

Value proposition of teledentistry: Cost savings, improved services, and more

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Telehealth services offer an innovative way for healthcare providers to interact with their patients and provide value to patients, providers, and health plans alike.

Telehealth initiatives have been used in a wide variety of ways: to help patients manage their chronic conditions, to increase capacity in dermatology practices, to decrease mortality and lengths of stay in intensive care units (ICUs),¹ and to provide access to specialists in rural settings,² just to name a few. In each example, telehealth initiatives add value to the healthcare delivery system. Health plans and patients benefit when chronic conditions are better managed and when ICU lengths of stay are shorter. Healthcare providers and patients benefit when office visits are reserved for more severe cases rather than being taken up by patients who can be well served without a live visit. Underserved populations benefit when access to specialty care is improved.

Telehealth services come in many different forms, such as live videoconferencing or other real-time interactions, store-and-forward transmissions (SFT) in which information is electronically transmitted to a practitioner who evaluates cases at a later time, remote patient monitoring (RPM) by providers not in the patient's location, and services using mobile communication devices where messages can be sent to aid, for example, in medication adherence.³

But are all the benefits from telehealth limited to medical care? Could dental health professionals use teledentistry services to provide value to stakeholders similar to those described above?

The American Dental Association (ADA) has added two teledentistry procedure codes for 2018: D9995 for synchronous teledentistry, in which there is a real-time interaction, and D9996 for asynchronous teledentistry, in which recorded health information is sent to a practitioner to evaluate outside of a real-time interaction. Synchronous teledentistry might take the form of a visit to a dental office where only a dental hygienist is available, and the hygienist and patient interact in real time with a remote dentist. An example of asynchronous teledentistry could involve a patient submitting pictures of his

teeth via an app and receiving treatment recommendations from a remote dentist after review. The ADA's guide to using these codes indicates that teledentistry should not be thought of as a procedure but rather as a way to deliver services⁴ that treat, monitor, or otherwise engage patients. The U.S. House of Representatives also recently reauthorized federal grants to support oral health work activities, which states can use toward several initiatives including teledentistry.⁵

This article explores the value proposition that teledentistry could provide to dental plans, dental providers, disease management programs, and populations lacking adequate oral healthcare. We conducted a literature search on teledentistry innovations and used Milliman's internal data sources to assess the cost impact of such products and services.

Let's consider an example of how teledentistry might be used to optimize the frequency of dental office visits. Commercial dental plans typically provide coverage for two dental exams per year for their members. Clinically, some members may not need two exams per year, while others may need more than two for optimal oral health.^{6,7} For illustration purposes, let's assume that teledentistry visits are offered to determine whether a member needs a second exam during a calendar year and that this reduces the number of non-medically-necessary routine live dental exam visits (consisting of an exam and cleaning) by 5% and the number of diagnostic imaging services by 1%. We recognize imaging services occur annually and therefore we would not expect as large of a decrease in these services. Based on analysis we conducted using 2015 Milliman commercial dental research data, dental plans could see an approximately 1% reduction in total billed claim costs.

The table in Figure 1 shows the illustrative overall reduction to total billed claims under the 5% reduction scenario and for other levels of utilization reduction in routine service visits under the assumptions just described. The reduction in overall claims would be offset by the amount paid to the teledentistry service. For this illustration, we assumed that a teledentistry visit cost of \$50 and that 50% of covered members use the teledentistry service. We have also shown the net savings after accounting for the teledentistry visit cost in Figure 1.

FIGURE 1: THEORETICAL REDUCTION IN BILLED CHARGES IF TELEDENTISTRY SERVICE REDUCES ROUTINE DENTAL VISITS

REDUCTION IN LIVE VISIT ROUTINE SERVICES		
(1)	(2)	(3)
Assumed utilization reduction (exam/imaging)	Percent change in billed charges	Percent change in billed charges offset by teledentistry fee*
5% / 1%	-1.4%	4.0%
10% / 2%	-2.9%	2.6%
15% / 3%	-4.3%	1.1%
20% / 4%	-5.8%	-0.3%

* Assuming teledentistry billed charge of \$50 and 50% of members received teledentistry service.

The results shown in Figure 1 are illustrative; the actual cost savings attainable via teledentistry will depend on what proportion of people use the teledentistry service, what proportion of those people avoid a live dental visit as a result and which particular services are avoided, and the relative costs of a live dental visit compared with a teledentistry service. In general, we would expect decreased live services for patients who are considered a low risk for dental events. Recognizing that patients with higher risks for dental events may require more care and therefore cost savings could be somewhat dampened.⁸

But while short-term savings may not always be significant, using teledentistry to optimize the number of services based on each patient's risk profile may, over the longer term, produce better oral health outcomes and avoidance of higher-cost services because of more appropriate routine care. Our illustrative example shows that, if routine procedures could be reduced by somewhere between 15% and 20%, then the teledentistry program generates net savings; results for any particular program will vary. Payers investigating the cost/benefit trade-off of a teledentistry effort should balance the potential for cost reductions via fewer services, offsetting costs including the teledentistry fees, provider education, and the potential impact on patient care and on provider relations.

There are other ways to use technology to improve oral health aside from optimizing the use of live dental visits. Some dental plans monitor brushing and flossing habits of their members in order to provide financial incentives for good oral hygiene. For example, Beam Technologies provides a toothbrush and smartphone app that sends members' brushing habits to the dental insurance plan. The more members brush, the higher the discounts on their dental insurance premiums.⁹

Dental providers could also see value in teledentistry services. For example, according to the American Association of Orthodontists, patients not yet ready for orthodontic treatment are seen periodically to monitor the presence of baby teeth and jaw growth.¹⁰ This "watchful waiting" approach could potentially be done with an SFT telehealth visit using

services such as Toothpic or DM Go Live, thereby freeing up the chair space for patients currently receiving care or for other new patients. Teledentistry referrals for orthodontia have been shown to be as effective as referrals from in-person examinations.¹¹ SFT telehealth services could also be used by dentists to answer questions about specific dental health issues, triage potential dental emergencies, or provide referrals to a dentist for treatment. Remote patient monitoring and other teledentistry innovations can help dentists "expand their practice and not be bound by the four walls of their office."¹²

California's Virtual Dental Home (VDH) is a current working example of how underserved populations receive dental treatment with the use of telehealth technology. Dental and medical health histories are uploaded to a secure site where a dentist evaluates them and forms a treatment plan to be performed by community-based professionals. A cloud-based system called Denticon is used to capture and transmit images to the reviewing dentist. Virtual dental homes are placed in nursing homes, schools, or other community settings, connecting on-site care with remote dentists.¹³ According to the 2016 Virtual Dental Home report about its six years in operation, VDH costs for diagnostic and preventive procedures for children were 40% lower than the Denti-Cal (California's dental Medicaid program) costs for elementary school-aged children and 3% lower for preschool-aged children. Virtual Dental Home "has proven to be a safe, effective and cost-effective system" while providing oral health services to the "most vulnerable and underserved citizens" of California.¹⁴ Several other states, including Arizona, Hawaii, Minnesota, Missouri, Montana, and New York also include teledentistry services in their Medicaid programs.¹⁵

In the category of "one of these things is not like the others," medical management firms or medical plans interested in monitoring patients with chronic conditions could borrow from the dental side and monitor patients' oral health. Diabetes, chronic obstructive pulmonary disease (COPD), and congestive heart failure (CHF) all have oral manifestations of complications, according to a Health Partners Research Foundation (HPRF) eDent study commissioned by the Agency for Health Research and Quality (AHRQ).¹⁶ The study suggests using electronic medical and dental records to inform dentists about a patient's chronic conditions. It recommends that patients monitor their oral health symptoms and report them to their dentists or doctors. Many of the oral manifestations are visual in nature and could be seen in a digital image. They include infection, bleeding, oral ulcerations, and leukoplakia (white patches on gums, insides of cheeks, and bottom of the mouth or tongue). Teledentistry-based diagnosis of oral disease has been shown to be successful when compared to biopsy results.¹⁷ Our literature review found several sources stating dentists are positioned to identify patients with undiagnosed chronic conditions or to observe oral manifestations indicating a deterioration in health status because of the frequency with which patients see a dentist.^{18,19}

Our literature review also found several studies linking good oral health to good overall health, especially for those with chronic conditions.^{20,21} For example, the link between diabetes and chronic periodontitis has been widely studied as has the relationship between periodontal disease and COPD.^{22,23} Teledentistry could play a role in managing the overall physical health, not just the dental health, of chronically ill patients. To that end, some states include “teledentistry as a specialty qualifying for Medicaid reimbursement and/or required to be reimbursed by private insurers.”²⁴ A teledentistry service may provide a cost-effective way to manage the oral health of patients who suffer with chronic conditions, with the potential to save on dental claim costs and even medical costs to the extent that better oral health can aid in managing a disease’s progression.

An evaluation of the potential medical cost savings associated with better oral health is beyond the scope of this article. That being said, chronic medical diseases are expensive and small beneficial changes in their management could produce significant changes in cost. The table in Figure 2 shows the U.S. prevalence rates and estimated annual costs of diabetes, COPD, and heart disease. Let’s suppose that a small portion of the population suffering with these chronic conditions were offered a teledentistry service and let’s further suppose that there was a very modest decrease in their annual medical and dental costs as a result.²⁵ A net decrease of even \$100 in annual medical and dental cost, for just 0.5% of the patients with these chronic conditions in the United States, would save the U.S. health system approximately \$37 million. The table in Figure 3 shows theoretical savings for various portions of the chronic population and net savings amounts. For this analysis we used the U.S. population as of July 1, 2016.²⁶

FIGURE 2: U.S. PREVALENCE RATE AND ANNUAL COST OF CHRONIC CONDITIONS

Chronic condition	U.S. prevalence rate ^{26, 27, 28}	Annual cost ^{26, 29, 30}
DIABETES	9.4%	\$245 billion (2012)
COPD	6.3% of adults	\$50 billion (2010)
HEART DISEASE	11.7% of adults	\$37.2 billion (2010)

FIGURE 3: THEORETICAL SAVINGS WHEN TELEDENTISTRY SERVICE PRODUCES NET SAVINGS (\$ MILLIONS)

Portion of chronic disease population using teledentistry service	U.S. NET SAVINGS IN MEDICAL AND DENTAL COSTS					
	NET SAVINGS OF \$100 PER PERSON PER YEAR			NET SAVINGS OF \$250 PER PERSON PER YEAR		
	Diabetes	COPD	Heart disease	Diabetes	COPD	Heart disease
0.5%	\$15.2M	\$7.6M	\$14.1M	\$38.0M	\$19.0M	\$35.2M
1.0%	30.4M	15.2M	28.2M	75.9M	38.0M	70.5M
2.0%	60.7M	30.4M	56.4M	151.9M	75.9M	141.0M

*Net savings in medical and dental costs of \$36.9M.

Although these net savings amounts were chosen simply to illustrate the total dollar savings associated with very small changes in cost per patient, we wondered what this would mean in more realistic terms. If we again assume a teledentistry service has a billed rate of \$50 and if it could replace just one annual medical office visit for a particular patient, what would the net savings be? Using Milliman data, we found that the national average commercial medical office visit billed rate in 2017 was \$182, so the net savings would be \$132 = (\$182 – 50). If two medical office visits could be avoided, the net savings grows to \$314 = (\$182 x 2 – 50). These per patient savings are relatively consistent with the values in Figure 3 above.

Although the theoretical savings to U.S. spending are small compared to the annual costs of diabetes, COPD, and heart disease, they represent a potential step toward improving the quality and efficiency of care for people with those conditions. Potential savings are proportional to the assumed portion of people in the chronic populations with access to teledentistry services. For underserved populations like those on Medicaid or who live in rural settings, teledentistry services could provide a cost-effective way to improve oral health and potentially improve patient outcomes for those with chronic conditions. For others, providing a modicum of control for the monitoring of their chronic conditions may provide for more engaged patients and a stickier patient/physician bond.³¹

Telehealth and teledentistry in particular provide a value proposition for many stakeholders within the dental industry. Teledentistry can aid in reducing dental claim costs, provide opportunities to grow individual practices, expand services to the underserved, and aid in the management of patients with chronic conditions. As innovations in teledentistry continue to emerge, payers, providers, public health programs, and disease management programs may be able to serve their customers in more efficient ways.

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Footnotes

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