



COVID-19's Impact on the Dental Care Sector

Modeling the Impact of COVID-19 on U.S. Dental Spending

Authors: Kamyar Nasseh, Ph.D.; Marko Vujicic, Ph.D.

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Key Messages

- *The COVID-19 pandemic has significantly impacted the U.S. dental care sector. Over three-fourths of dental practices in the U.S. are seeing emergency patients only and another 18 percent are closed fully. The vast majority of dentists report their volume of total collections is less than 5 percent of what is typical.*
- *Our modeling predicts that U.S. dental care spending could decline by up to 66 percent in 2020 and 32 percent in 2021. We model alternative scenarios as well and they have a more muted impact.*
- *Our analysis is subject to major uncertainty at this stage, and we will update it as more data become available. Nevertheless, COVID-19 is likely to have a long-lasting, multi-year impact on the dental care economy.*

Introduction

COVID-19 is having an unprecedented impact on society, the economy, and the dental care sector. The latest data from the American Dental Association's Health Policy Institute (HPI) shows the dental economy at a virtual standstill along with several other sectors of health care^{1,2,3} as well. It is clear that the early proactive response by the dental team to help flatten the curve and preserve personal protective equipment has impacted the dental economy in profound ways.

In this research brief, we look prospectively and estimate the economic impact of COVID-19 on U.S. dental spending through the end of 2021. To guide our analysis, we use the experience of the Great Recession in addition to new data collected by HPI on economic activity in dental practices, dental expenditure projections from the Centers of Medicare and Medicaid Services (CMS), and macroeconomic projections for the U.S. economy. We emphasize that this is our first iteration of modeling and is subject to significant uncertainty. We plan to regularly update our analysis as better information becomes available.

COVID-19, the U.S. Economy, and the Dental Economy

Since late 2019, COVID-19 has reached pandemic status with cases in 185 countries. Over 2.6 million individuals have been infected and over 180,000 have died.⁴ COVID-19 is a novel coronavirus that originated in Wuhan, China, where a cluster of pneumonia cases first appeared in December 2019.⁵ Doctors eventually connected these cases with COVID-19. On January 19, 2020, the first case of COVID-19 in the United States occurred in a 35-year-old male in Snohomish County, Washington. This individual had previously travelled to Wuhan, China.⁶ The first COVID-19 death occurred in California on February 6, 2020.⁷ COVID-19 thereafter spread to each state and the District of Columbia and as of April 21, 2020, over 800,000 have been infected and over 46,000 have died from the virus.⁴

In March, individual states and municipalities began imposing shelter-in-place orders. On March 16, 2020, six San Francisco Bay area counties imposed a shelter-in-place order and on March 19, 2019, California was the first state to mandate a state-wide shelter-in-place order.⁸ As of April 15, 2020, 42 states and the District of Columbia have state-wide shelter-in-place orders.⁹ On March 16, 2020, the Centers for Disease Control and Prevention (CDC) published social distancing guidelines to limit the spread of COVID-19.¹⁰ As a result of these state-wide orders and social distancing guidelines, many restaurants, shops, and other non-essential businesses have stopped operating. Where possible, workers now work from home or telecommute.

There are several projections that assess the impact of COVID-19 on the U.S. economy. Statewide shelter-in-place mandates, the high mortality rate of COVID-19 relative to other viruses (COVID-19 has a mortality rate

of approximately 3.4 percent as opposed to 0.1 percent for influenza),¹¹ the highly contagious nature of the virus, and the significant recovery period of those infected (2-6 weeks)¹² are key factors behind why COVID-19 will have such a significant impact on the U.S. economy. Unlike other economic downturns, the current contraction gripping the U.S. is driven by a pandemic, heavily rooted in consumer safety and well-being concerns and, consequently, in reduced demand within the services industry. The Congressional Budget Office (CBO) projects that Q2 2020 GDP will decline by 7 percent. Annualized, CBO projects a 28 percent contraction in U.S. GDP in 2020. If the U.S. maintains strict social distancing guidelines, GDP could decline more slowly, 6.5 to 10 percent on an annual basis.¹³ Using the 1918-1920 Spanish flu pandemic as a guide, Barro et al. (2020) predict that COVID-19 will decrease GDP globally by 6 percent and private consumption by 8 percent.¹⁴ The CBO also projects the unemployment rate to be at over 10 percent in Q2 2020 and 9 percent by the end of 2021.¹⁵ James Bullard, president of the St. Louis Federal Reserve, predicts that unemployment could hit 30 percent in Q2 2020.¹⁶ Total unemployment could reach 52.8 million, leading to Q2 2020 unemployment rate of 32.1 percent.¹⁷ As of April 16, 2020, U.S. jobless claims have reached 22 million, which is roughly equal to the number of jobs that have been created since the Great Recession. The unemployment rate is expected to hit 17 percent in April 2020, up from 4.4 percent in March 2020.¹⁸ If COVID-19 is successfully contained, it is possible that the U.S. could return to a pre-pandemic economic level in Q4 2020. However, if there is a resurgence of COVID-19, full recovery could be delayed until Q1 2023.¹⁹

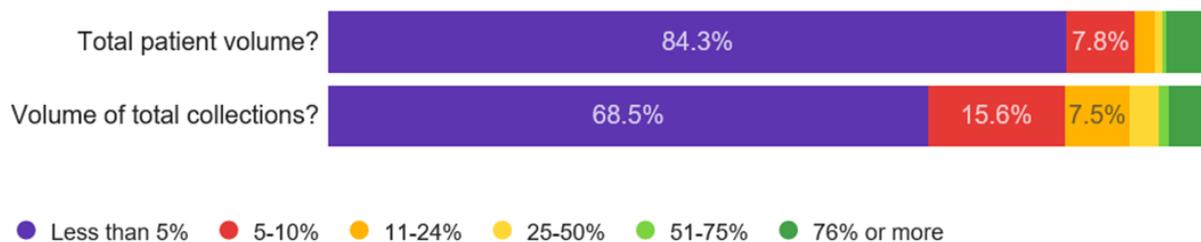
The COVID-19 pandemic is expected to have a significant adverse impact on high-contact industries, including dentistry. As a result of strict social distancing guidelines imposed by many states, dental clinics,

general practice physician offices, optometry offices, as well as non-health care industries like hotels and restaurants have closed. Preliminary estimates from the St. Louis Federal Reserve suggest that demand in high-contact industries will decline by 51 percent and that gross output will fall by 47 percent.²⁰

To keep dentists and patients safe from the adverse health effects of COVID-19 and to conserve personal protective equipment, the American Dental Association (ADA) issued on March 16, 2020 guidance that dental practices postpone elective procedures and only provide emergency or urgent care.²¹ On April 1, 2020, the ADA extended these guidelines to April 30.²² The procedures that the ADA recommended dentists postpone include radiographs, oral examinations, aesthetic dental procedures, routine cleaning and preventive therapies, and orthodontic procedures that don't involve pain management. Urgent dental care includes extensive dental caries involving pain, uncontrolled oral bleeding, facial trauma, dental trauma, tooth fractures and biopsies of abnormal tissues.²³

Since March 2020, the ADA has fielded a tracking poll to monitor the economic impact of COVID-19. The week of March 23, the poll found that 76 percent of dental practices were closed except for emergency patients, 19 percent were closed entirely, and 5 percent remained open though at a reduced patient volume.²⁴ The week of April 6, 79 percent of dental practices were closed except for emergency patients, 18 percent were closed entirely, and 3 percent remained open though at a reduced patient volume. The week of April 6, the poll asked about the volume of collections compared to what is typical for dental offices. The results indicate a large scale shutdown of the dental care sector, with 69 percent of dentists reporting the current volume of collections at less than 5 percent of what is typical and another 16 percent reporting collections at 5-10 percent of what is typical. Patient volume reductions were even more dramatic.

Figure 1: Dentists' Response to "How Does this Week Compare to What is Typical in Your Practice in Terms of Patient Volume and Volume of Total Collections?"



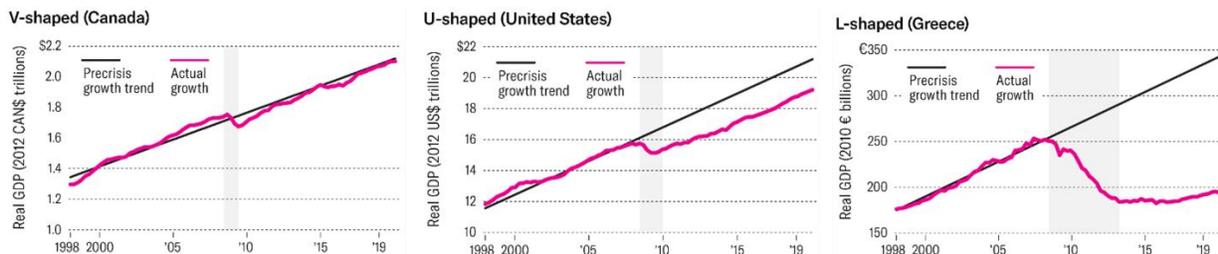
Source: ADA Health Policy Institute Economic Impact of COVID-19 on Dental Practices survey, week of April 6.

The second wave of polling probed dentists on how they would respond if CDC and ADA recommendations on delaying elective dental procedures were to continue, hypothetically, beyond April 30. The results indicate that were the current situation to continue through the end of June, most dental practices would respond by reducing staff and other expenses and borrowing money. However, if the current situation were to continue through the end of August, 46 percent of dentists indicated they would likely need to sell their practice or file for bankruptcy.¹ These data indicate that the next two to three months are a critical juncture for the sustainability of dental practices in the U.S.

While the sharp, steep economic contraction gripping the U.S. economy and the dental care sector is already

evident in the data, there is more uncertainty and debate surrounding the path to economic recovery. In terms of the general economic recovery, a useful paradigm is to think of three different shapes of recovery²⁵: V-shaped, U-shaped, and L-shaped (Figure 2). The figure below shows the GDP of three countries after the Great Recession. The V-shaped recovery entails a sharp decline and a fairly sharp recovery, returning to the overall pre-recession GDP trend line. The U-shaped recovery entails a sharp decline and a slower recovery. Under this scenario, GDP does not necessarily recover back to its pre-recession level, even though the growth rate might. The L-shaped recovery is most severe. Not only does GDP not recover to pre-recession levels, the growth rate is permanently lower.

Figure 2: Different Types of Economic Recoveries from the Great Recession



Source: Carlsson-Szlezak P, Reeves M, Swartz P. Understanding the economic shock of coronavirus. *Harvard Business Review*. March, 27, 2020. Available at: <https://hbr.org/2020/03/understanding-the-economic-shock-of-coronavirus>.

Specific to COVID-19, another relevant scenario is the W-shaped recovery, where there is a second contraction following the initial recovery. This scenario accounts for the second potential wave of COVID-19 spread in the latter half of 2020 as some epidemiologists have predicted is possible, depending on the extent and duration of social distancing and the development of testing and a vaccine.¹⁹

At this stage, most economists are predicting some variation of a U-shaped recovery. Obviously, there is a

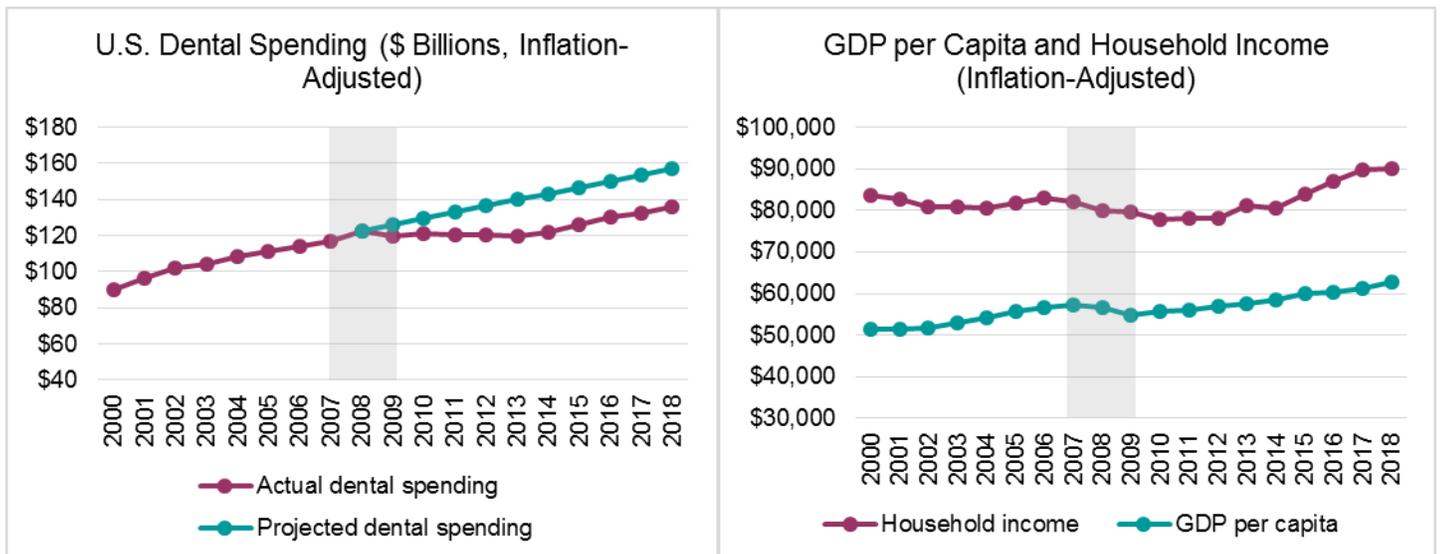
significant data void in many factors that are important for predicting the shape of recovery, including a timeline for re-opening the economy. Analysis by Goldman Sachs, JP Morgan and Morgan Stanley predicts, at this stage, that the U.S. economy will recover to pre-COVID-19 levels no earlier than Q2 2021.²⁶ In our view, this represents a reasonable timeframe at this stage.

Up until the Great Recession, the dental economy roughly tracked U.S. economic recessions but with

mutated effects and very quick recoveries. In fact, Guay and Wall (2015) showed that changes in dental expenditures tracked closely with GDP and personal consumption growth. The correlation between GDP growth and the change in dental expenditures was over 95 percent.²⁷ However, the experience with the Great Recession was different (Figure 3). The recovery

in the dental economy significantly lagged the recovery in the U.S. economy. In fact, it was only in 2015 that dental spending in the U.S. started to grow at pre-Great Recession levels. However, it never caught up to the pre-Great Recession trend line. In fact, it has stabilized at around 80 to 85 percent of projected levels, depending on the data source.²⁸

Figure 3: The U.S. Economy, U.S. Dental Spending and the Great Recession



Source: ADA Health Policy Institute analysis of data from the Bureau of Economic Analysis; U.S. Census Bureau, Current Population Survey, Centers for Medicare and Medicaid Services. **Note:** Shaded portions represent the Great Recession (December 2007 to June 2009).

Data, Methods and Assumptions

In our economic projection model, we modeled four overall scenarios based on two different assumptions regarding the recovery of the U.S. economy and two different assumptions related to how the dental economy tracks the U.S. economy. In terms of the U.S. economy, the first assumption is that the U.S. economy fully recovers in January 2021 and the second assumption is that it recovers in May 2021. This is based on our scan of the most up-to-date economic

forecasts.²⁶ In our view, the May 2021 scenario is more likely.

We have two assumptions for how the dental economy tracks the U.S. economy. One assumption is that the dental economy will recover fully to pre-COVID-19 projected levels in tandem with the U.S. economy. Under this assumption, the dental economy fully recovers to its long-term trend line either by January 2021 or by May 2021. The second assumption is that the dental economy recovers to 80 percent of pre-

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pandemic projected levels, meaning the dental economy does not return to its long-term trend line. This second assumption is more akin to the experience around the Great Recession. In our view, the assumption of 80 percent recovery is more realistic.

With two sets of assumptions regarding the U.S. economy and two regarding how dental spending tracks the U.S. economy, we have four scenarios overall that we modeled.

It is important to note that these projections are, at this stage, subject to a high degree of uncertainty. We drew on the best available data and historical experience, but there is simply very little to draw on. We plan to regularly update these projections as more economic data are published in the coming weeks and months.

We built our dental expenditure projection off of the estimated baseline for annual dental spending generated by CMS for 2020 and 2021.²⁹ Baseline total dental spending, not taking into account COVID-19, is estimated to be \$148.3 billion in 2020 and \$154.9 billion in 2021. In our model, we estimated dental expenditures on a monthly basis. We allocated dental spending to each calendar month based on the percentage of total annual spending that occurred each month in the private dental insurance market, as measured by the IBM Watson MarketScan commercial dental claims database (Table 1). These are seasonality factors that we incorporated into our model when projecting dental spending through December 2021.

We assumed that the current shelter-in-place period started on March 16 and will extend to mid-June. At the time of writing, current guidelines by the CDC and ADA extend through April 30, but it is uncertain how state regulators will react, when dental offices will reopen, to what extent practices will have sufficient personal

protective equipment, and how much patient volume will return. To be conservative, we assumed shelter-in-place recommendations will extend through mid-June. Hence, the shelter-in-place period in our model covers the last two weeks in March, four weeks in April, four weeks in May, and the first two weeks in June.

We used data from the ADA's weekly COVID-19 survey of dental practices to calculate the average collection rate during the shelter-in-place period. The latest data show that 79 percent of dentists reported that their practices were closed but seeing emergency-only cases. Eighteen percent of practices were closed entirely and 3 percent of practices remained open though at a reduced patient volume. Among these three categories of practices, we calculated the average collection rate compared to what is typical (Table 2). We then estimated a weighted average collection rate of dental practices in the U.S. of 7.9 percent of what is typical. This provided an estimate of current dental spending levels compared to what is typical historically. We applied this collection rate factor to estimate monthly dental expenditures in the U.S. during the shelter-in-place period in our model.

Our dental expenditure projection model covers four phases. In phase 1, which covers the period from January 1, 2020 to March 16, 2020, monthly dental expenditures are set at CMS projected levels. Phase 2 covers the shelter-in-place period from March 16, 2020 to June 15, 2020. In phase 3, we assumed that dental expenditures grow at a compounded monthly growth rate until they recover either fully to pre-pandemic projected levels or 80 percent of pre-pandemic levels and that this will happen either by January 2021 or May 2021, depending on the scenario. During phase 3, a seasonality factor is applied to this growth rate. In phase 4, dental spending grows at the rates projected by CMS for the relevant months.

Table 1: Percentage of Total Typical Dental Spending that Occurs Each Month

Month	Percentage
January	9.4%
February	8.2%
March	9.1%
April	8.2%
May	8.6%
June	8.7%
July	8.1%
August	9.0%
September	6.8%
October	7.9%
November	7.7%
December	8.2%
Total	100%

Source: ADA HPI analysis of 2016-17 IBM Watson MarketScan commercial dental claims database.

Table 2: Collection Rate of U.S. Dental Practices During COVID-19 Quarantine Period

Practice Classification	Percentage of Practices	Collection Rate
Percentage of practices that are closed, but seeing emergency only patients	79%	9.4%
Percentage of practices that are closed and not seeing any patients	18%	0%
Open but lower patient volume	3%	17.6%
<i>Overall Collection Rate</i>		7.9%

Source: ADA Health Policy Institute Economic Impact of COVID-19 on Dental Practices survey.

Results

We present four scenarios: in scenario 1, the U.S. economy fully recovers by May 2021 and dental spending recovers to 80 percent of its projected pre-pandemic level by May 2021. In scenario 2, the U.S. economy fully recovers by May 2021 and dental spending recovers fully to pre-pandemic projected

levels as well by May 2021. In scenario 3, the U.S. economy fully recovers by January 2021 and dental spending recovers to 80 percent of its pre-pandemic projected level by January 2021. In scenario 4, both the U.S. economy and dental spending recover fully by January 2021.

Table 3 summarizes our modeling results and compares them to CMS's pre-pandemic projections. Under Scenario 1 (May 2021 economic recovery, dental spending 80 percent recovered), we project total dental spending to be \$49.6 billion in 2020 and \$104.3 billion in 2021. Under this scenario, dental spending is 33.5 percent of its projected pre-pandemic level in 2020 and 67.3 percent in 2021. Put another way, we estimate COVID-19 leads to a 66.5 percent reduction in U.S. dental spending in 2020 and a 32.3 percent reduction in 2021 under this scenario. While there is significantly uncertainty, given the current data and economic forecast as well as the path of recovery for the dental economy post-Great Recession, we feel this is the most likely scenario.

Under scenario 2 (May 2021 economic recovery, dental spending fully recovered), we project total dental spending to be \$50.8 billion in 2020 and \$128.7 billion in 2021. Under this scenario, dental spending is 34.3 percent of its projected pre-pandemic level in 2020 and 83.1 percent in 2021.

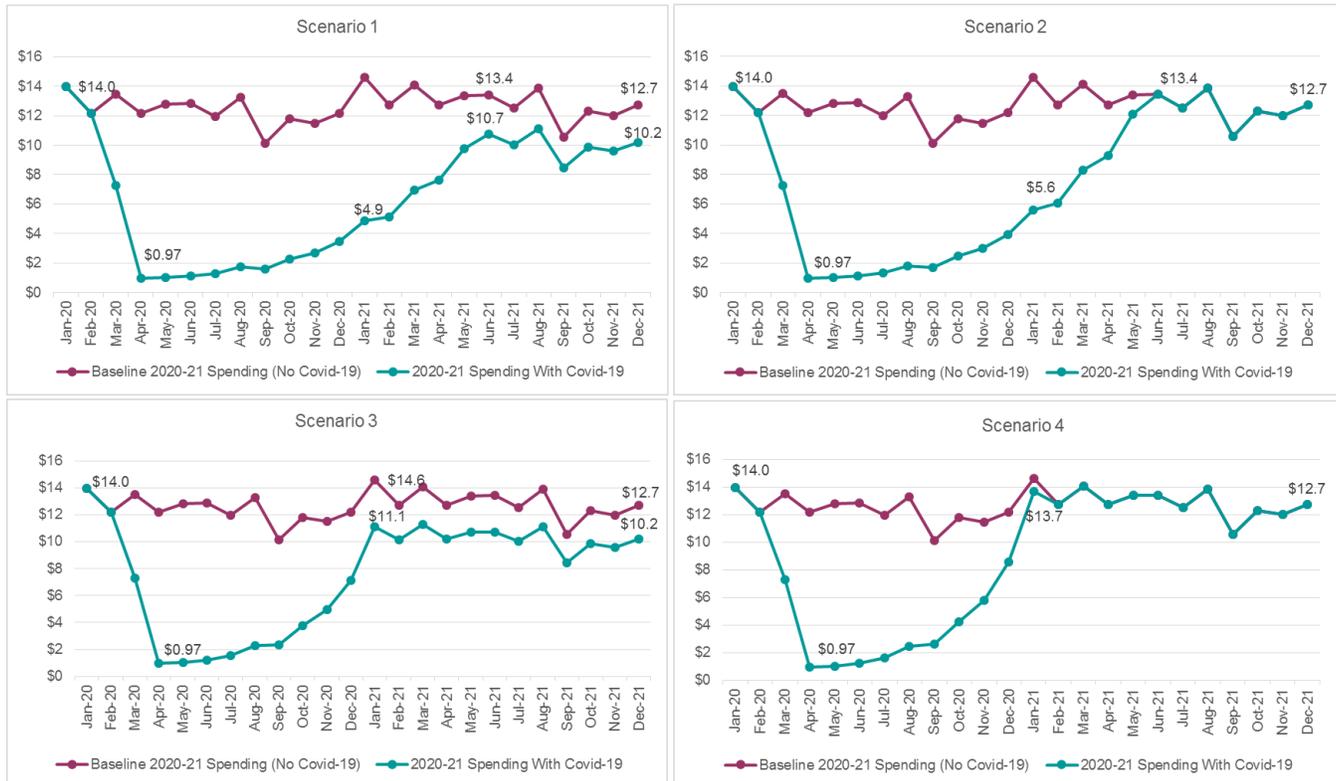
Scenarios 3 and 4 entail a full economic recovery by January 2021 and are, thus, the most optimistic. For example, under scenario 4 where dental spending fully recovers, dental expenditures in 2020 reach 41.8

percent of the pre-pandemic level, and in 2021, there is no negative impact on the dental economy at all.

Figure 4 shows our monthly dental spending estimates under each of the four scenarios and how these compare to CMS's projected dental spending levels pre-pandemic. Dental spending in Scenario 1 drops from \$14 billion in January 2020 to \$0.97 billion in April 2020, which is the nadir in the contraction in the dental economy. Dental spending then recovers to \$4.9 billion in January 2021 and then to \$10.7 billion in May 2021. The other scenarios show a similar pattern but vary in duration of recovery and whether dental spending recovers.

Under Scenario 2, dental spending increases from \$0.97 billion in April 2020 back to its pre-pandemic projected level of \$13.4 billion in June 2021. Table 4 summarizes our findings at the most aggregate level. For 2020, there is less variation in our estimates across the four scenarios, with between a 58 and 66 percent reduction in dental spending compared to projected pre-pandemic levels. In 2021, however, is where our assumptions vary and the different scenarios produce different results, ranging from a 32 percent reduction in dental spending to no reduction.

Figure 4: Projected Monthly Dental Spending under Four Modeling Scenarios (\$ Billions)



Source: ADA Health Policy Institute modeling results.

Table 3: Total Projected Expenditures in Billions (% of CMS pre-pandemic projection)

Scenarios	2020	2021
Economy recovers by May 2021, dental economy recovers to 80%	49.6 (33.5%)	104.3 (67.3%)
Economy recovers by May 2021, dental economy fully recovers	50.8 (34.3%)	128.7 (83.1%)
Economy recovers by January 2021, dental economy recovers to 80%	58.6 (39.5%)	123.3 (79.6%)
Economy recovers by January 2021, dental economy fully recovers	61.9 (41.8%)	154.9 (100%)
CMS Projection (pre-COVID-19)	148.3	154.9

Source: ADA Health Policy Institute modeling results.

Table 4: Estimated Impact of COVID-19 on U.S. Dental Spending in 2020 and 2021

	Dental spending recovers to 100% of projected levels	Dental spending recovers to 80% of projected levels
U.S. economy recovers to pre-COVID-19 level by January 2021	58.2% reduction in 2020 0% reduction in 2021	60.5% reduction in 2020 20.4% reduction in 2021
U.S. economy recovers to pre-COVID-19 level by May 2021	65.7% reduction in 2020 16.9% reduction in 2021	66.5% reduction in 2020 32.3% reduction in 2021

Source: ADA Health Policy Institute modeling results.

Discussion

Our analysis predicts up to a 66 percent reduction in U.S. dental spending in 2020 compared to pre-pandemic projections and up to a 32 percent reduction in 2021 under what, in our judgment, is the most likely scenario. Under other modeling scenarios, the impact is less significant, with a 58 percent reduction in 2020 and potentially little to no effect in 2021. From our perspective, our analysis is based on the best available data, takes into account the dental economy’s recovery pattern post-Great Recession, and incorporates macroeconomic projections of the U.S. economy. Still, the U.S. is in a highly uncertain stage of the pandemic, and we caution against over-interpretation of our analysis. For example, other researchers using a different methodology and different assumptions predict a 27 to 52 percent decline in private dental insurance spending in the first year of the COVID-19 pandemic,³⁰ a smaller decline than we predict.

The extent and pace of the dental economic recovery will depend on several factors, including when the CDC and ADA officially remove the restrictions on elective procedures currently in place and how state agencies respond. It could be that this occurs uniformly across the U.S. in the coming weeks, but given the significant differences in how state governments are managing

the pandemic, it is more likely that dental offices will re-open in staggered waves. Even when restrictions on elective procedures are lifted, the availability of personal protective equipment for dentists could be a major constraining factor in the re-opening of dental offices. New guidelines have recently been released by the ADA on enhanced personal protective equipment. Given rationing of supplies, it is unclear how the situation will unfold. Dental team members may also be reluctant to resume normal work schedules if there are concerns over workplace safety and risk. Taken together, these factors may limit how rapidly dental offices across the U.S. are able to re-open.

On the demand side, there are, in our view, even more significant factors at play that could significantly influence the rebound trajectory of the dental economy even as the supply side re-opens. Our analysis assumes shelter-in-place orders remain in effect until mid-June, even though at this stage it is uncertain if this will be the case. At this stage of the pandemic, public health and safety are still at the forefront. A recent consumer confidence study argues that “regardless of official announcements made by state or federal agencies, individual consumers will form their own judgments about the risks of the COVID-19

virus...based on science, experience, and emotion. Moreover, the fears generated by the coronavirus will not completely disappear anytime soon. Residual fears of exposure to some virus may still limit people's willingness to be in crowds at sport stadiums, theaters, airplanes, cruises, large shopping malls, or even shake hands at the workplace or social events. While most of these changes in behaviors will not be permanent, they will certainly persist over the next few years."³¹ There is no research we know of that examines how the public currently feels about the safety of dental offices, but the HPI is exploring collecting such data.

Beyond any potential issues surrounding perceptions of safety, demand for dental care is closely linked with dental insurance coverage which, in turn, is closely linked to employment. An estimated 70 percent of all dental patients in the U.S. have private dental insurance. With a significant increase in unemployment projected in the coming months, there is a major risk that demand for dental care will stagnate significantly. Moreover, some epidemiologists speculate that there could be intermittent periods of social distancing through 2022 or at least until a vaccine is found. It is

even possible that a resurgence of COVID-19 could occur in the coming years.³² Medical insurance premiums are predicted to increase, meaning that employers may "crowd out" dental care, further limiting dental coverage for employees, which would also constrain demand.

We want to be clear that this first round of projections is highly speculative and subject to significant uncertainty. We have tried to use the best available data and our best judgment but recognize there is so much we do not know about how COVID-19 will impact the U.S. economy. We plan to update our projections regularly as more information becomes available. For example, if new macroeconomic projection data are significantly different than those we drew on in our analysis, this will trigger an update. In states that re-open their economies and dental offices earlier, our bi-weekly polling will give us early insights into the uptick in patient volume. If the uptick is significantly different than what we assumed in our analysis, this will trigger an update. Thus, we anticipate potentially updating our analysis every few weeks.

This Research Brief was published by the American Dental Association's Health Policy Institute.

211 E. Chicago Avenue
Chicago, Illinois 60611
312.440.2928
hpi@ada.org

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Suggested Citation

Nasseh K, Vujicic M. Modeling the impact of COVID-19 on U.S. dental spending. Health Policy Institute Research Brief. American Dental Association. April 2020. Available from:
https://www.ada.org/-/media/ADA/Science%20and%20Research/HPI/Files/HPIBrief_0420_1.pdf?la=en.