or necessity and severity. The table in Figure 1 describes the dental services categorized by this severity level.

FIGURE 1: CATEGORIZATION OF DENTAL SERVICES BY SEVERITY

Severity	Dental Services
High	Emergency, Surgical Extractions, Oral Surgery, Anesthesia, X-Rays
Medium	Simple Extractions, Restorations, Periodontics, Endodontics, Space Maintainers, Sealants, Inlays/Onlays/Crowns, Dentures, Bridges
Low	Oral Exams, Prophylaxis, Fluoride, Routine X-Rays, Lab and Other Tests

The impact of COVID-19 on dental utilization during Phase 1 can be split into two subphases; first, a period of time when shelter-in-place orders may be active and individuals are limiting social contact, and second, a period of time immediately following a lift on shelter-in-place orders when people begin to return to daily routines and behavior. For each severity category described above, we made assumptions regarding the impact to utilization during each subphase. During shelter-in-place orders, we assumed a sharp drop in utilization in the medium-severity and low-severity services, and assumed the high severity utilization would remain at normal levels, consistent with the ADA guidance to dental providers. During the period immediately after shelter-in-place orders are lifted, we assumed that utilization for medium-severity and low-severity services would return at 70% of pre-pandemic levels, and high-severity emergency services would remain at normal levels. Given the unprecedented nature of this pandemic and the accompanying lack of historical data on

[12] Manski, R. et al. (January 2014). Dental Usage Under Changing Economic Conditions. J Public Health Dent. 74(1): 1-12. Doi:10.1111/j.1752-7325.2012.00370.x.

provider and patient actions, these assumptions are entirely judgment-based; we present them as broadly reasonable placeholders that can be adjusted as actual utilization data begins to emerge.

The table in Figure 2 summarizes the impact of these utilization reductions on per member dental costs assuming equal durations of three months each for the two subphases within Phase 1. We also tested a "lower-impact" scenario where shelter-in-place orders persisted for two months, followed by three months in the second subphase, and a "higher-impact" scenario where shelter-in-place orders persisted for six months, followed by a period of three months in the second subphase. We have shown the illustrative impact by dental procedure class of service, a common classification mechanism in which Class I includes routine preventive and diagnostic procedures such as oral exams, cleanings, and radiographs; Class II includes restorations, extractions, periodontics, and endodontics; and Class III includes crowns and prosthodontics like dentures and bridges.

FIGURE 2: ILLUSTRATIVE IMPACT TO OVERALL DENTAL ALLOWED CLAIMS BY SERVICE CLASS DURING PHASE 1

	Phase 1 Allowed Claims Cost Impact		
Dental Class of Service	Base Case	Lower-Impact Scenario	Higher-Impact Scenario
I	-65%	-58%	-77%
II	-49%	-44%	-57%
III	-65%	-58%	-77%
Total	-59%	-53%	-69%

The impact of the economic downturn in Phase 2 can likewise be split into two subphases; first, a period of time after the immediate onset of the economic downturn, and second, a sustained period of time representing the continued effects of the downturn similar to what was seen with the 2007-2010 global financial crisis. We view the first subphase as a transition period, when the major disruption from the outbreak is still subsiding and the effects of the economic downturn have begun; we assume these two forces interact in terms of impact on consumer behavior. During the first subphase, we made a judgment-based assumption that utilization levels for the medium-severity and low-severity procedures (as defined in Figure 1 above) would be 85% of pre-pandemic levels. This assumption suggests that reduced utilization levels would persist, but not at levels as low as after the shelter-in-place order is lifted in Phase 1, due to a variety of factors including release of some pent-up demand for dental services, lingering fear of going to the dentist, and the beginnings of the economic impact on dental demand. Similar to the assumptions made for Phase 1, this assumption was entirely judgment-based given the lack of historical data. However, it represents a midpoint between the 30% reduction assumed in Phase 1 and pre-pandemic levels.

For the second subphase we normalized to a total utilization level equal to 95% of pre-pandemic levels,[13] consistent with what was observed during the 2007-2010 global financial crisis according to one study. We assumed the utilization for procedures with high severity would remain at normal levels throughout Phase 2, while others were adjusted downward to generate 85% and 95% levels in total.

Combined impact of Phase 1 and Phase 2

To combine the effects of dental utilization caused by the pandemic itself (Phase 1) and its economic effects (Phase 2), we assumed specific durations for each phase as shown in the table in Figure 3. The timeline is designed to represent calendar years 2020 through 2022; as such we have included 2.5 months of pre-pandemic “normal” utilization. These assumptions were set as broadly reasonable starting points; we do not have enough information to explicitly predict the duration of each phase.

FIGURE 3: DESCRIPTION AND ASSUMED DURATION BY PHASE

		Duration (months)		
Phase	Description	Base Case	Lower-Impact Scenario	Higher-Impact Scenario
N/A	Before COVID-19 outbreak	2.5	2.5	2.5
1	Shelter-in-place	3	2	6
1	After shelter-in-place	3	3	3
2	Transition (lingering outbreak effects/onset of economic downturn)	6	7	3
2	Sustained economic downturn	21.5	21.5	21.5
	Total	36	36	36

[13] Sikka, V. & Savin, G. (January 21, 2014). The Impact of the Financial Crisis on the U.S. Dental Industry. Dental Economics. Retrieved April 8, 2020 from https://www.dentaleconomics.com/money/article/16390429/the-impact-of-the-financial-crisis-on-the-us-dental-industry.

Using these assumed durations by phase over this illustrative three-year timeframe, the impact to total costs by class is shown in the table in Figure 4. While these scenarios reflect a sustained three-year reduction in dental demand, there is considerable uncertainty around the duration—a shorter or less severe downturn could easily show a smaller impact to dental utilization than shown here, while a larger or deeper recession could similarly exceed these scenarios.

FIGURE 4: ILLUSTRATIVE IMPACT TO OVERALL DENTAL ALLOWED CLAIMS BY SERVICE CLASS SUMMARIZED BY YEAR

	Base Case Allowed Claims Cost Impact		
Dental Procedure Class	**Year 1**	**Year 2**	**Year 3**
I	-37%	-7%	-5%
II	-28%	-6%	-4%
III	-37%	-7%	-5%
Total	-34%	-7%	-5%
	Lower-Impact Scenario Allowed Claims Cost Impact		
Dental Procedure Class	**Year 1**	**Year 2**	**Year 3**
I	-30%	-7%	-5%
II	-23%	-6%	-4%
III	-30%	-7%	-5%
Total	-27%	-7%	-5%
	Higher-Impact Scenario Allowed Claims Cost Impact		
Dental Procedure Class	**Year 1**	**Year 2**	**Year 3**
I	-58%	-7%	-5%
II	-43%	-6%	-4%
III	-58%	-7%	-5%
Total	-52%	-7%	-5%

Methodology and caveats

The purpose of this paper is to illustrate a framework for consideration of the effects of the COVID-19 pandemic and the concurrent and subsequent economic impacts on dental utilization that can be used for further modeling as more real data becomes available. In developing this framework, we assumed nationwide average utilization for a commercially insured population. We did not include impacts to orthodontic services in this analysis. We relied on the data underlying the 2019 Milliman Health Cost Guidelines – Dental™ when developing this illustrative modeling framework.

The model used for this paper is premised on assumptions of the spread of the disease and the following economic impact, including assumptions as to the length and prevalence of shelter-in-place orders, the timing and extent of the outbreak, the timing and extent of an economic downturn, consumer willingness to procure dental services, and other factors. Scientific knowledge of these items is incomplete and new data on the spread of COVID-19 in the United States is still emerging. In addition, actions taken by governmental authorities and the healthcare system related to the COVID-19 pandemic are rapidly changing. Consequently, our model results will evolve as new information becomes available and new actions are taken by the authorities and other stakeholders. Due to the limited information available on the pandemic, any analysis is subject to a substantially greater-than-usual level of uncertainty than we would expect for a projection of this nature.

Milliman

CONTACT

Joanne Fontana
joanne.fontana@milliman.com

Thomas Murawski
tom.murawski@milliman.com