

Research Brief

Demand for Restorative Dental Care Varies by Patient Age

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Key Messages

- *Dental insurance claims data from 2005-2017 indicate that utilization of restorative procedures follows a bi-modal pattern, with utilization peaking in early adolescence (age 11-12) and middle age (age 50-52). Utilization of restorative procedures is lowest in early adulthood (age 20-30).*
- *While emphasis on preventive care for all ages may lead to reduced demand for restorative care, providers and policymakers may consider how patients' demand for care varies throughout their lifetimes, tailoring dental insurance benefits and treatment plans to meet age-specific care demands.*

Introduction

The decreasing prevalence of oral diseases, particularly dental caries and periodontal disease, marked a key improvement in U.S. public health in the late twentieth century.¹ Communal, technological and individual preventive measures have made these improvements possible.^{2,3} Success in these areas has shifted dental practice patterns, with providers focusing less on treating the destructive sequelae of oral diseases to overwhelmingly maintaining patients' sound oral health.⁴ In other words, dentistry is shifting from invasive, restorative procedures to preventive and diagnostic treatment.

Data show that utilization of diagnostic and preventive services has been increasing steadily since 2001 while utilization of restorative and other categories has decreased, though this varies by patient age group and dental benefits type (private versus public).⁵ There is a lack of research on how patient age relates to utilization of different types of dental procedures. Understanding patients' evolving dental needs as they age can inform providers and policymakers on how dentistry can best meet the evolving demand for care.

In this research brief, we examine utilization of restorative dental procedures by patient age to find trends in demand across a patient's lifespan.

Results

In 2018, 75.3 percent of procedures performed by dental professionals were diagnostic or preventive compared to 63.7 percent in 2001. Restorative procedures went down in this same timeframe, from 21.6 percent in 2001 to 11.9 percent in 2018 (Figure 1).

Data indicate that restorative procedures by patient age follows a bi-modal pattern, with peaks in early adolescence (age 11-12) and middle age (age 50-52) (Figure 2). In particular, amalgam and resin restorations peaked in early adolescence while crowns and metallic and porcelain/resin inlays peaked in middle age.

The isolated experience of younger patients age 0-26 reveals that restorative dental care utilization begins around age 2, reaches a peak at age 11-12, declines sharply, and remains in a relatively steady state through young adulthood (Figure 3). Tooth extractions in particular highlight this pattern. Other restorative treatments follow a less pronounced rise and fall.

For adults age 26-64, a slow, gradual utilization rate of restorative procedures leads to a peak in the middle fifties to early sixties (Figure 4). Removable dentures and implants in particular lead this pattern. Following the peak, there is a fairly rapid decline in treatment until the end of the observation period, except for endodontic services, which continue to increase. The reduction in restorative procedures among older adults approaches the lowered steady state of care seen in younger patients.

The lowest overall demand for restorative dental care occurs among young adults age 20-30.

Discussion

A clear bi-modal pattern has emerged within dental practices with respect to utilization of restorative procedures and patient age. The first mode begins in early adolescence, peaking in the middle teens, and declining in the early twenties to an approximate steady state up to the middle fifties. The second mode begins in the late teen years, peaking in the middle fifties and declining precipitously to the age limitation of this study (age 65 and older).

The breakout graphs of the younger and older age cohorts within the sample focus on the differing evolutions of the two practice modes for clarity and emphasis. A decline in the amount of treatment received began in both cohorts in the middle fifties. The steep decline seen in older patients is difficult to explain beyond assigning the problem to treatment cost, which is commonly cited.⁶ Recent data suggest financial barriers to dental care have been declining for some age groups;⁷ nevertheless, even those with private dental coverage face cost barriers.⁸

Declining need for restorative procedures, as seen among younger patients, may be due to increased preventive care utilization.^{9,10,11} Cost was, again, the most important factor for not seeking care in all categories of income in that group,⁷ except for families with income above the 400% of the federal poverty level. In that group, the most important factor was the feeling that they did not need any further care.

Perhaps the pattern of restorative care reduction will be repeated among older adults, since much of older adult care is centered on dealing with the sequelae of previous disease.^{12,13} If preventive care utilization were to increase among older adults, we can expect a

reduced demand for restorative care earlier in life as time progresses.

Earlier research¹⁴ identified leading indicators in the general economy that may give hints about future changes in the overall economy, external changes that could affect dental practices. This current study can be used to give some indication of the future revenue status of an individual dental practice related to the demographics of its patient base.

Considering the combination of these factors could lead practitioners to anticipate individual practice economics in the future and adjust as necessary to mitigate any negative impact. Taking into account patient age mix can assist dentists in enhancing practice stability and profitability. Marketing activities and educational outreach programs can focus on segments where optimal results can be expected. An opportunity exists for the 20-30 year age group in particular, whose demand for care is the lowest.

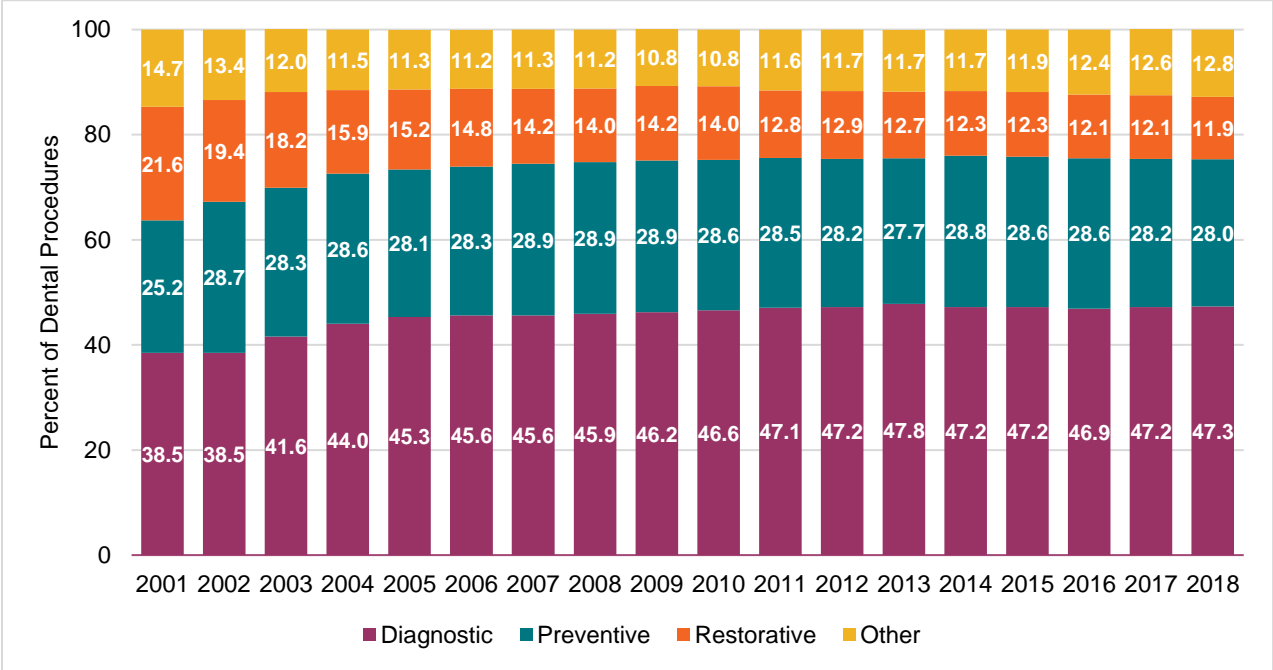
This information can be useful to sellers and potential buyers of dental practices to establish the value and

the potential for growth of a practice. The age distribution of patients can be a critical factor in estimating future gross practice revenue and where opportunities for revenue growth exist.

The patterns of demand for care could also inform how dental benefits should be allocated over a patient's lifetime. Data of this nature and the large database studied from which it was drawn will be very valuable for analysis using artificial intelligence techniques to answer yet-to-be-posed questions to improve dental practice and the health of the public.¹⁵

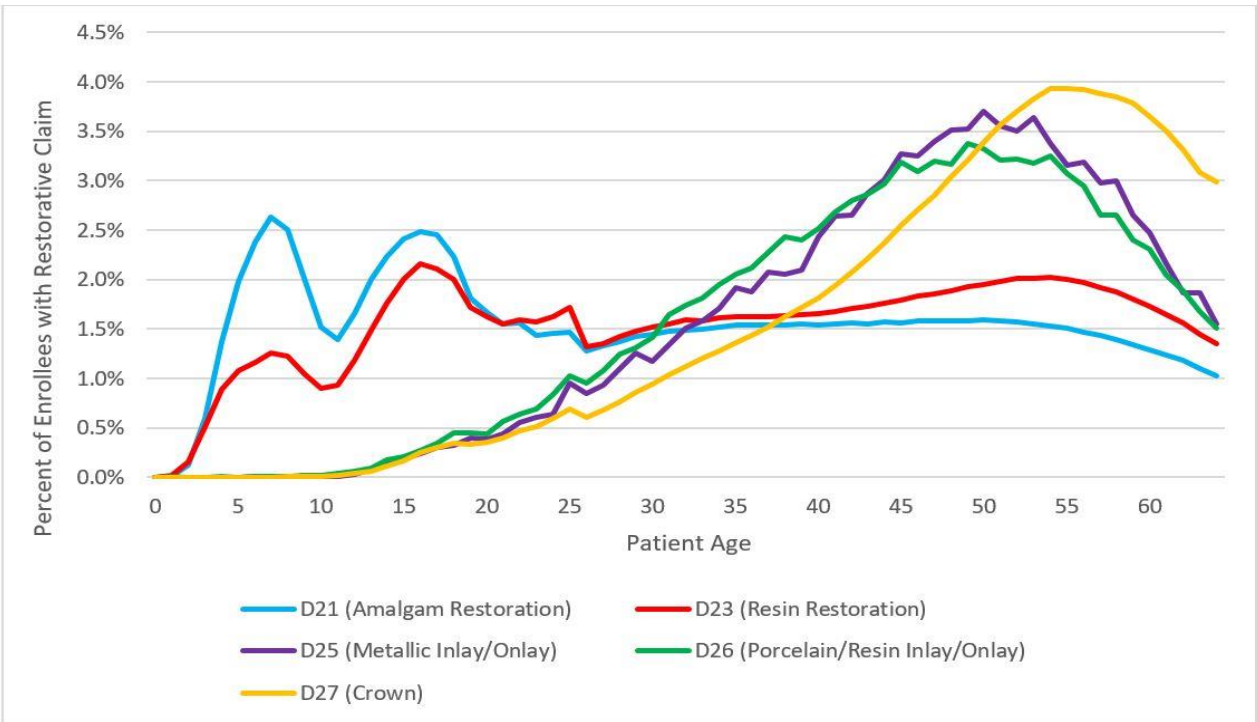
Private dental benefit plans should be reviewed to ensure they provide appropriate benefits for specific age groups while emphasizing preventive care for all. The relatively low level of dental claims during young adulthood and later middle age should be used to fund the increased costs associated with the oral health of older patients rather than increasing their co-payment for these services. In general, the level of cost is greater for treatment provided to adult patients compared to younger patients.

Figure 1: Volume of Dental Procedures by Procedure Type



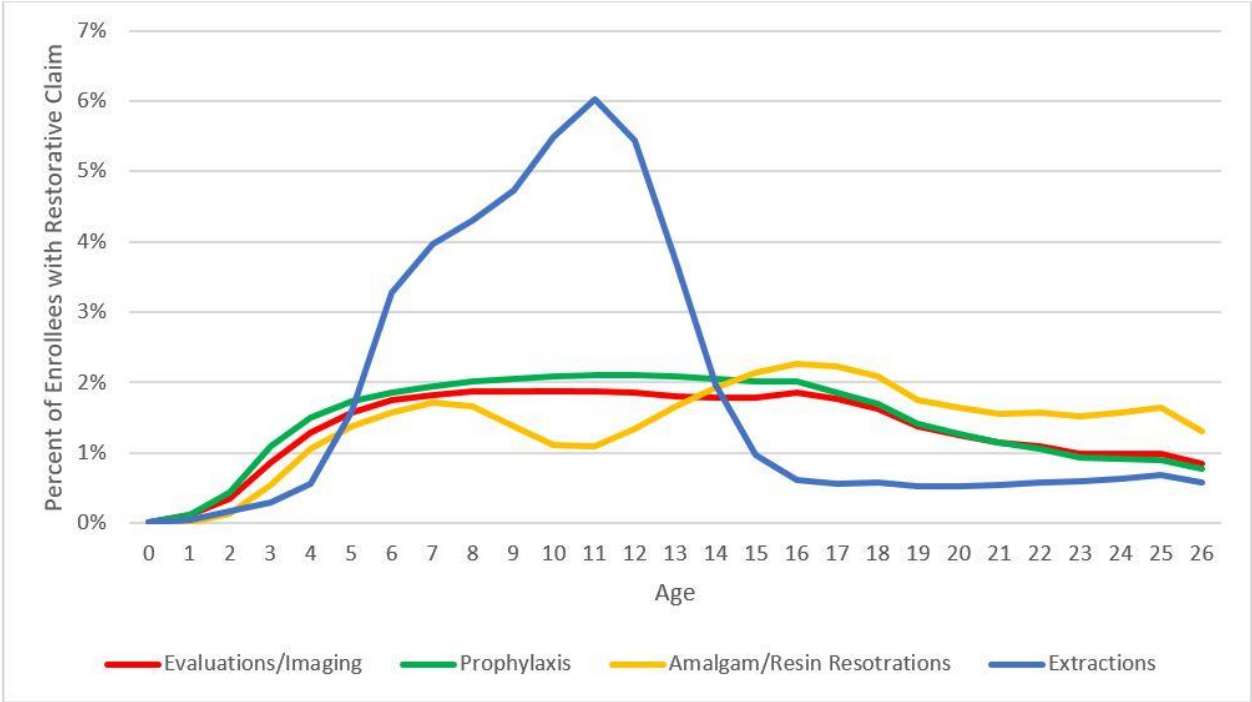
Source: American Dental Association Health Policy Institute Analysis of FAIR Health Database, 2001-2018.

Figure 2: Restorative Procedure Utilization, All Ages, 2005-2017



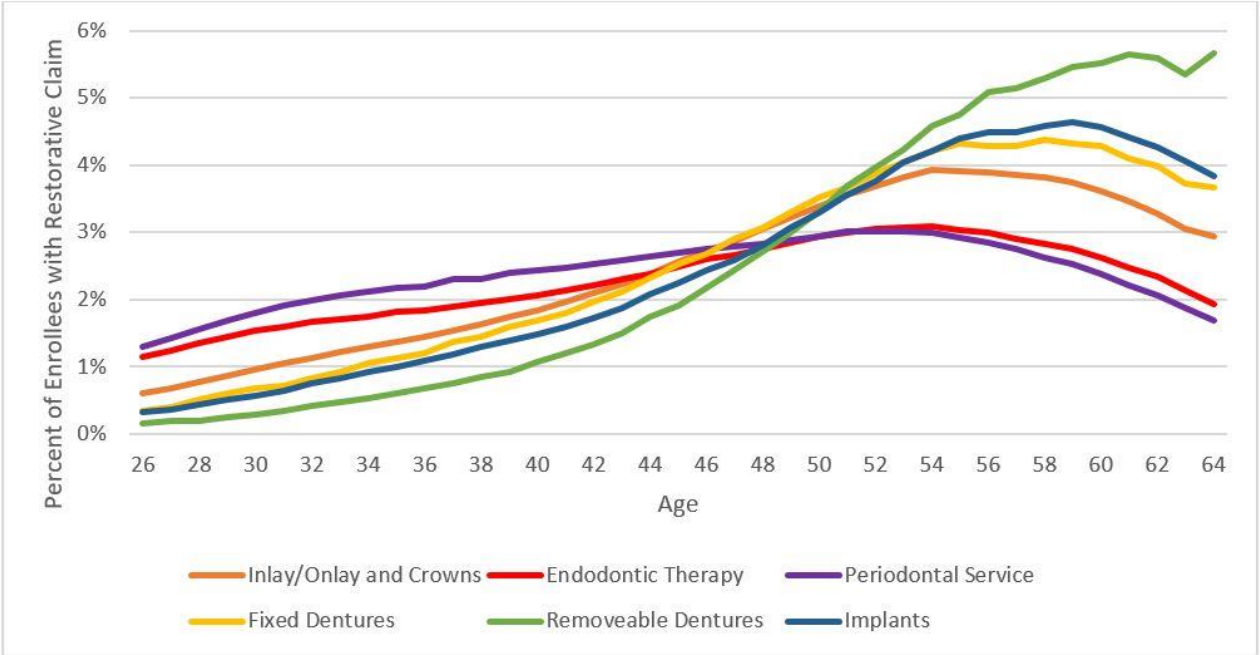
Source: IBM Watson MarketScan Research Database, 2005-2017. Notes: Data reflect percent of privately insured individuals with a restorative dental code claim.

Figure 3: Restorative Procedure Utilization, Age 0-26, 2005-2017



Source: IBM Watson Marketscan Research Database, 2005-2017. Notes: Data reflect percent of privately insured individuals with a restorative dental code claim.

Figure 4: Restorative Procedure Utilization, Age 26-64, 2005-2017



Source: IBM Watson Marketscan Research Database, 2005-2017. Notes: Data reflect percent of privately insured individuals with a restorative dental code claim.

Data & Methods

We analyzed IBM Watson MarketScan® dental database for the years 2005 to 2017. The database contains roughly 370 million claims submitted by dental providers for reimbursement from the patient's private dental plan or dental encounter data if the patient was enrolled in a capitated dental plan. Each record represents a specific service provided to the patient and specifies patient age when restorative treatments were performed, allowing the determination of age-treatment relationships. In addition, any influence of income status on treatment utilization could be partially ameliorated due to third-party subsidization of care.

The dental claims were combined to determine utilization for the privately insured. We analyzed data for patients age 0 to 64; data for those 65 and older were severely limited. We looked at restorative care for all patients as well as the most common dental procedures for the age groups 0-26 and 26-64, which were determined based on observation. Restorative procedures were identified according to the American Dental Association's Code on Dental Procedures and Nomenclature (CDT) manual.¹⁶ Utilization is defined as the number of people who had at least one claim for a particular service divided by the number of enrollees.

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

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Suggested Citation

Guay AH, Blatz A, Harrison B. Demand for Restorative Dental Care Varies by Patient Age. American Dental Association. Health Policy Institute Research Brief. March 2022. Available from: https://www.ada.org/-/media/project/ada-organization/ada/ada-org/files/resources/research/hpi/hpibrief_restorative_care_demand_patient_age.pdf