State of Wisconsin
Department of Health Services
Tony Evers, Governor
Karen E. Timberlake, Secretary

May 4, 2022

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Senate Co-Chair
Joint Committee on Finance
Room 316 East, State Capitol
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Madison, WI 53707

The Honorable André Jacque, Chair
Senate Committee on Human Services, Children and Families
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The Honorable Scott Krug, Chair
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Mr. Michael J. Queensland
Senate Chief Clerk
Room B20 Southeast, State Capitol
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Mr. Edward A. Blazel
Assembly Chief Clerk
17 West Main, Room 401
Madison, WI 53703

Dear Senators, Representatives, and Chief Clerks:

I appreciate the opportunity to provide the Legislature with an update on the Wisconsin Department of Health Services (DHS) Dental Reimbursement Pilot Project, which operates within the State's Medicaid program.

2015 Wisconsin Act 55 authorized and funded the Dental Pilot Project, directing DHS to increase reimbursement rates for pediatric dental care services and adult emergency dental services provided in Brown, Marathon, Polk, and Racine counties. DHS implemented the rate increase for the eligible services in those counties beginning October 1, 2016.

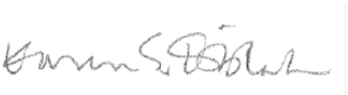
2017 Wisconsin Act 34, creating Wis. Stat. § 49.45(24k)(c), directs DHS to submit a report, by January 1, 2020 and biennially thereafter, about the Dental Pilot Project to the Legislature's committees with jurisdiction over health or public benefits and to the Joint Committee on Finance.

The first report was submitted in 2020, making this our biennial report for 2022. The findings in the first and second reports did not differ.

It is important to note that Wisconsin's 2021 Budget Act 58 increased reimbursement rates by 40 percent for all dental providers in the State of Wisconsin, except for those in the four pilot counties, who have received and will continue to receive the 50 percent rate increase associated with this pilot. Therefore, dental access comparisons between the pilot and other counties in future biennial reports will reflect this new landscape of increased dental rates statewide.

DHS recognizes the difficulties members continue to experience accessing dental services. We remain committed to working with dental providers and the Legislature to remedy these challenges.

Sincerely,



Karen E. Timberlake
Secretary-designee

2021 Medicaid Dental Pilot Program Evaluation

Final Report

Submitted to the

Wisconsin Department of Health Services

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CONTENTS

LIST OF TABLES

LIST OF FIGURES

1 EXECUTIVE SUMMARY

Wisconsin's Medicaid dental reimbursement pilot program increased Medicaid payment rates for pediatric dental services and eight specific adult emergency dental services, operating as a pilot in Brown, Marathon, Polk, and Racine counties. The Wisconsin Department of Health Services (DHS) implemented the rate increase on October 1, 2016, and the program has been in effect since that date.

Authorizing legislation specified that DHS measure and report on several outcomes from this pilot initiative. This evaluation addresses those questions, summarized as follows:

1. Who received services, and did the pilot program change access to services by Medicaid members?
2. Who provided services, and did the pilot program change the amount of participation in Medicaid/providing dental services to Medicaid members?
3. How much did the program cost, and did it result in any cost savings?

The evaluation includes all dental claims for the period October 2014 through February 2020, allowing observation for two years before the pilot was implemented and three-and-one-half years after the pilot was implemented. The evaluation measures the difference in outcomes before and after implementation in the pilot counties, compared to the differences in outcomes before and after that same time point in counties that did not participate (non-pilot counties). This allows estimates of causal effect attributed to the pilot program itself, accounting for other trends that could have caused any observed changes.

Who received services, and did the pilot change access to services by Medicaid Members?

The pilot increased services in two of the pilot counties: Brown and Marathon. This is measured by the percentage of BadgerCare members who reside in the county and received any dental services. Brown County seems to have particularly benefited from a factor outside of the pilot program, which is described in the report below.

Although the percentage of BadgerCare members who received care did increase in these counties, the overall percentage is still low relative to nation-wide estimates, suggesting that there is room for further improvement in access to dental care in Wisconsin.

Who provided services, and did the pilot program change the amount of participation in Medicaid/providing dental services to Medicaid members?

The provision of services changed in Polk and in Brown County after the pilot was implemented. It is important to note the differences in these counties- one rural and one urban.

In Brown County, there was a large increase in the number of providers immediately after the pilot was implemented. However, this measure of access to care decreased dramatically in February 2019, likely due to changes in billing practices. Though the total number of visits increased and remained higher in Brown County, it was not statistically significant compared to other counties.

There was a significant and sustained increase in the number of providers rendering dental services in Polk County after the pilot. This was accompanied by an increase in the total number of visits for dental care rendered in Polk County. However, the number of visits per provider did not change, indicating that the changes in the total number of visits is driven by the increase in providers.

The pilot program, if it had expanded access to regular and preventive care for adults, might have averted the need for emergency services. However, the pilot counties demonstrate no such reduction in the use of emergency services relative to their comparison counties.

How much did the program cost, and did it result in any cost savings?

Total payments made by the Wisconsin Medicaid program for dental services in the four counties during the pilot period amount to $71.6 million. This covers over 1.3 million services. In the absence of the pilot, total expected payments are $30.9 million in the four pilot programs.

Overall, the pilot program confirms findings in previous literature, that an increase in Medicaid payment appears necessary but certainly not sufficient to improve access to dental services. The results reported here suggest that the pilot program increased the percentage of BadgerCare members that received dental services in Brown and Marathon County. In addition, the increased reimbursement rates induced more dentists to participate in the Medicaid program, as observed in Polk County and Brown County. The pilot program did not reduce the use of emergency department visits related to dental care. And, overall, the level of dental service use by Medicaid members in the pilot counties remains well below that of patients with commercial insurance.

2 PROJECT BACKGROUND

2.1 PROJECT OVERVIEW: FOUR COUNTY MEDICAID PILOT PROGRAM

Wisconsin's 2015 Budget Act 55[1] created a pilot program that enhanced Medicaid dental services reimbursement, with the intent to increase the participation of dentists in the state Medicaid program.[2] The pilot program increases Medicaid payment rates for pediatric dental services and eight specific adult emergency dental services, operating as a pilot in Brown, Marathon, Polk, and Racine counties. The Wisconsin Department of Health Services (DHS) implemented the rate increase on October 1, 2016, and the program has been in effect since that date.

The four pilot program counties represent both rural and urban areas of Wisconsin, as well as fee-for-service and managed care dental payment models. Table 1 shows select characteristics of the participating counties. At least 30 percent of children in each county were enrolled in BadgerCare in October 2016, the start of the pilot. This value ranges from a low of 30.4 percent in Brown County to 37.2 percent in Polk County. The percentage of adults enrolled is substantially lower, ranging from 5.6 percent in Brown County to 7.6 percent in Racine County.

[1] 2015 Wisconsin Act 55. Page 325. Available at https://docs.legis.wisconsin.gov/2015/related/acts/55.pdf

[2] Wisconsin Legislative Fiscal Bureau. Dental Access Initiatives. Paper #365. LFB 2019-21 Budget Summary: Page 173, #12. May 2019. Available at https://docs.legis.wisconsin.gov/misc/lfb/jfcmotions/2019/2019_06_04/002_health_services/008_paper_365_dental_access_incentives

Table 1: Selected Characteristics of Pilot Program Counties[3]

	Brown	Marathon	Polk	Racine
Total Population	261,368	135,396	43,438	195,602
Percentage of Population with Incomes Below the FPL	9.8	9.2	9.2	12.4
Percentage of Children (Age <18) with Incomes Below the FPL	12.8	12.8	12.9	18.5
Percentage of Adults (Age 19-64) with Incomes Below the FPL	9.2	8.3	8.5	11.4
Medicaid Dental Payment Model	Fee-for-Service	Fee-for-Service	Fee-for-Service	Managed Care
Percent of children enrolled in BadgerCare, October 2016, excluding income extensions	30.4	31.3	37.2	37.0
Percent of adults ages 19-64 enrolled in BadgerCare, October 2016, excluding income extensions	5.6	5.8	6.8	7.6

NOTE: FPL stands for Federal Poverty Line.

Authorizing legislation in 2017 Wisconsin Act 344[4] specified that DHS measure and report on the following outcomes from this pilot initiative:

1. The number of Medical Assistance recipients who received services under the pilot program in total and specified by those who received pediatric care and who received adult emergency dental services.
2. An estimate of the potential reduction in health care costs and emergency department use by Medical Assistance recipients due to the pilot project.
3. An analysis of Medical Assistance recipient populations who received services under the pilot project and populations who may benefit from the pilot project.
4. The feasibility of continuing the pilot project and expanding the project in specific areas of the state or statewide.
5. The amount of moneys distributed under the pilot project and, if moneys allocated for the pilot project were not distributed, a summary on why the moneys were not distributed.

The increased payment rates for the pilot counties more than doubled the statewide Medicaid reimbursement rates. See Attachment for the rate schedule for the pilot program targeted services.

[3] Population data from ACS Table DP05, ACS Demographic and Housing Estimates, 2019 5-Year Estimates: Poverty Data from ACS Table S1701; Poverty Status in the Past 12 Months, 2019 5-year Estimates; Medicaid Enrollment Data from Wisconsin Medicaid - ForwardHealth Enrollment Data, October 2016. Available at https://www.forwardhealth.wi.gov/WIPortal/content/Member/caseloads/481-caseload.htm.spage

[4] 2017 Wisconsin Act 344. Available at https://docs.legis.wisconsin.gov/2017/related/acts/344

The rate increase applies to services provided through both fee-for-service and managed care arrangements.

Payment increased for:

- Pediatric dental services, including all dental services provided to members 0- to 20-years old, and
- Adult (age 21 and above) emergency services, including a subset of oral evaluations, X-rays, and extractions that are commonly provided as emergency dental care in a dental office.

The Wisconsin Dental Association worked with the DHS in selecting the list of covered adult emergency dental services. They intended that the pilot allow adult MA patients to obtain urgent dental care from dentists, "thereby lowering visits to emergency rooms and reducing the number of prescriptions needed for pain and infection which do not solve the underlying oral health issues."[5] These service codes occur outside the hospital setting.

It is important to note that the payment increase does not apply to services billed through a federally qualified health center (FQHC), because these clinics already receive higher Medicaid payment under a cost-related prospective payment system. FQHCs operate and provide dental services in Brown, Marathon, and Polk counties. While Racine County does not have an FQHC dental clinic, both Kenosha and Milwaukee counties do have clinics that may serve Racine County residents. During the same period of Medicaid pilot program implementation, FQHCs also received new federal and other funding to expand their dental services. Those changes in capacity, separate from the Wisconsin Medicaid dental pilot program, also had an influence on Medicaid dental service trends.[6]

DHS reports that the pilot counties varied in the level of organized effort focused on gaining dental provider participation. In particular, Brown County appears to have benefited from a well-organized community effort led by its local Oral Health Partnership (OHP).[7] DHS worked on the program planning and implementation of the dental pilot, with the participation of the Wisconsin Dental Association

[5] Wisconsin Dental Association. Dental Medicaid. Available at https://www.wda.org/bill-status/dental-medicaid

[6] Valid evaluation of any trends in dental service use by Medicaid members during this time period requires a sorting between those service changes linked to FQHC program changes, separate from the Medicaid pilot program. The methods section later in this report will explain this further. The Wisconsin DHS had contracted with the University of Wisconsin-Madison Population Health Institute (UWPHI) to conduct an evaluation of the pilot program after one year of implementation. That report was delivered to DHS in February 2019. That study, however, relied on aggregate county-level data, did not separate FQHC from other provider data, and did not use methods that allowed for causal inferences, so that study was unable to draw conclusions about the reasons for any observed changes in dental service use or provision.

[7] See Oral Health Partnership information here: https://www.smilegb.org/history-of-ohp

(WDA). The WDA promoted dentists' participation in the program,[8] rating the enhanced payment rates as "quite comparable" to dentists' contracted commercial insurance plan rates.[9]

A previous version of this report, submitted to DHS in June 2020 focused on the outcomes for the two-year period following the implementation of the pilot.[10] A discussion of the changes since the initial report was released and the current report are found in Section 5.

2.2 Background Literature

The Wisconsin Medicaid program covers various dental services for children and adults, including comprehensive coverage of dental exams, cleanings, diagnostic services, fillings, crowns, periodontics, and other dental services. Wisconsin is one of 18 states that includes Medicaid comprehensive dental services in adult coverage; 16 states offer limited coverage, and the other states cover only emergency services or offer no coverage.[11] Wisconsin Medicaid pays for dental services primarily on a fee-for-service basis in 66 of the 72 Wisconsin counties. In the remaining six counties, the DHS contracts with managed care organizations for delivery of dental services to most eligible members.

DHS reported that, for CY2014, Wisconsin's average statewide use of dental services was 43 percent for children and 34 percent for adults.[12] A separate report for federal fiscal year 2016, shows 30.7 percent of Wisconsin children covered by Medicaid/BadgerCare received any dental service.[13] Wisconsin's rate was among the lowest in the country, and compared unfavorably to 48.2 percent of Medicaid children nationally receiving any dental service during that period.[14]

The American Dental Association reports that, as of 2019, about 38 percent of Wisconsin dentists participate in providing services to the Medicaid program, compared to about 43 percent of dentists

[8] "What is the dental Medicaid pilot and why should I participate?" Wisconsin Dental Association. Available at https://www.wda.org/blog/dental-medicaid-pilot-participate

[9] "How do the new enhanced Medicaid rates compare to commercial insurance companies?" Wisconsin Dental Association. Available at https://www.wda.org/wp_super_faq/new-enhanced-medicaid-rates-compare-commercial-insurance-companies

[10] "Medicaid Dental Pilot Program Evaluation" by Gwyn Pauley, Donna Friedsam, David Hoang, Anita Nsubuga, and Sandra Spirovska.

[11] Center for Healthcare Strategies. Adult Dental Benefits: An Overview. Fact Sheet, September 2019. Available at https://www.chcs.org/media/Adult-Oral-Health-Fact-Sheet_091519.pdf

[12] Wisconsin Department of Health Services. Medicaid Plan for Monitoring Access to Fee-for-Service Health Care. 2016. Available at https://www.dhs.wisconsin.gov/publications/p01565.pdf

[13] Annual EPSDT Reporting Using the Form CMS-416. Available at. https://www.medicaid.gov/medicaid/benefits/epsdt/index.html

[14] Annual EPSDT Reporting Using the Form CMS-416. Available at https://www.medicaid.gov/medicaid/benefits/epsdt/index.html

nationally.[15] In the neighboring state of Minnesota, a reported 59 percent of dentists participate. The percentage of Wisconsin dentists enrolled to provide service in the Medicaid program is lower than other types of health care providers; the majority of enrolled dentists are inactive or provide very limited service to Medicaid members.[16] For calendar year 2017, of those who were enrolled as a Medicaid provider, 38 percent were inactive and saw zero patients during the calendar year, 36 percent had limited participation and saw between one and ten patients, and 25 percent were active and saw over 100 patients.

Beyond limited provider availability, several other factors influence the use of dental services by Medicaid members. These include lack of knowledge about dental service coverage and/or about the importance of regular dental care, difficulty finding time to visit the dentist during dental office hours, transportation barriers, and childcare challenges.[17]

Dental providers cite low Medicaid reimbursement rates, along with burdensome administrative requirements and the cost of missed appointments as reasons for not participating in the Medicaid program. [18] For example, dental providers in California who participate in Medicaid (Medi-Cal) cited low fees, denial of payments, and missed appointments as the biggest problem with accepting Medicaid patients. Non-participating dentists were more concerned with missed appointments and complicated paperwork.[19] Surveys administered to practicing dentists in Iowa suggest that even without increasing reimbursement rates for Medicaid, providers would be willing to increase participation if states improved claims processing and care coordination to reduce missed appointments.[20] In a separate, but related survey, dentists were asked about their willingness to treat Medicaid-enrolled adolescents with intellectual and developmental disabilities, the main factors influencing their decision were reimbursement rate and appointment keeping.[21] Additionally, surveys administered to dental students found that Medicaid was largely ignored in curriculum and that improved practice management and

[15] American Dental Association. Dentist Participation in Medicaid or CHIP. Health Policy Institute Infographic, 2019. Available at https://www.ada.org/-/media/project/ada-organization/ada/ada-org/files/resources/research/hpi/hpigraphic_0820_1.pdf

[16] Wisconsin Department of Health Services. Medicaid Plan for Monitoring Access to Fee-for-Service Health Care. 2016. Available at https://docplayer.net/221032256-Dentist-participation-in-medicaid-how-should-it-be-measured-does-it-matter.html

[17] Centers for Health Care Strategies, Inc. Medicaid Adult Dental Benefits: An Overview. July 2018. Available at https://www.chcs.org/media/Adult-Oral-Health-Fact-Sheet_072718.pdf

[18] Centers for Health Care Strategies, Inc. Medicaid Adult Dental Benefits: An Overview. July 2018. Available at https://www.chcs.org/media/Adult-Oral-Health-Fact-Sheet_072718.pdf

[19] Damiano P.C., Brown E.R., Johnson J.D., Scheetz J.P. (1990) Factors affecting dentist participation in a state Medicaid program. *Journal of Dental Education* 54(11). 638-643.

[20] Kateeb E.T., McKernan S.C. Gaeth G.J., Kuthy R.A., Adrianse N.B., Damiano P.C. (2015) Predicting dentists' decisions: a choice based conjoint analysis of Medicaid participation. *Journal of Public Health Dentistry* 76(3). 171-178.

[21] Donald C.L., Kateeb E.T. (2020) Factors influencing dentists' willingness to treat Medicaid-enrolled adolescents. *Journal of Public Health Dentistry* 81(1). 42-49.

experiential opportunities would be effective in increasing knowledge about Medicaid.[22] The Wisconsin Legislative Fiscal Bureau has cited low Medicaid payment rates as a reason that many dental providers in Wisconsin do not participate in the program or restrict the number patients they serve.[23]

The Medicaid program pays providers lower fees for health services overall compared to what providers receive from other payers.[24,25] The Medicaid-to-Medicare fee index—a measure of Medicaid physician fees relative to Medicare fees is 72 percent nationally, and 62 percent in Wisconsin.[26] The American Dental Association reports Wisconsin as among three states nationally with the lowest Medicaid fee-for-service reimbursement as a percentage of fees charged by dentists and as a percentage of private insurance payments, for both child and adult dental services.[27] By these measures, Wisconsin Medicaid pays about a third of charges and private insurance levels. An important note, however: Wisconsin's health care prices are generally among the highest nationally,[28] so a part of these fee-to-charge ratios could reflect the market power of the Wisconsin provider sector in leveraging higher prices in the commercial market.[29]

Most of Wisconsin's residents live in federally-designated Health Professional Shortage Areas (HPSA) for dental services, meaning substantially fewer practicing dentists than needed to serve lower-income, Medicaid, and uninsured residents.[30] This limits the capacity to supply needed services to the Medicaid

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[22] Meyer B.D., King J.D., Kowlowitz V., Lampiris L.N. (2019) Assessing dental students' knowledge, attitudes, and beliefs about Medicaid and health care reform: a mixed-methods study. *Journal of Dental Education* 83(11). 1263-1271.

[23] Wisconsin Legislative Fiscal Bureau, Health Services, Medical Assistance, General (Paper #351), 2015.

[24] Centers for Medicare and Medicaid Services. (2020, April 18). *Program History*. Retrieved from Medicaid.gov: Keeping America Healthy: https://www.medicaid.gov/about-us/program-history/index.html

[25] Tollen L. (2015). *Heallth Policy Brief: Medicaid Primary Care Parity*. Retrieved from HealthAffairs: https://www.healthaffairs.org/do/10.1377/hpb20150511.588737/full/

[26] Kaiser Family Foundation, State Health Facts. Medicaid-to-Medicare Fee Index, 2016. Available at https://www.kff.org/medicaid/state-indicator/medicaid-to-medicare-fee-index/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D

[27] Gupta N, Yarbrough C, Vujicic M, Blatz A, Harrison B. Medicaid Fee-For-Service Reimbursement Rates for Child and Adult Dental Care Services for all States, 2016 American Dental Association. Health Policy Institute. April 2017. https://www.ada.org/~/media/ADA/Science%20and%20Research/HPI/Files/HPIBrief_0417_1.pdf

[28] Health Care Cost Institute (HCCI). National Chartbook of Health Care Prices, 2015. May 2016. Available at https://www.healthcostinstitute.org/images/pdfs/HCCI-National-Chartbook-of-Health-Care-Prices-2015.pdf

[29] Health Care Cost Institute (HCCI). Healthy Marketplace Index. Available at https://healthcostinstitute.org/research/hmi-interactive#HMI-Price-Index.

[30] Wisconsin Office of Rural Health. Health Professional Shortage Area – Dental Health Care. Available at http://worh.org/library/health-professional-shortage-area-dental-health-care-0 and HPSA: Dental

population. The Wisconsin DHS estimates a need for an additional 200 full-time equivalent dentists to reduce the significant shortage of providers for Medicaid members.[31]

Various studies have assessed the effect of higher Medicaid fees on physician participation.

Higher Medicaid fees increase the probability of appointment availability[32,33] decrease reports of doctors not accepting the insurance,[34] decrease reported difficulties finding a physician, and generally improve access to care for children.[35]

Several states have previously pursued efforts similar to Wisconsin's, increasing dental reimbursement rates in an effort to improve dental access for Medicaid members and increase participation by dentists. Studies assessing single state payment increases have found positive results, particularly for children.[36] A 1994 increase in Medicaid dental payments in Connecticut increased the percentage of dentists accepting children covered by Medicaid from 33 to 50 percent.[37] Michigan Medicaid's Healthy Kids Dental program, which paid dentists at private reimbursement levels in pilot counties, resulted in a 31 percent increase in dental care use, an increase in dentist's participation and decrease in the distance traveled by patients.[38] South Carolina's year 2000 dental Medicaid payment increase also substantially

Health Care – Milwaukee County, Available at http://worh.org/library/hpsa-dental-health-care-%E2%80%93-milwaukee-county; Underlying data from the U.S. Health Resources and Services Administration, HPSA Find tool, Available at https://data.hrsa.gov/tools/shortage-area/hpsa-find

[31] Wisconsin Department of Health Services. Number of Dentist FTEs Needed to Reduce Significant Shortages for Medicaid Members. September 2019. Available at https://www.dhs.wisconsin.gov/publications/p0/p00368.pdf

[32] Sharma R, Tinkler S., Mitra A, Pal S., Susu-Mago,R., Stano,M. (2017). State Medicaid fees and access to primary care physicians. *Health Economics*, 629-636.

[33] Candon M, Zuckerman S, Wissoker D, Saloner B, Kenney, GM, Rhodes K., Polsky D. (2017). Declining Fees and Primary Care Availability for New Medicaid Patients. *JAMA Internal Medicine* , 145-146.

[34] Alexander, D, Schnell M. (2019). *The Impacts of Physican Payments on Patient Access, Use and Health.* The National Bureau of Economic Research.

[35] White C. (2012). A Comparison of Two Approaches to Increasing Access to Care: Expanding Coverage versus Increasing Physician Fees. Health Serv Res, 47: 963-983. doi:10.1111/j.1475-6773.2011.01378.x

[36] Nasseh K, Vujicic M. (2015) The Impact of Medicaid Reform on Children's Dental Care Utilization in Connecticut, Maryland, and Texas. *Health Services Research*. 50(4):1236–1249.

[37] Nainar HS., Tinanoff N. (1997). Effect of Medicaid reimbursement rates on children's access to dental care. *American Academy of Pediatric Dentistry.* 315-316.

[38] Eklund SA. Pittman JL, Clara SJ. (2003). Michigan Medicaid's Healthy Kids Dental Program. *JADA*, 1509-1515.

increased children's access to dental services.[39] Medicaid payment hikes in Alabama and Mississippi were linked to increases in sealant prevalence among 7-9 year old children.[40]

In 2008, the National Academy for State Health Policy (NASHP) studied six states—Alabama, California, Michigan, South Carolina, Tennessee, and Virginia—assessing the effect of raising Medicaid reimbursement rates on access to dental care.[41] In these states, provider participation increased by at least one-third, along with increases in the number of patients treated and the number of Medicaid enrollees using dental services. Nonetheless, the portion of children receiving services remained far below that of privately-insured children.

NASHP concluded that 1) rates need to at least cover the cost of providing service, which was then estimated to be 60 to 65 percent of dentists' charges; and 2) rate increases are necessary—but not sufficient on their own—to improve access to dental care. Here, NASHP refers to the administrative burdens of Medicaid, and the need to address other patient barriers to effective use of care.

The degree of expansion in dental service provision directly relates to the level of increase in payments. Decker (2011) reports positive correlation between increased Medicaid payment and dental care service: a $10 increase in dental payments increases the likelihood that a child has seen a dentist in the past 6 months by 4 percentage points.[42] More recently, Chalmers and Compton (2017) similarly concluded positive effects of payment increases, noting in particular that states with low dentist density and low dentist participation in Medicaid may be able to improve access to dental services significantly.[43]

However, meaningful increases appear to require large investments. Mayer, et al. (2000), reports increases in dental payments in North Carolina were associated with relatively small increases in access to dental care, deeming the payment increases only "marginally effective."[44] Buchmeuller and Shore-Sheppard (2013) report a modest, but statistically significant, positive relationship between Medicaid

[39] Nietert PJ, Bradford WD, Kaste ML. (2005). The Impact of Innovative Reform to the South Carolina Dental Medicaid System. *Health Services Research*, 1078-1090.

[40] Griffin SO, Jones KA, Lockwood S, Mosca NG, Honoré PA. (2007). Impact of Increasing Medicaid Dental Reimbursement and Implementing School Sealant Programs on Sealant Prevalence. *Journal of Public Health Management and Practice*, 202-206.

[41] Borchgrevink A, Snyder A, Gehshan S. (2008) The Effects of Medicaid Reimbursement Rates on Access to Dental Care. National Academy for State Health Policy. Available at: https://nashp.org/wp-content/uploads/sites/default/files/CHCF_dental_rates.pdf

[42] Decker SI. (2011). Medicaid Payment Levels to Dentists and Access to Dental Care Among Children and Adolescents. *JAMA*, 187-193.

[43] Natalia I. Chalmers NI, Compton RD. (2017) Children's Access to Dental Care Affected by Reimbursement Rates, Dentist Density, and Dentist Participation in Medicaid. American Journal of Public Health 107:1612-1614.

[44] Mayer ML, Steams SC, Norton EC, Rozier RG. (2000). The effects of Medicaid expansions and reimbursement increases on dentists' participation. Inquiry. 37(1): 33-44.

payment rates and several measures of dental care use. This includes a positive and statistically significant, but relatively small, effect of Medicaid payment rates on whether a dentist treats any publicly-insured patients and the percent of the practice's patients who have public insurance. The findings suggest that increasing Medicaid payments to the level of private market fees would increase access to care, but the incremental cost of the additional visits induced would be very high; An increase of about 40 percent in Medicaid reimbursement rates for dental preventive services yields only an increase of about 1 percent to 3 percent use of preventive services.[45]

Milliman very recently reports a study of seven states' Medicaid dental payment rates. Here, service use levels improve — especially for children — with increases in Medicaid dental provider reimbursement levels relative to commercial billed charges.[46] This report cautions about limits in the data but asserts the directional conclusion that 1) in general, Medicaid service use levels approach that of commercial populations as Medicaid fees increase relative to commercial billed charges, and 2) the correlation appears stronger for children than adults.

2.3 Evaluation Questions

As noted, authorizing legislation in 2017 Wisconsin Act 344[47] specified that DHS measure and report on the following outcomes from this pilot initiative:

1. The number of Medical Assistance recipients who received services under the pilot program in total and specified by those who received pediatric care and who received adult emergency dental services.
2. An estimate of the potential reduction in health care costs and emergency department use by Medical Assistance recipients due to the pilot project.
3. An analysis of Medical Assistance recipient populations who received services under the pilot project and populations who may benefit from the pilot project.
4. The feasibility of continuing the pilot project and expanding the project in specific areas of the state or statewide.
5. The amount of moneys distributed under the pilot project and, if moneys allocated for the pilot project were not distributed, a summary on why the moneys were not distributed.

These questions focus on descriptive elements of the program, and also seek a causal link between the pilot program itself and observed outcomes. We identify several evaluation questions and measures in

[45] Buchmueller TC, Orzol S, Shore-Sheppard LD. (2015) The Effect of Medicaid Payment Rates on Access to Dental Care among Children. Am J Health Econ. 1(2):194–223; See also: Buchmeller TC, Shore-Sheppard LD. (2013). *The Effect of Medicaid Payment Rates on Access to Dental Care Among Children.* Cambridge, MA: National Bureau of Economic Research.

[46] Fontana J, Lewis C, Carver T. Medicaid adult dental reimbursement. Milliman White Paper. May 2019. Available at http://assets.milliman.com/ektron/medicaid-adult-dental-reimbursement.pdf

[47] 2017 Wisconsin Act 344. Available at https://docs.legis.wisconsin.gov/2017/related/acts/344

order to support such causal inferences. Table 2 identifies the evaluation questions and measures, and provides a crosswalk between these questions and measures, and the legislature's questions:

Table 2: Legislature Questions and Evaluation Measures

Legislature's Questions	Evaluation Measures
Evaluation Question #1: Who received services, and did the pilot program change access to services by Medicaid members?	
1. The number of Medical Assistance recipients who received services under the pilot program in total and specified by those who received pediatric care and who received adult emergency dental services. 3. An analysis of Medical Assistance recipient populations who received services under the pilot project and populations who may benefit from the pilot project.	A1. Percentage of BadgerCare members who received any dental services, by county of residence. A2. Percentage of child BadgerCare members who received any dental services, by county of residence. A3. Percentage of adult BadgerCare members who received any dental services, by county of residence. A4. Percentage of Children BadgerCare Members Who Reside in Each County and Received Preventive Service A5. Percentage of Adult Resident County BadgerCare Members Receiving Emergency Services with Increased Reimbursement Rates
Evaluation Question #2: Who provided services, and did the pilot program change the amount of participation in providing services to Medicaid members?	
4. The feasibility of continuing the pilot project and expanding the project in specific areas of the state or statewide. 2. An estimate of the potential reduction in health care costs and **emergency department use** by Medical Assistance recipients due to the pilot project.	B1. Total Number of Providers Serving Medicaid Members B2. Total Number of Visits B3. Number of Visits per Provider B4. Total Number of Emergency Department Visits for Dental Care
Evaluation Question #3: How much did the program cost and did it result in any cost savings?	
5. The amount of moneys distributed under the pilot project and, if moneys allocated for the pilot project were not distributed, a summary on why the moneys were not distributed. 2. An **estimate of the potential reduction in health care costs** and emergency department use by Medical Assistance recipients due to the pilot project.	C1. Total Outlays C2. Payments per Member C3. Payments for Emergency Department Dental Services C4. Reasons for Increase in Payments

2.4 Evaluation Design and Methods

2.4.1 Study Population and Evaluation Period

This evaluation focuses on two study populations. The first relates to who received dental care during the evaluation period. This group includes all BadgerCare members – children, parents, caregiver adults, and childless adults -- that were enrolled for any period during the evaluation period.

The second study population consists of all dental service providers that submitted claims for service to Medicaid/BadgerCare members, excluding providers of services through a Federally Qualified Health Center (FQHC), during the evaluation period. We identified providers using the NPI associated with the billed service.

This evaluation includes all dental claims for the period October 2014 through February 2020, allowing observation for two years before the pilot was implemented and three- and one-half years after the pilot was implemented. We end the analysis in February 2020 to exclude the disruption in dental care due to Covid-19. For example, a report from C.S. Mott Children's Hospital and the University of Michigan found that approximately one-third of parents say that Covid-19 has made it difficult to obtain dental care for their children, with children who are enrolled in Medicaid having an especially hard time.[48]

2.4.2 Data and Outcome Measures

This report relies on two main sources of data.

- **Wisconsin Medicaid claims and encounter data.** Claims and encounter data include every service that the state of Wisconsin pays for through Medicaid. Dental claims include information about the procedure codes for the services and the date the service was provided. Each claim has a provider NPI associated with it, allowing us to identify unique providers. In addition, each claim has the county in which the service was rendered. Claims data also include the amount that the Medicaid program paid for each service rendered. To be consistent across the fee-for-service billings and the encounter (managed care) billings, we use the "allowed amount" for each service that was billed. Each observation is a single service provided to an individual.

- **CARES and Medicaid Enrollment.** The Wisconsin CARES database is the state's online eligibility and enrollment portal of public benefits, including Medicaid and BadgerCare. This database contains information about demographics and program participation on all cases that apply for or receive public assistance from the state. Demographics include age, sex, educational attainment, county of residence, and income. Each observation is an individual month. We use county of residence from CARES, which is updated at the point of enrollment or re-enrollment.

[48] Clark SJ, Schultz SL, Gebremariam A, Singer DC, Freed GL. Pandemic-posed challenges to children's oral health. C.S. Mott Children's Hospital National Poll on Children's Health, University of Michigan. Vol 38, Issue 1, February 2021. Available at: https://mottpoll.org/reports/pandemic-posed-challenges-childrens-oral-health.

It is important to note that the CARES data does not include individuals who qualify for Medicaid through SSI, as that is a separate enrollment portal.

We link these two sources using a unique pin generated by the Wisconsin Administrative Data Core (WADC).[49] We link the claims with CARES in order to connect the demographic information with information about the county residence for each person receiving services, where an individual received services, what services an individual received, when the service was performed, and how much the state paid for each service.

Our sample includes all individuals enrolled in BadgerCare. Importantly, this also includes children who are enrolled in any other Medicaid programs in Wisconsin, including Care4Kids (C4K). Care4Kids began in January 2014 and is open to children placed in out-of-home care in the following counties in Wisconsin: Kenosha, Milwaukee, Ozaukee, Racine, Washington, and Waukesha. The overall goal of C4K is to form a medical home for children in out-of-home care, and part of the benefits of the program include dental care.

One might worry that our results are partly driven by children who participate in C4K. For example, it could be that children who participate in C4K are more likely to get dental services anyway, regardless of the change in Medicaid reimbursement rates for those services. Since the C4K counties fall under our comparison group (except Racine) and C4K might increase dental use among children, our analysis would underestimate the true effect of the pilot program. Alternatively, if children participating in C4K are less likely to get dental care (or are less likely to have a paid dental claim), then our analysis might overestimate the true effect of the dental pilot program. These scenarios could be true only if the C4K program was implemented at about the same time as the dental pilot program, or if the dental provision under C4K changed significantly around the same time as the start of the dental pilot program.

However, we have several reasons to believe that our results are not driven by Care4Kids participants. First, there are roughly 3,000 enrolled children currently participating in C4K. Our analysis includes over 441,963 children, or 177,319 enrolled in C4K counties in February 2020. This means that approximately 98 percent of children in the participating counties are not enrolled in C4K. Because the majority of our sample is not enrolled in C4K, we don't expect that the small percentage enrolled in the C4K program would have an influence on our findings. The second reason that children enrolled in C4K should not affect our analysis is because this program was implemented before the dental pilot program. This means that children from C4K are using dental services under the C4K program both in the pre-period and in the post-period. If C4K was implemented at the same time as the increased reimbursement rates, it would not be possible to disentangle the two programs. However, because our analysis relies on a difference-in-difference framework, any effects that C4K had on dental provision for children in Wisconsin will be cancelled out between the pre- and post-periods. Last, several of our outcomes would not be affected by C4K regardless. For example, the number of providers who saw a BadgerCare patient, the number of visits for BadgerCare patients, and the number of visits per provider would not be

[49] Brown PR, Thornton K, Ross D, Smith, JA, Wimer L. (2020). Technical Report on Lessons Learned in the Development of the Institute for Research on Poverty's Wisconsin Administrative Data Core. Madison, WI : Institute for Research on Poverty.

affected by C4K. Additionally, no findings in Polk, a non-metropolitan statistical areas (MSA) county, would change because of C4K, as each of the six counties in the C4K pilot are all classified as part of an MSA.

All of the analyses exclude services that were provided at a federally qualified health center (FQHC). FQHC providers were not subject to the pilot program's change in payment, because FQHCs operate under a separate cost-related prospective payment system with Medicaid. In addition, FQHCs during this time period had been expanding their dental services with the attainment of federal grant funds. This pilot program evaluation needed to exclude from its measurement (via claims) any change in service clearly tied to factors separate from the change in Medicaid payment policy. We identify services provided at FQHCs as any claim that has a billing provider taxonomy that includes "FQHC," a rendering provider taxonomy that includes "FQHC," or a billing or rendering provider specialty that indicates it is an FQHC. Overall, we identified about 22 percent of the claims to be from FQHCs and these are eliminated from our analysis entirely, although this percentage does vary by county. For example, as discussed above, no FQHC provides dental care in Racine County.

Outcome Measures

The pilot program evaluation focuses on who received care, who provided care, and how much the program costs, and possible cost savings, as specified in Table 2, above.

1. Who received services, and did the pilot program change access to services by Medicaid members?
First, we look at the percentage of Medicaid members who reside in each county that received any dental care in each month. The county of residence comes from CARES and we exclude individuals with a missing county of residence. We consider all Medicaid members and specifically assess children and adults independently. Because counties differ in size, we focus on the percentage of individuals enrolled in BadgerCare who received care, rather than the number of individuals residing in each county who received care. Second, we look at the percentage of BadgerCare child members who reside in each county and received preventive care. Third, we look at the percentage of BadgerCare adults who reside in each county and received an emergency service that had an increased reimbursement rate.

2. Who provided services, and did the pilot program change the amount of dentist participation in Medicaid/providing services to Medicaid members?
We evaluate several measures of the supply of dental care. First, we consider the total number of providers in each county. We show the total number of providers that serve any BadgerCare member, any BadgerCare child, and any BadgerCare adult. We also evaluate the total number of visits that were provided in each county for all BadgerCare members, BadgerCare children, and BadgerCare adults. As a measure of the intensity of care provision, we also evaluate the number of visits per provider. Last, since one of the aims of the pilot was to reduce emergency department use related to dental care, we consider the number of emergency department visits in the county, overall and for children and adults separately.

3. How much did the program cost, and did it result in any total cost savings?

We show both the total Medicaid-paid dental claims by county, and the total amount for the services that experienced increased reimbursement rates. These are purely descriptive in nature but do answer the legislature's question regarding the amount of money distributed. In addition, we show the dental expenditures per enrollee for each. In order to attribute what fraction of the increased costs were due to the increased reimbursement rates, as opposed to a change in supply or demand, we evaluate what would have happened had the pilot counties had the same number of services per member as the control counties.

2.4.3 Analytic Methods

The evaluation relies on a difference-in-difference (DiD) framework, comparing the difference in outcomes before and after implementation in the pilot counties to differences in outcomes before and after that same time point, but in counties that did not participate (non-pilot counties). DiD is a quasi-experimental design that uses pre- and post-intervention data from treatment and control groups to estimate a causal effect. Causal effect means an estimate of the effect of a specific intervention or treatment on the observed outcomes. DiD compares the changes in outcomes over time between a population that is enrolled in a program (the intervention group) and a population that is not (the control group). The comparison to the control group offers measurement of the counterfactual: of the changes observed in the treatment group, what changes might have happened anyway, even if the intervention did not occur. The DiD approach removes biases in comparisons between the pre- and post-intervention period for the treatment group that could be the result of trends due to other causes of the outcome.

The comparison group that we rely on is counties similar in urbanicity to the pilot programs. The control group for the pilot program's three urban counties (Brown, Marathon, and Racine) includes a group of all other Wisconsin counties (excluding the pilot counties) classified as part of a MSA.[50] The comparison group for rural Polk County includes a grouping of all other non-MSA counties. For some outcomes, we eliminate the counties that border the pilot counties in order to minimize spillover between the pilot counties and the control counties.

In order to evaluate the effect of increased payments for our outcomes of interest, we implement a difference-in-difference model. Essentially, we are comparing the pilot counties to the control groups before and after the program was implemented.

For each outcome, we collapse the individual level data so that each observation is a county-month. For example, if the outcome of interest is the percentage of BadgerCare members that received care and 15 percent of members in Brown County received care at some point in March 2017, then the observation is 15 for this month. We then estimate the following model:

$$y_{ct} = \alpha + \beta P_t + \gamma_c + \delta D_{ct} + u_{ct} \quad (1)$$

[50] Jones M, Ewald M. Putting Rural Wisconsin on the Map. WisContext. May 17, 2017. Available at https://www.wiscontext.org/putting-rural-wisconsin-map

where *c* indexes county and *t* indexes month. Each model includes a set of county fixed effects, which are captured by γ_c, as well as an indicator variable indicating that the program had been implemented, P_t. D_{ct} is an indicator variable for each county that is equal to 1 if the pilot was implemented and the county was a pilot county and 0 otherwise. This variable is equal to 1 only for Brown, Marathon, Polk, and Racine counties in the months from October 2016–February 2020. The error term is represented by u_{ct}.

The coefficient of interest is δ which indicates if the pilot program affected participating counties differently than their chosen control group. We show confidence intervals calculated using robust standard errors as well as intervals calculated using errors that are clustered by county.[51] We identify statistically significant changes when δ is significant at the 5 percent level for both methods of calculating the interval. Each table with regression coefficients shows the estimated value of δ in the cell labeled Pilot County X Post.

The difference-in-difference framework assumes that, had the pilot not been implemented, outcomes in the pilot-counties would have trended in the same way that the non-pilot control counties did. Although pre-pilot outcomes do not have to be identical, the trends in outcomes for the treatment and control counties do have to be parallel. For each outcome, we show figures that depict the pilot county as well as the relevant control group for the two years prior to the pilot starting and the two years after it began. Some outcomes in Marathon and Racine Counties clearly violate this assumption. In these cases, we still show the summary statistics and results from the above regression, but we are not able to draw inferences about the effect of the pilot program in these counties for these outcomes.

[51] Bertrand, M., Duflo, E., and Mullainathan, S. (2004). How Much Should We Trust Differences-In-Differences Estimates? *Quarterly Journal of Economics.* 119(1). 249–275.

3 FINDINGS AND RESULTS

As outlined above, we consider three main questions: Who received care? Who provided care? and How much did it cost? In this section, we present results from each of these questions. For each outcome measure, we show figures with the average monthly rate from October 2014 through February 2020 in each of the pilot counties. We also show the average monthly values in the pre-pilot period (October 2014–September 2016) and the post-period (October 2016–February 2020). Last, we show regression results from models estimating Equation 1.

3.1 QUESTION 1: WHO RECEIVED CARE?

The legislature's statutory authorizing language required that the state Medicaid agency report the number of Medical Assistance recipients who received services under the pilot program in total and specified by those who received pediatric care and who received adult emergency dental services. The total number and percent of BadgerCare members in each pilot county and in the state of Wisconsin who received dental care in the two-years prior to the start of the program and in the most recent two years of data (March 2018–February 2020) are shown in Table 3. The population includes everyone who was enrolled at any point during each period and an individual is identified as receiving dental care if they received any dental service during the corresponding period.

Overall, in the state of Wisconsin, 35 percent of BadgerCare children who were enrolled at any point during the pre-period received care. In the most recent years, this number increased to 39.6 percent. In MSA-containing pilot counties, there has been a substantial increase in this percentage from the pre- to the most recent two-year post-period. In Brown County, for example, the percentage of children who received dental care increased from 32.8 to 44.9 percent. In Marathon County, it jumped from 30.4 to 41.2 percent, and in Racine from 31.9 to 44.1 percent. However, in Polk County, the percentage of children who received dental care is below the state average and did not increase between periods. In fact, in Polk county, the percentage of children who received dental care actually fell from 32.9 to 31.2 percent.

It should be noted that although there is some improvement in the percentage of individuals who received dental care, particularly among children, the percentages are still quite low compared to national numbers. For example, the percentage of children ages 1–18 enrolled in Medicaid at the time of the 2019 National Health Interview Survey (NHIS) who received a dental exam or cleaning in the past year was 84.3 percent.[52]

The percentage of adults, regardless of eligibility pathway, who received dental care in each period is substantially below the percentage of children. Additionally, statewide, there was no increase from the pre- to the post-period. However, in the MSA-containing pilot counties, there was an increase in the

[52] MACStats: Medicaid and CHIP Data Book. Exhibit 40. December 2021. Available at https://www.macpac.gov/wp-content/uploads/2021/12/MACStats-Medicaid-and-CHIP-Data-Book-December-2021.pdf

percentage of adults who received dental care, while in Polk County, there was a small decrease. Nationwide, adults were less likely than children to have received dental care, but the percentage is still far higher than Wisconsin. Specifically, 55.3 percent of adults enrolled in Medicaid at the time of the NHIS had a dental exam or cleaning in the year prior to the survey.[53]

Next, we show the total number of BadgerCare members that received dental services during the entire time of the pilot (October 2016–February 2020) in Table 4. In Brown County, a total of 18,299 children and 7,408 adults received dental care during the time of the pilot. In Marathon County the numbers are 7,712 (children) and 2,118 (adults); in Polk County the counts are 2,425 and 1,079; and in Racine County the counts are 15,488 and 9,887.

Table 5 shows the total number of adults that received any dental service as well as the total number that received one of the services that were targeted for an increased reimbursement rate for adults in each of the pilot counties. This table shows totals for the entire post-pilot period, October 2016 through February 2020. Of those who received any dental service, the percentage of adults that received the targeted services is quite high. In Polk County it hovers around 53–68 percent, depending on the eligibility group. However, for other pilot counties, of those adults that received dental services, the percentage of adults that received the targeted services is much higher. For example, in Brown County, this percentage is at least 90 percent. In Racine County, it is at least 81 percent, and in Marathon County, the percentage is at least 72 percent for categories excluding "other."

[53] MACStats: Medicaid and CHIP Data Book. Exhibit 44. December 2021. Available at https://www.macpac.gov/wp-content/uploads/2021/12/MACStats-Medicaid-and-CHIP-Data-Book-December-2021.pdf

Table 3: Number and Percent of Badger Care Members Who Received Dental Care in the Pre-Period and the Most Recent Two Years of the Post-Period

	Pre-Period, October 2014–September 2016			Most Recent 2 Years, March 2018–February 2020		
	Total Enrolled	Received Dental Service	Percent Received Dental Service	Total Enrolled	Received Dental Service	Percent Received Dental Service
Brown County						
Children	33,684	11,035	32.8	32,815	14,730	44.9
Childless adults	12,677	1,675	13.2	11,137	2,694	24.2
Parents	9,325	1,171	12.6	9,986	1,746	17.5
Pregnant women	1,423	189	13.3	1,375	250	18.2
Other	294	116	39.5	565	271	48.0
Marathon County						
Children	16,006	4,870	30.4	15,363	6,324	41.2
Childless adults	6,191	350	5.7	5,123	797	15.6
Parents	4,766	199	4.2	5,139	563	11.0
Pregnant women	647	37	5.7	686	65	9.5
Other	174	35	20.1	305	107	35.1
Polk County						
Children	5,807	1,908	32.9	5,671	1,769	31.2
Childless adults	2,461	578	23.5	2,148	419	19.5
Parents	1,660	268	16.1	1,854	251	13.5
Pregnant women	204	31	15.2	247	35	14.2
Other	68	33	48.5	125	62	49.6
Racine County						
Children	28,360	9,042	31.9	27,944	12,312	44.1
Childless adults	11,045	3,038	27.5	9,902	3,676	37.1
Parents	10,022	2,230	22.3	10,258	2,858	27.9
Pregnant women	915	179	19.6	935	258	27.6
Other	324	188	58.0	550	351	63.8
Wisconsin Statewide						
Children	666,875	233,179	35.0	645,550	255,613	39.6
Childless adults	267,406	57,075	21.3	232,700	53,485	23.0
Parents	240,956	41,295	17.1	241,588	44,153	18.3
Pregnant women	23,968	4,343	18.1	24,263	4,552	18.8
Other	8,023	3,818	47.6	12,807	6,006	46.9

NOTE: The population includes anybody who was enrolled in the period October 2014–September 2016 (columns 1–3) or anytime during the period March 2018–February 2020 (columns 4–6). Individuals are assigned to a grouping first based on what PGSB they had a dental claim under. (The priority list is child, parent, childless adult, pregnant woman, other. Other includes adults in extension who owe a premium, former foster care youth, and AFDC-related MA regular only.) Then, people without dental claims are grouped based on the same priority order.

Table 4: Number and Percent of BadgerCare Members Who Received Dental Services, October 2016 – February 2020

	Post-Period, October 2016–February 2020		
	Total Enrolled	Received Dental Service	Percent Received Dental Service
Brown County			
Children	39,743	18,299	46.0
Childless adults	14,321	4,126	28.8
Parents	12,878	2,635	20.5
Pregnant women	1,765	346	19.6
Other	593	301	50.8
Marathon County			
Children	18,834	7,712	40.9
Childless adults	6,808	1,127	16.6
Parents	6,504	767	11.8
Pregnant women	839	92	11.0
Other	295	132	44.7
Polk County			
Children	6,971	2,425	34.8
Childless adults	2,859	609	21.3
Parents	2,433	352	14.5
Pregnant women	282	45	16.0
Other	145	73	50.3
Racine County			
Children	33,930	15,488	45.6
Childless adults	12,639	5,218	41.3
Parents	13,142	4,013	30.5
Pregnant women	1,148	292	25.4
Other	544	364	66.9
Wisconsin Statewide			
Children	744,270	322,893	43.4
Childless adults	284,126	79,606	28.0
Parents	294,966	64,133	21.7
Pregnant women	29,648	6,270	21.1
Other	12,819	6,797	53.0

NOTE: The population includes anybody who was enrolled in the post-period October 2016–February 2020. Individuals are assigned to a grouping first based on what PGSB they had a dental claim under. (The priority list is child, parent, childless adult, pregnant woman, other. Other includes adults in extension who owe a premium, former foster care youth, and AFDC-related MA regular only.) Then, people without dental claims are grouped based on the same priority order.

Table 5: Number and Percent of Adults Who Received Targeted Emergency Services

	Number that Received Any Dental Service	Number that Received a Targeted Service	Percent that Received Services that Were Targeted
Brown County			
Childless adults	4,126	3,931	95.3
Parents	2,635	2,422	91.9
Pregnant women	346	317	91.6
Other	301	280	93.0
Marathon County			
Childless adults	1,127	818	72.6
Parents	767	576	75.1
Pregnant women	92	69	75.0
Other	132	72	54.5
Polk County			
Childless adults	609	414	68.0
Parents	352	241	68.5
Pregnant women	45	24	53.3
Other	73	40	54.8
Racine County			
Childless adults	5,218	4,624	88.6
Parents	4,013	3,528	87.9
Pregnant women	292	242	82.9
Other	364	295	81.0
Wisconsin			
Childless adults	79,606	64,531	81.1
Parents	64,133	50,709	79.1
Pregnant women	6,270	4,121	65.7
Other	6,797	4,721	69.5

NOTE: Population includes adults that were enrolled in BadgerCare at any point in the post-pilot period, October 2016–February 2020. Individuals are assigned to a grouping first based on what PGSB they had a dental claim under (priority list is child, parent, childless adult, pregnant woman, other). Then, people without dental claims based on the same priority order.

3.1.1 Percentage of BadgerCare Members Receiving Any Dental Service

An important outcome of the dental pilot is how many individuals were able to receive care because of it. To study this, we estimate the percentage of individuals who reside in each county (at the time of their enrollment) that received any dental services, as seen in Figure 1.

Brown County saw a noticeable increase in the percentage of BadgerCare members that received dental care immediately at the start of the pilot program. This increase was sustained through at least February 2020. In the two years prior to the start of the pilot, 5.1 percent of members that resided in Brown County received dental care each month. In the period of October 2018 through February 2020 this increased to 6.8 percent, as shown in Table 6. Prior to the start of the program, members who resided in Brown County were slightly more likely to receive care than the comparison group of members who

reside in MSA counties that did not participate in the program. However, the comparison group did not experience the same level of increase as Brown County did. Regression results controlling for county and time find that the program increased the percentage of individuals receiving care by 1.2 percentage points, as shown in the first column of Table 7. This amounts to a 23.5 percent increase from baseline.

Marathon County BadgerCare members also experienced an increase in the likelihood of having received dental services after the implementation of the pilot. On average, in the two years prior to the pilot, 4.2 percent of Marathon County BadgerCare members received dental care each month. That number increased to 6.0 percent in the period after the pilot was implanted, as shown in Table 6. Regression results, shown in Table 7, indicate that the percentage of Marathon County BadgerCare members that received dental services increased by 1.3 percentage points, or 30.9 percent from baseline, compared to other MSA counties that did not experience an increase in the payment for selected services.

Unlike Brown and Marathon County, members in Polk County were not statistically more likely to receive dental care after the pilot was implemented. The percentage of Polk County BadgerCare members that received care was 5.7 percent per month in the two years prior to the implementation of the pilot and increased only slightly to 6.0 percent in the period after the pilot. Non-MSA counties remained steady at 4.5 percent. Once county and time are controlled for, the increase in Polk County was not statistically different than the other non-MSA counties.

Although Racine BadgerCare members were more likely to receive dental care, up from 4.1 percent monthly to 6.6 percent, the increase began before the pilot was introduced, making it difficult to argue that this improvement was driven by the pilot.

Figure 1: Percent of BadgerCare Members That Received Dental Services, by County of Residence

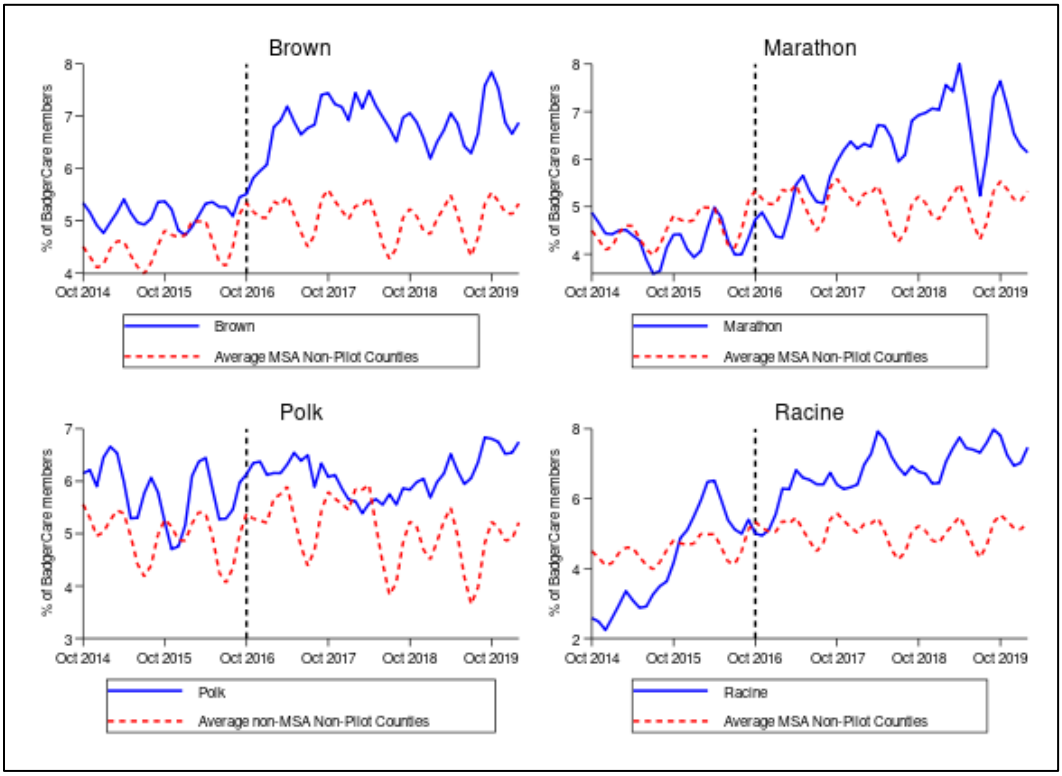


Table 6: Percent of BadgerCare Members Receiving Any Dental Service, by County of Residence and Time Period

	% of BadgerCare Members Who Received Any Dental Services, by County of Residence		% of BadgerCare Child Members Who Received Any Dental Services, by County of Residence		% of BadgerCare Adult Members Who Received Any Dental Services, by County of Residence	
	Pre-pilot	**Post-pilot**	**Pre-pilot**	**Post-pilot**	**Pre-pilot**	**Post-pilot**
Brown	5.1	6.8	6.7	8.7	2.3	3.3
Marathon	4.2	6.0	6.3	8.2	0.7	2.2
Polk	5.7	6.0	7.1	7.8	3.4	3.1
Racine	4.1	6.6	4.3	7.5	3.9	5.3
MSA, Non-Pilot Counties	4.4	4.9	5.5	6.3	2.8	2.8
Non-MSA, Non-Pilot Counties	4.5	4.5	6.1	6.1	2.3	2.0

NOTE: Numbers are calculated as average per month. The pre-pilot period is defined as October 2014–September 2016. The post-pilot period is defined as October 2016–February 2020.

Table 7: Regression Results, Percent of BadgerCare Members Residing in Each County Who Received Services

	All Ages, All Services	Children, All Services	Adults, All Services	Children, Preventive Services	Adults, Emergency Services with Increased Reimbursement
Brown County					
Pilot County X Post	1.20***	1.20***	1.06***	0.92***	1.09***
95% CI, Robust SE	[0.93,1.46]	[0.84,1.56]	[0.88,1.24]	[0.58,1.26]	[0.98,1.20]
95% CI, Robust SE Clustered by County	[0.73; 1.66]	[0.65; 1.76]	[0.59; 1.53]	[0.48; 1.36]	[0.83; 1.35]
Marathon County					
Pilot County X Post	1.31***	1.08***	1.51***	1.00***	0.72***
95% CI, Robust SE	[0.92,1.70]	[0.56,1.60]	[1.19,1.83]	[0.52,1.48]	[0.53,0.92]
95% CI, Robust SE Clustered by County	[0.84; 1.77]	[0.52; 1.63]	[1.04; 1.97]	[0.56; 1.44]	[0.46; 0.99]
Polk County					
Pilot County X Post	0.21	0.36	0.04	-0.50*	0.05
95% CI, Robust SE	[-0.20,0.61]	[-0.21,0.92]	[-0.31,0.40]	[-1.02,0.02]	[-0.16,0.25]
95% CI, Robust SE Clustered by County	[-0.09; 0.51]	[-0.00; 0.71]	[-0.21; 0.30]	[-0.81; -0.19]	[-0.10; 0.20]
Racine County					
Pilot County X Post	2.04***	2.39***	1.52***	1.43***	1.12***
95% CI, Robust SE	[1.47,2.60]	[1.74,3.04]	[1.02,2.03]	[0.91,1.95]	[0.74,1.49]
95% CI, Robust SE Clustered by County	[1.57; 2.50]	[1.84; 2.95]	[1.06; 1.99]	[0.99; 1.87]	[0.86; 1.38]

NOTE: Results from a basic DID regression without additional controls. All regressions are weighted by county population. The dependent variable is the percentage of BC members who live in each county and received specific type of dental care. Pilot County X Post indicates if the pilot had been implemented in the county at the time of observation. The estimated coefficient is the change in the percent of BC members that received any dental service and reside in the pilot county relative to the control counties. The pre-pilot period is defined as Oct 2014–Sept 2016. The post-pilot period is defined as Oct 2016–Feb 2020. Control counties are all non-pilot counties with the same urbanicity as the pilot county. We exclude FQHCs as well as observations with missing or unknown rendering provider or residence county. Observations where the rendering provider or residence county is tribal land are also excluded. Robust standard errors and 95 percent CIs are shown in brackets. Clustered 95 percent CIs use county-level clustering. * $p < 0.$; ** $p < 0.05$; *** $p < 0.01$

3.1.2 Percentage of BadgerCare Children Members Who Received Dental Services

Because most of the increased rates were targeted at services provided to children, it is natural to consider them separately. Overall, when the sample is restricted to children, findings and trends are very similar to when the entire universe of BadgerCare members are considered, as seen in Figure 2. For example, children living in Brown County and Marathon County were more likely to receive dental care after the pilot went into effect, but children in Polk County were not statistically more likely to receive care.

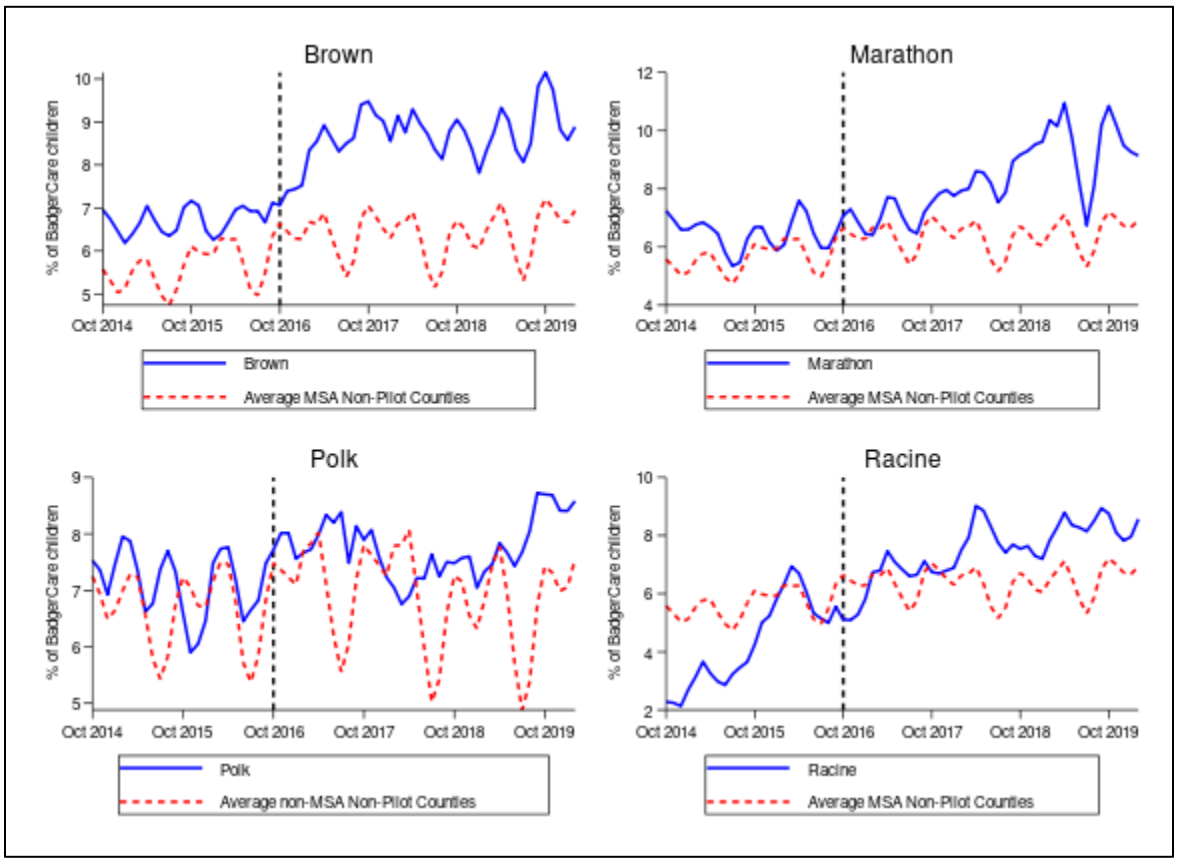
Children residing in Brown County were immediately more likely to receive dental care once the increased payments went into effect. Prior to the start of the pilot, 6.7 percent of BadgerCare members who were children received dental services each month. In the years prior to the pilot, this number increased to 8.7 percent (Table 6). MSA counties that did not participate in the program also experienced an increase in the percentage of BadgerCare child members that received services, from 5.5 to 6.3 percent. However, regression results, shown in the second column of Table 7, show that the increase in Brown County was statistically different than other MSA counties that did not participate in the pilot. The percentage of children who reside in Brown County and received dental care increased by 1.2 percentage points, or approximately 17.9 percent from baseline.

In Marathon County, the percentage of child BadgerCare members that received dental services prior to the pilot was 6.3 percent but increased to 8.2 percent after the increased rates were introduced. The percentage of child BadgerCare members started to increase at the start of the pilot and continued a steady increase through February 2020, as shown in Figure 2. After controlling for county and time, regression results indicate that this amounted to a statistically significant increase of 1.08 percentage points, or 17 percent from baseline.

Although there was a small increase in the percentage of child BadgerCare members that received dental care in Polk County (from 7.1 percent to 7.8 percent per month), this was not statistically significant (Table 7). Non-MSA counties remained steady at 6.1 percent.

The percentage of child BadgerCare members that received dental care did increase in Racine County, but the increase predated the implementation of the increased payments, as shown in Figure 2. Similar to the overall increase, this pre-trend makes it impossible to say that the pilot *caused* the percentage of BadgerCare children members that received dental care to increase.

Figure 2: Percentage of Child BadgerCare Members That Received any Dental Service, by County of Residence



3.1.3 Percentage of BadgerCare Adult Members Who Received Dental Services

Next, we turn to the percentage of adults who received care, shown in Figure 3.

Similar to the overall pattern of care and the pattern for children, there is a large increase in the percentage of Brown County BadgerCare members who received care immediately after the implementation of the program. Prior to the pilot, 2.3 percent of BadgerCare adults who reside in Brown County received dental care each month. This increased to 3.3 percent in the period after the pilot. The percentage of adults who received dental care each month in comparison counties, MSA non-pilot counties, was steady at 2.8 percent. These values are shown in Table 6. Results from the estimation of Equation 1 show that relative to other MSA counties that did not participate in the pilot program, the percentage of adults who reside in Brown County and received care each month increased by 1.06 percentage points, 57 percent of baseline.

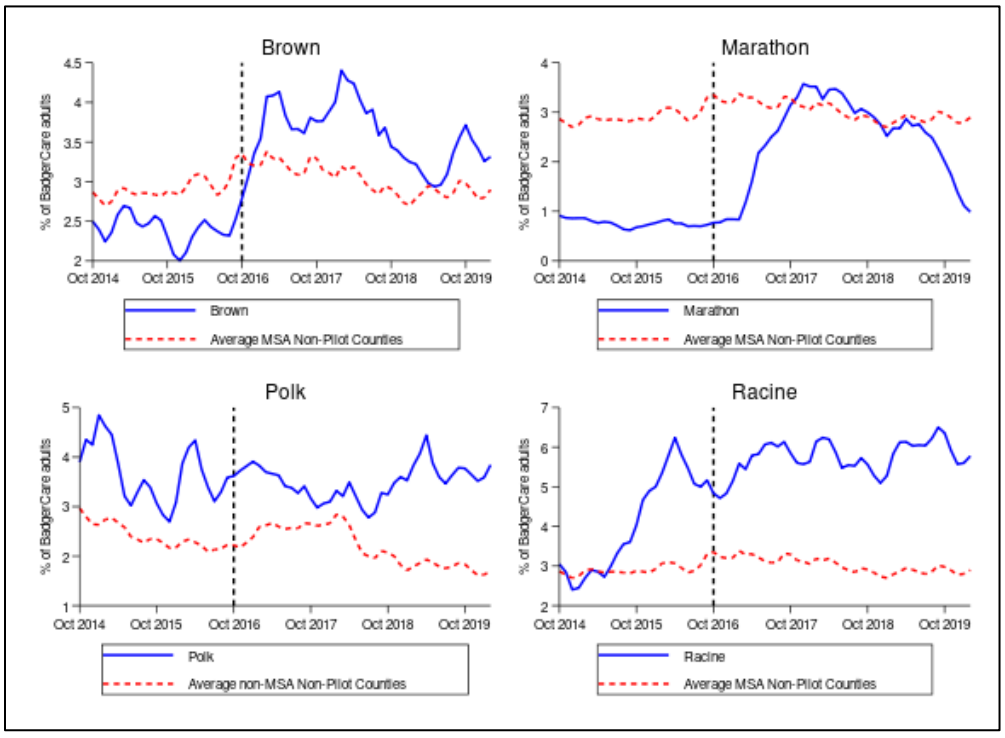
In Marathon County, unlike the overall percentage of BadgerCare members and the percentage of child BadgerCare members receiving dental care, the percentage of adults who received dental care did not increase immediately at the start of the pilot. However, in April 2017, there was a large increase in the

percentage of adult BadgerCare members that received care. In fact, prior to the pilot, this value was steady at approximately 0.7 percent per month, but jumped to about 3 percent per month, which is similar in value to other MSA non-pilot counties. Relative to the other MSA non-pilot counties, BadgerCare adults who reside in Marathon County were 1.5 percentage points (214 percent from baseline) more likely to receive dental care after the pilot was implemented. However, because the large jump occurred several months after the pilot was implemented, it is difficult to conclude without further information that this was due solely to the increased payments.

In Polk County, there was a small, but insignificant decrease in the percentage of BadgerCare adult members that received dental care. Specifically, the percent decreased from 3.4 to 3.1 (Table 6). In non-MSA non-pilot counties, the percentage of BadgerCare adult members that received dental care also fell slightly from 2.3 to 2.0 percent.

Similar to the overall trends and trends for children, the percentage of adult BadgerCare members that received dental care did increase in Racine County, from a monthly average of 3.9 to 5.3 percent, but the increase began well before the pilot began. This pre-trend makes it impossible to say that the pilot *caused* the percentage of BadgerCare adult members that received dental care to increase.

Figure 3: Percentage of BadgerCare Adult Members Who Received Dental Care, by County of Residence



3.1.4 Percentage of BadgerCare Child Members Who Received Preventive Services

The services targeted with increased rates were concentrated among preventive children's services. In this section, we consider those services as an independent outcome. The trends over the evaluation period are shown in Figure 4.

Given the trends in children receiving any dental care, it is not surprising that the percentage of BadgerCare children in Brown County who received preventive services increased substantially at the start of the pilot, from 4.9 to 6.4 percent, as shown in Table 8. The percentage of children who received preventive services increased in the MSA non-pilot counties as well, though by a smaller amount, from 3.7 to 4.3 percent. Relative to the other MSA non-pilot counties, children in Brown County were 0.92 percentage points more likely to receive preventive care, an increase of 18.8 percent from baseline (Table 7).

In Marathon County, the percentage of children who received preventive services started to gradually increase after the pilot began. The rate of increase was larger after August 2018, as seen in Figure 4. On average, the percentage of BadgerCare children who reside in Marathon County and received preventive care increased from a monthly rate of 4.0 to 5.6 percent. Compared to other MSA non-pilot counties, children in Marathon County were 1.00 percentage points more likely to receive preventive care, an increase of 25 percent from baseline.

There was no change in the percentage of children who received preventive services in either Polk County or other non-MSA non-pilot counties. In both Polk County and non-MSA non-pilot counties, the average percentage of children who received preventive dental care was approximately 4 percent in both the pre- and post-pilot periods.

In Racine County, the percentage of children receiving preventive dental care has been increasing since at least October 2014 (Figure 4). Because of this long-lasting trend, changes in this outcome cannot be attributed to the pilot program.

Figure 4: Percentage of BadgerCare Child Members Who Received Preventive Services, by County of Residence

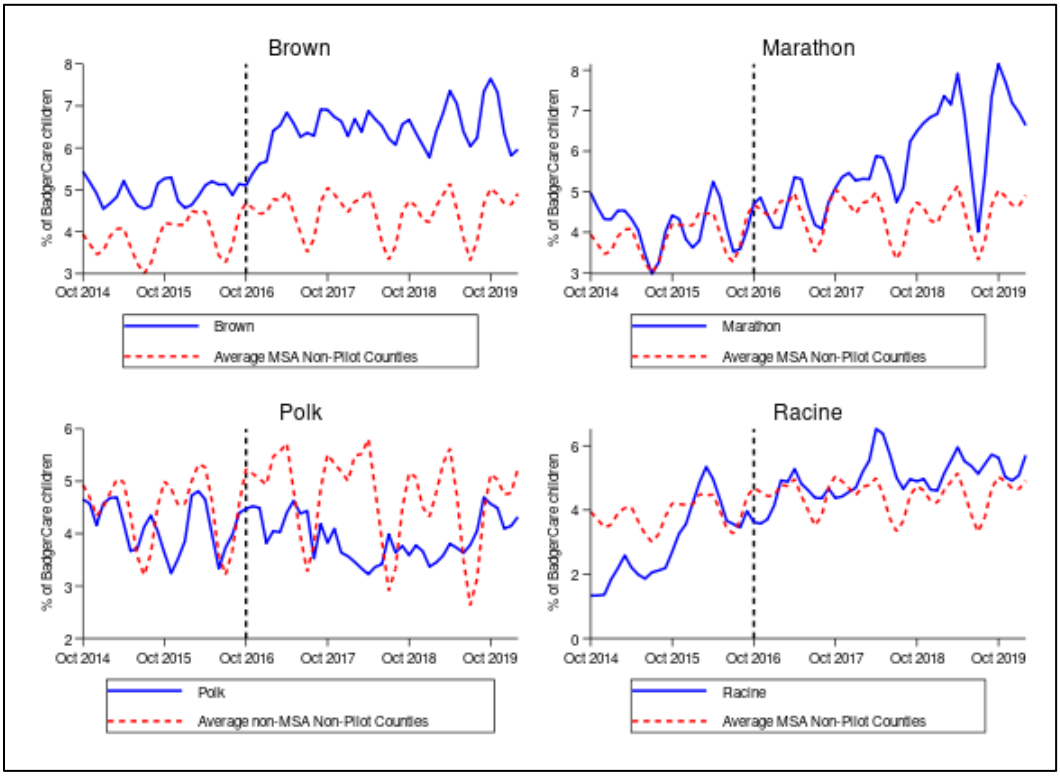


Table 8: Percentage of BadgerCare Members who Received Certain Types of Services, by County of Residence

	% of BadgerCare Child Members Who Received Preventive Dental Services, by County of Residence		**% of BadgerCare Adult Members Who Received Emergency Dental Services, by County of Residence**	
	Pre-pilot	Post-pilot	Pre-pilot	Post-pilot
Brown	4.9	6.4	1.2	2.4
Marathon	4.0	5.6	0.3	1.1
Polk	4.1	3.9	1.4	1.4
Racine	2.9	5.0	2.3	3.4
MSA, Non-Pilot Counties	3.7	4.3	1.4	1.6
Non-MSA, Non-Pilot Counties	3.9	3.9	1.0	1.0

NOTE: Numbers are calculated as average per month. The pre-pilot period is defined as October 2014–September 2016. The post-pilot period is defined as October 2016–February 2020.

3.1.5 Percentage of BadgerCare Adult Members Who Received Emergency Services

The pilot program increased Medicaid reimbursement rates for eight specified emergency services for adults, and the percentage of BadgerCare adults who received these services is the last outcome that we consider. The Wisconsin Medicaid program, with input from the Wisconsin Dental Association, specifically selected these services with the intention of decreasing emergency department visits for dental care. They occurred outside the hospital setting. Figure 5 shows the percent of adults who received at least one of these emergency services during the study period.

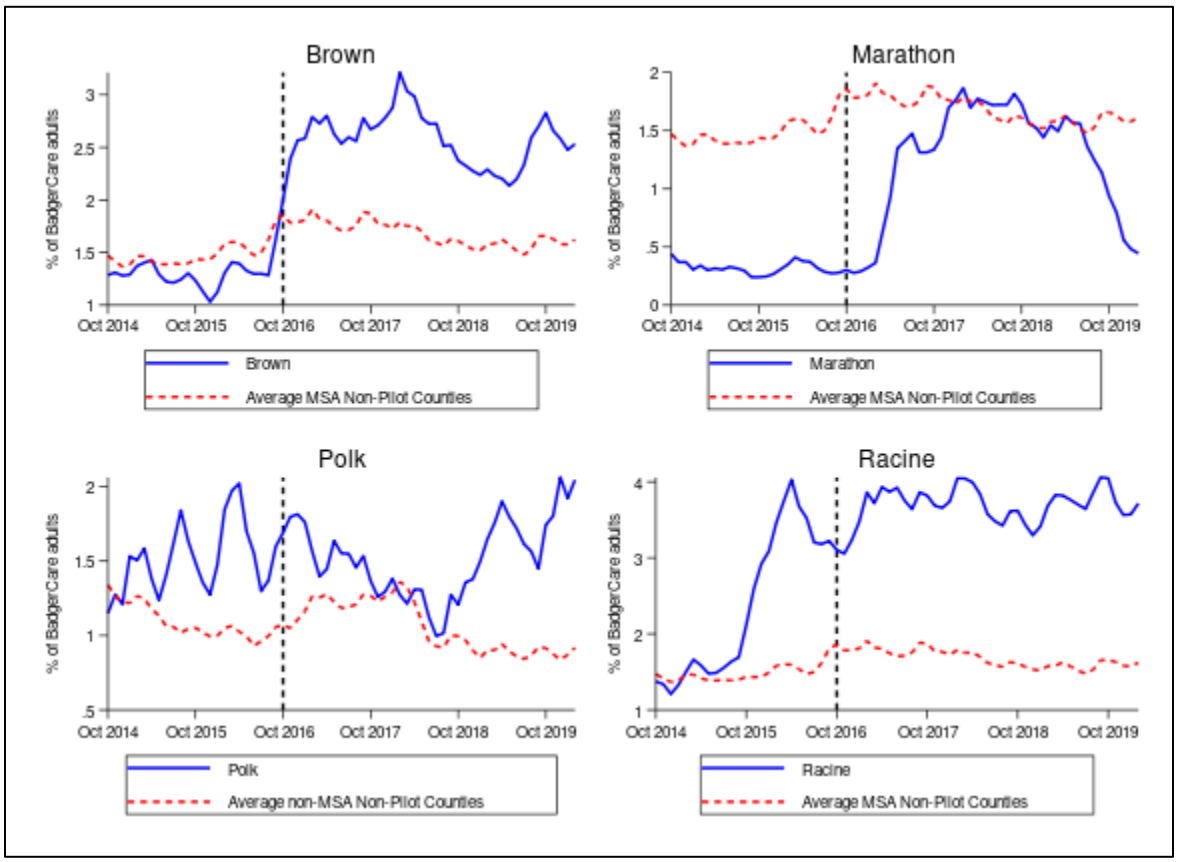
Similar to other outcomes considered, the percentage of adults who received the targeted emergency services increased substantially after the introduction of the pilot. On average, the percentage doubled from 1.2 to 2.4 percent between the pre- and post-pilot periods. In MSA non-pilot counties, the percentage was largely unchanged, from 1.4 to 1.6 percent (Table 8). Results from Equation 1 show that relative to the other MSA non-pilot counties, the percentage of adults who received emergency services increased 1.09 percentage points, or 91 percent from baseline.

Similar to Brown County, Marathon County also experienced a large increase in the percentage of adults who received these targeted emergency services after the start of the pilot. However, unlike Brown County, the percentage of adults who received emergency services fell sharply in June 2019. On average, the percentage increased from 0.3 to 1.1 percent. Compared to MSA non-pilot counties, this was an increase of 0.72 percentage points.

In Polk County, there was no change in the percentage of adult BadgerCare members that received emergency dental services. It was steady throughout the study period at 1.4 percent. In addition, the percentage of BadgerCare adults who reside in non-MSA non-pilot counties was steady at 1.0 percent throughout (Table 8).

In Racine County, there was a large spike between October and December of 2016, prior to the start of the pilot program. However, there was no noticeable change in the percentage of adults who reside in Racine County and received emergency services after the pilot began.

Figure 5: Percentage of BadgerCare Adult Members Who Received Emergency Services, by County of Residence



3.2 WHO PROVIDED CARE?

To measure the provision of dental care, we focus on three main outcomes: Total number of providers, total number of visits, and visits per provider. The first two outcomes measure the extensive margin of the pilot. Specifically, they are measures of how much care is being provided overall. The last measure is related to the intensive margin of the pilot. That is to say, how much does each provider do? For each outcome, we show results for all BadgerCare members as well as for children and adults separately.

In addition to our main measures of provision of care, we also consider the number of hospital emergency department visits in each county. One of the goals of the pilot was to increase the availability of dental providers, thereby decreasing the number of emergency department visits related to dental care in the pilot counties.

3.2.1 Total Number of Providers Serving BadgerCare Members

Figure 6 shows the total number of providers that serviced any dental care to a BadgerCare member during the month. For each pilot county, we compare it to the same level MSA counties that do not neighbor it.

After the pilot started in October 2016, there was a large increase in the number of providers in Brown County that was not seen in comparison counties. However, this dramatic increase was not sustained, and in February 2019, the number of providers reverted to pre-pilot levels. On average, there were 31 providers in the two years prior to the pilot and 39 in the period following the pilot, as shown in Table 9. In the comparison counties, the number of providers gradually increased from mid-2015 through mid-2016 and remained steady thereafter. Regression results, shown in Table 10, indicate that there was no statistically significant difference between Brown County and its comparison group after the pilot was introduced. This is largely due to the precipitous drop in providers in February 2019. There was also no difference in the number of providers that rendered care to children in Brown County. Though the number of providers that rendered care to adult BadgerCare members in Brown County decreased (Table 9), it was not statistically significant in all specifications.

The drop in providers in February 2019 in Brown County was likely due to a change in billing practices. In Section 3.2.2, we show the total number of visits provided to BadgerCare members and find that there was a sustained increase immediately after the implementation of the pilot (Figure 7). In addition, the number of visits per provider increased dramatically in February of 2019 (Figure 8).

In Marathon County, the number of providers was not changed after the pilot (Figure 6 and Table 9). However, in the comparison counties, the number of providers gradually increased during the time of the study. This implies that relative to MSA non-pilot counties that do not neighbor Marathon County, the number of providers fell. However, the number of providers in the control group was increasing prior to the pilot, so it is difficult to infer that the pilot *caused* the number of providers to fall in Marathon County.

Contrary to Brown and Marathon counties, Polk County did experience a large and sustained increase in the number of providers immediately after the start of the program. The average number of dental providers who rendered services increased from 10 to 14 per month. In comparison counties, the number of providers decreased slightly. Regression results (Table 10) show that the average number of dental providers increased by 4.78, almost 50 percent from baseline, compared to non-MSA non-neighboring counties. Providers that rendered care to children in Polk County also increased relative to non-MSA non-neighboring counties by 4.56 (48 percent of baseline) and providers that rendered care to adults in Polk County increased relatively by 3.06 (33 percent from baseline).

The number of providers in Racine County that rendered care to BadgerCare members started increasing dramatically starting in January 2016 and continued to increase until October 2017. This dramatic increase prior to the start of the pilot makes it difficult to attribute changes in the number of providers to the pilot. However, on average the number almost doubled, from 17 to 32. There was a

large increase for both children and adults (Table 9). There was largely no change in the number of providers in MSA non-neighboring counties.

Figure 6: Number of Providers that Rendered Dental Services to BadgerCare Members in Each County

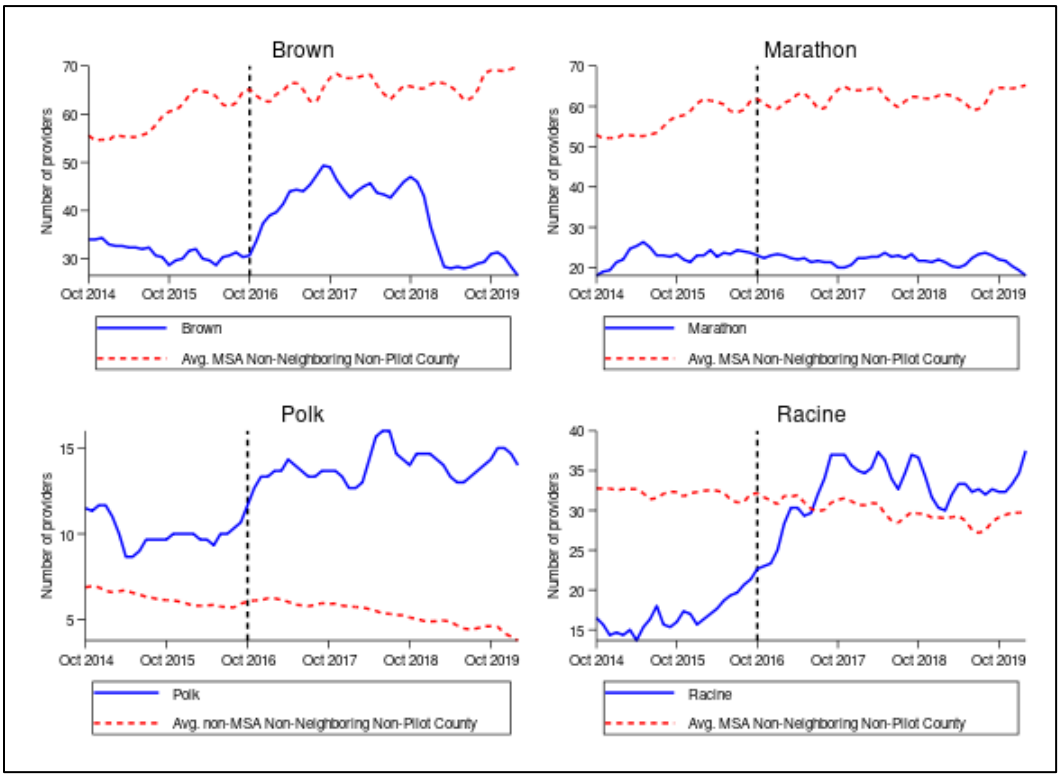


Table 9: Number of Providers that Rendered Dental Services to BadgerCare Members in Each County

	Number of Providers Rendering any Dental Services		Number of Providers Rendering any Dental Services to Children		Number of Providers Rendering any Dental Services to Adults	
	Pre-Pilot	Post-Pilot	Pre-Pilot	Post-Pilot	Pre-Pilot	Post-Pilot
Brown	31.4	38.6	27.4	33.8	25.1	23.3
Brown control	59.4	65.9	50.9	58.1	41.7	45.1
Marathon	22.9	21.8	21.5	20.5	8.6	8.6
Marathon control	56.5	62.3	48.4	54.8	39.6	42.4
Polk	10.0	13.9	9.6	13.5	9.3	11.1
Polk control	6.2	5.3	5.6	4.9	5.0	3.8
Racine	16.8	32.5	12.5	28.0	11.8	25.8
Racine control	32.1	30.0	27.7	25.5	21.9	19.1

NOTE: Numbers are calculated as an average per month. The pre-pilot is defined as October 2014–September 2016. The post-pilot period is defined as October 2016–February 2020.

Table 10: Regression Results, Number of Providers Rendering Services to BadgerCare Members in Each County

	All Ages, All Services	Children, All Services	Adults, All Services
Brown County			
Pilot County X Post	0.37	-1.02	-5.40***
95% CI, Robust SE	[-3.59,4.33]	[-4.90,2.86]	[-8.96,-1.85]
95% CI, Robust SE Clustered by County	[-12.297; 13.038]	[-14.954; 12.910]	[-14.684; 3.878]
Marathon County			
Pilot County X Post	-7.19***	-7.78***	-3.11***
95% CI, Robust SE	[-10.06,-4.32]	[-10.67,-4.90]	[-5.29,-0.93]
95% CI, Robust SE Clustered by County	[-19.101; 4.720]	[-20.842; 5.274]	[-11.868; 5.646]
Polk County			
Pilot County X Post	4.78***	4.56***	3.06***
95% CI, Robust SE	[4.17,5.39]	[3.92,5.21]	[2.40,3.73]
95% CI, Robust SE Clustered by County	[3.889; 5.673]	[3.673; 5.457]	[2.542; 3.585]
Racine County			
Pilot County X Post	18.20***	17.84***	16.89***
95% CI, Robust SE	[16.27,20.13]	[15.81,19.86]	[14.82,18.95]
95% CI, Robust SE Clustered by County	[16.926; 19.478]	[16.532; 19.144]	[15.510; 18.269]

NOTE: Results from a basic DID regression without additional controls. Each regression is weighted by county population. The dependent variable is the number of dental providers in each county that provide care to BC members. Pilot County X Post indicates if the pilot had been implemented in the county at the time of observation. The estimated coefficient is the change in the number of providers that rendered care in the pilot county relative to the control counties. The pre-pilot period is defined as Oct 2014–Sept 2016. The post-pilot period is defined as Oct 2016–Feb 2020. Control counties are all non-pilot and non-contiguous counties with the same urbanicity as the pilot county. We exclude FQHCs as well as observations with missing or unknown rendering provider. Observations where the rendering provider is tribal land are also excluded. Robust standard errors and 95 percent CIs are shown in brackets. Clustered 95 percent CIs use county-level clustering. * p < 0.; ** p < 0.05; *** p < 0.01

3.2.2 Total Number of Visits

As an alternative measure of total care provided, we consider the total number of visits provided in each county to BadgerCare members. The total number of dental visits rendered in each county for BadgerCare members is shown in Figure 7.

In Brown County, there was a sharp increase in the number of visits for BadgerCare members immediately after the start of the increased payments. This increase was sustained through February 2020. The number of visits increased from 1,978 per month to 2,936 after the pilot was implemented. However, the number of visits in MSA, non-pilot, non-neighboring counties also increased, from 4,934 to 5,736 per month. Regression results, seen in Table 11, the relative increase in visits was not statistically

significant. This is true for overall number of visits, the number of visits rendered to children, and the number of visits rendered to adults.

In Marathon County, there was a decrease in the number of visits that occurred at the very beginning of the program. In the two years prior to the pilot, the average number of visits per month provided to BadgerCare members was 1,696 but fell to 1,326 in the years following the introduction of the pilot. At the same time, the non-MSA, non-pilot, non-neighboring counties experienced an increase in the total number of dental visits provided to BadgerCare members. However, this increase of total visits in the comparison counties began well before the pilot was implemented, so it is difficult to attribute the relative decrease in visits to the pilot program.

In Polk County, the increase in the number of providers was accompanied by an increase in the number of visits immediately after the start of the pilot, as shown in Figure 7. The number of overall visits increased from 396 to 552 per month, as shown in Table 12. Compared to non-MSA, non-pilot, non-neighboring counties, where total visits fell slightly from 220 to 200, this was a statistically significant relative increase of 175.7 visits per month, or 44 percent from baseline (Table 12). The increase in visits was concentrated among children. Visits for BadgerCare children increased from 262 to 408 per month in Polk County and were stable in the comparison counties. Results from Equation 1 show that this was a relative increase of 148.4 visits, 56.6 percent from baseline. For adults, the total number of visits in Polk County increased only slightly, from 133.3 to 144.1 but decreased in the comparison counties. Regression results find that this is a relative increase of 27.3 visits, 20.5 percent of baseline.

The total number of dental visits provided in Racine County also increased throughout the period after the pilot was introduced. This increase was especially large for children, from 874 to 1,825 per month, compared to 709 to 1,037 for adults. However, similar to the number of providers in Racine County, this increase began well before the pilot began, which makes causal inference impossible.

Figure 7: Total Number of Visits for BadgerCare Members, by County Where Services Were Rendered

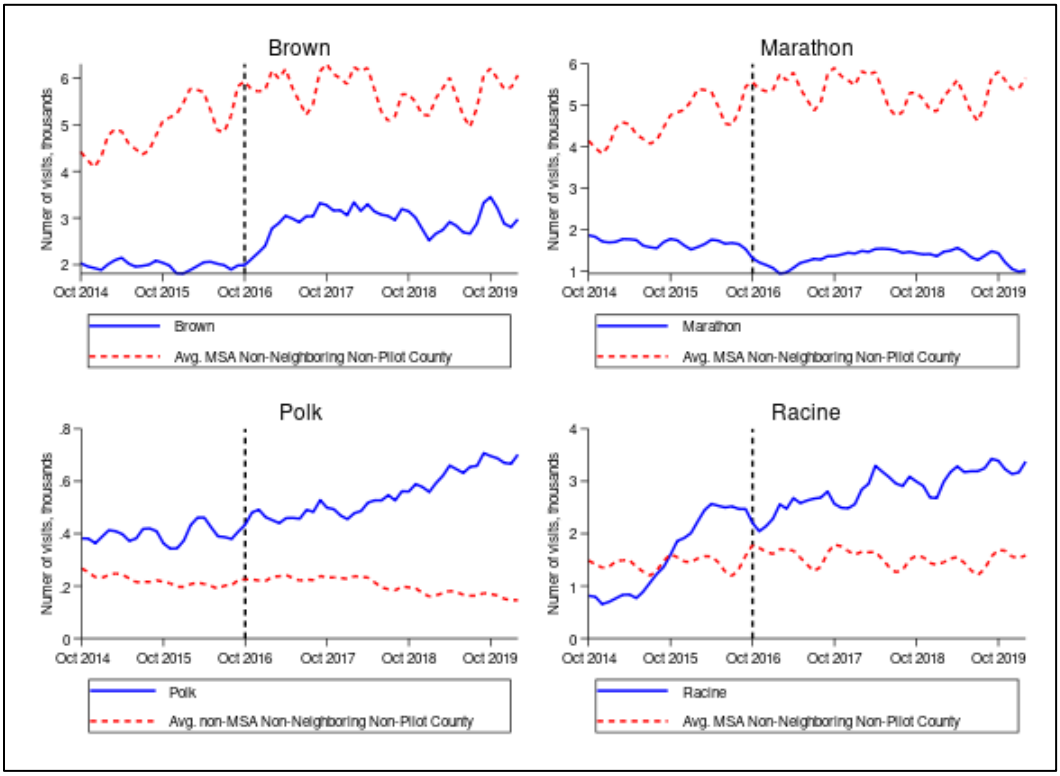


Table 11: Number of Visits for BadgerCare Members per Month by County Where Care was Rendered

	Number of Dental Visits Rendered to any BadgerCare Member		Number of Dental Visits Rendered to Child BadgerCare Members		Number of Dental Visits Rendered to Adult BadgerCare Members	
	Pre-Pilot	Post-Pilot	Pre-Pilot	Post-Pilot	Pre-Pilot	Post-Pilot
Brown	1978.4	2935.5	1605.9	2266.9	372.6	668.6
Brown control	4934.4	5735.9	3299.8	3978.9	1634.7	1757.1
Marathon	1695.5	1326.1	1657.5	1093.9	37.9	232.2
Marathon control	4621.7	5368.8	3098.0	3734.5	1523.7	1634.3
Polk	395.6	552.1	262.2	408.0	133.3	144.1
Polk control	219.9	200.4	153.9	150.9	66.0	49.5
Racine	1582.1	2861.9	873.5	1824.7	708.6	1037.2
Racine control	1425.3	1542.5	1227.2	1280.7	198.2	261.8

NOTE: Numbers are calculated as an average per month. The pre-pilot is defined as October 2014 – September 2016. The post-pilot period is defined as October 2016 – February 2020.

Table 12: Regression Results, Number of Dental Visits Rendered in Each County to BadgerCare Members

	All Visits	All Visits for Children	All Visits for Adults
Brown County			
Pilot County X Post	104.66	-46.04	150.70***
95% CI, Robust SE	[-252.36,461.67]	[-313.36,221.27]	[40.72,260.68]
95% CI, Robust SE Clustered by County	[-926.80; 1136.12]	[-931.95; 839.87]	[-40.51; 341.91]
Marathon County			
Pilot County X Post	-1167.24***	-1228.31***	61.07
95% CI, Robust SE	[-1519.96,-814.52]	[-1492.45,-964.17]	[-47.32,169.46]
95% CI, Robust SE Clustered by County	[-2139.46; -195.03]	[-2058.44; -398.18]	[-121.33; 243.46]
Polk County			
Pilot County X Post	175.65***	148.35***	27.30***
95% CI, Robust SE	[134.80,216.51]	[119.13,177.57]	[11.15,43.45]
95% CI, Robust SE Clustered by County	[137.00; 214.30]	[117.17; 179.54]	[11.82; 42.78]
Racine County			
Pilot County X Post	1176.47***	910.59***	265.88***
95% CI, Robust SE	[847.33,1505.62]	[685.28,1135.91]	[146.06,385.70]
95% CI, Robust SE Clustered by County	[939.61; 1413.34]	[828.42; 992.77]	[91.80; 439.96]

NOTE: Results from a basic DID regression without additional controls. Each regression is weighted by county population. The dependent variable is the number of visits by dental providers in each county to BC members. Pilot County X Post indicates if the pilot had been implemented in the county at the time of observation. The estimated coefficient is the change in the total number of visits rendered in the pilot county relative to the control counties. The pre-pilot period is defined as Oct 2014–Sept 2016. The post-pilot period is defined as Oct 2016–Feb 2020. Control counties are all non-pilot and non-contiguous counties with the same urbanicity as the pilot county. We exclude FQHCs as well as observations with missing or unknown rendering provider. Observations where the rendering provider is tribal land are also excluded. Robust standard errors and 95 percent CIs are shown in brackets. Clustered 95 percent CIs use county-level clustering. * p < 0.; ** p < 0.05; *** p < 0.01

3.2.3 Visits per Provider

We consider the number of visits that each provider rendered as a measure of how much time each provider spends with BadgerCare members. The number of visits per provider serves as measure of the degree of engagement by providers with the Medicaid program. For each provider, we total the number of BadgerCare patients to whom the provider rendered care to in each month, which is shown in Figure 8. Overall, the number of visits per provider is somewhat noisy and there is no clear evidence that indicates that the pilot program influenced the number of visits per provider in any of the pilot counties. For this reason, we do not present regression results for this outcome.

For example, there was a large and noticeable increase in the number of visits per provider in Brown County in February 2019. Because of this relatively late increase in the number of visits per provider in Brown County, the overall average number of visits per provider increased from 63.3 to 78.8 in the post-period (Table 13). In Marathon County, the number of dental visits per provider steadily decreased from April 2016 until February 2017, when it began an increase. However, it did not increase to the original average; the number of visits per provider decreased in Marathon County from 75.2 to 61.1 in Marathon County. In Polk County, the number of visits per provider was noisy, but did not show any noticeable trend until July 2018 when it started to increase through February 2020. There was no change in the average number of visits per provider in Polk County comparing the pre- and post-pilot periods. In Racine County, the number of visits per provider increased dramatically from August 2015 to April 2016 before peaking and sharply decreasing through the implementation of the pilot until November 2017. The average number of visits per provider fell from 92.6 in the pre-period to 88.7 in the post-period.

Figure 8: Number of Dental Visits to BadgerCare Members per Provider, by County Where Services Were Rendered

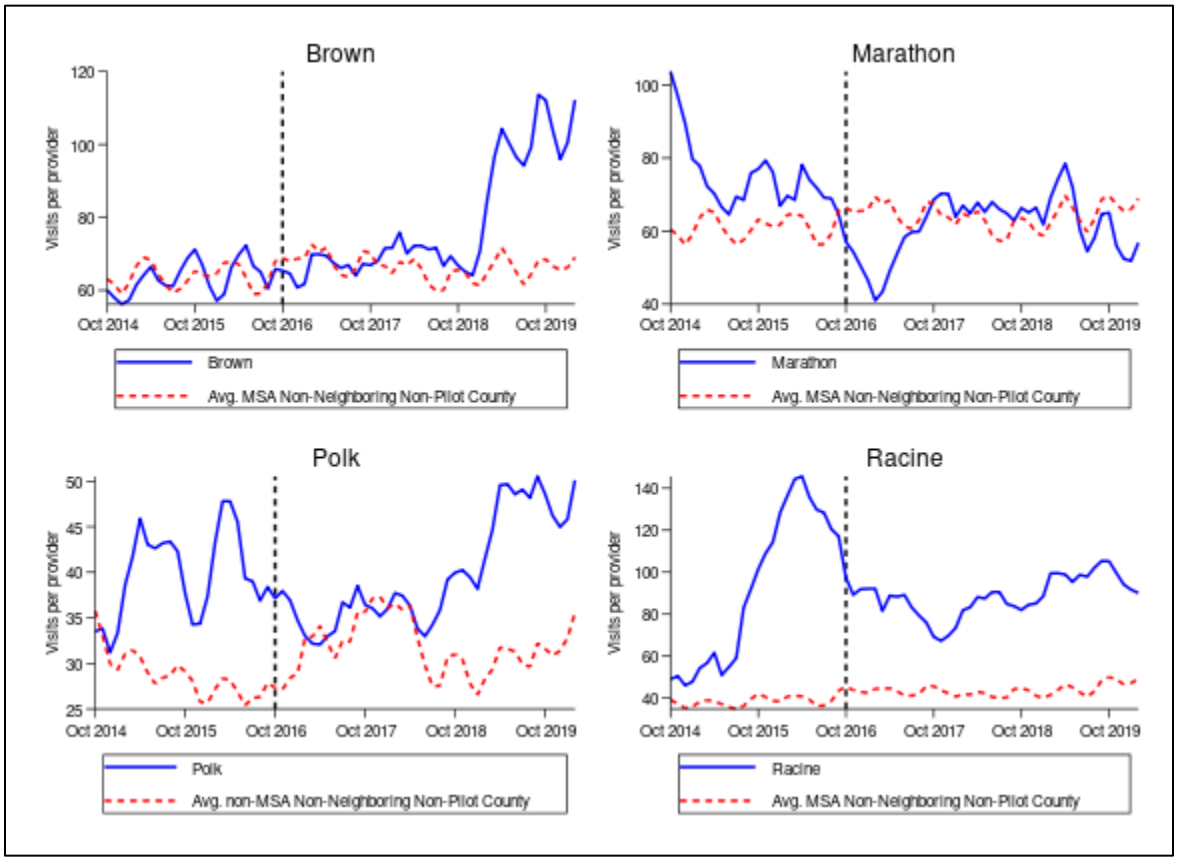


Table 13: Dental Visits to BadgerCare Members per Provider, by County Where Services Were Rendered

	Number of Dental Visits to BadgerCare Members per Provider		Number of Dental Visits to BadgerCare Child Members per Provider		Number of Dental Visits to BadgerCare Adult Members per Provider	
	Pre-Pilot	Post-Pilot	Pre-Pilot	Post-Pilot	Pre-Pilot	Post-Pilot
Brown	63.3	78.8	59.0	69.1	14.9	32.1
Brown control	63.8	66.5	50.9	55.0	28.7	26.6
Marathon	75.2	61.1	78.4	53.9	4.5	27.2
Marathon control	61.0	64.3	48.9	53.6	27.1	25.6
Polk	39.8	39.7	27.6	30.1	14.6	13.0
Polk control	28.8	31.7	21.7	25.0	10.9	10.5
Racine	92.6	88.7	65.8	65.5	59.8	41.5
Racine control	38.6	43.8	33.5	39.7	13.7	14.8

NOTE: Numbers are calculated as an average per month. The pre-pilot is defined as October 2014–September 2016. The post-pilot period is defined as October 2016–February 2020.

3.2.4 Total Number of Emergency Department Visits

Our last measure of care is the number of emergency department visits provided in each county, which is shown in Figure 9. To identify these visits, we use the entire universe of Medicaid claims data (not just dental). We mark observations with procedure codes 99281-99285, which indicate an emergency department setting.[54] We use ICD-9 codes 520–529 and ICD-10 codes K00–K14 (diseases of the oral cavity, salivary glands, and jaw) to identify dental diagnosis codes. We keep only those observations that have an ED procedure code and have at least one dental diagnosis code. There may be many diagnosis codes per visit, but there needs to be at least one dental among them for us to classify the visit as a dental visit. We collapse multiple services in the same day by the same person to a single visit. More specifically, if a person has more than one ED service in a day, we take the total amount paid for all ED services that day and collapse to one visit.

We use this as a measure of potentially avoidable treatment (and cost) if a Medicaid member is receiving adequate dental care. If access to services improves for Medicaid members in pilot counties for office-based dental care, as contemplated by the Wisconsin Dental Association in recommending the payment changes for adult services, then there is the possibility of a decrease in the total volume of emergency department visits. However, our analysis finds no evidence that the number of Emergency Department visits fell in any of the pilot counties after the pilot began.

Brown County experienced a gradual decline in the number of ED visits for dental care. On average, the number of visits fell from 187.5 to 110.9 on a monthly basis (Table 14). However, there was also a

[54] This analysis does not include free standing emergency rooms not attached to hospitals.

decline in ED visits for dental care in MSA, non-pilot, non-neighboring counties. There was no relative change in ED visits rendered in Brown County overall, for children, or for adults (Table 15).

There was also a slow decline in Marathon County in the number of emergency department visits, on average from 51.0 per month in the pre-period to 38.3 in the post-period. Although the comparison counties had a larger decrease in ED visits, it was not statistically different in all specifications (Table 15).

In Polk County, the number of ED visits for dental care is much smaller than in the other pilot counties, between 5 and 10 per month. There is no clear pattern in the number of ED visits for dental care in Polk County. However, in comparison counties, there has been a general downward trend. Regression results show that the number of ED visits in Polk County increased by 4.87 for BadgerCare members. However, this increase was not found in children and is entirely concentrated in adults (Table 15).

Similar to the other urban pilot counties, the number of ED visits in Racine County also fell gradually over time, from 101.4 to 84.5. However, this decrease was not statistically different from the decrease in MSA non-pilot non-neighboring counties (Table 15). This is true overall, for children, and for adults.

Figure 9: Number of Emergency Department Visits for Dental Care, by County Where Care Was Rendered

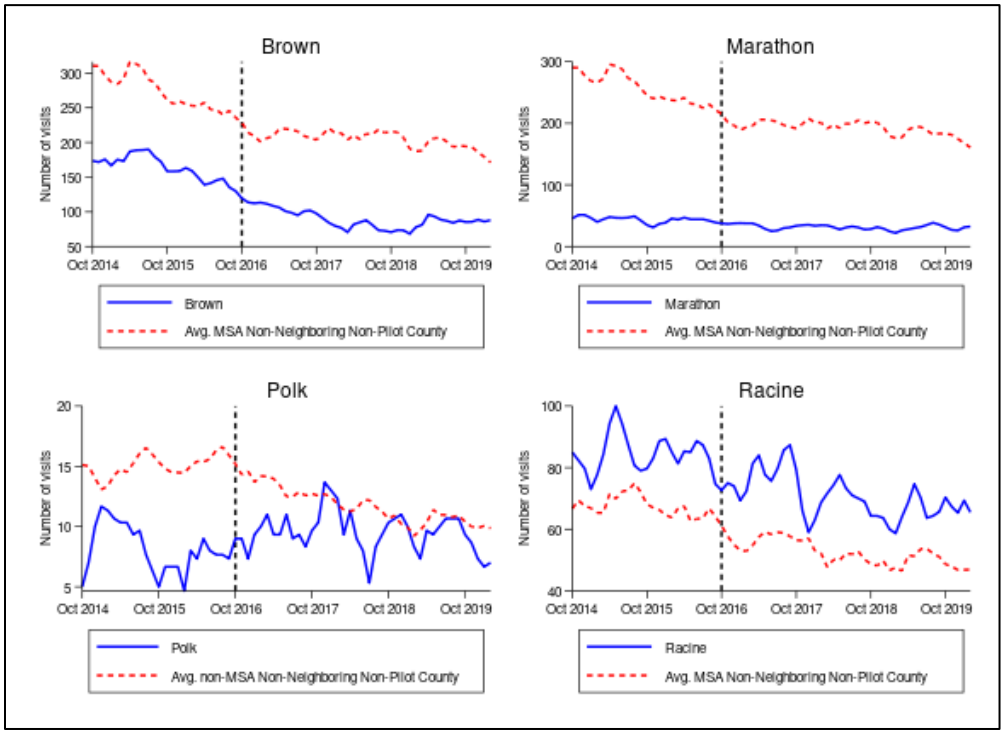


Table 14: Number of Emergency Department Visits for Dental Care, by County Where Care Was Rendered

	Number of Emergency Department Visits for Dental Care to BadgerCare Members		Number of Emergency Department Visits for Dental Care to Child BadgerCare Members		Number of Emergency Department Visits for Dental Care to Adult BadgerCare Members	
	Pre-Pilot	Post-Pilot	Pre-Pilot	Post-Pilot	Pre-Pilot	Post-Pilot
Brown	187.5	110.9	26.2	21.9	124.0	64.9
Brown control	326.7	251.4	63.7	53.3	194.2	140.7
Marathon	51.0	38.3	5.9	5.4	36.2	25.4
Marathon control	306.5	236.0	59.6	49.9	182.5	132.3
Polk	10.6	11.3	2.5	1.9	5.8	6.3
Polk control	18.1	14.2	3.0	2.3	11.6	9.1
Racine	101.4	84.5	16.9	17.5	64.5	47.5
Racine control	80.4	63.2	11.8	10.5	52.4	39.5

NOTE: Numbers are calculated as an average per month. The pre-pilot is defined as October 2014–September 2016. The post-pilot period is defined as October 2016–February 2020.

Table 15: Regression Results, Number of Emergency Department Visits for Dental Care, by County Where Care Was Rendered

	All Visits	All Visits for Children	All Visits for Adults
Brown County			
Pilot County X Post	-7.93	2.72	-8.08
95% CI, Robust SE	[-24.63,8.76]	[-1.14,6.57]	[-20.29,4.13]
95% CI, Robust SE Clustered by County	[-89.20; 73.34]	[-8.18; 13.62]	[-66.92; 50.76]
Marathon County			
Pilot County X Post	49.31***	6.39***	35.15***
95% CI, Robust SE	[32.73,65.89]	[3.36,9.42]	[22.69,47.62]
95% CI, Robust SE Clustered by County	[-27.04; 125.66]	[-3.79; 16.57]	[-20.18; 90.49]
Polk County			
Pilot County X Post	4.87***	0.51*	3.08***
95% CI, Robust SE	[2.95,6.80]	[-0.07,1.09]	[1.65,4.50]
95% CI, Robust SE Clustered by County	[2.87; 6.87]	[0.17; 0.85]	[1.78; 4.37]
Racine County			
Pilot County X Post	1.26	1.57	-2.19
95% CI, Robust SE	[-4.50,7.02]	[-0.69,3.82]	[-6.70,2.32]
95% CI, Robust SE Clustered by County	[-11.92; 14.44]	[0.77; 2.36]	[-12.26; 7.88]

NOTE: Results from a basic DID regression without additional controls. Each regression is weighted by county population. The dependent variable is the number of Emergency Department visits with dental primary diagnosis rendered in each county. Pilot County X Post indicates if the pilot had been implemented in the county at the time of observation. The estimated coefficient is the change in the number of visits rendered in the pilot county relative to the control counties. The pre-pilot period is defined as Oct 2014–Sept 2016. The post-pilot period is defined as Oct 2016–Feb 2020. Control counties are all non-pilot and non-contiguous counties with the same urbanicity as the pilot county. We identify ED visits using procedure codes 99281-99285. We identify visits with dental diagnosis using ICD-9 codes 520-529 and ICD-10 codes K00-K14. These codes represent diseases of oral cavity. We exclude FQHCs as well as observations with missing or unknown rendering provider. Observations where the rendering provider is tribal land are also excluded. Robust standard errors and 95 percent CIs are shown in brackets. Clustered 95 percent CIs use county-level clustering. * $p < 0.$; ** $p < 0.05$; *** $p < 0.01$

3.3 How Much Has the Program Cost?

3.3.1 Total Outlays

Of central importance is how much the pilot program has cost since its implementation. Table 15 shows the two-year pre-pilot, the first two-years after the pilot, the period from October 2018–February 2020, and the total payments made during the pilot. As can be seen in Table 15, expenditures on dental service increased in all pilot counties after the reimbursement rates increased. In the MSA non-pilot counties, there was also an increase, although it was much smaller than the pilot counties. In non-MSA non-pilot counties, there was essentially no change in payments. Table 17 shows payments made for the targeted services for the same time periods.

Table 16: Total Payments for Dental Services ($1000s) Rendered in Each County

	Pre-pilot	Oct 2016 – Sept 2018	Oct 2018 – Feb 2020	Total Post-Pilot
Brown	6,120.96	16,955.83	11,096.97	28,052.79
Marathon	6,160.98	7,887.02	5,331.61	13,218.63
Polk	1,126.86	2,317.86	2,100.56	4,418.41
Racine	4,932.67	16,222.40	13,972.34	30,194.75
MSA, Non-Pilot Counties	4,281.60	4,659.89	2,989.24	7,649.12
Non-MSA, Non-Pilot Counties	370.73	370.46	211.31	581.77

Table 17: Total Payments for Dental Services with Increased Reimbursement Rates ($1000s) Rendered in Each County

	Pre-pilot	Oct 2016 – Sept 2018	Oct 2018 – Feb 2020	Total Post-Pilot
Brown	5,524.51	16,476.98	10,868.01	27,344.99
Marathon	5,234.20	7,002.59	4,635.05	11,637.64
Polk	949.46	1,892.28	1,617.08	3,509.36
Racine	4,894.17	15,609.66	12,775.51	28,385.17
MSA, Non-Pilot Counties	3,938.49	4,218.36	2,637.08	6,855.44
Non-MSA, Non-Pilot Counties	335.64	342.97	182.65	525.61

3.3.2 Payments per Member

Next, we turn to payments made for dental services per-member. Specifically, we total the dental services rendered in each county in each month and divide it by the number of BadgerCare members enrolled in each county per-month. We compare each pilot county to the payments made in MSA or non-MSA, non-neighboring counties. Per-member payments increased at the start of the pilot for all

counties, as shown in Figure 10. Immediately at the start of the pilot, there was a large and sustained increase in per-capita payments in Brown County, from $7.41 to $20.36, as shown in Table 18. Regression results, shown in Table 19, indicate that this amounted to an increase in per-member payments of $12.29, or 165 percent of baseline. The increase was larger for children ($14.50) than it was for adults ($8.02).

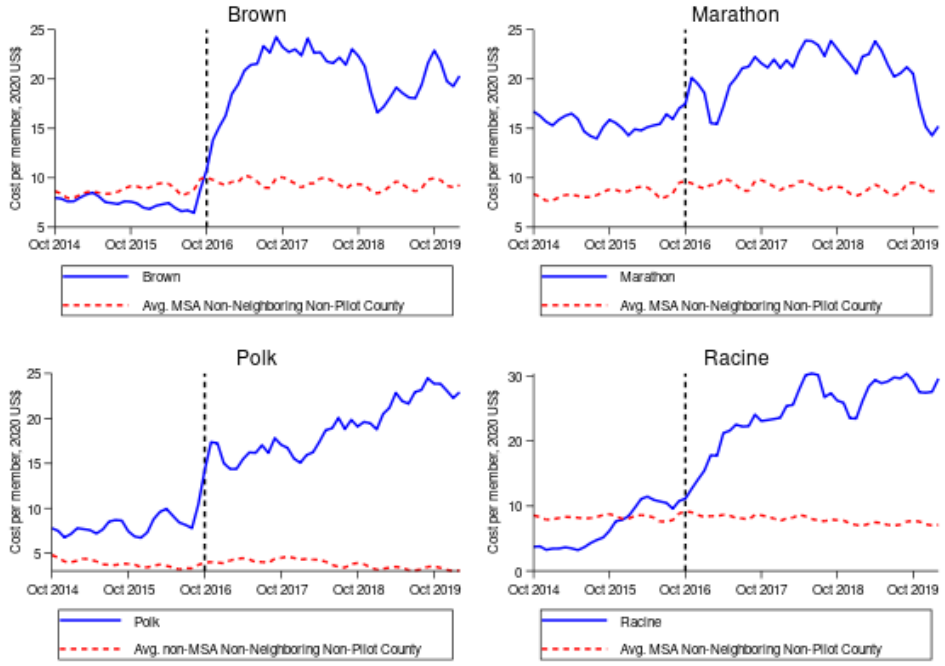
There was also an increase in Marathon County at the start of the pilot. However, there was a sharp decline in payments starting in January 2019. On average, per-member payments increased from $15.47 to $20.56 in Marathon County. Results from Equation 1 (Table 19) show that this amounts to a relative increase in payments per member of $4.43, or 28 percent of baseline. The increase was larger for adults in Marathon County than it was for children.

Similar to Brown County, per-member payments increased immediately after the start of the pilot in Polk County and remained high until the start of the COVID-19 pandemic. In fact, per-capita payments continued to increase through the pilot period. On average, per-capita payments increased from $7.98 to $18.93. Relative to non-MSA, non-neighboring counties, this was an increase of $10.99, or 138 percent of baseline. The increase for per-member child payments was larger ($15.85) in Polk County than it was for adults in Polk County.

Payments also increased in Racine County at the start of the pilot. However, the per-member payments had been increasing for at least a year prior to the start of the pilot in Racine, so increases in Racine should not necessarily be attributed to just the pilot. However, per-member payments increased from $6.64 to $24.72.

While per-member payments were increasing in the pilot counties, they remained largely unchanged in control counties, as shown by the red dashed lines. Per-member payments increased on average by $0.68 in non-pilot MSA counties and were unchanged in non-MSA counties during the same period.

Figure 10: Per-member Dental Payments for Services Rendered in Each County to BadgerCare Members per BadgerCare Member that Reside in that County



NOTE: All values are in 2018 real-dollars, inflated using the medical care CPI.

Table 18: Per-member Dental Payments for Services Rendered in Each County per BadgerCare Members in Each County

	Total Per-capita Payments, Pre-pilot	Total Per-capita Payments, Post-pilot	Total Per-capita Payments for Children, Pre-pilot	Total Per-capita Payments for Children, Post-pilot	Total Per-capita Payments for Adults, Pre-pilot	Total Per-capita Payments for Adults, Post-pilot
Brown	7.41	20.36	10.21	25.88	2.63	10.50
Brown control	8.74	9.41	10.80	12.01	5.72	5.54
Marathon	15.47	20.56	24.15	27.90	1.27	7.81
Marathon control	8.40	9.08	10.42	11.64	5.43	5.24
Polk	7.98	18.93	7.91	24.18	8.10	10.58
Polk control	3.83	3.81	4.47	4.92	2.93	2.19
Racine	6.64	24.72	5.83	30.03	7.89	16.38
Racine control	8.24	7.91	11.26	10.95	3.78	3.28

NOTE: All values are in 2018 real-dollars, inflated using the medical care CPI and are weighted by county population. The pre-pilot period is defined as October 2014–September 2016. The post-pilot period is defined as October 2016–February 2020.

Table 19: Regression Results, Per-Member Payments Made for Dental Services Rendered in Each County

	Per-Member Payments for All Members	Per-Member Payments for Children	Per-Member Payments for Adults
Brown County			
Pilot County X Post	12.29***	14.50***	8.02***
95% CI, Robust SE	[11.19,13.40]	[13.15,15.85]	[7.14,8.91]
95% CI, Robust SE Clustered by County	[11.25; 13.34]	[12.73; 16.26]	[6.92; 9.13]
Marathon County			
Pilot County X Post	4.43***	2.58***	6.70***
95% CI, Robust SE	[3.27,5.59]	[1.12,4.04]	[5.53,7.88]
95% CI, Robust SE Clustered by County	[3.38; 5.48]	[0.81; 4.34]	[5.60; 7.81]
Polk County			
Pilot County X Post	10.99***	15.85***	3.21***
95% CI, Robust SE	[9.83,12.15]	[14.30,17.40]	[2.22,4.21]
95% CI, Robust SE Clustered by County	[10.42; 11.56]	[14.96; 16.74]	[2.70; 3.72]
Racine County			
Pilot County X Post	17.42***	23.03***	8.65***
95% CI, Robust SE	[15.31,19.52]	[20.18,25.88]	[7.35,9.95]
95% CI, Robust SE Clustered by County	[16.37; 18.46]	[21.27; 24.79]	[7.54; 9.76]

NOTE: Results from a basic DiD regression without additional controls. Each regression is weighted by county population. The dependent variable is the total payments in each county per BC enrollee. Pilot County X Post indicates if the pilot had been implemented in the county at the time of observation. The estimated coefficient is the change in the total number of visits rendered in the pilot county relative to the control counties. The pre-pilot period is defined as Oct 2014–Sept 2016. The post-pilot period is defined as Oct 2016–Feb 2020. Control counties are all non-pilot and non-contiguous counties with the same urbanicity as the pilot county. We exclude FQHCs as well as observations with missing or unknown rendering provider. Observations where the rendering provider is tribal land are also excluded. Robust standard errors and 95 percent CIs are shown in brackets. Clustered 95 percent CIs use county-level clustering. * $p < 0.$; ** $p < 0.05$; *** $p < 0.01$

3.3.3 Why did payments increase?

In this section, we estimate how much payments increased because of the pilot program. We then consider what fraction of the increased payments were due to the mechanics of the program and what fraction was due to changes in services delivered. That is: What portion of the increase in payment outlays is due to the increased reimbursement rate for services rendered, and what is due to changes in the supply and use of services?

To estimate the increase in payments due to the pilot program, we estimate Equation 1 where the outcome is total dental payments. We use the "allowed amount" to calculate payments for both fee-for-service and managed care. We then assume that the pilot counties, in the absence of the program, would have behaved exactly like the non-pilot control groups. For example, if payments made in MSA

non-pilot counties increased by 5 percent after the pilot program was enacted, we assume that the MSA pilot counties (Brown, Marathon, and Racine) would have also increased by this amount. Multiplying this by the pre-pilot payments yields the predicted payments during the pilot program.

Last, we take the increase in payments due to the increased reimbursement rates and divide that by the actual increase in payments to obtain what fraction of the increased payments was due strictly to the increase in reimbursement rates. Table 20 shows this for each pilot county, for both children and adults.

Consider payments made for children's dental services in Brown County:

- Total payments made during the pilot program for all dental services rendered to children was $21,553,906.
- Total predicted payments for the pilot period is $9,257,623.
- The difference between the actual payments made and the predicted payments is $12,296,283.
- The predicted payments for the post-pilot period—if only the rates increased and there was no increase in utilization—is equal to the predicted number of services multiplied by the increased rate. This would equal $12,224,224.
- Payments would be increased by $2,966,601 if only the reimbursement rate increased.
- Thus, 24 percent of the increased payments (= $2,966,601/$12,296,283) is due only to the increased reimbursement rates.
- The remaining 76 percent is due to the increased number of services provided.

The additional payments made because of the pilot was $3,674,816 for adults in Brown County. Almost 90 percent of the increased payments were made because of changes in utilization, rather than a mechanical increase due to increased rates. The large percentages attributed to utilization are in-line with findings that both adults and children in Brown County were more likely to have received care because of the increased payments made during the pilot.

In Polk County, about 70 percent of the increased payments were made mechanically, due to the increased rates. We found that residents of Polk County were no more likely to have dental care, which is consistent with this finding. For adults in Polk County, about 43 percent of the increased payments were due to the rates and not a change in utilization.

Marathon County experienced large changes in visits and services before the pilot was implemented. An inconsistent pattern in the number of services provided, as shown in Figure 13, precludes the ability to estimate how the number of services and payment outlays would have changed in the absence of the pilot. The same is true in Racine County.

Table 20: Total Change in Payments, Percent due to Service Increase, and Percent due to Payment Rate Increase (Mechanical)

	Brown County		**Marathon County**		**Polk County**		**Racine County**	
	Children	Adults	Children	Adults	Children	Adults	Children	Adults
Total Outlays ($)	21,553,906	4,888,764	10,730,751	1,719,883	3,276,171	899,547	21,206,761	7,342,600
# Services	462,013	111,501	163,501	28,636	43,221	18,066	358,030	158,842
Average Payment ($)	46.65	43.85	65.63	60.06	75.80	49.79	59.23	46.23
Predicted number of Services	262,029	36,702			36,899	13,225		
Predicted Total Spending ($)	9,257,623	1,213,948	10,402,955	287,832	1,167,408	473,528	4,619,165	3,514,006
Actual Spending Minus Predicted Spending ($)	12,296,283	3,674,816	327,796	1,432,051	2,108,763	426,019	16,587,596	3,828,593
Predicted Total Payments if only Reimbursement Rates Increased ($)	12,224,224	1,609,182	16,805,024	302,191	2,796,938	658,526	13,563,447	5,158,482
% of Increase Due to Increased Reimbursement Rates	24.1	10.8			77.3	43.4		
% of Increase Due to Increased Utilization	75.9	89.2			22.7	56.6		

4 LIMITATIONS

There are several limitations that should be noted. The first is related to the data used and the second is related to the assumptions underlying the empirical framework.

First, all analysis is based on Medicaid claims data for the state of Wisconsin. While this is the ideal data to study questions outlined in this report, there are potential limitations. The quality of the analysis relies on the data being consistent before and after the pilot was implemented and across county lines. For example, if some providers changed the way they bill or the county that they bill from, this could contaminate our findings. Ideally, all services would be coded as having been rendered in the county where the service was provided. However, this is likely not always the case.

Another example related to the use of claims data that could pose challenges to our analysis is if a provider has several offices in different counties from which they practice in. If they change how they code these services during the timeframe of our analysis, this could potentially contaminate our findings. [55] For example, if at the start of the pilot, a provider in a pilot-county changed from billing from a non-pilot county to a pilot-county, we would falsely attribute increases in services provided in the pilot-county to the program.[56]

We are also unable to isolate the role of school-based clinics and the expansion of dental sealant programs. Dental sealant programs have expanded in counties throughout the state in recent years. To the extent that these services expanded more so in the pilot counties because of the increased reimbursement rates, they will be captured in this evaluation's total estimates. Unfortunately, the number of claims that are coded with schools as the place of service is not consistent across counties. For example, in Brown County, fewer than five claims were coded as having schools identified as the place of service during the pilot. The rendering provider, rather than the school itself, more likely bills for school-based services.

The use of the difference-in-difference framework relies on assumptions. In particular, our analysis relies on the construction of a valid control group. Although control group and treatment groups need not have the same mean prior to the start of the program, they do need to move in parallel in the pre-period. This is what is known as parallel trends. This assumption is clearly violated for certain outcomes

[55] In private communication, it was suggested that one or more Marathon providers may have several branch offices in the region that bill from Marathon County, and that this practice may have changed during the pilot program.

[56] The claims data also rely on the use of identifying providers. To do so, we use the provider NPI (National Provider Identifier). Each NPI should correspond to a single provider. However, in a very few situations, some claims have an NPI linked to an office or practice, rather than a single individual. This would lead to a potential undercount of the number of providers in each county. It is not considered problematic for our analysis because the number of claims affected is minimal and would not have changed differentially over time between the pilot and non-pilot counties.

for at least two counties. Namely, the violation of parallel trends makes us unable to draw conclusions about the percentage of Marathon County residents that received dental care. This is also why we are unable to draw conclusions about the pilot program's effect of the number of visits and services provided in Racine County.

Another assumption underlying our framework is that nothing substantial changed in the counties during the timeframe of our study. This assumption would be violated if, for example, a local initiative occurred to increase dental care utilization, unrelated to the increased reimbursement rates (for example, expansion of school dental sealant programs). If such an initiative happens in a pilot county after the pilot begins, then we would be erroneously attributing the increased utilization to the pilot program. Alternatively, if it occurs in a non-pilot county, we would be underestimating the effect of the pilot program.

Last, ideally, treatment would be randomly assigned. If treatment was not randomly assigned and, instead, counties were chosen based on characteristics that are correlated with outcomes of interest, then findings will be skewed. For example, if Brown was selected for the pilot program because it was most likely to show success, then the effect of the pilot includes the effect of these other determinants. To control for this, all our models include county fixed effects, which control for characteristics of each county that may be unobserved.

5 DISCUSSION AND CONCLUSION

Table 21 provides a snapshot of the findings for the different outcomes considered in this report. We also provide a summary by county and a comparison of the previous report in this section.

Brown County

The pilot increased the percentage of Brown County residents who received care, which is an indication of the expansion of service to BadgerCare members. Although the number of providers and visits did not change relative to the comparison counties, this is largely due to the change in comparison counties and not because of a decrease in Brown County. The pilot program did not decrease ED use.

Brown County appears to have benefited from a well-organized community effort led by the Oral Health Partnership (OHP).[57] This non-profit focuses on delivering services to Medicaid- and low-income children. Coincident to the Medicaid pilot program, in January 2017, the OHP received a large donation from Delta Dental of Wisconsin, allowing the partnership to substantially expand its operations, including the addition of new sites for direct services. This factor modifies the degree to which the county's success may be attributed to the pilot program itself.

Like all pilot counties, Brown County saw an increase in payments made for dental care per member residing in the county. This was largely due to an increase in services for both children and adults.

Marathon County

Similar to Brown County, Marathon County also experienced an increase in the percentage of BadgerCare members who reside in that county that received dental care. However, we did not find that there was any change in the number of providers rendering care in Marathon County. Large changes in trends prior to the implementation of the pilot make causal inference with respect to these outcomes (number of visits, visits per provider, and ED visits) impossible. Marathon County experienced a mechanical increase in payment outlays, and it remains unclear whether the increase is due exclusively to the enhanced rate or due to increasing visits or services that occurred prior to the policy change.

Polk County

There were substantial gains in Polk County with respect to the number of providers and the number of visits in the county compared to changes in non-MSA counties. This indicates that providers are responding to the increased payments.

Gains in provision were not accompanied by increases in the percentage of BadgerCare members who reside in Polk County receiving care. One explanation for this is that with the increase in supply of dental care in Polk County, individuals crossed county lines to receive care. The use of ED visits for dental care did not decrease because of the pilot. In fact, they are higher than they were prior to the pilot, relative

[57] See Oral Health Partnership information here: https://www.smilegb.org/history-of-ohp

to non-MSA counties. However, the actual number of ED visits for dental care is quite small in Polk County.

Like all pilot counties, per-member payments for dental services increased in Polk County. Unlike Brown County, most of the increases were mechanical for children, and caused strictly by the increase in payments and not because of changes in utilization for Polk County children. For adults, the change in utilization was more important.

Racine County

There were several changes prior to the initiation of the pilot program related to Medicaid members' use of dental services, visits per provider, and services per visit in Racine County. None of these pre-pilot program changes can be attributed to the pilot program, and the initiation of the pilot program did not signal any particular change in trend. Per-capita dental payments increased, but any of these increases may have been due to the mechanics of the pilot program rate change and background trend, and not due to any change in service pattern induced by the pilot program.

Table 21: Summary of Findings

	Brown	Marathon	Polk	Racine
Percentage of Resident County BadgerCare Members Receiving Any Dental Services	Increase	Increase	No change	Increase prior to pilot program
Children, receiving any service				
Children, receiving preventive service				
Adult, receiving any service				
Adult, receiving Emergency Services				
Number of Providers Serving Medicaid/BadgerCare, All	No change, possibly due to change in billing practices	No change, but increase in comparison counties	Increase	Increase prior to the start of the pilot program
Serving Children				
Serving Adults				
Total Number of Visits, All	No change	Decrease prior to pilot program	Increase	Increase prior to the start of the program
By Children				
By Adults				
Visits per Provider, All	No change	Decrease prior to pilot program	No change	Increase prior to pilot program
By Children				
By Adults				
Emergency Department Visits, All	No change	Decrease, but smaller decrease than in comparison counties	Increase	No change
To Children			No change	
To Adults			Increase	
Per-capita Dental Payments, All	Increase	Increase	Increase	Increase
For Children				
For Adults				

Comparison to Previous Report

There are several changes from the previous report that should be noted. First, when considering the percentage of individuals that received dental care during the pilot period, there was an overall drop in the percentage of children that received dental care. This is true statewide and for each of the pilot

counties. However, the drop was smallest in Brown and Marathon County. These are the two counties that were found to have a relative increase in the percentage of children residing in each county that received care. The overall drop could be because fewer children are receiving care, or it could be because more children are enrolled in BadgerCare.

The second main difference is related to the percentage of children who received care, both overall and preventive, in Marathon County. In the earlier report, we did not find a statistically significant change. This change in findings is due to a slow increase at the beginning of the program, which was accompanied by steep gains after the first year of increased payments.

The major changes between the first report and this updated one with respect to who provided care can be seen in the number of providers and number of visits in Brown County. The initial report found that both outcomes increased relative to the comparison counties. With updated data, we now find that is not the case. It is important to point out that providers and visits did increase in Brown County, but relative to the control groups it was not statistically significant. When considering the number of providers, the reason can be seen in Figure 6, which shows the large decrease in providers in February 2019. When considering the number of visits, the comparison counties to Brown County gradually increased the number of visits, so although the increased visits were sustained in Brown County, the change in the comparison group means that the differences between the two is no longer significant.

There are also several outcomes that have remained consistent between the two reports that should be highlighted. For example, the percentage of Brown County residents that received care has remained higher than in comparison counties because of the pilot. This largely speaks to the success of the Oral Health Partnership.

Additionally, the gains that Polk County experienced in terms of the number of providers rendering care and the number of visits has persisted. The sustained increased number of providers can be seen in Figure 6 and the sustained number of visits can be seen in Figure 7. These outcomes are important measures of overall care, and their continued success is an important outcome of the pilot program.

6 ATTACHMENT: DENTAL SERVICE FEE SCHEDULE

Targeted Reimbursement Rate Maximum Allowable Fee Schedule, Revised January 1, 2018. Wisconsin Department of Health Services. Available at

www.forwardhealth.wi.gov/WIPortal/content/Provider/medicaid/dentist/Targeted_Reimbursement_Rate_MAFS.htm.spage