

Providing Minimally Invasive Care with Silver Diamine Fluoride

CareQuest Institute Continuing Education Webinar

August 11, 2021

Housekeeping

- All lines will remain muted to avoid background noise.
- A copy of the slides and a link to the recording will be sent by email after the live program.
- The slides and recording will also be available on CareQuest.org

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- Evaluation form will be sent by email.
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Your feedback is greatly appreciated.

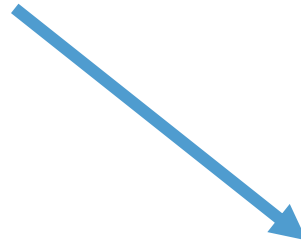


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*Full disclosures available upon request

Question & Answer Logistics

- Feel free to enter your questions into the **Question & Answer box** throughout the presentations.
- We will turn to your questions and comments toward the end of the hour.

A screenshot of a web browser window titled 'Question and Answer'. The window has a white background and a thin grey border. At the top, there is a blue icon of a speech bubble with a question mark, followed by the text 'Question and Answer'. Below this, the text 'Welcome' is centered, followed by 'Feel free to ask the host and panelists questions'. At the bottom, there is a large, rounded rectangular text input field with the placeholder text 'Type your question here...'. The window has standard window controls (minimize, maximize, close) in the top right corner.

Learning Objectives

- Explain how silver diamine fluoride (SDF) works.
- Identify the best practices and challenges of incorporating SDF into practice.
- Recognize why SDF was especially effective during the COVID-19 pandemic
- Discuss lessons learned and outcomes from using SDF on patients in a group of community dental clinics.

Our Strategy

Vision

A future where every person can reach their full potential through optimal health

Mission

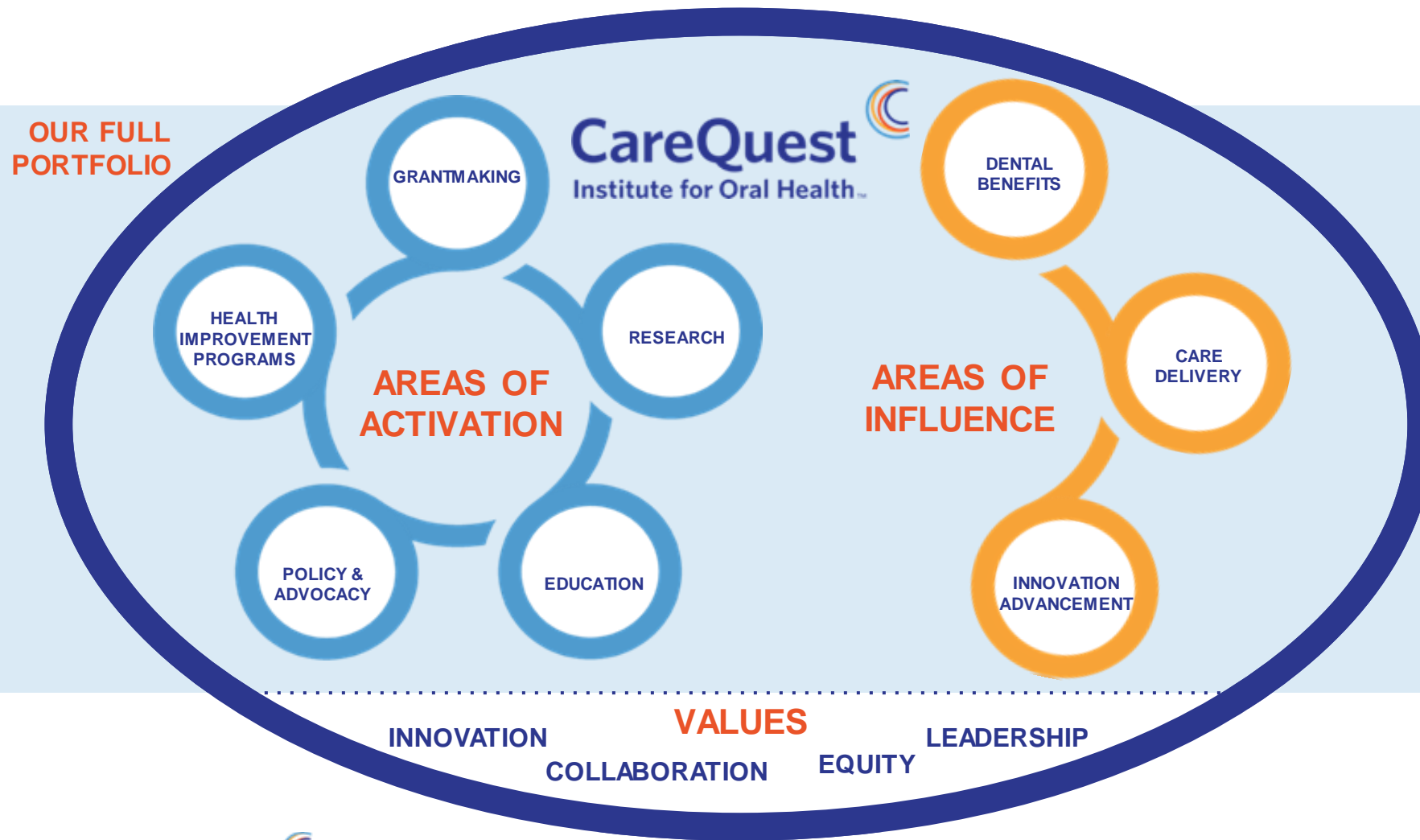
To improve the oral health of all

Purpose

To catalyze the future of health through oral health



A Catalyst for Systems Change



Through our Areas of Activation and Influence, we bring forth ideas and solutions to create a more equitable, accessible, and integrated health system for everyone.

Presenters

Providing Minimally Invasive Care with Silver Diamine Fluoride (SDF)



WEBINAR | Wed., August 11, 2021 | 1 p.m. (ET) | ADA CERP Credits: 1

MODERATOR



Mary Bayham, MPH

Health Improvement Program Manager,
CareQuest Institute for Oral Health

SPEAKER



Jeremy Horst Keeper, DDS, PhD

Director of Clinical Innovation,
CareQuest Innovation Partners

SPEAKER



Christine Kanan, BSPH

Quality Improvement Specialist,
CareQuest Institute for Oral Health

SPEAKER



Sharity Ludwig, EPDH, MS

Director, Alternative Care Models,
Advantage Dental Oral Health Center
and Affiliated Practices

Exploring SDF During the Pandemic and Beyond

COVID-19 has been a catalyst for providers' adoption of minimally invasive care in dentistry.



Silver Diamine Fluoride (SDF) is an effective tool that supports prevention and management of caries.

What is COrHT?



The Community Oral Health Transformation (COrHT) Initiative is a learning community that enables dental teams to learn, share experiences, and grow out of the pandemic stronger.

Using the Three Domain Framework to Innovating Oral Health Care, dental teams tested and adopted new care strategies.

A Three Domain Framework to Innovating Oral Health Care

Tele-Prevention



Domain One builds an accessible, convenient, evidence-based virtual care approach to accompany in-person oral health care delivery using technology for enhanced disease prevention and whole-person health.



Minimally Invasive Care



Domain Two focuses on minimally invasive care that reverses or slows early disease stages using a program of anticipatory guidance and collaborative decision-making with patients.

Integrated and Personalized Care



Domain Three introduces personalized oral health care that prolongs the life of hard and soft tissues by reducing tooth/tissue mortality through risk stratification and medical-dental integration using predictive analytics and safe, individualized surgical intervention.

Silver Fluoride is the first line treatment for caries

Jeremy Horst Keeper, DDS, PhD
Director of Clinical Innovation

SDF - what is it?



Colorless liquid

25% **silver**: antimicrobial

8% ammonia: solvent

5% **fluoride**: remineralization



SDF - what does it do?

- Arrests dental caries
- Prevents dental caries
 - *directly & indirectly*
- Decreases dentin hypersensitivity
- Turns de-/hypo-mineralized areas BLACK.



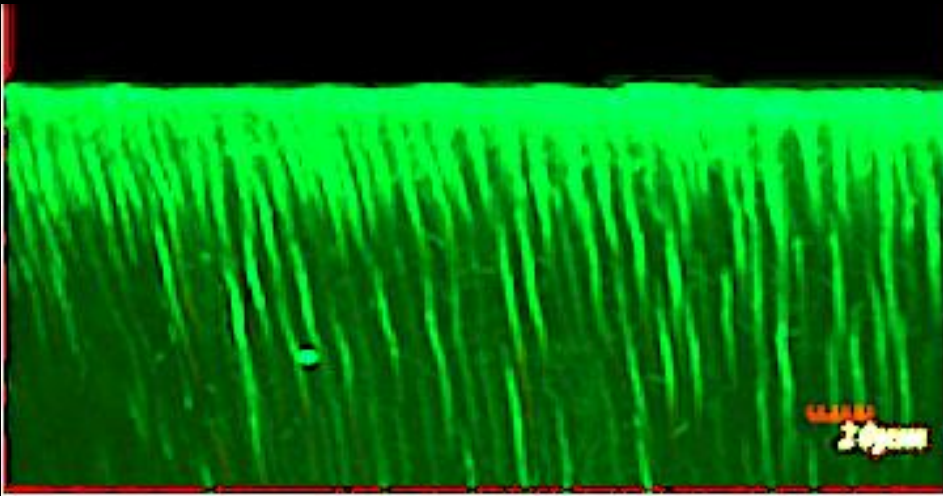
This is how cavities grow



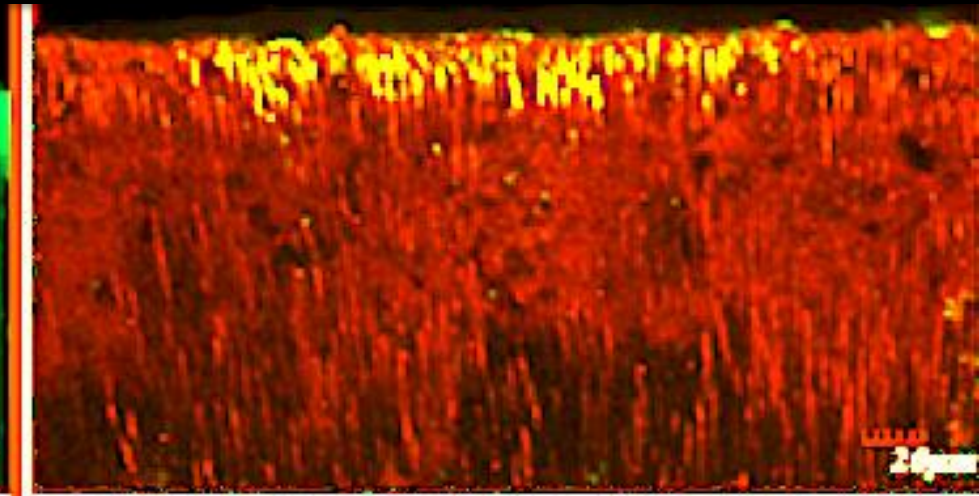
Microcavitations from bacteria in dentinal tubules

GV Black 1908

SDF chases bugs down dentinal tubules



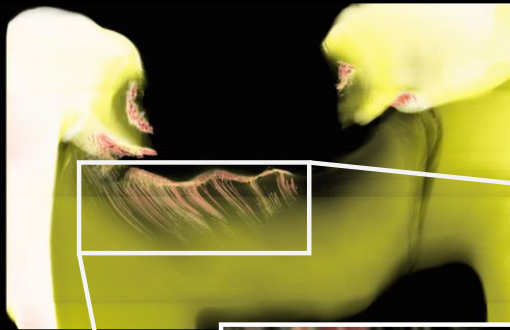
Living



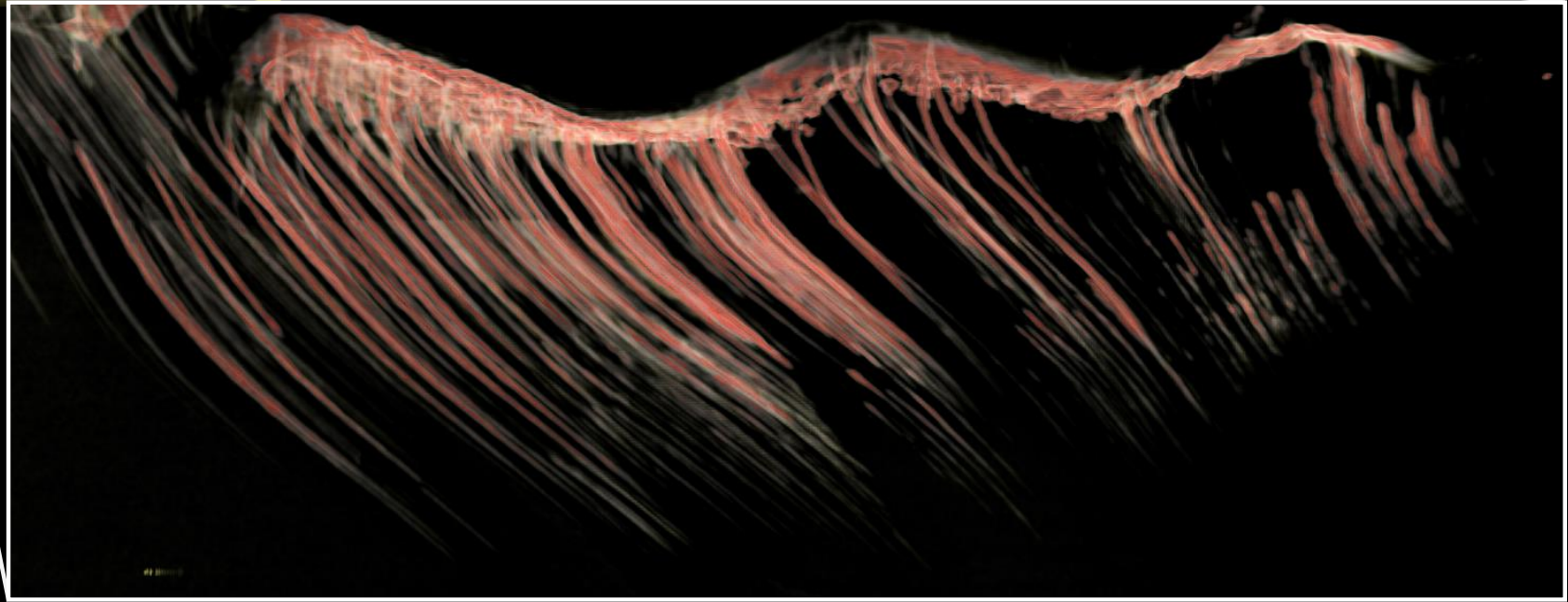
Dead

Makin' a come back

SDF microstructures



SDF casts silver rebar millimeters into dentin, reinforcing the lesion and sustaining kill.



Don't forget about the
Fluoride!



Suggested frequency protocol for prevention



- For mild caries risk:
none
- For moderate caries risk:
once per year
- For high caries risk:
once per year

Suggested frequency protocol for treatment



- For mild caries:

q6mo

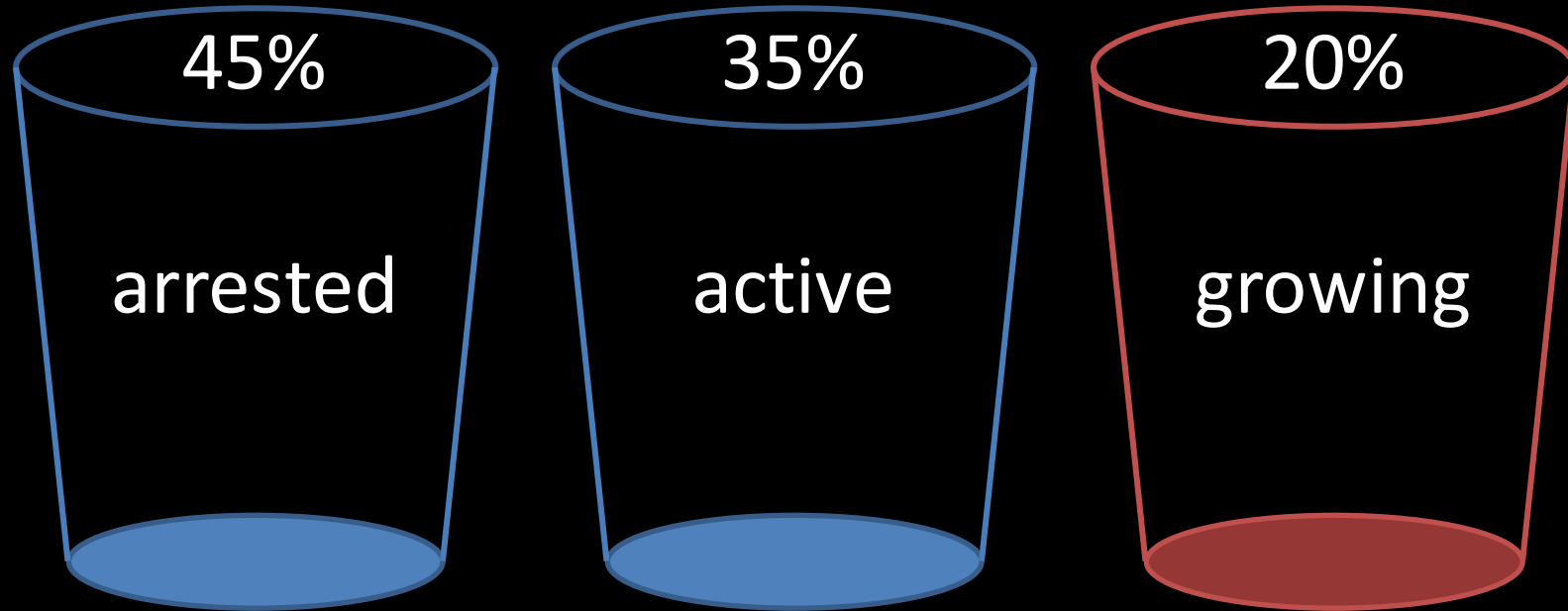
- For moderate caries:

q6mo + 2-6 week loading dose

- For severe caries:

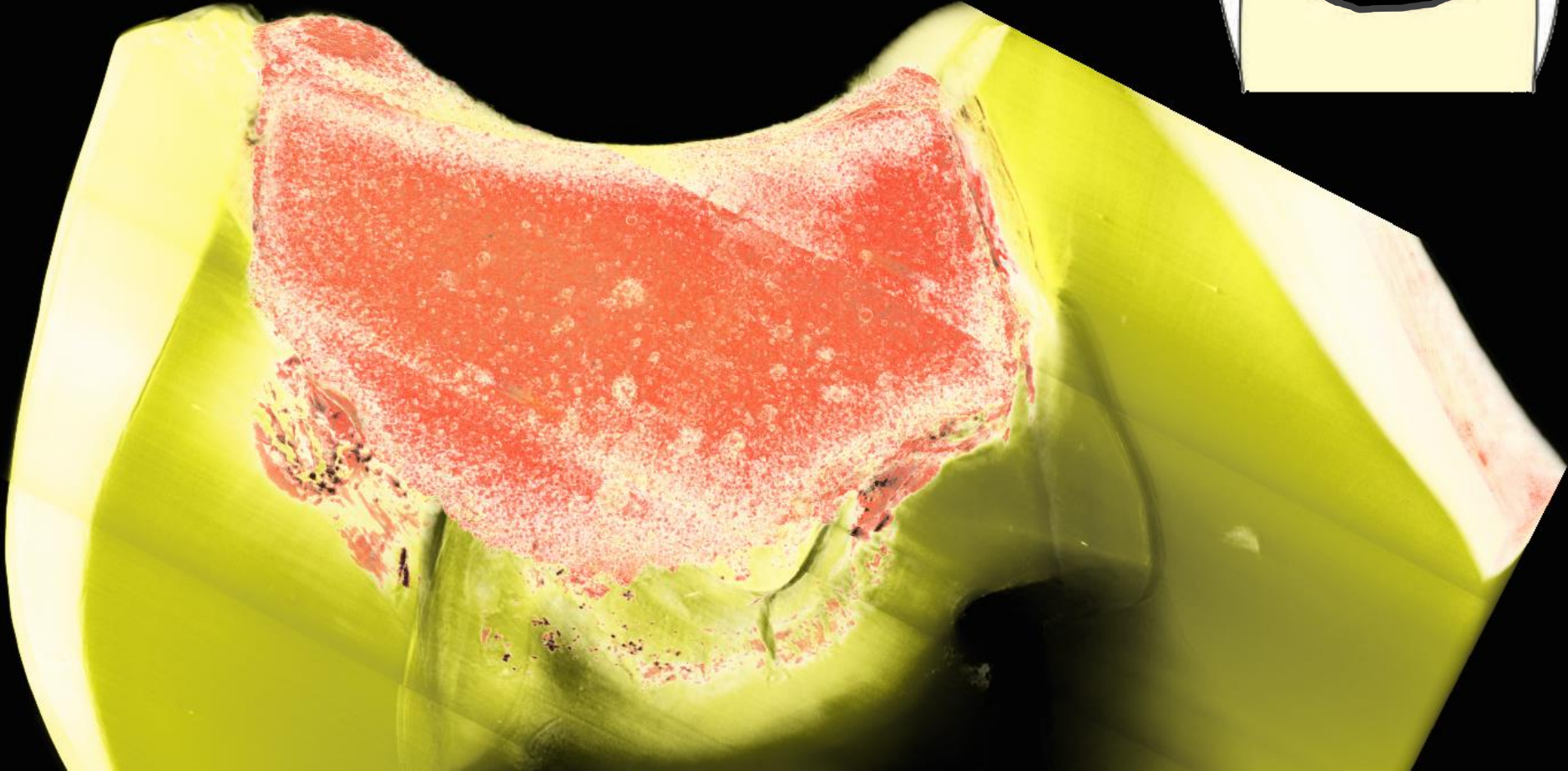
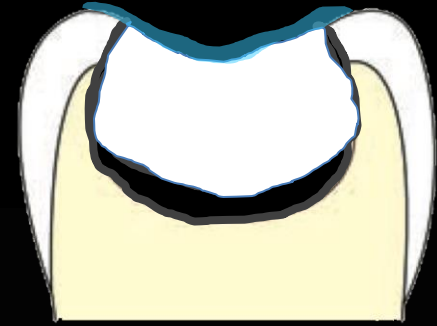
q6mo + two 2-6 week loading doses + 3mo

What to watch for:



@ 6 months.

∴ SDF-hardened dentin
can support a restoration



Seto, Horst, Frachella

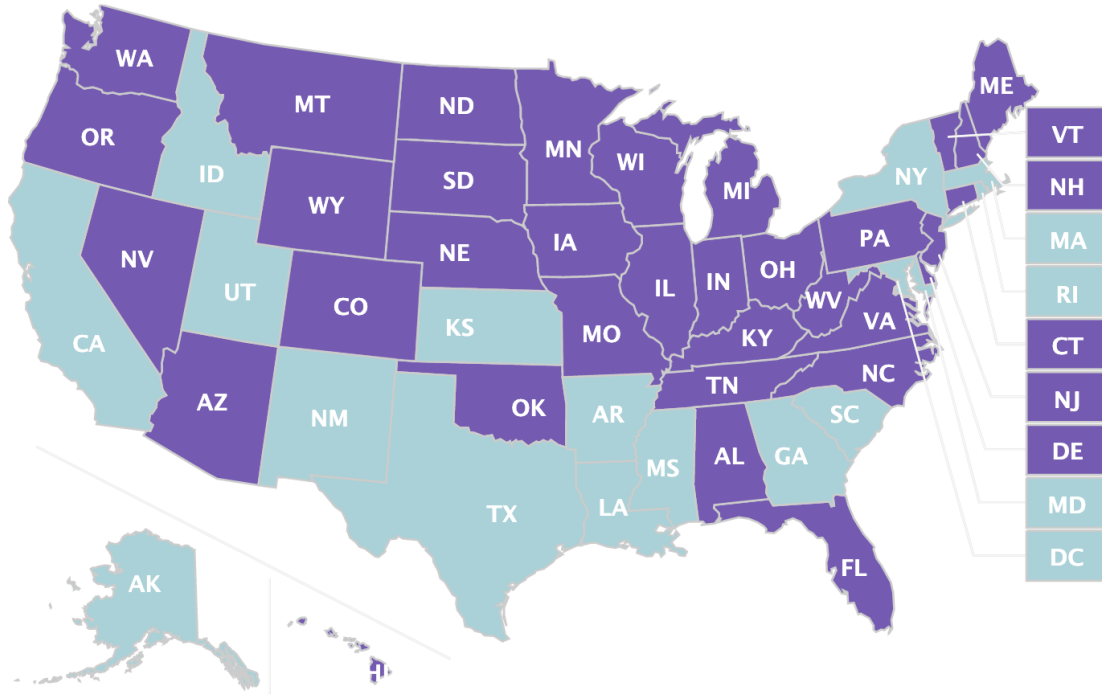
2-visit SMART filling, no excavation





MSDA

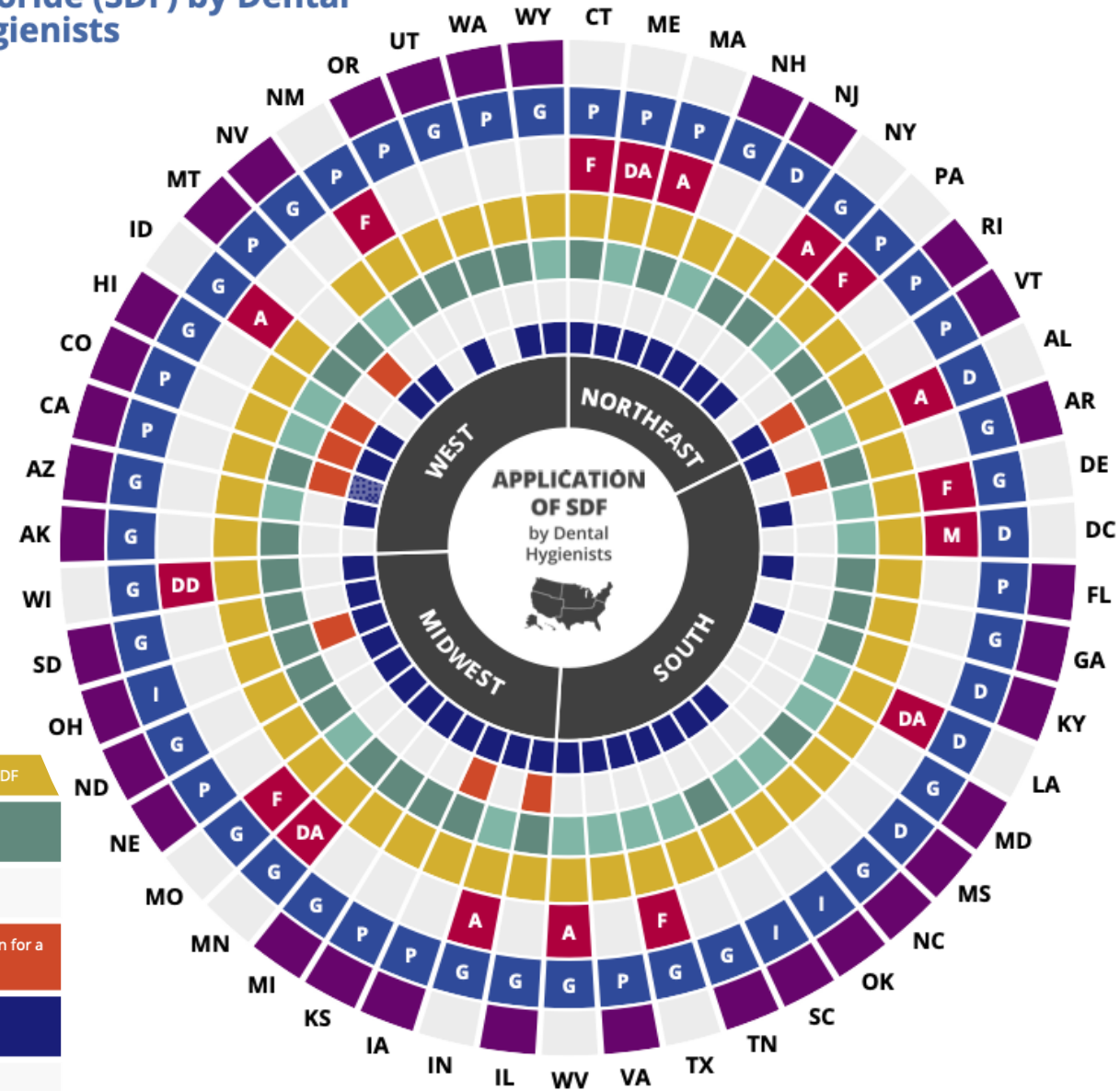
MEDICAID | MEDICARE | CHIP
SERVICES DENTAL ASSOCIATION



D1354 ● Covered ● Not Covered ● No data



Application of Silver Diamine Fluoride (SDF) by Dental Hygienists



SDF Clearly Within Scope of Practice (Statute, Regulation, or Board Opinion)

Lowest Level of Supervision Under Which a DH can Apply SDF

- D Direct
- I Indirect
- G General
- P Public Health/Collaborative

Scope of Practice for DHs May Allow SDF Under Permission for Application of:

- A Antimicrobial/Anticariogenic Agents
- F Topical Fluoride/Preventative Agents
- M Medicament
- DA Desensitizing Agent
- DD Delegable Duty

State Medicaid Has Frequency Limitations on Payment for Fluoride or SDF

Age Limitation in Medicaid Guidance for Payment of Fluoride or SDF Applications

- Children Only
- Children & Some or All Adults

Dental Board Recommendations or Requirements for Specific Education for a DH to Apply SDF Under All or Specific Conditions

State Medicaid Program Covers CDT 1354 (Interim Caries arresting Medicament Application)

- Yes
- No
- Pilot Program Only

Contact Information

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Director of Clinical Innovation

CareQuest Innovation Partners

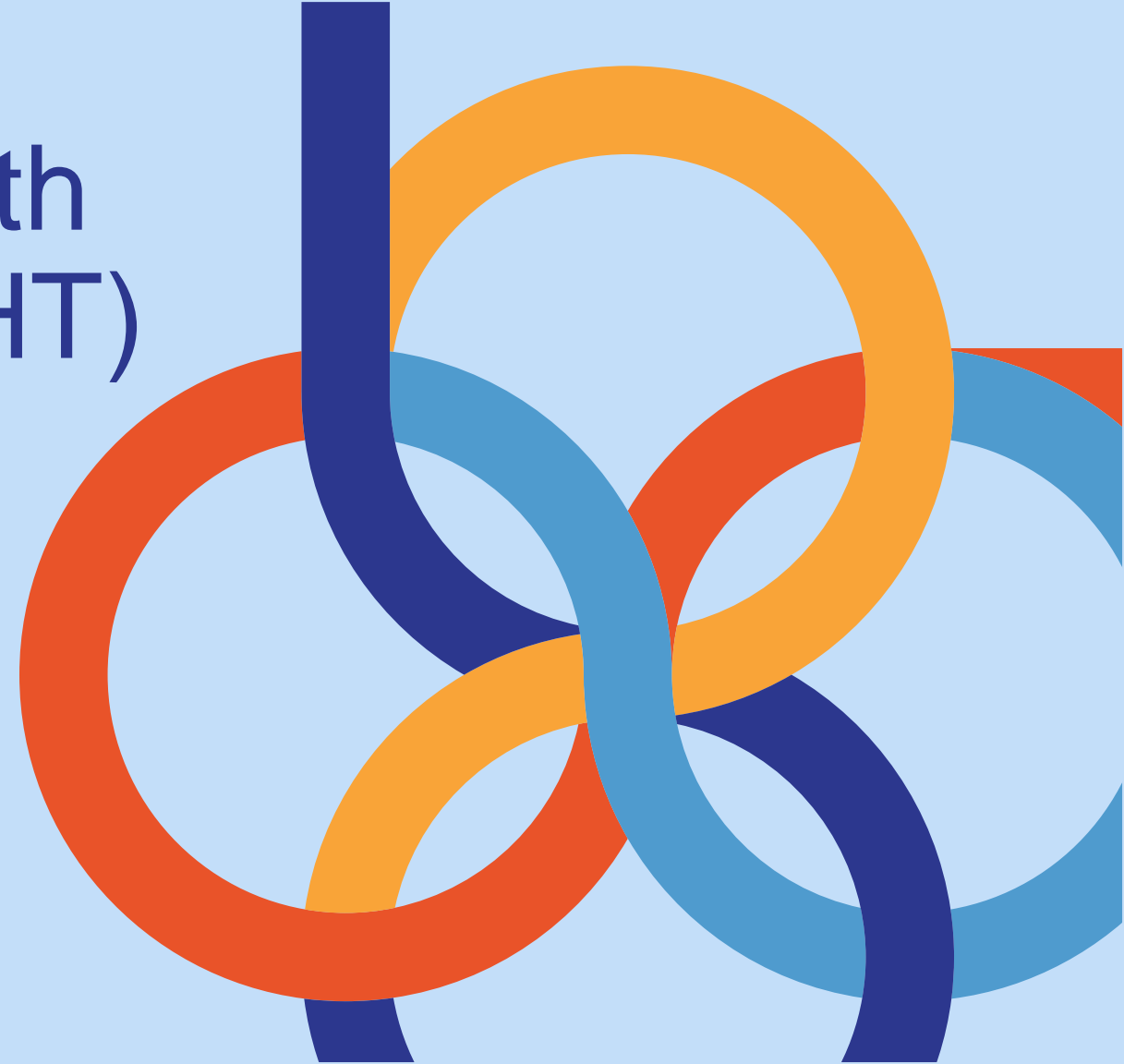
jhorst@carequestinnovation.com



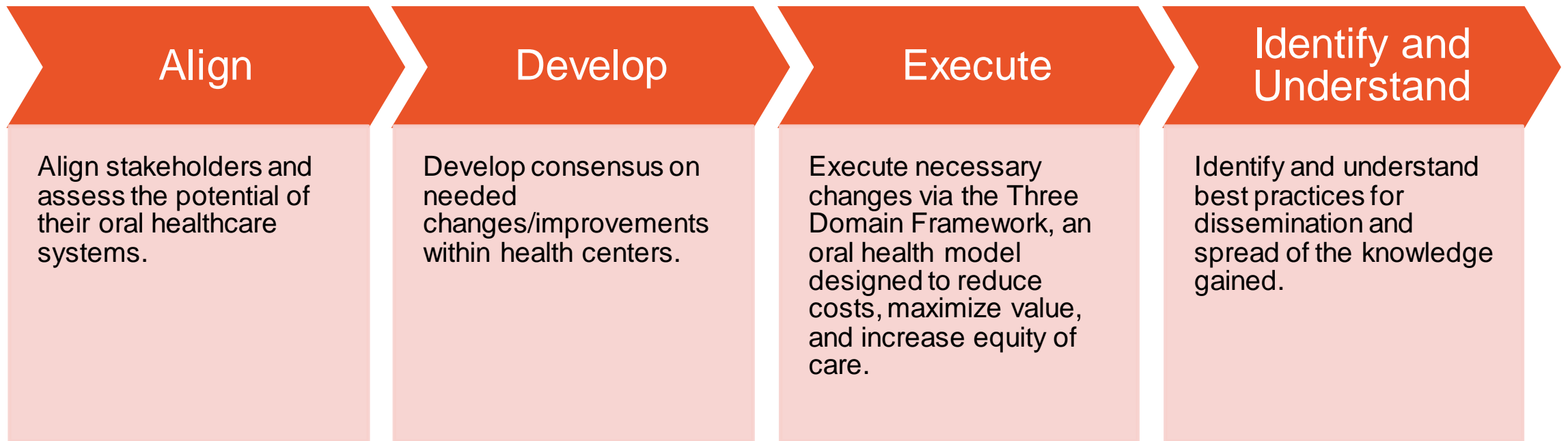
Community Oral Health Transformation (COrHT)

Collaboration, Learnings and Results Using SDF

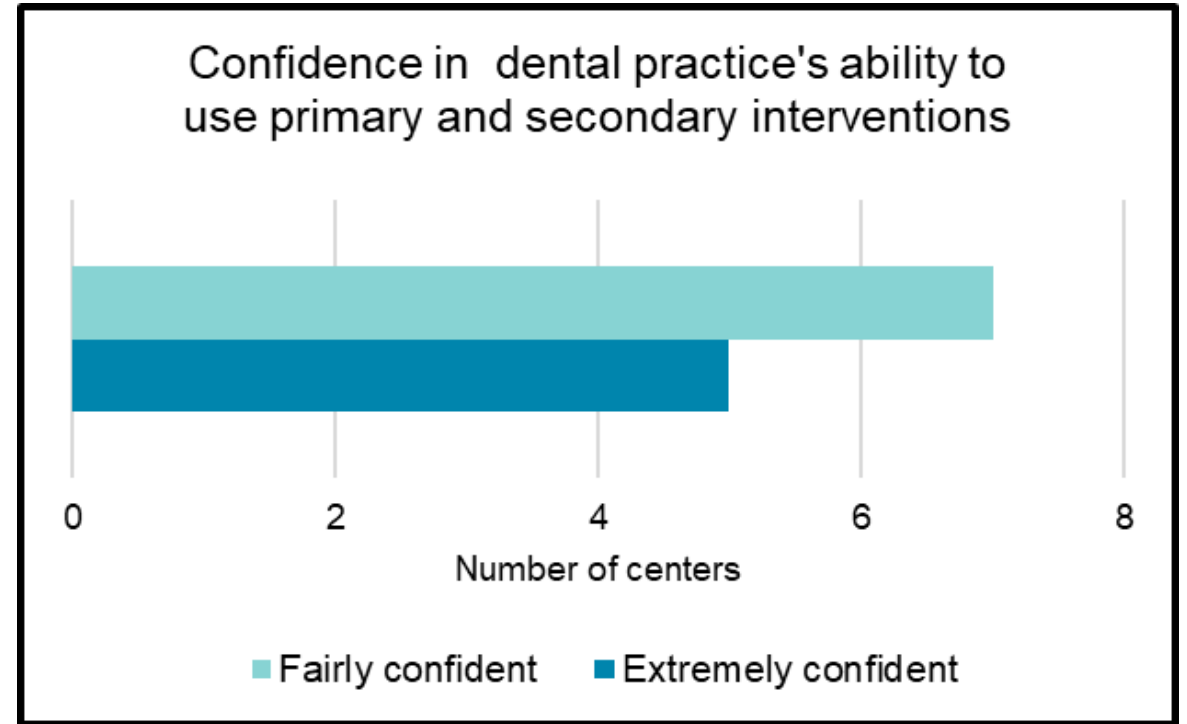
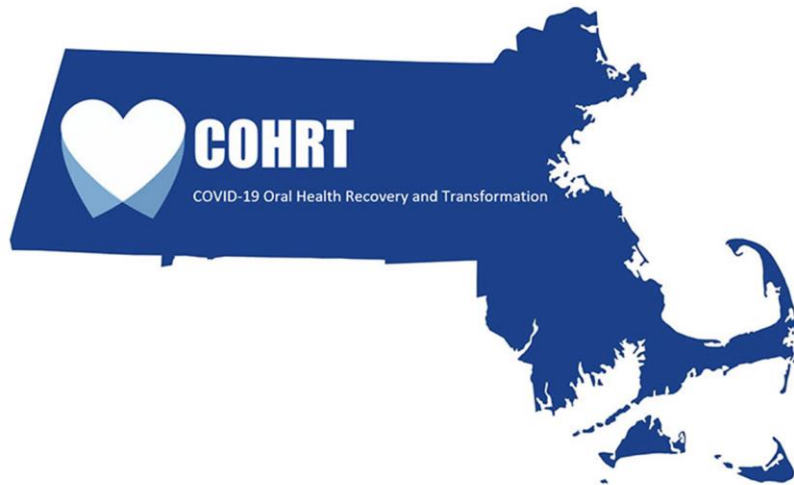
Christine Kanan, BSPH
Quality Improvement Specialist



Community Oral Health Transformation (COrHT) Learning Community

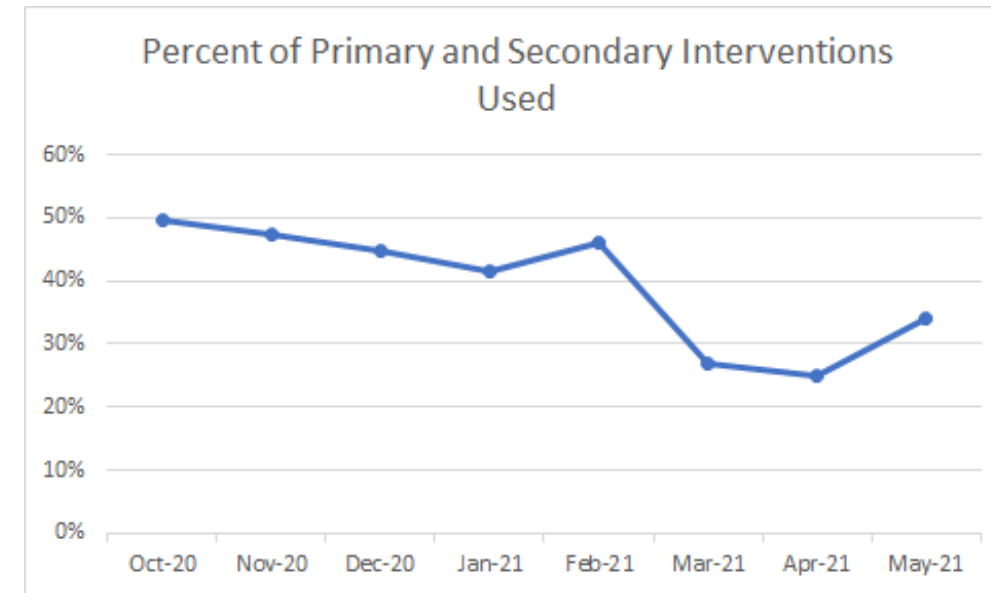
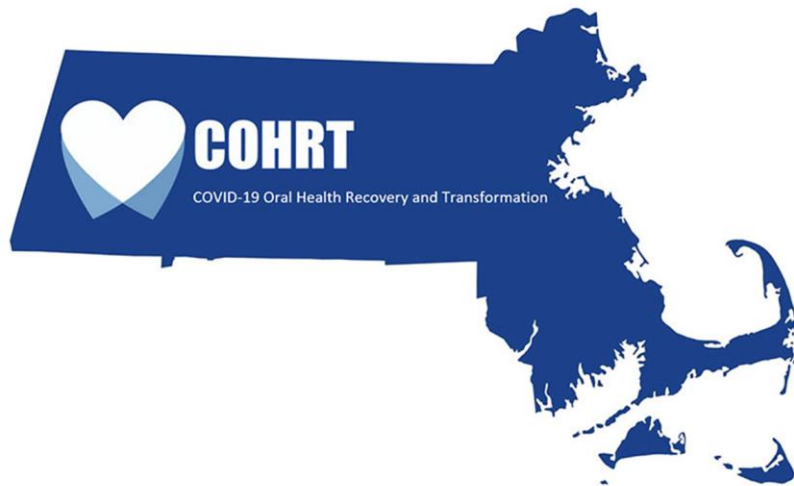


Massachusetts Experience



Ohio and Arizona Experience

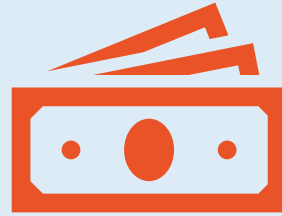
COVID-19 Response to Oral Health Transformation



Lessons Learned Through Emphasizing Minimally Invasive Care



Scope of practice



Coding and billing



Application technique
and scheduling

Lessons Learned Through Emphasizing Minimally Invasive Care (cont.)



Appropriate Patient
Populations



Safety and
Effectiveness



Issues of Black
Staining

Contact Information

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Implementation of Silver Diamine Fluoride into Clinical Practice

Sharity Ludwig, EPDH, MS
Director, Alternative Care Models

Survival of silver diamine fluoride among patients treated in community dental clinics: a naturalistic study

Available on BMC Oral Health!
<https://bmcoralhealth.biomedcentral.com/articles/10.1186/s12903-020-01379-x>

Raskin et al. *BMC Oral Health* (2021) 21:35
<https://doi.org/10.1186/s12903-020-01379-x>

BMC Oral Health

RESEARCH ARTICLE

Open Access



Survival of silver diamine fluoride among patients treated in community dental clinics: a naturalistic study

Sarah E. Raskin¹, Eric P. Tranby^{2*}, Sharity Ludwig³, Ilya Okunev², Julie Frantsve-Hawley² and Sean Boynes²

Abstract

Background: Silver diamine fluoride (SDF) is a minimally-invasive preventive service used in the U.S. to avert and arrest caries since 2014. No studies document survival outcomes based in real world delivery. We analyzed 12-month survival outcomes of SDF applied independently or concurrently with other restorative procedures among a population receiving community dental care.

Methods: We analyzed data on SDF applications from de-identified dental claims on Oregon Health Plan patients served by Advantage Dental in 2016, who had been seen in 2015 (patient n = 2269; teeth n = 7787). We compared survival rates of SDF alone, SDF applied with a sedative filling, and SDF with a same-day restoration. Failure was defined as a restoration or extraction of the tooth 7 to 365 days after initial application. Survival was defined as a patient returning 180 or more days after application whose tooth did not have a restoration or extraction. Differences were assessed through Wilcoxon equality of survivor function tests and log-rank equality of survivor tests to compare failure rates, Cox Proportional Hazards models to assess factors associated with survival of SDF, and Kaplan–Meier survival estimate to calculate the probability of survival over time.

Results: SDF alone had an overall survival rate of 76%. SDF placed with sedative filling and with a same-day restoration had survival rates of 50% and 84% respectively, likely reflecting treatment intent. SDF alone survived exceptionally well on primary cuspids, permanent molars, and permanent bicuspids and among patients aged 10 to 20 years, with modest variation across caries risk assessment categories. A single annual application of SDF was successful in 75% of cases. Among SDF failures on permanent dentition, more than two-thirds of teeth received a minor restoration.

Conclusion: SDF is a minimally invasive non-aerosolizing option that prevented non-cavitated lesions and arrested early decay among community dentistry patients when applied independently or concurrently with restorative procedures. Professional organizations, policy makers, providers, and payors should broaden optional SDF use by informing clinical guidelines, reimbursement policies, and treatment decisions. Future research should address clinical, social, service delivery, workforce, and economic outcomes using diverse population-based samples, and the mechanisms underlying single application success and caries prevention potential.

Keywords: Silver diamine fluoride, Dental caries, Aerosol, Community dentistry, Survival analysis, Kaplan–meier estimate, COVID-19

Background

Dental caries, the most common disease of childhood and most prevalent health condition worldwide, persists despite concerted clinical and public health efforts

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Background on Advantage Dental

- In 2016, Advantage Dental incorporated twice-annual 38% SDF into its clinical guidelines as a risk-based treatment option
 - Advantage Dental delivers services to approx. 284,000 members of the Oregon Health Plan (the State's Medicaid Program)
 - The goal of adopting and utilizing SDF was to reduce oral health disparities
 - The clinical guidelines indicated that patients with:

Risk Level	Eligibility
Moderate Caries Risk	Receive twice-annual SDF to the occlusal surfaces of posterior teeth for preventive treatment of future
High Caries Risk	Receive twice-annual preventive SDF as well as SDF application to stabilize cavitated lesions until definitive care could occur, with temporary restorations without excavation where appropriate

Methodology

Objective

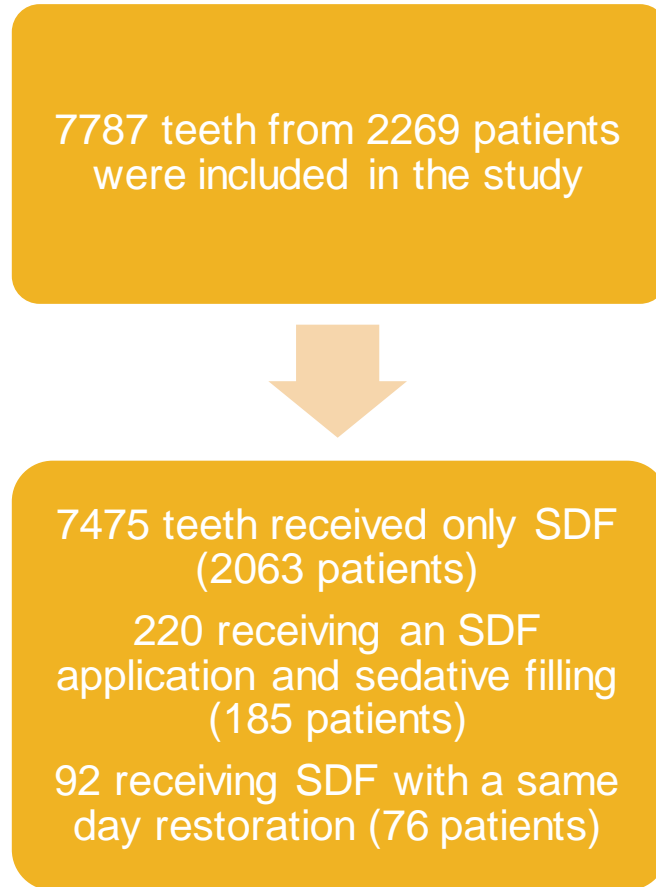
This study aimed to assess SDF survival among a population sample treated in a real-world practice setting, both when used alone and in combination with a sedative filling or restorations.

Dataset (Study population)

All Advantage Dental patients aged 0 to 64 who had at least one SDF application, defined as the presence of CDT code D1354 on a patient claim.

- Patients were only included in the cohort if they had been a patient in 2015.

Description of Study Participants



- Participants aged 1 to 20 accounted for the majority of all SDF delivered.
- ½ of SDF were a same-day restoration were among adults 21+.
- SDF was commonly applied to those at increased caries risk.
- SDF alone and SDF + sedative filling were more often placed on primary teeth than on permanent teeth, primarily on molars.
- SDF with same-day restoration was more often placed on permanent teeth (molars and upper bicuspid) than primary teeth.

Survival Analysis

- SDF alone had an overall survival rate of 76%.
- SDF with a sedative filling had a survival rate of 50%.
- SDF with a same-day restoration has a survival rate of 84%.
- SDF survival varied little based on the number of applications.
- Survival rates were substantially lower among young children and adults aged 41 and older.
- Among those with SDF applied with a sedative filling, survival rates by category never exceeded 60%.
- Moreover, SDF with a sedative filling failed at 2.5 times the rate of SDF alone, even after controlling for number of applications, caries risk, age, and tooth type and location and accounting for the multilevel design of the data.
- Survival rates were highest among those under age 14 and lowest among patients between 15 and 50 years of age.

Table 2. Comparisons of survival rates of teeth treated with SDF applications alone versus SDF application with same day restoration among advantage dental patients 64 and under

	SDF Survival %	SDF + Sedative Filling Survival %	SDF + Restoration Survival %
Overall	76%	50%	84%
# of SDF applications within 1 year			
1	75%	49%	84%
2	77%	56%	—
3+	75%	33%	—
Caries risk			
Low	81%	50%	—
Moderate	76%	51%	82%
High	75%	42%	79%
No assessment	75%	59%	94%
Age			
1–5	69%	53%	—
6–9	77%	57%	61%
10–14	84%	53%	83%
15–20	82%	29%	100%
21–30	76%	23%	92%
31–40	77%	31%	100%
41–50	72%	33%	50%
51–64	68%	44%	92%
Primary versus permanent			
Primary tooth	74%	56%	74%
Permanent tooth	78%	40%	88%
Tooth type—primary teeth			
Lower incisor	74%	—	—
Lower cuspid	86%	—	—
Lower molar	71%	51%	73%
Upper incisor	77%	—	—
Upper cuspid	83%	—	—
Upper molar	75%	60%	67%
Tooth type—permanent teeth			
Lower incisor	70%	—	—
Lower cuspid	69%	—	—
Lower bicuspid	82%	29%	100%
Lower molar	80%	39%	81%
Upper incisor	50%	—	—
Upper cuspid	69%	—	—
Upper bicuspid	75%	—	100%
Upper molar	82%	47%	88%

Discussion/Conclusions

- **SDF applied independently or concurrently with a sedative or restorative procedure is an effective treatment** that prevented non-cavitated lesions and arrested early decay among numerous tooth types and patient demographic groups within a population receiving care in community settings over the course of 1 year.
- **SDF is a valuable option for preventing or arresting early-stage dental caries** that can improve patient and population-level oral health.
- **Professional organizations, policy makers, dental and medical providers, dental payors, and patients themselves should consider the relative success of this treatment** in informing clinical practice guidelines, reimbursement policies, and treatment decisions.
- **Future research should address clinical, social, health service delivery, workforce, and economic outcomes.**

Transitioning the Data into Practice



**Community
Stakeholders**



Patients



Providers

Contact Information

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Director

Alternative Care Models

Advantage Dental Oral Health Center and
Affiliated Practices

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Questions

To Explore More Industry-Moving Research

Resource Library

We publish white papers, research reports, briefs, articles, posters, infographics, and tools on topics ranging from adult dental benefits to teledentistry. Use the filters below to find resources by type or topic.

Search by Title Filter by Type Filter by Category

Enter keywords - All - - All - Search

1 of 7 Next >

Title	Category	Type	View
Caries Risk Conversation	General	Video	
An Open Ended Question During A Caries Risk Conversation	General	Video	
Emergency and Urgent Dental Visits Among Medicaid Enrollees from 2013 to 2017	General	Article	
A systematic review of dental-related emergency department visits among Medicaid beneficiaries	General	Article	
Dental Visits during Pregnancy: Pregnancy Risk Assessment Monitoring System Analysis 2012-2015	General	Article	
The Effect of Well Child Visit Location on Preventative Dental Visit	Research	Article	
Teledentistry: Removing Barriers and Moving Toward Implementation	General	Infographics and Dashboards	
Teledentistry Use Beyond the Pandemic	General	Infographics and Dashboards	

CareQuest
Institute for Oral Health

Provider and Public Perceptions of Silver Diamine Fluoride

Some facts about silver diamine fluoride

- Silver diamine fluoride (SDF) is highly effective in arresting the progression of active caries as well as preventing the formation of new lesions, both in the enamel and dentine. The mechanism works through combined hardening, antimicrobial, and remineralization actions.*
- It has been commonly used as a **non-invasive treatment modality among children** and has favorable acceptability among parents for its ease of use.*
- There is evidence to show that the application of SDF in children arrested **61% of new carious lesions**.*
- Among older adults, SDF prevented **60% of root caries**.*
- A single application of SDF was successful in **75% of all cases** over a one-year period.*
- SDF leaves a black stain on carious lesions and may burn or stain surrounding soft tissues on accidental exposure.*

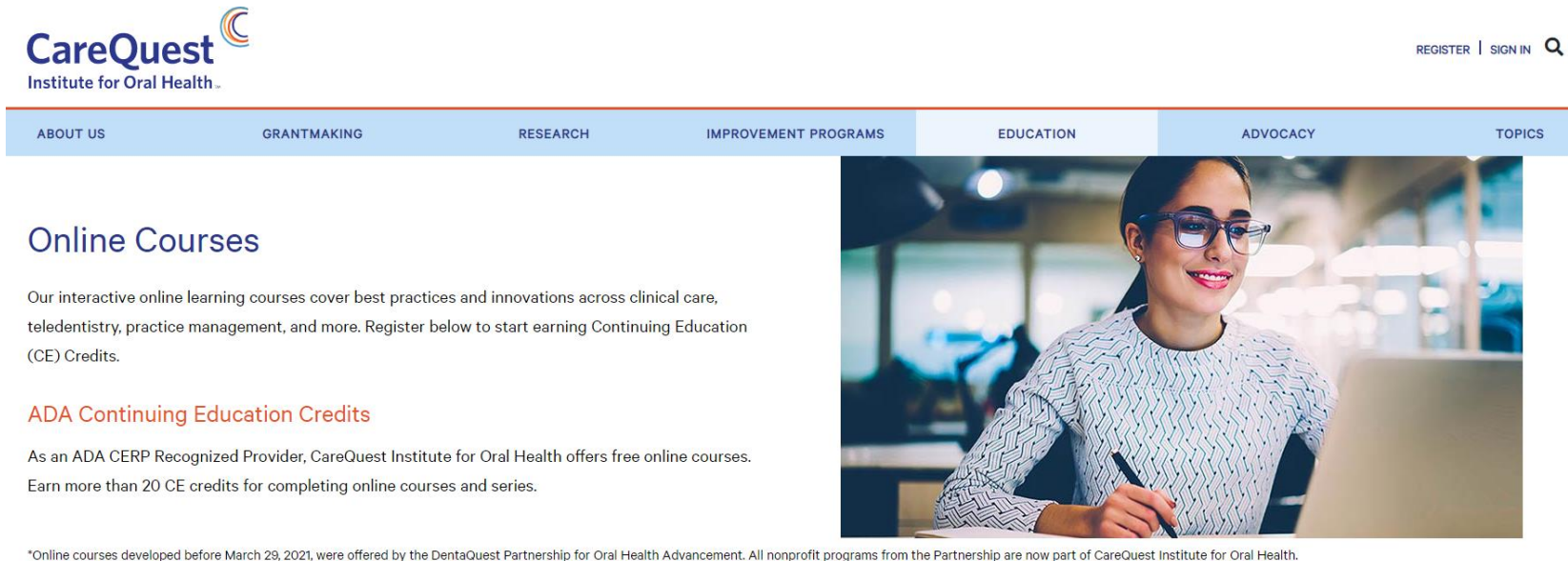
What providers think about the applicability of SDF as a treatment of choice for arresting caries

90% of 377 dental providers who completed the Provider Recovery Survey* agreed that SDF is an effective choice of treatment.

*See the Methodology section below

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- Sign up for our newsletter to get more information on upcoming webinars.
- <https://www.carequest.org/education/online-courses>



The screenshot displays the CareQuest Institute for Oral Health website. At the top, the logo is on the left, and navigation links for REGISTER, SIGN IN, and a search icon are on the right. A horizontal menu bar contains links for ABOUT US, GRANTMAKING, RESEARCH, IMPROVEMENT PROGRAMS, EDUCATION (which is highlighted), ADVOCACY, and TOPICS. The main content area is titled "Online Courses" and includes a paragraph about interactive learning modules. Below this, a section titled "ADA Continuing Education Credits" states that the institute offers free online courses for CE credits. A large image on the right shows a woman with glasses working on a laptop. A small footnote at the bottom provides context about the origin of the online courses.

CareQuest
Institute for Oral Health

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Online Courses

Our interactive online learning courses cover best practices and innovations across clinical care, teledentistry, practice management, and more. Register below to start earning Continuing Education (CE) Credits.

ADA Continuing Education Credits

As an ADA CERP Recognized Provider, CareQuest Institute for Oral Health offers free online courses. Earn more than 20 CE credits for completing online courses and series.

*Online courses developed before March 29, 2021, were offered by the DentaQuest Partnership for Oral Health Advancement. All nonprofit programs from the Partnership are now part of CareQuest Institute for Oral Health.

Webinar Evaluation

<https://www.carequest.org/node/227634>

Deadline is **August 19 in order to receive CE credit*

Upcoming Webinars:

- **How Antiracist Policies Can Support Health Equity**
- **September 2021**

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