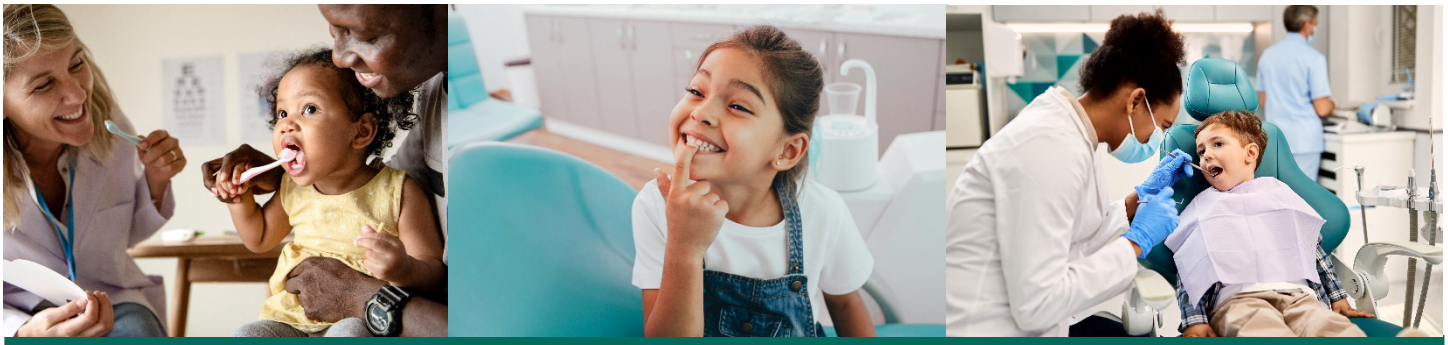

Evaluation of the Dental Transformation Initiative

Final Evaluation Report

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Executive Summary

The Dental Transformation Initiative (DTI) is one component of California's multifaceted Medi-Cal 2020 section 1115 waiver program (Medi-Cal 2020). DTI combined statewide strategies and county-based components that promoted the use of preventive dental services, prevention and management of early childhood caries, and continuity of care to advance the overall health and well-being of children enrolled in Medi-Cal. The state hoped that DTI, together with several other important policy and program changes focused on oral health for families with low incomes, would boost historically low rates of provider participation and improve access to dental services.

The DTI had four components, or domains:

- **Domain 1** aimed to increase use of preventive services among Medi-Cal beneficiaries ages 1 to 20. It operated statewide starting January 2016. Dental offices received incentive payments of varying amounts for meeting or exceeding certain benchmark rates of increasing the number of Medi-Cal children who receive preventive services in a year over the intervention. All dental offices that participated in Medi-Cal could receive the incentive payments, but Federally Qualified Health Centers and other Safety Net Clinics were required to opt in and use a special claims form to receive credit for the services they provided.
- **Domain 2** tested a new approach to reducing dental caries and improving oral health among beneficiaries younger than age 7. It began operating in 11 counties in January 2017 and expanded to another 18 counties in January 2019, for a total of 29 counties. Incentives were paid to dental providers for using a bundled package of services that included a caries risk assessment (CRA) and related educational and motivational interventions for patients and caregivers. To be eligible for incentive payments, dental providers were required to opt into this domain and participate in training. Beneficiaries were entitled to a varying number of follow-up visits based on their CRA.
- **Domain 3** aimed to improve continuity of care by rewarding dental offices with incentive payments when a Medi-Cal beneficiary age 20 or younger received care in the same office location from year to year. It began operating in 17 counties in January 2016 and expanded to another 19 counties in January 2019, for a total of 36 counties. All dental offices that participated in Medi-Cal were eligible to receive these incentive payments. Safety Net Clinics were required to opt in and use a special claims form. Incentives were paid annually to practices' billing offices, and the incentive payments increased incrementally with each year of additional continuity an office achieved for a given beneficiary. The incentive payment in 2021 was the same amount offered in 2020.
- **Domain 4** tested alternative strategies for achieving the goals of Domains 1, 2, and 3. The 13 applicants selected to implement Local Dental Pilot Projects (LDPPs) conducted activities such as strengthening the capacity of the dental provider workforce, furthering the integration of oral health into primary care, and promoting the use of telehealth technology to improve access to dental care in rural and other underserved areas. The pilot program began in February 2017. Funding to LDPPs ended on December 31, 2020.

A. Overview of the evaluation

Mathematica conducted a five-year mixed-methods evaluation of DTI. This final report summarizes all evaluation findings and assesses how DTI contributed to California's progress in improving access to dental care for children participating in Medi-Cal. It focuses on evaluation activities that occurred during the second phase of the evaluation, including (1) in-depth qualitative interviews with dental providers, managed care organizations, state officials, and other key informants in Fall 2021; (2) dental provider surveys in fall 2019; (3) beneficiary interviews in Spring 2021; (4) descriptive analyses of administrative data and DTI monitoring and performance data; (5) multivariate impact analyses using administrative data; and (6) case study data for Domain 4 LDPPs.

B. Findings by domain

1. Domain 1

Overall, Domain 1 made considerable progress towards its goal of increasing preventive dental services among children enrolled in Medi-Cal by 10 percentage points. We found that before 2020, Domain 1 increased the use of preventive dental services by approximately 4 percentage points. These effects occurred before the COVID-19 pandemic began to influence health care use. This increase was primarily driven by dental providers increasing the number of Medi-Cal beneficiaries they served rather than more providers serving Medi-Cal beneficiaries. We also found evidence of increased use of other dental services, with small but statistically significant impacts on any dental exams, treatment services, and restorative services in the years before 2020.

The impact of Domain 1 on preventive dental services might be limited because a few aspects of the structure and rollout of the Domain 1 incentives limited dental providers' interest and ability to treat more children than they had before DTI. These aspects include that the incentives were not intuitive and were better suited for dental providers serving small numbers of children enrolled in Medi-Cal. In addition, there were several barriers beyond reimbursement rates, such as capacity constraints and concerns with treating infants and toddlers, that limited the extent to which dental providers could treat more children.

2. Domain 2

We found evidence that Domain 2 changed the way many dental providers assess and treat early childhood caries among children enrolled in Medi-Cal. About one-quarter of Medi-Cal beneficiaries eligible for Domain 2 received an assessment for early childhood caries during the intervention period, with use of CRAs increasing over the intervention periods. Services that Domain 2 incentivized also increased after the start of the interventions in Domain 2 pilot and expansion counties. Children who we assessed as high risk based on dental claims from the previous year were more likely to receive CRAs in the following year than children we assessed as low risk, suggesting that CRAs were focused on the appropriate population. Children at higher risk levels received substantially more treatment dental services than children at lower risk levels.

By the end of the intervention, Domain 2 increased total dental service use by 1.2 services per beneficiary in Domain 2 pilot counties and 1.3 services per beneficiary in Domain 2 expansion counties. Although most of the increase is attributable to use of the services that Domain 2 incentivized, we found evidence that preventive dental service use (not including services incentivized by Domain 2) increased by 0.3 services per beneficiary per year in Domain 2 pilot counties and 0.2 in Domain 2 expansion counties.

One reason that not all children eligible for Domain 2 with a dental visit received a CRA is that participation by dental providers was limited, with the percentage of active Medi-Cal dental providers who participated (provided at least one CRA) never exceeding 40 percent. However, dental providers that participated in Domain 2 found the CRA bundle worked well in their practice; they reported it was easy to implement, the training on the CRA bundle was helpful, and the payments were satisfactory. Key informants and providers interviewed reported that implementing the bundle of services went well overall. The California Department of Health Care Services designed the domain with input from dental experts across the state to include an appropriate set of services, which helped build support for them.

3. Domain 3

We found impacts of Domain 3 on continuity of care that are less than 1 percentage point. Although continuity of care increased for Domain 3 counties before 2020 (and before the disruptions in health care related to COVID-19), continuity of care also increased for children enrolled in Medi-Cal in counties that did not participate in Domain 3, and in Domain 3 expansion counties before the start of the Domain 3 expansion. This finding is consistent across several outcome measures designed to capture continuity of care.

Although we found limited evidence that Domain 3 substantially increased continuity of care for beneficiaries, results from our provider survey and key informant and provider interviews suggest that Domain 3 incentives motivated many dental providers to take steps to improve continuity of care for the children they serve enrolled in Medi-Cal and gave dental providers the resources to do it. Despite motivating some providers to take steps to improve continuity of care, for others, findings from the provider survey indicate that the payments were not the providers' focus, which might help explain the limited effects on beneficiaries' outcomes of continuity of care and dental service use. In addition, many of the additional steps taken by providers to improve continuity of care, such as increasing outreach activities and follow-up visits for children enrolled in Medi-Cal, are likely insufficient to address key outside factors related to Medi-Cal beneficiaries' challenges accessing dental care, such as life stressors that make dental appointments a lower priority for some families.

4. Domain 4

Nearly all LDPPs built on prior investments, efforts, and partnerships in children's dental care when developing their models. We found that LDPPs' strategies fit into five common components, with each LDPP working on multiple components: (1) offering care coordination services, (2) conducting oral health outreach and education, (3) enhancing the dental provider workforce, (4) providing services virtually, and (5) facilitating medical–dental integration. Across LDPPs, we found that some components were easier to implement than others. Nearly all LDPPs successfully implemented care coordination activities, which played a critical role in identifying and connecting children in need to dental care. LDPPs had difficulty facilitating medical-dental integration, because these activities required substantial investments in process and systems changes.

LDPPs' efforts to try new ways of providing dental care in the community showed promise in expanding and improving the overall structure and capacity of the dental safety net, but LDPPs faced several challenges that limited their effectiveness. First, LDPPs faced issues recruiting and retaining staff; some LDPPs reported long hiring processes, hiring delays, and high levels of staff turnover, which led to many extended vacancies in LDPP positions. Second, the COVID-19 pandemic introduced a myriad of challenges that delayed or halted some LDPP activities.

C. Discussion

As DTI came to a close, key informants saw the program positively overall—particularly its goals, objectives, and effects on oral health care for children. They thought DTI complemented the state's other efforts to improve the dental components of the Medi-Cal program, such as Proposition 56 supplemental payments; administrative refinements to promote provider participation; and outreach efforts of the Smile, California campaign and California Department of Public Health's California Oral Health Plan. At the same time, key informants came away from the DTI experience with recognition of some of the barriers to success of the initiative, particularly the design and allocation of Domain 1 provider incentives and the implementation of the LDPPs. They also offered several ideals for what might have improved DTI's implementation and impacts, such as conducting a more explicit provider recruitment effort and implementing strategies to proactively steer Medi-Cal beneficiaries to dental providers. Lessons from the LDPPs suggest that more collaboration between the California Department of Health Care Services and dental experts, providers, and community agencies and organizations is vital to assess and improve the effectiveness of new strategies to improve oral health for Medi-Cal beneficiaries.

The results of our evaluation suggest that DTI helped California make considerable progress in improving access to dental care for children enrolled in Medi-Cal. In designing and implementing the next waiver—the California Advancing and Innovating Medi-Cal— the California Department of Health Care Services has already taken steps to address aspects of DTI that might have limited the impact of the initiative—most notably, simplifying the incentive structure to encourage preventive dental care and continuity of dental care. Our evaluations findings suggest that providing enhanced reimbursement can improve some aspects of access to dental care among children enrolled in Medi-Cal. However, the structure of the provider incentives and the persistence of other barriers are likely to play an important role in the success of initiatives like DTI. As the California Department of Health Care Services continues its implementation, it should consider additional lessons from DTI to further address and improve oral health care for children participating in Medi-Cal and other beneficiaries.

I. Introduction

The Dental Transformation Initiative (DTI) is one component of California's multifaceted Medi-Cal 2020 Section 1115 waiver program (Medi-Cal 2020). Medi-Cal 2020 was a six-year program that spanned 2016 through 2021.[1] It aimed to transform and improve access, quality and efficiency of health care for the more than 13 million Medi-Cal members. California's Department of Health Care Services (DHCS) contracted with Mathematica to conduct a five-year evaluation of DTI from July 1, 2018, through June 30, 2023.[2]

In this report, we provide final evaluation findings for the six-year DTI demonstration program. An interim evaluation report (Harrington et al. 2019) to DHCS in fall 2019 summarized findings from (1) the first round of qualitative interviews with providers and other key informants conducted in spring 2019, and (2) selected descriptive quantitative findings on implementation progress and provider participation, using DHCS/DTI reporting data. This final report builds on interim report findings and incorporates findings from all evaluation components. It focuses on activities that occurred after the interim evaluation report was written, including (1) a second round of in-depth qualitative interviews with dental providers, managed care organizations, state officials, and other key informants in fall 2021; (2) dental provider surveys in fall 2019; (3) beneficiary interviews in spring 2021; (4) descriptive analyses of administrative data, and DTI monitoring and performance data; (5) multivariate impact analyses using administrative data; and (6) case study data for Domain 4 Local Dental Pilot Projects (LDPPs).

A. Overview of DTI

To accelerate improvements in dental care and oral health for children eligible for Medi-Cal, California tested strategies through a multifaceted set of interventions. DTI combined statewide strategies and targeted county-based components that together provided a strong foundation for evaluating the effectiveness of various approaches to improving the access and quality of oral health care for children. The original waiver period for the DTI demonstration spanned five years, from January 2016 through December 2020. However, given delays implementing the planned California Advancing and Innovating Medi-Cal (CalAIM) initiative brought on by the COVID-19 pandemic, Domains 1, 2, and 3 were extended to include a sixth program year that ended December 31, 2021. Domain 4 was allowed to end as scheduled on December 31, 2020.

The DTI had four components, or domains, described below and summarized in Table I.1:

- **Domain 1** attempted to increase the use of preventive services among Medi-Cal beneficiaries ages 1 through 20. It operated statewide starting January 2016. Dental offices received incentive payments of varying amounts for meeting or exceeding certain benchmark rates of increasing the number of children enrolled in Medi-Cal who receive preventive services in a year over the intervention. All dental offices that participated in Medi-Cal were eligible to receive the incentive payments. However, Federally Qualified Health Centers and other Safety Net Clinics were required to opt in and use a special claims form to receive credit for the services they provided.[3]

[1] The Centers for Medicare & Medicaid Services approved Medi-Cal 2020 on December 30, 2015, and the initiative ran through December 31, 2020. DHCS received a 12-month waiver extension for Medi-Cal 2020 until December 31, 2021.
[2] The original contract with DHCS to conduct the DTI evaluation was to span four years, from July 1, 2018, through June 30, 2022. However, because of the 12-month extension to the DTI program, DHCS extended Mathematica's evaluation contract another 12 months for a fifth year, and it will run through June 30, 2023.
[3] Because Safety Net Clinics billed for dental services differently than other providers, they had to agree to use a special claims form that was developed for the demonstration for the services they provided.

- **Domain 2** tested a new approach to reducing dental caries and improving oral health among beneficiaries younger than age 7. It began operating in 11 counties in January 2017 and expanded to an additional 18 counties in January 2019, for a total of 29 counties. Incentives were paid to dental providers for using a bundled package of services that included a caries risk assessment (CRA) and related educational and motivational interventions for patients and caregivers. To be eligible for incentive payments, dental providers were required to opt into this domain and participate in training. Beneficiaries were entitled to a varying number of follow-up visits based on their CRA.
- **Domain 3** aimed to improve continuity of care by rewarding dental offices with incentive payments when a Medi-Cal beneficiary age 20 or younger received care in the same office location from year to year. It began operating in 17 counties in January 2016 and expanded to an additional 19 counties in January 2019, for a total of 36 counties. All dental offices that participated in Medi-Cal were eligible to receive these incentive payments. Safety Net Clinics were required to opt in and use a special claims form. Incentives were paid annually to practices' billing offices. Payments increased incrementally with each year of additional continuity an office achieved for a given beneficiary. The incentive payment in 2021 was the same amount offered in 2020.
- **Domain 4** tested alternative strategies for achieving the goals of Domains 1, 2, and 3. The 13 applicants selected to implement LDPPs conducted activities such as strengthening the capacity of the dental provider workforce, furthering the integration of oral health into primary care, and promoting the use of telehealth technology to improve access to dental care in rural and other underserved areas. The pilot program began in February 2017. Individual project agreements were finalized on a rolling basis; the first was finalized in April 2017, and 11 more LDPPs were approved by the end of 2017. The 13th and final LDPP project was added in early 2018. Funding to LDPPs ended on December 31, 2020.

Table I.1. Details on DTI domains

Domain	1	2	3	4
Goal	To increase the percentage of children enrolled in Medi-Cal who receive preventive services in a year by 10 percentage points	To reduce dental caries and improve oral health among children enrolled in Medi-Cal ages 0 to 6	To improve continuity of care by rewarding dental offices when a child received care in the same office location from year to year	To test alternative strategies for achieving the goals of Domains 1, 2, and 3
Timing	January 2016 through December 2021	January 2017 through December 2021	January 2016 through December 2021	February 2017 through December 2020
Locations	Operated statewide	Began operating in 11 counties in January 2017: Glenn, Humboldt, Inyo, Kings, Lassen, Mendocino, Plumas, Sacramento, Sierra, Tulare, Yuba Expanded to an additional 18 counties in January 2019: Contra Costa, Fresno, Imperial, Kern, Los Angeles, Madera, Merced, Monterey, Orange, Riverside, San Bernardino, San Diego, San Joaquin, Santa Barbara, Santa Clara, Sonoma, Stanislaus, Ventura	Began operating in 17 counties in January 2016: Alameda, Del Norte, El Dorado, Fresno, Kern, Madera, Marin, Modoc, Nevada, Placer, Riverside, San Luis Obispo, Santa Cruz, Shasta, Sonoma, Stanislaus, Yolo Expanded to an additional 19 counties in January 2019: Butte, Contra Costa, Imperial, Merced, Monterey, Napa, Orange, San Bernardino, San Diego, San Francisco, San Joaquin, San Mateo, Santa Barbara, Santa Clara, Solano, Sutter, Tehama, Tulare, Ventura	Pilot program began in mid-February 2017. Individual project agreements were finalized on a rolling basis. The first was finalized in April 2017, and 11 more LDPPs were approved by the end of 2017. The 13th LDPP project was added in early 2018. LDPPs included Alameda County, California Rural Indian Health Board, Inc. (CRIHB),[a] California State University Los Angeles, First 5 San Joaquin, First 5 Riverside, Fresno County, Humboldt County, Orange County, Sacramento County, San Luis Obispo County, San Francisco City and County Department of Public Health, Sonoma County, and University of California Los Angeles.
Incentives[b]	Dental offices received incentive payments of varying amounts for meeting or exceeding certain benchmark rates of increase in number of Medi-Cal children receiving preventive services.	Dental providers received incentives for providing a bundled package of services that included a caries risk assessment and related educational and motivational interventions for patients and caregivers.	Dental offices received incentives that increased incrementally with each year of additional continuity an office achieved for a given child enrolled in Medi-Cal.	Not applicable; LDPPs were not eligible for incentives and submitted quarterly invoices for costs incurred.
Eligibility	All participating Medi-Cal dental offices were eligible to receive the incentive payments. Safety Net Clinics were required to opt in and use a special claims form[c]	Dental providers in the Domain 2 counties were required to opt into this domain and complete training to become eligible for incentive payments.	All participating Medi-Cal dental offices in Domain 3 counties were eligible to receive incentive payments. Safety Net Clinics were required to opt in and use a special claims form[c]	Lead entities submitted project proposals to apply for LDPP funding.

[a] CRIHB operated in many counties.

[b] More details on DTI incentives by domain are available at https://www.dhcs.ca.gov/provgovpart/Pages/dti.aspx.

[c] Because Safety Net Clinics billed for dental services differently than other providers, they had to agree to use a special claims form that was developed for the demonstration for the services they provided.

B. The evaluation

As required under conditions of the waiver program, DHCS submitted an evaluation design for the DTI to the Centers for Medicare & Medicaid Services (CMS). It was finalized and approved by CMS in September 2017 (California Department of Health Care Services 2017). Mathematica's evaluation approach built and expanded on that design document.[4]

Mathematica conducted an independent evaluation of DTI to assess the DTI theory of change. That is, it examined whether offering dental providers financial incentives increased provider capacity and facilitated increased demand for care, resulting in more children enrolled in Medi-Cal receiving more preventive dental care and fewer restorative services.

Table I.2 highlights several key research questions, listed by domain, that this final evaluation report addresses. Appendix A, Table A.I.1 summarizes all the hypotheses and detailed evaluation questions, as well as the data sources and analytic methods we used to address the questions. The appendix table also indicates whether findings were available for both the interim and final evaluation reports, or for only the final evaluation report. Throughout this report, we highlight additional details of our evaluation methods in callout boxes.

Table I.2. Key research questions for the independent evaluation of DTI

Relevant domains	Research question
Domain 1	• Do Domain 1 incentive payments lead to an increase in Medi-Cal provider participation? • Do Domain 1 incentive payments lead to higher usage rates for preventive services? • What factors other than the Domain 1 incentive payments influence the volume of preventive services provided to children enrolled in Medi-Cal?
Domain 2	• Do Domain 2 incentive payments lead providers to perform carries risk assessments (CRAs) for the focus population, and to provide the CRA bundle to manage early childhood caries? • How does the volume of dental related services change over time for children enrolled in Medi-Cal receiving services offered through Domain 2? • How do providers view the reimbursement amounts for CRA and related Domain 2 services?
Domain 3	• Are incentive payments effective in promoting continuity of care for children enrolled in Medi-Cal? • What are providers and practices doing to increase continuity of care?
Domain 4	• What types of approaches (components, activities, and strategies) are Local Dental Pilot Projects (LDPPs) using to meet the goals of Domains 1, 2, and 3? • What lessons on improving access to and quality of dental care for children did the Department of Health Care Services and other policymakers learn from the LDPPs?
Domains 1, 2, 3, 4	• What barriers other than payment amounts influence providers' ability or willingness to increase the number of children enrolled in Medi-Cal they serve? • How do providers view the role of the incentive payments in influencing their decision to become a Medi-Cal dental provider?

[4] In February 2019, Mathematica submitted a plan for implementing the independent evaluation of DTI and preparing the interim and final evaluation reports.

To answer these research questions, we engaged in the following core evaluation components:

- In-depth **qualitative interviews with a sample of dental providers, provider associations, managed care organizations, state officials, advocacy organizations, and other key informants** about experiences with and perceptions of the DTI as well as contextual and other factors influencing the implementation and outcomes of the demonstration. We conducted an initial set of 21 interviews in spring 2019, and another round of 12 interviews in fall 2021.
- A web-based **survey of a statewide sample of Medi-Cal dental providers** that generated quantitative descriptive data to complement findings from the qualitative interviews and provided context for the analyses of outcomes and impacts. The provider survey was fielded in fall 2019 with 532 providers.
- **Telephone interviews with parents and caregivers of a sample of children enrolled in Medi-Cal** to learn about their experiences with various aspects of the demonstration and their views on dental care.[5] Interviews were conducted in spring 2021 with 58 families of children enrolled in Medi-Cal.
- A **descriptive analysis** of administrative data and DTI monitoring and performance data. Administrative data included Medi-Cal eligibility and enrollment, claims, and encounter data that enabled us to examine trends in provider participation, beneficiaries' use of services, expenditures, continuity of care, and related outcomes. DTI monitoring and performance data provided by DHCS supplemented the findings from the administrative data and included incentive payments made at the office and provider level for all domains.
- A **multivariate impact analysis** using administrative data and appropriate comparison designs that assessed the impact of DTI interventions on service use, expenditures, continuity of care, and related outcomes.
- **Case studies** of the 13 Domain 4 LDPP demonstrations that explored in greater depth how the pilot projects were implemented and implications for the broader initiative. In fall 2020, we conducted 48 interviews, including with each LDPP's lead entity and its key partners. In addition, we reviewed background materials on each LDPP provided to us by DHCS, including its DTI Domain 4 applications and the annual and quarterly reports it submitted to DHCS.

[5] The original design plan involved a computer-assisted telephone survey of a statewide sample of parents and caregivers of children enrolled in Medi-Cal receiving services through one or more of the DTI domains. In May 2020, after receiving approval from DHCS, we revised our approach to conduct telephone interviews with parents and caregivers of children served by the LDPPs. We revised our approach because we thought the LDPPs would have more current contact information than Medi-Cal administrative data sources and qualitative interviews with families familiar with the LDPP and DTI services would allow for richer data collection.

C. Road map for this report

In Section II, we describe findings from a review of the literature, qualitative interviews with key informants and providers, and our 2019 survey of dental providers about the state of dental care for children enrolled in Medi-Cal. We also summarize factors external to DTI that might have influenced dental outcomes targeted by the demonstration, including important Medi-Cal program and policy changes that occurred during the intervention period. Section III presents findings from our analysis of Medi-Cal administrative data and provider survey data, including estimates of the causal impacts of DTI on access to dental care and use of dental services among children enrolled in Medi-Cal. We also incorporate perceptions and experiences of key informants, providers, and families of children enrolled in Medi-Cal. In Section IV, we present results from our case studies on the 13 LDPPs. Section V identifies and describes key lessons learned about the design and implementation of DTI, and the implications of DTI on the future of oral health for children enrolled in Medi-Cal. Section VI concludes with a discussion of the findings from the evaluation.

II. Context: Oral Health Care for Children Enrolled in Medi-Cal

This section provides background on contextual issues that shaped the oral health care landscape for children enrolled in Medi-Cal throughout the implementation of DTI. It discusses challenges these children faced accessing dental care, barriers to participation for Medi-Cal dental providers, and notable program and policy changes in Medi-Cal during the DTI intervention period.

A. Access to dental care for children enrolled in Medi-Cal

Before DTI, children enrolled in Medi-Cal received fewer preventive dental services than children in the nation as a whole and in many other states. From 2011 to 2015, 36 to 38 percent of children (ages 1 to 20) enrolled in Medi-Cal received a preventive dental service each year. The national average for children of the same age enrolled in Medicaid programs ranged from 44 to 46 percent across the same years. During this period, California ranked in the bottom 10 of states providing children enrolled in Medicaid with preventive dental services (Center for Medicaid and CHIP Services 2020). In addition, a 2015 analysis of state Medi-Cal data found that 29 percent of children (ages 1 to 20) continuously enrolled in Medi-Cal in 2011 and 2012 received no dental services, and an additional 49 percent did not receive all required dental services (Office of Inspector General 2016).

Since 1974, most children enrolled in Medi-Cal have accessed dental services through a fee-for-service (FFS) delivery system. There are exceptions: since 1995, most children living in Sacramento County enrolled in Medi-Cal must enroll in managed care plans for their dental care, while children living in Los Angeles County have the option to enroll in managed dental care. Dental providers who contract with Medi-Cal FFS and managed care plans include Federally Qualified Health Centers and other Safety Net Clinics that provide both medical and dental care, large dental practices that focus on the Medi-Cal population, and private practice dental offices that treat people with a variety of insurance types.

1. Barriers to oral health care for children enrolled in Medi-Cal

Within this context, children enrolled in Medi-Cal and their families face several common barriers to accessing dental services. Key informants and dental providers we interviewed reported that a combination of a lack of education and awareness about the importance of oral health (in other words, low oral health literacy), as well as socioeconomic factors (commonly known as social determinants of health), limit the extent to which families enrolled in Medi-Cal seek and obtain dental care for their children (see accompanying text box). In particular, many of these families are unaware that very young children need dental care. Common social determinants of health affecting oral health care include challenges finding transportation to appointments (although the Medi-Cal program

Common barriers to oral health care for children enrolled in Medi-Cal

Dental providers and key informants reported several key barriers to oral health that are relevant to all DTI domains:

- Awareness and education
  - Low oral health literacy
  - Misconceptions about the need for dental care for young children and for baby teeth
- Social determinants of health
  - Difficulty with transportation to appointments
  - Work schedules that prevent families from attending appointments
  - Financial difficulties purchasing oral health supplies
  - Other life stressors that take precedence over dental care
- Inability to find dentists who will accept Medi-Cal coverage

Source: Mathematica interviews with key informants and dental providers conducted in spring 2019.

offers assistance with transportation), inflexible work schedules that prevent families from going to appointments, inability to pay for oral health supplies, and other stressors that take precedence over oral health and dental care. Further, key informants noted that many families face challenges finding dental providers who will accept their Medi-Cal coverage, as the supply of dental providers participating in the program is inadequate to meet the needs of children across the state.

Methods: Interviews with key informants and Medi-Cal dental providers

We interviewed key informants and Medi-Cal dental providers in California about their experiences with and perceptions of the DTI demonstration. Researchers interviewed 11 dental providers and 12 key informants in Spring 2019 and interviewed another 12 key informants (some the same individuals and others different) in Fall 2021. These interviews were separate from the survey of dental providers, as described below in the next methods box. We randomly selected dental providers for interviews in a diverse set of eight counties participating in Domain 2 (Mendocino, Inyo, Sacramento, Tulare) or 3 (Alameda, Fresno, Kern, Riverside). For the key informant interviews, following a review of program documents and background information on the development and rollout of DTI, we drafted a comprehensive list of potential respondents. We then selected (with input from DHCS) leaders from provider associations, dental health plans participating in Medi-Cal, state officials, advocacy organizations, and others with a broad statewide or multi-regional perspective on DTI and oral health for children.

To avoid potential bias in our sample of key informants, we first identified organizations and people we thought could provide a range of perspectives on the implementation and outcomes of DTI through research of the program data and online resources. After discussions with DHCS and further research, we removed some from our interview list because we learned that they had less current insight into the topics of interest. Most of the people we invited for interviews agreed to participate, and we heard a range of opinions about DTI.

We conducted an in-depth interview with each respondent by telephone using semi-structured discussion guides customized to respondents' areas of expertise. The 2019 interviews covered topics including the context in which DTI was implemented (such as the factors affecting provider participation in Medi-Cal and Medi-Cal beneficiaries' access to care) and the role of the DTI incentives in changing provider behavior and organizational strategies aimed at meeting the goals of DTI for the four domains. The 2021 interviews covered changes in these topics over the course of DTI's implementation, barriers and facilitators to their implementation and effects, lessons learned and feedback for DHCS and other states, and plans for sustaining changes made under DTI. All interviews were recorded and professionally transcribed.

2. Challenges to provider participation in Medi-Cal

Across state Medicaid programs, dentists commonly cite low payment rates, administrative requirements, and patient issues, such as frequently missed appointments, as the reasons why they do not treat more patients enrolled in Medicaid (U.S. General Accounting Office 2000). Dental providers in California have long faced similar challenges to participating in Medi-Cal. In our survey of dental providers fielded from October 2019 to March 2020, we asked dentists what affects provider willingness to treat children enrolled in Medi-Cal, as well as what state or local changes could encourage more providers to provide dental care to children enrolled in Medi-Cal (see methods box below).

Many dental providers' concerns about treating children enrolled in Medi-Cal center on the belief that they are more difficult to treat because of socioeconomic challenges and lower oral health literacy. Indeed, 73 percent of dentists surveyed reported that missed scheduled appointments among Medi-Cal

patients (which, as noted earlier, can be related to transportation challenges, inflexible work schedules, and other life stressors) are a barrier to providers' willingness to treat Medi-Cal beneficiaries, and 56 percent of providers pointed to these patients not understanding the importance of oral health care (see accompanying text box on the next page). One provider said this lack of understanding can result in children's oral health deteriorating to a point at which dentists fear they will not be able to fix the children's dental problems. Of providers surveyed, 67 percent thought that educating parents on the importance of good oral health and receiving preventive care could encourage more providers to provide dental care to children enrolled in Medi-Cal. A few key informants and dental providers said some providers inaccurately perceive that Medi-Cal beneficiaries are less committed to oral health and less compliant with dental treatment; these perceptions that could be related to stigma, implicit bias, and racism.

Low reimbursement rates relative to the costs of providing care is another key barrier to dental provider participation in Medi-Cal. In 2016, compared with other states with FFS dental programs, California had the lowest Medicaid FFS reimbursement for child dental services as a percentage of fees charged, at 30.8 percent (Gupta et al. 2017). Although the state implemented policy changes to address some of these concerns (discussed below in Section II.B), low reimbursement rates have remained a key barrier to provider participation. While 58 percent of providers surveyed named low reimbursement as a barrier to dental providers' willingness to treat children enrolled in Medi-Cal, 83 percent of providers surveyed said that raising reimbursement would encourage more providers to provide care to this population.

Perceptions of barriers affecting providers' willingness to treat children enrolled in Medi-Cal in their communities

(Percentage of providers surveyed indicating each as a barrier)

Missed appointments	73%
Low payment levels/reimbursement rates	58%
Parents not understanding importance of oral health care	56%
Administrative burden, payment delays or denials	33%
Patients' low compliance with prevention and treatment	32%
Patients switching providers frequently	31%

Source: Mathematica fielded a survey of 532 dental providers from October 2019 through March 2020.

Methods: Survey of Medi-Cal dental providers

Survey of Medi-Cal dental providers. We conducted a survey with 532 dental providers to learn about their experiences providing dental care to children in the Medi-Cal dental program. The 20-minute survey was administered as a web and paper survey organized into three sections: (1) dental service provision and continuity of care, (2) caries risk assessment and oral disease management, and (3) provider demographics.

Survey timing, sample, and response rate. The survey was fielded from October 2019 to March 2020 to 1,160 providers from practices in counties participating in Domains 1, 2, and 3. The overall weighted response rate for the survey was 47.6 percent.

Analytic methods. We conducted a descriptive analysis of the survey data using frequencies and means, weighted for sampling and nonresponse, and compared provider responses overall, by domain participation, by percentage of their patient population that is children enrolled in Medi-Cal (for example, less than 25 percent, less than 50 percent, more than 50 percent, more than 75 percent), and by respondent type (dentist or non-dentist).

Appendix B further describes the survey content, sample, and methods. It also includes the survey instrument and additional analysis tables.

Additional state and local efforts that could encourage more providers to provide dental services to children enrolled in Medi-Cal

(Percentage of providers surveyed)

Increase reimbursement rates	83%
Educate parents on importance of good oral health and receiving preventive care	67%
Make billing and payments more efficient	57%
Make application process easier	50%
Provide better marketing and advertising to providers	32%
Provide more instruction for how to work effectively with children	23%
Offer more student loan repayment opportunities	19%

Source: Mathematica fielded a survey of 532 dental providers from October 2019 through March 2020.

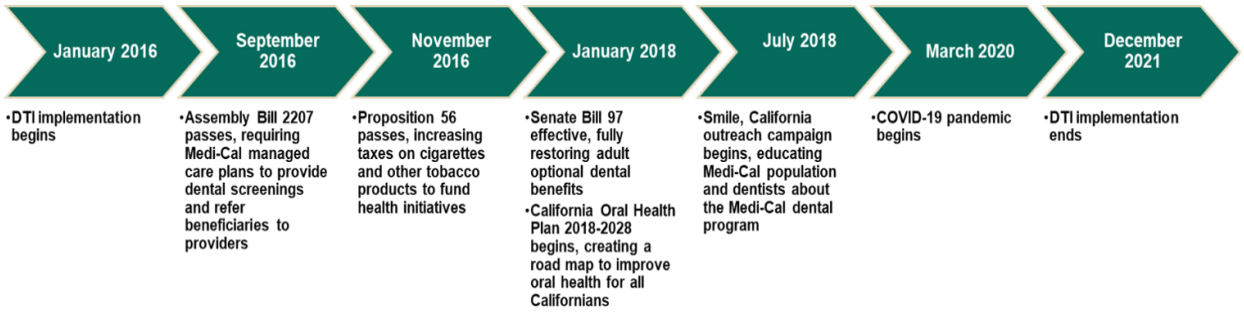
Other common challenges related to participating as a Medi-Cal provider are administrative burden and receiving reimbursement for services provided. DHCS has taken steps such as streamlining the Medi-Cal provider application several years ago, transitioning to an online provider application and portal, allowing online claims submissions, and efforts to shorten response time to authorization requests for treatment. However, these issues persist. Of providers surveyed, 50 percent of providers said making the enrollment process easier and 57 percent said making billing and payments more efficient could encourage more provider participation. Specifically, the process of applying to become a Medi-Cal dental provider has been lengthy and difficult, the process to request treatment authorization has been complex and stringent, and the time it takes to receive payment is slow compared with commercial insurers. One dental provider described Medi-Cal's rules as a source of frustration, saying "Rules change, and then you don't get paid."

The dental providers we interviewed said that given these issues, the main reason they participate in Medi-Cal is because they have a mission to care for underserved people. Yet providers' ability and capacity to serve children enrolled in Medi-Cal also limits their participation. Some providers lack training and confidence in treating young children, especially infants and toddlers. Of providers surveyed, 23 percent said that providing more instruction for how to work effectively with children would encourage more providers to treat the Medi-Cal population. Further, Safety Net Clinics and other clinics that already serve many Medi-Cal beneficiaries often face financial constraints that limit their ability to expand their facilities and staff to take in more children. It is unclear how expanding dental benefits to adults enrolled in Medi-Cal in 2018 (discussed further below) will affect provider supply: it could spur more providers to participate in Medi-Cal, ultimately benefitting children, or it could exacerbate capacity challenges.

B. Additional Medi-Cal changes to improve access to dental care

Over the course of DTI, California implemented several additional policy and program changes to encourage Medi-Cal families to seek preventive dental services for their children and for dental providers to offer these services. Key informants thought most of these efforts were helpful complements to DTI to improve access to and provision of dental care for children enrolled in Medi-Cal. See Figure II.1 for a timeline of key activities and developments.

Figure II.1. Timeline of key events shaping the oral health landscape in California



Rebranding dental benefits. Traditionally, dental coverage in the Medi-Cal program was referred to as Denti-Cal. However, the state became concerned that using a separate term to refer to these dental benefits created confusion among the Medi-Cal population, who thought they needed to enroll in a separate program. California therefore phased out the term Denti-Cal and informed beneficiaries of the dental benefits available through their regular Medi-Cal coverage. The state now refers to these benefits as Medi-Cal Dental.

Assembly Bill 2207. In 2016, California passed Assembly Bill 2207, which started requiring Medi-Cal managed care plans to provide dental screenings for Medi-Cal beneficiaries during their initial health assessments, and then refer these beneficiaries to Medi-Cal dental providers. (Medi-Cal managed care plans manage medical benefits; dental benefits, as described earlier, are administered separately.) Per Medi-Cal enrollment data reported through December 2021, 92 percent of children enrolled in Medi-Cal were enrolled in a Medi-Cal managed care plan (California Department of Health Care Services 2022a). This law might have led to some level of integration and coordination of medical and dental care.

Proposition 56. In November 2016, the state passed Proposition 56, the California Healthcare Research and Prevention Tobacco Tax Act. This law increased state taxes on cigarettes and other tobacco products with most of the revenue earmarked to support health care programs for Californians with low incomes. California used this revenue to establish supplemental payments for Medi-Cal providers, including for several dental billing codes, starting July 1, 2017 (California Department of Health Care Services 2022b). Although the dental rate increases apply primarily to billing codes not affected by DTI (and mostly for adult services), key informants thought that Proposition 56 complemented DTI well in that both initiatives increased the amount of reimbursement dental providers could receive; this "package" made them more receptive to being a Medi-Cal provider.

Senate Bill 97. Effective January 2018, Senate Bill 97 fully restored dental benefits for adults that the state had eliminated in 2009 and partially restored in 2014. The partially restored Medi-Cal services included basic preventive, diagnostic, and restorative care; anterior tooth endodontic treatment; complete dentures; and complete denture relining and repair (Fletcher 2018; California Department of Health Care Services 2022c). The restoration of partial benefits and ultimately full benefits might have led to more parents seeking dental care for themselves and their children (Lipton 2020; Lipton et al. 2021). And, as noted above, greater access for adults might also boost access for children or exacerbate existing capacity problems.

Outreach campaign. In 2018, the state initiated an outreach campaign called "Smile, California," to educate populations eligible for Medi-Cal about Medi-Cal dental benefits and to improve access to care.

The campaign seeks to raise awareness of the importance of oral health and using dental benefits through culturally appropriate messaging conveyed through various communication channels, including community-based organizations. Other features include efforts to encourage dentists to participate in Medi-Cal, including one-on-one assistance to help dentists enroll in the program, and a website that connects Medi-Cal beneficiaries to available providers through a provider database (California Department of Health Care Services 2021a). One key informant described the website as a "one-stop shop" for beneficiaries to learn about the Medi-Cal dental program. According to another key informant, the campaign was responsive to feedback about how to improve, such as by translating website information and materials into additional languages.

California Oral Health Plan 2018–2028. In 2014, the California State Legislature charged the California Department of Public Health (CDPH) with preparing an assessment of the burden of oral diseases in California and developing an oral health plan based on its findings (California Department of Public Health 2018). In response, CDPH and DHCS convened an advisory committee to develop the California Oral Health Plan 2018–2028. This plan involves a road map for improving oral health for all California residents (not just the Medi-Cal population) by addressing insufficient infrastructure to promote culturally sensitive community-based oral health programs, insufficient data to inform interventions, barriers to access to care, and a lack of consistent and effective messaging to encourage improvements in oral health, among other issues. Through the plan, the state established a public health infrastructure and capacity to improve oral health, including conducting assessments and increasing fluoride treatments and oral health literacy.

The California Oral Health Plan also provides funding from Proposition 56 for Local Oral Health Programs across the state. These programs provide clinical interventions to improve oral health. In one example, community health workers incorporate oral health promotion into their home visits with patients. The local programs also collaborate with Smile, California, including on the Back Tooth School campaign, which focused on identifying children in low-income schools who need dental services. However, some of these local programs were suspended due to the COVID-19 public health emergency (PHE).

C. Emergence of the COVID-19 pandemic

In March 2020, during the final year of DTI's implementation, the governor of California issued a stay-at-home order to "protect the health and well-being of all Californians and to establish consistency across the state in order to slow the spread of COVID-19 (Office of Governor Gavin Newsom 2020)." Although dental offices were considered essential services, most closed per recommendations and guidance from the Centers for Disease Control and Prevention and local health departments. Offices postponed routine and preventive dental care and limited patient treatment to emergency care (California Dental Association 2020; Reese 2020).

The pandemic affected all DTI domains and effectively shortened the demonstration period, as many services were curtailed or halted. Key informants reported that the PHE and stay-at-home order "wreaked havoc" on dental services usage as dental providers closed their offices. Even after offices were allowed to reopen on June 15, 2021, dental providers faced challenges obtaining personal protective equipment, and their capacity declined because of the time needed to adhere to COVID-19 protocols between patients. Parents also had safety concerns about in-person dental care, reducing demand for dental services.

However, providers' and states' responses to the pandemic might have mitigated some of the disruptions to dental care access and for DTI specifically. To maintain contact during the PHE with children enrolled in Medi-Cal, dental providers tried new strategies that were not a part of DTI but might have helped advance the goals of DTI. These strategies included "drive-through" screenings and applications of fluoride varnish that limited patient and staff contact. Patients received treatment in clinic parking lots either in their cars or on foot. In addition, although dental providers could deliver dental services via telehealth before the COVID-19 pandemic, they did not typically do so (Libersky et al. 2020). Once the pandemic began, some providers began using telehealth to encourage and monitor dental habits in their patients' homes and to triage cases to determine treatment. DHCS began allowing dental providers to bill for remote triage, which involves screening patients remotely to determine their condition and the care needed. This was a "sea change for dentistry" according to a key informant. Another key informant said that the pandemic also "cleaned the window," so the state could better see the inequities in preventive care for children enrolled in Medi-Cal that still need to be addressed.

D. DTI extension

In response to the COVID-19 pandemic, DHCS submitted a request to CMS for federal approval to extend the Medi-Cal 2020 Waiver, including DTI Domains 1 through 3, for 12 months ending on December 31, 2021. On December 29, 2020, CMS approved DHCS' request for an extension. However, the state did not extend Domain 4, so the LDPPs ended as originally scheduled on December 31, 2020. This decision led to some key informants from LDPPs reporting that they did not have enough time to fully implement their strategies and demonstrate progress on their implementation and impact. The LDPPs reported that the decision against providing them with an extra year significantly hindered their ability to regain the momentum they lost during the PHE and to demonstrate more progress toward their goals.

III. Effect of DTI on Provider and Beneficiary Outcomes and Perceptions and Experiences of Key Informants, Providers, and Beneficiaries

A. Introduction

In this section, we present findings from the quantitative and qualitative components of the evaluation that assess whether DTI is meeting its objectives and improving children's access to and use of dental care in the Medi-Cal program. Sections III.B, III.C, and III.D organize findings by domain, and Section III.E presents results on the total benefits and costs of DTI.

B. Domain 1. Improving use of preventive dental services among children enrolled in Medi-Cal

Key takeaways

Overall, Domain 1 made considerable progress towards its goal of increasing preventive dental services among children enrolled in Medi-Cal by 10 percentage points (a 23 percent increase over the pre-DTI rate). We found that before 2020, Domain 1 increased the use of preventive dental services by approximately 4 percentage points. We also found evidence that Domain 1 had favorable spillover effects on other dental services, with small impacts on any dental exams, treatment dental services, and restorative dental services. These effects occurred before the COVID-19 pandemic began to influence health care use. Use of preventive dental services increased over time starting in 2017 and increased when compared with older Medi-Cal beneficiaries and Medicaid beneficiaries from other states. This increase was primarily due to dental providers increasing the number of Medi-Cal beneficiaries they served rather than more providers serving Medi-Cal beneficiaries. The impact of Domain 1 might be limited because a few aspects of the structure and rollout of the Domain 1 incentives limited dental providers' interest and ability to treat more children than they had before DTI. These aspects include that the incentives were not intuitive and were better suited for dental providers serving small numbers of children enrolled in Medi-Cal. In addition, there were several persistent barriers, beyond the Domain 1 incentives, that limited the extent to which dental providers could treat more children. These included limited capacity within their practices, administrative challenges related to billing Medi-Cal, and lack of confidence treating very young children. ◢

1. Descriptive results on preventive dental service use

Use of preventive dental services among Medi-Cal beneficiaries ages 1 to 20 increased from 2017 through 2019. Beginning in 2020, the COVID-19 pandemic led to a substantial decline in the use of all dental services (including preventive services) halting this favorable trend. Figure III.1 shows the percentage of Medi-Cal beneficiaries ages 1 to 20 who had a preventive dental visit, including Safety Net Clinics and not including Safety Net Clinics, by year. The percentage declined from 43 percent in 2014 and 2015 to 42 percent in 2016 (the first year of the

Beneficiaries reported experiencing delays in care due to COVID-19

Twenty-four of the parents interviewed reported experiencing some delays in care due to COVID-19. Practices were closed for a number of months, and appointments at this time were canceled. Once practices reopened, it was harder for parents to schedule appointments, as some offices limited their appointments to emergencies or appointments for adults. A couple parents reported being directed to another provider's office. One parent reported that because their child is immunocompromised, they do not feel comfortable taking that child to the dentist.

Source: Interviews with 58 Medi-Cal parents and caregivers in LDPP counties in February through May 2021. ◢

Comparison with DHCS findings

Analyses conducted by DHCS (California Department of Health Care Services 2021b) show similar trends in use of preventive dental services in estimates that exclude Safety Net Clinics (a 2 percentage point increase from 2014 to 2019). However, they found a 10 percentage point increase in results that include Safety Net Clinics, because they compared use in 2019 that included Safety Net Clinics (48 percent) with use in 2014 that didn't include Safety Net Clinics (38 percent). DHCS took this approach because it was difficult to map ICD-10 codes for dental services to ICD-9 codes in 2014 and 2015. Using CMS's general equivalence mappings, we determined that 43 percent of children enrolled in Medi-Cal received preventive dental services (including Safety Net Clinics) in the baseline period (2014 and 2015). ◢

intervention). However, after this initial decline, the percentage increased to 47 percent by 2019, a 4 percentage point increase from the pre-DTI period. With the emergence of the COVID-19 pandemic, the percentage of beneficiaries who had a preventive visit declined to 38 percent in 2020 and increased to 40 percent in 2021. The increases in preventive visits from 2017 through 2019 were primarily driven by care delivered by Safety Net Clinics, because preventive visits without including encounter data from these clinics did not increase substantially after the start of Domain 1 (a 1 percentage point increase from 2015 to 2019). We did not find evidence that Domain 1 had substantially different effects on children with different backgrounds enrolled in Medi-Cal (see Appendix A, Figure A.III.1).

Methods: Understanding the effect of Domain 1 on beneficiary outcomes and dental providers' participation in Medi-Cal

Beneficiary sample. We use Medi-Cal enrollment data from 2014 to 2021 to identify Medi-Cal beneficiaries ages 1 to 20 with at least three consecutive months of enrollment in Medi-Cal in a calendar year.

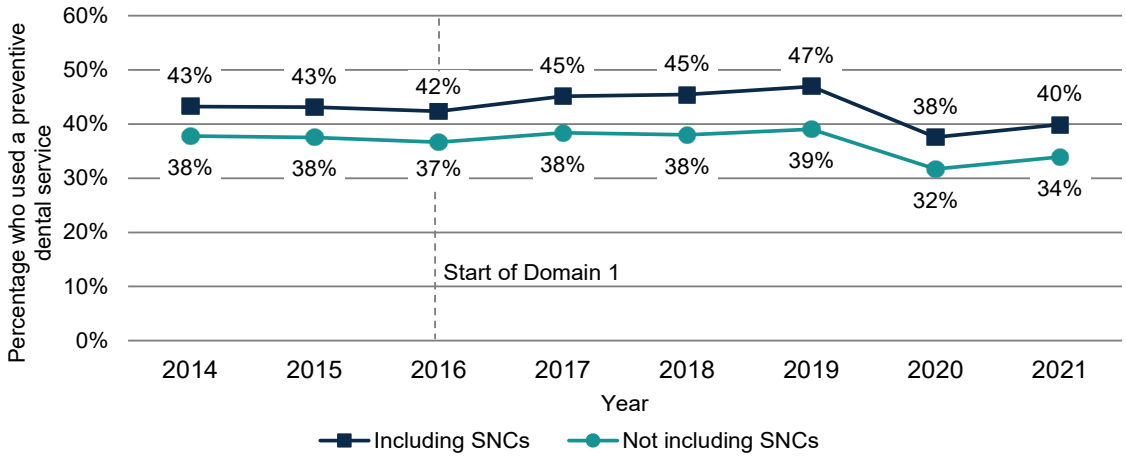
Provider sample. We use Medi-Cal claims data to identify dental providers who billed a dental service in a calendar year for at least one child aged 1 to 20 enrolled in Medi-Cal.

Outcomes. The primary beneficiary outcome of interest is whether a beneficiary had a preventive dental service in a calendar year. We also examined secondary dental service measures and dental expenditures to determine whether DTI was effective in advancing the overall health and well-being of children enrolled in Medi-Cal.

Analytic methods. To estimate the causal impacts of Domain 1 on use of dental services among children enrolled in Medi-Cal, we conducted a difference-in-differences analysis comparing changes in outcomes among those affected by DTI (children ages 1 to 20 enrolled in Medi-Cal) with a comparison group that was not impacted by DTI. The two comparison groups are adults ages 26 to 34 enrolled in Medi-Cal and Medicaid beneficiaries ages 1 to 20 in states near California (Arizona, Nevada, Oregon, and Washington). When we used adults enrolled in Medi-Cal as the comparison group, we ran a linear probability model regression at the beneficiary year level that estimated the difference-in-differences impact controlling for beneficiary characteristics. When we used Medicaid beneficiaries outside of California as the comparison model, we calculated the difference-in-differences estimates as differences in changes of average use among the treatment and comparison sample.

See the main text for more details on the analytic methods and Appendix C for more details on the data, analytic methods, and methodological limitations.

Figure III.1. Preventive dental service use before and after the start of DTI



Source: Mathematica's analysis of Medi-Cal claims and eligibility data 2014–2021. We used 2021 claims data that were pulled in January 2022, resulting in some missing 2021 claims due to insufficient claims runout.

Note: The dark blue line represents the percentage of the sample who used a preventive dental service in that year using data that includes visits to both offices and SNCs. The teal line includes only office visits. See Appendix C for details on how we constructed use of preventive dental services from claims. The sample is restricted to Medi-Cal beneficiaries ages 1 to 20 who were enrolled in Medi-Cal for three consecutive months in the calendar year.

DTI = Dental Transformation Initiative; SNC = Safety Net Clinics.

2. Impact results on use of preventive dental services

Estimates across a range of strategies suggest that Domain 1 led to an increase in Medi-Cal beneficiaries ages 1 to 20 who had a preventive visit compared with comparison groups. The impact varied between 0 to 4 percentage points, depending on the year and comparison group, and lasted through 2019. It appears unlikely that even without the COVID-19 pandemic, Domain 1 would have achieved a 10 percent increase in preventive visits by December 2021.[6] Although descriptive findings suggest that Domain 1 led to more children enrolled in Medi-Cal receiving preventive dental services before COVID-19, it is unclear whether these changes in preventive dental use are directly related to the intervention or due to unrelated factors that influenced the use preventive dental services among children enrolled in Medi-Cal.

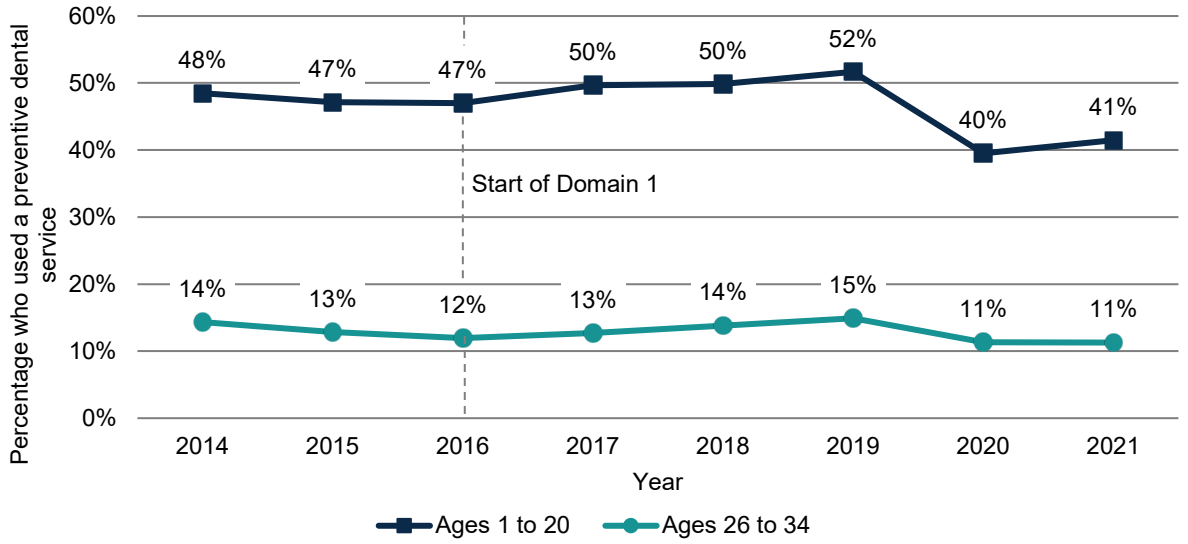
To understand whether Domain 1 caused the changes in preventive use, we implemented two separate identification strategies. First, we conducted a difference-in-differences analysis comparing changes in preventive use among California Medi-Cal beneficiaries who were impacted by Domain 1 with those who were never affected (that is, beneficiaries ages 26 to 34). Although this comparison group has the benefit of living in the same state and being enrolled in Medi-Cal, use of dental services is much lower than among children enrolled in Medi-Cal. Second, because of the limitations of the within-California comparison group, we compared changes in preventive use among Medi-Cal beneficiaries ages 1 to 20 with Medicaid beneficiaries ages 1 to 20 in states near California (Arizona, Nevada, Washington, and

[6] If impacts followed a similar trajectory during 2020 and 2021 (that is, an increase of about 1 percentage point in use of preventive dental services per year), we would project them to be around 6 percentage points.

Oregon) using state-reported data from the Percentage of Eligibles Who Received Preventive Dental Services quality measure.[7]

Figure III.2 shows preventive dental service use over time for treatment and comparison groups from the first strategy: children ages 1 to 20 enrolled in Medi-Cal and adults ages 26 to 34 enrolled in Medi-Cal. The figure lines suggest that preventive dental service use increased more for Medi-Cal beneficiaries younger than 21 than it did for the sample of older beneficiaries. To explore this descriptive evidence further, we used a standard difference-in-differences regression framework.

Figure III.2. Trends in preventive dental service use for Medi-Cal beneficiaries, by beneficiary age groups



Source: Mathematica's analysis of Medi-Cal claims and eligibility data 2014–2021. We used 2021 claims data that were pulled in January 2022, resulting in some missing 2021 claims due to insufficient claims runout.

Note: Each line represents the percentage of the age group who had a preventive dental service in that year. See Appendix C for details on how we constructed preventive dental service use from claims. The sample is restricted to Medi-Cal beneficiaries who were enrolled in Medi-Cal for the full calendar year.

Table III.1, the Column labeled (1), reports the difference-in-differences estimates by year when we used the first comparison group, beneficiaries ages 26 to 34, and included standard controls.[8] Impact estimates are from linear probability model regressions that estimate the difference in use between the treatment and comparison group in a given calendar year relative to that difference in the year before the start of

[7] For this analysis, we chose states based on their proximity to California to account for potential regional trends in health care use, such as those related to the COVID-19 pandemic. While this strategy might help account for regional trends, these states could be different from California on other key factors that affect trends in Medi-Cal members' use of dental services, such as Medicaid benefits, Medicaid program delivery systems, and demographics. This is a limitation and could confound our results. Notwithstanding these potential differences, we found the geographic approach to overall be the best suited for this evaluation.

[8] Controls include language fixed effects, ethnicity fixed effects, county fixed effects, dental health plan fixed effects, age by Medicaid eligibility aid code fixed effects, and a cost of the average reimbursement for an average fixed bundle of services in that year.

Domain 1 (2015).[9] There is some evidence of significant pre-trend differences between the samples, indicated by the -0.5 percentage point estimate in 2014 that is statistically significant at the 10 percent level. This finding suggests that children enrolled in Medi-Cal were increasing preventive service use before the intervention compared with the adult comparison group. If these trends continued, our estimates for the intervention period would have overestimated the impact of Domain 1.

We found that during the intervention years 2016 through 2019, use of preventive dental services increased by 2 to 4 percentage points for beneficiaries ages 1 to 20 compared with beneficiaries ages 26 to 34, with the largest effect in 2017 and 2019 (4 percentage points). However, we found that in 2020 and 2021, use of preventive dental services decreased, by 4 and 2 percentage points, respectively, for the treatment group relative to the comparison group compared with their levels in 2015. This finding is likely due to COVID-19 having a larger impact on parents' decisions to not seek dental care for their children during the pandemic compared with adults enrolled in Medi-Cal, rather than a true impact of Domain 1. Therefore, we do not interpret the estimates for 2020 and 2021 as an impact of DTI.

Difference-in-differences assumptions

The key assumption of the difference-in-differences strategy is that service use for the treatment group would have followed the same trends as the comparison group absent the intervention. Although we cannot test that assumption directly, we can see whether trends were different before the start of the intervention, indicated by the estimates for years before the baseline year. These estimates calculate the difference between the treatment and comparison group in the year compared with the baseline year. Negative estimates suggest that service use for the treatment group was already increasing relative to the comparison group before the intervention, and if we expect the factors that generated these trends to continue, our impact estimates could be overestimates. Alternatively, positive estimates indicate that service use for the treatment groups was decreasing relative to the comparison group before the intervention, and that our impact estimates could be underestimates. More broadly, large and significant pre-trends indicate that our comparison group might not the best counterfactual, and additional sensitivity tests might be needed. ◢

We found similar results across a series of robustness tests we conducted to explore the consistency of the impact estimates. Results were not sensitive to changes in modeling (not including controls, or using a logistic regression), changes in data (not including claims from Safety Net Clinics), and changes in sample restrictions (instead using beneficiaries who were enrolled for only three consecutive months, dropping Domain 2 pilot and expansion counties, dropping Domain 3 pilot and expansion counties, and using samples of Medi-Cal beneficiaries closer in age), see Appendix A, Table A.III.1.

[9] DHCS uses 2014 as its baseline to estimate effect of DTI on dental outcomes. We used 2015 as our baseline because of concerns about how California's partial restoration of dental benefits to adults (2014) and the implementation of the Affordable Care Act impacted adult service use between 2014 and 2015. We conducted robustness checks using 2014 as our baseline period, and our estimates are not sensitive to this change.

Table III.1. Domain 1 difference-in-difference estimated impacts (in percentage points) on preventive dental service use, for children enrolled in Medi-Cal

	Ages 26–34 comparison group		AZ, NV, OR, WA comparison group
	Coefficient (1)	SE (2)	Estimate (3)
2014	-0.5*	(0.3)	0.7
2015	-	-	-
2016	1.7***	(0.2)	-0.5
2017	3.9***	(0.2)	1.5
2018	3.4***	(0.3)	0.9
2019	4.4***	(0.4)	2.6
2020	-3.9***	(0.7)	0.0
2021	-1.6***	(0.6)	NA
Number of observations	44,309,711	44,309,711	

Source: Mathematica's analysis of Medi-Cal claims and eligibility data 2014-2021, and state-reported PDENT-CH quality measure data 2014–2020. We used 2021 claims data that were pulled in January 2022, resulting in some missing 2021 claims due to insufficient claims runout.

Note: Impact estimates from the column labeled (1) are in percentage point units and regression-adjusted using a difference-in-difference analysis that reflects the difference in the percentage of Medi-Cal beneficiaries ages 1 to 20 who used a preventive dental service in the year with the percentage in the baseline year (2015), relative to the same difference over time for Medi-Cal beneficiaries ages 26 to 34, while controlling for language fixed effects, ethnicity fixed effects, county fixed effects, dental health plan fixed effects, age by Medicaid eligibility aid code fixed effects, and the cost of a fixed bundle of dental services control. The sample is restricted to beneficiaries who were enrolled in Medi-Cal for the full calendar year. Standard errors in Column (2) are from the same regression as the impact estimates, which clusters standard errors at the age level. Column (3) reports the difference-in-difference estimate that reflects the difference in the percentage of the sample who used a preventive dental service in the year for Medi-Cal beneficiaries ages 1 to 20 with the average in the baseline year (2015), relative to the same difference over time for Medicaid beneficiaries ages 1 to 20 in Arizona, Nevada, Oregon, and Washington. The sample for Column (3) is restricted to Medi-Cal beneficiaries who were enrolled in Medi-Cal for three consecutive months in the year. See Appendix C for details on how we constructed preventive dental service use from claims.

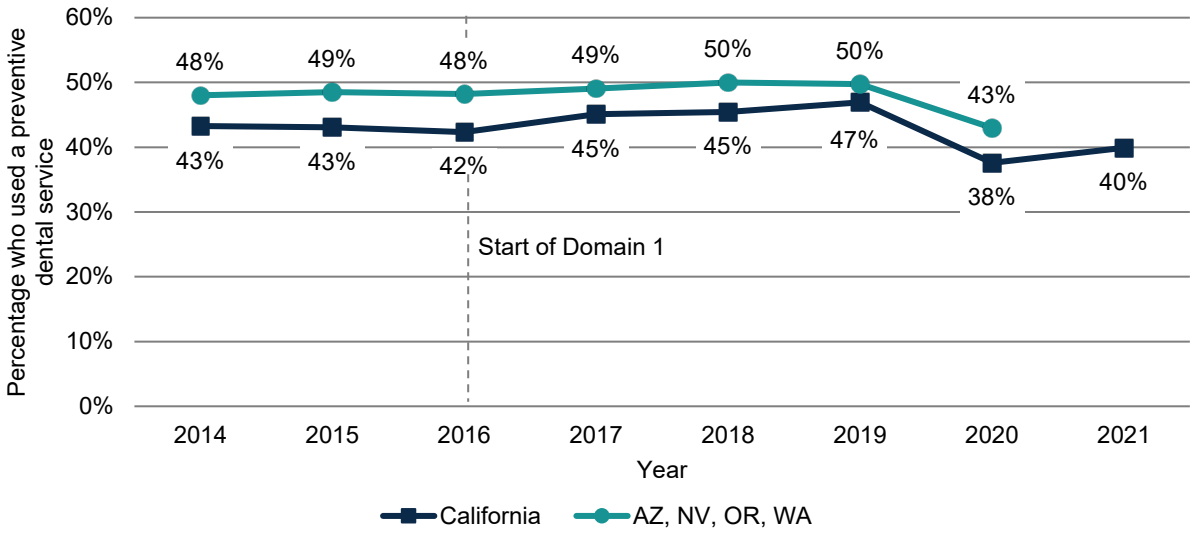
Cells shaded gray indicate that the year does not overlap with the intervention.

*/**/*** Significantly different from zero at the 0.10/0.05/0.01 level, two-tailed test.

AZ = Arizona; NA = not available; NV = Nevada; OR = Oregon; PDENT-CH = Percentage of Eligibles Who Received Preventive Dental Services; SE = standard error; WA = Washington.

Figure III.3 shows use of preventive dental services over time for treatment and comparison groups from the second strategy: children ages 1 to 20 enrolled in Medicaid in California, and in states near California. The figure suggests that, as with the in-California strategy, children enrolled in Medi-Cal increased their use of preventive services more than the children from nearby states before COVID-19. This finding is reflected in the difference-in-difference estimates in Column (3) of Table III.1. The estimates using the nearby states comparison group range from 0 to 3 percentage points during the intervention period. There is evidence of small pre-trends in the prior period, but the magnitude is smaller than the estimate for 2019 (3 percentage points).

Figure III.3. Trends in preventive dental service use for children enrolled in Medicaid, by region



Source: Mathematica's analysis of Medi-Cal claims and eligibility data 2014–2021, and state-reported PDENT-CH quality measure data 2014–2020. We used 2021 claims data that were pulled in January 2022, resulting in some missing 2021 claims due to insufficient claims runout.

Note: Each line represents the percentage of Medicaid beneficiaries in each geographical region who used a preventive dental service in that year. We calculated the percentage for Arizona, Nevada, Oregon, and Washington as the average of each state's percentage, weighted by the number of beneficiaries in the state in the year. See Appendix C for details on how we constructed preventive dental service use from claims. The sample is restricted to Medicaid beneficiaries ages 1 to 20 who were enrolled in Medicaid for three consecutive months in the year.

AZ = Arizona; NV = Nevada; OR = Oregon; PDENT-CH = Percentage of Eligibles Who Received Preventive Dental Services; WA = Washington.

3. Effect of Domain 1 on other dental services and dental expenditures

We found some evidence that Domain 1 increased dental expenditures, and some other dental services. However, the magnitude is small and present only through 2019. By increasing access to dental care, Domain 1 could have had spillover effects on other dental services and expenditures.

We saw a similar increase in dental exams and use of fluoride as preventive services after the introduction of DTI through 2019 (Appendix A, Figure A.III.2). However, dental sealants, use of treatment dental services,[10] and use of restorative dental services show flat trends, until the start of the COVID-19 pandemic, when use decreased.

To understand whether receipt of other dental services and dental expenditures increased because of Domain 1, we compared changes in use by Medi-Cal beneficiaries ages 1 to 20 with those ages 26 to 34. Consistent with the effects on any use of preventive dental services, we found small positive impacts on the number of preventive dental services received before the COVID-19 pandemic, ranging from an increase of 0.09 in 2016 to 0.33 in 2019 (see Appendix A, Table A.III.2). We also found similar effects on any dental visits to the impacts on preventive dental service use, with impacts on any service use being

[10] Throughout the report, we exclude the Domain 2 incentivized service (motivational interviewing) from the measure of treatment dental services.

at most 1 percentage point larger than any preventive dental service use. Impacts on any dental exams, treatment dental services, and restorative dental services ranged from 0 to 2 percentage points in the pre-COVID-19 intervention period, suggesting some small impacts on these dental services, as well. We also found evidence that Domain 1 increased expenditures before the COVID-19 pandemic, with estimates ranging from $10 to $33 per beneficiary per year.

4. Provider participation and key informant perspective results

We found little descriptive evidence that Domain 1 increased the number of dental providers servicing children enrolled in Medi-Cal. Instead, the increases we observed in number of beneficiaries receiving preventive dental services were likely driven by providers already participating in Medi-Cal increasing the number of children they serve enrolled in Medi-Cal. DHCS hypothesized that the Domain 1 incentive payments would lead to an increase in the number of dental providers participating in Medi-Cal by 5 percent (over the presumed five-year intervention period). Figure III.4 shows the number of dental providers that served children enrolled in Medi-Cal any dental services in a year, the number that administered preventive dental services to children enrolled in Medi-Cal, and the number that administered preventive dental services to at least 10 children enrolled in Medi-Cal. We observed little evidence of a consistent upward trend in the number of dental practitioners providing children enrolled in Medi-Cal during the DTI intervention. For both the total number of dental practitioners providing any service and preventive dental services, there was a decline of about 5 percent from 2015 to 2016, and then slow growth from 2016 to 2019 back to 2015 levels. There was an additional decline in 2020—likely due to the COVID-19 pandemic. We found similar trends in the number of dental offices serving children enrolled in Medi-Cal (Appendix A, Table A.III.3).

Figure III.4. Trends in the number of dental providers administering preventive dental services to children enrolled in Medi-Cal

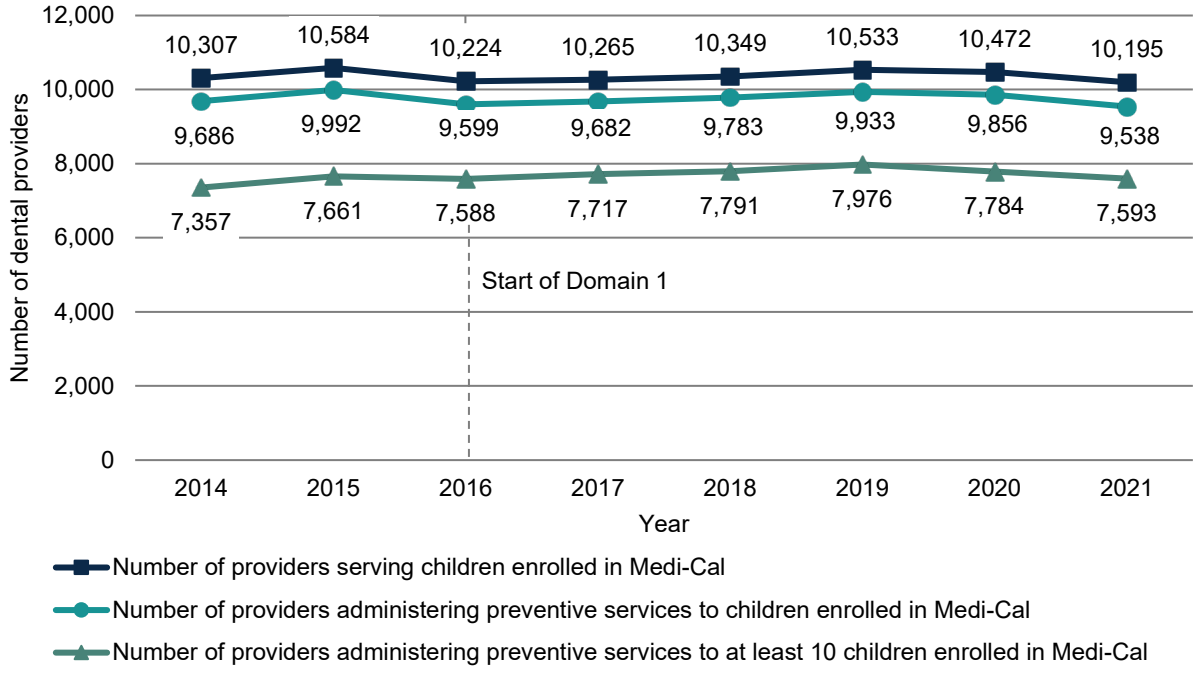


Figure III.4 (*continued*)

Source: Mathematica's analysis of Medi-Cal claims and eligibility data 2014–2021. We used 2021 claims data that were pulled in January 2022, resulting in some missing 2021 claims due to insufficient claims runout.

Note: The number of dental providers serving children enrolled in Medi-Cal is based on the providers who billed a dental service in the calendar year for at least one child age 1 to 20 enrolled in Medi-Cal. The number administering preventive dental services to children enrolled in Medi-Cal is based on the number who billed a preventive dental service in the calendar year for at least one child ages 1 to 20 enrolled in Medi-Cal. The number administering preventive dental services to at least 10 children enrolled in Medi-Cal is based on the number who billed a preventive dental service in the calendar year for at least 10 children ages 1 to 20 enrolled in Medi-Cal.

The decline from 2015 to 2016 was driven by both an increase in the number of dental practitioners that stopped providing preventive dental services to children enrolled in Medi-Cal from 15 to 17 percent, and a decrease in the number of dental providers that started providing these children with preventive dental services from 13 to 10 percent (Appendix A, Figure A.III.3). In the other years, the percentage of dental providers newly starting and newly stopping their participation in Medi-Cal was similar (between 12 and 15 percent), with an exception in 2021 (possibly due to incomplete claims data). In addition, when looking at participation in Medi-Cal as a proportion of all active dentists, we observed little evidence that DTI increased participation in Medi-Cal (see Appendix A, Table A.III.4 for more details).

Together, these results suggest that Domain 1 did not encourage a larger proportion of dental providers to participate in Medi-Cal by serving children. Evidence from interviews of key informants and dental providers suggest that underlying barriers to participation persisted, such as providers' perceptions about difficulties in enrolling to become a Medi-Cal provider, billing for services, and serving the Medi-Cal population. Plus, dental providers were wary not only of the state potentially discontinuing the incentive payments after DTI, but also that the state might reduce its payment rates, which has happened in the past (California Department of Health Care Services 2018).[11]

Although the number of providers serving any children enrolled in Medi-Cal did not increase because of Domain 1, the number of dental practitioners serving at least 10 children enrolled in Medi-Cal increased from 7,661 in 2015 to 7,976 in 2019 (4 percent, see Figure III.4). Key informants and dental providers speculated that Domain 1 incentives provided a "financial buffer" to enable participating dental providers to serve more children enrolled in Medi-Cal. However, this financial buffer might not have been sufficient to incentivize enough Medi-Cal providers to increase the number of children enrolled in Medi-Cal they served to meet Domain 1's goal. This finding is supported by the provider survey: only 13 percent of respondents reported that the DTI incentive payments influenced them to increase the number of children they served enrolled in Medi-Cal.

A few aspects of the structure and rollout of the Domain 1 incentives limited dental providers' interest and ability to treat more children than they had before DTI, according to key informants and providers interviewed. These aspects include the following:

- **Incentives were not intuitive.** Measuring performance against a benchmark to determine the size of the incentive payment was more complicated than increasing base FFS payments**.** It took time for DHCS to create the benchmarks and to notify and educate each dental provider about their benchmark and how many additional services they would need to provide to obtain incentives. Still, it was difficult for dental providers to anticipate how much of an incentive they would receive, and the lag in receiving the incentive relative from when the services were provided made it difficult to reflect on

[11] For example, in October 2013, DHCS implemented a ten percent provider payment reduction retroactive for services performed on or after June 1, 2011. The policy changed in November 2013 to apply to prospective payments only.

how specific changes they made might have affected their payments. Larger dental practices and Safety Net Clinics were more likely than smaller ones to have the financial savvy and staffing to understand the incentives and incorporate them into their planning and practice.

- **Safety Net Clinics faced more challenges benefiting from the Domain 1 incentives than did other dental practices.** Although dental practices automatically received Domain 1 incentives through their regular Medi-Cal billing process, Federally Qualified Health Centers and other Safety Net Clinics that had a different Medi-Cal billing structure were required to first opt in to Domain 1 and proactively document the services they provided that were eligible for incentive payments. It took time for the state to develop a new process and special claims form for the Safety Net Clinics to use. Despite these challenges, our descriptive evidence suggests that participation by Safety Net Clinics was critical to the 4 percentage point increase in the number of children enrolled in Medi-Cal who received preventive dental services between 2015 and 2019 (see Section III.B.1).
- **Incentives were better suited for dental providers serving small numbers of children enrolled in Medi-Cal.** An objective of Domain 1 was to increase the number of dental providers participating in Medi-Cal and the number of dentists serving 10 or more children enrolled in Medi-Cal. However, because the incentive's benchmark structure was based on increases in the *percentage* of children served, Domain 1 provided smaller rewards to dental providers who had been long-standing, large providers for children enrolled in Medi-Cal and who already served many children with Medi-Cal. In the survey, dental providers serving fewer Medi-Cal beneficiaries reported being more influenced by the incentives to increase participation than those providers already serving many Medi-Cal beneficiaries.

Key informants and providers we interviewed reported several persistent barriers, beyond the Domain 1 incentives, that limited the extent to which dental providers could treat more children. Capacity constraints limited the number of additional children some dental providers could see. Some dental providers continued to lack confidence in how to treat very young children, have concerns about scheduling patients who might not be able to keep their appointments, and face administrative challenges billing and receiving reimbursement for the care they provided. In addition, although the incentives (along with Proposition 56 supplemental payments) raised the level of reimbursement for dentists, Medi-Cal payments still lagged those of commercial payers. And the supplemental payments through Proposition 56 for treating adults might have led some dental providers to prioritize treating adults over children, particularly if these providers were not aware of the Domain 1 incentives, thought they would be temporary, or found them to be negligible.

C. Domain 2. Reducing incidence of dental caries among beneficiaries ages 0 to 6

Key takeaways

Approximately one in four Medi-Cal beneficiaries eligible for Domain 2 received an assessment for early childhood caries during the intervention period, with use of CRAs increasing over the intervention periods. Domain 2 incentivized services also increased after the start of the interventions in both Domain 2 pilot and expansion counties. Children who we assessed as high-risk using dental claims from the previous year were more likely to receive CRAs in the following year than children assessed as low risk, suggesting that CRAs were focused on the appropriate population. Children at high risk

received substantially more treatment dental services than children at lower risk levels; however, they did not receive as many services as the treatment plan allowed.

By the end of the intervention, Domain 2 increased total dental service use by 1.2 services per beneficiary in Domain 2 pilot counties, and 1.3 services per beneficiary in Domain 2 Expansion counties. Although most of the increase is due to use of the Domain 2 incentivized services, we found evidence that preventive dental service use (not including Domain 2 incentivized services) increased by 0.3 services per beneficiary per year in Domain 2 pilot counties and 0.2 in Domain 2 expansion counties. One reason not all beneficiaries who had a dental visit in Domain 2 counties received CRAs is that participation by dental providers was limited, with the percentage of active Medi-Cal dental providers who participated (provided at least one CRA) never exceeding 40 percent; participation in Domain 2 was more common among providers who served more children enrolled in Medi-Cal. Dental providers who did participate found the CRA bundle worked well in their practice; they reported it was easy to implement, the training on the CRA bundle was helpful, and the payments were satisfactory. Key informants and providers interviewed reported that implementing the bundle of services went well overall. DHCS designed the domain with input from dental experts across the state to include an appropriate set of services, which helped build support for them. ◢

Methods: Understanding the effect of Domain 2 on beneficiary outcomes and provider participation

Beneficiary sample. We used Medi-Cal enrollment data from 2014 to 2021 to identify Medi-Cal beneficiaries ages 1 to 6 with at least three consecutive months of enrollment in Medi-Cal in a calendar year. We grouped beneficiaries based on whether their address is within a Domain 2 pilot, expansion, or non-Domain 2 county.

Provider sample. We used Medi-Cal claims data to identify dental providers who billed a dental service in a calendar year for at least one child ages 1 to 20 enrolled in Medi-Cal. To assess dental provider participation in Domain 2, we used Medi-Cal claims data to identify providers that billed at least one CRA in a calendar year. We grouped providers based on whether their business address is within a Domain 2 pilot, expansion, or non-Domain 2 county using data from the National Plan & Provider Enumeration System.

Outcomes. To assess participation in Domain 2, beneficiary outcomes include having any CRA in a year and the number of Domain 2 incentivized services received in a year, both overall and by risk level. We also examined secondary dental service measures, such as total dental services received and dental expenditures to determine whether the DTI was effective in advancing the overall health and well-being of children enrolled in Medi-Cal.

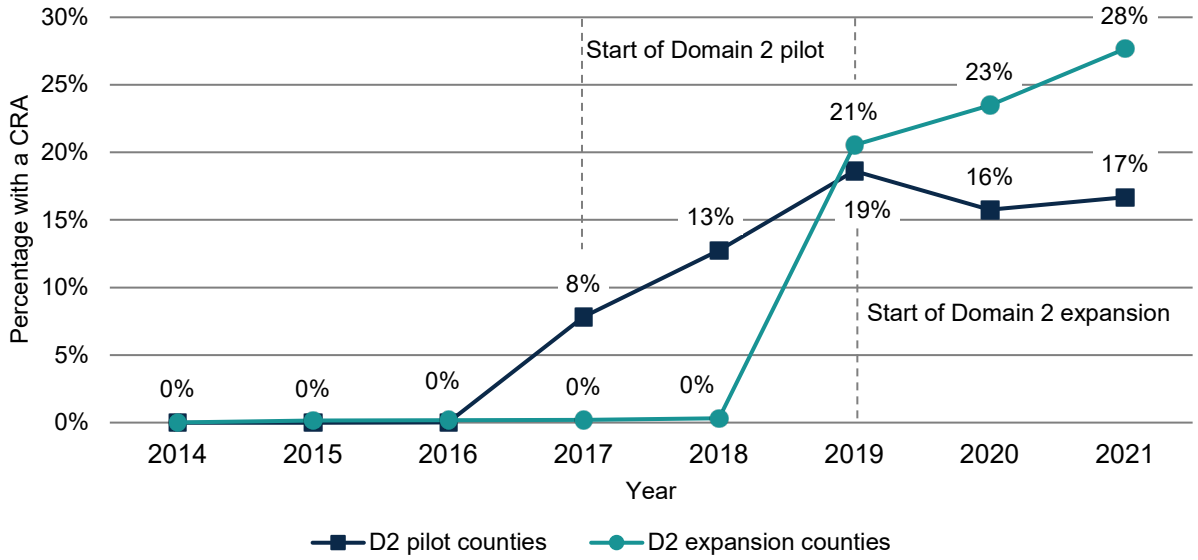
Analytic methods. To estimate the causal impacts of Domain 2 on use of dental services among children enrolled in Medi-Cal, we conducted difference-in-differences and triple-difference analyses comparing changes in outcomes among those affected by Domain 2 with comparison groups that were not impacted by DTI. The two main comparison groups are children ages 7 to 10 in the same county, and children ages 1 to 6 in counties that never participated in Domain 2.

See the main text for more details on the analytic methods and Appendix C for more details on the data, analytic methods, and methodological limitations.

1. Descriptive results

Approximately one in four Medi-Cal beneficiaries eligible for Domain 2 received a billed assessment for early childhood caries by the end of DTI, compared with close to 0 percent before Domain 2. The uptake for CRAs was slower and less complete for Domain 2 pilot counties than it was for Domain 2 expansion counties. The goals of Domain 2 were to diagnose early childhood caries by using CRAs; to treat early childhood caries as a chronic disease; and to introduce a model that proactively prevents and mitigates oral disease. Figure III.5 shows the percentage of Medi-Cal beneficiaries ages 1 to 6 with a CRA in each year for Domain 2 pilot counties and Domain 2 expansion counties. Before the intervention, for both Domain 2 pilot and expansion counties, the percentage of beneficiaries receiving CRAs was essentially 0, reflecting that dental providers were not allowed to bill Medi-Cal for these services. For Domain 2 pilot counties, this percentage increased progressively during the first three years of the intervention—from 8 percent in 2017, to 19 percent in 2019 (there were slight declines in 2020 and 2021, likely related to COVID-19). The impact in Domain 2 expansion counties was more immediate, rising to 21 percent in the first year (2019), and increasing to 23 percent in 2020 and 28 percent in 2021. This finding was surprising given the impact of the COVID-19 pandemic on use of dental services. Even among beneficiaries ages 1 to 6 who visited the dentist, not all received CRAs. By the last year of the intervention, 45 percent of Medi-Cal beneficiaries ages 1 to 6 who had at least one claim in Domain 2 pilot counties received a CRA, and 67 percent received a CRA in Domain 2 expansion counties (see Appendix A, Figure A.III.4).

Figure III.5. Trends in the percentage of Medi-Cal beneficiaries ages 1 to 6 with a CRA by Domain 2 pilot and expansion counties



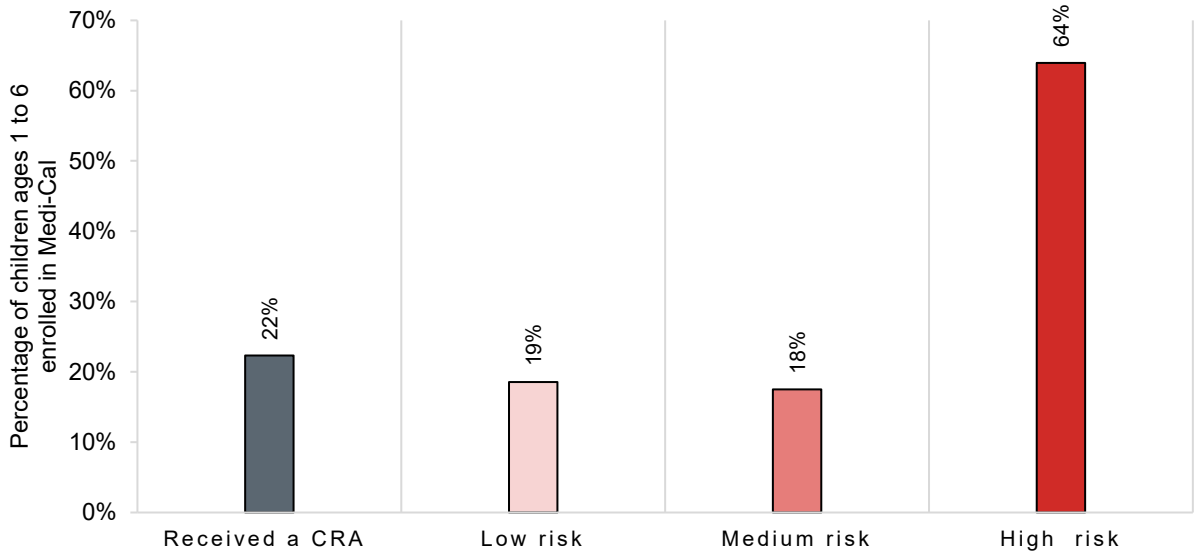
Source: Mathematica's analysis of Medi-Cal claims and eligibility data 2014–2021. We used 2021 claims data that were pulled in January 2022, resulting in some missing 2021 claims due to insufficient claims runout.

Note: Each line represents the percentage of Medi-Cal beneficiaries in the geographical area (indicated by the color of the line) who had at least one CRA in the calendar year. See Appendix C for details on how we identified CRA claims. The sample is restricted to Medi-Cal beneficiaries ages 1 to 6 who were enrolled in Medi-Cal for three consecutive months in the calendar year. The Domain 2 pilot started in January 2017, and the Domain 2 expansion started in January 2019.

CRA = caries risk assessment; D2 = Domain 2.

Most children enrolled in Medi-Cal who received CRAs were evaluated as being at high risk for caries. Across all years and counties, on average, 64 percent of those with a CRA were evaluated as high-risk, 18 percent were evaluated as medium-risk, and 19 percent were evaluated as low-risk (Figure III.6). This finding suggests the need for assessment of caries risk among the eligible population was high.

Figure III.6. CRA use and assessed risk status for caries among Medi-Cal beneficiaries ages 1 to 6 during the intervention period for both Domain 2 original pilot and expansion counties



Source: Mathematica's analysis of Medi-Cal claims and eligibility data 2017–2021. We used 2021 claims data that were pulled in January 2022, resulting in some missing 2021 claims due to insufficient claims runout.

Note: The gray bar represents the percentage of children ages 1 to 6 enrolled in Medi-Cal who received a CRA per year during the intervention years, combining the Domain 2 pilot and expansion interventions (weighting by the number of beneficiaries in each intervention and year). Non-gray bars represent the percentage who were assessed at each risk level, where risk levels are assessed for only the 22 percent of children who received a CRA. Beneficiaries who received multiple CRAs in a year and were assessed at two or more risk levels are assigned the highest risk level they were assessed at in that calendar year. See Appendix C for details on how we constructed the CRAs and CRA risk levels from claims. The sample is restricted to Medi-Cal beneficiaries who were enrolled in Medi-Cal for three consecutive months in a calendar year.

CRA = caries risk assessment.

CRAs appear to focus on children at higher risk for dental caries.[12] Because not all beneficiaries received CRAs, it is important to understand how the beneficiaries who received them differed from those that did not. Using non-CRA claims-based measures of risk,[13] we found that beneficiaries who we identified as high-risk in the previous year received 39 percent more CRAs than those who were low-risk in Domain 2 pilot counties, and 33 percent more CRAs than those who were low-risk in expansion counties (Appendix A, Figure A.III.5).

[12] This focus remains even when we require children in the group to have had at least one claim, so it is not just because children who are at high risk for caries are more likely to go to the dentist.

[13] We used claims-based measures of risk, rather than CRA measures, to include all beneficiaries who had a claim in the previous year in the analysis, not just those who received a CRA.

Children assessed at different risk levels were authorized to receive different services:

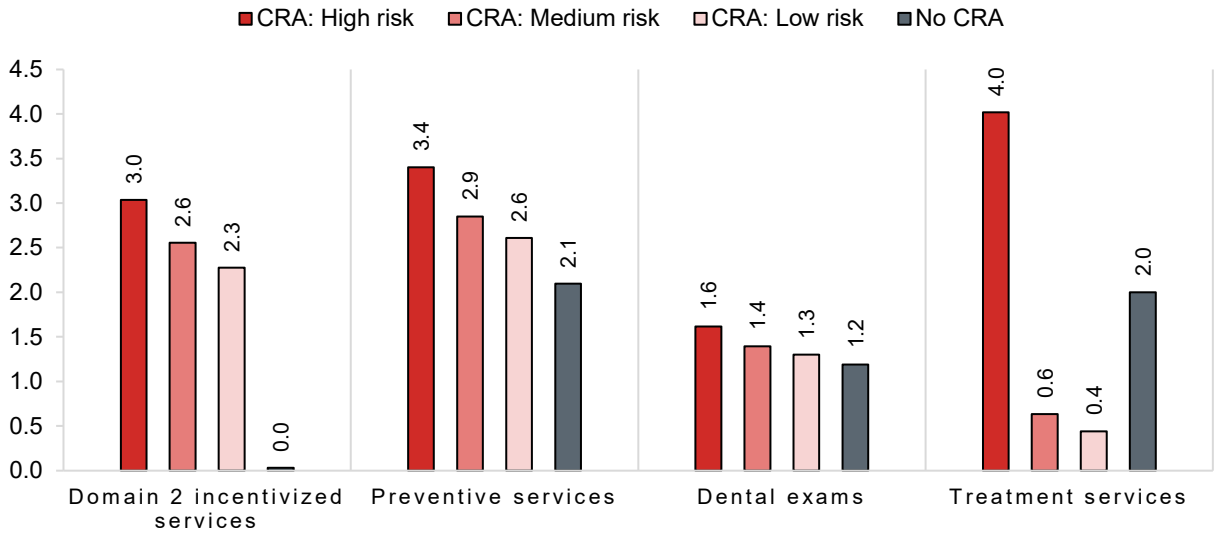
- Children at low risk could visit their Medi-Cal dental provider every six months (the same as those who do not receive a CRA), receive nutritional counseling, and participate in a motivational interview.
- Children at medium risk could visit their provider every four months and receive the same services.
- Children at high risk could visit their provider every three months, receive the same services, and obtain interim caries arresting medication. ◢

Although Domain 2 aimed to decrease the risk of caries over time, the percentage of beneficiaries who received CRAs and who were evaluated as high-risk increased over the intervention years, particularly between the first and second years (Appendix A, Table A.III.5). The increase in the percentage of beneficiaries who were evaluated as high-risk might reflect that the composition of the patient population receiving CRAs changed over time to include more high-risk patients, or that dental providers changed their standards for evaluation over time (possibly recognizing the benefit that beneficiaries assigned a higher risk status were allowed more frequent visits).

Mirroring CRA uptake, use of Domain 2 incentivized services—including nutritional counseling, motivational interviews, and interim caries arresting medication—increased after the start of the interventions in both Domain 2 pilot and expansion counties (see Appendix A, Figure A.III.6). As part of the Domain 2 intervention, children who received a CRA were eligible to receive additional services, with children at a higher risk eligible to receive more additional services (see accompanying text box). Based on the allowable services by risk tier, we would expect children at high risk could receive twice as many services as children at low risk and 30 percent more than children at medium risk (not including the additional interim caries arresting medication).

Children at high risk received more Domain 2 incentivized services than children at lower risk, but not as many as the treatment plan allowed. Figure III.7 shows the average number of services beneficiaries received by their CRA-assessed risk status in that year across Domain 2 pilot and expansion counties and all intervention years (see Appendix A, Table A.III.6 for data broken out by year and Domain 2 pilot versus expansion status). The figure also includes those who did not receive a CRA but did have at least one dental claim in that year. Children at high risk received 3.0 Domain 2 incentivized services, on average, compared with 2.6 for children at medium risk, and 2.3 for children at low risk. As expected, children without a CRA received no Domain 2 incentivized services.

Figure III.7. Frequency of dental service use by assessed risk status for caries among Medi-Cal beneficiaries ages 1 to 6 in Domain 2 counties



Source: Mathematica's analysis of Medi-Cal claims and eligibility data 2017–2021. We used 2021 claims data that were pulled in January 2022, resulting in some missing 2021 claims due to insufficient claims runout.

Note: Each bar represents the average number of dental services per year beneficiaries ages 1 to 6 received during the Domain 2 intervention years, combining Domain 2 pilot and expansion counties, by risk status for caries (indicated by the color of the bar). Domain 2 incentivized services include nutritional counseling, motivational interviews, and interim caries arresting medication. Preventive dental services and treatment dental services do not include those Domain 2 incentivized services. See Appendix C for details on how we constructed the CRA risk levels and dental service use outcomes from claims. The sample is restricted to Medi-Cal beneficiaries who were enrolled in Medi-Cal for three consecutive months in the calendar year and had at least one dental service in the calendar year.

CRA = caries risk assessment.

Children at high risk also received more non-Domain 2 incentivized related dental services than children at lower risk. Use of preventive dental services and dental exams among children at high risk (not including Domain 2 incentivized services) was 14 to 60 percent higher than it was among children at medium and low risk and those who did not receive a CRA but had at least one dental claim (see Figure III.7). Treatment use (not including CRA-incentivized services) was 7 to 10 times higher for children at high risk compared with children at medium and low risk. This finding is not surprising given that children at higher risk are likely to need more treatment dental services. Treatment use for those who did not receive a CRA but had at least one claim was 3 to 5 times higher than it was for children at medium or low risk, even though these children received fewer preventive and dental exam services. This finding suggests that the children who did not receive a CRA but had at least one claim might be at higher risk for caries than those who were evaluated as medium or low risk, and they would benefit from receiving a CRA and additional preventive dental services.

The ratio of total preventive to restorative visits increased after the start of the Domain 2 intervention in both Domain 2 pilot and expansion counties, but there were no noticeable changes in other measures of costly restorative procedures. The goal of Domain 2 was to manage the disease of caries using preventive dental services and non-invasive treatment approaches instead of more invasive

and costly restorative procedures. In Domain 2 pilot counties, the ratio of preventive to restorative services increased from 1.5 in 2016 to 2.5 in 2019 through 2021. In Domain 2 expansion counties, it increased from 1.8 in 2018 to 2.6 in 2020 and 2.8 in 2021 (Table III.2). This finding is likely due to the large increase in the Domain 2 incentivized services that are preventive dental services (that is, nutritional counseling and interim caries arresting medication). There was no noticeable effect on the percentage of beneficiaries who had dental surgery under general anesthesia, which stayed constant at 2 percent in Domain 2 pilot counties and 1 percent in Domain 2 expansion counties, or the average expenditures for services that require general anesthesia (which rose substantially over time for all counties).

Table III.2. Trends in select dental service outcomes for Medi-Cal beneficiaries ages 1 to 6, by Domain 2 pilot and expansion counties

	2015	2016	2017	2018	2019	2020	2021
Domain 2 pilot counties							
Ratio of preventive to restorative dental services	1.4	1.5	1.8	2.0	2.5	2.5	2.5
Percentage with a dental service that requires general anesthesia	2.0%	2.0%	2.0%	2.4%	2.1%	2.1%	2.0%
Average expenditures for services that require general anesthesia	$3.90	$5.07	$5.35	$8.83	$10.28	$14.52	$13.26
Domain 2 expansion counties							
Ratio of preventive to restorative dental services	1.7	1.7	1.9	1.8	2.3	2.6	2.8
Percentage with a dental service that requires general anesthesia	0.9%	0.8%	0.7%	0.7%	0.8%	0.9%	1.1%
Average expenditures for services that require general anesthesia	$1.14	$1.06	$1.15	$2.88	$5.47	$6.77	$8.04

Source: Mathematica's analysis of Medi-Cal claims and eligibility data 2015–2021. We used 2021 claims data that were pulled in January 2022, resulting in some missing 2021 claims due to insufficient claims runout.

Note: This table shows average outcomes per beneficiary by year for Medi-Cal beneficiaries ages 1 to 6 who are in Domain 2 pilot and expansion counties. Preventive dental services include Domain 2 incentivized services of nutritional counseling and interim caries arresting medication. See Appendix C for details on how we constructed the dental outcomes from claims. The sample is restricted to Medi-Cal beneficiaries who were enrolled in Medi-Cal for three consecutive months in the calendar year.

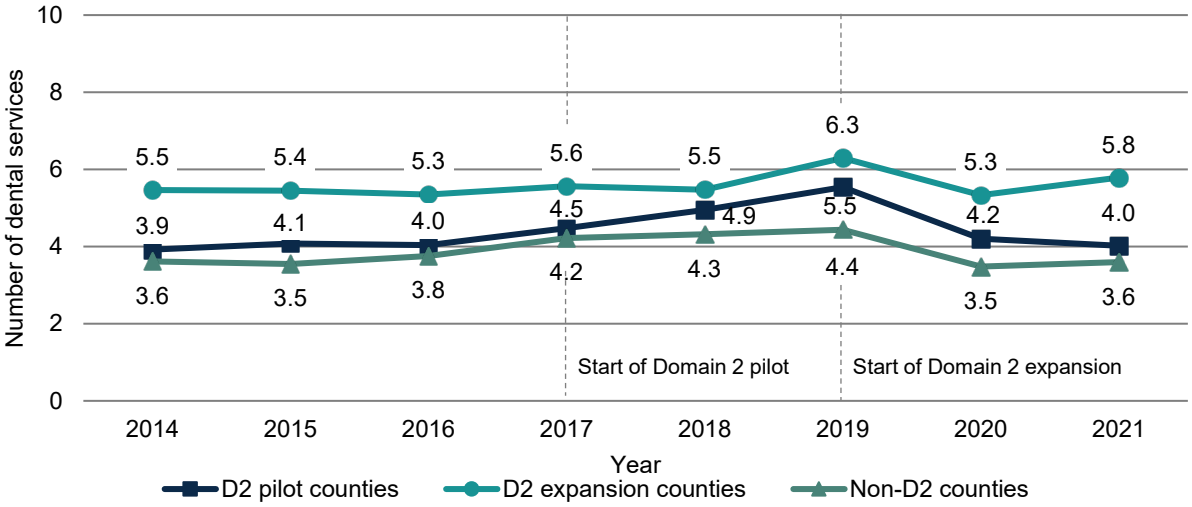
Cells shaded gray indicate that the year does not overlap with the intervention.

2. Impact results on dental service use

Domain 2 increased the average number of dental services received by beneficiaries. Although Domain 2 increased use of incentivized services, the impact on the total number of services received is unclear. Total services might not increase if providers substituted for Domain 2 incentivized services for other services they were previously providing.

We used several strategies to assess whether Domain 2 increased services. First, we conducted a difference-in-differences analysis that estimated the difference in changes in dental service use from before to after the interventions for children ages 1 to 6 in Domain 2 pilot and expansion counties compared with children in counties that never participated in Domain 2. Figure III.8 shows the total number of services received by Medi-Cal beneficiaries ages 1 to 6 by the county types over time.

Figure III.8. Trends in the number of dental services received by children ages 1 to 6 enrolled in Medi-Cal, by county type



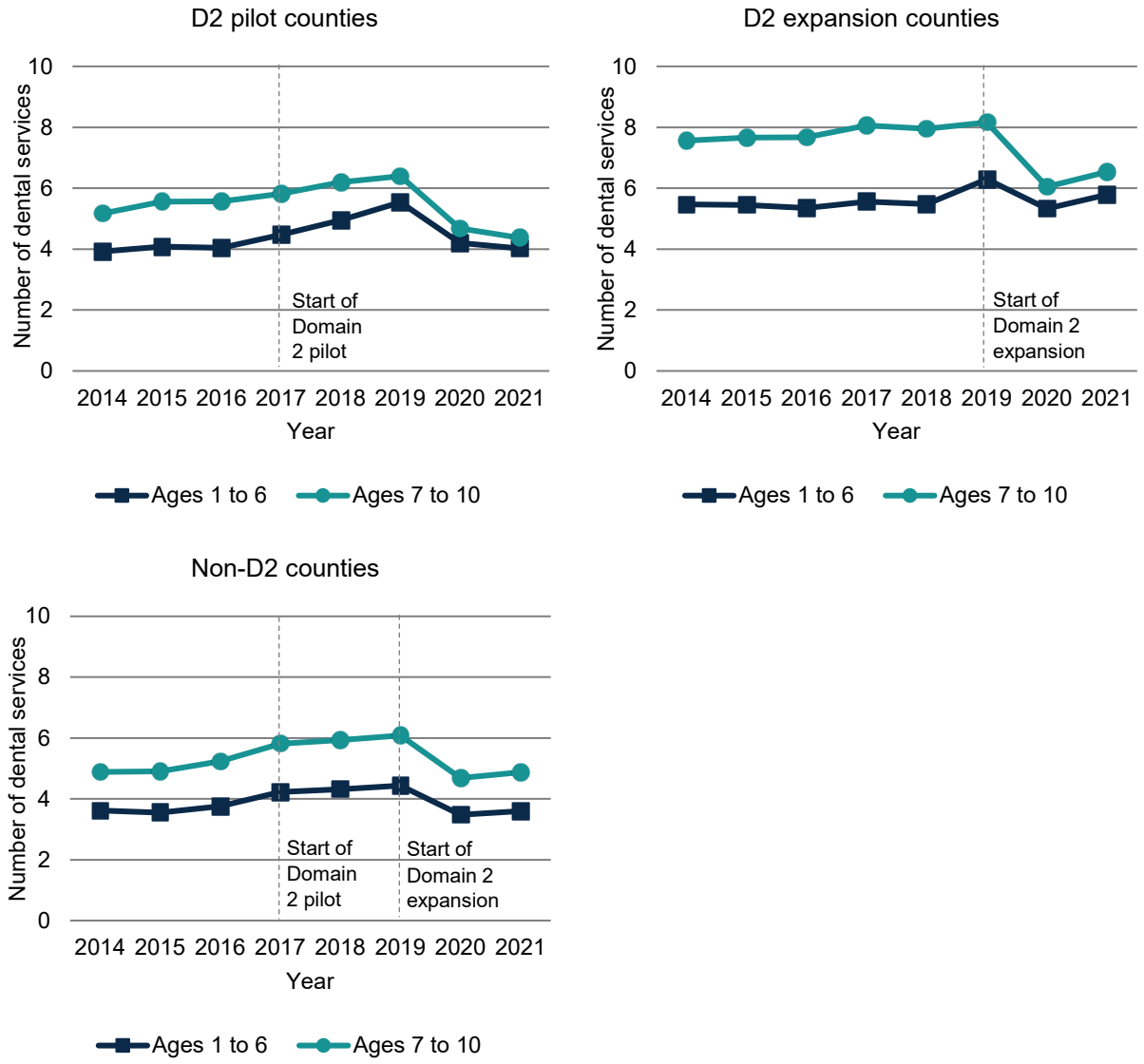
Source: Mathematica's analysis of Medi-Cal claims and eligibility data 2014–2021. We used 2021 claims data that were pulled in January 2022, resulting in some missing 2021 claims due to insufficient claims runout.

Note: Each line represents the average number of dental services received per Medi-Cal beneficiary ages 1 to 6 by year for different geographical areas. Observations are weighted by the fraction of months in the year the beneficiary is enrolled in Medi-Cal. See Appendix C for details on how we constructed the number of dental services from claims. The sample is restricted to Medi-Cal beneficiaries ages 1 to 6 who were enrolled in Medi-Cal for three consecutive months in the calendar year.

D2 = Domain 2.

Second, we conduct a within-county differences-in-differences analysis that estimates the difference in changes in dental service use from before to after the interventions for children ages 1 to 6 compared with children ages 7 to 10. The first panel of Figure III.9 plots the average number of services in each year for the two age groups in Domain 2 counties, and the second plots it for Domain 2 expansion counties (see Appendix A, Table A.III.7 for more details). The third panel of Figure III.9 plots average number of services for children ages 1 to 6 and ages 7 to 10 in non-Domain 2 counties (see Appendix A, Table A.III.7 for more details). Third, we combine the first two strategies for a triple-differences analysis that estimates the differences in the change in number of services between children ages 1 to 6 and those ages 7 to 10 in intervention counties with the differences in the change in number of services for children ages 1 to 6 and those ages 7 to 10 in non-Domain 2 counties. This approach enables us to identify any trends specific to age group and county group and remove them from our estimates.

Figure III.9. Trends in the number of dental services received by children ages 1 to 6 and 7 to 10 enrolled in Medi-Cal, by county type



Source: Mathematica's analysis of Medi-Cal claims and eligibility data 2014–2021. We used 2021 claims data that were pulled in January 2022, resulting in some missing 2021 claims due to insufficient claims runout.

Note: Each line represents the average number of dental services received per Medi-Cal beneficiary by year by age group. Observations are weighted by the fraction of months in the year the beneficiary is enrolled in Medi-Cal. See Appendix C for details on how we constructed the number of dental services from claims. The sample is restricted to Medi-Cal beneficiaries ages 1–10 who were enrolled in Medi-Cal for three consecutive months in the calendar year.

D2 = Domain 2.

Across intervention years and methodologies, we found that the average number of dental services received increased by 0 to 1.1 services in Domain 2 pilot counties and by 0.5 to 1.5 services in Domain 2 expansion counties, with impacts growing larger over time. Table III.3 provides the impact estimates and standard errors by year from regressions across the strategies for Domain 2 pilot counties, and for Domain 2 expansion counties. All regressions include controls.[14]

The first panel reports results for Domain 2 pilot counties. The Column labeled as (1) reports the difference-in-difference estimates by year for the model using non-Domain 2 counties as the comparison group. For Domain 2 pilot counties, we found some evidence for pre-trends, and found evidence that Domain 2 increased services use by 0.9 services relative to the comparison group in 2019. This effect diminished in 2020 and 2021, perhaps because of differences in the impact of the COVID-19 pandemic across the two sets of counties. When we used the age-based comparison group (Column (3)), we found evidence for pre-trends in 2014, and then found increasing estimated impacts from 2017 (0.2 services) to 2021 (1.0 services). The effects are not always statistically significant, but the effects in 2020 and 2021 are significant at the 1 percent level. When we used the triple-difference strategy (Column (5)), we found impacts during the intervention period are similar to the other two strategies, and we found no evidence of differential pre-trends. Impact estimates in 2021 suggest an increase of 1.1 services per beneficiary, which is statistically significant at the 5 percent level.

Table III.3. Domain 2 estimated impacts on number of dental services by empirical strategy

	DD county-based impact		DD age-based impact		DDD impact	
	Coefficient (1)	SE (2)	Coefficient (3)	SE (4)	Coefficient (5)	SE (6)
Domain 2 pilot counties						
2014	0.1	(0.2)	0.3***	(0.1)	0.1	(0.4)
2015	0.3***	(0.1)	0.1	(0.1)	0.0	(0.2)
2016	-	-	-	-	-	-
2017	0.0	(0.1)	0.2***	(0.1)	0.3	(0.2)
2018	0.3	(0.2)	0.2	(0.2)	0.4	(0.4)
2019	0.9***	(0.3)	0.5**	(0.3)	0.9	(0.6)
2020	0.5**	(0.2)	0.9***	(0.2)	0.9*	(0.5)
2021	0.2	(0.2)	1.0***	(0.2)	1.1**	(0.5)
Number of observations	13,260,218	13,260,218	2,002,038	2,002,038	24,064,701	24,064,701
Domain 2 expansion counties						
2016	0.4**	(0.1)	0.3***	(0.1)	0.0	(0.3)
2017	0.2*	(0.1)	0.1	(0.1)	0.0	(0.2)
2018	-	-	-	-	-	-
2019	0.8***	(0.1)	0.5***	(0.2)	0.6***	(0.2)
2020	0.8***	(0.1)	1.5***	(0.3)	1.3***	(0.3)
2021	1.0***	(0.2)	1.4***	(0.2)	1.3***	(0.4)
Number of observations	13,260,218	13,260,218	19,300,449	19,300,449	24,064,701	24,064,701

Source: Mathematica's analysis of Medi-Cal claims and eligibility data 2014–2021. We used 2021 claims data that were pulled in January 2022, resulting in some missing 2021 claims due to insufficient claims runout.

[14] Regressions include Medicaid eligibility aid code fixed effects, language fixed effects, dental health plan fixed effects, cost of fixed bundle of dental services control, and ethnicity by age by county fixed effects.

Table III.3 (*continued*)

Note: Impact estimates from the coefficient column labeled (1) are regression-adjusted using a difference-in-difference analysis that reflects the difference in the average number of dental services received for Medi-Cal beneficiaries ages 1 to 6 in Domain 2 counties in the year to the average in the baseline year, relative to the same difference over time for Medi-Cal beneficiaries in non-Domain 2 counties. Standard errors in Column (2) are from the same regression as the impact estimates, which clusters standard errors at the county level. Impact estimates from Column (3) are regression-adjusted using a difference-in-difference analysis that reflects the difference in the average number of dental services received for Medi-Cal beneficiaries ages 1 to 6 in Domain 2 counties in the year to the average in the baseline year, relative to the same difference over time for Medi-Cal beneficiaries ages 7 to 10 in the same counties. Standard errors in Column (4) are from the same regression as the impact estimates, which clusters standard errors at the age level. Impact estimates from Column (5) are regression-adjusted using a triple-difference analysis that reflects the difference in (a) the difference in the average number of dental services received for Medi-Cal beneficiaries ages 1 to 6 in Domain 2 counties in the year to the average in the baseline year, relative to the same difference over time for Medi-Cal beneficiaries ages 7 to 10 in the same counties, and (b) the difference in the average number of dental services received for Medi-Cal beneficiaries ages 1 to 6 in non-Domain 2 counties in the year to the average in the baseline year, relative to the same difference over time for Medi-Cal beneficiaries ages 7 to 10 in the same counties. Standard errors in Column (6) are from the same regression as the impact estimates, which clusters standard errors at the county-age level. The sample is restricted to beneficiaries who are enrolled for three consecutive months in Medi-Cal, and observations are weighted by the fraction of months beneficiaries are enrolled in Medi-Cal in the calendar year. All regressions control for Medicaid eligibility aid code fixed effects, language fixed effects, dental health plan fixed effects, the cost of a fixed bundle of dental services control, and ethnicity by age by county fixed effects. See Appendix C for details on how we constructed the number of dental services from claims.

Cells shaded gray indicate that the year does not overlap with the intervention.

*/**/*** Significantly different from zero at the 0.10/0.05/0.01 level, two-tailed test.

DD = difference-in-differences; DDD = triple-differences; SE = standard error.

The second panel reports results for Domain 2 expansion counties. Using the non-Domain 2 county comparison group, we found some significant pre-trends. After the start of the intervention in 2019, we estimate an effect of 0.8 and an effect of 1.0 in the last year, which are statistically significant at the 1 percent level. Using the age-based comparison group (Column (3)), we found a significant pre-trend in 2016 of 0.3, and in the year the intervention started (2019), an effect of 0.5. This value increased to 1.5 in 2020, then decreased slightly to 1.4 in 2021. Using the triple-difference strategy, we found no-significant pre-trends; an effect of 0.6 in 2019, the year the intervention started; and an effect of 1.3 in 2020 and 2021. All of these values are significant at the 1 percent level.

The consistency of the results across all three strategies, gives us even more confidence that Domain 2 increased dental service use among children eligible for the intervention.[15] Because of the consistency of results and the lack of pre-trends, we prefer the triple-difference strategy and used it to analyze additional outcomes.

3. Effect of Domain 2 on other dental outcomes

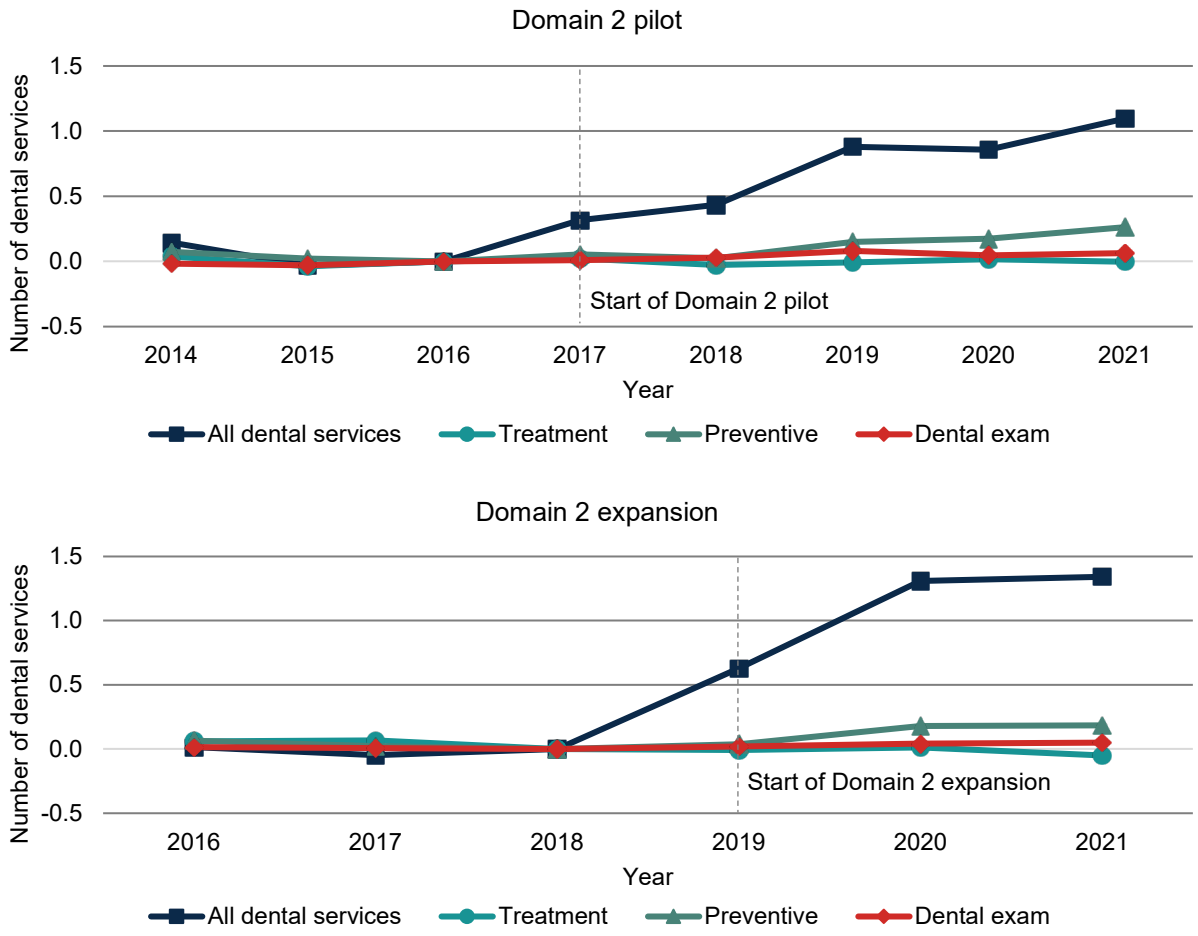
We found that impacts on total services were primarily driven by increases in Domain 2 incentivized services. However, there are some small impacts on preventive dental services that are not part of the Domain 2 incentivized services, suggesting some spillover of the intervention on overall preventive dental services. Domain 2 might have affected services that were not incentivized by Domain 2 for a couple reasons. First, as mentioned previously, those who receive a CRA and are

[15] We also found consistency within the triple-difference strategy across modeling decisions (not including controls), changes in data (not including encounter data from Safety Net Clinics), and changes in sample restriction (restricting to beneficiaries who are enrolled all 12 months). See Appendix A, Table A.III.8.

evaluated as high or medium risk are allowed more frequent visits. Second, the CRA tool might help diagnose problems that require treatment dental services. Third, under the goal of better management of oral health, providers might deliver more non-CRA related preventive dental services and non-invasive treatment dental services than they would have otherwise.

Figure III.10 plots the impact estimates for Domain 2 pilot and expansion counties from the triple-differences regression by year for total dental services, treatment dental services, preventive dental services, and dental exams. To isolate these impacts from the impacts on Domain 2 incentivized services, we excluded Domain 2 incentivized services from the treatment and preventive dental services. For the Domain 2 pilot counties (first panel of Figure III.10), all estimates are calculated relative to 2016, which is by construction set at zero. As reported in the Table III.3, there is an increase in total services from the start of the intervention in 2017 until 2021. There is no noticeable effect on treatment dental services, or dental exams, but there is a small positive effect on preventive dental services. We estimate that by 2021, Domain 2 resulted in 0.3 more preventive dental services, which is statistically significant at the 10 percent level (see Appendix A, Table A.III.9).

Figure III.10. Domain 2 triple-differences estimated impacts on selected dental outcomes for Domain 2 pilot counties by year



Source: Mathematica's analysis of Medi-Cal claims and eligibility data 2014–2021. We used 2021 claims data that were pulled in January 2022, resulting in some missing 2021 claims due to insufficient claims runout.

Figure III.10 (*continued*)

Note: Each line represents the triple-difference regression-adjusted estimated Domain 2 pilot impact on particular outcomes. Treatment and preventive dental services do not include Domain 2 incentivized services. Impact estimates reflect the difference in (a) the difference in the average outcome received for Medi-Cal beneficiaries ages 1 to 6 in Domain 2 pilot (first panel) or expansion (second panel) counties in the year to the average in the baseline year, relative to the same difference over time for Medi-Cal beneficiaries ages 7 to 10 in the same counties, and (b) the difference in the average number of dental services received for Medi-Cal beneficiaries ages 1 to 6 in non-Domain 2 counties in the year to the average in the baseline year, relative to the same difference over time for Medi-Cal beneficiaries ages 7 to 10 in the same counties. The regression sample is restricted to Medi-Cal beneficiaries who are enrolled for three consecutive months of Medi-Cal and observations are weighted by the fraction of months beneficiaries are enrolled in Medi-Cal in the calendar year. Regressions control for Medicaid eligibility aid code fixed effects, language fixed effects, dental health plan fixed effects, the cost of a fixed bundle of dental services control, and ethnicity by age by county fixed effects. See Appendix C for details on how we constructed the dental service measures from claims.

We found similar results for Domain 2 expansion counties (second panel of Figure III.10). Although total services increased sharply after the start of the intervention, treatment dental services and dental exams stayed fairly constant. There is a small impact on preventive dental services of 0.2, which is statistically significant at the 1 percent level in 2020 and significant at the 5 percent level in 2021 (Appendix A, Table A.III.9).[16]

DHCS hypothesized that using the CRA tool to diagnose early childhood caries and treating early childhood caries like a chronic disease would reduce invasive restorative treatment. However, we found no large impacts among children eligible for the Domain 2 intervention on restorative visits or surgery under general anesthesia (Appendix A, Table A.III.9).[17]

Given the increase in dental service use, it is not surprising that we also found an increase in dental expenditures, particularly for Domain 2 expansion counties (Appendix A, Table A.III.9). In Domain 2 expansion counties, we estimate a significant increase in expenditures of $33 per beneficiary per year in 2019, $40 per beneficiary per year in 2020, and $58 per beneficiary per year in 2021. Because of larger standard errors for the Domain 2 pilot county estimates, we cannot reject that there was zero impact, nor can we reject that there was a similar effect as that on Domain 2 expansion counties.

4. Beneficiaries' perspectives

Parents reported the use of the CRA form and education encouraged children to limit sugary food and drinks.[18] When asked about the CRA form, parents described questions that asked about whether the child drinks soda or juice, eats sugar, is allergic to medication, and has general health conditions. One parent reported, "It asks me which vegetables he eats, which fruit, if he eats cookies or fried foods, yogurt, cheese, eggs, if he drinks in a baby bottle, if he drinks from a cup, if he can already use a spoon, all those types of things. Also, the growth stage he's in, whether he can crawl, walk, run, that kind of thing." Parents noted the education they received also focused on limiting sugary food and drinks and

[16] Note that here, preventive services do not include Domain 2 incentivized services (whereas in Table III.2, they do).
[17] In our design for implementing the independent evaluation of DTI, we included plans to assess the impact of DTI on emergency room use for dental-related reasons. Data limitation concerns arose regarding the medical (emergency department) claims we received and prevented us from analyzing these measures. Appendix C provides more details on the administrative data, outcome measures, and limitations.
[18] In interviews with beneficiaries, parents did not recognize the terms "caries risk assessment," or "CRA," which suggests CRAs were not introduced to the parent, or the process of administering the CRA bundle was integrated into the visit, rather than a separate step. However, when asked about components of the CRA—such as completing assessment forms, receiving general care coordination, education, or more frequent visits—parents spoke favorably.

Experiences of Medi-Cal beneficiaries in Domain 2 counties

Of the 58 respondents, 17 parents and caregivers were located in Domain 2 counties and were asked about their involvement with the CRA and components of the CRA process including assessment forms, education, care coordination, and more frequent visits for high-risk children. Fifteen of those parents had responses about at least one component of the CRA process, although it was not always clear whether they were describing CRA forms or other forms or receiving general care coordination or education.

Source: Interviews with 58 Medi-Cal parents and caregivers in LDPP counties in February through May 2021.

encouraging the child to brush and floss regularly. Parents who spoke Spanish noted the forms and education were translated to Spanish, which they appreciated. Most parents reported the education was helpful, and a couple of parents noted that because they did not grow up in the United States, this information was new to them. For example, one parent reported, "I learned quite a lot, because he's the first kid that I've been doing things this way with, because my other children were born in El Salvador, and they never provided this kind of information for my baby—like what to do [and] what to avoid to keep his teeth healthy. I think the conversations I have with them there are really interesting."

A few parents in our sample reported the dentist or dental hygienist encouraged their child to visit the dentist more frequently than every six months. Parents who were visiting the dentist more frequently found these visits helpful to ensure that the children were not developing additional caries and put parents at ease.

Methods: Interviews with parents and caregivers of Medi-Cal beneficiaries

Recruitment. Mathematica researchers interviewed parents and caregivers with children enrolled in Medi-Cal who received dental care in 2019 or 2020 and received services from an LDPP. We received 207 names and contact information of families who met our inclusion criteria across 10 of the 13 LDPPs. We reached out to all 207 families in our sample, calling as many as three times to recruit them for an interview. To encourage participation, we offered to conduct interviews in English or Spanish and to provide respondents with $40 incentive payments. The final sample included 58 interviews (21 in English and 37 in Spanish) conducted from February to May 2021.

Data collection. We conducted a 30-minute in-depth interview with each respondent by telephone using a semi-structured interview protocol. Interview topics and questions covered their child's regular source of dental care, dental emergencies, perceptions of care and satisfaction with dental providers, unmet dental needs, and the impacts of the COVID-19 pandemic on dental health. For beneficiaries located in Domain 2 counties, we also asked whether the beneficiary was involved in aspects of the CRA.

Analysis. The 37 interviews conducted in Spanish were translated to English for coding and analysis. We used NVivo software to code and organize the interview transcripts to identify themes.

Characterizing interview data. When characterizing responses from the beneficiary interviews, we used "couple" to denote two respondents, "few" to denote three to four respondents, "several" to denote more than five respondents but fewer than one-quarter of respondents, "many" to denote more than one-quarter of respondents but fewer than three-fourths of relevant respondents, and "most" to indicate more than three-fourths of respondents.

5. Provider participation and key informant perspective results

One reason not all children eligible for Domain 2 with a dental visit received a CRA is that participation by dental providers was limited. However, those who participated generally remained in the program. Table III.4 reports the number of dental providers in Domain 2 pilot counties in each year who served children enrolled in Medi-Cal (ages 1 to 20), and the percentage who provided at least

one CRA. In Domain 2 pilot counties, 15 percent of Medi-Cal dental providers (81 providers) billed for CRAs in the first year of the intervention in 2017, and by 2021, the percentage participating increased to 38 percent (210 providers). In Domain 2 expansion counties, 21 percent (1,870) of dental providers billed for CRAs in the first year of the intervention in 2019, and by 2021, this value increased to 27 percent (2,286). Although the percentage of dental providers in expansion counties providing CRAs was lower than in pilot counties, expansion counties included many more Medi-Cal dental providers, resulting in an overall large expansion in number of dental providers offering CRAs. Although participation remained relatively low as a percentage of all dental providers participating in Medi-Cal, of those that billed for a CRA, 84 percent also did so in the following year.

Table III.4. Trends in dental provider participation in Domain 2, by Domain 2 original pilot and expansion counties

	2016	2017	2018	2019	2020	2021
Domain 2 pilot counties						
Total number of dental providers	511	523	579	592	575	555
Number of dental providers with at least one CRA	n.a.	81	143	196	202	210
Percentage of dental providers with at least one CRA	n.a.	15%	25%	33%	35%	38%
Percentage of participating providers who gave a CRA in year following	n.a.	81%	80%	75%	79%	n.a.
Domain 2 expansion counties						
Total number of dental providers	8,567	8,563	8,598	8,773	8,732	8,427
Number of dental providers with at least one CRA	n.a.	n.a.	n.a.	1,870	2,253	2,286
Percentage of dental providers with at least one CRA	n.a.	n.a.	n.a.	21%	26%	27%
Percentage of participating providers who gave a CRA in year following	n.a.	n.a.	n.a.	87%	80%	n.a.

Source: Mathematica's analysis of Medi-Cal claims and eligibility data 2016–2021. We used 2021 claims data that were pulled in January 2022, resulting in some missing 2021 claims due to insufficient claims runout.

Note: The total number of dental providers is based on the providers who billed a dental service in the calendar year for at least one child ages 1 to 20 enrolled in Medi-Cal in the Domain 2 pilot and expansion counties. Provider's county was assigned based on the county of the majority of beneficiaries ages 1 to 20 they served in that year. The number of dental providers with at least one CRA is based on the providers who billed at least one CRA to a Medi-Cal beneficiary ages 1 to 6 in each calendar year. The percentage of participating providers who gave a CRA in year following is based on the percentage of dental providers billing at least one CRA to a Medi-Cal beneficiary ages 1 to 6 in the associated year who also billed a CRA to a Medi-Cal beneficiary ages 1 to 6 in the year following.

Cells shaded gray indicate that the year does not overlap with the intervention.

CRA = caries risk assessment; n.a. = not applicable.

Among the DTI domains, Domain 2 required the most planning by the state and extra effort from dental providers for them to receive the incentives. It took time to design and implement a standard approach to training, onboarding, and service provision for Domain 2. The state set up the Treating Young Kids Everyday (TYKE) training for Domain 2 in collaboration with the California Dental Association, including developing and launching the new opt-in attestation form and adding the training to regular provider training seminars and outreach. The requirement to participate in training and complete forms, coupled with confusion about the documentation needed to bill to receive the incentive payment, might have limited some providers' initial participation. One key informant observed that the biggest challenge to provider participation in Domain 2 was that general dentists wanted to be able to refer patients to a

pediatric dentist if they encountered a risk factor they were not comfortable managing on their own. Related to the challenges with dental providers' participation in Medi-Cal discussed previously, key informants reported that general dentists face challenges finding pediatric and other dental specialists who will accept patients covered by Medi-Cal. Still, key informants reported that provider education and dentists' realization that the training and certification was neither excessively time consuming nor difficult likely helped boost provider participation over time.

Looking into how participating dental providers differed from those who did not participate, we found that participation in Domain 2 was more common among providers who served more children enrolled in Medi-Cal. Table III.5 shows the average characteristics of dental providers during intervention years in Domain 2 pilot and expansion counties by whether they provided a CRA in that year. Dental providers who billed at least one CRA were much more likely to serve at least 10 Medi-Cal beneficiaries in a year (94 to 95 percent versus 68 percent). In addition, key informants mentioned that it was easier to recruit dental providers who already were treating children enrolled in Medi-Cal than those who were new to serving this population, because new dentists had to first enroll in Medi-Cal and then enroll in Domain 2, which could be daunting. In expansion counties, dental providers who administered CRAs also had a higher preventive (not including CRA services) to restorative ratio (8.6 versus 4.5). This was not true in Domain 2 pilot counties, where CRA providers had a lower average ratio (4.9 versus 6.0).

Table III.5. Characteristics of dental providers in Domain 2 counties by participation in Domain 2

	Domain 2 pilot counties		Domain 2 expansion counties	
	CRA providers	No CRA providers	CRA providers	No CRA providers
Percentage who provided preventive dental services to at least 10 children enrolled in Medi-Cal	94%	68%	95%	68%
Ratio of preventive to restorative dental services	4.9	6.0	8.6	4.5
Total number of provider years	832	1,992	6,409	19,523

Source: Mathematica's analysis of Medi-Cal claims and eligibility data 2017–2021. We used 2021 claims data that were pulled in January 2022, resulting in some missing 2021 claims due to insufficient claims runout.

Note: This table shows the average characteristics of dental providers, based on whether they are in Domain 2 pilot or expansion counties, and whether they for billed for at least one CRA in that year to a Medi-Cal beneficiary ages 1 to 6. Average characteristics are calculated across all intervention years. The average ratio of preventive to restorative dental services is calculated as the average across all provider years of the ratio of the total preventive dental services to total restorative dental services the provider billed in that year. Preventive dental services do not include the Domain 2 incentivized services of nutritional counseling and interim caries arresting medication. See Appendix C for details on how we constructed the dental service measures from claims.

CRA = caries risk assessment.

Key informants and dental providers we interviewed indicated that the selection criteria for the Domain 2 counties likely contributed to the overall pace and composition of provider participation and therefore administration of the CRAs. The pilot Domain 2 counties were selected based on having a high ratio of restorative to preventive dental services and tended to be small counties with fewer dentists from which to recruit. Adding counties in the Domain 2 expansion group, particularly larger ones, such as Los Angeles, with many Medi-Cal dental providers, helped significantly increase the number of dental providers participating in this domain.

Many dental providers (47 percent of surveyed Domain 2 participating providers) chose to participate in Domain 2, because they were familiar with offering Domain 2 incentivized services. Key informants and providers we interviewed reported that familiarity and engagement with the Domain 2 incentivized services and facilitated provider participation in Domain 2. DHCS designed the domain with input from key dental leaders in the state to select the bundle of services that dentists considered appropriate and helpful. CRAs had been under development for decades in California and considered a best practice. Key informants noted that the dental community broadly recognized the importance of going beyond ensuring that children have a dental home to also understanding their underlying nutrition and motivations to encourage helpful behaviors. Many dental providers reportedly already conducting CRAs and some of the other activities, noted that the Domain 2 payments enabled them to add to or formalize these activities. These findings suggest that some of the increase in CRAs and CRA incentivized services that we found in Medi-Cal claims could overstate the true change in service use, because some dental providers reported that they provided some of these services before the intervention (perhaps in a less formal way) to children enrolled in Medi-Cal.

Survey evidence suggests that the participating dental providers had favorable views of the Domain 2 intervention. Overwhelmingly, providers thought the CRA bundle was easy to implement (93 percent), thought the CRA worked somewhat or very well in their practice (98 percent), found the training on the CRA bundle helpful (98 percent), and were somewhat or very satisfied with the payments (85 percent). Although dental providers had less experience with the motivational interviewing CRA activity than other CRA activities, key informants noted its importance and that pediatric dentists appreciated that the state had heard their requests to pay them for doing it. One provider appreciated that Domain 2 enabled him to "spend a little bit more time with the kids and the parents, not just go through the exam but also conduct a motivational interview, find out the real cause of the risk, and help modify the behavior of the child and the parents to actually help prevent cavities." This finding helps explain why Domain 2 was successful at providing CRA services even though participation among dental providers was limited.

From the providers' perspective, the biggest challenges in getting children at medium and high risk to return for follow-up visits were patients having a high rate of no shows (85 percent), and parents' reluctance to bring children back for follow-up visits (49 percent). These findings might help explain why children at medium and high risk did not receive as many CRA services as they were entitled to in the intervention years.

Dental providers we interviewed had mixed experiences with beneficiaries' receptiveness and follow-through with the recommended number of visits based on risk level. Some found that "[the term] 'high risk' gets moms' attention," while others found that despite their efforts to stress the importance of more frequent visits, they ultimately struggled to see children at high risk with that frequency. This finding might be largely due to the nature of being high-risk; these families face many of the socioeconomic-related constraints discussed earlier, such as inflexible work schedules and lack of reliable transportation. In fact, one key

Dental providers thought the CRA bundle worked well in their practice for the following reasons:

- It helped providers assess patient risk regularly and consistently (87 percent).
- It helped parents learn about their children's oral health (85 percent).
- It enabled providers to talk more with patients and parents about diet (80 percent).
- It motivated parents pay more attention to home care for their children (66 percent).
- Patients and their parents respond well to the questions (47 percent).

Source: Mathematica fielded a survey of 532 dental providers from October 2019 through March 2020.

informant surmised that patients who visit the dentist four times a year are not actually high-risk, because they are able to keep all of those appointments, and there should be more focus on serving children at high risk in other ways, such as through telehealth and by encouraging healthy habits at home.

D. Domain 3. Improving continuity of care

Key takeaways

Domain 3 aimed to improve continuity of care for eligible children by offering incentive payments to dental offices in 36 counties. Although continuity of care increased for Domain 3 counties before 2020 (and the disruptions in health care related to COVID-19), it also increased in counties where Domain 3 was not implemented. We found impacts of Domain 3 on continuity of care to be less than 1 percentage point. This finding is consistent across several outcome measures designed to capture continuity of care. We also found little evidence to suggest persistent impacts of Domain 3 on other dental outcomes, such as dental exams and preventive dental service use. Although we found limited evidence that Domain 3 substantially increased continuity of care for beneficiaries, results from our provider survey and key informant and provider interview suggest Domain 3 incentives motivated many dental providers to take steps to improve continuity of care and gave them with the resources to do it.

Methods: Understanding the effect of Domain 3 on beneficiary outcomes

Beneficiary sample. We used Medi-Cal enrollment data from 2014 to 2021 to identify Medi-Cal beneficiaries ages 1 to 20 with at least three consecutive months of enrollment in Medi-Cal in a calendar year. To assess continuity of care over consecutive years, we further restricted our sample to Medi-Cal beneficiaries with at least three consecutive months of enrollment in Medi-Cal in each year. We grouped beneficiaries based on whether their address is within a Domain 3 pilot, expansion, or non-Domain 3 county.

Outcomes. The primary outcome is two-year dental exam continuity of care, which is measured as whether a beneficiary received at least one dental exam with any provider in two consecutive years. We also examined continuity of care measured over longer periods (three to six years), and alternative definitions of continuity of care (having a dental exam with the same dental provider in consecutive years and having a dental exam at the same office location in consecutive years). We also examined secondary dental service measures and dental expenditures to determine whether Domain 3 had spillover effects on access to and use of dental care among children enrolled in Medi-Cal.

Analytic methods. To estimate the causal impacts of Domain 3 on continuity of dental care and dental service use among children enrolled in Medi-Cal, we conducted difference-in-differences analyses comparing changes in outcomes among those affected by Domain 3 with comparison groups that were not impacted by Domain 3, children ages 1 to 20 enrolled in Medi-Cal in counties that never participated in Domain 3.

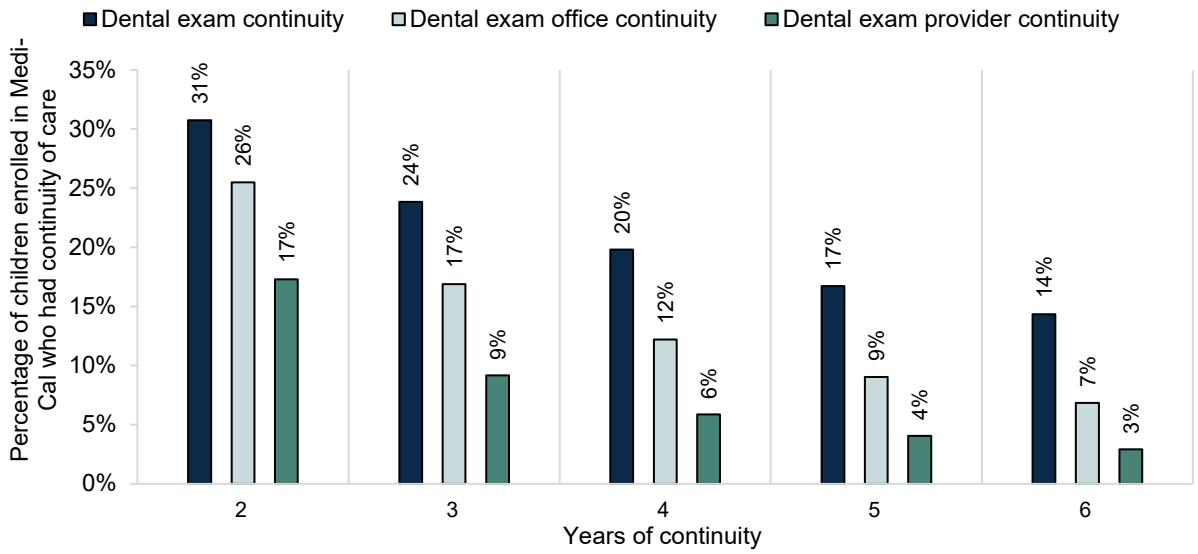
See the main text for more details on the analytic methods and Appendix C for more details on the data, analytic methods, and methodological limitations.

1. Descriptive results

Across the baseline and intervention period, less than half of all children enrolled in Medi-Cal received dental exams in consecutive years. For those with Medi-Cal enrollment of at least three consecutive months in each year, receiving dental exams in consecutive years (from any dental provider) was on average between 31 percent (two-year continuity) to 14 percent (six-year continuity) across all

counties for 2014 through 2021 (Figure III.11). Continuity of care based on consecutive dental exams with the same office ranged from 26 percent (two-year continuity) to 7 percent (six-year continuity). Continuity of care based on consecutive dental exams with the same dental provider was much lower—ranging from 17 percent (two-year continuity) to 3 percent (six-year continuity).

Figure III.11. Dental exam continuity of care for Medi-Cal beneficiaries ages 1 to 20 in California from 2014 to 2021



Source: Mathematica's analysis of Medi-Cal claims and eligibility data 2010–2021. We used 2021 claims data that were pulled in January 2022, resulting in some missing 2021 claims due to insufficient claims runout.

Note: The bars represent the percentage of Medi-Cal beneficiaries ages 1 to 20 who had dental exam continuity of care for a varying number of years, out of all the Medi-Cal beneficiaries ages 1 to 20 in years 2014–2021 who had three consecutive months of Medi-Cal eligibility across all years continuity of care is measured. The dark blue bars measure dental exam continuity of care as having consecutive dental exams across a varying number of years. The light blue bars measure dental exam continuity of care as having consecutive dental exams at the same office location across a varying number of years. The green bars measure dental exam continuity of care as having consecutive dental exams with the same provider across a varying number of years. See Appendix C for details on how we constructed the dental exam measure from claims.

Dental continuity of care increased across all county groups before the onset of the COVID-19 pandemic. Table III.6 reports dental exam continuity of two to six years from 2014 to 2021 for Domain 3 pilot counties, Domain 3 expansion counties, and counties that did not participate in Domain 3 (non-Domain 3). Across all county groups, continuity of two to six years increased between 2015 and 2019, by 2 to 4 percentage points. Therefore, although continuity of care increased for Domain 3 counties before the onset of the COVID-19 pandemic, it also increased for counties that did not participate in Domain 3, and in Domain 3 expansion counties before the start of the intervention. Continuity of care decreased in 2020 and 2021, during the COVID-19 pandemic, by 3 to 9 percentage points depending on the number of years of continuity of care and the type of county (D3 pilot, D3 expansion, or non-D3 county). When defining continuity of care based on having dental exams with the same dental provider or dental office in consecutive years, we found similar results. However, the magnitude of the percentage point changes is smaller, because continuity of care at the office and provider levels is much lower overall (Appendix A, Tables A.III.10 and A.III.11).

Table III.6. Trends in dental exam continuity of care for Medi-Cal beneficiaries ages 1 to 20, by county type

	2014	2015	2016	2017	2018	2019	2020	2021
2-Year Continuity								
D3 pilot counties	30%	29%	29%	30%	31%	32%	26%	23%
D3 expansion counties	33%	32%	32%	32%	34%	35%	29%	26%
Non-D3 counties	31%	31%	31%	32%	34%	35%	30%	26%
3-Year Continuity								
D3 pilot counties	22%	22%	22%	22%	23%	24%	20%	18%
D3 expansion counties	24%	25%	24%	25%	26%	27%	24%	21%
Non-D3 counties	25%	24%	23%	25%	26%	28%	24%	22%
4-Year Continuity								
D3 pilot counties	17%	17%	18%	18%	19%	20%	17%	15%
D3 expansion counties	20%	20%	21%	21%	22%	22%	20%	18%
Non-D3 counties	20%	21%	20%	21%	22%	23%	20%	18%
5-Year Continuity								
D3 pilot counties	14%	14%	14%	15%	16%	16%	14%	13%
D3 expansion counties	16%	17%	17%	18%	18%	19%	17%	16%
Non-D3 counties	17%	17%	17%	18%	18%	20%	17%	16%
6-Year Continuity								
D3 pilot counties	NA	12%	12%	12%	13%	14%	12%	11%
D3 expansion counties	NA	14%	14%	15%	16%	17%	15%	14%
Non-D3 counties	NA	15%	15%	16%	16%	17%	15%	14%

Source: Mathematica's analysis of Medi-Cal claims and eligibility data 2010–2021. We used 2021 claims data that were pulled in January 2022, resulting in some missing 2021 claims due to insufficient claims runout.

Note: The table reports the percentage of beneficiaries ages 1 to 20 with dental exam continuity of care for a varying number of years of continuity, by the county the beneficiary resides in that year, and by year. The sample is restricted to beneficiaries who were enrolled for Medi-Cal for three consecutive months in the calendar year and each year previous that the continuity of care measure covers. Dental exam continuity of care is measured as having a dental exam in the current year and the consecutive years previous. See Appendix C for details on how we constructed the dental exam measure from claims.

Cells shaded dark gray indicate that continuity of care is measured across years before the intervention.

Cells shaded lighter gray indicate that continuity of care is measured across years that are both before and during the intervention period.

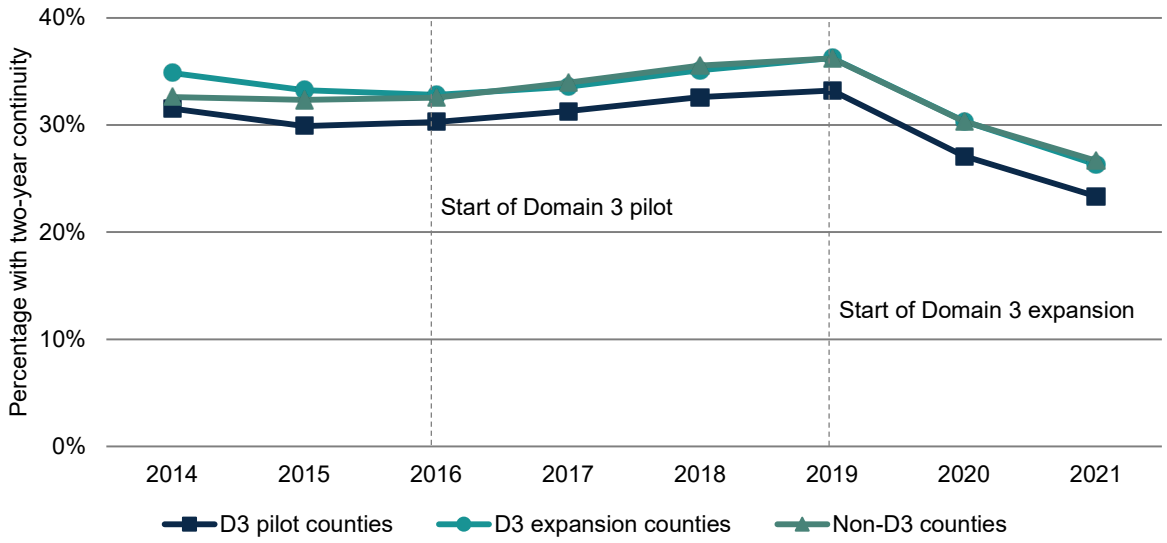
D3 = Domain 3; NA = not available.

Domain 3 did not appear to have stronger effects on continuity of care for any particular beneficiary subgroup. Appendix A, Table A.III.12 reports average two-year continuity by county group before the intervention, and then the change in average two-year continuity through 2019 (that is, before the COVID-19 pandemic). For most of the beneficiary subgroups we looked at (by age, ethnicity and language spoken), the increases in average two-year continuity between pre- and post-intervention periods were similar or slightly less than those in the non-Domain 3 counties. This finding suggests that Domain 3 did not have meaningful favorable effects on some groups more than others.

2. Impacts results

Domain 3 did not seem to have any meaningful impact on continuity of care, with impact estimates that never exceed 0.9 percentage points. Although continuity of care in Domain 3 counties increased before the COVID-19 pandemic, the similar increase in the non-Domain 3 counties and in Domain 3 expansion counties before the expansion highlights the importance of formally testing this relationship. We used a difference-in-differences analysis that estimates the difference in changes in two-year dental continuity from before to after the interventions for children from 1 to 20 in Domain 3 pilot and expansion counties compared with children in counties that never participated in Domain 3. Figure III.12 (see Appendix A, Table A.III.13 for more details) shows the percentage of children enrolled in Medi-Cal with two-year continuity for the two treatment groups (Domain 3 pilot counties and Domain 3 expansion counties) and the comparison group (non-Domain 3 counties). The graph shows that the increases in continuity of care over the intervention periods are mirrored in the non-Domain 3 counties, again suggesting Domain 3 had no causal impact on continuity of care.

Figure III.12. Trends in two-year dental exam continuity of care for Medi-Cal beneficiaries ages 1 to 20, by county type



Source: Mathematica's analysis of Medi-Cal claims and eligibility data 2013–2021. We used 2021 claims data that were pulled in January 2022, resulting in some missing 2021 claims due to insufficient claims runout.

Note: The lines represent the percentage of Medi-Cal beneficiaries ages 1 to 20 with two-year dental exam continuity of care in each year for beneficiaries from different county types. Two-year dental exam continuity of care is defined as having two consecutive years of dental exams (that is, in the current and previous year). See Appendix C for details on how we constructed the dental exam measure from claims. The sample is restricted to beneficiaries who are enrolled for three consecutive months in the current year and the previous year. The sample is weighted by the fraction of months the beneficiary is enrolled in Medi-Cal over the two-year period if their continuity of care is equal to 0 and has a weight equal to 1 if their continuity of care is equal to 1.

D3 = Domain 3.

Table III.7 reports the regression coefficients for Domain 3 pilot counties and Domain 3 expansion counties, for two specifications: one that includes only difference-in-difference related variables, and one with additional controls.[19] For Domain 3 pilot counties, in the regressions that do not include additional controls, we found no effect on two-year continuity in the years after the start of the intervention in 2016. When we included controls, we found a significant effect at the 10 percent level of 0.8 percentage points in 2016. However, this effect diminishes in subsequent years. For both specifications (with and without controls), we found evidence of a significant pre-trends of 1.3 and 1.2 percentage points, which could suggest that non-Domain 3 counties might not be a good counterfactual for Domain 3 pilot counties. For Domain 3 expansion counties, we found no evidence of a pre-trend in either specification, and although we found statistically significant increases in continuity of care in some years (2019 and 2021), the effects were less than 1 percentage point.

Findings from several sensitivity tests, presented in Appendix A, Table A.III.14, closely mirror those from the main models. Sensitivity models included measuring continuity of care based on having a dental exam with the same dental provider, or with the same dental office; restricting the sample to beneficiaries with 12 months of enrollment in the current and previous year; using weights to balance on the number of beneficiaries in Domain 2 expansion counties in the Domain 3 pilot, expansion, and non-Domain 3 counties; and including controls for COVID-19. In each case, effects are never larger than 2.4 percentage points.

Results are also similar for dental exam continuity of care for three to six years, with effects in intervention years ranging from -1.0 to +0.9 percentage points, depending on the year and whether it is for Domain 3 pilot or expansion counties (see Appendix A, Table A.III.15).

Table III.7. Domain 3 difference-in-difference estimated impacts (in percentage points) on two-year dental exam continuity of care for children ages 1 to 20 enrolled in Medi-Cal

	No controls		Full controls	
	Coefficient (1)	SE (2)	Coefficient (3)	SE (4)
Domain 3 pilot counties				
2014	1.3***	(0.4)	1.2***	(0.5)
2015	-	-	-	-
2016	0.2	(0.4)	0.8*	(0.4)
2017	-0.2	(0.7)	0.2	(0.6)
2018	-0.5	(0.8)	-0.1	(0.7)
2019	-0.6	(0.9)	0.1	(0.8)
2020	-0.8	(1.0)	-0.1	(0.9)
2021	-0.9	(0.9)	-0.2	(0.9)
Domain 3 expansion counties				
2017	0.0	(0.3)	0.0	(0.3)
2018	-	-	-	-
2019	0.5**	(0.2)	0.7***	(0.2)
2020	0.5	(0.6)	0.9	(0.6)
2021	0.1	(0.7)	0.9*	(0.6)
Number of beneficiaries	38,403,644	38,403,644	38,403,644	38,403,644

[19] Controls include Medicaid eligibility aid code fixed effects, language fixed effects, dental health plan fixed effects, and ethnicity by age and county fixed effects.

Table III.7 (*continued*)

Source: Mathematica's analysis of Medi-Cal claims and eligibility data 2013–2021. We used 2021 claims data that were pulled in January 2022, resulting in some missing 2021 claims due to insufficient claims runout.

Note: Impact estimates are regression-adjusted using a difference-in-difference analysis that reflects the difference in average two-year dental exam continuity of care for Medi-Cal beneficiaries ages 1 to 20 in Domain 3 counties in the year to the average in the baseline year, relative to the same difference over time for Medi-Cal beneficiaries in non-Domain 3 counties. Standard errors are from the same regression as the impact estimates, which clusters standard errors at the county level. The column labeled (1) reports impact estimates when no additional controls are included in the regression model beyond the main difference-in-differences variables. Column (3) reports the impacts estimates when we also control for Medicaid eligibility aid code fixed effects, language fixed effects, dental health plan fixed effects, the cost of a fixed bundle of dental services control, and ethnicity by age by county fixed effects. Two-year dental exam continuity of care is defined as having two consecutive years of dental exams (that is, in the current and previous year). The sample is restricted to beneficiaries who are enrolled for three consecutive months in the current and previous years. The sample is weighted by the fraction of months the beneficiary is enrolled over the two-year period if their continuity of care is equal to 0 and has a weight equal to 1 if their continuity of care is equal to 1. See Appendix C for details on how we constructed the dental exam measure.

Cells shaded gray indicate that the year does not overlap with the intervention.

*/**/*** Significantly different from zero at the 0.10/0.05/0.01 level, two-tailed test.

SE = standard error.

3. Effect of Domain 3 on other dental services and dental expenditures

Given that we found limited impacts on continuity of dental care, it is not surprising that we found limited effects on other dental outcomes, as well. Although DTI Domain 3 targeted increasing continuity of dental care as measured by dental exam visits, if DTI Domain 3 strengthened the relationship between beneficiaries and dental providers, it could also increase other dental service use.[20] We found that impacts on having any dental exam are similar to the two-year continuity impacts—with a significant impact in the first year after the intervention (2 percentage points for Domain 3 pilot counties and 1 percentage point for Domain 3 expansion counties). These impacts then diminish (see Appendix A, Table A.III.16). We found no effect on the number of dental exams received. For outcomes of any preventive dental service use and any dental visits, we found some evidence of a small positive effect (of about 1 to 2 percentage points) in the first two years after the intervention, but these small effects diminish in subsequent years. We found some evidence that Domain 3 increased restorative dental service use by about 1 percentage point, particularly in expansion counties. There is also some evidence of a negative impact on expenditures starting in 2020, but this impact might be due to COVID-19 affecting non-Domain 3 counties more than Domain 3 pilot or Domain 3 expansion counties. In regressions where we tried to control for the effects of the COVID-19 pandemic, this effect is diminished.

4. Related perspectives from beneficiaries

Most parents acknowledged in the beneficiary interviews the importance of keeping the same dentist over time for their children. However, many parents reported changing dental providers. Parents felt that having the same dentist over time helps to make the child feel more comfortable and enables the provider to maintain a long-term of record of care and track progress over time. Parents also noted that children might be reluctant or scared to visit the dentist and that seeing the same dentist over time helps children build a trusting relationship. One parent noted, "I think [continuity of care is] very important due to the relationship with the dental office and the dentist. And also, just them being familiar

[20] Increased continuity of care might lead to Medi-Cal beneficiaries receiving more timely treatment and restorative dental services. However, if they also receive more diagnostic and preventive dental services, it could also decrease future need of treatment and restorative dental services.

with your child and being able to watch them grow. And if things change, as far as [the child's] dental [health], sometimes the dentist can … make you aware of maybe eating habits or brushing habits, [and]… they can tell you, hey, watch this, because I see this is what's going on."

Many of the parents in our sample had changed their child's dental provider in the past and reported several different reasons for doing so—for example, because the family's situation changed, they moved, or they changed insurance. Other reasons cited were related to the practices, such closures or staffing changes, long wait times, lack of equipment for more advanced procedures (such as those that require sedation or anesthesia), and negative experiences with a previous provider. However, once parents found a dental provider they trusted, they reported they were more likely to continue seeing this provider.

5. Provider and key informant perspectives results

Although we found limited evidence at the beneficiary level that Domain 3 substantially increased continuity of care, results from our provider survey and interviews from key informants suggest Domain 3 incentives motivated some dental providers to take steps to improve continuity of care. Most key informants and dental providers we interviewed reported that the Domain 3 incentives were straightforward for DHCS to implement and for dental providers to understand. They also thought the payment amounts were adequate to support practice efforts to encourage patients to return year after year.

Many providers tried to improve continuity of care because of Domain 3. In the survey of dental providers, 42 percent of providers who received Domain 3 incentive payments said they increased outreach activities because they received DTI incentive payments, and 37 percent of providers in Domain 3 counties said they increased the number of follow-up visits with children enrolled in Medi-Cal to receive more Domain 3 incentive payments. Key informants and providers interviewed also reported that Domain 3 incentives encouraged providers to redouble and update such "recall strategies" that many had already used to encourage patients to return to the office for follow-up care and remind them of the upcoming appointments. For example, one dental provider described how their office created a dashboard that enabled them to systematically track patients who are due for visits and to issue prompts for staff to send reminders.

Key informants and dental providers interviewed named a few additional efforts providers implemented using Domain 3 incentive payments to improve continuity of care. These efforts included raising awareness of the Medi-Cal transportation benefit, using ride-sharing apps to facilitate timely transport (because traditional transportation services typically require 24-hour notice, according to informants), and working with case managers to identify and address the barriers individual beneficiaries face in attending appointments. Some providers participated in broader outreach efforts and relationship building in their community, such as by working with schools to help children enrolled in Medi-Cal establish dental homes.

Some key informants perceived that Domain 1 also helped improve continuity of care by emphasizing the importance of preventive care. That is, they thought Domains 1 and 3 complemented one another to create a "powerful" combination of incentives that promote ongoing preventive care at the same provider. This perspective that these two domains potentially had some overlapping effects could help explain why continuity of care improved in all counties and why we found small impacts of Domain 3 on continuity of care, because our comparison counties were participating in Domain 1.[21]

[21] Note that to understand whether Domain 3 incentives were important on their own, it is necessary to compare Domain 3 counties with counties participating in Domain 1, as we do above.

Domain 3 incentives did not address all barriers to continuity of care. Although incentives were influential for some providers to take steps at improving continuity of care for the children enrolled in Medi-Cal that they serve, for many others, the payments were not the providers' focus, which might help explain some of the limited impacts on beneficiary outcomes of continuity of care and dental service use. For example, 44 percent of providers surveyed said they didn't know whether they had received Domain 3 payments, and 16 percent said they did not receive them. In addition, a few dental providers we interviewed were either not aware of the incentives or appreciated them as general financial support for their practice but did not consider them significant enough to support new strategies to promote continuity of care. As with Domain 1, key informants observed that larger practices were more equipped than smaller ones to anticipate the Domain 3 incentives and make changes to improve continuity of care.

In addition, Domain 3 might have had a limited impact on continuity of care due to the prevalence of outside factors that the dentist cannot control. The two factors most commonly cited in the provider survey were the high rate of no-shows among Medi-Cal patients (69 percent) and patients not understanding the importance of following up (63 percent). The factors related to Medi-Cal beneficiaries' challenges accessing dental care also increase the likelihood of Medi-Cal beneficiaries not scheduling follow-up appointments or missing appointments. They include lack of access to timely transportation (which could include being unaware of transportation assistance), work schedules and policies that make it difficult for parents to bring their children to the dentist, and other life stressors that make dental appointments a lower priority for some families.

Changing providers also disrupts continuity of care, as defined by Domain 3; in interviews, more than half of families said they had changed providers in the past. Although not identified as an issue by providers surveyed,[22] key informants and dental providers interviewed discussed the importance of beneficiary satisfaction with their provider as key to them remaining with that provider year after year, naming similar factors as Medi-Cal beneficiaries (such as parents and children being comfortable with their provider, the ability to obtain follow-up appointments in a timely manner, and the ability to receive all services in the same location). Although many of those factors are within the providers' control, adding capacity for more appointment availability or additional services might be too costly to address with the additional funds Domain 3 provided. Also, some key informants and dental providers perceived that Medi-Cal beneficiaries relocated more often than the general population, which made staying with the same provider challenging, particularly given the transportation and the other socioeconomic challenges they face.

E. Costs and benefits

The costs of DTI were substantial, and it did not lower dental expenditures or use of restorative or dental surgery under general anesthesia during the intervention period. This finding suggests that the benefits of DTI did not outweigh its costs.

Table III.8 reports the expenditures on incentive payments for each domain by year. Costs were highest in 2019, when all four domains were active, and both the pilot and expansions of Domains 2 and 3 were in place. Total costs across all domains and years were more than half a billion dollars.

[22] Although 25 percent of surveyed providers indicated that patients' unwillingness to return was a factor limiting their ability to improve continuity of care, it is unclear whether this limitation is due to patients switching dental providers or not returning to a dentist at all.

Table III.8. Trends in total expenditures on each DTI domain

	2016	2017	2018	2019	2020	2021 through July
Domain 1	$46,540,000	$53,620,000	$54,461,000	$56,318,000	$35,092,000[a]	$0
Domain 2	$0	$2,041,616	$4,075,045	$56,565,452	$70,764,834	$35,497,894
Domain 3	$9,811,600	$12,166,710	$13,604,750	$84,029,320	$73,102,720[b]	$0
Domain 4	$0	$7,214,442	$14,278,555	$33,300,000	$42,500,000	$0

Source: Mathematica's analysis of DHCS DTI reports, June 2022.

Note: Each cell indicates the total expenditure for DHCS on each DTI domain by year as reported by DHCS in annual reports and quarterly progress reports. Domain 1 started January 2017. The Domain 2 pilot started in January 2017, and the Domain 2 expansion started in January 2019. The Domain 3 pilot started in January 2016, and the Domain 3 expansion started in January 2019. Domain 4 started in January 2017.

[a] This value includes only the first two (out of a total of three) payments.

[b] This value includes only the first (out of two) payments.

DHCS = Department of Health Care Services; DTI = Dental Transformation Initiative.

DTI did not lower expenditures on costly restorative services during the intervention period. DTI aimed to use incentive payments for the three domains that would lead to increased access, use of preventive dental service, and continuity of care. These increases would, in turn, prevent the need for treatment and costly restorative dental services. Although we found some evidence that Domains 1 and 2 increased use of preventive dental services, we found no evidence that any of the domains led to fewer restorative dental services or, ultimately, lower dental expenditures during the intervention. The increases in access to dental care and preventive dental services could lead to lower expenditures in the post-evaluation period, but we are unable to quantify them at this time.

The cost per benefit received was high for Domain 1 and 3. To better understand the cost per benefit received for Domains 1 and 3, in which the costs were not for the additional services received by Medi-Cal beneficiaries, we estimate the per-beneficiary-per-year cost of the additional services that we estimated resulted from DTI. Because the incentive payments for Domain 1 and 3 for 2020 and 2021 are incomplete, we only used the estimated impacts and cost from before 2020 for this calculation.

To estimate cost per additional benefit attributable to Domain 1, we multiplied the estimated impacts of DTI on preventive services in each intervention year by the total number of Medi-Cal beneficiaries ages 1 to 20. We find that Domain 1 led to an average of 183,088 more Medi-Cal beneficiaries ages 1 to 20 receiving a preventive service each year, with Domain 1 incentive payments averaging $52,734,750 per year. Therefore, the cost of the additional Medi-Cal beneficiaries ages 1 to 20 receiving a preventive service was $288 per beneficiary per year higher than the cost of preventive service itself ($52,734,750 divided by 183,088).

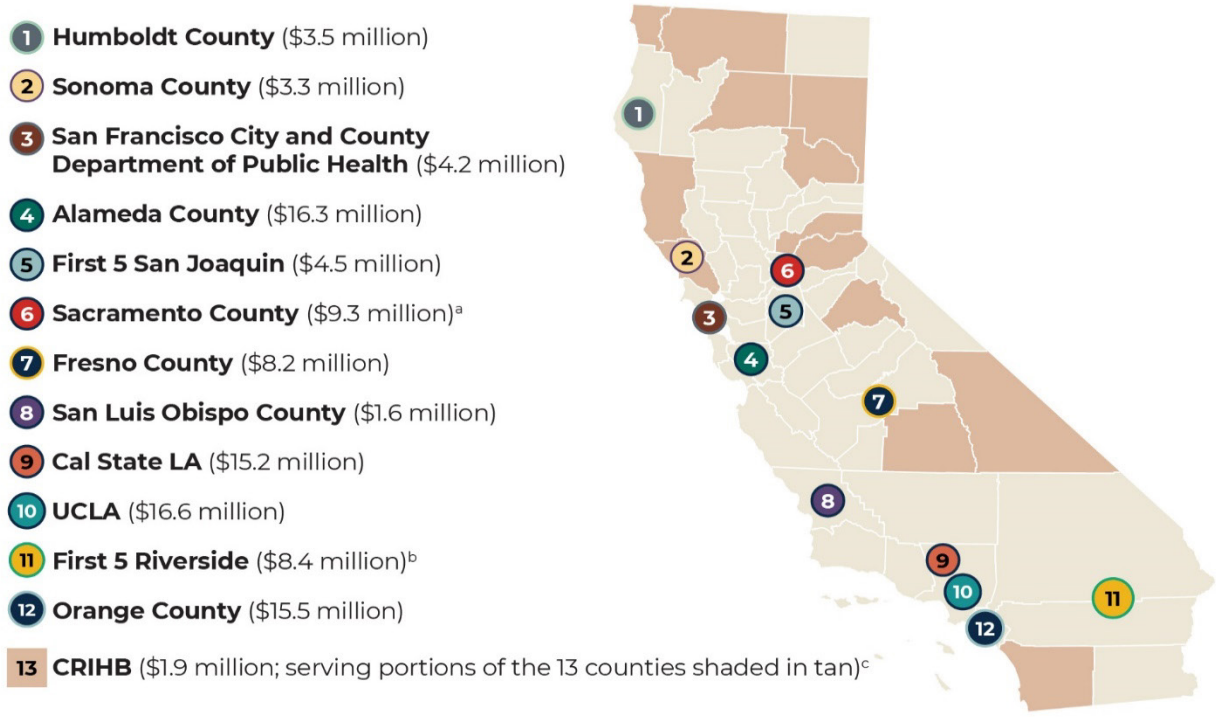
To estimate cost per additional benefit attributable to Domain 3, we multiplied the estimated impacts on two-year continuity at any provider in each intervention year by the number of Medi-Cal beneficiaries ages 1 to 20 who were eligible for three consecutive months in the year and the year previous. Domain 3 led to on average 6,422 more Medi-Cal beneficiaries ages 1 to 20 having two-year continuity in dental exams per year, with Domain 3 incentive payments of $29,903,095 per year. Therefore, the cost of the additional Medi-Cal beneficiaries ages 1 to 20 having two-year continuity was $4,656 per beneficiary per year higher than the cost of any additional services those beneficiaries received ($29,903,095 divided by 6,422).

IV. Domain 4. Local Dental Pilot Project Case Studies

A. Background on local dental pilot projects

From February 2017 to December 2020, the LDPP component of DTI funded 13 pilot programs throughout California to test strategies for advancing one or more of the Domain 1, 2, or 3 goals: increasing preventive dental care, promoting CRA and evidence-based disease management, and improving continuity of care. DHCS received 23 LDPP applications and selected the 13 programs listed in Figure IV.1 (California Department of Health Care Services, n.d.(a)).[23]

Figure IV.1. LDPP names, locations, and funding amounts



Source: California Department of Health Care Services, Dental Transformation Initiative Final Annual Report, n.d.(b).

Note: Funding amounts rounded to the nearest $100,000.

[a] The Sacramento County LDPP worked in Sacramento and Amador counties.

[b] The First 5 Riverside LDPP worked in Riverside and San Bernardino counties.

[c] CRIHB served tribal and urban Indian health programs with dental departments serving portions of 13 counties in California (shaded in tan).

Cal State LA = California State University, Los Angeles; CRIHB = California Rural Indian Health Board, Inc.; LDPP = Local Dental Pilot Project; UCLA = University of California, Los Angeles.

Nearly all LDPPs built on prior investments, efforts, and partnerships in children's dental care when developing their models. Common planned activities included strengthening the capacity of the workforce, further integrating oral health into primary care, and promoting the use of telehealth technology. To conduct this work, LDPP lead entities—which included county health departments, First 5

[23] Appendix A, Table A.IV.1 includes more detailed information about each LDPP.

organizations,[24] and universities, among other groups—partnered with community health centers, private dental clinics, schools, universities, and nonprofit organizations. Most LDPPs—except one, which was a cross-county rural Indian health board—operated on a county-wide basis.

Methods: Case studies of Domain 4 LDPP

From September to December 2020, we conducted telephone interviews with respondents from all 13 LDPP lead entities. Each lead entity identified two to three partner organizations that we subsequently interviewed, for a total of 48 interviews. All interviews were recorded and professionally transcribed.

We approached each LDPP as a case study and extracted insights and lessons from lead agencies and partners about their experiences implementing their projects and the barriers and facilitators they observed in working toward the DTI goals. We reviewed background materials on each LDPP provided to us by DHCS, including the LDPPs' DTI Domain 4 applications and the annual and quarterly reports each submitted to DHCS. Finally, we conducted a cross-case analysis to identify common themes and compare LDPPs' approaches. Descriptions of LDPPs' successes, challenges, lessons learned, and progress against their stated goals are based on the interviews conducted by Mathematica and data the LDPPs self-reported to DHCS.

B. Findings

In this section, we (1) describe LDPP activities generally; (2) describe the LDPP core components in detail, including implementation experiences, challenges, and lessons learned; and (3) conclude with a discussion of LDPPs' feedback for DHCS. We base our findings primarily on a series of 48 interviews with all 13 LDPP lead entities and 2 to 3 of their partners between September and December 2020. We also incorporated observations about the LDPPs from interviews with state-level respondents conducted in fall 2021 and interviews with parents and caregivers of Medi-Cal beneficiaries from February to May 2021, where relevant.

1. LDPP activities

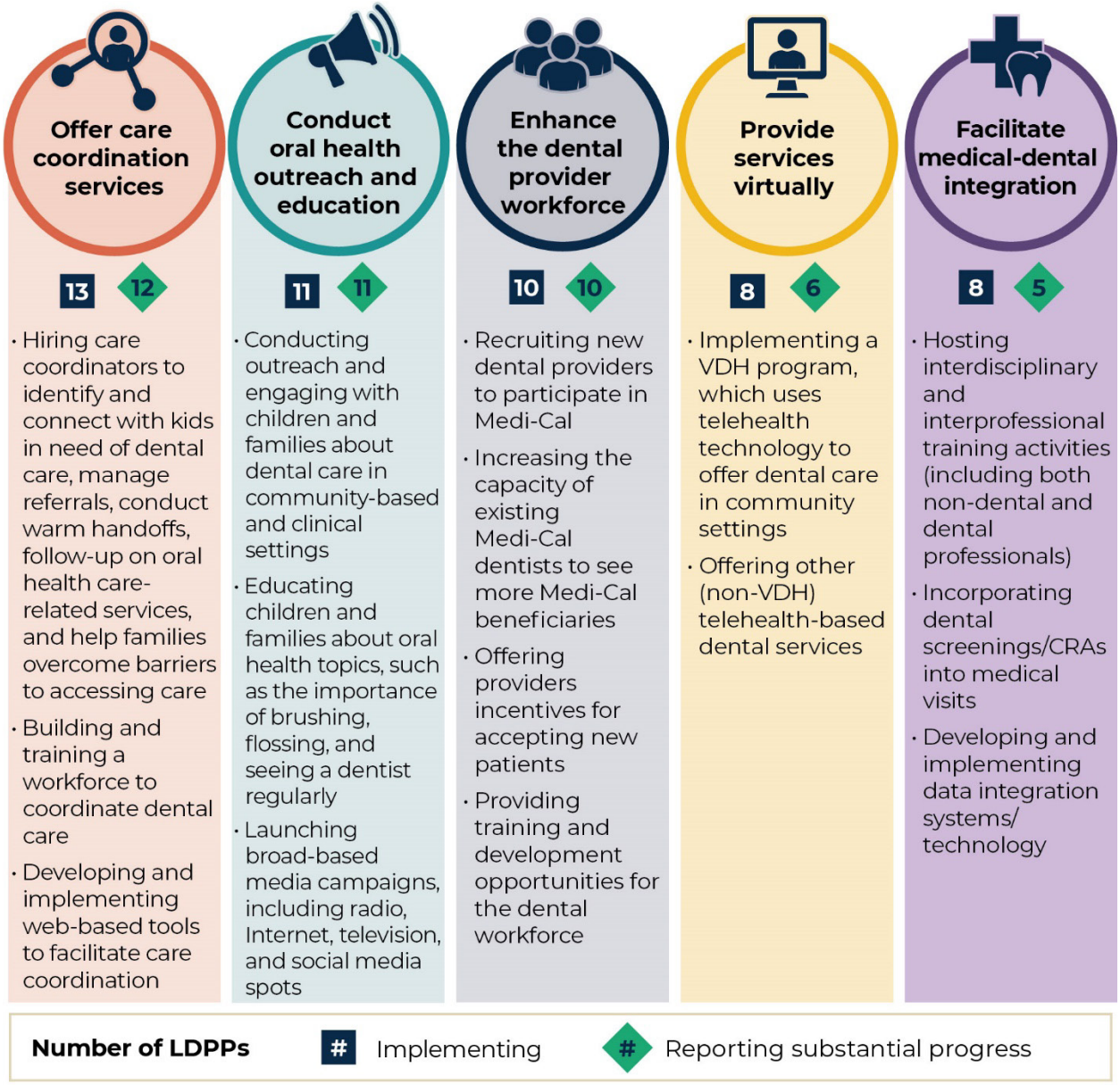
Although each LDPP designed and implemented a unique project with components and combinations of strategies tailored to local circumstances and needs, there were many similarities across LDPPs. In general, LDPPs worked to create demand for dental services through education campaigns. They also sought to expand the supply of dental services, primarily through capacity-building efforts in traditional venues, and by providing services in nontraditional settings, such as schools, medical offices, and other community locations. In addition, many LDPPs sought to create new types of staff, processes, and technology to facilitate and coordinate the care among providers and venues.

Within this broad framework, we found that LDPPs' strategies fit into five common components: (1) offering care coordination services; (2) conducting oral health outreach and education; (3) enhancing the dental provider workforce; (4) providing services virtually; and (5) facilitating medical-dental integration (see Figure IV.2). Each LDPP implemented several of these components; care coordination was the most common and appeared to be the most useful to integrate with other components. For example, care coordination strategies often supported strategies promoting oral health outreach and education,

[24] Each county in California has a First 5 commission dedicated to improving the lives of California's young children and their families through a comprehensive system of education, health services, child care, and other programs. Funding for First 5 organizations is levied from a state cigarette tax.

enhancing the dental provider workforce, and providing services virtually. Facilitating medical-dental integration and strategies to enhance the dental provider workforce also often went hand in hand.

Figure IV.2. LDPP core components



Source: Mathematica's analysis of LDPPs' application materials and interview data, January 2022.

CRA = caries risk assessment; LDPP = Local Dental Pilot Projects; VDH = Virtual Dental Home.

2. Implementation experiences, by core component

LDPPs implemented all the core components described above at least partially, with varying degrees of success. The following section describes the strategies, implementation experiences, challenges, and lessons learned for each core component.

a. Offer care coordination services

Dental care coordinators can play a critical role in identifying and connecting children in need to dental care, managing dental referrals, conducting warm handoffs, and following up on services related to oral health care. All 13 LDPPs provided some form of care coordination services to advance the goals of Domains 1, 2, and 3, and 12 of the 13 reported substantial progress in this area. For this component, LDPPs commonly hired community health workers (CHWs) and registered dental assistants (RDAs) to offer patients outreach and services. These services helped increase scheduled appointments for children and youth and helped connect families with resources and follow-up care. For example, Humboldt County created a Care Coordination Hub that linked patients to care coordinators who could provide them with a variety of services. These services included instructing patients on oral hygiene, preparing treatment plans, helping them make appointments for dental services, and providing them with information about how to access other resources to support their dental care and other social needs, such as transportation to appointments. Humboldt County's care coordinators also tried to meet families in convenient locations, including at home or in community health centers, mobile dental vans, schools, and homeless shelters. (However, once the COVID-19 pandemic began, care coordinators transitioned to mostly phone-based work.)

At the San Francisco City and County Department of Public Health (SFDPH) LDPP, bilingual health workers offered similar services, including translation services, appointment scheduling, education on appointment compliance, and promoting health messaging among Medi-Cal beneficiaries. Orange County organized mobile clinics that offered beneficiaries dental services and care coordination. Parents whose children visited the mobile clinics reported being satisfied with the convenience, attention to communication, and follow-up.

> *"It's more convenient for them when they're at school, so that they don't miss out on any of their classes. [Appointments] take an hour at most, and [children] have a check-up every six months. If they find something, they make another appointment… When they finish, they explain what they did, what can happen, how long [the child] could experience some discomfort, and that they expect to see [the child] at [their] next check-up. They're very friendly, and they explain everything they [do] in detail."*
>
> —Parent of Medi-Cal beneficiary in Orange County

Care coordination work at some LDPPs focused on building and training a workforce to coordinate dental care. For example, Sonoma County developed a curriculum and established a course at Santa Rosa Junior College to train community dental health workers (CDHWs), building off the county's CHW model. Through this curriculum, CDHWs (also known as "tooth fairies") gained linguistic and cultural competence to provide caregivers with appropriate information and to educate providers about community perspectives and cultural norms. They also learned important skills, such as how to explain what to expect at dental visits, facilitate transportation to dental services, and address other barriers to care, to support follow-up appointments and referrals.

As part of their efforts to coordinate care, several LDPPs sought to develop and implement web-based tools to enable care coordination. Alameda County expanded and transformed an existing care coordination database to better support data tracking, sharing, evaluation, and quality improvement. The project migrated the database's functionality to a web-based care coordination management system that was accessible to all community dental care coordinators and dental providers from any location. The project hired and maintained a workforce of at least 25 community dental care coordinators, including

many with bilingual capabilities, and reported substantial progress toward its goal of enrolling 15,000 children who had not received dental care in at least the previous 12 months into their care coordination program. Care coordinators also scheduled many dental appointments for children, including first appointments.

Care coordination brings Medi-Cal families tremendous value by helping them navigate the confusing dental care landscape, while providers benefit from a reduction in costly no-shows. Several LDPPs reported that they could not overstate the value of their program's care coordinators. One noted that care coordination was "the glue" that held all the LDPP components together by helping families understand and use their Medi-Cal dental benefits and by promoting continuity of care. LDPPs report that many parents are not aware that their child's Medi-Cal coverage includes dental coverage or do not know how to access these benefits and navigate the system without the help of a trusted care coordinator. Care coordinators play a critical role in helping families overcome fear or reluctance about seeking dental care, because they have developed trusting relationships with these families. In addition, providers appreciate care coordinators' work with families to overcome obstacles to care by assisting with making and attending appointments, resulting in fewer missed appointments.

Experiences of Medi-Cal beneficiaries who participated in LDPP services

Parents of children enrolled in Medi-Cal in LDPP counties shared positive experiences with dental care:

- Most parents reported they were very satisfied with their child's routine care provider. Parents described "kid-friendly" practices where children felt comfortable and calm and where providers took the time to clearly communicate with parents and explain treatment.
- Most parents found it easy to schedule an appointment that fit their schedule. Several parents who took their child to an appointment booked their child's next appointment while at the office. Several parents also noted they were able to make appointments within one week of calling.
- Most parents were satisfied with the wait time in the office and reported the dental office was either or a short drive away or within walking distance.

Source: Interviews with 58 Medi-Cal parents and caregivers in LDPP counties in February through May 2021. These views might not be generalizable to all children who participate in Medi-Cal, because these children might have received additional services (such as care coordination) or had access to a mobile dental unit. ◢

To optimize this strategy, LDPPs reported that hiring full-time care coordinators from the local community worked best for three primary reasons: (1) it allowed care coordinators to dedicate themselves fully to the work (rather than requiring dental assistants or other staff to do the care coordination work in between their other duties); (2) care coordinators were familiar with the social and cultural norms of the communities they served and were therefore able to develop deep relationships with parents and families; and (3) in some communities, local care coordinators developed a strong community resource network, which was important during crises, such as the COVID-19 pandemic and California wildfires. To be effective, care coordinators also need a strong understanding of how the Medi-Cal program works and what services are covered, and the flexibility to approach their work according to their local context. For example, Humboldt County reported success developing standard trainings and scripts for care coordination staff, but then allowed each health center with care coordinators to implement coordination activities based on the clinic's overall workflow.

> *"Seeing these community health workers connect with each other [to] build this powerful group of knowledge and caring and systems change has been really amazing to see. That was a lesson learned: how powerful it is for people who are transformed by the work they do to want to connect, and the need to connect about helping their community members through thick and thin."*
>
> —LDPP respondent

Spotlight: Cross-cutting challenges

LDPPs and their partners uncovered two major challenges that affected their ability to implement strategies as planned and to meet their stated goals:

- **LDPPs faced issues recruiting and retaining staff. Some counties reported long hiring processes, hiring delays, and high staff turnover, which led to many extended vacancies in LDPP positions.** For example, Sonoma County reported challenges retaining CDHWs. Interviews with clinics found that some CDHWs left their positions to pursue more education or professional growth, leaving the clinics short-staffed. Vacancies created capacity challenges for the remaining staff and sometimes meant that planned work could not be executed. Alameda County also reported high levels of turnover among care coordinator staff and dentists in health center locations; because the project was temporary, care coordinators would leave after finding a permanent position. The California Rural Indian Health Board, Inc. also reported high levels of turnover among dentists at health centers located in rural communities, because some dentists in these communities are placed in these centers through participation in a loan repayment program and leave the centers once the program is over. Respondents from First 5 San Joaquin noted that unexpected staff turnover among the community health center Virtual Dental Home (VDH) teams and care coordinators slowed progress in some sites, as each new staff member required time for hiring, onboarding, and training, and to develop relationships in the community.
- **The COVID-19 pandemic introduced myriad challenges that delayed or halted some LDPP activities.** COVID-19 impacted every aspect of LDPPs' core components and activities. With state and local stay-at-home orders, in-person outreach and education events ceased, dental clinics were closed except for emergencies (for several months, in some counties), and even VDH locations such as schools and centers offering services through the Special Supplemental Nutrition Program for Women, Infants, and Children were closed for in-person education. LDPPs had to delay trainings and workforce development opportunities. However, some were able to make them accessible via online videos and webinars. LDPPs adapted to the new environment and found workarounds for some activities, such as by mailing dental kits or passing them out at food distribution events. ◢

b. Conduct oral health outreach and education

Promoting oral health and conducting outreach in community-based and clinical settings helped LDPPs connect with families and provide them with information about maintaining oral health; community partnerships were key to supporting these efforts. Eleven LDPPs sought to raise families' awareness of the importance of dental services by incorporating into their projects outreach and education strategies to promote oral health. Messaging focused on preventive care and care coordination and thus primarily advanced the goals of Domains 1 and 3. All of the LDPPs reported successful partnerships with a number of key organizations in their communities. For example, the LDPP at California State University, Los Angeles (Cal State LA) supported interdisciplinary "bridge teams," comprising students and interns who worked to build trust with community-based partner agencies and educated them on how to promote oral health. By the end of 2020, Cal State LA partnered with more than 100 distinct community entities, representing more than 350 individual program sites. Using these partnerships, the LDPP participated in community outreach events, including speaking to parent groups, conducting workshops on how to promote oral health, hosting developmental disabilities events, and attending urban American Indian and Alaska Native workshops and powwows. Modeling its approach after the successful Reach Out and Read program, the California Rural Indian Health Board, Inc. (CRIHB) purchased selected children's books related to oral health and trained their project's oral health care coordinators (OHCCs) on how to use these books in primary care visits with families of children ages 1 to 12. Because of this initiative's wide reach, CRIHB considered it successful at increasing oral health literacy in clinical settings.

A few LDPPs supported oral health media campaigns. For example, First 5 San Joaquin worked with a marketing organization to implement a media communications campaign featuring a web page, radio spots, billboards, and so on, to convey messages on the importance and accessibility of dental care. The LDPP subsequently detected a notable increase in traffic to the sjteeth.org website. The LDPP at the University of California, Los Angeles (UCLA) partnered with Sesame Street in Communities to develop new media resources for raising awareness of oral health issues. The campaign created five videos featuring Muppet characters Grover and Elmo. By the third quarter of 2020, the videos exceeded the program's goals for views and engagement, leading to an increase in followers across all of the LDPP's social media platforms by the fourth quarter of 2020.

"Even though we felt like we were badgering people, sometimes, even though we've given information 10 different times, that might be the first time the parent is actually processing that information."

—LDPP respondent

LDPPs reported that the most effective approaches for delivering oral health education included using direct and encouraging messages, delivering them multiple times and in families' preferred language; incorporating dental education and activities into other events and programs can also increase families' engagement. Examples of messages that LDPPs reported as resonating with families include "nothing beats water," "brush twice a day and floss," and "first birthday, first tooth, first visit." Sometimes, families need to hear the message multiple times to absorb it. Offering families an item with the message printed on it, such as a refrigerator magnet, reportedly helped by giving families a visual reminder of the message. LDPPs commonly shared messages in English and Spanish, with some offering messages in additional languages, too. Some LDPPs found family attendance at events focused solely on oral health to be low, and that families were more likely to respond to oral health outreach and education when these elements were incorporated into other community-based programs, such as fairs and festivals sponsored by schools, Head Start, Boys and Girls Clubs, and the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). LDPPs thought schools were particularly effective places to reach children with oral health education, with some observing the benefits of educating children during school hours when parents—who might feel fear, anxiety, or shame related to their children's oral health—aren't present.

c. Enhance the Medi-Cal dental provider workforce

Offering providers training on the administrative aspects of Medi-Cal and professional development opportunities helped expand and strengthen the Medi-Cal dental provider workforce. Ten LDPPs worked to expand and strengthen the Medi-Cal dental provider workforce, which primarily advanced the goals of Domains 1 and 3; all reported positive effects. For example, Fresno County hired provider relations representatives (PRRs) with backgrounds in medical or dental sales to contact both Medi-Cal dentists who are not accepting new patients and non-Medi-Cal dentists, to educate them, recruit them to the program, or encourage them to treat more children enrolled in Medi-Cal. PRRs offered dental practices on-site education and customer support on Medi-Cal and DTI, including guidance on forms, paperwork, and billing for incentive payments.

"We have to keep maintaining the relationship with our providers in order to make sure that they are satisfied, or [that] they have good feedback as to accepting the Medi-Cal patients. We can help them address their issues."

—LDPP respondent

LDPPs offered dentists opportunities for clinical workforce development, including one-on-one, small-group, and larger convenings and courses. For example, Orange County sought to reach and train pediatric dental providers on Medi-Cal and DTI opportunities by hosting twice-yearly forums and annual summits for current and prospective Medi-Cal providers. Dentists from across the state attended the forums, and topics included silver diamine fluoride treatments (a liquid substance applied to teeth topically to help prevent caries), Medi-Cal enrollment, teledentistry, and interim therapeutic restorations. San Luis Obispo County offered training and scholarship incentives to increase the number of hygienists trained to deliver preventive care services.

To increase the supply of dental services for children enrolled in Medi-Cal, a handful of LDPPs offered provider incentives beyond the standard DTI incentives and for different services. For example, CRIHB offered financial incentives for the number of completed treatment plans; Alameda County offered private dentists incentive payments for providing Family Oral Health Education services; and San Luis Obispo County encouraged providers to accept new patients by offering a stipend of $100 for each new patient younger than 20.

> *"We were building something that was really transforming the attitude about working with the Medi-Cal program, which is a relationship to a bureaucracy, as compared to the human quality of a partnership with people at the county level, and care coordinators who were embracing the need and taking it on. And we were there arming the dentists with confidence [and] competence, and they were part of a wide phalanx of providers who are willing to take on this issue."*
>
> —LDPP respondent

Appealing to dental providers' desire to help their communities can improve their longstanding negative attitudes toward Medi-Cal and encourage provider take-up. Several LDPPs described some dental providers' resistance to the statewide Medi-Cal dental program. They overcame this stereotype by focusing on the role dental providers can play in improving dental outcomes for children in their local communities. Providers valued being part of a broader local effort and responded positively to messages about how they can help. Fresno County noted the importance of the PRR, who offered providers a trusted person to help them navigate and "believe in the [Medi-Cal] system," particularly when paperwork was confusing or when it took time to obtain DTI incentive payments.[25]

d. Provide dental services virtually

Offering virtual dental services helped LDPPs connect with children in community-based settings; several expanded telehealth services, particularly when the COVID-19 pandemic hit. Eight LDPPs provided dental services virtually through Virtual Dental Homes (VDHs) or other telehealth strategies, to advance the goals of Domains 1, 2, and 3. These models often leaned on allied dental providers—such as RDAs, community dental health coordinators, and dental hygienists—to offer services in the community. Some LDPPs developed and implemented these programs for the first time, whereas others built on existing programs by expanding them into new settings. Six of the eight LDPPs that launched VDH programs or implemented other telehealth strategies made progress toward their goals. Some deviated from their original plans.

Broadly, the VDH model uses telehealth technology to expand the number of allied dental providers that work in the community and to link them with dentists in dental offices and clinics to offer dental care in

[25] In particular, and as discussed in earlier in this report, Safety Net Clinics faced a longer ramp-up period for the other DTI domains because of the unique structure of their Medicaid payments. It took time for the state to develop a process for the clinics to submit claims so they could receive DTI incentive payments.

community settings. The model can include synchronous care, where the patient is connected in real time to a dentist via telehealth technology, and asynchronous care, where the patient's chart is transmitted through a secure server for a dentist to review offline. For example, First 5 Riverside organized 12 VDH teams, each of which included a dental hygienist and a patient navigator or coordinator, to meet with families in schools, day care centers, Head Start sites, and other community settings. At the first visit, the VDH team would explain the program and determine whether a child had an established dental home. Families would then consent to receive VDH services either immediately or at a future appointment. VDH teams provided families with dental education; took patient x-rays; charted dental conditions; provided preventive procedures, such as fluoride treatments and sealants; and offered interim therapeutic restorations to families, as needed. The VDH team would forward each patient's x-rays and electronic dental record to a dentist at a community health center to review the record and prescribe a treatment plan.

"Starting a Virtual Dental Home is almost like starting a [dental] practice. Starting a practice is time-consuming. It takes five years before you build a practice, and that was a struggle."

—LDPP respondent

Adapting the VDH model to local contexts proved burdensome, but participants believe the model can be effective with significant investment in relationships and understanding of local conditions. Some LDPPs experienced technical challenges with adapting the VDH model to fit their local contexts. First 5 Riverside cited low adoption of VDH because of the physical and technical challenges of transporting VDH equipment. Some VDH teams opted to lease cargo vans, because their personal cars could not safely transport VDH equipment. However, they still found it physically daunting to set up and take down the VDH equipment every day. Sacramento County noted that it was difficult to make direct contact with parents, which is necessary to enroll the children in the VDH program. Several LDPPs partnered with schools and found that although VDH excited many schools, they struggled to find space and time for the program. Administrators, principals, school nurses, and teachers were also concerned that their workloads would increase if their school participated in VDH. Interviews with respondents with more of a statewide perspective highlighted similar challenges, including issues with obtaining parental consent to enroll children into the VDH program, procuring the necessary portable VDH equipment, and establishing patients through VDH methodology, rather than through an in-person visit, for billing purposes.

State-level respondents noted the potential for VDH to address all DTI domains and the value of reaching children in their local communities. Specifically, they thought VDH helped increase use of preventive dental services, created opportunities for teams to do CRAs and other Domain 2 components within schools, and offered significant opportunities for care coordination. However, because of the infrastructure and relationships required to implement a successful VDH program, LDPPs recommended allowing adequate time to ramp up these programs and establish strong working relationships with partners, especially schools. Some LDPPs overcame the difficulties of working with schools by coordinating with another program already working in the school, such as a Boys and Girls Club or the YMCA. Others noted that asking parent leaders to reach out and recruit other parents into VDH was an effective approach to overcoming some parent's initial reluctance to enroll

"Getting those parents who were connected to a lot of other parents, talking about how good it is, and having those kids come back and say, it was fantastic, or I really like the hygienist, it's easy, and spreading word of mouth that way [was beneficial]. If we had more time to do that, I'm sure enrollment would have been much higher than it was."

—LDPP respondent

their children. Undertaking an initial community needs assessment before implementing a VDH program might be useful in the future to identify potential challenges or concerns specific to individual communities. For example, some community health centers noted that they would have preferred using mobile dental vans over the VDH model, because it would have been more convenient for providers and potentially safer than requiring them to haul heavy VDH equipment in and out of schools and other sites. Another noted the importance of ensuring that Internet capabilities at VDH locations are adequate to support sharing information, and that this information would have been useful before launching the program.

Some LDPPs did not operate formal VDH programs but still offered virtual services to Medi-Cal members; COVID-19 provided some unanticipated opportunities for telehealth investment. LDPPs quickly pivoted activities and figured out ways to continue providing oral health services despite lockdowns and social distancing, with some reporting surprisingly positive results. For example, Fresno County had been hosting "dental days" at WIC centers where registered dental hygienists in alternative practice (RDHAPs) provided services in community-based settings. During the COVID-19 pandemic, they moved this community-based work to telehealth. Alameda County program staff also increased their support of teledentistry efforts to continue providing services to clients.

e. Facilitate medical-dental integration

The interdisciplinary and interprofessional training activities offered by LDPPs helped providers incorporate dental services into medical visits and coordinate across new data-sharing technologies. Eight LDPPs implemented strategies to integrate medical and dental care, advancing the goals of Domains 1, 2, and 3, with five LDPPs reporting substantial progress with these efforts. Activities focused on training medical and dental providers to incorporate dental care into medical visits reportedly showed promise. For example, UCLA developed and offered a no-cost, tailored curriculum for medical and dental providers for which they received continuing education credits. The curriculum for medical providers sought to help them understand what they could do to support oral health through their practices, and when they were eligible for reimbursement. Sacramento County hosted a monthly learning collaborative that included medical and dental providers as well as other stakeholders. The in-person gatherings provided medical and dental providers with opportunities to interact and form relationships while discussing topics such as how to incorporate behavioral health screening into dental visits and how to integrate preventative dental services into medical care settings.

Several LDPPs worked to incorporate dental screenings and CRAs into routine medical visits. For example, community health centers in Humboldt County that provided both medical and dental services worked to increase preventive dental services provided to children during medical visits and connect them with ongoing dental care. In some community health centers, care coordinators provided fluoride varnish, oral health screening, education, and referrals to the center's dental clinic during well-child medical visits. At least one health center also integrated dental care into prenatal visits, educating pregnant patients about the importance of taking care of their baby's oral health even before their baby has teeth, and providing these patients with the appropriate supplies. Humboldt County noted that its medical-dental integration component created a culture shift among community health center medical staff, who now consider dental care a basic foundational element of overall good health. Participating medical staff reportedly took more ownership over the task of connecting patients to oral health care; one community health center considered this change one of the "biggest wins of the LDPP."

A few LDPPs developed data systems to facilitate and modernize medical-dental services integration. For example, Sacramento County developed the Medical-Dental Referral and Navigation (MDRAN) system to identify children who have not had a dental visit in 12 months, facilitate referrals, "close the referral loop" with physicians, and track care coordination. Securing buy-in for the MDRAN system from medical groups required time, training, and multiple discussions about the value of the system, but these efforts reportedly paid off. For example, UCLA developed and implemented the electronic Los Angeles Dental Registry & Referral System (LADRRS), to document the provision of oral health services, track referrals between medical and dental providers, and gather data on oral health measures to inform program monitoring and decision making. By November 2020, the LADRRS team had onboarded approximately 140 providers, although use of the system remained low. Onboarding providers to the system took time, and accessing LADRRS presented an additional step in the workflow of already very busy providers. The LDPP initiated a pay-for-performance incentive to compensate providers for the time it takes to enter the information and generate referrals, but this incentive did not do much to boost uptake in the midst of the COVID-19 pandemic.

Integrating dental and medical care takes time, flexibility, and trust; integration might work best when there is buy-in from a medical champion at the practice and when dental professionals deliver the care in medical settings. LDPPs noted the importance of establishing partnerships with medical departments and staff early, as it took time to develop relationships, support medical-dental training activities, and develop appropriate workflows. Practices with supportive medical directors to champion efforts that required medical provider training or practice updates were deemed more successful. Those without high-level support found dental activities fell by the wayside in the face of other important priorities. Several respondents from community health centers believed that the most successful model for integrating dental activities into medical visits was to have an RDA or RDHAP "pop in" to a well-child visit to meet with the family, apply fluoride varnish, and establish a relationship for follow-up. Respondents noted that the model of asking medical assistants to integrate dental activities during well-child visits was less successful, because medical assistants often lack the time and expertise to provide these services. Finally, medical practices that could use electronic medical records to prompt the need for referrals were also reported to integrate dental care into their work more effectively and seamlessly.

3. Feedback for DHCS

Several LDPPs expressed appreciation for DHCS' willingness to support the LDPP work but wished for more engagement with them and with one another. LDPPs valued DHCS' investment in community-based oral health work under DTI. As one noted, deciding to take on DTI and the LDPP component in particular as part of the state's 1115 waiver was "a big deal." However, eight LDPPs expressed a desire for more substantive interaction with DHCS, including more communication about goals, outcomes, and the decision to not allow an extension of Domain 4. LDPPs wished their quarterly meetings with DHCS had included more attention to programmatic issues and opportunities to share progress and challenges. LDPPs also wanted more feedback on the quarterly and annual reports they submitted to understand whether they were meeting expectations or should be making course corrections. One LDPP noted that it appreciated the DHCS site visit conducted midway through the funding period and craved more such feedback and technical assistance. LDPPs also thought they could have benefited from opportunities to learn from one another about challenges and successes, such as through a virtual conference or other investments in LDPP continuous learning.

Future grant programs could benefit from built-in planning and phase-out periods and streamlined contracting and funding processes. Six LDPPs noted that the pilot program was short, and felt even shorter, because of the delays in contracting and funding at the outset, delays due to COVID-19, and the decision to not request an extension of Domain 4. Streamlining the contracting processes to enable work to begin earlier would have helped, providing LDPPs an uninterrupted five years to implement and test their models. State-level respondents offered similar observations, noting that it took a long time for the LDPPs to finalize contracts, establish partnerships, and begin work in earnest. The short duration of the program made it difficult to create lasting change or drive innovation. Six LDPPs said they would have appreciated more flexibility in purchasing equipment as well as clarity in how they could allocate their budgets. LDPPs felt the funding rules were too rigid and limited their ability to fund useful priorities, such as in-person convenings. Others noted inconsistencies in what were deemed allowable expenses, such as dental kits. Finally, one LDPP noted that it rolled over substantial funds each year and would have appreciated the opportunity to begin reallocating funding sooner in the grant.

To support improved oral health care going forward, DHCS should include more robust care coordination for oral health in the Medi-Cal program. Four LDPPs believe that DHCS should support systematic care coordination for the Medi-Cal oral health delivery system. They found care coordination to be valuable in educating families and helping them set and keep dental appointments. Several recommended working with local community-based organizations or health departments to offer care coordination, and that DHCS should consider reimbursing for these care coordination services. One noted that the new California Advancing and Innovating Medi-Cal (CalAIM) initiative should include more robust funding mechanisms for care coordination, and that health plans should be held accountable for the care coordination work that they are required to do. This feedback aligns with the findings and recommendations from a study of the LDPPs' care coordination efforts, that recommended California capitalize on the investment and momentum gained through the LDPPs' care coordination services by working with a variety of stakeholders to develop and adopt a comprehensive statewide plan for robust, community-based dental care coordination (Andrew, Gonzales, and Alongi 2020).

C. Sustainability

LDPPs demonstrated interest in sustaining activities after DTI, particularly those that they considered as having a strong return on investment. However, without dedicated funding from DTI, some LDPPs were unsure how they would achieve this goal. Some LDPPs identified potential alternative financial support, but none expressed the ability to sustain all activities. State-level respondents noted that the state ultimately allowed the LDPPs to keep any equipment they purchased for their LDPP activities, such as dental equipment, which should help them sustain certain activities post-DTI. However, covering costs for any staff added would likely be a challenge. We interviewed LDPPs as they were nearing the end of the LDPP demonstration period, and they were not yet certain about their future plans. We interviewed key informants a year later and thus were able to gain some insight on the activities that were and were not actually sustained.

LDPPs expressed interest in sustaining certain activities—including care coordination, educational and outreach strategies for providers or patients, VDH services, and partnerships—that were perceived as having high value, high impact, or low cost. For example, Alameda County identified care coordination services as essentially "paying for themselves" by reducing the patient no-show rate and planned to continue offering these services. Humboldt County, SFDPH, Sonoma County, and First 5 San Joaquin identified educational and outreach strategies for providers or patients, such as continuing to

share and promote educational videos, handouts, and websites that were developed through LDPP funding, as relatively low cost to maintain. They anticipated continuing these services, especially given that most of the messaging and lessons were already developed. Community health centers in Humboldt County were also likely to sustain the medical-dental integration component, because they saw value in embedding oral health into the medical clinic workflow, and the cost of these services could be covered by their regular encounter payment rate.

LDPPs acknowledged that some activities would need to be modified or to evolve over time. Notably, LDPPs thought that some activities, such as VDH services, were likely to continue but would need to be modified to remain sustainable and to better meet community needs. For example, Orange County noted that although all its community health center partners were committed to continuing VDH services, each center would adapt VDH services according to its needs. San Luis Obispo County noted that some schools would reconfigure the VDH approach to have dentists present during the VDH visits, which would enable them to develop a treatment plan during the VDH visit rather than requiring them to schedule a follow-up appointment. Key informants acknowledged that, although the data management tools developed in partnership with Oral Health Solutions to track and evaluate program activities are sustainable, they will require funding for ongoing software updates.

Despite interest, some LDPPs expected they would not have sufficient funds to continue activities, including care coordination, medical-dental integration, and VDH efforts. CRIHB noted that it was unlikely that clinics would continue supporting the work on oral health coordination, and without the OHCCs to encourage and support the incorporation of CRAs during primary care visits, it was unlikely that medical staff would continue incorporating CRAs into primary care visits in the future. Similarly, SFDPH shared that its work developing interprofessional collaborative practice and incentivizing community health centers to refer children from medical care to dental care ended when the LDPP's funding stopped.

State-level key informants noted that some LDPPs found funding to sustain certain activities in the short-term. UCLA used carry-forward funds from DTI to continue working with the partners at their school district to distribute oral health kits and provide oral health education at food distribution stations. One state-level key informant shared that First 5 San Joaquin secured funding through its county to rehire some of its dental care coordinators, allowing it to provide services through community health centers or other community-based organizations. Although its plan was not finalized at the time of our interviews, Fresno County intended to sustain some of its work by working with its Local Oral Health Program. Sacramento County's physician-to-dental referral component was sustained through funding from an unknown source and was working to receive ongoing funding from health plans. Finally, Riverside County provided First 5 Riverside with a follow-up grant to further develop its home visiting program to include dental care.

V. Lessons for Future Efforts to Improve Oral Health

As DTI came to a close, key informants viewed the program positively overall, particularly its goals, objectives, and effects on oral health care for children. They thought DTI complemented the state's other efforts to improve the dental components of the Medi-Cal program, such as Proposition 56 supplemental payments; administrative refinements to promote provider participation; and outreach efforts of the Smile, California campaign and California Department of Public Health's California Oral Health Plan to encourage Medi-Cal families to seek care. They perceived that DTI's incentive payments helped support the Medi-Cal dental provider workforce, promoted continuity of care, and elevated the importance of preventive dental services for children. Key informants also valued the partnerships among local health agencies, providers, community-based organizations, and state dental experts that were established through DTI. Those partnerships helped foster oral health at the community level and highlighted care coordination as a promising component to helping children access oral health care.

> *"The [DTI] program has helped to incentivize and push out [oral health] information in a positive way, so that it really is increasing the number of children and families who have a better understanding of what to do, and to, most importantly, have a place to go."*
>
> —Key informant

At the same time, key informants perceived lessons from the DTI experience that might have improved DTI's implementation and impacts. They thought the greatest challenges were the design and allocation of Domain 1 provider incentives and the implementation of the LDPPs. Although they agreed LDPPs' efforts to try new ways of providing dental care in the community showed promise in expanding and improving the overall structure and capacity of the dental safety net, they noted that LDPPs faced many challenges that could have been mitigated through more communication with DHCS and potentially having more time to overcome initial start-up delays and interruptions related to COVID-19.

A. Implications for CalAIM Oral Health implementation

As California implements its California Advancing and Innovating Medi-Cal (CalAIM) initiative—DHCS should consider lessons learned from DTI to further address and improve oral health care for children enrolled in Medi-Cal and other Medi-Cal beneficiaries. DHCS set an initial goal for CalAIM to have at least 60 percent of children enrolled in Medi-Cal use their dental benefits annually, up from 51 percent in 2019.[26]

Overview of CalAIM Oral Health

CalAIM is a broad effort to transition the Medi-Cal program into an approach to population health that prioritizes prevention and addresses the whole person, including their physical, behavioral, developmental, long-term care, and dental care needs (California Department of Health Care Services 2022d). CMS approved the California State Plan Amendment (SPA) 21-0019 to take effect January 1, 2022, leaving no gap between the end of DTI Domains 1, 2, and 3 and the start of CalAIM. ◢

To achieve greater access and use of dental services among the Medi-Cal population, CalAIM has incorporated aspects of DTI through modified versions of Domains 1, 2, and 3 (although CalAIM does not use the same domain terminology as DTI) (California Department of Health Care Services 2022e). CalAIM incorporates many of the lessons from DTI and recommendations from key informants and dental providers—for example, to expand incentives statewide and also apply them to the adult population. Most key informants thought these changes were reasonable and would still promote the

[26] Mathematica's analysis of Medi-Cal claims and eligibility data 2014–2021.

overall aims of the three domains, yet they were uncertain of the extent to which they will help the state increase preventive service use for children and adults enrolled in Medi-Cal.

DHCS should consider key informants' and dental providers' additional experiences with and reflections on DTI that could help improve the implementation and impacts of CalAIM. We describe each of the components in terms of how they compare with the original DTI domains, and potential implications of the changes and recommendations for implementation. (See Table V.1 for a comparison of DTI domains and CalAIM.).

Table V.1. Comparison of DTI domains to CalAIM features

DTI	CalAIM
Domain 1	**Pay-for-performance: Preventive services**
• Dental providers received incentive payments if they met or exceeded a 10 percent increase from their baseline in the volume of preventive care provided to children enrolled in Medi-Cal. • Providers near or at capacity benefited marginally from the incentives because they could not take a large volume of new patients.	• Dental providers receive performance payments for Medi-Cal adults as well as children. • Performance payments are flat-rate payments for each preventive service provided and not based on meeting a benchmark. • Providers will receive performance payments for both existing and new patients.
Domain 2	**CRA and SDF: New benefits**
• Dental providers in 29 counties were eligible to participate if they completed the required training.	• Dental providers in all 58 counties statewide are eligible to participate if they complete the training.
• Providers received a bundled payment for providing all services in the CRA bundle for a child from birth to age 6 at recommended intervals depending on the child's risk level. • The bundle included a caries risk assessment, nutritional counseling, and motivational interviewing; as well as applying SDF for high-risk patients.	• The CRA bundle will not include motivational interviewing. • SDF will be reimbursed as a separate service for children from birth to age 6 and for people who have underlying conditions that make nonrestorative treatment of caries preferable over restorative treatment. • Payment for completing the CRA bundle will be half of what it was under DTI.
Domain 3	**Pay-for-performance: Continuity of care**
• Dental office locations in 36 counties received an incentive payment for treating a child enrolled in Medi-Cal year after year.	• Dental office locations in all counties will be eligible for the performance payment. • The performance payment will also apply to treating adults enrolled in Medi-Cal.
• Incentive payments increased for each consecutive year a practice saw a child enrolled in Medi-Cal.	• The performance payment is the same amount each year a Medi-Cal beneficiary returns to the office and will be half the amount DTI provided for the first year a child returned (two years of continuous coverage).

CRA = caries risk assessment; DTI = Dental Transformation Initiative; SDF = silver diamine fluoride.

1. Access to and use of preventive services (Domain 1)

Under CalAIM, incentive payments to dental providers who administer preventive services will extend to treating adults and children. Providers will receive a flat-rate payment increase for each preventive service provided and do not need to achieve a certain percentage increase in the volume of services provided over a benchmark to receive the incentive. This structure should be more straightforward for

providers to understand and will better reward providers, including Federally Qualified Health Centers, that already treat many Medi-Cal patients.

Lessons from DTI suggest that pairing these incentives with additional supports could foster additional provider participation and further boost the use of preventive services. Key informants named several support methods to consider, including the following:

- **Expedite the payments.** Ensuring that the billing process for the incentives accommodates how Federally Qualified Health Centers are paid through their prospective payment system, and paying all providers more quickly after delivering services would help providers' cash flow. It would also help them better anticipate how increasing the volume of services will affect them financially.
- **Conduct a more explicit provider recruitment strategy.** The state could do more to promote providers' participation in Medi-Cal. For example, it could build on California Dental Association's focused communications with dental specialists about recent improvements in Medi-Cal to encourage their participation. It could also expand on DHCS' Administrative Services Organization's "door-to-door" effort to assist dentists with all aspects of participating in Medi-Cal, including enrollment and billing questions. The Fresno LDPP offered this type of dedicated support and found providers very receptive to it. To promote health equity, the state also could create incentives to encourage more people of color to enter the dental profession and work in underserved communities. One approach might be to expand student loan repayment programs for people of color (among the dental providers we surveyed, 19 percent of them said that offering more student loan repayment options could encourage more providers to provide dental care to children enrolled in Medi-Cal).
- **Offer more training opportunities.** Given the importance of starting preventive oral health care at a very young age, the state could do more to alleviate concerns that many general dentists have in treating infants and toddlers. Developing more training options could make dentists more comfortable and confident in treating this population. One option could be to focus more on strategies for treating young children in the TYKE program that providers must complete to participate in the CRA bundle and provide supplemental training for the providers already administering the CRA bundle. In addition, incorporating more such training into dental school curricula could help ensure that new dentists start their careers with these skills.

In addition, strategies to steer more Medi-Cal beneficiaries proactively toward providers could help promote timely and ongoing dental care. Key informants offered several suggestions for meeting this goal:

- **Mine and analyze data.** DHCS could review utilization data from Medi-Cal dental plans and DHCS' Administrative Services Organization to identify children who had not received services and contact them to link them to available providers. Utilization data could also help payers assign beneficiaries to a dental home and help providers know where they should focus their outreach efforts.
- **Ensure the value of care coordination.** Although the LDPPs and many key informants highlighted the importance of care coordination in linking Medi-Cal beneficiaries to needed dental care, they acknowledged the high cost of these services. More studies to determine whether care coordination is cost effective could help identify the most valuable structures for promoting timely and regular dental care, build funding support for those structures, and focus care coordination on populations that will benefit from it the most.

2. Assessing risk and treating caries (Domain 2)

Under CalAIM, the CRA bundle of services will expand statewide for children from birth to age 6 but with fewer elements. New providers will still be required to participate in TYKE training. Dentists will continue to be incentivized to administer the CRA, to see medium- and high-risk patients more frequently, and to provide nutritional counseling. The bundle no longer includes motivational interviewing; a key informant reported that two large clinical trials found that motivational interviewing did not impact early childhood caries. Domain 2 piloted the use of silver diamine fluoride (a topical solution to slow the growth of a cavity) for high-risk patients; CalAIM removes it from the CRA bundle and instead will reimburse it as a separate service for any child from birth to age 6. Dentists will be paid roughly half of what they were paid under DTI for providing the CRA bundle during a visit.

Lessons from DTI suggest that more could be done to engage Medi-Cal beneficiaries in managing caries risk. Key informants thought more outreach to educate Medi-Cal families about the importance of managing caries risk would be helpful in encouraging families to seek treatment at the recommended frequencies determined by the CRA. For example, DHCS could use existing data about the prevalence of oral disease among children enrolled in Medi-Cal —including the prevalence of broken teeth and abscesses that require prompt attention—as a call to action for Medi-Cal families.

3. Improving continuity of care (Domain 3)

Under CalAIM, the performance payment to promote continuity of care is a flat payment of $55 for each year that a beneficiary returns to a dental practice; it extends to all dentists statewide and applies to both adults and children enrolled in Medi-Cal. Under DTI, the incentive was a graduated payment for each consecutive year a patient returned to a practice (up to $140[27]). A key informant said the payment change was based both on budget factors and findings that a graduated payment did not produce sufficient increases in continuity of care.

Lessons from DTI suggest that helping providers encourage patients to return year after year and potentially expanding which entities can receive incentive payments might help increase continuity of care. One key informant suggested creating sample outreach messaging and communication tools for providers to help them explain the importance of establishing a dental home and the benefits of seeking continuous care through that dental home. Other key informants thought that providing incentives, either to community partners (for example schools, Head Start, and WIC) to encourage the families they work with), or to families directly, to obtain care at the same provider year after year, might also help. However, there is no current funding source identified to create such incentives.

4. Providing care in the community (Domain 4)

The LDPPs ended according to the original DTI schedule on December 31, 2020. By the end of 2021, some LDPPs secured funding to sustain certain activities in the short term, typically through other local dental-related programs (see Section IV). CalAIM does not include LDPP-like models that fund collaborations among community-level entities to implement oral health strategies to promote preventive care, manage caries risk, or encourage continuity of care.

[27] The original DTI Domain 3 incentive payments ranged from $40 to $80 annually. In January 2019, the range increased from $100 to $140 annually.

> *"They have a very good dentist because... How should I put it? They help you make appointments, and they go to the kids' schools, so that [the kids] don't have to miss a whole day of class. They're very attentive with the kids, so [the kids are] not afraid to visit the dentist. It's fast, and the staff are very friendly, and they explain everything."*
>
> —Medi-Cal parent

Still, some aspects of the LDPPs will continue statewide through CalAIM. For example, CalAIM will use medical managed care plans to promote the integration of dental and medical care, as well as coordination of care across medical, dental, and social services. Key informants saw promise in efforts to involve medical providers more in ensuring children receive needed preventive oral health screenings and treatments, including referring them to dental providers. They also emphasized the importance of ensuring that dental care receives sufficient attention and that DHCS should monitor and enforce related managed care plan requirements (such as AB 2207).

Key informants also thought DHCS could do more to help develop dental services in community settings where Medi-Cal beneficiaries learn or receive other services. Ideas for how and why to do achieve this goal included the following:

- **Encourage dentists to expand their reach.** This approach could help meet children where they regularly visit, such as schools and WIC and Head Start sites. DHCS could develop incentives for working in alternative settings and demonstrating the potential financial impacts on their practices of providing these services with support from other staff (non-dentists). A key informant reported that dentists who participated in the virtual dental home model (as several LDPPs implemented) gained more business, because the model identifies dental issues that need to be addressed by a dentist.
- **Broaden expectations of Medi-Cal managed care plans.** DHCS could encourage the plans to establish community relationships. These connections could include requiring managed care plans to contract with local organizations that have established relationships with Medi-Cal beneficiaries and devoting resources to support them.
- **Use data to identify areas of greatest need to help address health disparities and promote health equity.** Key informants noted how Hispanic Medi-Cal beneficiaries and Medi-Cal beneficiaries of color often live in "dental deserts," and the few dental offices near them are focused on the commercially insured population. DHCS could mine existing data on demographics and social determinants of health—or start collecting these data if they do not exist or are incomplete—and draw on them to determine whether to dedicate resources.

> *"The dentists explain everything, the whole procedure in Spanish, or if they don't speak Spanish, they have a translator present. That's good, because sometimes you go to the dentist and they can't even understand you. But there, the dentist gets a member of staff who speaks Spanish, and they explain everything—like he has this and this, he needs another appointment, you need to bring him in to get his teeth cleaned or for a filling—all of that. I like that place."*
>
> —Medi-Cal parent

- **Inform Medi-Cal beneficiaries about the value of and options for obtaining oral health care in alternative settings.** In addition to broad outreach campaigns, DHCS could enlist the managed care plans and community-level entities in more customized, community level campaigns. One key informant stressed the importance of efforts to explain to Medi-Cal beneficiaries that receiving dental care in a community setting can be a more accessible and efficient option than going to a dental office.

B. Supporting future dental care transformation efforts

Lessons from the LDPPs suggest that more collaboration between DHCS and dental experts, providers, and community agencies and organizations is vital to assess and improve the effectiveness of new strategies to improve oral health for Medi-Cal beneficiaries. DHCS could spend more time gathering input from these entities on the types of measures that are helpful and feasible to track and reassessing these measures throughout implementation to determine how well they work. Collaboration could also include exploring innovative ways to assess progress beyond provider participation and data to include other measures to track progress in areas such as provider and beneficiary satisfaction and health equity.

In addition, DHCS could offer more opportunities for providers, community organizations, and others participating in new incentives and implementing new strategies to share their experiences with DHCS and with each other. From these interactions, DHCS could establish focused learning resources and sessions to help providers and entities learn about and apply best practices from experts and their peers. Further, explicitly sharing data and early findings as entities implement changes would offer opportunities for adjusting strategies throughout their implementation to maximize the impact of the changes and improve outcomes for Medi-Cal beneficiaries.

VI. Discussion

To accelerate improvements in dental care and oral health for children enrolled in Medi-Cal, DHCS implemented a multifaceted set of interventions with DTI. DTI combined statewide strategies and county-based components that promoted the use of preventive dental services, the prevention and management of early childhood caries, and continuity of care to advance the overall health and well-being of children enrolled in Medi-Cal. The state hoped that DTI, combined with several other important policy and program changes focused on oral health for families with low incomes, would boost historically low rates of provider participation and improve access to dental services.

Key design components included the following provisions:

- Incentives for dental providers who met benchmarks for increasing the number of children to whom they provided preventive services (Domain 1), and in some counties, for dental offices that provided dental care to the same child year-to-year (Domain 3)
- Training and reimbursement for dental providers who use a bundled package of dental services that includes use of a CRA tool and related education and motivational interventions for caregivers (Domain 2)
- Funding for 13 pilot programs throughout California to test community-level strategies for advancing one or more goals of Domains 1, 2, or 3 (Domain 4)

Through these intervention components, DTI aimed to increase dental provider participation in Medi-Cal; increase the number of children enrolled in Medi-Cal who receive preventive dental services by 10 percentage points; encourage dental providers to use evidence-based disease management to prevent and treat more early childhood caries, thereby reducing the need for invasive and costly restorative procedures; and increase dental continuity of care.

A. Did DTI achieve its ambitious goals to improve access to care for Medi-Cal beneficiaries?

The results of our evaluation suggest that DTI helped California make considerable progress in improving access to dental care for children enrolled in Medi-Cal. Overall, we found evidence that Domain 1 increased preventive care among children enrolled in Medi-Cal before 2020, when the COVID-19 pandemic and the resulting mitigation efforts deterred people from seeking health care services. Estimates suggest that by 2019, DTI had increased preventive care use in this group by about 4 percentage points. We also found evidence of increases in the use of other dental services, with small but statistically significant impacts on any dental exams, treatment services, and restorative services by 2019. These findings suggest that DTI increased access to dental services among children enrolled in Medi-Cal.

We also found evidence that Domain 2 changed the way many dental providers assess and treat early childhood caries among children enrolled in Medi-Cal. Approximately one in four of these children ages 1 to 6 in Domain 2 counties received an assessment for early childhood caries during the intervention period, with use of the CRA tool growing over time. Similar to the Domain 1 findings, by the end of the intervention, Domain 2 increased the volume of dental services received by children enrolled in Medi-Cal. Although most of the increase is due to use of the CRA bundled services, we found evidence that the intervention had some spillover effects on other preventive dental services. Taken together, these results suggest that DTI increased access to dental services among the children enrolled in Medi-Cal who were the focus of the Domain 2 intervention.

However, results from our impact analysis of Domain 3 show that the intervention did not improve continuity of dental care. Outcomes for children enrolled in Medi-Cal in Domain 3 pilot and expansion counties were not statistically or substantively better than those for children enrolled in Medi-Cal who lived in counties where Domain 3 was not implemented. This finding is consistent across several outcome measures designed to capture continuity of care.

Although the state made progress increasing the use of dental services during the DTI period, there is meaningful room for further progress. Although we found notable increases in preventive service use due to DTI, the increase was smaller than the Domain 1 goal of 10 percentage points. Although the COVID-19 pandemic disrupted the progress that DTI was making on children's access to preventive services, even without the pandemic, it is unlikely that Domain 1 would have achieved its goal. The evaluation also found that much of the increase in preventive service use was due to Safety Net Clinics increasing the number of children enrolled in Medi-Cal they serve. This finding suggests that participation in Medi-Cal among office-based dental providers might need to remain a priority area if California wishes to increase access further. In addition, despite the increase in preventive and treatment services and robust use of CRAs in Domain 2 counties, there is no evidence of meaningful impacts on restorative services across any of the domains. However, it might be too early to draw conclusions about the long-term benefits of DTI on oral health.

We also found no evidence that DTI widened the pool of dental providers participating in Medi-Cal. In fact, we found essentially the same number of dental providers providing preventive services to children enrolled in Medi-Cal in 2019 as we observed in 2015, the year before DTI.

B. Why did DTI have success in some aspects of the intervention, but fall short in others?

One reason for the varied effects across Domains 1, 2, and 3 (the three domains in which we were able to estimate causal impacts of DTI) might lie in how the incentives were structured. There is empirical evidence that increases in Medicaid reimbursement rates increases the willingness of providers to participate in Medicaid, and results in modest increases in dental use among Medicaid beneficiaries (Decker 2011, Buchmueller et al. 2015). Whereas Domain 2 led to a direct increase in the amount Medi-Cal reimbursed dental providers for providing the targeted dental services (from no reimbursement before the intervention), providers in Domain 1 were paid incentives for hitting benchmarks, and providers in Domain 3 received incentives for seeing the same Medi-Cal beneficiary over time. The simplicity of the reimbursement changes for Domain 2 services likely contributed to the stronger response of providers to Domain 2, compared to performance incentives of Domains 1 and 3.

Findings from the qualitative and provider survey components support the idea that the relative complexity of the Domain 1 incentives might have dampened their effectiveness in motivating change. Themes from the key informant and provider interviews included that the Domain 1 incentives were not top of mind for dental providers, the incentive process was not intuitive to dental providers, and it was difficult for providers to anticipate and reflect on how practice changes affected payments. Conversely, Domain 2's approach of increasing base FFS payments was straightforward; survey evidence suggests that participating providers had favorable views of the Domain 2 intervention and payment, with 85 percent of Domain 2 providers reporting they were somewhat or very satisfied with the payments they received for services.

A second reason that DTI could have fallen short of some of its goals is that, outside of the incentive payments, the initiative did not focus on addressing other barriers to dental provider participation in Medi-Cal. Our findings suggest the incentive payments motivated those already participating in Medi-Cal to provide more services or increase the number of children enrolled in Medi-Cal they serve, an important outcome, but did not lead to an overall increase in dental providers participating in Medi-Cal. We do not mean to suggest that the focus on provider payments is unnecessary for increasing access to dental care among children enrolled in Medi-Cal—only that the payments alone might not be sufficient. There are several reasons for this insufficiency, some of which have been highlighted by prior literature and this evaluation. Without motivating new dental providers to participate in Medi-Cal, initiatives like DTI might run into a "ceiling effect," whereby capacity constraints and other barriers to access (like geographical distribution or acceptability) might limit progress toward dental access and service use goals and could leave some Medi-Cal beneficiaries behind.

A third and related reason might be that DTI was designed to focus more on motivating provider change than on addressing barriers that Medi-Cal beneficiaries face in accessing dental care, outside of provider supply. It might be unrealistic to expect that dental providers can break down the multitude of barriers that Medi-Cal beneficiaries face in receiving regular dental care. Without additional supports aimed at addressing access, programs like DTI might fall short of their goals. These supports could include training or materials for providers on best practices in conducting outreach or educating families on oral health, more training options to help dentists become more comfortable and confident in treating infants and young children (which could include encouraging dentists broadly to take the TYKE training required for dentists participating in Domain 2), or they could focus directly on families of children enrolled in Medi-Cal.

Several of the LDPPs implemented components that were designed, at least in part, to address provider participation issues *and* beneficiary barriers. For example, they might have offered care coordination services to identify and connect children with dental care or conducted oral-health outreach and education in alternative settings. Several of these approaches showed promise. However, the efforts were relatively small in scale and were likely incapable of producing large impacts on dental outcomes among the full universe of children enrolled in Medi-Cal child. However, lessons from these programs might help future provider-focused efforts improve access to dental care for Medi-Cal beneficiaries.

C. What are the implications of evaluation findings about DTI for future oral health strategies?

Overall, the evaluation findings suggest that providing enhanced reimbursement can improve some aspects of access to dental care among children enrolled in Medi-Cal. However, the structure of the provider incentives and the persistence of other barriers play an important role in the success of initiatives like DTI. As we describe in Section V, California is sustaining versions of DTI Domains 1, 2, and 3 through its CalAIM initiative. In designing and implementing CalAIM, California has already taken steps to address aspects of DTI that might have limited the impact of the initiative—most notably, simplifying the incentive structure to encourage preventive dental care and continuity of dental care. Also notable is the integration of dental and medical care, which might be critical in addressing the beneficiary-level barriers to care that might have prevented Domains 1 and 3 from meeting their goals.

Developing an overall strategy to promote oral health care for children is neither an easy reach nor a short-term goal. It almost certainly requires a multilevel approach, combining broad investments in capacity building with more focused investments, such as DTI and CalAIM. California has embarked on a

commendable journey to modernize the Medi-Cal dental program to be more accessible and equitable for the beneficiaries it serves and the dental providers that participate in it. Using data to test and monitor California's progress in improving dental access will continue to prove critical in helping the state meet the ambitious goals it has set.

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