

THE MOUTH

The Missing Piece to Overall Wellness and Lower Medical Costs

WHITE PAPER



UNITED CONCORDIA[®] DENTAL

Protecting More Than Just Your Smile[®]

THE MOUTH

The Missing Piece to Overall Wellness and Lower Medical Costs

Executive Summary

Chronic medical conditions are a widespread issue, affecting an estimated one out of every two adults over 21.¹ And, periodontitis, also known as gum disease, is an epidemic of its own with 47% of Americans having the disease at any one time.²

To understand if there's a connection between the two, United Concordia pursued original research conducted by Dr. Marjorie Jeffcoat, Professor of Periodontology and Dean Emeritus at the University of Pennsylvania School Of Dentistry. The study, published in a peer-reviewed medical journal,³ was conducted on a comprehensive, five-year data set in collaboration with our parent company, Highmark Health, Inc. and evaluated the impact of gum disease treatment on medical costs and hospitalizations for members with certain chronic medical conditions and women who were pregnant. Using medical claims data from Highmark and United Concordia dental plans, nearly 1.7 million insurance records from 2005–2009 were analyzed. Of that data set, 338,891 members were identified with both medical and dental insurance. Data subsets were created by including those with 1) a diagnosis of at least a specified medical condition and 2) evidence of periodontal disease. Chronic conditions included: cerebral vascular disease (stroke), coronary artery (heart) disease, and type 2 diabetes. Also, included in the study were women who were pregnant during this same time period.

Type 2 diabetes was a covariant in this study, meaning that its effect on the outcome, if any, was accounted for when inspecting the results of these other diseases. The study compared members who completed treatment and maintenance for gum disease and those who didn't. For each treatment group of each medical condition, two outcomes were analyzed: 1) total annual medical costs and 2) total annual number of hospitalizations.

The results of this study were presented by Dr. Jeffcoat at the American Association of Dental Research meeting in Charlotte, NC on March 21, 2014⁴ and included data on the average annual medical cost savings and reduction in hospitalizations for those who completed periodontal treatment and maintenance versus those who did not. These results were impressive:

Annual Medical Costs Savings

\$5,681 for members with cerebral vascular disease (stroke)

\$1,090 for members with coronary artery disease (heart)

\$2,840 for members with diabetes (\$1,477 for diabetes outpatient drug costs*)

\$2,433 for women who were pregnant

**Internal Jeffcoat data analysis on diabetes and drug costs. Average savings after seven or more periodontal visits.*

Annual Hospitalization Reductions**

21.2% for members with stroke

28.6% for members with heart disease

39.4% for members with diabetes

***Not applicable for women who were pregnant.*

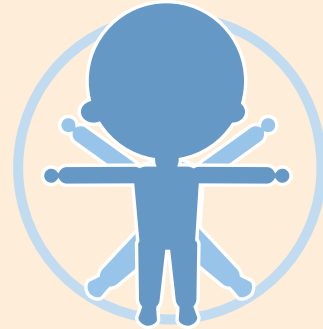
This study showed overall that annual medical costs and hospitalizations were considerably lower for members with chronic medical conditions and women who were pregnant who completed their periodontal treatment and maintenance. When people treated oral health as a key piece of wellness, their overall health care costs and hospital admissions went down across all these condition categories. And, the opportunity for cost savings is significant.

Routine oral care helps prevent and respond to problems early before they develop into complex and more expensive ones. Without a doubt, good oral health is critical to overall health. The right dental coverage makes it easy for members to get the care they need to improve their overall wellness. At United Concordia, we are looking to do that.

Introduction

Periodontal disease and chronic conditions—common and costly

Wellness programs are built on the idea that the body is a system, but there's a piece of the system we forget: the mouth. The mouth plays an important role in people's overall health and wellness. In fact, there's growing scientific evidence that periodontal (gum) disease has a physiological association with chronic diseases, among those: cerebral vascular disease (stroke), coronary artery disease (heart), diabetes and in women who are pregnant. The prevalence of gum disease is staggering with 47% of adults in the U.S. with it today,² and an estimated 74% who will have it at some point in their lives.⁵ Some of them will also have health conditions that can be complicated by infection and inflammation, like diabetes and heart disease. Even more staggering are the medical expenses associated with chronic illnesses and the cost they impose on employer-sponsored health plans. It is estimated that 75% of U.S. total health care expenses were spent on people with chronic conditions. Given these percentages, it's realistic to think that successful treatment of gum disease could improve some of the negative effects of chronic medical conditions.



What is Periodontal Disease?

Understanding the silent threat and its effect on the body

Periodontal disease, commonly known as gum disease, is the result of infection and inflammation of the gums and bone that surround and support the teeth. It starts with the buildup of bacterial plaque—the colorless, sticky film that constantly forms on the teeth. If not removed, plaque hardens into tartar. Toxins released by bacteria in plaque breakdown and irritate the gums. Gingivitis is a mild form of periodontal disease. In this early stage, the gums become red, swollen and can bleed easily. Gingivitis can usually be reversed with daily brushing and flossing, and regular cleaning by a dentist or dental hygienist. Left untreated, gingivitis can advance to periodontitis where the gums pull away from the teeth and form spaces or pockets that become infected. Bacterial toxins and the body's natural response to infection start to breakdown the bone and connective tissue that hold the teeth in place. If not treated, the bones, gums and tissue that support the teeth are destroyed. The teeth eventually become loose or even fall out. Gum disease progresses painlessly, therefore, patients with gingivitis and/or periodontitis may not even know they have it.

Since body is a system—what affects one area can affect others. And, since periodontitis is an infection, it produces a variety of bacteria and inflammatory agents. They get into the body's pathways—like the bloodstream and respiratory system—and travel to other parts such as the pancreas and arteries where inflammation sets in and triggers the chronic conditions diabetes and heart disease, respectively.

The good news? Gum disease can be prevented and treated with good oral care at home and regular dental cleanings. Even in its severe form, periodontitis, gum disease can also be successfully controlled, but may require more extensive treatment such as deep cleanings of the tooth root surface below the gumline or surgical procedures.

Objective

Understanding the connection between oral health and medical costs

We set out to determine if treatment and maintenance of periodontal disease reduced medical costs and inpatient hospital admissions in members with certain chronic medical conditions and women who were pregnant. Periodontal treatment refers to deep cleanings, scaling or root planing or surgical procedures. Chronic medical conditions include: cerebral vascular (stroke) disease, coronary artery disease (heart) and type 2 diabetes. Results were split by medical condition and whether or not members received and completed their periodontal care. Type 2 diabetes was factored in the study as a covariate, meaning it was present and accounted for in some patients already identified with another disease.

Methodology

How our members changed our view of oral care

In partnership with Highmark Health, Inc., we conducted our study, published in a peer-reviewed medical journal,³ using insurance claims data from nearly 1.7 million members enrolled in both medical and dental insurance coverage spanning 2005–2009. From this pool, we identified 338,891 members who had both continuous medical and dental insurance over the study period. Further, data subsets were created by including those with 1) a diagnosis of at least a specified medical condition, and 2) evidence of periodontal disease.

Dental treatment groups

Members who were identified with both a condition and periodontal disease were further categorized into two groups according to whether or not they completed treatment for their periodontitis.

Group 1: Those who completed periodontal treatment ("treatment group")

Group 2: Those who were untreated ("control group")

The treatment group was treated initially and received periodontal therapy for at least four dental visits in 2005 and beyond. The control group remained untreated during the same timeframe. For each specified condition, the treatment and control groups were compared using age, gender and type 2 diabetes as covariates. Two outcomes were calculated from this data:

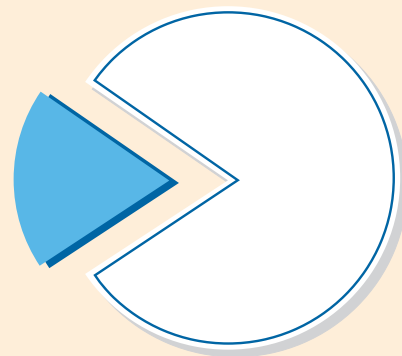
1. Total annual covered medical (non-dental) costs
2. Total annual number of hospitalizations

In this study, we took into account the type 2 diabetes as a covariate since we wanted to be certain that when looking at other chronic diseases, we attributed the savings to that specific disease rather than the possibility of diabetes masking the results of the stroke or heart disease. For example, in the group of patients who had cerebral vascular disease, all of those individuals had cerebral vascular disease, but some also had diabetes. Using ANCOVA, or analysis of covariance, we accounted for the diabetes effect when analyzing the outcomes.

Results

A healthy mouth means healthy savings

We set out to find if periodontal treatment and proper maintenance or incomplete treatment and lack of proper maintenance reduced the cost of medical care and hospitalizations in members identified with a chronic medical condition and in women who were pregnant. In short, we wanted to test our theory that the mouth is the missing piece to overall wellness.



CORONARY ARTERY DISEASE

Annual Medical Costs

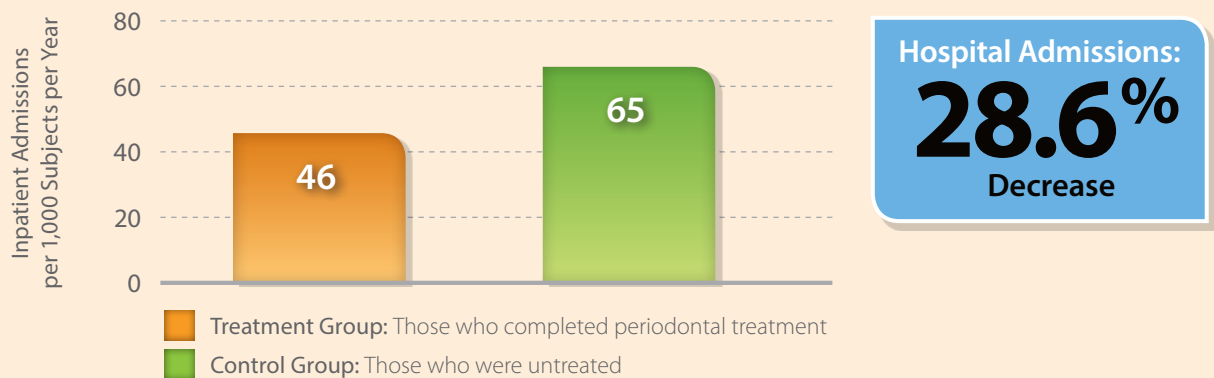
8,458 members in the study were identified with both coronary artery disease and periodontal disease. Of these members identified, 90 completed and maintained their periodontal treatment; 8,368 didn't complete or continue to maintain their treatment.



This data represents an averaged **savings of \$1,090** (10.7%) per patient per year for those who received and completed periodontal treatment at a statistically significant value of $p < 0.04$.

Hospital Admissions

In the case of hospitalizations, of the 8,458 members identified with coronary artery disease and periodontitis, 46 completed treatment and were hospitalized; 65 didn't complete treatment and were hospitalized.



This data represents an **admission rate drop of 28.6%** for those who received and completed periodontal treatment at a statistically significant level of $p < 0.01$.

CEREBRAL VASCULAR DISEASE

Annual Medical Costs

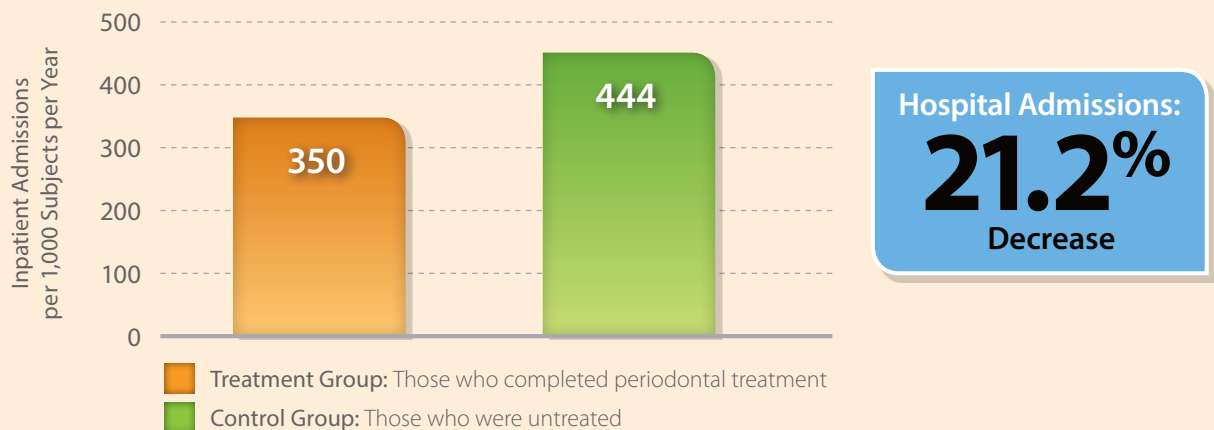
13,007 members in the study were identified with both cerebral vascular disease and periodontal disease. Of these members identified, 139 completed periodontal treatment; 12,868 didn't complete treatment.



This data represents an averaged **savings of \$5,681** (40.9%) per patient per year for those who received periodontal treatment at a statistically significant level of $p < 0.04$.

Hospital Admissions

In the case of hospitalizations, of the 13,007 members identified with cerebral vascular disease and periodontitis, 350 completed treatment and were hospitalized compared to 444 who didn't complete treatment and were hospitalized.



This data represents an **admission rate drop of 21.2%** for those who received and completed periodontal treatment at a statistically significant level of $p < 0.002$.

DIABETES

Annual Medical Costs

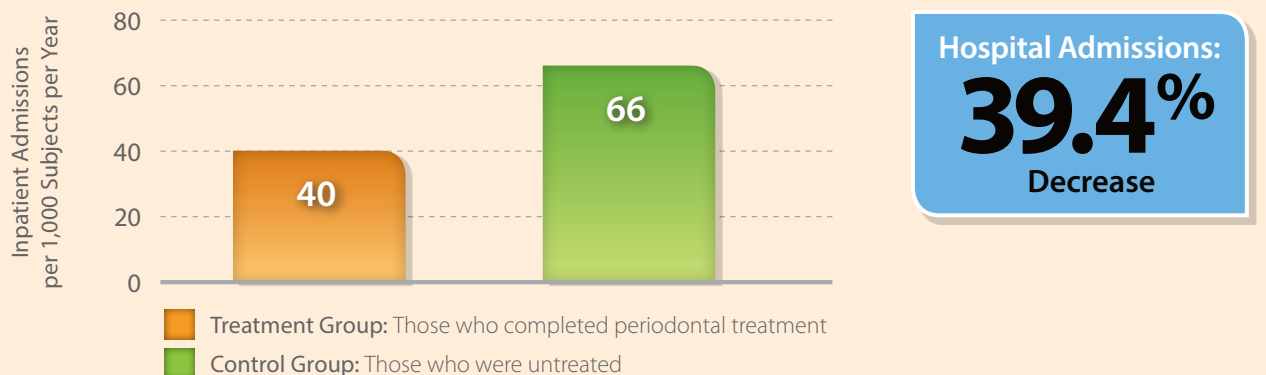
91,242 members in the study were identified with both type 2 diabetes and periodontal disease. Of these members identified, 913 completed periodontal treatment; 90,329 didn't complete treatment.



This data represents an averaged **savings of \$2,840** (40.2%) per patient per year for those who received periodontal treatment at a statistically significant level of $p < 0.04$.

Hospital Admissions

In the case of hospitalizations, of the 91,242 members identified with type 2 diabetes and periodontitis, 40 completed treatment and were hospitalized compared to 66 who didn't complete treatment and were hospitalized.



This data represents an **admission rate drop of 39.4%** for those who received and completed periodontal treatment at a statistically significant level of $p < 0.05$.

ADDITIONAL FINDINGS ...

Outpatient Drug Costs in Diabetic Members

Outpatient Drug
Cost Savings:
\$1,477

We also conducted an internal study of annual outpatient pharmaceutical savings for members with diabetes. We expected that drug costs would decrease over the longer term as the periodontal disease was better controlled and maintained. Our findings indicated that drug costs initially increased over the first two visits, but after a period of seven periodontal visits of treatment and maintenance, the result was a **reduction in annual drug costs of \$1,477** for periodontally-treated diabetics compared to those who were untreated.

PREGNANT WOMEN

Annual Medical Costs

8,342 pregnant women in the study were identified with periodontal disease. Of these women identified, 22 completed periodontal treatment; 8,320 didn't complete treatment.



Average Savings:
\$2,433
Per Patient Per Year

This data represents an **averaged savings of \$2,433** (73.7%) per patient per year for those who received periodontal treatment at a statistically significant level of $p < 0.001$.

Conclusion

Treating gum disease can have an overall effect on wellness and medical cost savings

Our study proved significantly lower medical costs and fewer hospitalizations among members with certain chronic medical conditions who completed their periodontal treatment and maintenance compared to those who didn't complete their periodontal therapy. Savings for those individuals who completed periodontal care were observed across the chronic medical disease categories of: cerebral vascular disease, coronary heart disease, and diabetes and we also saw this affect in pregnant women. The difference in medical savings suggests a connection between the lack of or incomplete periodontal treatment and maintenance and overall medical costs. It also implies that simple, noninvasive periodontal therapy may improve health outcomes in people with systemic conditions and in pregnancy.

While periodontal treatment improves overall health, lessens disease complications and lowers medical costs for people with such chronic conditions, it doesn't mean individuals should be complacent about treating their oral health. Routine oral care at home combined with regular dental visits can mean the difference between preventing or identifying simple, affordable problems early, versus treating major, more expensive ones later.

Solution

The right oral care so everyone can reap the benefits

As we saw in our research, preventing and treating periodontal disease definitely reduces the financial impacts of conditions affected by infection and inflammation. The science suggests that it may have positive effects on the overall health of those individuals as well. But, most dental plans don't fully cover periodontal care; leaving many people with a choice to let their periodontitis go untreated or undertreated so they can save money. The right dental coverage makes it easy for members to get the care they need to improve their overall health.



We can customize the right combination of plans and riders to make an opportunity for significant medical cost savings. We also have the resources to provide an integrated solution that delivers education and targeted outreach to engage members to take control of their oral health to improve their overall wellness. And, with access to health information, we can work

with medical care providers to identify and track members with both chronic conditions and gum disease who can benefit most from better dental care. We can help close the gap between oral health and total body health.

Next Steps

Future studies are planned to look at these data in more detail over an even larger period of time. We are considering the investigation of several other chronic diseases shown to be affected by periodontal disease, the prospective costs associated with these study participants, and other behavior factors that may affect the costs and productivity of individuals who have periodontal disease and whether or not they have the condition treated.

Acknowledgment

We graciously acknowledge **Dr. Marjorie Jeffcoat, D.M.D.**, a pioneer in the study of the relationship between oral and systemic disease, for her commitment to ongoing research on the oral-systemic connection. A graduate of Harvard School of Dental Medicine and Massachusetts Institute of Technology, she is a professor and Dean Emeritus at the University of Pennsylvania School of Dental Medicine. Dr. Jeffcoat has authored more than 200 papers and received numerous clinical and research awards. She is the periodontics spokeswoman for the American Dental Association (ADA) and has served as past president of the Academy of Osseointegration, the American Association of Dental Research and the International Association for Dental Research. Dr. Jeffcoat maintains a dental practice in Philadelphia and treats patients with complex dental and medical needs.

1. CDC, National Center for Chronic Disease Prevention and Health Promotion. "The Power of Prevention: Chronic disease ... the Public Health Challenge of the 21st Century." 2009.
2. CDC. "Prevalence of Periodontitis in Adults in the United States: 2009 and 2010." Sept 2012.
3. Jeffcoat MK, Jeffcoat RL, Gladkowski PA, Bramson JB, Blum JJ. *Impact of Periodontal Therapy on General Health: Evidence from Insurance Data for Five Systemic Conditions*, American Journal of Preventive Medicine, 47 (2014) pp. 174–182. DOI: 10.1016/j.amepre.2014.04.001
4. Jeffcoat, M., et. al., Periodontal Therapy Reduces Hospitalizations and Medical Costs in Diabetics, Abstract, American Association of Dental Research, March 21, 2014.
5. <http://statisticbrain.com/dental-hygiene-statistics/> Web. 24 April 2012.

About United Concordia Dental

United Concordia is an innovative dental wellness company working to deliver high-quality, cost-effective dental care. Headquartered in Harrisburg, Pa., the company has more than seven million members, one of the nation's largest dentist networks, an A.M. Best A– (Excellent) rating and is licensed in all 50 states, D.C. and Puerto Rico. United Concordia has a companywide dedication and commitment to superior customer service, which is evident in the design, implementation, administration and servicing of research-backed wellness programs. For more information about United Concordia products, visit www.UnitedConcordia.com.

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