CAVITY FREE AT THREE CDC EVALUATION 2013-2018

Health Surveys And Evaluation Branch

COLORADO
Center for Health & Environmental Data
Department of Public Health & Environment

TABLE OF CONTENTS

Established in 2007, the Cavity Free at Three program trains medical and dental professionals to provide preventive oral health services for young children and pregnant women to ultimately decrease dental disease and reduce oral health disparities among high risk populations. The CF3 model includes eight standard practices, including caries risk assessment, oral evaluation, knee to knee exam, fluoride varnish application, counseling/education with primary caregiver, caregiver goal setting, provision of or referral to dental provider for a dental visit, and oral health services for pregnant women. The CF3 program moved from the University of Colorado's School of Medicine to CDPHE's Oral Health Unit (OHU) in 2013. In 2013, the Centers for Disease Control and Prevention (CDC) funded the development and implementation of a 5-year comprehensive program evaluation that concluded on August 30, 2018 (Grant #1U58DP004904). The OHU partnered with CDPHE's Health Surveys and Evaluation Branch to develop the evaluation infrastructure and implement the evaluation.

The evaluation was developmental in nature and included process, outcome and impact questions. Evaluation and programmatic infrastructure was built in tandem, and the process included frequent data reporting and feedback, a continual honing of the evaluation focus, and attention to results and continuous program improvement. The evaluation answered the following questions: What has been the reach of the CF3 training program? What are the facilitators and barriers to implementing CF3 in a provider's practice? What types of support would be the most helpful to implement after a CF3 training? What types of support and technical assistance did CF3 give to providers? How many providers were given support and technical assistance? What is the CF3's geographic and population-level impact?

The evaluation team developed data collection and reporting infrastructure through Qualtrics, an online survey platform, Freshdesk, a technical assistance tracking platform, and Tableau, a data visualization software package. The evaluation also utilized population-level data from CDPHE's Child Health Survey and the CDC funded Basic Screening Survey, as well as Medicaid billing data supplied by the Colorado Department of Health Care Policy and Finance via an interagency agreement.

Key findings of the 5-year evaluation include:

- 5,026 individuals have been trainings across Colorado, from 2007 to June 2018. 3,348 of these were medical providers, dental providers, students, or other health professionals.
- CF3 has trained providers and key partners in 73 percent of the counties in Colorado, both rural and urban.
- The CF3 training is positively impacting oral health practice changes of medical and dental healthcare providers: 56% of providers who responded to the post-training survey between 2015 and 2018 (n=195) reported they were fully implementing and 27 percent were partially implementing the CF3 model in their practice after the training. Implementation rates significantly increased for six of the eight oral health services covered in the CF3 training.
- Since 2015 when it was implemented, Freshdesk, the program's technical assistance platform, is mostly used as a place for individuals to communicate with CF3 staff about upcoming trainings. CF3

staff have responded to 602 technical assistance requests, most of which focused on training requests and registration assistance or logistics. The platform has also been commonly used to request mailed resources or request assistance with billing for services. The implementation of a webinar and billing assistance resource document in March 2017 resulted in a significant decrease in requests for billing assistance.

- The most common facilitators of CF3 implementation for both medical and dental providers are the CF3 training and the overall need for services in the patient population. Many providers do not experience any barriers to implementing CF3 (45% of dental providers and 26% of medical providers). When barriers are reported, inadequate time on the part of medical providers (27%) and staff turnover on the part of dental providers (16%) are the most common.
- While CF3 has made some positive impacts since 2007, population-level data trends cannot be attributed solely to CF3's work, as many partners within the state have been implementing strategies to improve children's oral health. However, it is reasonable to assume that CF3 played a key role in:
    - A significant decrease in the percent of Colorado kindergartners with untreated decay (45% to 31%) and caries experience (27% to 18%), between 2006-2007 and 2016-2017
    - The percent of Medicaid-recipient children (age 0-2) receiving oral health services by medical or dental providers has significantly increased from 23 percent in 2010 to 33 percent in 2017.
    - A significant increase in the percent of Medicaid recipient children who receive CF3 services during a Well Child Visit with a medical provider 0.5 percent in 2009 to 5 percent in 2017.
    - Medicaid-recipient children (all ages) who had a well child visit that included a CF3 service were 12 percent more likely to have a dental visit within 6 months.

While significant strides have been made to address the oral health needs of young children, there is still more work to be done. CDPHE is committed to further integrating the CF3 program with other public health initiatives and identifying ways to make systems-based changes that support the CF3 model and further expand the reach of CF3 into all medical and dental provider practices.

BACKGROUND

Cavity Free at Three (CF3) was established in 2007 by several local health foundations. The program trains medical and dental professionals to provide preventive oral health services for young children and pregnant women to ultimately decrease dental disease and reduce oral health disparities among high risk populations. The training outlines the oral health services that are standard of care for children and pregnant women including, but not limited to: caries risk assessment, oral evaluation, knee to knee exam, fluoride varnish application, and counseling/education (anticipatory guidance) with primary caregiver. In addition, Colorado Medicaid offers reimbursement of limited preventive oral health services in primary care settings, but requires primary care providers to complete a "certification" program for reimbursement. CF3 is one of the two qualified certification programs and to date, about 5,000 individuals have attended CF3 training.

In September 2013, CF3 funders worked with the Colorado Department of Public Health & Environment (CDPHE) to move the program from the University of Colorado's School of Medicine to CDPHE's Oral Health Unit (OHU). This transition allowed both the OHU and CF3 to align efforts, workforce, resources and strategic plans. In 2016, CF3 received funding from Health Resources and Services Administration (HRSA) to expand the work with the prenatal population and pilot health systems change work to increase the number of women who receive oral health services during pregnancy. The Centers for Disease Control and Prevention (CDC) funded clinical preventive services and health systems change work, which included the work of the CF3 program and its corresponding evaluation from August 31, 2013 - August 30, 2018. This report is the conclusion of the CDC-funded evaluation.

The CF3 evaluation has evolved over the years. Prior to CF3's move to CDPHE, programmatic data such as a handwritten sign-in sheet and training feedback survey, were collected at each training. This data was used to help track training numbers and provide the trainers with feedback on how the training was received by participants. The feedback was overwhelmingly positive about the training and trainers at the time when CF3 moved to CDPHE, which prompted CF3 staff to begin thinking about what was next to evaluate.

After the move to CDPHE, CF3 engaged evaluation support through the Health Surveys and Evaluation Branch (HSEB). HSEB worked with the CF3 program to plan the evaluation and build programmatic and evaluation infrastructure.

INFRASTRUCTURE DEVELOPMENT

During the 2013-2018 CDC funding cycle, CF3's greatest evaluation-related accomplishment was building its capacity and infrastructure to support evaluation and quality improvement efforts. The developed infrastructure helped to streamline data collection processes and improve tracking of trainings, trained providers and technical assistance, while providing real-time data for staff and key stakeholders. Table 1 provides a summary of the infrastructure elements developed, the technology adapted, and data collected or displayed within each element. This report highlights the technology used to develop each element of the infrastructure, the data collected or used for each element, and program improvements made based on the evaluation.

Table 1. Evaluation infrastructure elements developed.

Infrastructure Element	Technology Adapted	Data Collected/Displayed
Data collection	Qualtrics	# and type of trained providers, current and changes to oral health practice provided for children and pregnant women, facilitators and barriers to implementation, technical assistance needs
Technical assistance	Freshdesk	# and type of requests for technical assistance (tickets), # of tickets addressed
Data visualization	Tableau	Displays monthly numbers of providers trained, type of providers trained, oral health practice behavior change, facilitators and barriers for dental and medical providers, geographic impact of trainings

DATA COLLECTION - QUALTRICS

Qualtrics, an online survey platform, is the standard online survey platform used at CDPHE. Qualtrics enables CF3 to collect pre-training data from attendees as the time they complete their online registration. The online survey platform is set up for trainees to seamlessly pass a tablet around the training to sign in and ensures all providers who sign in at the training have completed the pretest. Qualtrics also automates the administration of post-test surveys and reminders, as well as, generate automated tickets or technical assistance requests in Freshdesk.

Technical Assistance - Freshdesk

Freshdesk is a free online technical assistance platform that allows CF3 staff to streamline technical assistance and training requests. CF3 receives technical assistance inquiries through Freshdesk in two ways, 1) through the online post-test, where trainees are able to request technical assistance support to implement the CF3 model, and 2) through a Freshdesk widget that has been embedded into the CF3 website and newsletter. The platform serves as a centralized communication hub which allows the CF3 team to address technical assistance needs, assign tickets to appropriate staff to respond, categorize and prioritize needs, and run reports on several metrics (e.g. number and type of inquiries received, time taken to address the inquiry). Also, in the event of staff turnover the Freshdesk holds all historical technical assistance requests so no communications are lost with partners or trainees.

Data Visualization - Tableau

Tableau is the data visualization platform used at CDPHE with many internal supports available (i.e., internal server, web developers, and learning community). Hosting the CF3 dashboard on Tableau allows for access to all of these services and the accessible interface increases the likelihood of data utilization by CF3 staff.

In August 2016, the evaluation team created a data dashboard for CF3 which included programmatic, community, and population level data. The dashboard's objective is to effectively disseminate and translate the data to program staff, internal partners, and external key stakeholders. The evaluation team continues to discuss with CF3 staff the functionality of the dashboard and make changes in accordance with feedback. Each tab on the dashboard reflects a different data source and provides CF3 with ongoing feedback about their program. Tabs and data sources include: Community assessment (population-level data), geographic impact (county-level training data), trainings by month, trainings by year (pre-test registration survey data), model

implementation, facilitators and barriers, and post-training practice changes (post-test survey data). The CF3 dashboard is available online here: https://www.colorado.gov/pacific/cdphe/Cavity-Free-at-Three-Dashboard

EVALUATION FOCUS & QUESTIONS

The CF3 evaluation was developmental in nature. The evaluation and programmatic infrastructure was built simultaneously, with continued feedback, looking at results and continuous improvements. In the CF3 evaluation plan, nine questions were proposed. While all questions were pursued, not all were answered due to the evolution of the program infrastructure. In addition to the originally proposed evaluation questions, two new evaluation questions were included to address CF3's overall reach, geographic reach and population-level impact on the oral health of infants and children. The impact evaluation questions were identified as an evaluation area of interest from local stakeholders due to CF3's 10 year anniversary in 2017.

The table below indicates whether an evaluation question was answered and where in the report to find results and details. If the evaluation question was not answered, an explanation of why this question was not answered will be presented in the cited section.

Table 2. Evaluation questions.

Evaluation question	Answered	For more information:
What has been the reach of CF3 training program? [New evaluation question, not proposed in CDC evaluation plan]	Yes	RESULTS, Pre/Post Data, p. 8
What are the facilitators and barriers to implementing CF3 in a provider's practice? What types of support would be the most helpful to implement CF3 after training?	Yes	RESULTS, Pre/Post Data, p. 8
What factors contributed to successful implementation of CF3 in practices?	No	RESULTS, Pre/Post Data, p. 8
What types of support and technical assistance did CF3 give to providers? How many providers were given support and technical assistance?	Yes	RESULTS, Technical Assistance Data, p.12
When should Support Follow-up occur? How should Support Follow-up occur? What can CF3 do to improve the Follow-up component? Did CF3 have a greater impact after implementing the Follow-up component?	No	RESULTS, Technical Assistance Data, p. 12
What is CF3's geographic and population-level impact? [New evaluation question, not proposed in CDC evaluation plan]	Yes	RESULTS, Impact Data, p. 15

The evaluation and data infrastructure developed for the CF3 program coincided and helped to inform the process and outcome evaluation which was used to inform program improvements and support sustainability efforts.

METHODS

A mixed methods approach was used to measure both process, outcome and impact measures of the CF3 program.

DATA COLLECTION PROCESS

Pre and post-test data

In 2015, a CF3 data collection process was developed to help streamline training registration, validate training attendance, and collect of pre and post-test data. Since then, all CF3 trainees register online for a training which includes a pretest that collects provider demographic information and current oral health services offered in their practice. Trainees must sign into each training to confirm their attendance and inform monthly training data. About two months after each training, trained providers who are able to bill for CF3 related services (e.g. medical providers, dental providers, medical assistants, and dental assistants) receive a post-test, which assess the level of CF3 model implementation, facilitators and barriers to implementation, and identifies technical assistance needs. The pre- and post-test design evaluates whether any differences in self-reported oral health practice behaviors exist from before to after the CF3 training.

Technical assistance data

The Freshdesk platform stores all technical assistance and training requests gathered through the post-test, CF3 website and newsletter. All requests are categorized into themes such as: training request, mailed resources, billing assistance, hands-on coaching, electronic medical record assistance, policy development, Medicaid/CHP+ application assistance, or other. The data is regularly pulled and shared with the program to inform training and program improvements.

Population-level data

In addition, population-level metrics are also tracked using the Child Health Survey (CHS), Basic Screening Survey (BSS), and Centers for Medicare and Medicaid 416 report (CMS 416), described below. CDPHE also receives periodic CF3 related data reports through an interagency agreement with the Department of Health Care Policy and Finance (HCPF), as HCPF has capacity to provide.

- Child Health Survey: was developed to fill the gap in health data in Colorado that existed for children ages 1-14 years and is conducted annually. Through a screening process, Behavioral Risk Factor Surveillance System (BRFSS) participating households with children ages 1-14 are called a few days later to conduct the follow-up survey on their children's health (i.e., physical activity, nutrition, oral health, access to health and dental care, etc.)
- Basic Screening Survey: is an in-mouth dental screening conducted with kindergarten and third grade students to assess caries experience, untreated decay, dental sealants and need for dental treatment. The survey is conducted every 3-4 years.

- Centers for Medicare and Medicaid 416 Report: State Medicaid agencies are required to report Early and Periodic Screening, Diagnostic, and Treatment (EPSDT) performance information annually to help ensure children under the age of 21 who are enrolled in Medicaid receive appropriate preventive, dental, mental health and developmental, and specialty services.

RESULTS

TRAINING DATA

This section answers the following evaluation questions:

- *What has been the reach of the CF3 training program?*

While CDC funding for CF3 began in August 31, 2013 the training data below are since CF3's inception in 2007 which demonstrates CF3's larger reach and impact. Data are reported based on calendar year, not fiscal year. From January 2008 to June 2018, 5,026 individuals have been trained at 332 trainings across Colorado: 839 medical providers, 476 dental providers, 1,719 students, 314 "other health professionals" (providers who cannot bill for CF3 services such as RNs and LPNs), 1,245 "other professionals" (e.g. office staff, office assistants, partners), and 433 individuals with an unknown provider type (they did not designate their profession on data collection tools). Figure 1 shows the respective number of CF3 trainings held and number of individuals trained per year.

Figure 1. Number of CF3 trainings held and trainees per year.

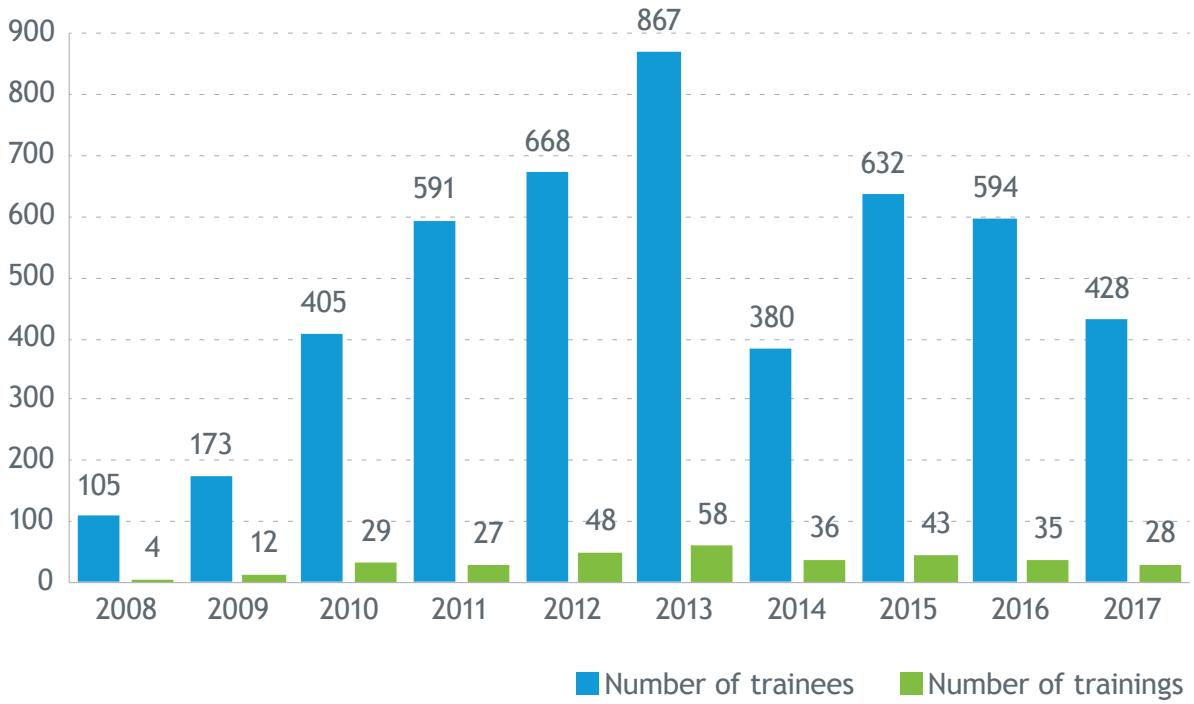
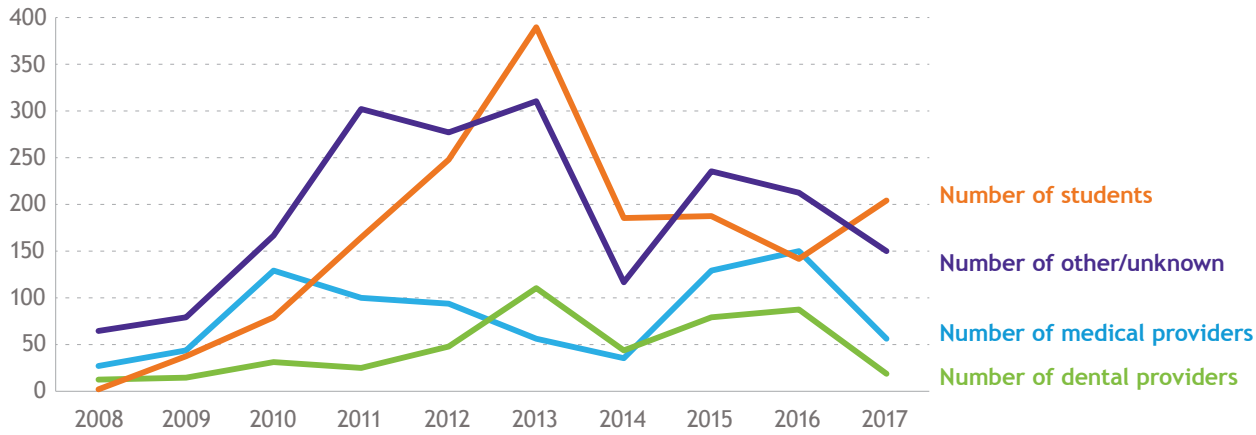


Figure 2 shows the number of medical providers, dental providers, students, and other/unknown trainees each year. The other/unknown category includes "other health professionals", "other professionals", and "unknown" provider type described above.

Figure 2. Number of CF3 trainees by provider type per year.



These trends show that CF3 increased the number of trainees of all types from 2008-2013. There was one year of decline from 2013-2014 when CF3 moved to CDPHE. After that transition period, CF3 again increased the number of trainees from 2014-2015. In 2016, CF3 focused on training more students, which is indicated by the increase in students trained from 2016-2017. From 2015-2017, there is a slight decrease in overall number of trainees which may be due to the implementation of a readiness assessment.

The readiness assessment was used to screen a clinic's ability to implement CF3 services. If the clinic demonstrated adequate readiness, the clinic was eligible for CF3 training. The CF3 trainings were more targeted towards clinic change efforts, rather than larger trainings where any provider or professional could attend. While the screening process decreased the quantity of trainings and number of providers trained, the screening process has been seen as beneficial since only clinics that were ready to implement the CF3 model were trained. The hope is for greater implementation and impact with providers. In the future, CF3 will be looking for ways to help clinics become ready to implement the CF3 model and support their practice transformation efforts.

PRE AND POST TRAINING DATA

This section answers the following evaluation questions:

- *What are the facilitators and barriers to implementing CF3 in a provider's practice?*
- *What types of support would be the most helpful to implement CF3 after training?*

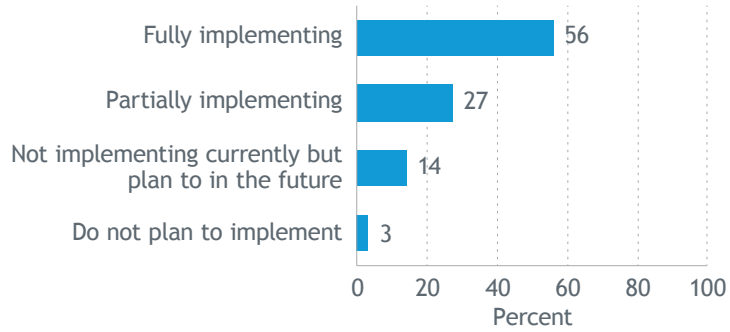
Unaddressed evaluation question explained:

- *What factors contributed to the successful implementation of CF3 in practices?*

Oral Health Services

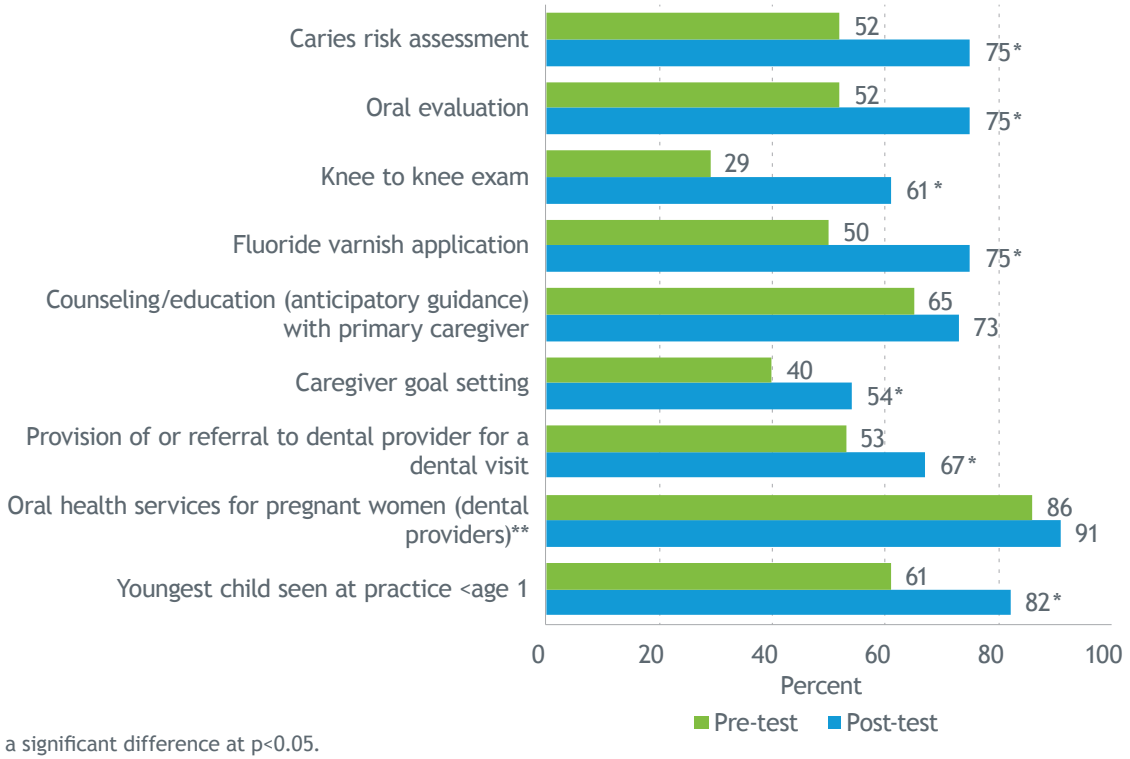
Since June 2015, 693 medical/dental providers and medical/dental assistants received the post-test. One-hundred ninety-five of those providers completed the post-test, which resulted in a 28 percent response rate. At post-test, slightly more than half of providers (56%) reported they were fully implementing the CF3 model into practice, 27 percent were partially implementing, 14 percent were not implementing currently but plan to in the future, and 3 percent do not plan to implement CF3 into their practices (Figure 3).

Figure 3. Self-reported level of CF3 model implementation (n=195).



To examine the impact of the training, paired samples t-test and chi-square analyses were run on pre and post-training data to assess the changes in oral health service implementation for children under age 3 and pregnant women. Overall, the results suggest that CF3 training is positively impacting oral health practice changes and provider behaviors. Post-test data reveals that six out of the eight standard CF3 practices are being implemented by medical and dental providers at significantly higher rates that they were pre-training (Figure 4). The percent of medical and dental providers providing counseling or anticipatory guidance increased from 65 percent to 73 percent from pre to post-training, however this change was not statistically significant. Also included in Figure 4, the percent of medical and dental providers reporting that the age of the youngest child seen by the practice as under the age of one significantly increased from 61 percent to 82 percent after CF3 training.

Figure 4. Oral health practice changes by medical and dental providers pre and post CF3 training (n=195).



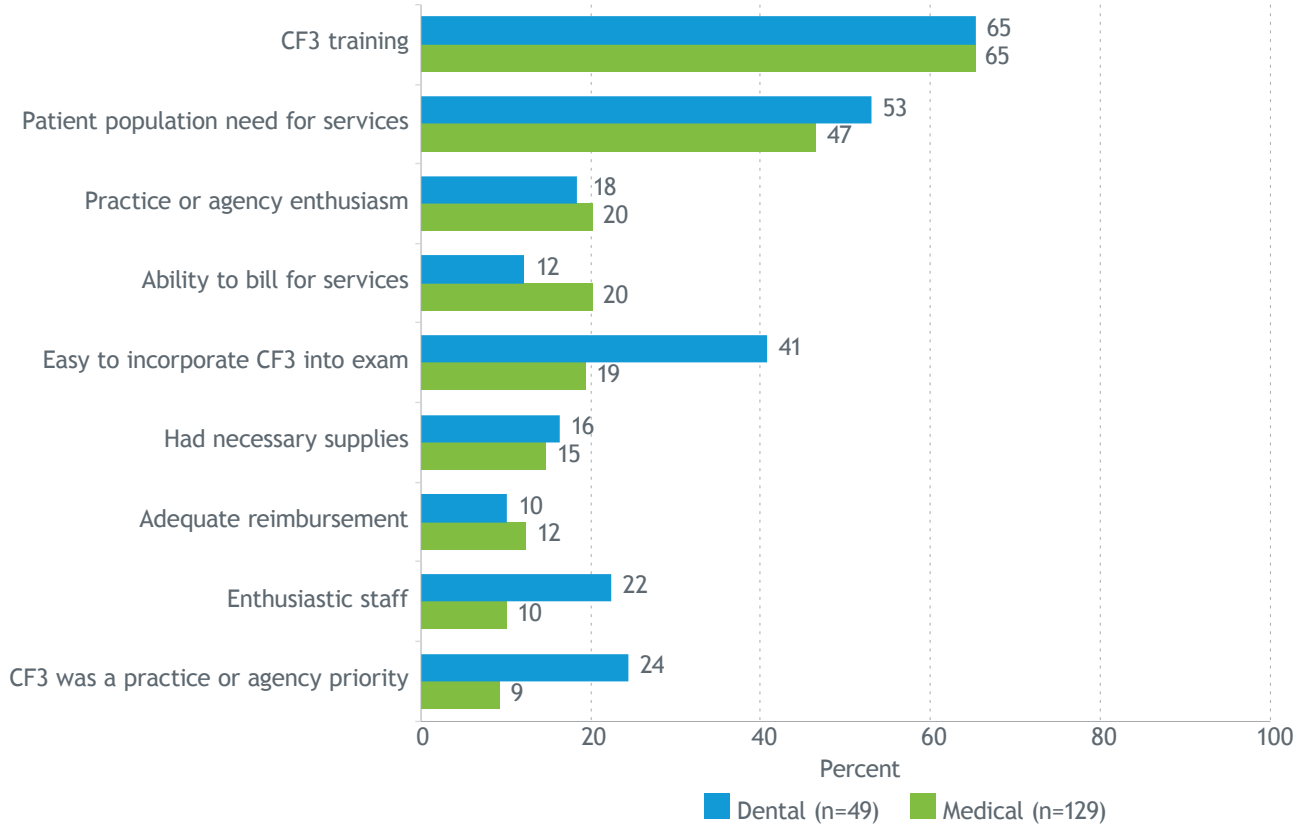
* indicates a significant difference at p<0.05.
** Denominator for dental providers (general dentists, pediatric dentists, dental hygienists, dental assistants) = 57.

Facilitators and Barriers

Overall, healthcare providers consistently report more facilitators than barriers to implementing CF3 at post-test. Medical and dental providers reported similar facilitators about the implementation of the CF3 model, whereas barriers differed amongst the two provider groups.

The most common facilitators for both medical and dental providers, continue to be the CF3 training and the children under age three patient population need for oral health services. The remaining most commonly reported facilitators, shown in Figure 5, vary between provider groups, but this is likely due to differences between the set up and support within medical and dental offices.

Figure 5. Most commonly reported facilitators to implementing CF3 model by provider type.



Few barriers were reported amongst the two provider groups. In fact, 45 percent of dental providers and 26 percent of medical providers reported "none" for barriers. The most common barrier for medical providers was "inadequate time to provide oral health services" (27%), while dental providers reported "staff turnover" (16%). Medical providers reported not having adequate time to provide oral health services, which is likely due to the competing priorities providers experience during a well child visit.

Program Improvements

The barriers informed improvements to CF3 technical assistance such as creating an implementation guide for organizations that are planning to be trained by CF3 and implement oral health services in their clinical practice in the near future. Among other tools and tips, the implementation guide provides instructions on how to develop process charts for optimizing clinic flow, which can help medical providers allocate time for oral health services. The best practices taught in the CF3 training are the caries risk assessment, the knee-to-knee approach for oral health screenings, the US Preventive Services Task Force (USPSTF) grade B and the American Academy of Pediatrics (AAP) recommendations for fluoride varnish application and prescription of oral fluoride supplementation by primary care providers. The CF3 training focuses on hands-on skill building to improve clinician competency to provide these services quickly and efficiently. Clear messaging that the CF3 model is based upon the USPSTF grade B and AAP recommendations helps providers understand, and thereby practice, the standard of care.

Unaddressed Evaluation Question

The evaluation question, "What factors contributed to the successful implementation of CF3 in practices?" could not be fully answered due to the nature of the self-report data available. The program was unable to obtain or connect the self-report data to clinical outcome or practice billing data which would help to operationalize successful implementation. Anecdotally, it appears that the CF3 training, a practice's awareness of patient's need for CF3 services, and ease of incorporating CF3 components into the exam procedure could lead to successful CF3 implementation.

TECHNICAL ASSISTANCE DATA

This section answers the following evaluation questions:

- *What types of support and technical assistance did CF3 give to providers?*
- *How many providers were given support and technical assistance?*

This section also addresses why the following evaluation questions were not answered:

- *When should Support Follow-up occur?*
- *How should Support Follow-up occur?*
- *What can CF3 do to improve the Follow-up component?*
- *Did CF3 have a greater impact after implementing the Follow-up component?*

Since adopting the Freshdesk system in April 2015, CF3 staff have addressed 602 tickets. Figure 6 shows the number of tickets addressed each year. Please note that the 2018 data reflect tickets from January 1 - June 30. The data in this chart indicate that Freshdesk was quickly integrated into CF3 communication processes and has continued to be a consistent form of communication over the past few years.

Figure 6. Number of tickets per year.

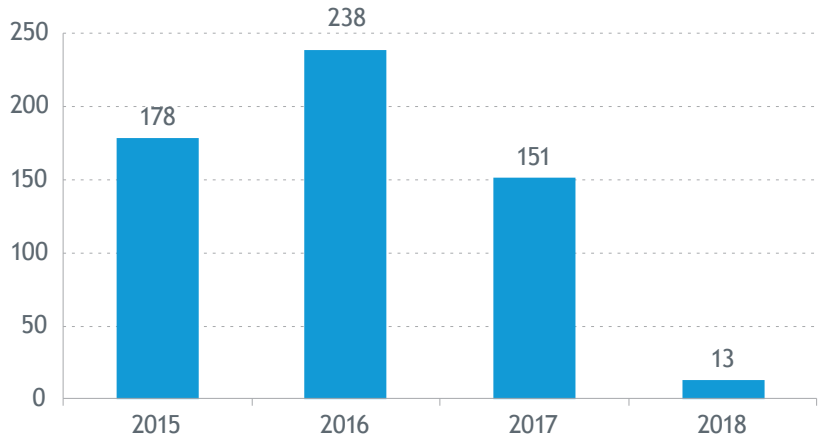


Figure 7 shows the number (and percent) of tickets submitted by each provider type. Of the types of providers listed, "Other/Unknown" providers (n=123, 19%) submit the most tickets to Freshdesk, followed by dental hygienists (n=114, 19%), physicians (n=72, 12%), and nurses (n=71, 12%). These data indicate that a variety of providers reach out to CF3 from both medical and dental professions, and are likely the providers who have more influence on practice transformation and may reach out to request a CF3 training or seek advice on implementing the CF3 model, for example. The large number of unknown providers is likely due to the self-report nature of the ticket form. Individuals are not required to fill in that field when they submit the form, so many people do not.

Dental hygienists have submitted the most technical assistance requests, followed by physicians, nurses, mid-level providers, and medical staff. Dental hygienists submitted the most training requests (n=46), followed by physicians (n=26) and mid-level providers (n=22). Dental hygienists also submitted the most requests (n=18) for mailed materials, followed by nurses (n=14). Medical staff and physicians both submitted the same number of requests for billing assistance (n=10), followed by dental hygienists (n=6).

Figure 7. Number (and percent) of tickets submitted by provider type.

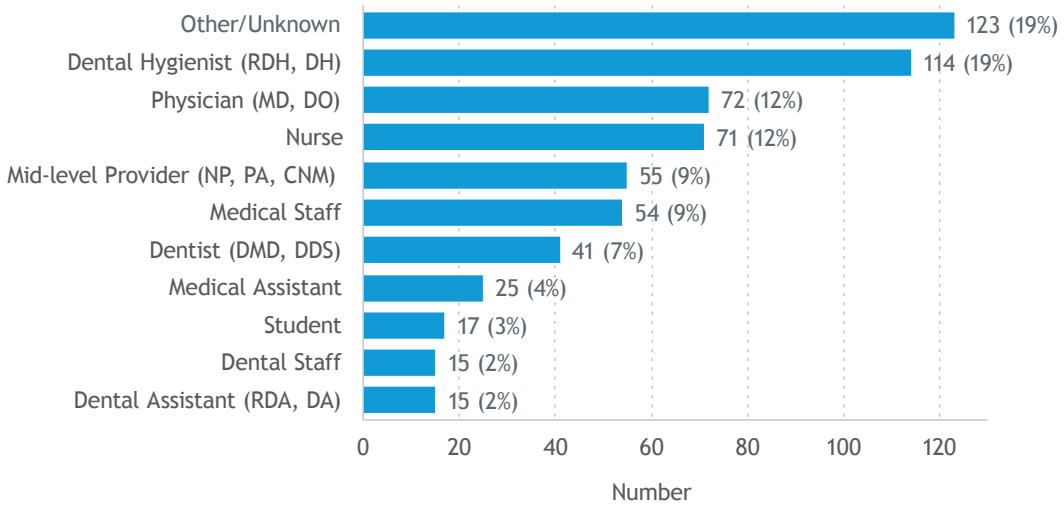
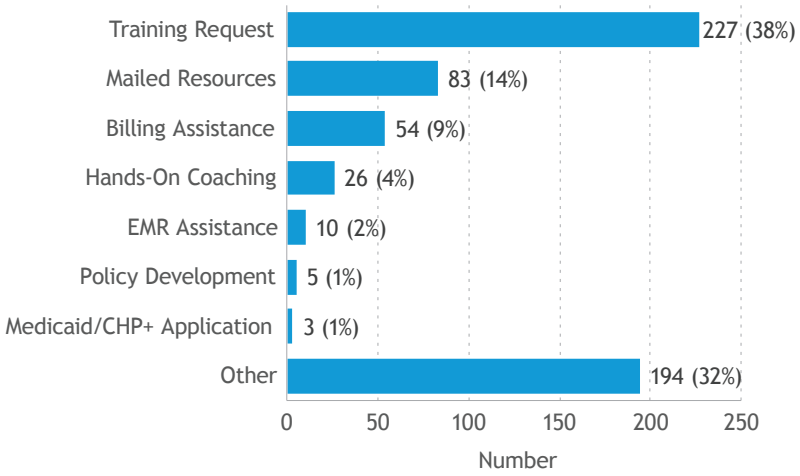


Figure 8 shows the number (and percent) of the types of tickets addressed within Freshdesk. Training requests are the most popular reason someone reaches out to CF3 through Freshdesk (n=227, 36%), followed by the "Other" category (n=194, 33%), mailed resources (n=84, 14%), and billing assistance (n=55, 10%). The "Other" category consists mostly of resolving training registration issues (e.g. re-sending the registration link), questions about training logistics (e.g. date, time, location, training certificates), communication regarding Master Trainers (e.g. how to become a Master Trainer), sending education curriculum scan results, and sending the CF3 implementation guide. These data indicate that Freshdesk is mostly used as a place for individuals to communicate with CF3 staff about upcoming trainings (e.g. requesting a training, resolving training registration issues, getting questions answered about training logistics).

Figure 8. Number (and percent) of types of tickets addressed.



Program Improvements

The top three types of tickets (training requests, mailed resources, and billing assistance) have been consistent since 2015. In response to the high number of tickets requesting billing assistance, CF3 has developed a webinar series to educate individuals about best billing practices and developed a billing assistance resource document for use in clinics. An independent samples t-test was run to explore the impact of creating the billing sheets on the frequency of billing assistance requests in Freshdesk. From April 2015 to March 2017 (when the billing assistance sheets were created), CF3 addressed 467 tickets, 46 (n=10%) of which were billing assistance requests. From April 2017 to June 2018, CF3 addressed 135 tickets, 8 (6%) of which were billing assistance requests. The independent samples t-test revealed that the frequency of times people asked for billing assistance significantly dropped after the billing sheets were created. CF3 makes program improvements based on Freshdesk requests, and these data indicate that CF3 is addressing the need for billing assistance through their billing sheets and webinar series.

In response to the high number of tickets requesting mailed resources, CF3 has made their resources more available on the website (e.g. reorganized the website so users can more easily search for and download resources), shared resources with online listservs, and printed resources in several languages for distribution at health care centers. These resources were released on the CF3 website on January 23, 2018. Not enough time has passed to look at the impact of this program improvement.

Unaddressed Evaluation Question

The Follow-Up Component evaluation questions were not answered because of low response rate to the post-test survey and lack of communication through Freshdesk. Ideally, trainees would request technical assistance through the post-test survey, a CF3 staff member would reach out to them to address the request, and the trainee and CF3 staff member could work with the provider to resolve the technical assistance request. In addition, information could be gathered about the effectiveness of these interactions through Freshdesk. Realistically, a low response rate on the post-test survey meant fewer people were requesting technical assistance than expected. CF3 staff followed up with trainees within one week after trainees completed the post-test, and unfortunately trainees rarely engaged in email or phone correspondence with CF3 staff about the request.

To improve the Follow-up Component, CF3 staff tried reaching out to providers multiple times to try to initiate conversation before "resolving" the technical assistance request in the system. Because CF3 was unable to gather meaningful information from the Follow-up Component, they were unable to understand if they had a greater impact after implementing the Follow-up Component.

IMPACT DATA

This section answers the following evaluation question that was added to the evaluation after the CDC proposed evaluation questions were created:

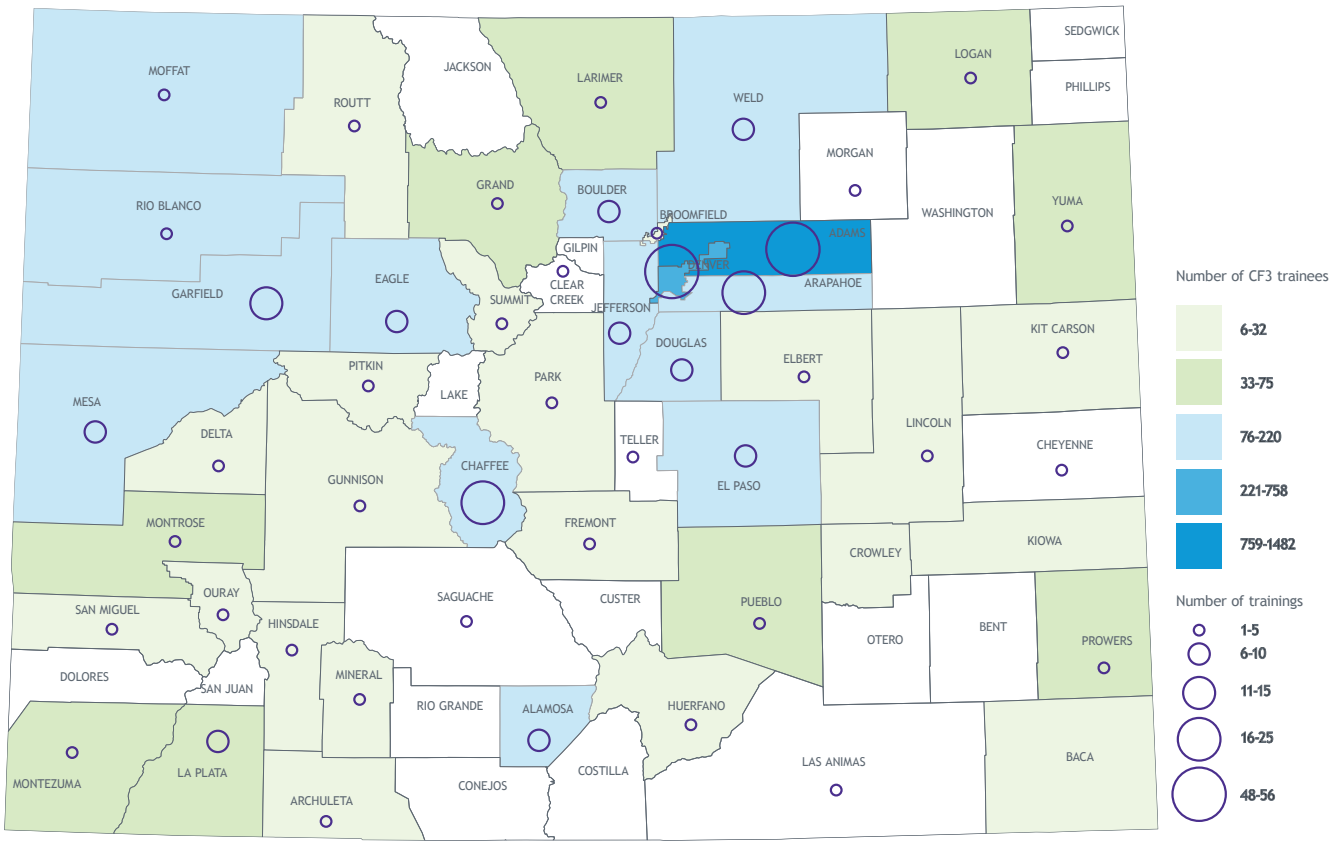
- *What is CF3's geographic and population-level impact?*

CF3's vast geographic impact around Colorado has allowed a variety of different providers in a variety of different healthcare settings to be trained. CF3 has also contributed to population-level data indicating improvement in children's oral health. While there has been CF3 success in certain practices, the program recognizes the difficulty in changing practice behaviors and creating sustainable practices within the clinic.

Geographic Impact

As of December 2017, CF3 had trained providers in 47 of Colorado's 64 counties (73%). Figure 9 shows the number of trainings and trainees by county from 2007 through 2017. CF3 has trained providers and supported practices implementing the model throughout both urban and rural Colorado. The urban counties reached the most by CF3 were along the Front Range: Adams, Arapahoe, Boulder, Denver, Douglas, Jefferson, and El Paso. The rural counties reached the most by CF3 were: Alamosa, Chaffee, Eagle, Garfield, Mesa, Moffat, Rio Blanco, and Weld.

Figure 9. Number of CF3 trainees and trainings by county 2007-2017.



Population-Level Impact

Population-level data helps the CF3 staff understand oral health needs and trends across Colorado. While CF3 has made some positive impacts since 2007, the population-level data trends cannot be attributed solely to CF3's work, as many partners within the state have been implementing strategies to improve children's oral health. It is also important to note that Medicaid expansion in 2012 was also likely a large contributor to changes in the Medicaid data. This section highlights the population-level data trends that CF3 has contributed to since 2007.

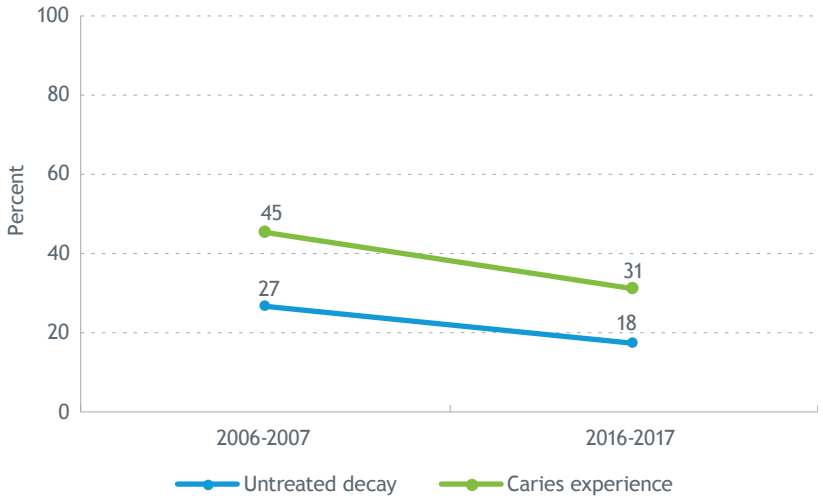
Child Health Survey

The CHS asks parents to rate the condition of their child's teeth. Children ages 1-4 with poor/fair condition of teeth has decreased from 4.3 percent in 2010-12 to 1.6 percent in 2016-17. Also, the percent of children ages 1-4 who have received a preventive dental visit within the past year has increased from 60 percent in 2010-12 to 64.8 percent in 2014-16. Due to small sample sizes for this age group, multiple years of data must be combined for prevalence estimates. While these trends are not statistically significant, they are in the desired direction.

Basic Screening Survey

The BSS also continues to show a decrease in the percent of kindergartners with untreated decay and caries experience (Figure 10). The decrease demonstrated below in disease burden for young children parallels the implementation of the CF3 program. Given that CF3 was the only long-term significant change in access to preventive care during this time period, and the research indicating the model leads to decrease decay (Braun, 2017), CDPHE attributes CF3 to contributing to these improvements.

Figure 10. Percent of kindergarteners with untreated decay and caries experience.*

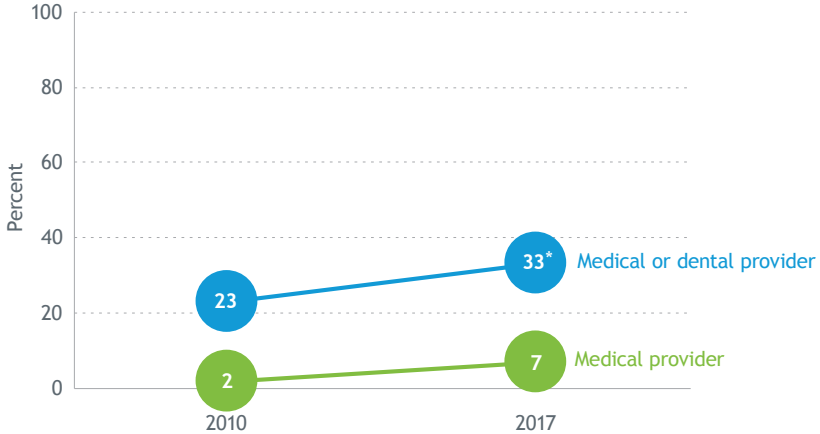


*The 2016-17 BSS introduced a new methodology and trends should be interpreted with caution, however, the authors believe the results of the trend analyses are valid.

Centers for Medicare and Medicaid 416 Report

The CMS 416 report is an important data source the CF3 program follows since the CF3 training is one of the required training options for providers to become a Medicaid billing provider for oral health services. Since 2010, the CMS 416 has shown significant increases in the percent of Medicaid-recipient children ages 0-2 who receive oral health services from a medical provider and from dentists or other qualified medical practitioners between 2010 and 2017 (Figure 11).

Figure 11. Percent of Medicaid-recipient children ages 0-2 receiving oral health services by provider type.



Data source: CMS 416 report. * Indicates a significant difference at p<0.05.

In 2017, HCPF conducted a linear probability model and found that Medicaid-recipient children who had a well child visit that included a CF3 service were 12 percent more likely to have a dental visit within 6 months. In addition, the percent of well child visits that include a CF3 service has significantly increased from 0.5 percent in fiscal year 2009-10 to 5 percent in 2015-16. The analysis demonstrates the uptake of CF3 implementation at well child visits. However, it is important to note that Medicaid claims data can include multiple visits per child and children between the ages of birth to 21.

CONCLUSION

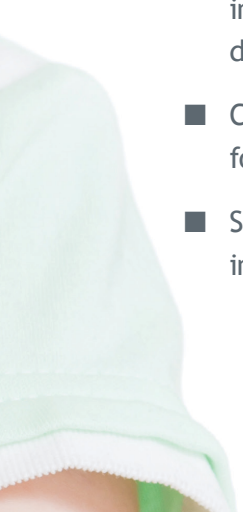
CF3 has raised awareness of oral health needs of young children and ways to address those needs through the training and subsequent support of over 5,000 healthcare providers, support staff, students and key partners in rural and urban Colorado since 2007. CF3 has contributed to practice improvements in both medical and dental offices, and to the significant increases seen in the number of young Medicaid-recipient children receiving oral health services from both medical and dental providers in Colorado. CF3 has also contributed to significant decreases in untreated decay and caries experience among kindergartners. While significant strides have been made to address the oral health needs of young children and pregnant women, there is still more work to be done. Not enough young children receive preventive oral health interventions and many pregnant women do not receive needed dental care.

Given the positive impact CF3 has demonstrated on the oral health of Coloradans, and the remaining gaps in access to oral health services, it is important to continue the spread of the model across the state. CDPHE is committed to further integrating the CF3 program with other public health initiatives and identify ways to make systems-based changes that support the CF3 model and continue to expand the reach of CF3 into all medical and dental provider practices.

Future Steps

There are many potential next steps for the Cavity Free at Three program. CDPHE is committed to continue addressing barriers to the sustainability and spread of the program within health systems. The partnerships and strategies below will be further explored by CDPHE and CF3 partners to prioritize future allocation of resources and efforts.

- Continuing to use systems-based approaches to increase access to oral health preventive services for infants, toddlers and pregnant patients with: public health partners serving communities with a high burden of oral disease, Accountable Care Collaborative partners serving publicly insured Coloradans, health systems within dental Health Professional Shortage Areas, commercial insurers and other partners.
- Continuing to provide community-level data, strategies, capacity and technical assistance to local public health agencies (LHPAs) throughout the Colorado Health Assessment and Planning process.
- Continuing collaborations with CDPHE clinical quality improvement (CQI) partners to support alignment of CF3 efforts with best practices and increase CQI resources for oral health interventions. E.g.: implementing AHRQ's public health academic detailing model to increase uptake of the CF3 model by dentists.
- Continuing collaborations with HCPF and other insurers to increase the types of providers able to bill for CF3 services and, therefore, increase long-term sustainability of program implementation.
- Supporting alignment of CF3 efforts with other programs addressing perinatal health to increase impact and evidence-informed strategies.



- Increasing coordination of perinatal oral health activities among the Oral Health Unit's staff, partners and contractors throughout new HRSA and CDC grant cycles. (E.g.: using Regional Oral Health Specialists as CF3 Master Trainers; Colorado Community Health Network (CCHN) linking FQHCs to receive CF3 trainings; and HCPF representative being represented on the CF3 Advisory Board to coordinate efforts to increase the reach of the program).
- Continuing to explore other data sources such as utilization, surveillance, workforce and other data to inform program improvements.
- Continuing ongoing evaluations, including rapid cycle quality improvement efforts to ensure efficient and effective program implementation.

REFERENCES

American Academy of Pediatrics Policy Statement–Organizational Principles to Guide and Define the Child Health Care System and/or Improve the Health of All Children: Section on Pediatric Dentistry Reprinted with permission of the American Academy of Pediatrics (Pediatrics. 2003;111:1113-1116). Retrieved from: http://www.aapd.org/assets/1/25/Editorial4-03.pdf

Braun, Patricia; Widmer-Racich, Katina; Sevick, Carter; Starzyk, Erin; Mauritson, Katya; Hambidge, Simon. (2017). Effectiveness on Early Childhood Caries of an Oral Health Promotion Program for Medical Providers. American Journal of Public Health. Retrieved from: https://ajph.aphapublications.org/doi/abs/10.2105/AJPH.2017.303817

Calanan, Renee; Elzinga-Marshall, Gabrielle; Gary, Dahsan; Payne, Emily; Mauritson, Katya. (2018). Tooth be Told – Colorado's Basic Screening Survey, Children's Oral Health Screening: 2016-17. Colorado Department of Public Health & Environment. Retrieved from: https://www.colorado.gov/pacific/sites/default/files/PW_OH_BSSReport.pdf

Cavity Free at Three Data Dashboard. Accessed through the CF3 website: https://www.colorado.gov/pacific/cdphe/Cavity-Free-at-Three-Dashboard

Centers for Medicare and Medicaid 416, 2010-2017 data. Accessed through the Medicaid EPSDT website: https://www.medicaid.gov/medicaid/benefits/epsdt/index.html

Child Health Survey (CHS), 2010-16 data. Accessed through the CDPHE VISION system at: https://www.colorado.gov/pacific/cdphe/vision-data-tool

U.S. Preventive Services Task Force, Grade B Recommendations. Accessed through the USPSTF recommendations website: https://www.uspreventiveservicestaskforce.org/Page/Name/uspstf-a-and-b-recommendations/