



State of Wisconsin
Department of Health Services

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August 27, 2024

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The Honorable Jesse James, Chair
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The Honorable Patrick Snyder, Chair
Assembly Committee on Children and Families
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Dear Senators and Representatives:

I appreciate the opportunity to provide the Legislature with an update on the Department's Dental Reimbursement Pilot Project, which operates within the State's Medicaid program. This report includes relevant data from October 2016 through June 2021.

2015 Wisconsin Act 55 authorized and funded the Dental Pilot Project, directing the Department to increase reimbursement rates for pediatric dental care services and adult emergency dental services provided in Brown, Marathon, Polk, and Racine counties. The Department 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 the Department 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.

Please note that Wisconsin's 2021 Budget Act 58 increased reimbursement rates by 40% 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% 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.

Senators and Representatives

August 27, 2024

Page 2

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,

A handwritten signature in blue ink, appearing to read "Kirsten Johnson", with a long horizontal flourish extending to the right.

Kirsten L. Johnson
Secretary-designee

2024 Medicaid Dental Pilot Program Evaluation

Final Report

**Submitted to the
Wisconsin Department of Health Services**

August 2024



**Institute for
Research on
Poverty**

UNIVERSITY OF WISCONSIN-MADISON



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CONTENTS

List of Tables	3
List of Figures	4
1 Executive Summary	5
2 Project Background	7
2.1 Project Overview: Four County Medicaid Pilot Program	7
2.2 Background Literature	10
2.3 Evaluation Questions	15
2.4 Evaluation Design and Methods	18
2.4.1 Study Population & Evaluation Period	18
2.4.2 Data and Outcome Measures	18
2.4.3 Analytic Methods	21
3 Findings & Results	24
3.1 Question 1: Who Received Care?	24
3.1.1 Percentage of BadgerCare Members Receiving Any Dental Service	31
3.1.2 Percentage of BadgerCare Children Members Who Received Dental Services	34
3.1.3 Percentage of BadgerCare Adult Members Who Received Dental Services	36
3.1.4 Percentage of BadgerCare Child Members Who Received Preventive Services	38
3.1.5 Percentage of BadgerCare Adult Members Who Received Emergency Services	42
3.2 Who Provided Care?	43
3.2.1 Total Number of Providers Serving BadgerCare Members	44
3.2.2 Total Number of Visits	47
3.2.3 Visits per Provider	52
3.2.4 Total Number of Emergency Department Visits	54
3.3 How much did the program cost?	57
3.3.1 Total Outlays	57
3.3.2 Payments per Member	59
3.3.3 How Much and Why Did Payments Increase?	61
4 Teledentistry during Covid	64
5 Limitations	66
6 Discussion & Conclusion	67
7 Attachment: Dental Service Fee Schedule	70
8 Appendix A: Medicaid Enrollment	71

LIST OF TABLES

Table 1: Selected Characteristics of Pilot Program Counties.....	8
Table 2: Legislature Questions and Evaluation Measures	17
Table 3: Pilot and Comparison Counties.....	22
Table 4: Number and Percent of BadgerCare Members Who Received Dental Care in Select 16-Month Intervals	28
Table 5: Number and Percent of BadgerCare Members Who Received Dental Care, October 2016 - June 2021	29
Table 6: Number and Percent of Adults Who Received Targeted Emergency Services, October 2016 - June 2021	30
Table 7: Percentage of BadgerCare Members Who Received Any Dental Services, by County of Residence	33
Table 9: Regression Results, Percentage of BadgerCare Members Who Had Any Dental Care.....	34
Table 9: Percentage of BadgerCare Members who Received Selected Services, by County of Residence	40
Table 10: Regression Results, Percentage of BadgerCare Members who Received Specific Types of Services	41
Table 11: Number of Providers that Rendered Dental Services to BadgerCare Members in Each County	45
Table 12: Regression Results, Number of Providers that Rendered Care	47
Table 13: Number of Visits to BadgerCare Members, by County Where Care Was Provided	49
Table 14: Regression Results, Number of Visits by Where County Where Care Was Rendered.....	51
Table 15: Number of Visits to BadgerCare Members per Provider, by Where Care Was Rendered.....	53
Table 16: Number of ED Visits for Dental Care by BadgerCare Members Who Reside in Each County.....	56
Table 17: Regression Results, ED Visits for Dental Care by BadgerCare Members that Reside in Each County.....	57
Table 18: Total Payments for Dental Visits (\$1000s) Rendered by County	58
Table 19: Total Payments for Visits with Targeted Services (\$1000s) Rendered by County	58
Table 20: Average Monthly Per-Member Payments for Dental Care Provided in Each County.....	60
Table 21: Regression Results, Per-Member Payments Made for Dental Services Rendered in Each County	61
Table 22: Total Change in Payments, Percent Due to Increased Utilization and Percent Due to Increased Reimbursement Rates	63
Table 23: Counties where Teledentistry Occurred, March 2020 – June 2021.....	65
Table 24: Summary of Findings.....	69

LIST OF FIGURES

Figure 1: Percent of BadgerCare Members that Received Dental Services, by County of Residence.....	33
Figure 2: Percentage of BadgerCare Child Members That Received Dental Care	35
Figure 3: Percentage of BadgerCare Adult Members That Received Dental Care	38
Figure 4: Percent of BadgerCare Child Members That Received Preventive Dental Care.....	40
Figure 5: Percent of BadgerCare Adult Members that Received Emergency Services, by County of Residence	43
Figure 6: Number of Providers that Rendered Dental Care to BadgerCare Members in Each County	45
Figure 7: Total Number of Visits for BadgerCare Members, by County Where Care Was Rendered.....	49
Figure 8: Number of Dental Visits to BadgerCare Members per Provider, by Where Care Was Rendered	53
Figure 9: Number of ED Visits for Dental Care by BadgerCare Members Who Reside in Each County.....	56
Figure 10: Per-Member Dental Payments for Services Rendered in Each County	60
Figure 11: Number of Teledentistry Visits for BadgerCare Members in Wisconsin, by Month	65
Figure 12: Medicaid Enrollment by County	71
Figure 13: Enrollment, Statewide	71

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 June 2021, allowing observation for two years before the pilot was implemented and more than four-and-half years after the pilot was implemented, including after the start of the Covid-19 pandemic. 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 elsewhere in this report.

In Polk County, there was a relative increase in the percentage of BadgerCare members that received dental services after Covid. Specifically, while other counties had a sustained drop in the percentage of BadgerCare members that received dental care after March 2020, the percentage of BadgerCare members in Polk County who received dental care returned quickly to pre-Covid levels.

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 two rural and urban counties.

In Brown County, there was a large increase in the number of providers immediately after the pilot was implemented. This increase was detected for the total number of providers and for those who serve children. However, this measure of access to care decreased dramatically in February 2019, likely due to changes in billing practices. The total number of visits increased and remained higher in Brown County.

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.

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?
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Total payments made for dental services in the four pilot counties total \$112.564 million through June 2021. The vast majority of these payments are for visits that included a service with an increased rate.

Overall, the pilot program was found to increase visits and the number of providers in some counties, but not all. This confirms findings from previous literature. An increase in Medicaid payment appears necessary but not sufficient to improve access to dental services for Medicaid members. The results reported here show that the pilot increased the percentage of BadgerCare members that received services in Brown and Marathon counties. In addition, the increased reimbursement rates induced more dentists to participate in the Medicaid program in Brown and Polk County. The pilot did not reduce the use of the emergency department for visits related to dental care in any pilot county.

2 PROJECT BACKGROUND

2.1 PROJECT OVERVIEW: FOUR COUNTY MEDICAID PILOT PROGRAM

Wisconsin's 2015 Budget Act 55¹ 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% 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% in Brown County to 37.2% in Polk County. The percentage of adults enrolled is substantially lower, ranging from 5.6% in Brown County to 7.6% 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

	Brown	Marathon	Polk	Racine
Total Population	267,364	137,597	44,806	197,379
% of Population with Incomes Below the FPL	9.7	7.9	8.6	11.7
% of Children (Age <18) with Incomes Below the FPL	12.6	9.2	12.5	17.6
% of Adults (Age 19-64) with Incomes Below the FPL	9.2	7.6	7.9	10.6
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. Population data from ACS Table DP05, ACS Demographic and Housing Estimates, 2011 5-Year Estimates; Poverty Data from ACS Table S1701; Poverty Status in the Past 12 Months, 2011 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>

Authorizing legislation in 2017 Wisconsin Act 344³ 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 funds distributed under the pilot project and, if funds allocated for the pilot project were not distributed, a summary on why the funds 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

³ 2017 Wisconsin Act 344. Available at <https://docs.legis.wisconsin.gov/2017/related/acts/344>

services.) 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 Wisconsin 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.”⁴ 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 residents⁵. 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 (WDA). The WDA promoted dentists’ participation in the program,⁸ rating

⁴ Wisconsin Dental Association. Dental Medicaid. Available at <https://www.wda.org/bill-status/dental-medicaid>

⁵ Racine Community Health Center is planning to offer pediatric dental services in the near future.

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>

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>

the enhanced payment rates as “quite comparable” to dentists’ contracted commercial insurance plan rates.⁹

There are two previous versions of this report. The first was submitted to DHS in June 2020 focused on the outcomes for the two-year period following the implementation of the pilot.¹⁰ A second was submitted to DHS in April 2022 focused on the period of time before the Covid-19 pandemic closed dental offices in Wisconsin. This report focuses on dental care through June 2021. In addition to the longer timeframe, this report includes a summary about the use of teledentistry during the Covid-19 public health emergency. A discussion of the changes since the initial report was released and the current report are found in Section 6.

2.2 BACKGROUND LITERATURE

The Wisconsin Medicaid program provides dental benefits for both children and adults, including comprehensive coverage of dental exams, cleanings, diagnostic services, fillings, crowns, periodontics, and other dental services. While Medicaid is required to cover dental services for children (up to age 21), this is not the case for adults and so there is variation across states in services covered. For example, as of March 2020, three states provided no dental benefit and nine states only covered emergency services.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% for children and 34% for adults.¹² A separate report for federal fiscal year 2016, shows 30.7% 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% of Medicaid children nationally receiving any dental service during that period.¹⁴

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 MACPAC, Medicaid Coverage of Adult Dental Services, January 2021. Available at <https://www.macpac.gov/wp-content/uploads/2021/01/Medicaid-Coverage-of-Adult-Dental-Services.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>

Not all dentists that provide dental care in Wisconsin accept BadgerCare patients. The American Dental Association reports that as of 2019, about 38% of Wisconsin dentists participate in providing services to the Medicaid program, compared to about 43% of dentists nationally.¹⁵ In the neighboring state of Minnesota, a reported 59% 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% were inactive and saw zero patients during the calendar year, 36% had limited participation and saw between one and ten patients, and 25% were active and saw over 100 patients.

Using data from state Boards of Dentistry and the National Plan and Provider Enumeration System (NPPES), linked with data from InsureKidsNow.gov, Serban et al. (2022) estimate that just 29% of Wisconsin dental providers are willing to accept children enrolled in Medicaid as patients. Nationally, they estimate that this value is 40%. The authors also find that this percentage varies across urbanicity, with 27% of urban dentists in Wisconsin accepting Medicaid patients, 30% of suburban dentists, and 39% of rural dentists.¹⁷ This finding is similar to a recent report that surveyed Wisconsin dentists in 2018 and found that of those who responded, just 29% accepted MA/BC+ patients¹⁸.

The Medicaid program pays providers lower fees for health services overall compared to what providers receive from other payers.^{19,20} In 2019, the Medicaid-to-Medicare fee index – a measure of Medicaid physician fees relative to Medicare fees was 72% nationally, and 62% in Wisconsin.²¹

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 Serban N, Anderson A, Oberst G, Edupuganti N, Ramachandran R, Solipuram SR, Lu T. (2022) Assessment of Dentist Participation in Public Insurance Programs for Children in the US. *JAMA Network Open* 5(7). e2221444. doi: 10.1001/jamanetworkopen.2022.21444. PMID: 35816300; PMCID: PMC9274318.

¹⁸ Davis, L, Hang M. Wisconsin Dentist Workforce Report, 2/23/2022. Wisconsin Oral Health Program, Wisconsin Department of Health Services. Publication number P-03204. Available at <https://www.dhs.wisconsin.gov/publications/p03204.pdf>

¹⁹ Centers for Medicare & Medicaid Services. (2020, April 18). *Program History*. Retrieved from Medicaid.gov: Keeping America Healthy: <https://www.medicaid.gov/about-us/program-history/index.html>

²⁰ Tollen L. (2015). *Health Policy Brief: Medicaid Primary Care Parity*. Retrieved from HealthAffairs: <https://www.healthaffairs.org/doi/10.1377/hpb20150511.588737/full/>

²¹ Kaiser Family Foundation, State Health Facts. Medicaid-to-Medicare Fee Index, 2019. 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>

The American Dental Association (ADA) reports this ratio to be 61.4% for dental services provided to children and 53.3% for dental services provided to adults in 2020. The ADA also reports Wisconsin as among two 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 child and third lowest for adult dental services in 2020.²² 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,²³ 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.²⁴ Wisconsin Medicaid continues to evaluate opportunities for dental services rate increase. In 2023, Wisconsin Medicaid implemented a 40% rate increase for dental services effective January 1, 2024.

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.²⁵ This limits the capacity to supply needed services to the Medicaid 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.²⁶

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.²⁷

A recent study found that higher rates of the ratio between Medicaid payment and the rates charged by dentists was associated with an increase in the probability of children having at least one and two dental visits in the past year, as well as an increase in the probability of reporting

²²Health Policy Institute, American Dental Association (ADA), Reimbursement Rates for Child and Adult Dental Services in Medicaid by State October 2021. Available at:

https://www.ada.org/-/media/project/ada-organization/ada/ada-org/files/resources/research/hpi/hpigraphic_1021_1.pdf

²³Health 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>

²⁴Health Care Cost Institute (HCCI). Healthy Marketplace Index. Available at <https://healthcostinstitute.org/research/hmi-interactive#HMI-Price-Index>.

²⁵Wisconsin Office of Rural Health. Health Professional Shortage Area – Dental Health Care. August 2022. Available at https://worh.org/wp-content/uploads/2022/08/HPSA_Dental_Aug2022.pdf

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>

²⁶Wisconsin 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>

²⁷Centers 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

excellent oral health.²⁸ However, low rates of reimbursement is not the only factor in dental provider decisions to accept Medicaid patients. For example, burdensome administrative requirements and the cost of missed appointments have also been noted as reasons for not participating in the Medicaid program .²⁹

Dental providers in California who participated 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.³⁰ 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.³¹ 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.³² Additionally, surveys administered to dental students found that Medicaid was largely ignored in curriculum and that improved practice management and experiential opportunities would be effective in increasing knowledge about Medicaid.³³ 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.³⁴

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.³⁵ A 1994 increase in Medicaid dental payments in Connecticut increased the percentage of dentists accepting children covered by Medicaid from 33% to 50%.³⁶ Michigan Medicaid's Healthy Kids Dental program, which paid dentists at private

²⁸ Lipton, B. J., Decker, S. L., Stitt, B., Finlayson, T. L., & Manski, R. J. (2022). Association Between Medicaid Dental Payment Policies and Children's Dental Visits, Oral Health, and School Absences. *JAMA Health Forum* 3(9). e223041-e223041.

²⁹ 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

³⁰ 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.

³¹ 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.

³² 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.

³³ 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.

³⁴ Wisconsin Legislative Fiscal Bureau, Health Services, Medical Assistance, General (Paper #351), 2015.

³⁵ 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.

³⁶ Nainar HS., Tinanoff N. (1997). Effect of Medicaid reimbursement rates on children's access to dental care. *American Academy of Pediatric Dentistry*. 315-316.

reimbursement levels in pilot counties, resulted in a 31% increase in dental care use, an increase in dentist's participation and decrease in the distance traveled by patients.³⁷ South Carolina's year 2000 dental Medicaid payment increase also substantially increased children's access to dental services.³⁸ Medicaid payment hikes in Alabama and Mississippi were linked to increases in sealant prevalence among 7-9 year old children.³⁹

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.⁴⁰ 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% 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.⁴¹ 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.⁴²

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

³⁷ Eklund SA, Pittman JL, Clara SJ. (2003). Michigan Medicaid's Healthy Kids Dental Program. *JADA*, 1509-1515.

³⁸ Nietert PJ, Bradford WD, Kaste ML. (2005). The Impact of Innovative Reform to the South Carolina Dental Medicaid System. *Health Services Research*, 1078-1090.

³⁹ 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 & Practice*, 202-206.

⁴⁰ 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

⁴¹ Decker SI. (2011). Medicaid Payment Levels to Dentists and Access to Dental Care Among Children and Adolescents. *JAMA*, 187-193.

⁴² 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.

access to dental care, deeming the payment increases only “marginally effective.”⁴³ Buchmeuller and Shore-Sheppard (2013) report a modest, but statistically significant, positive relationship between Medicaid 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% in Medicaid reimbursement rates for dental preventive services yields only an increase of about 1% to 3% use of preventive services.⁴⁴

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.⁴⁵ 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 344⁴⁶ 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.

⁴³ 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.

⁴⁴ 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.

⁴⁵ 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>

⁴⁶ 2017 Wisconsin Act 344. Available at <https://docs.legis.wisconsin.gov/2017/related/acts/344>

5. The amount of funds distributed under the pilot project and, if funds allocated for the pilot project were not distributed, a summary on why the funds 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 order to support such causal inferences. At this time, we omit any outcomes related to cost. These measures include total outlays, payments per member, payments for ED dental visits, and reasons for increase in payments. These outcomes will be provided in a separate report. **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?	
<p>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.</p> <p>3. An analysis of Medical Assistance recipient populations who received services under the pilot project and populations who may benefit from the pilot project.</p>	<p>A1. Percent of BadgerCare members who received any dental services, by county of residence.</p> <p>A2. Percent of child BadgerCare members who received any dental services, by county of residence.</p> <p>A3. Percent of adult BadgerCare members who received any dental services, by county of residence.</p> <p>A4. Percent of children BadgerCare members who reside in each county and received preventive service.</p> <p>A5. Percent of adult resident county BadgerCare members receiving emergency services with increased reimbursement rates.</p>
Evaluation Question #2: Who provided services, and did the pilot program change the amount of participation in providing services to Medicaid members?	
<p>4. The feasibility of continuing the pilot project and expanding the project in specific areas of the state or statewide.</p> <p>2. An estimate of the potential reduction in health care costs and emergency department use by Medical Assistance recipients due to the pilot project.</p>	<p>B1. Total number of providers serving Medicaid members.</p> <p>B2. Total number of visits.</p> <p>B3. Number of visits per provider.</p> <p>B4. Total number of emergency department visits for dental care.</p>
Evaluation Question #3: How much did the program cost and did it result in any cost savings?	
<p>5. The amount of moneys distributed under the pilot project and, if moneys allocated for the pilot were not distributed, a summary on why the moneys were not distributed.</p>	<p>C1. Total outlays.</p> <p>C2. Payments per member.</p> <p>C3. Reason for increase in payments.</p>

2.4 EVALUATION DESIGN AND METHODS

2.4.1 Study Population & Evaluation Period

This evaluation focuses on two main 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. Many of the outcomes are also evaluated for children and adults separately.

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 June 2021, allowing observation for two years before the pilot was implemented and over four-years after the pilot was implemented. The analysis ends in June 2021 because Wisconsin’s 2021 biennial budget increased the rates of select dental services by 40% in all counties except for the four in the pilot program. In the pilot counties, rates for all adult services, except the eight emergency services increased by 40%.⁴⁷

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 and where the service was billed. 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 & 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

⁴⁷ See

https://docs.legis.wisconsin.gov/misc/lfb/budget/2023_25_biennial_budget/302_budget_papers/407_health_services_medical_assistance_eligibility_and_benefits_medical_assistance_provider_reimbursement_rates.pdf

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. 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).⁴⁸ 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% of children in the participating counties are not enrolled in C4K. Because the vast 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

⁴⁸ 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.

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 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.

It should also be noted that our sample includes individuals enrolled in BadgerCare during the Covid-19 Public Health Emergency (PHE). From March 2020 through the end of our evaluation period, the federal government mandated that individuals enrolled in Medicaid were not to lose coverage. Thus, individuals were automatically reenrolled, and enrollment reached record numbers.⁴⁹ This occurred nationwide and was not specific to the state or any one county in the pilot. As explained in more detail below, our evaluation method compares changes in outcomes for the pilot counties and a set of comparison counties. Any effects of the PHE would be controlled for since they presumably occurred in both treated and comparison counties. However, where applicable, we show percentage outcomes (ex- the percentage of BadgerCare members who received dental care) in the main text and numbers (ex- the number of BadgerCare members who received dental care) in an appendix. However, some of our evaluation does include dividing individuals by their county of residence. County of residence is measured at the most recent renewal and may not have been updated as frequently after the PHE as it was before.

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% 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 currently provides dental care in Racine County.

⁴⁹ See <https://www.dhs.wisconsin.gov/medicaid/renewal-data.htm>.

Outcome Measures

The pilot program evaluation focuses on who received care and who provided care, 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 provided to residents of the county, overall and for children and adults separately.

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

We show total outlays for all dental care, as well as outlays only for visits with a service that had an increased rate. These descriptive statistics answer the legislature's question regarding outlays. We also show dental expenditures per BadgerCare member in each county and estimate how these have increased due to the pilot. Last, we estimate what fraction of the increased costs are due to increased utilization and what fraction is mechanical and due to the increase in rates.

2.4.3 Analytic Methods

In order to estimate the effect of the increased reimbursement rates, we compare changes in outcomes before and after the pilot began in counties with the pilot (Brown, Marathon, Polk, Racine) to changes during the same time period in outcomes in a set of comparison counties. To reduce measures of spillover from the pilot program, the comparison counties are comprised of counties that do not border a pilot county. We also control for urbanicity of the pilot counties by

using comparison counties that have a similar urbanicity as the pilot counties (metropolitan statistical area, MSA or non-MSA).⁵⁰ **Table 3** shows the list of pilot counties and the corresponding comparison counties.

Table 3: Pilot and Comparison Counties

Pilot Counties	Comparison Counties, Non-neighboring same MSA Counties
Brown, Marathon, Racine (MSA)	Chippewa, Columbia, Dane, Douglas, Eau Claire, Fond du Lac, Green, Iowa, La Crosse, Ozaukee, Pierce, Rock, Sheboygan, Washington, Winnebago
Polk (Non-MSA)	Adams, Ashland, Bayfield, Buffalo, Crawford, Dodge, Door, Florence, Forest, Grant, Green Lake, Iron, Jackson, Jefferson, Juneau, Lafayette, Marinette, Marquette, Monroe, Oneida, Pepin, Price, Richland, Rusk, Sauk, Sawyer, Trempealeau, Vernon, Vilas, Washburn, Waushara

Specifically, we use a difference-in-difference (DiD) framework, a quasi-experimental design that uses pre- and post-intervention data from treatment and comparison 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 treatment group) and a population that is not (the comparison group). The contrast to the comparison group offers measurement of the counterfactual: of the changes observed in the treatment group, what changes might have happened anyway, even if the increased reimbursement rates 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.

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 to the county-month level. For example, if the outcome of interest is the percentage of BadgerCare members that received care and 15% 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:

$$y_{ct} = \alpha + \beta Pilot_c \times Post_t + \delta Pilot_c \times Covid_t + \gamma_c + \gamma_t + u_{ct} \quad (1)$$

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. $Pilot_c$ is an indicator variable if the county is a county participating in the pilot, $Post_t$ is an indicator if the pilot has been implemented (i.e.- it is after October 2016), and $Covid_t$ is an indicator if the month is after the Covid-19 PHE was implemented (ie- it is after March 2020). Each model includes a set of county fixed effects, which are captured by γ_c , as well as month fixed effects, which are indicated by γ_t . These control for any differences in access to dental care in counties and across time. The error term is represented by u_{ct} .

The coefficient of interest is β which indicates if the pilot program affected participating counties differently than their comparison group. For example, if the pilot increased the percentage of individuals in Brown County *relatively* more than the comparison counties, β will be positive. On the other hand, if the pilot decreased the number of individuals with an ED visit for dental care in Brown County *relatively* more than in comparison counties, β will be negative.

We also show the result for δ which estimates if Covid affected the pilot counties differently in terms of dental care than their comparison group. Covid may have affected counties differently, in terms of dental care, for a multitude of reasons. For example, counties had different masking mandates which may have affected how people chose to consume health care. Including the interaction between Covid and county allows for the fact that counties may have also had different populations that had different reactions to Covid.

We estimate Equation 1 both with and without the $Pilot_c \times Covid_t$ interaction and show results from both. We show confidence intervals calculated using robust standard errors.⁵¹ We identify statistically significant changes when δ is significant at the 5% level. Each table with regression coefficients shows the estimated value of δ in the row labeled Pilot County X Post and the estimated value of δ in the row labeled Pilot X Covid.

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 comparison during the study period. In cases where the pre-pilot trends in a given outcome are not parallel, we show summary statistics and results from the above regression, but do not draw inferences about the effect of the pilot program in the county for the given outcome.

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

3 FINDINGS & RESULTS

As outlined above, this report considers three main questions: Who received care? Who provided care? 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 June 2021 in each of the pilot counties as well as the comparison counties. We also show the average monthly values in the pre-pilot period (October 2014 – September 2016), the post-pilot pre-Covid period (October 2016 – February 2020), and the post-pilot post-Covid period (March 2020 – June 2021). 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. We show these numbers for several periods, including the entirety of the pilot, in each pilot county, and in the state of Wisconsin.

The total number and percent of BadgerCare members who received dental care in select sixteen-month periods, representing the pre-pilot, post-pilot pre-Covid, and post-pilot post-Covid timeframes are shown in **Table 4**. Though these are not the entirety of each period, we keep the length of the period the same to compare the percentages that received care. The population includes everyone who was enrolled through CARES 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. We separate out the post-Covid period because of the public health emergency and change in re-enrollment procedures.

There was a well-documented increase in the number of people enrolled in Medicaid during the public health emergency. At first glance it may appear that **Table 4** runs contrary to this, as the number enrolled in each period decreases. However, each time-period counts the *unique* number of individuals enrolled through CARES during the entire period regardless of how long they were enrolled for. The length of enrollment increased during the public health emergency, as shown in the first column of each period. This is in line with previous literature which found that enrollment was high during the public health emergency primarily due to individuals not disenrolling rather than new individuals enrolling.^{52,53} The drop in the number of people enrolled in each period happens at the same time as enrollment increased because those who were enrolled

⁵² Dague L, Badaracco N, DeLeire T, Sydnor J, Tilhou AS, Friedsam D. Trends in Medicaid Enrollment and Disenrollment During the Early Phase of the COVID-19 Pandemic in Wisconsin. *JAMA Health Forum*.2022;3(2):e214752.

⁵³ Sun R, Staiger B, Chan A, Baker LC, Hernandez-Boussard T. Changes in Medicaid enrollment during the COVID-19 pandemic across 6 states. *Medicine (Baltimore)*. 2022 Dec 30;101(52):e32487.

stay enrolled for a longer period of time. For reference, **Appendix A** shows figures for enrollment by county and for the state.

Overall, in the state of Wisconsin, 32% of BadgerCare children who were enrolled at any point during the period between June 2015 and September 2016 received care. In the sixteen-months prior to Covid, this number increased to 36%. However, in the sixteen-months after Covid, it fell to 30%. The percentage of adults receiving care was fairly steady across the three periods. For example, about 19% of parents and 15% of childless adults received care in each period.

In Brown County, the percentage of children who received any dental care increased from 31% to 41% between the pre-pilot and post-pilot pre-Covid period. However, it did not fall substantially like the statewide numbers, and remained at 40% in the post-Covid period. The percentage of adults who received any dental service increased in each period. For parents, the percentage that received dental services in each period increased from 11% to 20% to 22%. For childless adults, the percentages were 11%, 14%, and 19%.

Marathon County had similar patterns as Brown County, in that the percentage of children who received any dental care was higher in the post-pilot periods than in the pre-pilot and did not drop substantially in the post-Covid period. In the pre-period, 28% of children received any dental care. This number increased to 40% in the post-pilot pre-Covid period and did not fall dramatically (38%) post-Covid. Additionally, the overall percentage of adults that received dental care increased substantially each period.

Polk County differs from the other pilot counties because it had an increase in the percentage of children and all adult groups who received services post-Covid. For example, the percentage of children who reside in Polk County and received dental services increased from 29% to 31%, to 39% after Covid. The percentage of parents who received any dental service increased from 18% to 19% to 23%, and the percentage of childless adults who received any dental service was steady at 13% and increased to 19% after Covid.

In Racine, there were increases in the percentage of BadgerCare members who received dental services between pre-pilot and post-pilot, and for adults, the increase lasted to the post-Covid period. Children had a small decrease in the post-Covid period, compared to the post-pilot period, but the percentage is still above pre-pilot levels. Specifically, the percentage of children who received dental services moved from 31% to 40% to 38%. For parents, the percentage increased from 27% to 33%, then fell to 31%, and for childless adults, the percentage increased from 21% to 24% to 26%.

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 estimates. In results not shown we found that statewide, 33.3% of children enrolled in WI Medicaid in 2019 received any dental care and 26.4% enrolled in 2020 received dental care. 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

estimated to be 84.3%.⁵⁴ However, recent national estimates from the Medical Expenditure Panel Survey (MEPS) from 2020 are far lower.⁵⁵ The dramatic change can be explained for at least two reasons: the pandemic halted dental care for a period of time and the NHIS is known to produce higher estimates of health care utilization than MEPS.

The percentage of adults who received dental services, regardless of eligibility pathway, in each period is substantially below the percentage of children (**Table 4**). In 2019, we found that 16.8% of parents and 13.6% of childless adults received dental services, and this fell to 14.6 and 12.3% in 2020. Nationwide, adults were less likely than children to have received dental care, but national estimates of the percentage of adults who are enrolled in Medicaid and received dental care are still far higher than estimates from Wisconsin. Specifically, 55.3% of adults enrolled in Medicaid at the time of the 2019 NHIS had a dental exam or cleaning in the year prior to the survey.⁵⁶ Similar to children, the estimates from the 2020 MEPS are far lower for adults.⁵⁷

Next, we show the total number of BadgerCare members that received dental services during the entire time of the pilot evaluation period (October 2016 – June 2021) in **Table 5**. In Brown County, a total of 20,466 children (49%) and 9,048 adults received dental care during the time of the pilot. The percentage of adults receiving dental services depended on eligibility pathway and ranged from 22% for pregnant women, 23% for parents, to 32% for childless adults. In Marathon County the numbers are 8,729 (44%) and 2,766 (adults), with 15% of pregnant women, 14% of parents, and 19% of childless adults receiving dental care. In Polk County the counts are 2,877 (40%) and 1,335 adults, with 16% of pregnant women, 17% of parents, and 19% of childless adults receiving care. In Racine County the counts are 17,473 (49%) and 11,675 of adults, with 27% of pregnant women, 33% of parents, and 45% of childless adults receiving care. Statewide, 358,379 (46%) of children and 667,545 adults, 23% of pregnant women, 24% of parents, and 31% of childless adults enrolled in BadgerCare for at least a month between October 2016 and June 2021 received dental services.

Table 6 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 evaluation period, October 2016 through June 2021. Of the adults who received any dental service, the percentage that received the targeted services is quite high. In Polk County, it is about 73-74% for parents and childless adults. 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%. In Racine County, it is between 80-

⁵⁴ 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>

⁵⁵ MACStats: Medicaid and CHIP Data Book. Exhibit 41. December 2022. Available at https://www.macpac.gov/wp-content/uploads/2022/12/MACSTATS_Dec2022_WEB-508.pdf

⁵⁶ 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>

⁵⁷ MACStats: Medicaid and CHIP Data Book. Exhibit 46. December 2022. Available at https://www.macpac.gov/wp-content/uploads/2022/12/MACSTATS_Dec2022_WEB-508.pdf

83% for parents and childless adults, and in Marathon County, the percentage is 78-79% for parents and childless adults.

Table 4: Number and Percent of BadgerCare Members Who Received Dental Care in Select 16-Month Intervals

	Pre-Pilot, June 2015 – Sept 2016				Post-Pilot Pre-Covid, Nov 2018 – Feb 2020				Post-Covid, March 2020 – June 2021			
	Avg. Months Enrolled	Total Enrolled	Received Dental Service	%	Avg. Months Enrolled	Total Enrolled	Received Dental Service	%	Avg. Months Enrolled	Total Enrolled	Received Dental Service	%
Brown County												
Children	11.5	30,860	9,373	30.37	11.7	29,341	12,287	41.88	15.0	24,997	10,004	40.02
Parents	10.7	11,103	1,210	10.90	11.0	9,415	2,199	23.36	14.7	7,640	1,912	25.03
Childless adults	8.8	8,322	868	10.43	8.2	8,712	1,522	17.47	14.0	7,090	1,548	21.83
Pregnant ind.	6.0	1,271	138	10.86	6.5	1,182	238	20.14	12.8	926	216	23.33
Other	7.7	412	117	28.40	9.2	608	282	46.38	14.9	848	295	34.79
Marathon County												
Children	11.5	14,427	3,987	27.64	11.5	13,691	6,401	46.75	15.1	11,429	5,077	44.42
Parents	10.5	5,320	250	4.70	10.7	4,215	1,081	25.65	14.9	3,226	848	26.29
Childless adults	8.9	4,210	139	3.30	8.2	4,445	952	21.42	14.1	3,525	819	23.23
Pregnant ind.	6.0	602	25	4.15	6.5	625	95	15.20	13.3	451	102	22.62
Other	7.0	224	35	15.63	8.8	367	165	44.96	14.9	492	183	37.20
Polk County												
Children	11.1	5,217	1,511	28.96	11.2	4,966	2,473	49.80	15.2	4,079	2,051	50.28
Parents	10.2	2,136	377	17.65	10.4	1,752	556	31.74	14.6	1,283	439	34.22
Childless adults	8.7	1,437	190	13.22	8.3	1,602	376	23.47	14.0	1,247	352	28.23
Pregnant ind.	6.0	171	21	12.28	6.0	223	55	24.66	13.3	143	35	24.48
Other	7.6	90	38	42.22	9.6	165	83	50.30	15.3	230	114	49.57
Racine County												
Children	11.7	25,816	7,988	30.94	11.6	24,897	10,032	40.29	15.0	21,096	8,217	38.95
Parents	10.9	9,716	2,572	26.47	11.1	8,487	2,805	33.05	14.8	6,797	2,330	34.28
Childless adults	8.9	8,820	1,828	20.73	8.6	8,963	2,193	24.47	14.2	7,290	1,903	26.10
Pregnant ind.	6.6	827	168	20.31	6.9	819	198	24.18	13.4	731	242	33.11
Other	8.6	388	183	47.16	10.0	604	339	56.13	15.2	828	359	43.36
Wisconsin Statewide												
Children	12.8	616,286	195,008	31.64	12.9	593,118	258,038	43.51	15.2	533,723	197,406	36.99
Parents	12.0	236,640	43,465	18.37	12.4	201,485	56,527	28.06	14.9	171,556	46,679	27.21
Childless adults	10.1	213,049	31,275	14.68	10.2	214,235	46,582	21.74	14.4	190,767	42,358	22.20
Pregnant ind.	6.7	21,163	3,481	16.45	7.2	21,641	5,075	23.45	13.3	18,407	4,631	25.16
Other	8.3	10,488	3,727	35.54	10.1	15,170	7,984	52.63	15.2	22,719	8,221	36.19

Note: The population includes anybody who was enrolled in the period October 2014 – September 2016 (columns 1-3) or anytime during the period November 2018 – February 2020 (columns 4-6) or anytime between March 2020 – June 2021 (col 7-9). Individuals are assigned to a grouping first based on what eligibility pathway 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 BadgerCare Members Who Received Dental Care, October 2016 - June 2021

	Total Enrolled in BadgerCare	Number Received Dental Service	Percent Received Dental Service
Brown County			
Children	41,756	20,466	49.01
Childless adults	15,494	4,933	31.84
Parents	14,507	3,330	22.95
Pregnant women	1,909	421	22.05
Other	642	364	56.70
Marathon County			
Children	19,788	8,729	44.11
Childless adults	7,276	1,417	19.47
Parents	7,239	1,044	14.42
Pregnant women	915	138	15.08
Other	320	167	52.19
Polk County			
Children	7,273	2,877	39.56
Childless adults	3,047	742	24.35
Parents	2,702	457	16.91
Pregnant women	296	48	16.22
Other	165	88	53.33
Racine County			
Children	35,569	17,473	49.12
Childless adults	13,552	6,122	45.17
Parents	14,531	4,814	33.13
Pregnant women	1,253	343	27.37
Other	562	396	70.46
Wisconsin Statewide			
Children	777,483	358,379	46.09
Childless adults	301,863	92,705	30.71
Parents	321,159	78,149	24.33
Pregnant women	31,213	7,224	23.14
Other	13,310	7,809	58.67

Note: The population includes anybody who was enrolled in the post-period October 2016 – February 2-2020. Individuals are assigned to a grouping first based on what eligibility pathway 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 6: Number and Percent of Adults Who Received Targeted Emergency Services, October 2016 - June 2021

	Number that Received Any Dental Service	Number that Received a Targeted Service	Percent that Received Services that Were Targeted
Brown County			
Childless adults	4,933	4,710	95.48
Parents	3,330	3,083	92.58
Pregnant women	421	388	92.16
Other	364	337	92.58
Marathon County			
Childless adults	1,417	1,100	77.63
Parents	1,044	821	78.64
Pregnant women	138	111	80.43
Other	167	97	58.08
Polk County			
Childless adults	742	545	73.45
Parents	457	337	73.74
Pregnant women	48	23	47.92
Other	88	56	63.64
Racine County			
Childless adults	6,122	5,539	90.48
Parents	4,814	4,261	88.51
Pregnant women	343	282	82.22
Other	396	332	83.84
Wisconsin			
Childless adults	92,705	76,957	83.01
Parents	78,149	62,890	80.47
Pregnant women	7,224	4,937	68.34
Other	7,809	5,567	71.29

Note: The population includes anybody who was enrolled in the post-period October 2016 – February 2-2020. Individuals are assigned to a grouping first based on what eligibility pathway 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.

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. Because the number of people living in each county varies, 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 March 2020. However, as of June 2021, the percentage of BadgerCare members residing in Brown County that received dental services had not returned to pre-Covid levels. In the two years prior to the start of the pilot, 5.2% of members that resided in Brown County received dental care each month. In the period of October 2018 through February 2020 this increased to 7.0%, as shown in **Table 7**. Between March 2020 and June 2021, this number dropped to 4.8%. Prior to the start of the program, members who resided in Brown County were slightly more likely to receive care than the comparison counties (5.1%). However, the comparison counties did not experience the same level of increase as Brown County did, and this percentage remained at 5.1% after the start of the pilot but before Covid and fell to 3.3% after Covid.

We find that there was a statistically significant increase of 1.4-1.5 percentage points (27-29% of baseline) in the percentage of BadgerCare members who reside in Brown County that received dental care due to the increased reimbursement rates in the pilot. Regression results controlling for county and month trends, shown in **Table 8**, find that there was a significant, 1.4 percentage point (ppt) increase in the percentage of Brown County residents that received dental services relative to the comparison counties. This increase is 27.1% of the pre-pilot baseline (ie- 1.4 ppt increase/5.17 pre-pilot value = 27.1%). Once we estimate the full model which includes the interaction between Covid and counties, we find that the percentage of BadgerCare members who reside in Brown County & received dental care increased by 1.5 percentage points, or 29.0% of baseline. We also estimate that the interaction between Brown County and Covid was negative, suggesting that Covid affected Brown more than the comparison counties in terms of dental care.

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, 4.4% of Marathon County BadgerCare members received dental care each month. That number increased to 6.2% in the period after the pilot was implemented but before Covid, and fell to 4.5% after Covid, as shown in **Table 7**. Regression results, shown in **Table 8**, indicate that the percentage of Marathon County BadgerCare members that received dental services increased by 1.6 percentage points, an increase of 36.7% of baseline, compared to the comparison counties. We find similar results when we allow for Covid to differently affect the counties. We find no evidence that Covid affected the percentage of BadgerCare members who received dental care differently in Marathon County than in the comparison counties.

The percentage of Polk County BadgerCare members that received care was 6.0% per month in the two years prior to the implementation of the pilot and increased to 6.3% in the period after

the pilot. It is important to note that Polk, unlike the other pilot counties, did not have a decrease in the percentage of BadgerCare residents who received dental care in the post-Covid period. The percentage of BadgerCare members who reside in non-MSA counties and received dental care remained steady at 5.1% until Covid, when it fell to 3.3%. If we do not allow for Covid to affect counties differently, Polk had an increase in the percentage of BadgerCare members who received dental services of 0.83 percentage points. However, as can be seen in **Figure 1**, this is almost entirely due to Polk not having a large decrease in the percentage of BadgerCare members who received dental services post-Covid that other counties experienced. Once we allow Covid to differently affect counties, the increase in Polk County was not statistically different than the other non-MSA counties. However, the interaction between Polk and Covid is positive, suggesting that, in terms of dental care, Polk County may have weathered the effects of Covid better than the comparison counties.

Although Racine BadgerCare members were more likely to receive dental care, up from 4.2% monthly to 6.9%, prior to Covid, and 5.2% after Covid, the increase began before the pilot was introduced, making it impossible to argue that this improvement was driven by the pilot.

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

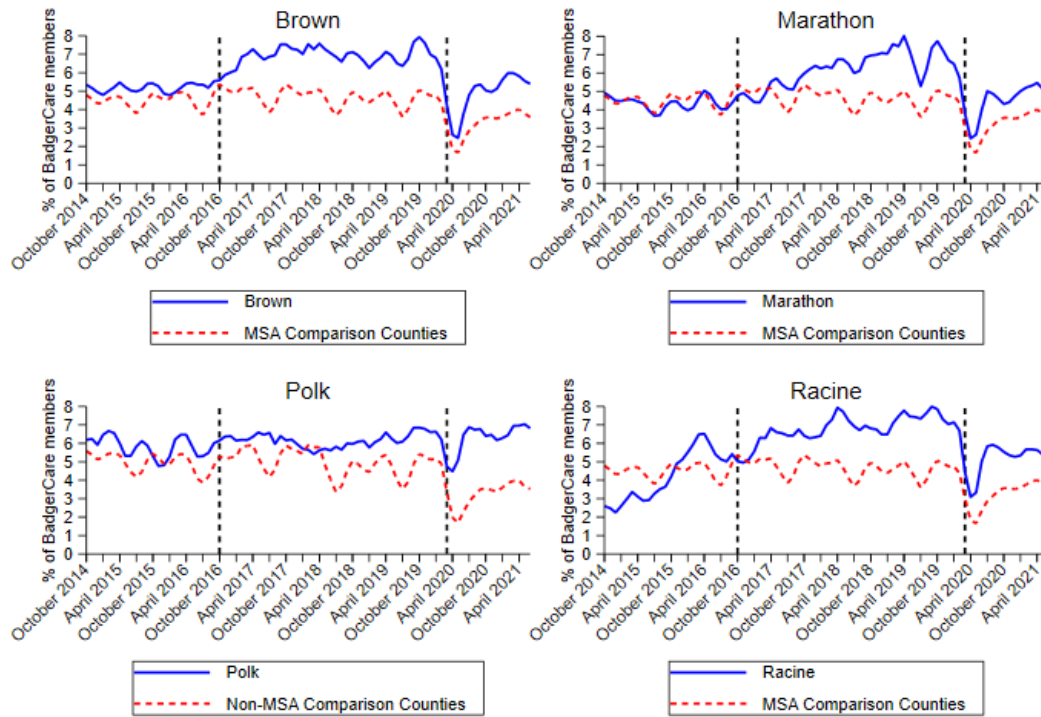


Table 7: Percentage of BadgerCare Members Who Received Any Dental Services, by County of Residence

	% of BadgerCare Members who Received Any Dental Services			% of BadgerCare Child Members who Received Any Dental Services			% of BadgerCare Adult Members who Received Any Dental Services		
	Pre-pilot	Post-Pilot, Pre-covid	Post-Pilot, Post-covid	Pre-pilot	Post-Pilot, Pre-covid	Post-Pilot, Post-covid	Pre-pilot	Post-Pilot, Pre-covid	Post-Pilot, Post-covid
Brown	5.17	6.95	4.83	6.78	8.81	6.18	2.44	3.63	2.74
Marathon	4.36	6.22	4.47	6.53	8.41	6.39	0.80	2.43	1.55
Polk	6.03	6.28	6.30	7.37	7.95	8.22	3.90	3.64	3.50
Racine	4.22	6.90	5.15	4.30	7.57	5.99	4.10	5.86	4.01
MSA Comparison Counties	4.69	4.93	3.28	6.16	6.55	4.52	2.56	2.47	1.66
Non-MSA Comparison Counties	5.10	5.12	3.27	6.72	6.88	4.63	2.74	2.47	1.44

Note: Numbers are calculated as average per month. The pre-pilot period is October 2014 – September 2016. The post-pilot pre-Covid period is October 2016 – February 2020. The post-pilot, post-Covid period is March 2020 – June 2021.

Table 8: Regression Results, Percentage of BadgerCare Members Who Had Any Dental Care

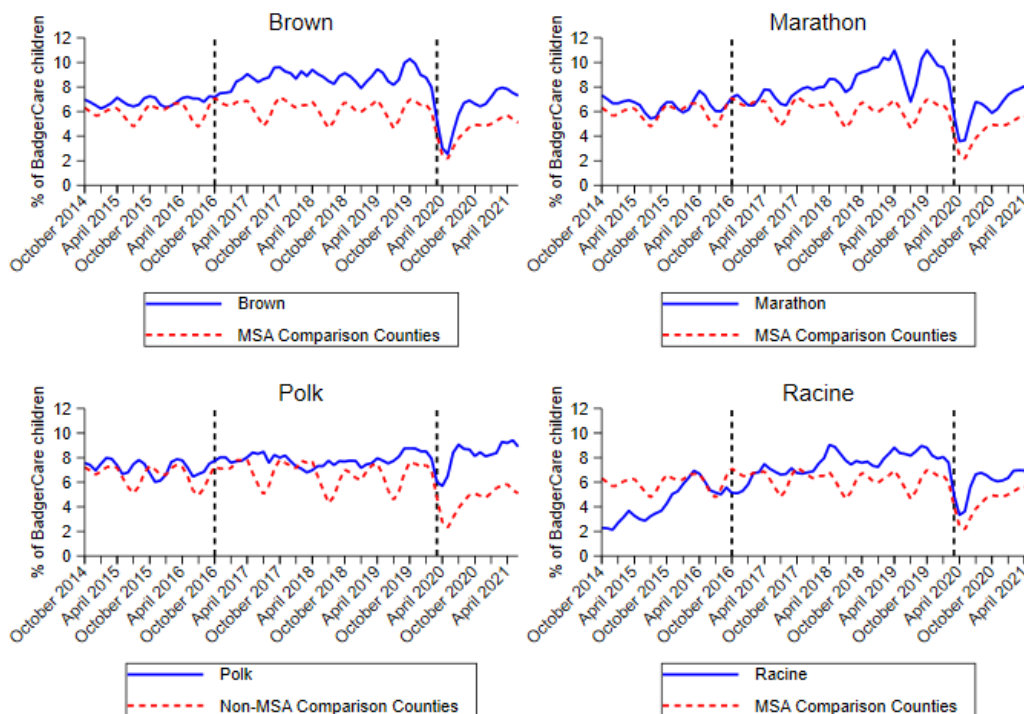
	All		Children		Adults	
	(1)	(2)	(1)	(2)	(1)	(2)
Panel A: Brown County						
Pilot X Post	1.40*** [1.11,1.69]	1.57*** [1.26,1.88]	1.49*** [1.07,1.90]	1.70*** [1.26,2.14]	1.23*** [1.04,1.42]	1.28*** [1.08,1.47]
Pilot X Post-Covid		-0.60*** [-0.94,-0.26]		-0.75*** [-1.22,-0.27]		-0.17 [-0.42,0.08]
N	1296	1296	1296	1296	1296	1296
Panel B: Marathon County						
Pilot X Post	1.60*** [1.26,1.93]	1.66*** [1.26,2.07]	1.51*** [1.05,1.96]	1.55*** [1.01,2.08]	1.67*** [1.39,1.95]	1.72*** [1.37,2.06]
Pilot X Post-Covid		-0.24 [-0.70,0.23]		-0.14 [-0.76,0.49]		-0.17 [-0.55,0.22]
N	1296	1296	1296	1296	1296	1296
Panel C: Polk County						
Pilot X Post	0.83*** [0.38,1.28]	0.3 [-0.13,0.72]	1.17*** [0.53,1.81]	0.45 [-0.17,1.06]	0.38** [0.03,0.74]	0.11 [-0.25,0.47]
Pilot X Post-Covid		1.89*** [1.36,2.42]		2.53*** [1.73,3.33]		0.96*** [0.63,1.28]
N	2592	2592	2592	2592	2592	2592
Panel D: Racine County						
Pilot X Post	2.35*** [1.76,2.95]	2.41*** [1.78,3.04]	2.98*** [2.29,3.66]	2.88*** [2.15,3.62]	1.45*** [0.89,2.01]	1.75*** [1.19,2.30]
Pilot X Post-Covid		-0.19 [-0.65,0.27]		0.34 [-0.25,0.92]		-1.07*** [-1.43,-0.72]
N	1296	1296	1296	1296	1296	1296

NOTE: All regressions are weighted by county population. The dependent variable is the percentage of BC members who live in each county and received any kind 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. Control counties are non-pilot counties with the same urbanicity as the pilot county who do not neighbor the pilot counties. 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% CIs are shown in brackets. * 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 is 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 and Polk County fared better post-Covid than other non-MSA counties.

Figure 2: Percentage of BadgerCare Child Members That Received Dental 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, 6.8% of BadgerCare members who were children received dental services each month. After the pilot began, but before Covid, this number increased to 8.8%. After Covid, the percentage of BadgerCare children who received dental services fell below pre-pilot levels to 6.2% (**Table 7**). MSA comparison counties experienced a smaller increase in the percentage of BadgerCare child members that received services after the start of the pilot and a drop post-Covid. The percentage of children in the comparison counties who received dental care changed from 6.2% to 6.6% pre-Covid to 4.5% after Covid.

Regression results, shown in the third and fourth columns of **Table 8**, show that the increase in the percentage of children BadgerCare members who reside in Brown County and received dental care due to the increased reimbursement rates was between 1.5-1.7 percentage points relative to the comparison counties. The percentage of children who reside in Brown County and received dental care increased relative to the comparison counties by 1.49 percentage points, 22% of baseline. Once Covid is allowed to affect counties differently, we estimate that the percentage of BadgerCare children who reside in Brown County that received dental services increased by 1.7 percentage points, or 25.1% of baseline. However, the estimated coefficient on Brown X Covid is negative, suggesting that BadgerCare children who reside in Brown County may have had worse outcomes related to the pandemic.

In Marathon County, the percentage of child BadgerCare members that received dental services prior to the pilot was 6.5% but increased to 8.4% after the increased rates were introduced but prior to Covid. After Covid, this number fell to 6.4% (**Table 7**). 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 1.51 percentage points, or 23.1% of baseline (**Table 8**). Results are similar when we allow Covid to affect counties differently. We do not find evidence that Covid affected Marathon County differently than comparison counties.

The percentage of BadgerCare children who reside in Polk County increased from 7.4% to 8.0% after the pilot was implemented and remained high, at 8.2% after Covid (**Table 7**). In non-MSA counties that do not border pilot counties, the percentage of BadgerCare children who received dental services each month was 6.7% prior to the start of the pilot, 6.9% between the pilot and the start of Covid, and 4.6% after Covid.

We find similar results for children in Polk County as we did overall BadgerCare members. Specifically, the estimated increase in the percentage of BadgerCare children who received dental services was higher after the pilot, relative to the comparison counties, by 0.38 percentage points (9.7% of baseline) but this was driven by the fact that Polk County did not have a sustained drop after Covid, while other counties did (**Table 8**).

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 child members that received dental care to increase.

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**. Results focused on adults largely mirror findings for the overall BadgerCare population and child BadgerCare members.

There was an increase in the percentage of Brown County BadgerCare members who received dental care immediately after the implementation of the program. Prior to the pilot, 2.4% of BadgerCare adults who resided in Brown County received dental care each month. This increased to 3.6% in the period after the pilot but before Covid and fell to 2.7% after Covid. This is still above pre-pilot levels, in contrast to child BadgerCare members. The percentage of adults who received dental care each month in comparison counties changed only slightly after the implementation of the pilot, from 2.6% to 2.5%. However, after Covid, the percentage of BadgerCare adults receiving dental services in MSA comparison counties fell to 1.7%. These values are shown in **Table 7**.

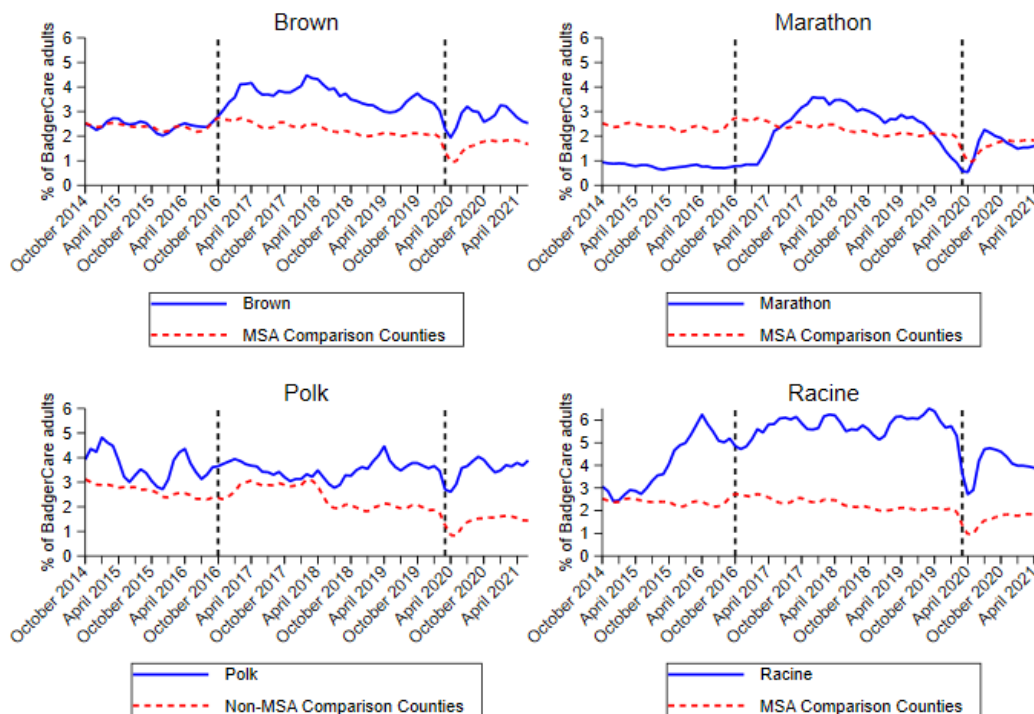
Results from the estimation of Equation 1 show that relative to other MSA comparison counties, the percentage of adults who reside in Brown County and received care each month increased by 1.23-1.28 percentage points, 50.4-52.4% of baseline (**Table 8**). We find no evidence that Covid affected Brown County differently than the comparison set of counties.

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% per month, but jumped to about 3% per month, which is similar in value to other MSA non-pilot counties (**Table 7**). A substantial decrease occurred prior to Covid, in July 2019. Relative to the other MSA non-pilot counties, BadgerCare adults who reside in Marathon County were 1.67 percentage points 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. We do not find any evidence that Covid affected Marathon County differently than the comparison counties.

In Polk County, there was a small decrease in the percentage of BadgerCare adult members that received dental care after the pilot was implemented. Specifically, the percent decreased from 3.9% to 3.6% after the pilot but before Covid and 3.5% after Covid (**Table 7**.) In non-MSA non-pilot counties, the percentage of BadgerCare adult members that received dental care also fell slightly, from 2.7% to 2.5%. However, the post-Covid drop was more substantial in the comparison counties and the percentage of adults that received dental services fell to 1.4%. Like findings for all BadgerCare members and BadgerCare children, we find that the *relative* increase in Polk County (0.38 percentage points, 9.7% of baseline, **Table 8**), was due to Covid affecting Polk County differently than the comparison counties.

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 4.1% to 5.9% after the pilot but before Covid. The percent fell to 4.0% after Covid. However, the pre-trend, i.e., the substantial increase in the percentage of adults prior to the pilot that received dental services in Racine County, 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 That Received Dental Care



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 these services as an independent outcome. The trends in the percentage of BadgerCare children who received preventive services over the evaluation period are shown in **Figure 4**.

Given the findings of the increase in children receiving any dental care in Brown County after the pilot, 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 5.0% to 6.5% (**Table 9**). After Covid, this percentage fell below pre-pilot levels to 4.4%. The percentage of children who received preventive services increased in the MSA non-pilot counties as well, though by a smaller amount, from 4.1% to 4.5%. The post-Covid dip was also substantial in the comparison counties and the percentage of BadgerCare children receiving preventive dental services fell to 2.7%. Relative to the other MSA non-pilot counties, children in Brown County were 1.09 percentage points (22.1% of baseline) more likely to receive preventive care (**Table 10**). Allowing Covid to affect counties differently changes the results very little.

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 4.2% to 5.8% and then fell back to pre-pilot levels after Covid (**Table 9**). Compared to other MSA non-pilot non-neighboring counties, children in Marathon County were 1.26 percentage points, 30% of baseline, more likely to receive preventive care. Similar to Brown County, allowing Covid to affect counties differently did not change the results.

There was no change in the percentage of children who received preventive services in Polk County relative to the comparison counties. The percentage of children BadgerCare members who received preventive dental services remained relatively steady during the study period. Pre-pilot, 4.2% of children received preventive services; after the pilot began but before Covid, this rate was 4.0%, and after Covid, it was 4.2%. Non-MSA, non-neighboring counties had a dramatic drop after Covid. The rate went from 4.6% to 4.7% to 2.5% after Covid (**Table 9**).

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. Prior to the start of the pilot, 3.0% of BadgerCare child members received preventive services. After the pilot but before Covid it increased to 5.1%, and after Covid it remained above pre-pilot rates at 3.8% (**Table 9**).

Figure 4: Percent of BadgerCare Child Members That Received Preventive Dental Care

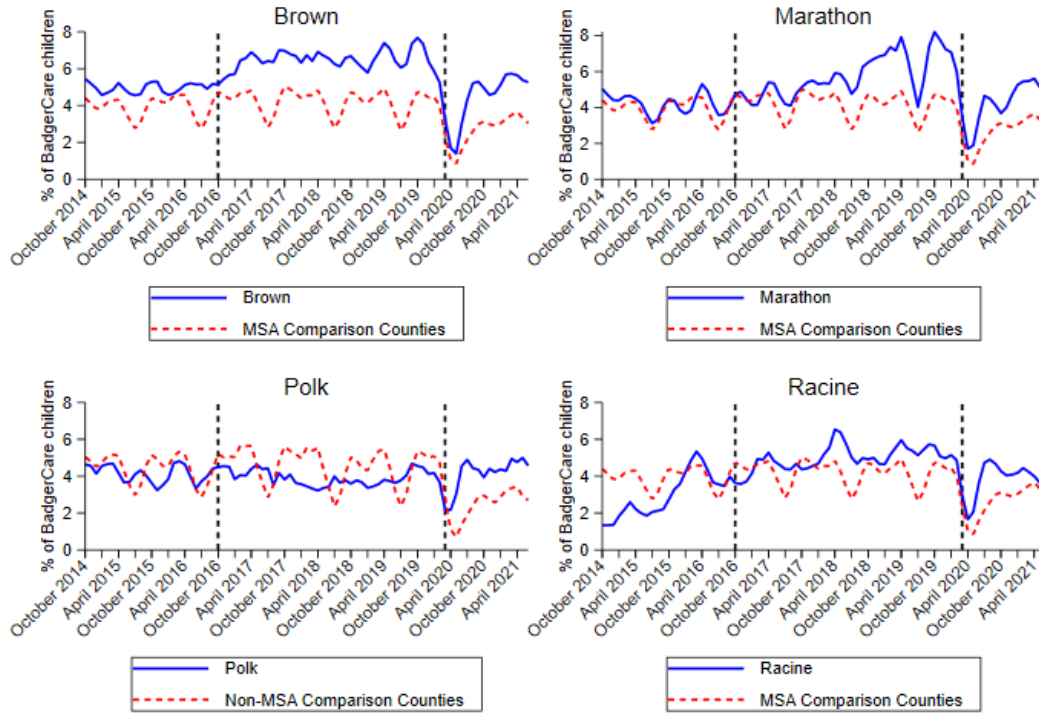


Table 9: Percentage of BadgerCare Members who Received Selected Services, by County of Residence

	% 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-Covid	Post-Pilot, Post-Covid	Pre-Pilot	Post-Pilot, Pre-Covid	Post-Pilot, Post-Covid
Brown	4.94	6.49	4.41	1.30	2.59	2.09
Marathon	4.22	5.78	4.22	0.33	1.26	1.10
Polk	4.23	3.99	4.15	1.66	1.60	1.69
Racine	2.95	5.06	3.80	2.36	3.77	2.75
MSA Comparison Counties	4.10	4.49	2.71	1.33	1.43	1.00
Non-MSA Comparison Counties	4.55	4.72	2.50	1.24	1.18	0.77

Note: Numbers are calculated as average per month. The pre-pilot period is October 2014 – September 2016. The post-pilot pre-Covid period is October 2016 – February 2020. The post-pilot, post-Covid period is March 2020 – June 2021.

Table 10: Regression Results, Percentage of BadgerCare Members who Received Specific Types of Services

	Preventive Services for Children		Emergency Services for Adults	
	(1)	(2)	(1)	(2)
Panel A: Brown County				
Pilot X Post	1.09*** [0.71,1.47]	1.22*** [0.82,1.62]	1.15*** [1.03,1.27]	1.19*** [1.07,1.31]
Pilot X Post-Covid		-0.44* [-0.89,0.01]		-0.14 [-0.32,0.04]
N	1296	1296	1296	1296
Panel B: Marathon County				
Pilot X Post	1.26*** [0.85,1.66]	1.23*** [0.76,1.71]	0.88*** [0.71,1.05]	0.82*** [0.62,1.02]
Pilot X Post-Covid		0.08 [-0.54,0.69]		0.21 [-0.05,0.47]
N	1296	1296	1296	1296
Panel C: Polk County				
Pilot X Post	0.27 [-0.33,0.87]	-0.41 [-0.99,0.18]	0.23** [0.03,0.43]	0.08 [-0.13,0.29]
Pilot X Post-Covid		2.38*** [1.63,3.13]		0.54*** [0.34,0.74]
N	2592	2592	2592	2592
Panel D: Racine County				
Pilot X Post	1.83*** [1.26,2.41]	1.72*** [1.12,2.32]	1.06*** [0.65,1.46]	1.23*** [0.83,1.63]
Pilot X Post-Covid		0.41 [-0.11,0.92]		-0.61*** [-0.83,-0.39]
N	1296	1296	1296	1296

NOTE: All regressions are weighted by county population. The dependent variable is the percentage of BC members who live in each county and received the specified type of dental care. Pilot 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 the type of dental service and reside in the pilot county relative to the control counties. Control counties are non-pilot counties with the same urbanicity as the pilot county who do not neighbor the pilot counties. 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% CIs are shown in brackets. * p < 0.; ** p < 0.05; *** p < 0.01

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 as a measure of who received care. The Wisconsin Medicaid program, with input from the Wisconsin Dental Association, specifically selected these services, as they occur outside the hospital setting, with the intention of decreasing emergency department visits for dental care. **Figure 5** shows the percent of adults who received at least one of these targeted emergency services during the study period.

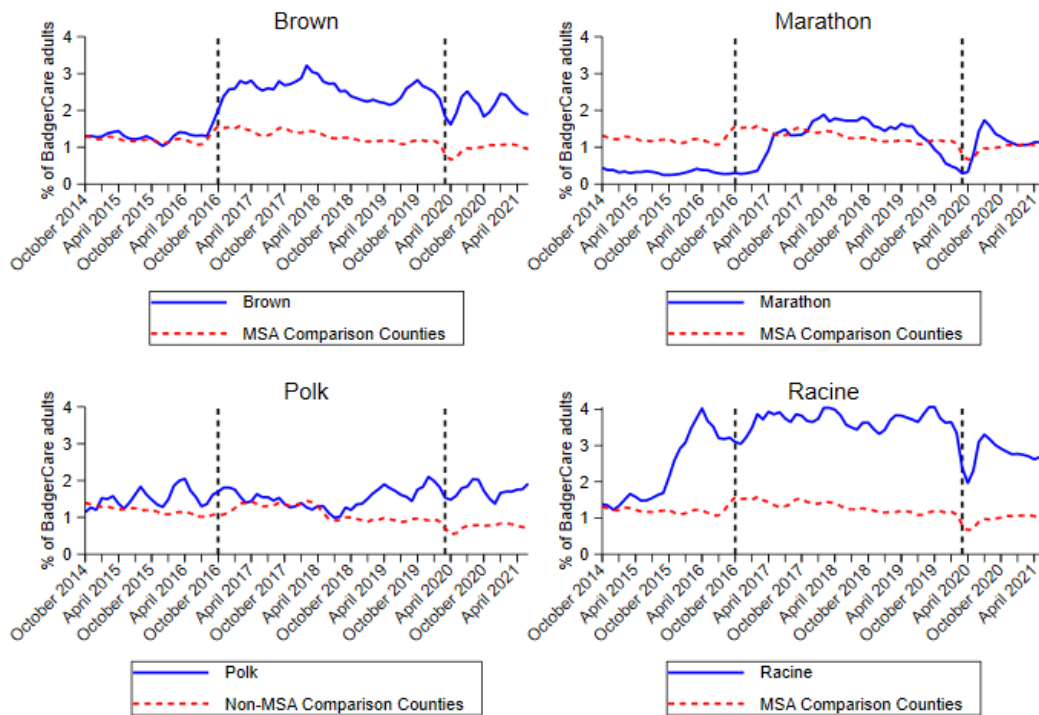
Similar to other outcomes considered, the percentage of adults who received the targeted emergency services in Brown County increased substantially after the introduction of the pilot. On average, the percentage doubled from 1.3% to 2.6% between the pre- and post-pilot pre-Covid periods. After Covid, this percentage remained above pre-pilot levels at 2.1%. In MSA non-pilot non-neighboring counties, the percentage was largely unchanged after the start of the pilot, from 1.3% to 1.4% and fell to 1.0% after Covid (**Table 9**). Results from Equation 1, seen in **Table 10**, show that relative to the other MSA non-pilot counties, the percentage of adults who received emergency services increased 1.15 percentage points, or 88.5% of baseline. We do not find evidence that Covid affected Brown County differently than the comparison counties.

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 1.3% and fell slightly to 1.1% after Covid (**Table 9**). Compared to MSA non-pilot counties, this was an increase of 0.88 percentage points, or 266.7% of baseline (**Table 10**). Allowing for Covid to affect counties differently changes the results very little. We also find evidence that Covid affected the percentage of adults in Marathon County who received these targeted services less than in the comparison counties. In other words, the decrease due to Covid was smaller in Marathon County than it was in the comparison counties.

In Polk County, the percentage of adult BadgerCare members that received the targeted emergency services was steady at 1.7% before the pilot, 1.6% after the pilot but before Covid, and 1.7% after Covid. In the comparison counties, the rate fell more after Covid, from 1.2% before and after the pilot to 0.8% after Covid (**Table 9**). The estimated relative increase in the percentage of Polk County BadgerCare adults that received the targeted services of 0.23 percentage points (13.9% of baseline) is because the post-Covid drop was smaller in Polk than in the comparison counties (**Table 10**).

In Racine County, there was a large spike between October and December of 2016, prior to the start of the pilot program. The percentage of BadgerCare adults who reside in Racine County and received the targeted services was 2.4% before the pilot, 3.8% after the pilot but before Covid, and fell a full percentage point to 2.8% after Covid (**Table 9**).

Figure 5: Percent of BadgerCare Adult Members that 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: the total number of providers that provided any dental care in the county, the total number of dental visits in the county, and the number of visits per provider in the county. 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

The total number of providers that serviced any dental care to a BadgerCare member during the month in each pilot count is shown in **Figure 6**.

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 32 providers in the two years prior to the pilot and 41 in the period following the pilot but before Covid, as shown in **Table 11**. After Covid, the number of providers in Brown County was similar to pre-pilot levels at 33. In the comparison counties, the number of providers was slowly declining over the entire study period. Prior to the pilot, there were 36 providers. After the pilot began but before Covid, there were 34 providers, and this fell to 31 post-Covid. Regression results, shown in **Table 12**, indicate that the number of dental providers increased in Brown County relative to the comparison counties by about 10, 29% of baseline, after the pilot. Results including the interaction between counties and Covid indicate that Brown County might have had a larger Covid dip in the number of providers than other counties.

The raw 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**).

Results for the number of providers rendering dental services to BadgerCare children in Brown County is similar to the results for the total number of providers. Namely, the number of providers rendering care to children increased after the start of the pilot, from 28 to 36, but fell to near pre-pilot levels, 29, after Covid (**Table 11**). The number of providers rendering dental care to children in the comparison counties fell in all periods. Results from estimating Equation 1 show that the number of providers rendering care to children in Brown County increased relative to comparison counties by 9, or 31% of baseline (**Table 12**).

We find no evidence that the pilot affected the number of providers rendering dental services to adults in Brown County. Each period, the number of providers rendering dental care to adults fell in Brown County. However, it also fell in the comparison counties, so there was no relative change.

In Marathon County, the total number of providers did not change much after the pilot. Prior to the pilot, the total number of dental providers was 24.5. After the start of the pilot, the number fell slightly to 23.3 and Covid pushed this number lower, to 19.4 (**Table 11**). We find no evidence that the total number of providers in Marathon County was affected by the increased rates in the pilot.

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

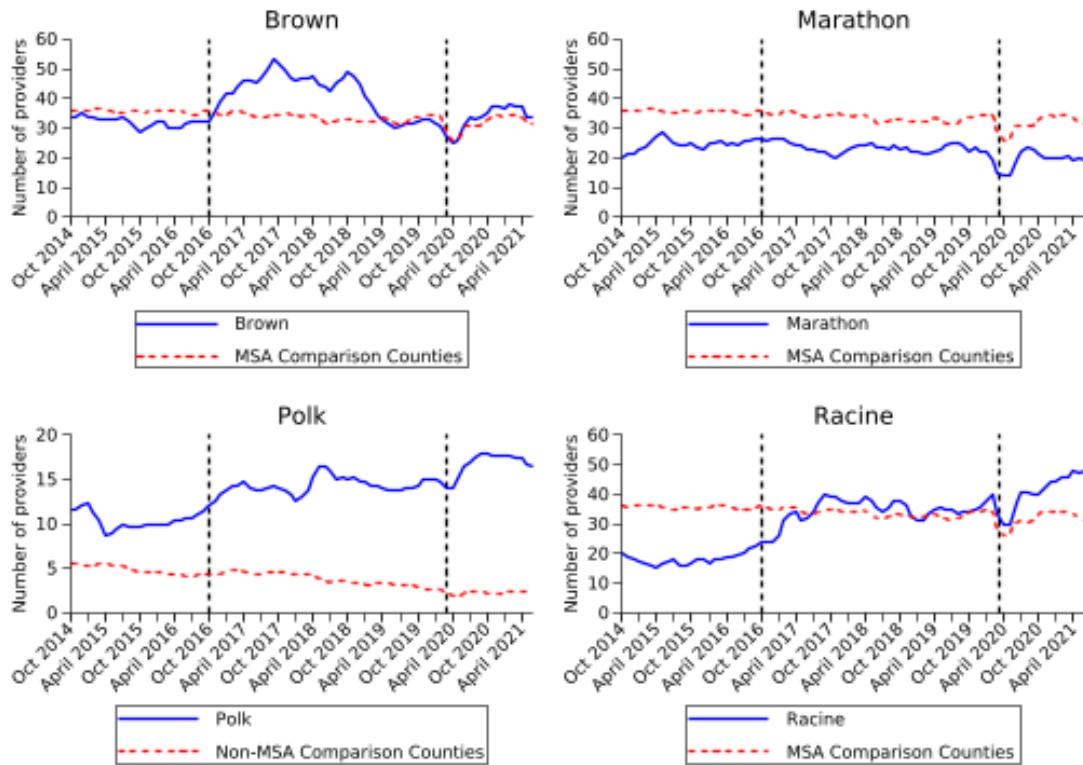


Table 11: Number of Providers that Rendered Dental Services to BadgerCare Members in Each County

	Providers Rendering any Dental Care to BadgerCare Members			Providers Rendering any Dental Care to BadgerCare Children			Providers Rendering any Dental Care to BadgerCare Adults		
	Pre-Pilot	Post-Pilot, Pre-Covid	Post-Pilot, Post-Covid	Pre-Pilot	Post-Pilot, Pre-Covid	Post-Pilot, Post-Covid	Pre-Pilot	Post-Pilot, Pre-Covid	Post-Pilot, Post-Covid
Brown	32.08	40.96	33.38	27.91	35.53	28.70	26.00	24.95	20.31
Marathon	24.50	23.32	19.38	23.17	21.83	18.06	9.04	8.95	7.31
Polk	10.38	14.27	16.75	9.96	13.86	16.75	9.29	11.10	11.93
Racine	18.08	34.37	40.83	13.42	29.32	37.14	12.42	27.03	28.76
MSA Comparison Counties	35.59	33.68	31.39	30.50	28.47	25.24	24.39	21.79	20.27
Non-MSA Comparison Counties	4.84	3.79	2.22	4.31	3.45	1.98	4.06	3.03	1.72

Note: Numbers are calculated as average per month. The pre-pilot period is October 2014 – September 2016. The post-pilot pre-Covid period is October 2016 – February 2020. The post-pilot, post-Covid period is March 2020 – June 2021.

We also find no evidence that the number of providers in Marathon County rendering dental care to children was affected by the increased rates (**Table 12**). However, the pilot did increase the relative number of providers who provide care to adults by 2.7, 37% of baseline. This is because, although the number of providers who service BadgerCare adults in Marathon County did not change after the introduction of the pilot, the number of providers who service adults in comparison counties fell during the study period (**Table 11**).

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 10.4 to 14.3 per month. Even after Covid, the number of providers continued to grow to 16.8. In comparison counties, the number of providers decreased from 4.8 to 3.8 to 2.2 post-Covid, as shown in **Table 11**. Regression results (**Table 12**) show that the average number of dental providers increased by 6.09, 36% of baseline, compared to non-MSA non-neighboring counties. We also find evidence that Covid affected Polk differently than the comparison counties and once we allow for this, the number of dental providers in Polk County increased by 4.94 (29% of baseline) relative to the comparison counties.

Similar to the number of total providers, we find that the number of providers who service children or adults increased in all three time-periods (**Table 11**). Providers that rendered care to children in Polk County increased relative to non-MSA non-neighboring counties by between 5.99 and 4.75 (35.8-28.3% of baseline). Providers that rendered care to adults in Polk County increased relatively by between 3.44 and 2.83 (28.8-23.7% of baseline). Similar to the overall number of providers, we also find that Covid did not affect the number of providers rendering care to children or adults as much as it did in the comparison counties.

The number of providers in Racine County that rendered care to BadgerCare members started increasing 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. A key assumption of the difference in difference framework is that the pre-pilot trends between pilot and control counties is parallel. This is not the case in Racine, so although the number of providers did increase, we cannot attribute the increase to the pilot. We do find that Covid did not affect Racine negatively relative to the comparison counties in terms of the number of dental providers. On average, the number of providers in Racine County more than doubled, from 18.1 to 34.4 to 40.8 (**Table 11**). There was a large increase for both children and adults. The number of dental providers rendering care to children in Racine County almost tripled, from 13.4 to 29.3 to 37.1.

Table 12: Regression Results, Number of Providers that Rendered Care

	All		Children		Adults	
	(1)	(2)	(1)	(2)	(1)	(2)
Panel A: Brown County						
Pilot X Post	9.67*** [7.76,11.58]	11.11*** [8.81,13.41]	8.94*** [7.21,10.67]	9.91*** [7.88,11.94]	0.9 [-0.81,2.62]	1.75 [-0.39,3.89]
Pilot X Post-Covid		-5.09*** [-7.72,-2.46]		-3.44*** [-5.89,-0.99]		-3.00** [-5.50,-0.49]
N	1296	1296	1296	1296	1296	1296
Panel B: Marathon County						
Pilot X Post	0.64 [-0.79,2.06]	1.05 [-0.39,2.48]	0.85 [-0.60,2.30]	0.95 [-0.55,2.46]	2.70*** [1.56,3.84]	2.70*** [1.58,3.83]
Pilot X Post-Covid		-1.45 [-3.60,0.69]		-0.37 [-2.48,1.73]		0.00 [-1.96,1.97]
N	1296	1296	1296	1296	1296	1296
Panel C: Polk County						
Pilot X Post	6.09*** [5.31,6.87]	4.94*** [4.27,5.61]	5.99*** [5.20,6.78]	4.75*** [4.09,5.41]	3.44*** [2.80,4.08]	2.83*** [2.18,3.49]
Pilot X Post-Covid		4.05*** [3.21,4.90]		4.36*** [3.53,5.19]		2.14*** [1.45,2.83]
N	2592	2592	2592	2592	2592	2592
Panel D: Racine County						
Pilot X Post	21.03*** [18.97,23.10]	18.52*** [16.52,20.52]	21.35*** [19.19,23.51]	18.20*** [16.30,20.09]	18.36*** [16.57,20.15]	17.41*** [15.36,19.45]
Pilot X Post-Covid		8.95*** [6.04,11.86]		11.21*** [8.49,13.94]		3.37*** [1.16,5.59]
N	1296	1296	1296	1296	1296	1296

NOTE: All regressions are weighted by county population. The dependent variable is the number of providers that rendered dental services in each county. Pilot 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 any dental service in the pilot county relative to the control counties. Control counties are non-pilot counties with the same urbanicity as the pilot county who do not neighbor the pilot counties. 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% CIs are shown in brackets. * 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 and remained above pre-pilot levels after Covid. The number of visits increased from 2018 per month to 2991 after the pilot was implemented, and 2540 after Covid. The number of visits in the MSA comparison counties also increased, from 1582 to 1733 per month after the pilot but before Covid. However, the average number of monthly dental visits in the

comparison counties did not rebound to pre-pilot levels and was just 1369 (**Table 13**). The statistically significant relative increase in the number of visits in Brown County was 816.7, or 40% of baseline (**Table 14**). Results are similar after allowing Covid to affect each county differently.

In addition to relative increases overall, there were also relative increases in the number of visits for BadgerCare children and for BadgerCare adults in Brown County. The number of visits for children in Brown County increased after the introduction of the pilot but remained above pre-pilot levels after Covid. This contrasts with the comparison counties, which saw a large decrease in the number of visits for BadgerCare children after Covid (**Table 13**). The relative increase in the number of visits for BadgerCare children is estimated to be between 582.5 and 624.5, 35.5-38.1% of baseline. The relative increase in the number of visits for BadgerCare adults is estimated to be between 234.2 and 214.0, 62-56.6% of baseline (**Table 14**). We find no evidence that Covid affected the number of visits in Brown County relative to the comparison counties.

Figure 7: Total Number of Visits for BadgerCare Members, by County Where Care Was Rendered

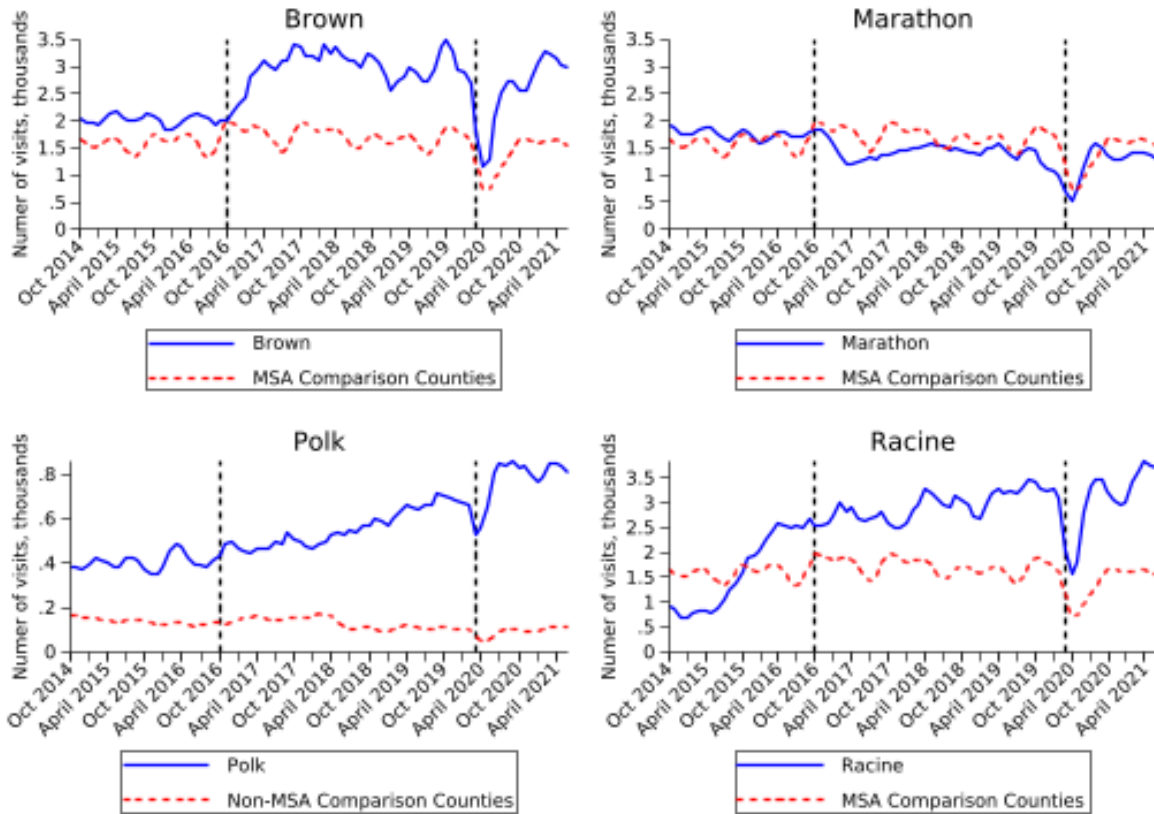


Table 13: Number of Visits to BadgerCare Members, by County Where Care Was Provided

	Number of Visits to BadgerCare Members			Number of Visits to BadgerCare Children			Number of Visits to BadgerCare Adults		
	Pre-Pilot	Post-Pilot, Pre-Covid	Post-Pilot, Post-Covid	Pre-Pilot	Post-Pilot, Pre-Covid	Post-Pilot, Post-Covid	Pre-Pilot	Post-Pilot, Pre-Covid	Post-Pilot, Post-Covid
Brown	2,017.6	2,990.7	2,539.5	1,639.6	2,310.9	1,807.3	377.9	679.7	732.2
Marathon	1,749.3	1,426.3	1,239.3	1,709.9	1,191.7	1,054.9	39.4	234.6	184.5
Polk	402.7	559.3	774.8	268.7	413.9	588.7	134.0	145.3	186.0
Racine	1,596.0	2,958.0	3,047.9	880.6	1,876.9	1,930.5	715.3	1,081.2	1,117.4
MSA Comparison Counties	1,581.5	1,732.9	1,368.9	1,366.5	1,428.4	1,082.4	214.9	304.6	286.5
Non-MSA, Comparison Counties	137.4	127.6	90.7	78.4	78.8	63.1	59.0	48.8	27.6

Note: Numbers are calculated as average per month. The pre-pilot period is October 2014 - September 2016. The post-pilot, pre-Covid period is October 2016 - February 2020. The post-pilot, post-Covid period is March 2020 - June 2021.

In Marathon County, there was a sharp decrease in the number of visits that occurred at the beginning of the pilot. In the two years prior to the pilot, the average number of visits per month provided to BadgerCare members was 1749 but fell to 1426 in the years following the introduction of the pilot but before Covid and continued to fall to 1239 after Covid (**Table 13**). This decrease is only in the number of visits for children. The average number of visits for children fell from 1710 pre-pilot to 1192 post-pilot to 1055 post-Covid. However, there is little reason to think the increased payment rates would cause a decrease in the number of visits. Until April 2017, there were extremely few billed visits for adults in Marathon County, so it is difficult to infer trends caused by the pilot in Marathon County.

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 403 to 559 per month and continued to increase after the initial Covid dip to 775, as shown in **Table 13**. Compared to non-MSA, non-pilot, non-neighboring counties, where total visits fell slightly from 137 to 128 to 91, this was a statistically significant relative increase of 237.9 visits per month, or 59% from baseline (**Table 14**). Once we allow Covid to affect counties differently, we find that the increase due to the pilot was 166.4, or 41% of baseline. Similar to other outcomes, Covid appears to have had less of a negative effect in Polk County than the comparison counties.

The increase in visits in Polk County because of the pilot was concentrated among children. Visits for BadgerCare children increased from 269 to 414 to 589 per month in Polk County and were stable in the comparison counties prior to Covid but then never returned to pre-Covid levels (**Table 13**). Results from Equation 1 show that this was a relative increase of between 198.8 and 144.8 visits, 74-54% from baseline (**Table 14**). For adults, the total number of visits in Polk County increased from 134.0 to 145.3 to 186.0 but decreased in the comparison counties, particularly after Covid. Regression results find that this is a relative increase in the number of visits for BadgerCare members in Polk County of 39.0 and 21.5 visits, 29-16% of baseline.

The total number of dental visits provided in Racine County also increased throughout each period after the pilot was introduced. This increase was especially large for children, from 881 to 1877 to 1931 per month, compared to 715 to 1081 to 1117 per month for adults (**Table 13**). However, similar to the number of providers in Racine County, this increase began well before the pilot began, which makes causal inference impossible. Thus, although the number of dental visits to Badger Care members in Racine County did increase, we are not able to conclude that it is *because* of the increased reimbursement rates.

Table 14: Regression Results, Number of Visits by Where County Where Care Was Rendered

	All		Child		Adults	
	(1)	(2)	(1)	(2)	(1)	(2)
Panel A: Brown County						
Pilot X Post	816.69*** [668.10, 965.28]	838.49*** [679.63, 997.35]	582.48*** [456.61, 708.35]	624.51*** [491.77, 757.25]	234.21*** [186.79, 281.63]	213.98*** [166.60, 261.36]
Pilot X Post-Covid		-77.05 [-350.60, 196.51]		-148.53 [-373.35, 76.29]		71.48* [-9.98, 152.93]
N	1296	1296	1296	1296	1296	1296
Panel B: Marathon County						
Pilot X Post	-405.11*** [-527.77, -282.44]	-457.86*** [-585.30, -330.42]	-503.69*** [-616.35, -391.02]	-565.23*** [-682.03, -448.44]	98.58*** [54.21, 142.95]	107.37*** [59.19, 155.56]
Pilot X Post-Covid		187.08* [-7.16, 381.31]		218.27** [50.71, 385.82]		-31.19 [-99.58, 37.20]
N	1296	1296	1296	1296	1296	1296
Panel C: Polk County						
Pilot X Post	237.86*** [191.84, 283.88]	166.35*** [127.34, 205.36]	198.83*** [165.38, 232.28]	144.81*** [116.84, 172.78]	39.03*** [22.67, 55.39]	21.54*** [6.05, 37.04]
Pilot X Post-Covid		252.20*** [182.23, 322.18]		190.54*** [137.47, 243.61]		61.66*** [39.93, 83.39]
N	2592	2592	2592	2592	2592	2592
Panel D: Racine County						
Pilot X Post	1357.73*** [1037.06, 1678.39]	1227.15*** [908.55, 1545.75]	1064.25*** [846.92, 1281.59]	949.24*** [728.34, 1170.14]	293.47*** [171.14, 415.80]	277.92*** [157.89, 397.94]
Pilot X Post-Covid		464.34*** [134.59, 794.08]		409.02*** [168.26, 649.77]		55.32 [-67.25, 177.89]
N	1296	1296	1296	1296	1296	1296

NOTE: All regressions are weighted by county population. The dependent variable is the number of dental visits in each county. Pilot 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 that occurred in the pilot county relative to the control counties. Control counties are non-pilot counties with the same urbanicity as the pilot county who do not neighbor the pilot counties. 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% CIs are shown in brackets. * 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 a 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 to 75 to 74 (**Table 15**). 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 per-pilot average; the number of visits per provider decreased in Marathon County from 72.2 to 61.5 to 62.3 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. After the initial Covid-dip, the number of visits returned quickly to the pre-Covid average.

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. As of June 2021, the average number of visits per provider to BadgerCare members in Racine County has not returned to pre-Covid levels.

Figure 8: Number of Dental Visits to BadgerCare Members per Provider, by Where Care Was Rendered

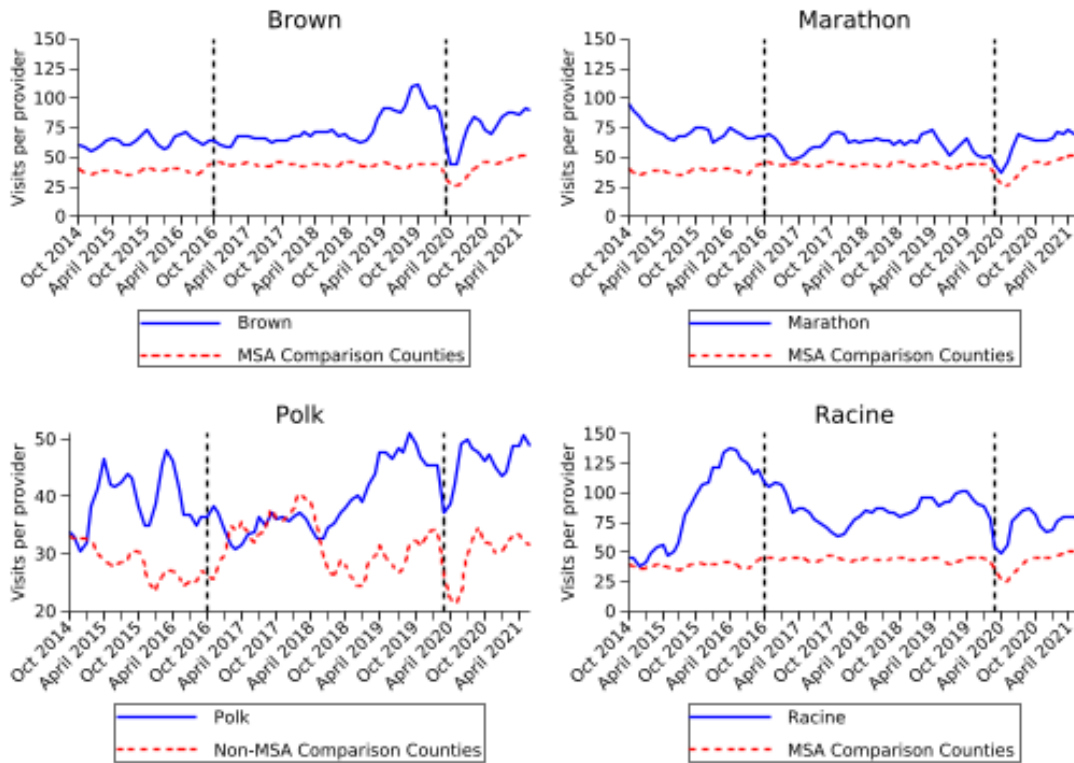


Table 15: Number of Visits to BadgerCare Members per Provider, by Where Care Was Rendered

	Number of Visits to BadgerCare Members per Provider			Number of Visits to BadgerCare Children per Provider			Number of Visits to BadgerCare Adults per Provider		
	Pre-Pilot	Post-Pilot, Pre-Covid	Post-Pilot, Post-Covid	Pre-Pilot	Post-Pilot, Pre-Covid	Post-Pilot, Post-Covid	Pre-Pilot	Post-Pilot, Pre-Covid	Post-Pilot, Post-Covid
Brown	63.19	75.11	74.13	59.20	66.62	60.41	14.54	30.07	36.25
Marathon	72.18	61.48	62.31	74.78	54.86	57.44	4.47	26.27	24.91
Polk	39.29	39.27	45.94	27.32	29.80	34.98	14.61	13.12	15.50
Racine	87.85	87.49	72.87	62.72	64.55	50.69	57.95	41.90	38.12
MSA Comparison Counties	38.54	44.04	41.31	33.65	39.68	40.27	13.73	15.14	11.64
Non-MSA, Comparison Counties	28.41	31.73	29.69	18.18	21.15	20.12	13.32	13.60	12.79

Note: Numbers are calculated as average per month. The pre-pilot period is October 2014 - September 2016. The post-pilot, pre-Covid period is October 2016 - February 2020. The post-pilot, post-Covid period is March 2020 - June 2021.

3.2.4 Total Number of Emergency Department Visits

Our last measure of care is the number of emergency department visits for dental care for BadgerCare members of each county, shown in **Figure 9**. To identify these visits, we use the entire universe of Medicaid claims data (not just dental claims). We mark observations with procedure codes 99281-99285, which indicate an emergency department setting.⁵⁸ 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.

We use this as a measure of potentially avoidable treatment 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, starting well before the pilot began. Pre-pilot, the average number of ED visits for dental care by BadgerCare members who reside in Brown County was 107.7. It fell to 56.6 post-pilot and 46.7 post-Covid (**Table 16**). While there is a pre-pilot decrease in the MSA comparison counties, it is not as stark as the trend in Brown County. These pre-trends make causal estimates unreliable. The vast majority of ED visits for dental care are for adults, and there was a pre-pilot decrease for this subgroup as well.

There was a slow decline in Marathon County in the number of emergency department visits, on average from 33.3 per month in the pre-period to 22.7 in the post-pilot period and 17.9 post-Covid. However, because there was a similar change in the MSA comparison counties, there was not a statistically significant change in ED visits for Marathon County residents relative to residents in the MSA pilot counties (**Table 17**).

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 (**Table 16**). 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 for Polk County residents increased by 2.93 for BadgerCare members. However, this increase was concentrated in adults, who had a relative increase of 2.3 visits (**Table 17**).

Similar to the other MSA pilot counties, the number of ED visits for dental care in Racine County also fell gradually over time, from 60.1 to 48.9 to 31.5. However, the MSA comparison counties also had a decrease over the study period and Racine actually had a *relative* increase in

⁵⁸ This analysis does not include free standing emergency rooms not attached to hospitals.

the number of ED visits of 6.41 – 9.03 (10.7 – 15% of baseline), as shown in **Table 17**. Since the majority of ED visits for dental care are for adults, the relative increase overall is driven by adult visits.

Figure 9: Number of ED Visits for Dental Care by BadgerCare Members Who Reside in Each County

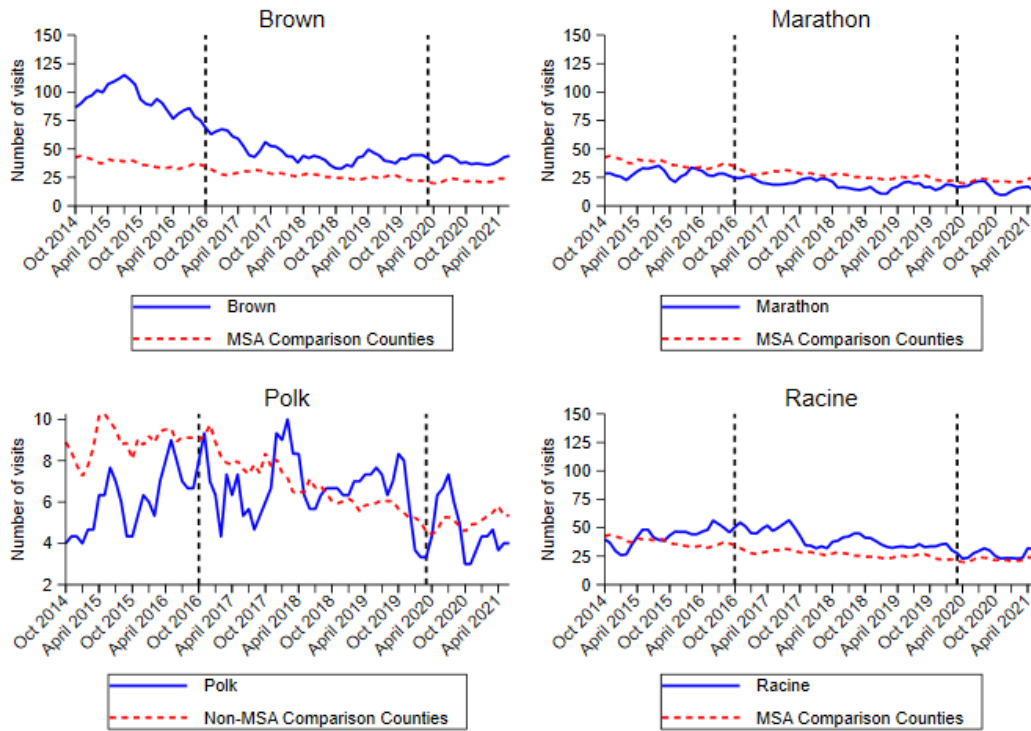


Table 16: Number of ED Visits for Dental Care by BadgerCare Members Who Reside in Each County

	Number of ED Visits for Dental Care for BadgerCare Members			Number of ED Visits for Dental Care for BadgerCare Children			Number of ED Visits for Dental Care for BadgerCare Adults		
	Pre-Pilot	Post-Pilot, Pre-Covid	Post-Pilot, Post-Covid	Pre-Pilot	Post-Pilot, Pre-Covid	Post-Pilot, Post-Covid	Pre-Pilot	Post-Pilot, Pre-Covid	Post-Pilot, Post-Covid
Brown	107.68	56.58	46.69	17.96	14.13	10.31	89.72	42.44	36.38
Marathon	33.25	22.66	17.94	5.04	3.66	2.94	28.21	19.00	15.00
Polk	7.96	8.24	5.06	2.58	2.39	1.50	5.37	5.85	3.56
Racine	60.08	48.94	31.50	13.42	13.58	6.87	46.67	35.36	24.62
MSA Comparison Counties	44.67	32.67	28.26	7.35	6.06	5.00	37.31	26.61	23.26
Non-MSA, Comparison Counties	10.59	8.29	6.18	1.90	1.60	0.98	8.69	6.68	5.19

Note: Numbers are calculated as average per month. The pre-pilot period is October 2014 - September 2016. The post-pilot, pre-Covid period is October 2016 - February 2020. The post-pilot, post-Covid period is March 2020 - June 2021.

Table 17: Regression Results, ED Visits for Dental Care by BadgerCare Members that Reside in Each County

	All		Child		Adults	
	(1)	(2)	(1)	(2)	(1)	(2)
Panel A: Brown County						
Pilot X Post	-36.85*** [-42.34,-31.35]	-36.10*** [-41.91,-30.28]	-2.22*** [-3.87,-0.58]	-1.76* [-3.55,0.03]	-34.63*** [-39.96,-29.30]	-34.34*** [-39.91,-28.77]
Pilot X Post-Covid		-2.68 [-6.37,1.00]		-1.65* [-3.33,0.04]		-1.04 [-4.25,2.18]
N	1296	1296	1296	1296	1296	1296
Panel B: Marathon County						
Pilot X Post	1.66 [-1.89,5.21]	1.27 [-2.42,4.96]	0.09 [-1.05,1.22]	-0.2 [-1.38,0.98]	1.57 [-1.66,4.81]	1.47 [-1.91,4.85]
Pilot X Post-Covid		1.4 [-1.76,4.56]		1.03** [0.12,1.95]		0.37 [-2.69,3.42]
N	1296	1296	1296	1296	1296	1296
Panel C: Polk County						
Pilot X Post	2.93*** [1.90,3.97]	3.03*** [1.89,4.17]	0.69** [0.16,1.22]	0.61** [0.02,1.21]	2.24*** [1.18,3.31]	2.41*** [1.27,3.56]
Pilot X Post-Covid		-0.34 [-1.70,1.02]		0.26 [-0.46,0.98]		-0.6 [-1.80,0.60]
N	2592	2592	2592	2592	2592	2592
Panel D: Racine County						
Pilot X Post	6.41** [1.12,11.71]	9.03*** [3.66,14.41]	1.16 [-0.72,3.05]	2.16** [0.15,4.17]	5.25** [0.91,9.59]	6.87*** [2.43,11.32]
Pilot X Post-Covid		-9.32*** [-13.14,-5.50]		-3.54*** [-5.17,-1.91]		-5.78*** [-8.97,-2.60]
N	1296	1296	1296	1296	1296	1296

NOTE: All regressions are weighted by county population. The dependent variable is the number of ED visits for dental care by residents of each county. Pilot 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 ED visits for dental care that occurred in the pilot county relative to the control counties. Control counties are non-pilot counties with the same urbanicity as the pilot county who do not neighbor the pilot counties. 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% CIs are shown in brackets. * p < 0.; ** p < 0.05; *** p < 0.01

3.3 HOW MUCH DID THE PROGRAM COST?

3.3.1 Total Outlays

Of central importance is the total cost of the pilot. For all cost measures, we only include payments for claims that were not denied. We inflate costs to the 2020 CPI medical care index of the Midwest. Costs are available at the claim level, so we are not able to calculate costs at the service level⁵⁹. When focusing on targeted services, we include any claim that had a targeted service as part of the claim. For claims with multiple first dates of service, we assign the cost to the earliest date in the claim.

⁵⁹ This is an update from previous reports. At the direction of DHS, IRP now calculates costs only at the claim (ICN) level.

Table 18 shows the total payments made for dental visits, in thousands of dollars, for each pilot county as well as the comparison counties. Costs are shown for five periods: 16-month intervals of the pre-pilot (June 2015-September 2016), post-pilot but pre-Covid (November 2018-February 2020), and post-pilot, post-Covid (March 2020-June 2021), the entire pre-period (October 2014 – September 2016), and the entire post-period (October 2016 – June 2021). We include the first 3 columns so that cost comparison is easier- the length of time in each column is equal. Each of the pilot counties had large increases in costs after the pilot was implemented. However, total costs for dental care in the comparison counties actually decreased.

Table 19 shows payments for visits that included a targeted service. We include the same five periods as in **Table 18**. The same pattern exists for targeted costs as for total costs- they increased after the pilot in the pilot counties, as expected. However, they decreased in the comparison counties. Comparing **Table 18** and **Table 19**, we can also see that claims with the increased rates of the targeted services comprise a high fraction of total dental costs.

Table 18: Total Payments for Dental Visits (\$1000s) Rendered by County

	Pre-Pilot (16 mo)	Post-Pilot, Pre-Covid (16 mo)	Post-Pilot, Post-Covid (16 mo)	Total Pre-Pilot	Total Post-Pilot
Brown	4,064.27	10,546.46	11,606.82	6,289.76	40,723.23
Marathon	4,150.49	5,072.89	4,648.45	6,373.53	19,105.17
Polk	790.02	2,009.60	2,572.69	1,158.25	7,064.52
Racine	4,311.54	13,487.95	13,693.84	5,319.96	45,672.05
MSA, Non-Pilot, Non-neighboring Counties	1,736.41	1,441.10	1,197.60	2,619.99	5,279.97
Non-MSA, Non-pilot, Non-neighboring Counties	162.84	128.72	103.23	255.36	492.61

Note: All costs are in 2020 Dollars, inflated using the Midwest medical care CPI.

Table 19: Total Payments for Visits with Targeted Services (\$1000s) Rendered by County

	Pre-Pilot (16 mo)	Post-Pilot, Pre-Covid (16 mo)	Post-Pilot, Post-Covid (16 mo)	Total Pre-Pilot	Total Post-Pilot
Brown	3,682.82	10,313.67	11,416.41	5,692.69	39,787.77
Marathon	3,558.66	4,385.31	4,075.27	5,449.40	16,876.87
Polk	669.48	1,554.53	2,131.66	966.95	5,705.02
Racine	4,278.44	12,314.29	12,773.70	5,282.15	42,880.96
MSA, Non-Pilot, Non-neighboring Counties	1,486.74	1,200.50	946.93	2,254.51	4,400.75
Non-MSA, Non-pilot, Non-neighboring Counties	162.25	110.22	71.36	254.31	437.89

Note: All costs are in 2020 Dollars, inflated using the Midwest medical care CPI.

3.3.2 Payments per Member

Next, we turn to the payments made per member. Specifically, we total the costs for dental services rendered in each county in each month and divide it by the number of BadgerCare members enrolled in the given county in that month.

Figure 10 shows the average monthly dental costs per BadgerCare member who resides in each county during the period of evaluation. As expected, the increased reimbursement rates immediately increased costs. Costs stayed high Per-member costs remained higher until Covid, when they took a sharp dip. Per-member costs in each of the pilot counties did rebound to pre-Covid levels.

Table 20 shows the average per-member costs in the pre-pilot period, the post-pilot but pre-Covid period, and the post-pilot and post-Covid period. Average monthly per-member costs almost tripled in Brown County, increasing from \$7.60 to \$21.11. Post-Covid, the average per-member costs fell slightly to \$18.78 in Brown County. Per-member costs in the MSA comparison counties were trending down during the period of evaluation until Covid, from \$8.82 to \$8.49 and then dropped to \$5.70. Regression results, shown in **Table 21**, estimate that average monthly per-member costs increased by between \$13.87 and \$14.01 in Brown County, relative to the comparison counties. The increase was higher for children than for adults. For children, the increase was between \$16.78 and \$16.95 and for adults the relative increase was between \$8.62 and \$9.01.

In Marathon County, per-member costs immediately spiked after the implementation of the pilot, but then dropped precipitously, as seen in **Figure 10**. The average cost per-member prior to the pilot was \$15.97, higher than the MSA comparison counties. Post-pilot and pre-Covid the per-member cost was \$22.41 but dropped to \$16.23 and after Covid (**Table 20**). We found that the relative per-member increase in Marathon County was between \$5.85 and \$6.79. For children, the increase was between \$5.10 and \$6.25 and for adults it was between \$6.83 and \$7.09 (**Table 21**).

Per-member costs in Polk County increased immediately at the start of the pilot and continued to increase until Covid. After a Covid-dip, per-member costs continued to increase, as can be seen in **Figure 10**. The pre-pilot per-member costs in Polk County were \$8.18 and more than doubled to \$19.21 after the pilot, but before Covid. After Covid, per-member costs increased to \$24.73, as seen in **Table 20**. The per-member costs in non-MSA comparison counties fell from \$3.00 to \$2.86 to \$1.77 during this time. Regression results find that the relative increase in per-member costs in Polk County was between \$11.17 and \$13.05. This increase was concentrated among children. Per-member costs for children increased relative to the non-MSA comparison counties by between \$16.17 and \$18.81. For adults, the increase was between \$3.12 and \$4.09 per-member.

Per-member per-month costs in Racine was \$7.16 in the pre-pilot period, \$26.12 in the post-pilot pre-Covid period and \$25.04 in the post-pilot post-Covid period (**Table 20**). Per-member costs started increasing about a year before the pilot was implemented (**Figure 10**).

Figure 10: Per-Member Dental Payments for Services Rendered in Each County

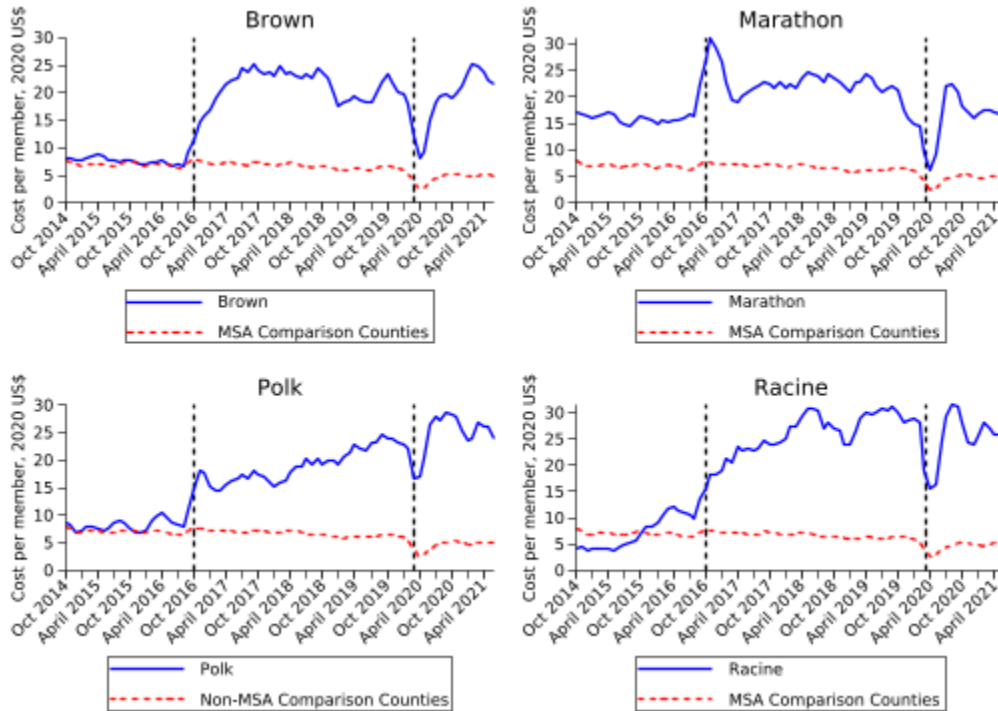


Table 20: Average Monthly Per-Member Payments for Dental Care Provided in Each County

	Pre-Pilot	Post-Pilot, Pre-Covid	Post-Pilot, Post-Covid
Brown	7.60	21.11	18.78
Marathon	15.97	22.41	16.23
Polk	8.18	19.21	24.73
Racine	7.16	26.12	25.04
MSA, Non-Pilot, Non-neighboring Counties	8.82	8.49	5.70
Non-MSA, Non-pilot, Non-neighboring Counties	3.00	2.86	1.77

Note: All costs are in 2020 Dollars, inflated using the Midwest medical care CPI. Numbers are calculated as average per month. The pre-pilot period is October 2014 - September 2016. The post-pilot, pre-Covid period is October 2016 - February 2020. The post-pilot, post-Covid period is March 2020 - June 2021.

Table 21: Regression Results, Per-Member Payments Made for Dental Services Rendered in Each County

	All		Child		Adults	
	(1)	(2)	(1)	(2)	(1)	(2)
Panel A: Brown County						
Pilot X Post	14.01*** [13.01,15.01]	13.87*** [12.85,14.89]	16.95*** [15.62,18.28]	16.78*** [15.52,18.04]	9.01*** [8.25,9.76]	8.62*** [7.76,9.48]
Pilot X Post-Covid		0.5 [-1.93,2.92]		0.59 [-2.73,3.91]		1.35* [-0.02,2.73]
N	1296	1296	1296	1296	1296	1296
Panel B: Marathon County						
Pilot X Post	5.85*** [4.67,7.03]	6.79*** [5.59,8.00]	5.10*** [3.31,6.88]	6.25*** [4.27,8.22]	6.83*** [5.83,7.84]	7.09*** [5.89,8.29]
Pilot X Post-Covid		-3.35*** [-5.81,-0.90]		-4.08** [-7.52,-0.63]		-0.92 [-2.73,0.88]
N	1296	1296	1296	1296	1296	1296
Panel C: Polk County						
Pilot X Post	13.05*** [11.64,14.45]	11.17*** [9.95,12.40]	18.81*** [16.93,20.68]	16.17*** [14.64,17.71]	4.09*** [2.96,5.21]	3.12*** [2.00,4.24]
Pilot X Post-Covid		6.62*** [3.92,9.32]		9.29*** [5.44,13.13]		3.42*** [1.75,5.10]
N	2592	2592	2592	2592	2592	2592
Panel D: Racine County						
Pilot X Post	19.81*** [18.06,21.57]	19.32*** [17.45,21.20]	27.35*** [24.91,29.79]	25.82*** [23.23,28.42]	8.59*** [7.37,9.81]	9.36*** [8.14,10.57]
Pilot X Post-Covid		1.74 [-1.06,4.54]		5.43** [1.27,9.58]		-2.73*** [-4.01,-1.44]
N	1296	1296	1296	1296	1296	1296

NOTE: All regressions are weighted by county population. The dependent variable is the dental care cost per BadgerCare member of that county. Pilot 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 cost for dental care that occurred in the pilot county relative to the control counties. Control counties are non-pilot counties with the same urbanicity as the pilot county who do not neighbor the pilot counties. 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% CIs are shown in brackets. * p < 0.; ** p < 0.05; *** p < 0.01

3.3.3 How Much and Why Did Payments Increase?

Last, we consider how much total payments for dental care increased because of the pilot program. We also calculate what fraction of the increase in payments was due to mechanical reasons and what fraction was due to the increase in dental claims paid for. 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?

For example, an extreme case would be if reimbursement rates increased but the number of dental care services did not change at all. In this case, the total amount of payments made would increase only because of the increased rates. In other words, 100% of the increase in total payments would be due to the increased rates.

To estimate the increase in payments due to the pilot program, we estimate Equation 1 where the outcome is total dental payments. We then assume that the pilot counties, in the absence of the pilot program, would have behaved exactly like the non-pilot control groups. For example, if

payments made in MSA non-pilot non-neighboring counties increased by 5% 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 divide the increase in payments due to the increased reimbursement rates and divide it by the actual increase in payments to obtain what fraction of the increased payments was due to the increased rates. **Table 22** shows this for each pilot county, for both children and adults. However, because of the changes in visits and services before the pilot was implemented in Marathon and Racine County, we are unable to estimate how payments changed *because* of the program. Thus, the results for these counties are blocked out.

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

- Total payments made during the pilot program for all dental services rendered to children was \$13,460,688. There were 54,142 claims, so the average payment for each claim was \$249.
- The predicted number of claims is 26,261 and the predicted payments made is \$5,652,070. These are the predicted values if the pilot was not implemented.
- The additional spending because of the pilot was \$7,808,619. This is the difference between what was actually spent and what was predicted to have been spent.
- The predicted total payments if only reimbursement rates increased (and there was no change in utilization) is \$6,529,042. This is the predicted number of claims X the average payment per claim.
- The increase in reimbursement accounts for 11% of the increased payments. In other words, the increased rate explains \$6,529,042-\$5,652,070 of the additional \$7,808,619 payments made.

The additional payments made for dental services rendered to adults in Brown County is \$2,476,892. About 28% of this increase is mechanical and due to the increased rates alone. The remaining 72% is due to increased utilization for adults.

In Polk County, the pattern seen in Brown County flips and increased payments due to the reimbursement rates is the dominating reason for increased payments. For adults, the increased reimbursement rates explain 65% of the increase in total payments made during the pilot and for children the increased rates explain 82% of the increase in total payments made during the pilot.

Table 22: Total Change in Payments, Percent Due to Increased Utilization and Percent Due to Increased Reimbursement Rates

	Brown County		Marathon County		Polk County		Racine County	
	Children	Adults	Children	Adults	Children	Adults	Children	Adults
Outlays (\$)	3,263,064	13,460,688	1,070,254	7,338,121	495,426	1,809,172	4,655,472	11,644,285
Claims (#)	16,661	54,142	5,714	28,879	3,610	9,060	45,475	105,238
Average Payment per Claim (\$)	196	249	187	254	137	200	102	111
Predicted claims	7,544	26,261			3,209	8,080		
Predicted outlays	786,172	5,652,070			337,606	720,266		
Actual Spending Minus Predicted Spending (\$)	2,476,892	7,808,619			157,820	1,088,907		
Predicted Total Payments if Only Rates Increased (\$)	1,477,510	6,529,042			440,408	1,613,384		
% Increase Due to Increased Rate	27.9	11.2			65.1	82.0		
% Increase Due to Increased Utilization	72.1	88.8			34.9	18.0		

4 TELEDENTISTRY DURING COVID

In addition to the outcomes related to the pilot, DHS requested information about the use of teledentistry in Wisconsin. **Figure 11** shows the total number of visits to BadgerCare members per month that included a teledentistry claim. Teledentistry was identified in the Medicaid claims data as any visit with a procedure code that includes “D9995” or “D9996”⁶⁰.

Overall, we only found 1 claim prior to March 2020 that had a teledentistry code attached to it, so we restrict our sample to after Covid. There were 543 visits with teledentistry between March 2020 and June 2021. Teledentistry rapidly increased from March 2020 to May 2020 and fell dramatically after. There was another, though smaller spike in September 2020. However, after November 2020, teledentistry was largely not utilized by providers.

We also found that teledentistry visits were concentrated in relatively few counties in Wisconsin. Of the 72 counties in the state, only 24 ever had a teledentistry visit. These counties are shown in **Table 23**. Even among the counties that had a teledentistry visit for BadgerCare members, the visits are concentrated in a select few counties. Dane County accounted for 24.3% (132 visits) of teledentistry visits; Kenosha accounted for 8.5% (46 visits); and Rock County accounted for 32.5% (191 visits). Over half of the counties with a teledentistry visit have less than 5 visits.

DMS' interpretation of these results is that there was an increase in utilization of teledentistry in some counties during COVID, which levelled out and decreased after the pandemic. The pilot counties were not among the few counties that used teledentistry more widely. Telehealth utilization is not the same across all areas of healthcare, and the drop-off of telehealth utilization for dental care, specifically, does not cause major concern due to the nature of dental services as primarily occurring in person.

⁶⁰ ADA “D9995 and D9996 – ADA Guide to Understanding and Documenting Teledentistry Events.” January 1, 2023. Accessed November 26, 2023. https://www.ada.org/-/media/project/ada-organization/ada/ada-org/files/publications/cdt/v4_d9995andd9996__adaguidetounderstandinganddocumentingteledentistryevents_2023jan.pdf

Figure 11: Number of Teledentistry Visits for BadgerCare Members in Wisconsin, by Month

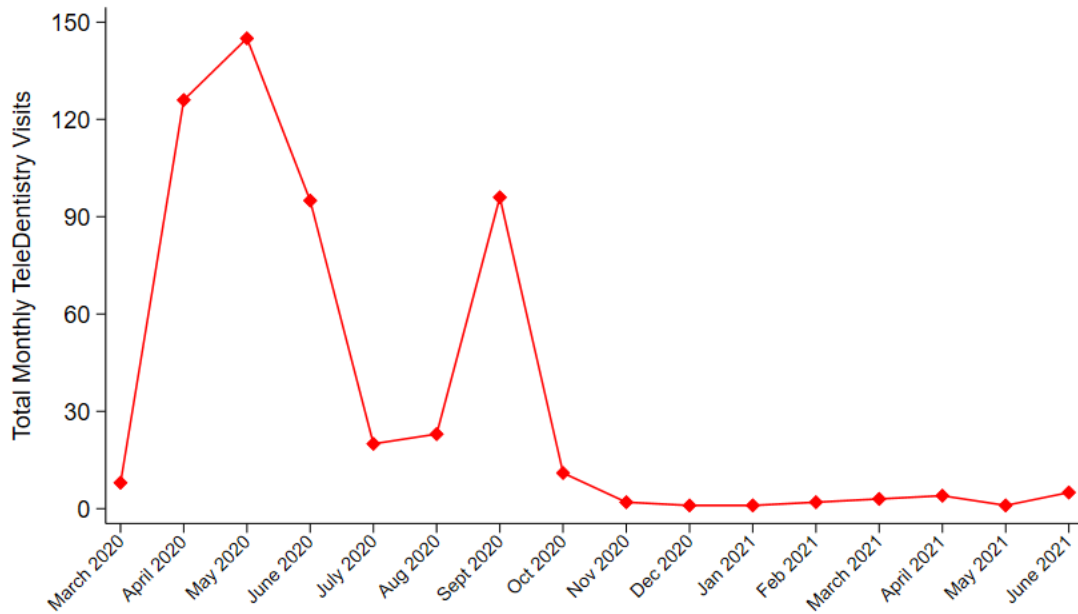


Table 23: Counties where Teledentistry Occurred, March 2020 – June 2021

County	# of Teledentistry Visits	County	# of Teledentistry Visits
Ashland	6	Marathon	1
Brown	2	Oconto	1
Burnett	1	Outagamie	1
Chippewa	3	Portage	1
Dane	132	Racine	1
Dodge	24	Rock	191
Door	6	Sauk	3
Douglas	2	Sawyer	9
Forest	1	St. Croix	7
Juneau	16	Washburn	1
Kenosha	46	Waushara	27
Manitowoc	3		

Note: 58 visits cannot be attributed to a county.

5 LIMITATIONS

There are several limitations that should be noted. The first set is related to the data used and the second set 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.⁶¹ 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.⁶²

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.

It should also be noted that the Covid-19 PHE meant that BadgerCare members did not have to re-enroll every year as was required prior to March 2020. If members moved, were no longer eligible, or were enrolled in another insurance, this would not necessarily be reflected in our enrollment data. This creates noise in the county of residence that we use from the enrollment data.

⁶¹ 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.

⁶² 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.

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 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 on 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.

6 DISCUSSION & CONCLUSION

Table 24 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. This relative increase was across the board including the percentage of children receiving any care, children receiving preventive services, and adults receiving any care or the targeted emergency services. The number of providers servicing BadgerCare members in Brown County (all and child members), and the number of total visits, overall and for children and adults separately, also increased relative to the comparison counties. There was a strong decrease in the number of ED visits for dental care for Brown County residents prior to the start of the pilot, so we are unable to conclude that the pilot program decreased ED use.

Brown County may have benefited from a well-organized community effort led by the Oral Health Partnership (OHP).⁶³ This non-profit agency focuses on delivering services to the Medicaid population 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 mitigates the degree to which the county's success may be attributed to the pilot program itself.

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 relative change in the number of providers rendering care in Marathon County to all BadgerCare members or to child members. 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) impossible. We do not find that there was a relative change in the number of ED visits in Marathon County.

Polk County

There was a relative increase in the percentage of BadgerCare members in Polk County that received dental care. This increase was because Polk County did not have a sustained drop in the percentage of BadgerCare members who received dental care post-Covid that other counties did. This is true when considering all BadgerCare members, BadgerCare children, and BadgerCare adults. There were substantial gains in Polk County with respect to the relative number of providers and the number of visits in the county. This indicates that providers are responding to the increased payments in Polk County.

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

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. For example, the number of providers and the number of visits did increase during the pilot period. However, because the increase began before the reimbursement rates increase, we cannot attribute the changes to the pilot program. The initiation of the pilot program did not signal any change in trend.

⁶³ See Oral Health Partnership information here: <https://www.smilegb.org/history-of-ohp>.

Comparison to Previous Reports

Overall, the findings between the last report and this one changed very little. The exception is that Polk County had an increase in the percentage of BadgerCare members (all, children, and adults) who received dental care. This increase is driven by the fact that there was not a sustained drop in the percentage of members who received dental care after Covid that was seen in the non-MSA comparison counties.

The second major difference is that the number of providers and number of visits rendered to BadgerCare members was also found to increase in Brown County. The number of providers increased relative to the comparison counties because of a larger drop post-Covid in the comparison counties. The previous report did not find any statistical increase in the number of providers or the number of visits in Brown County relative to the control counties.

This report contains data post-Covid that was not in previous reports. This allows us to show trends in dental care utilization and provision during and after the state-wide “Safer at Home” orders expired. Many measures of dental care have not returned to their pre-Covid levels, including the number of providers and the number of visits rendered to BadgerCare members in some counties. The use of teledentistry during Covid was also shown in this report.

Table 24: Summary of Findings

	Brown	Marathon	Polk	Racine
Percentage of Resident County BadgerCare Members Receiving Any Dental Services				
Children, receiving any service	Increase	Increase	Increase post-Covid	Increase prior to start of pilot
Children, receiving preventive service			No change	
Adults, receiving any service			Increase post-Covid	
Adults, receiving Emergency Services				
Number of Providers Serving Medicaid/BadgerCare Members				
Serving any member	Increase	No change	Increase	Increase prior to start of pilot
Serving children				
Serving adults	No change	Increase		
Total Number of Visits				
All	Increase	Decrease prior to start of pilot	Increase	Increase prior to the start of pilot
By children				
By adults				
Emergency Department Visits				
All	Decrease prior to start of pilot	No change	Increase	Increase
To children				No change
To adults				Increase

Per-Member Costs				
All	Increase	Increase	Increase	Increase prior to the start of pilot
For children				
For adults				

7 ATTACHMENT: DENTAL SERVICE FEE SCHEDULE

Targeted Reimbursement Rate Maximum Allowable Fee Schedule, Revised 1/1/2018. Wisconsin Department of Health Services. Available at https://www.forwardhealth.wi.gov/WIPortal/content/Provider/medicaid/dentist/Targeted_Reimbursement_Rate_MAFS.htm.spage

8 APPENDIX A: MEDICAID ENROLLMENT

Figure 12: Medicaid Enrollment by County

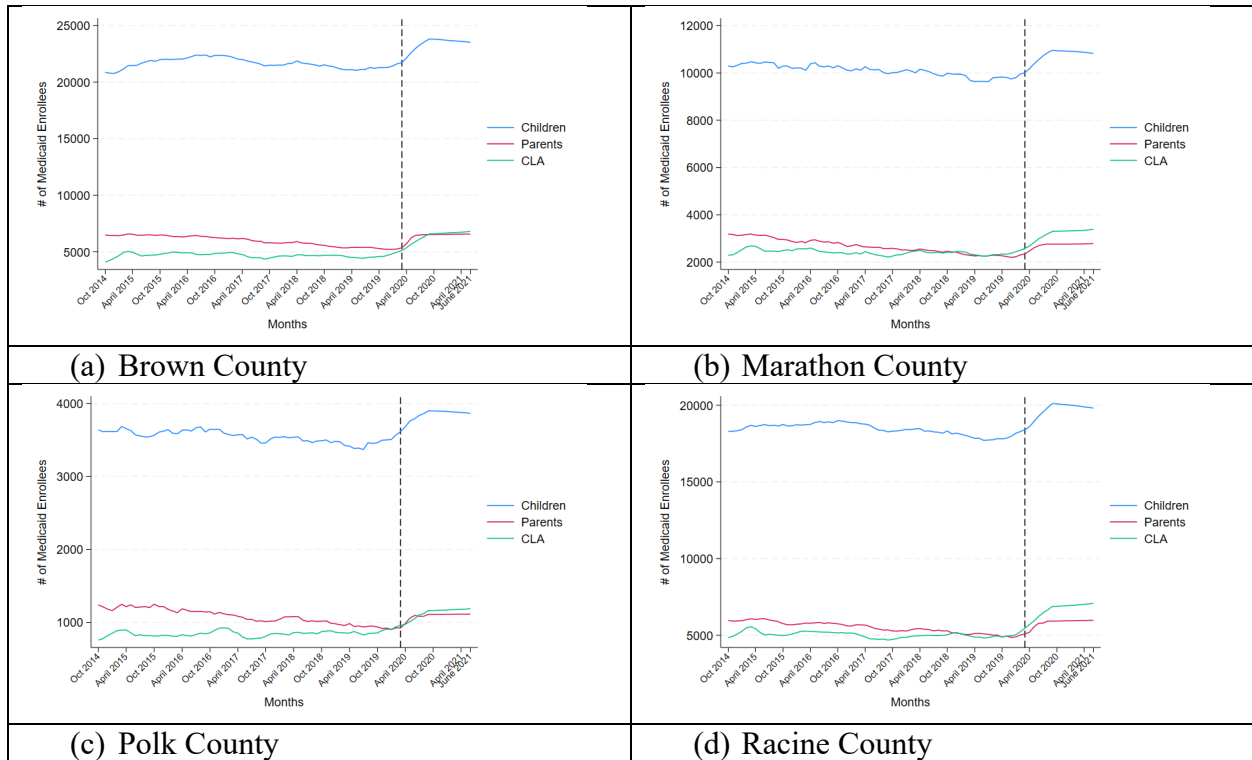


Figure 13: Enrollment, Statewide

