

October 2023

Pediatricians and Pediatric Oral Health

Knowledge and Attitudes
about Silver Diamine
Fluoride in Pediatric Practice

Summary

Introduction

Pediatric dental disease, while largely preventable, continues to impact too many children and families, particularly those disproportionately impacted by racial and economic inequalities. Pediatricians are essential partners in keeping children's teeth healthy but may lack the knowledge, training, or incentive to incorporate oral health promotion and disease prevention services into care provision for young children.

With a longstanding commitment to children's oral health, the American Academy of Pediatrics (AAP) [Section on Oral Health](#) embarked on a project in 2023 to better understand pediatricians' provision of preventive oral health services for children ≤ 5 years of age and assess pediatrician familiarity with and use of a new modality for treating dental caries – silver diamine fluoride (SDF).

The project included a Pediatric Oral Health Practices Survey with over 300 pediatricians and a series of key informant interviews. The interviews were conducted to learn more about:

- 🗣️ Pediatricians' oral health training experiences
- 🗣️ Current provision of oral health services and guidance to families of children ≤ 5 years of age
- 🗣️ Perceptions about SDF as a treatment option for dental caries in the medical setting, including anticipated startup needs and challenges.

This report summarizes findings from 12 key informant interviews conducted during July and August 2023.

About the Interviews

The interview opportunity was promoted to pediatricians through relevant AAP Committees, Councils, and Sections. Prior knowledge about and/or use of SDF in pediatric practice was not a participation prerequisite.

Over 75 pediatricians applied to take part by completing an online interest form. Twelve applicants – all primary care pediatricians – were invited to participate through a selection process that prioritized 1) diversity in AAP Committee, Council, Section membership, 2) applicants who rated pediatric oral health as a serious problem in their patient population and, 3) applicants with larger percentages of patient populations ≤ 5 years of age.

To understand perceived needs and challenges that may be associated with SDF implementation in pediatric primary care settings, the majority of interviews (9 of 12) were devoted to pediatricians who *did not* currently use SDF in practice.

Conducted virtually, the 30-minute interview topics included pediatric oral health training, current provision of oral health services, community oral health partnerships, envisioning SDF implementation in the clinical setting (those not currently applying SDF), and lessons learned from practices already using SDF. Prior to each interview, participants reviewed the American Academy of Pediatric Dentistry's [Chairside Guide: Silver Diamine Fluoride in the Management of Dental Caries Lesions](#). Attendees received a \$50 e-gift card in thanks for their time.

Results

Oral Health Training

Nine of 12 pediatricians reported some type of oral health training, typically in residency, although most characterized their training as limited. Several interviewees participated in practice-based learning opportunities through a state-sponsored program or an AAP quality improvement initiative. Regardless of source, training content often focused on fluoride varnish application.

No participants had received SDF-related training. Several noted limited familiarity with SDF and three pediatricians were unaware of SDF prior to interview participation.

Current Provision of Oral Health Services and Guidance

Almost all pediatricians interviewed provided each of five key oral health preventive services to their patients.



- Review oral health self-management goals with families
- Refer to a dental home
- Apply fluoride varnish



- Perform oral health risk-assessment
- Perform visual exams of the mouth

Interviewees described most to all parents as receptive to and accepting of oral health services offered, especially families of children without a dental home.

Community Oral Health Partnerships

All participants reported relationships with local dentists but described limited dental care access for uninsured or Medicaid-insured patients. Some in academic practices had access to the resources of an affiliated dental school – and their pediatric dental trainees – but often reported "saving" those referrals for their most complex patients.

Envisioning SDF Implementation in the Clinical Setting: Pediatricians Not Currently Using SDF (n=9)

Anticipated Clinician and Staff Involvement in SDF Application. All reported that pediatricians in their practice would potentially be responsible for SDF application as well as nursing staff (n=6) and medical assistants (n=5). One participant suggested that residents might apply SDF.

Preparing for SDF Implementation. All participants endorsed the need for professionally-led training due to the risks of SDF staining and concerns about correctly identifying caries for treatment. Several anticipated more extensive and intensive training than they received for fluoride varnish application.

Few pediatricians expressed concerns about appropriate procedure space; several raised questions about SDF storage (eg, shelf life; cold storage requirements).

Incorporating SDF into Practice Workflows.

Participants envisioned different strategies for incorporating SDF into their practice workflows including applying SDF during a health supervision visit and scheduling a separate appointment. Several raised concerns about recommended post-SDF application follow-up, citing issues of compliance and billing. Participants described numerous resources that could support incorporation of SDF at the practice level.

Conditions to Make SDF Implementation Feasible and Successful in Practice. Pediatricians identified numerous conditions necessary to make SDF implementation feasible and successful in their practice. Foremost among these were education/training and payment.

Several pediatricians shared concerns about adding "one more thing" to young patients' visits, especially at a time when many practices are experiencing ongoing challenges associated with COVID, staffing, and clinician burnout.

Interest in SDF as a Treatment Modality. On a 5-point scale (*1 = not at all interested; 5 = very interested*), participants rated their own interest in SDF as a treatment modality for pediatric caries higher (mean = 4.0) than perceived interest among the families for whom they provide care (mean = 3.8) and pediatrician colleagues in their practice (mean = 2.6).

Lessons from Practices that Currently Use SDF (n=3)

Among the three pediatrician participants who affirmed practice use of SDF, none reported direct involvement in SDF application at the time of the interview, thus lessons learned are limited.

SDF Implementation. Participants acknowledged uncertainties about SDF implementation specifics (eg, supplies/equipment; office workflow; fiscal considerations).

Further, no interviewees could speculate on the percentage of families in their practice that accept the offer of SDF treatment.

Conclusions

Key informant interviews with a small set of primary care pediatricians provide learnings that can inform the direction of current and future AAP initiatives regarding oral health in general, and use of SDF as a treatment for childhood caries specifically. Despite concerns about correct SDF application and being asked to do “one more thing,” most pediatricians interviewed expressed interest in and recognized the need for SDF. Conditions required for successful and feasible SDF implementation in the clinic setting centered on appropriate education/training and adequate payment.

Limitations of note include a small, self-selected sample whose experiences and opinions may not reflect those of pediatricians in general. Willingness to participate in an interview about an innovative treatment for childhood caries may also reflect a stronger interest in pediatric oral health than exists in the overall population of primary care pediatricians.

Recommendations

Despite these limitations, interview learnings inform several recommendations for AAP consideration that include:

- 🦷 Creating educational and training opportunities for pediatricians to learn about SDF.
- 🦷 Studying and learning from practices that have successfully implemented SDF across a variety of practice types and settings.
- 🦷 Championing appropriate payment for practices that implement SDF and providing coding and billing guidance.
- 🦷 Continuing to promote and support the critically important oral health preventive care that many pediatricians provide.

Table of Contents

01

Background

02

About the
Key Informant
Interviews

03

Results - Interview
Learnings

19

Conclusions

20

Recommendations

21

Appendices

Background

Pediatric dental disease, while largely preventable, continues to impact too many children and families, particularly those disproportionately impacted by racial and economic inequalities. Reducing the proportion of children and adolescents with lifetime tooth disease is a strategic objective of the [Healthy People 2030 call to action](#) from the US Department of Health and Human Services.

Pediatricians are essential partners in keeping children's teeth healthy but may lack the knowledge, training, or incentive to incorporate oral health promotion and disease prevention services into care provision for young children. Results from a [recent AAP Periodic Survey of Fellows](#) revealed an increase in pediatrician application of fluoride from 2008 to 2018 but the probability percentage remained low at 17%.

The **American Academy of Pediatrics** (AAP) has a longstanding commitment to children's oral health. The [Section on Oral Health](#) began in 1999 and many AAP Chapters currently support oral health at state and community levels through their [Chapter Oral Health Advocates](#).

In 2023, the Section on Oral Health embarked on a project to better understand pediatricians' provision of preventive oral health services for **children ≤ 5 years of age** and assess pediatrician familiarity with and use of a new modality for treating dental caries – **silver diamine fluoride (SDF)**.

The project [1] included a **Pediatric Oral Health Practices Survey** with over 300 pediatricians (see Appendix A for survey results) and a series of **key informant interviews**. The interviews were conducted to learn more about:

- Pediatricians' oral health training experiences
- Current provision of oral health services and guidance to families of children ≤ 5 years of age
- Perceptions about SDF as a treatment option for dental caries in the medical setting, including anticipated startup needs and challenges

This report summarizes findings from **12 key informant interviews** conducted during July and August 2023.



“I'm glad that AAP is bringing oral health into the pediatric space and helping support pediatricians to do this work.”

[1] The AAP Institutional Review Board approved the project for Exempt status on May 16, 2023.

About the Key Informant Interviews

The interview opportunity was promoted to pediatricians through relevant AAP Committees, Councils, and Sections. Prior knowledge about and/or use of SDF in pediatric practice was not a participation prerequisite. Seventy-six pediatricians applied to take part by completing an online interest form. The AAP staff team and evaluation consultant developed a selection process that prioritized 1) diversity in AAP Committee, Council, Section membership, 2) applicants who rated pediatric oral health as a serious problem in their patient population and, 3) applicants with larger percentages of patient populations ≤ 5 years of age. Because the primary purpose of the interviews was to gain insights about perceived needs and challenges associated with SDF implementation, the majority of interviews (9 of 12) were devoted to pediatricians who did not currently use SDF in practice.

Among the list of selected pediatricians, no one declined participation, however seven invitees failed to respond to the scheduling invitation and were replaced from the wait list alternates.

All interviewees were primary care pediatricians. See Appendix B for additional participant information.

Interviews lasted approximately 30 minutes and were scheduled based on pediatrician availability. A semi-structured interview guide (see Appendix C), developed collaboratively by the evaluation consultant and the AAP project team, directed the discussion. Discussion topics included pediatric oral health training, current provision of oral health services, community oral health partnerships, envisioning SDF implementation in the clinical setting (those not currently applying SDF), and lessons learned from practices already using SDF.

All sessions were conducted by the project's evaluation consultant on the Zoom teleconference platform. Transcripts created from session audio recordings were used to support content analyses of key concepts and recurrent themes.

Prior to each interview, participants reviewed the American Academy of Pediatric Dentistry's [**Chairside Guide: Silver Diamine Fluoride in the Management of Dental Caries Lesions**](#). At interview conclusion, attendees received their choice of a \$50 Amazon or Target e-gift card.

Participant quotes are presented in italics throughout the report. In some instances, quotes have been lightly edited for confidentiality or readability.

Results – Interview Learnings

Oral Health Training

Nine of 12 pediatricians reported some type of oral health training, typically in residency (n=6), although most characterized their training as limited. Several interviewees participated in practice-based learning opportunities through a state-sponsored program or an AAP quality improvement initiative. Regardless of source, training content often focused on fluoride varnish application.

Residency training really focuses more on medical pathologies like when things go wrong rather than maintenance and that's really it. Fluoride application, I guess, is mainly the main training we got, and it wasn't much of a training.

Pediatricians practicing in academic settings described more comprehensive oral health training for their own program's residents. Those in settings with an affiliated dental school noted the valuable "cross-pollination" that occurs when pediatric dentistry residents rotated through or worked in their clinics.

No participants had received SDF-related training. Several noted limited familiarity with SDF and three pediatricians were unaware of SDF prior to interview participation.

I've been aware of SDF for a few years now. I've read some about it, but we have not received training on it and I have not sought out training, honestly. On SDF specifically, we talked about it when the dental hygienist from the [state dental health program] came out. At that program they mentioned it as kind of a stop gap measure when they're trying to arrest the cavities and trying to find patients a dental home.

I never even heard of SDF until this morning when I read the [SDF Chairside Guide].

Current Provision of Oral Health Services and Guidance



Almost all of the 12 pediatricians interviewed provided five key oral health preventive services to their patients.

12 → Perform oral health risk assessments
Perform visual exams of the mouth

11 → Review oral health self-management goals with families
Refer to a dental home
Apply fluoride varnish

Current Provision of Oral Health Services and Guidance (con't)

Interviewees described most to all parents^[2] as receptive to and accepting of oral health services offered in the pediatric practice setting. Families without a dental home due to factors such as dental workforce shortages and local dentists who do not accept Medicaid and/or who will not see children until age 3-4 years were noted as particularly receptive.

If families have the Medicaid coverage for dental, we don't have any dentists other than our federal health center. So there are no dentists accepting new patients that have Medicaid for dental in about a 2-3 hour radius. The community health center, they will take Medicaid but they're the only one and so the wait is extensive. ...So that population I would say universally has been very receptive to not just the education, but also the fluoride varnish.

Probably half of our dentists here see kids, but not until they're like three or four years old. So the parents will call and they'll be told, 'No, you don't need to be seen until they're four. There's nothing we do for them anyway.'... They [local dentists] won't talk about fluoride toothpaste.

A lot of the kids I take care of have disabilities, have a hard time accessing dental care. And so any kind of dental guidance they can get in the primary care space is often very well received.

My clinic is probably 80% underserved Medicaid on a good day. And you know that adds to the challenge of finding a dentist. So we really have to own oral health in primary care at this point as much as we can.

Several interviewees noted that only a small subset of families typically reject fluoride varnish due to reasons such as private insurance co-pays, duplication of services already provided by the child's dentist, or concerns about fluoride not being *organic* or *natural*.

[2] The term "parent" is used throughout the report to represent parents/guardians/caregivers.

Community Oral Health Partnerships

All participants reported relationships with local dentists but the existence of relationships did not translate to care availability, especially for uninsured or Medicaid-insured patients. Pediatricians described long waits or limited to no dental care access for these families. One pediatrician reported that families without private insurance must often travel 2-4 hours to obtain care for a pediatric dental emergency and/or dental surgery. **No interviewee reported a pediatric dental workforce adequate to meet their community's needs.**

So I feel like I have really strong ties. I know the dental community but no good resources for my patients.

If there's a dental emergency, then it's almost like you've got currency in medicine to spend. You're like 'Okay, I haven't called this dentist in a while. Let me see if they'll take one,' because I mean, quite honestly, a lot of the population that's at risk is also the population that no shows or has problems.

If they are private [insurance], they have excellent access. I had a 9 month old baby who had a dental appointment already which I was surprised. The problem is that Medicaid patients, it's very hard for them to get appointments. Unfortunately, there are two places that they will be able to get appointments, but we don't trust those places very much. So we are not saying, 'Hey, don't go there,' but we're always saying like, 'Hey, I mean, if you guys feel like they are doing too many things on your son or your daughter, maybe you just want to hold off and get a second opinion.'

Some in academic practices had access to the resources of an affiliated dental school – and pediatric dental trainees – but often reported "saving" those referrals for their most complex patients.

For our patients, often with disabilities or complex medical conditions, the access is just as impossible as in more remote places you know. The wait list for our academic dental team who is amazing is very, very long. And a lot of the community dentists won't see our patients, even if they're pediatric dentists.

Five pediatricians reported developing lists of local dentists that they share with patients. Interviewees also queried families regarding experiences and satisfaction with community dentists to inform and revise their lists.

Envisioning SDF Implementation in the Clinical Setting

Pediatricians Not Currently Using SDF (n=9)

In response to a series of questions that asked pediatricians to anticipate needs associated with SDF implementation in their practice, most drew on their experiences with fluoride varnish application and information acquired from the [SDF Chairside Guide](#) document reviewed prior to the interview.

Clinician and Staff Involvement in SDF Application

Pediatricians expressed some uncertainty regarding clinician involvement in SDF application and often based their suggestions on who in the practice currently applies fluoride varnish.



All (n=9) reported that pediatricians would potentially be responsible for SDF application as well as nursing staff (n=6) and medical assistants/associates (n=5). One participant included residents in their list of clinicians who might apply SDF in their practice.

That's a tough question. Currently we are mostly staffed by LPNs and MAs and that's who applies our fluoride varnish. For our workflow, it would probably be them as well. I will say, the SDF application looks like maybe it takes a little more technical skill than the fluoride so maybe that would have to be a provider level intervention. I'm not sure.

I have two very experienced pediatric nurses who have been in the clinic for more than 15 years that would eventually become comfortable with the application, but they would want to kind of go through that process first, mostly because they love kiddos and the thought of staining or burning the gums is really kind of a big drawback. We've talked about it over the past 18 months.

Anticipated to serve in support roles were other staff including front desk attendants (visit / follow-up visit scheduling), administrators (ordering supplies), and coding/billing staff.

Preparing for SDF Implementation

Training. All participants endorsed the need for professionally-led training prior to SDF implementation in their practice, particularly due to the risks of SDF staining and concerns about correct identification of caries for treatment. Several anticipated requiring more extensive and intensive training than they received for fluoride varnish application. Suggested training modalities differed among pediatricians but included:



- Opportunities to watch live demonstrations and observe others applying SDF [n=6]
- Hands on, supervised learning with SDF application practice [n=5]
- Didactic presentations, lectures (slide decks or online modules) [n=4]

Envisioning SDF Implementation in the Clinical Setting

Pediatricians Not Currently Using SDF (n=9)

I would say some hands on in terms of seeing it...even just identifying what is an appropriate tooth to do it on and what's not? I would envision more than what we had for fluoride. Fluoride [varnish training] was just over lunch.

So I would think that there would have to be hands-on training and even observations before a lot of the providers would feel comfortable being able to apply it. ...[by] a pediatric dentist or someone who has the training and the proper application for it to be sure that the correct procedures are being used.

Additional suggested educational and training content, beyond clinical knowledge and application guidance, included:

- Communicating with/educating parents about SDF [n=3]
- Instruction on child life techniques to support SDF application [n=1]
- Billing training [n=1]

Probably at least like a one hour kind of lecture didactic type learning, but then also either practice with some of the complicating factors of doing it in a pediatric office, thinking about maybe even some child life techniques to help the child to aid in the application, practical management pieces, tips and tricks to how you hold the applicator and those sorts of things.

How to apply it, how to store it, side effects, what to do if something happens. What's the backup plan? From what I've heard, it's a simple procedure, but parents sometimes need to be talked into it. And maybe because of the discoloration, and sometimes they're not happy with the results they see afterwards. How do you manage those things for the rest of the staff so that you don't affect flow much?

Envisioning SDF Implementation in the Clinical Setting

Pediatricians Not Currently Using SDF (n=9)

Obtaining Supplies, Equipment, and/or Space. The most common concern among interviewees (n=5) was obtaining and incorporating compressed air for drying the lesion, post-SDF application.[3] Only one pediatrician reported current availability of compressed air.

Identifying appropriate procedure space was less of an issue as most pediatricians envisioned that SDF could be successfully applied in exam rooms. Similarly, few expressed any concerns about obtaining materials and supplies like application tools (eg, microbrushes) although several raised questions about SDF storage (eg, need for cold storage; shelf life).

I imagine this would be something that might need to be done in like a procedure type area where you have the materials all in one space...I think our exam tables would probably be fine for this. We don't need any special type of exam tables or chairs.

I think that we can do it in the either with a knee-to-knee or on the exam table.

With the fluoride application, we do it in the exam room and we position the child with the parent holding them so it's a little bit easier for us to do that. With this, it seems a little bit more, having to be a lot more careful than necessarily you are with the fluoride varnish as far as what you touch and so I would suspect that we probably could continue to do it in any exam room but it probably would be much harder to do it with just that provider and the parent.

The only thing would be how is it stored? I don't know if it's refrigerator or not. Where can it be? And how is it going to be accessible to the staff that's putting it in? ...so I think it'll have to be easily accessible to everybody that's using it. ... Does it need gloves? Does it need special precautions to handle it?

[3] The [Chairside Guide](#) that pediatricians reviewed prior to their interview instructed use of compressed air for clinical application of SDF. Compressed air is no longer necessary for SDF application.

Envisioning SDF Implementation in the Clinical Setting

Pediatricians Not Currently Using SDF (n=9)

Participants' current experiences with ordering materials and supplies ranged from easy (eg, notifying administrators who purchase items) to difficult (eg, advocating up the chain of command to seek permissions and approvals, often with limited success). One pediatrician recalled past challenges associated with purchasing oral health supplies.

...I actually tried to order one of the chairs that our pediatric dentist uses and you have to get a dental supply account even to order their stuff. Or even for our fluoride varnish...we had to go back and forth a few times with the company to prove, because we weren't dentists, that we were still medical and that we're going to use it in that sense. So I just bring that up because as I think about accessing the SDF that may present some similar challenges.

Incorporating SDF into Practice Workflows

Participants described several strategies to potentially incorporate SDF application into their practice workflows. Five pediatricians envisioned that SDF application would require scheduling another appointment beyond a health supervision or acute visit while four suggested that SDF could be applied during a health supervision visit. One pediatrician proposed a separate SDF clinic day (1 day/week or month) based on demand.



I don't think that I could do it during my regular well visit because there is already so much that is being crammed into there. ...So as far as the existing workflow, I think identification, discussion, but treatment may be for a different day at a different appointment time. ... I don't think I would have time to do this without sacrificing one of the other things we're supposed to be doing at the time.

I'm not sure if it can be done at the same time as fluoride. So can you do preventive and treatment at the same time?

Envisioning SDF Implementation in the Clinical Setting

Pediatricians Not Currently Using SDF (n=9)

Several raised concerns about the recommendation for a post-SDF application follow-up visit, citing issues such as compliance and billing.

I think this calls for follow-up. So if I have a patient that's never going to come back, it also makes me worry a little bit. I'll never see them again.

Participants identified numerous resources that could be helpful in incorporating SDF into practice workflows including:

- Procedural/training videos and modules (n=6)
- Hands on training (n=4)
- Local dentist or dental expert “coach”/mentor/early adopter available for questions, guidance, and support (n=4)
- Billing and insurance guidance (n=4)
- Patient education materials (pre- and post-application instructions; promotional posters, handouts, brochures) (n=3)
- Printed educational materials for clinicians (n=3)
- Equipment/supply recommendations and ordering guidance (n=3)
- Information and advocacy for sharing with practice/health system administration (n=3)
- CME/MOC credit for clinician training (n=2)
- Sample standard parental consent form (n=1)
- SDF Frequently Asked Questions (FAQ) for families (n=1)
- SDF FAQ for clinicians (n=1)
- Child life-focused tips and tricks for successful SDF application (n=1)
- Checklist for practice start-up/set up (n=1)

Envisioning SDF Implementation in the Clinical Setting

Pediatricians Not Currently Using SDF (n=9)

Conditions to Make SDF Implementation Feasible and Successful in Practice



Pediatricians identified numerous conditions necessary to make SDF implementation feasible and successful in their practice. Foremost among these were education/training and reimbursement.

Education and training for physicians and other health care professionals (n=7).

The disease burden is so high for my kids and the access is so low that I just feel like I need to do something else. I just want to feel confident in having all the tools and materials that I need and having the practice to do the actual procedure on a wiggly kid.

Strong, strong, very actionable, and also clear recommendations from a national organization on why this should be included, how to include it, would be really helpful. I like the sheet that you all handed out, but I think really clear inclusion/exclusion criteria of SDF, or for patients who should receive SDF. I know [the SDF Chairside Guide] says 'active cavitated caries,' but for most pediatricians, including me, that really wasn't very specific, so specifically define cavities. How we should screen. Should it include x-rays? More specific details about what is cavitated, how can you identify on exam. Things like that, I think, would be helpful.

In my training, oral health was something that was not very well addressed. So I think if there's any advocacy the AAP can do with increasing oral health education across the medical education spectrum, I think that would be great. For example, even reading this PDF, I think I just realized that I would need extra training to realize what an active cavitated caries was.

I'm not convinced yet that SDF is something I could just pick up and do because I watched a video. That's why I say I need some kind of hands on.

Envisioning SDF Implementation in the Clinical Setting

Pediatricians Not Currently Using SDF (n=9)

Appropriate payment (n=5). Pediatricians from practices that currently offer fluoride varnish are paid for the service but reported that other oral health services (eg, visual exam of the mouth) are bundled with the health supervision visit. Several interviewees noted that fluoride varnish reimbursement varies and that Medicaid payment is more reliable than private insurers. When private insurance won't pay, families may have to pay out-of-pocket – and are sometimes unhappy about it.

The majority of interviewees argued that to feasibly implement SDF, the procedure would need to be paid and that the practice would need, at a minimum, to break even or cover program costs. Several highlighted the importance of AAP advocacy for appropriate payment.

We're an academic practice with a largely Medicaid population. We're not out to make a lot of money. It's not our goal. So I think if it were cost neutral or slightly cost positive, that that would be fine, but if it were cost negative, I don't think we could justify it.

If it ends up being that we make special 15-minute appointments for these, you would hope it covers the cost of the physician time and the resources that it would take for that specific appointment.

Tell AAP to make sure Medicaid pays for it.

Other conditions for feasible and successful SDF implementation cited by fewer participants included:

- Buy-in at the physician (n=2) and organizational (n=2) levels. Several pediatricians noted the importance of AAP recommendations and guidance to foster and inform buy-in and support
- Patient/family education materials about SDF and resources to support physician communication about SDF with families (n=2)
- Ease of accessing/ordering (n=1) SDF and related supplies including SDF all-in-one kits (n=1)
- SDF-related equipment recommendations from a reliable source such as the AAP or the American Academy of Pediatric Dentistry (n=1)
- Easy SDF storage (n=1)
- SDF affordability (n=1)
- Sample parental consent template (n=1)
- Time (n=1)

Envisioning SDF Implementation in the Clinical Setting Pediatricians Not Currently Using SDF (n=9)

Several pediatricians raised concerns about adding "one more thing" to young patients' visits, especially at a time when many practices are experiencing ongoing challenges associated with COVID, staffing, and clinician burnout.

My patient population is much more complex here than when I lived in a larger city. And so some of that is just, I guess, just workload, so it's kind of like overwhelming to think about, 'Gosh, I'm already stuffed to the gills with stuff to do during the day.' It's the one more thing. I don't know if I'm in the right mindset.

It is so difficult. We have very high turnover in nurses and physicians. And every additional thing that we are trying to do, it just sometimes seems like one more thing, one more thing that you're asking even though you know anecdotally that this is a good thing. It's going to be a challenge, the buy-in to do one more thing.

When I read the [Chairside Guide PDF] this morning, I thought, "Oh, another task for me to do," and I barely am keeping up.

Envisioning SDF Implementation in the Clinical Setting

Pediatricians Not Currently Using SDF (n=9)

Interest in SDF as a Treatment Modality

Pediatricians were asked to rate patients' families, their own, and their colleagues' interest in SDF as a treatment modality for pediatric dental disease on a 1 to 5 scale where 1 equaled *not at all interested* and 5 equaled *very interested*.



Anticipated concerns focused on aesthetics and family perceptions that SDF application should be under dentists' purview.

Pediatricians weighed the ability to support children's oral health, particularly patients with limited access to dental care, against concerns about the unknowns (eg, time, workflows) and the potential for harms (eg, staining healthy teeth).

Pediatricians rated their colleagues' potential interest in SDF lower than their own, but suggested that interest might be changeable with AAP recommendations and appropriate training.

Envisioning SDF Implementation in the Clinical Setting

Pediatricians Not Currently Using SDF (n=9)

Interest in SDF as a Treatment Modality (con't)

I'm always excited to have an opportunity to do something that's going to help kids have better oral health because I understand how important that is. This seems like there are definitely some barriers. ... I'm just not totally convinced that this fits into sort of the primary care pediatrics workflow.

I think the thing that kind of the biggest brain block for me is kind of the two parts. One, if I did it, am I correctly identifying cavities? Because we do oral screening, but I'm not a dentist and we didn't go through that in detail. And so I guess in my head, what's the risk for harm and am I trying to take on too much? ... I could stain your teeth or do it wrong and what if I stain permanent teeth right next to it? What happens then? Am I going to be liable for it? Did I cause this patient damage that someone's going to come back to me and tell me 'Well, your training isn't adequate.'

I really view SDF as a stopgap measure in the oral health crisis that we have, both in the disease burden and access to care. It is not something that I want to do, but rather something that I feel I need to do for the health of my patients. I do have a fair amount of hesitancy just because of, I don't want to call it barbaric, but just the appearance of it, you know, the risk of having a squirmy two-year-old and burning the mucosa, you know, just the concerns of kind of the risk versus benefits.

I know the residents would love it. I feel like a lot of the other attendings would love it too. So if the application was pretty easy, I think that people would definitely be on board with it.

I'm one of those people that like to do fluoride a lot in our practice. Other physicians, I think, think it takes up too much time. And I think there would also be that hesitance because of the cosmetic. They're like 'We already have hesitance with the normal fluoride' and now I think it'll be even harder from the parents perspective to get it done than from the physician perspective as far as time-wise.

Lessons from Practices Currently Using SDF (n=3)

Among the three pediatrician participants who affirmed practice use of SDF, none reported direct involvement in SDF application at the time of the interview, thus lessons learned are limited.

Clinician and Staff Involvement in SDF Application

Interviewees acknowledged some uncertainty about who in their practice administers SDF but responses included a dental hygienist, a program-affiliated general dentist, and the nursing team (MAs and RNs).

I think it would be very challenging if we didn't have [dental hygienist]. It would be very challenging for us to implement into our workflow if it was something that me as a pediatrician needed to do. The demands on how quickly we need to see patients...especially with all the things we need to do for people, whether it's vaccine, etc.

SDF Implementation

Training. All (n=3) interviewees were unsure about the training completed by those who currently apply SDF.

Supplies, Equipment, and/or Space. Similar to information about training, pediatricians were uncertain about specifics associated with supplies, equipment, and space but the pediatrician who noted that SDF is applied by an affiliated dentist reported that the dental "side" has dental chairs and different supplies than in the clinic's pediatric medical exam rooms.

Office Workflow. Descriptions of SDF-related workflows (and the comprehensiveness of those descriptions) varied across the three pediatricians interviewed. In the practice with an affiliated dentist, the pediatrician reported that the dentist performs an oral health assessment after the health supervision visit and determines SDF-related need at that time; the clinic's pediatricians are not involved in any aspect of SDF workflow. In the practice where nursing staff apply SDF, the participant reported that a pediatrician or resident typically makes a dental-related referral within the electronic health record if a child has never seen a dentist but acknowledged that visual exams of the mouth are more consistently performed when pediatric dental trainees are in clinic with pediatricians. One pediatrician was unable to speak about SDF-related workflows entirely. No interviewees had information about parental consent procedures associated with SDF administration or post-SDF application follow-up visits.

Lessons from Practices Currently Using SDF (n=3)

In terms of integration, it's part of our electronic medical record. There is, as we're going through the well child visit, something where we're able to click...It's in the same workflow that we use when we're ordering vaccinations or other work within the clinic, so vision screens, hearing screens, vaccinations, it's all on the same workflow as that. So the physician puts it in and then on the nursing side, they get a notice that there's been an order placed, and then they go forward and do the order.

Similarly, participants were unaware of any specific resources that their practice had found helpful associated with SDF implementation, although one pediatrician recalled that their practice incorporated lessons from other clinics already using SDF within their health system.

Fiscal Considerations. Interviewees had little to no awareness regarding billing or the financial impact of SDF on their practice.

I don't do the billing, but I have seen it coded as a procedure, as like a modified procedure or a modifier.

Interest in SDF as a Treatment Modality

Asked to rate interest in SDF among the families in their care on a 1 to 5 scale where 1 equaled *not at all interested* and 5 equaled *very interested*, two participants chose “3” and “4,” respectively; one pediatrician declined to offer an assessment.

One pediatrician argued that families who are vaccine-hesitant or resistant due to fears that vaccines aren't *natural* may also be more likely to decline SDF.

No interviewees could speculate on the percentage of families that accept the offer of SDF as a treatment option for their child's dental disease.

Lessons from Practices Currently Using SDF (n=3)

Advice to Practices Considering SDF Implementation

I realize that not every practice is going to be able to have the type of oral health program that we do. But I think it's great to have someone in-house that can provide a wide range of oral health services for families. Especially because when families have a lot of barriers to meeting their healthcare needs, dental care seems to be something that falls by the wayside. And so finding ways to overcome those barriers, whether it's having someone in-house or having staff members who are trained to apply SDF or do other oral health services, or a lot of time to do both, learn how to do it ourselves as pediatricians or have maybe extra visit spaces or ways to make it realistic to our schedule, I think all of those things, depending on the practice would be helpful.

Conclusions

Key informant interviews with a small set of general pediatricians provide learnings that can inform the direction of current and future AAP initiatives regarding oral health in general, and use of SDF as a treatment for childhood caries specifically. With a strong commitment to delivering preventive oral health care in the early years – particularly for patients without a dental home – pediatricians may be open to exploring treatment options such as SDF for their patients but many questions remain unanswered.

Interviewees described having limited oral health training and even less familiarity with SDF. When asked to envision SDF implementation in their practice, all pediatricians expected to be involved in SDF application but shared concerns about potentially being asked to do “one more thing” in already time-constrained health supervision visits. Interviewees unanimously endorsed the need for education and training as a prerequisite to SDF administration but differed on preferred learning modalities. In anticipating how SDF might be incorporated into practice workflows, several pediatricians looked to fluoride varnish application as a model while recognizing the challenges, for both families and the practice, in applying SDF and assuring follow up with dental professionals. Conditions required for successful and feasible SDF implementation in the clinic setting centered on appropriate training and adequate payment.

Despite concerns and uncertainties, most pediatricians interviewed **expressed interest in and recognized the need for SDF**. Most anticipated that the families in their care would be at least somewhat interested, too. Ratings of expected interest in SDF among practice colleagues were lower.

Limitations

The key informant interview project includes several limitations of note, including reliance on a small, self-selected sample. The practices in which interview participants provide care do not represent all practice types. The experiences and viewpoints of the pediatricians who took part may not reflect those of pediatricians in general. Willingness to participate in an interview about an innovative treatment for childhood caries may also reflect a stronger interest in pediatric oral health, a possibility strengthened by a far higher percentage of fluoride varnish use reported among the interviewee sample than in a recent AAP Periodic Survey of Fellows (92% vs 17%, respectively).

Despite these limitations, interview learnings inform several next step recommendations for AAP consideration.



“There's such a need, anything that AAP can do to push the envelope, especially for our underserved or immigrants and our refugee kids who don't have access...we're willing to listen. We've heard about SDF, but I think we really don't have the training for it at this point in time. Those are skills that we will need to learn. But you know we weren't doing fluoride varnishes 15 years ago and now it's automatic. So I'm interested in any kind of education and assistance.”

Recommendations

1

Create **educational and training opportunities** for pediatricians to learn about SDF.

Risk/benefit information will be important, as will guidance to help pediatricians make realistic assessments about SDF-related harm and liability. Leverage pediatricians' comfort and knowledge about fluoride varnish application to *market* SDF while addressing misconceptions about how SDF may be similar to and different from fluoride varnish.

Recognize that pediatricians may want/need some level of **basic oral health education** and training to build the confidence and comfort needed to adopt SDF as a treatment strategy for their young patients. Many interviewees expressed concerns about whether they had sufficient knowledge and expertise to, for example, identify caries appropriate for treatment or prepare cavitated areas for SDF application.

2

Study and **learn from practices that have successfully implemented SDF across a variety of practice types and settings**. Of particular value would be case studies that include practical information and real-world examples of staffing needs, time requirements, and workflow models.

3

Support SDF adoption by providing practices with **coding and billing guidance; advocate for appropriate payment** from public and private payors.

4

Continue to **promote** and **support** the critically important **oral health preventive care** that many pediatricians currently provide. With shortages of pediatric dentists, general dentists who will not see children until ages 3-4, and a lack of high quality and accessible dental care for uninsured or Medicaid-insured patients, pediatricians will likely continue to fill an important gap in oral health care for young children.

Appendices

A

Pediatric Oral Health Survey Summary

B

Key Informant Interview Participant Demographics
and Practice Characteristics

C

Key Informant Interview Discussion Guide

Acknowledgements

Thank you to the pediatricians who contributed their time, insights, and experiences by completing a key informant interview. Gratitude to the AAP for supporting this work and to the staff team for their vision about this project, their partnership in developing the evaluation tools, and their dedication to pediatric oral health. We also acknowledge and thank the **CareQuest Institute for Oral Health** for their ongoing financial support and commitment to increasing the availability of minimally invasive dental care for children in need.

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Appendix A



American Academy
of Pediatrics



DEDICATED TO THE HEALTH OF ALL CHILDREN®

Pediatric Oral Health Practices Survey Summary

August 2023



Contents

- 1** About the Pediatric Oral Health Practices Survey
- 2** What is Silver Diamine Fluoride?
- 3** Survey Result Highlights
- 8** About the Survey Participants
- 11** Technical Information about the Pediatric Oral Health Practices Survey
- 12** What's Next?



About the Pediatric Oral Health Practices Survey

Pediatric dental disease is largely preventable but continues to impact too many children and families, particularly in underrepresented, marginalized communities. **Pediatricians are essential partners in keeping patients' teeth healthy** but may lack the knowledge, training, and incentive to incorporate oral health promotion and disease prevention services into care for young children.

The **Pediatric Oral Health Practices Survey**, conducted by the American Academy of Pediatrics (AAP) Section on Oral Health (SOOH) in Summer 2023, sought to 1) better understand pediatricians' provision of preventive oral health services for **children ≤ 5 years of age** and, 2) assess physician familiarity with a newer tool for treating early dental caries – silver diamine fluoride.

Through promotion to relevant AAP sections, councils, and committees, **337 pediatricians completed the survey**. Eligibility required that participants be general or subspecialty pediatricians who provide direct patient care.

A review copy of the survey is available [here](#). You may review the survey for personal reference only. To reproduce in any form for commercial purposes, please contact oralhealth@aap.org.



What is Silver Diamine Fluoride?



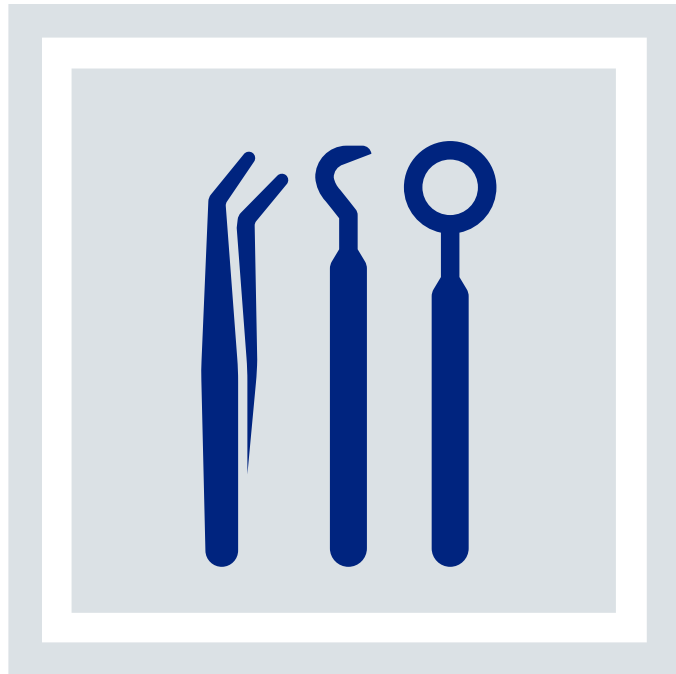
Silver diamine fluoride (SDF) is a clear liquid that combines the antibacterial effects of silver with the remineralizing power of fluoride.

According to the 2017 clinical practice guidelines of the American Academy of Pediatric Dentistry, SDF may be used in certain circumstances as a non-restorative management technique to arrest the progression of small carious lesions and caries-susceptible areas on primary and permanent teeth.

SDF is painted on the caries-affected areas of teeth in a quick, painless procedure. Application of SDF does not restore form or function of caries-affected teeth, and the treated carious lesions are permanently stained black. Its effective use requires training in diagnosis of dental caries, assessment of pulpal status, application technique, and collaboration with and referral to a dentist.

In late 2022, a current procedural terminology (CPT) category III code for the use of SDF in the medical setting was approved, moving its use in the pediatric medical setting one step closer to implementation.

Survey Result Highlights*



Pediatric Preventive
Oral Health Services
Provided by Practices



Likelihood of
Continuing or
Implementing Pediatric
Preventive Oral
Health Services



Pediatrician
Familiarity with SDF

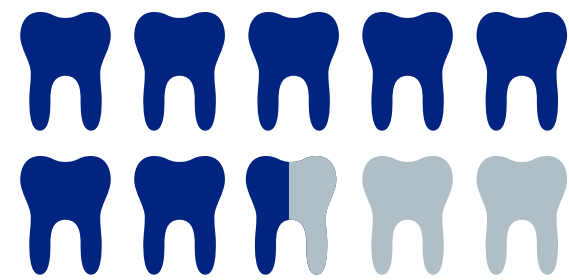


Likelihood of SDF
Implementation
with CPT Code

* Sample size for oral health services questions = 337 unless noted

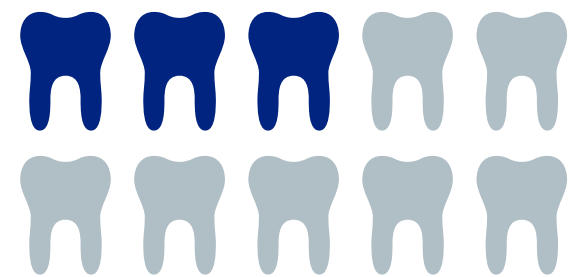


Pediatric Preventive Oral Health Services Provided by Practices¹



≥75%

Perform a visual exam of the mouth (96%, n=322)
Perform oral health risk assessments (81%, n=272)
Review oral health self-management goals w/family (75%, n=252)
Refer to a dental home (75%, n=254)



>30%

Apply fluoride varnish (34%, n=116)



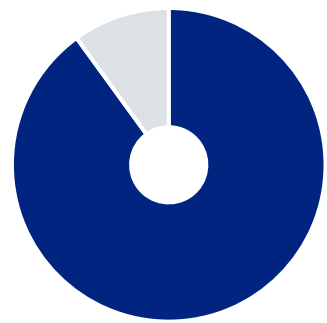
<5%

Apply silver diamine fluoride (4%, n=13)
**** 89% (n=299) reported no use of silver diamine fluoride ****

¹ Service provided to most patients (>50%) ages birth–5 years; for example, 96% reported performing a visual exam of the mouth for 51% or more of patients birth–5 years of age.

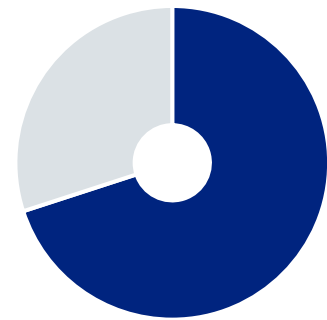


Likelihood* of Continuing/Implementing Pediatric Oral Health Services



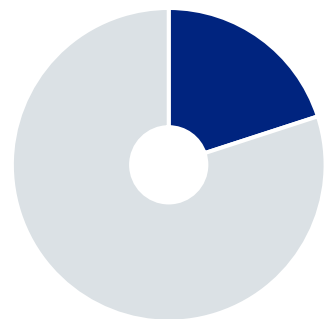
≥90%

Perform a visual exam of the mouth (98%, n=331)
Review oral health self-management goals w/family (95%, n=321)
Perform oral health risk assessments (94%, n=318)
Refer to a dental home (94%, n=318)



>70%

Apply fluoride varnish (72%, n=244)



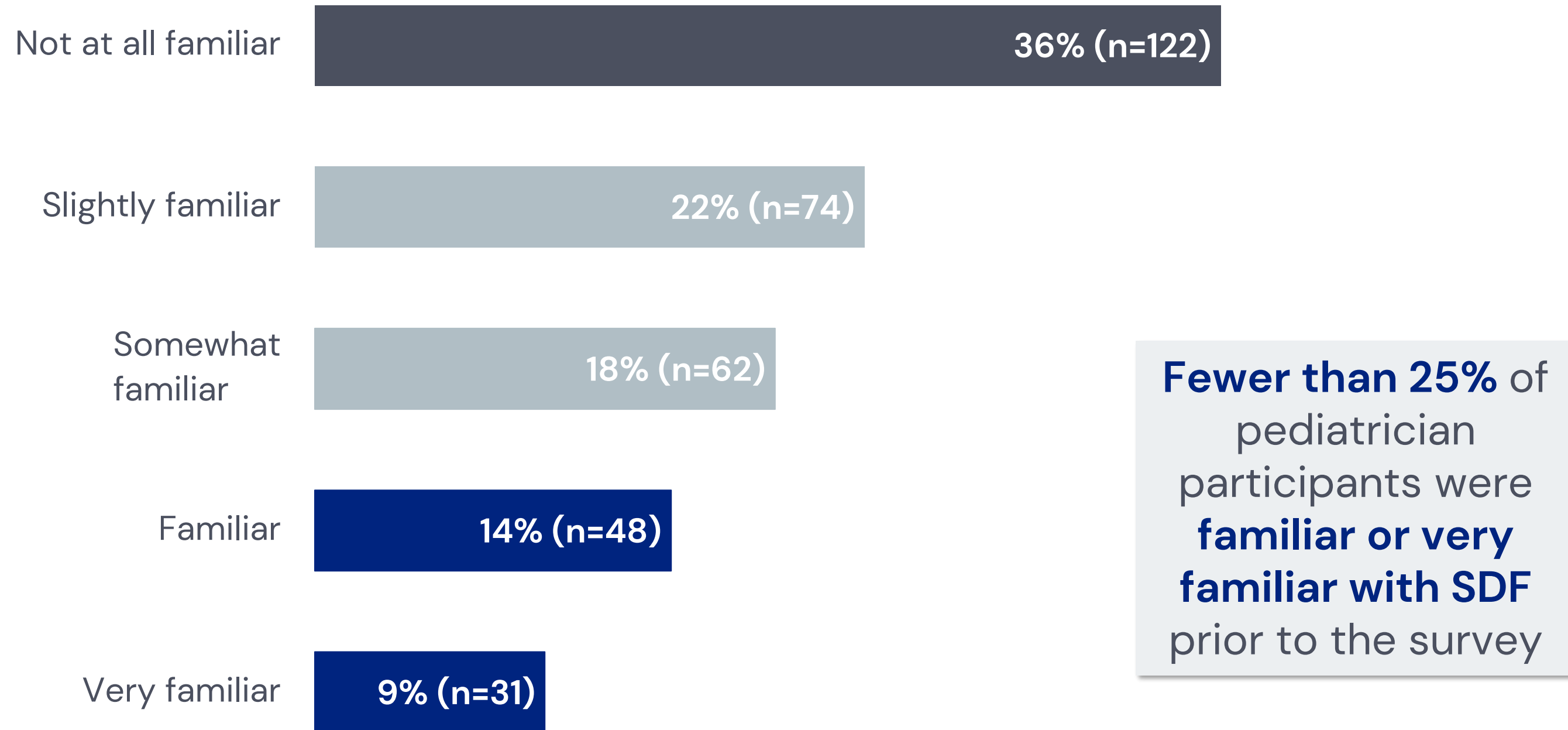
<20%

Apply silver diamine fluoride (19%, n=64)

* % reporting *Very likely* or *Likely* to continue offering or to implement service in the future

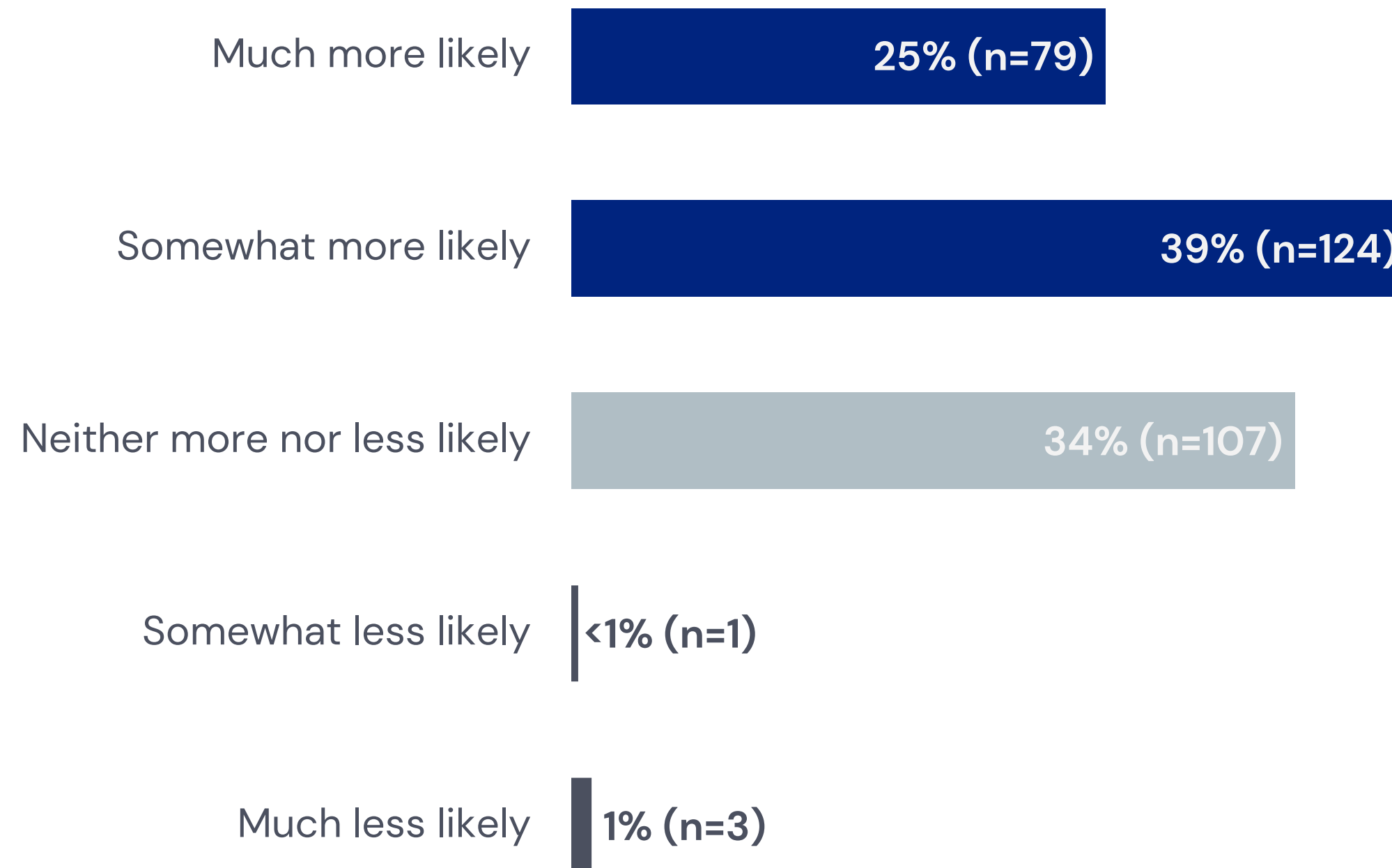


Pediatrician Familiarity with SDF





Likelihood of Practice SDF Implementation with CPT Code*



~ 2/3 of pediatrician participants would be **much** or **somewhat more likely** to implement use of SDF in practice if there was a **CPT code** for **SDF application**

* Includes the subset of pediatricians (n=314) who reported *No* or *Unsure* to previous question regarding current SDF use in practice

About the Survey Participants*



Practice Type

Pediatric group practice (29%)
Medical school or university-affiliated hospital or clinic (25%)
Community or non-university hospital or clinic (14%)
Federal, state, local government hospital or clinic (12%)
Multispecialty practice (9%)
Solo or 2 physician practice (7%)
Other (4%)



Practice Location

Urban (42%)
Suburban (40%)
Rural (18%)
Tribal area (<1%)



Patients ≤5 Years

Participant percentage estimates of practice population ≤5 years of age: mean [*M*]=42.7, standard deviation [*SD*]=18.8; range 0-100



Patient Insurance

Participant percentage estimates of patient insurance status:
Public: *M*=56.0, *SD*=29.5; range 0-100
Private: *M*=37.2, *SD*=29.2; range 0-100
TRICARE: *M*=10.6, *SD*=24.4; range 0-100
Uninsured: *M*=4.8, *SD*=11.0; range 0-95

*Sample size for practice and participant demographic questions = 313

About the Survey Participants*



Patient Race/Ethnicity

Participant percentage estimates of patient race/ethnicity:

White/Caucasian: $M=38.9\%$, $SD=25.9$; range 0-100

Hispanic/Latinx: $M=24.4\%$, $SD=22.9$; range 0-100

Black or African American: $M=22.6\%$, $SD=20.4$; range 0-95

Asian or Asian American: $M=8.0\%$, $SD=8.4$; range 0-70

Middle Eastern or North African: $M=4.1\%$, $SD=5.3$; range 0-50

American Indian or Alaska Native: $M=4.0\%$, $SD=14.8$; range 0-100

Native Hawaiian or Other Pacific Islander: $M=2.4\%$, $SD=8.6$; range 0-75

*Sample size for practice and participant demographic questions = 313

About the Survey Participants*



AAP Engagement

Participant-reported AAP Committee, Council, and Section membership(s):

Section on Early Career Physicians n=145
Council on Community Pediatrics n=45
Section on Administration and Practice Management n=41
Council on Immigrant Child and Family Health n=35
Section on Minority Health, Equity, and Inclusion n=34
Section on Oral Health n=27

Section on Uniformed Services n=25
Committee on Native American Child Health n=5
Other n=21 (eg, Committee on Practice and Ambulatory
Medicine, Section on Breastfeeding, Council on Children and
Disasters, Council on Children with Disabilities, Council on
Clinical Information Technology, Committee on School Health)

*Sample size for practice and participant demographic questions = 313

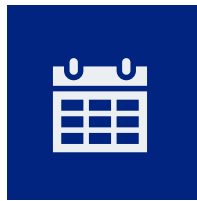
Technical Information

Pediatric Oral Health Practices Survey



Survey Promotion and Recruitment

AAP program managers and staff promoted the survey through emails and e-newsletters to members of relevant AAP committees, councils, and sections



Survey Administration and Field Dates

Administered electronically via SurveyMonkey, the survey was fielded from May 31–June 23, 2023



Participant Incentives

Participants could enter a drawing for a \$50 e-gift card upon survey completion; two Amazon e-gift cards were distributed



Institutional Review Board Approval

The survey was reviewed and approved as Exempt by the AAP Institutional Review Board

Appendix B

Key Informant Interview Participant Demographics and Practice Characteristics (n=12)

	Number (unless otherwise noted)
AAP Section Membership	
Section on Early Career Physicians (SOECP)	7
Council on Immigrant Child and Family Health (COICFH)	5
Council on Community Pediatrics (COCP)	4
Section on Minority Health, Equity, and Inclusion (SOMHEI)	3
Section on Oral Health (SOOH)	2
Council on Children with Disabilities (COCWD)	1
Section on Administration and Practice Management (SOAPM)	1
Section on Uniformed Services (SOUS)	1
Practice Type	
Medical school or university-affiliated hospital or clinic	5
Solo or two-physician practice	3
Federally Qualified Health Center (FQHC)	2
Community or non-university hospital or clinic	1
Pediatric group practice	1
Practice Location – Region	
South	5
West	3
Northeast	2
Midwest	2
Practice Location – Setting	
Urban	5
Suburban	5
Rural	2
Perception of children's dental disease as a problem among patient population	
Serious	9
Moderate	3
Percentage of practice patient population \leq5 years of age	
	Mean=47.5%
	Range=30%-80%

WELCOME AND INTRODUCTIONS

INTERVIEW QUESTIONS

1. Please confirm whether you've had a chance to review the 2-page document that I shared titled, "Chairside Guide: Silver Diamine Fluoride in the Management of Dental Caries Lesions."
2. As we begin, please tell me more about any clinical training that you've received regarding pediatric oral health.
 - a. Probe: What, if any, training have you received specific to SDF?
3. In your interest form, you noted that your practice currently provides the following: [*review individual list of oral health services and guidance from interest form*]. In general, how accepting have parents been of the oral health services and guidance that the practice provides?
 - a. When needed, what procedures are in place for obtaining consent from parents for oral health services?
4. As we transition into a more focused discussion of SDF, I'm going to share my screen and what you should see in a moment is a definition of SDF accompanied by a brief explanation of SDF's use in treating children's dental disease. *Slide to include the following:*

SDF is a clear liquid that combines the antibacterial effects of silver with the remineralizing power of fluoride. According to the 2017 clinical practice guidelines of the American Academy of Pediatric Dentistry (AAPD), SDF may be used in certain circumstances as a non-restorative management technique to arrest the progression of small carious lesions and caries-susceptible areas on primary and permanent teeth. SDF is painted on the caries-affected areas of teeth in a quick, painless procedure. Application of SDF does not restore form or function of caries-affected teeth, and the treated carious lesions are permanently stained black. Its effective use requires training in diagnosis of dental caries, assessment of pulpal status, application technique, and collaboration with and referral to a dentist.

In late 2022 a CPT category III code for the use of Silver Diamine Fluoride (SDF) in the medical setting was approved, moving its use in the pediatric medical setting one step closer to implementation.

To confirm, your practice *does not* currently use SDF, is that correct? [*proceed to Q5*]

To confirm, your practice currently uses SDF, is that correct? [*proceed to Q9*]

Questions: Practice *Has Not* Implemented SDF

5. If your practice were to implement use of SDF...
 - a. What office or practice staff do you envision would be involved?
Facilitator note: If questions arise about whether nurses or medical assistants can apply SDF—state practice acts determine; AAP does not yet have that level of information.
 - b. What types of training would you/practice staff likely need? What supplies, equipment and/or space would you likely need to obtain?
 - i. What is typically the process involved in obtaining that type of equipment?
 - c. How would you envision incorporating the use of SDF into office workflows?
 - i. What resources would be helpful?
 - d. On a scale from 1 to 5 where 1 is “not at all interested” and 5 is “very interested,” how interested do you think families in your practice would be in SDF as a treatment option for children’s dental disease?
 - e. On a scale from 1 to 5 where 1 is “not at all interested” and 5 is “very interested,” how interested are you as a provider in SDF as a treatment option for children’s dental disease?
 - f. On a scale from 1 to 5 where 1 is “not at all interested” and 5 is “very interested,” how interested do you think other pediatricians in your practice would be in SDF as a treatment option for children’s dental disease?
6. Let’s also talk about the financial/fiscal side of SDF. Does the practice currently bill for oral health services? Tell me more about the payment the practice currently receives for provision of oral health services. (probe: public vs private insurance payments for oral health)
 - a. If you were to implement SDF, what do you expect to be the financial impact?
7. Do you currently make oral health referrals for your patients? What types of relationships do you have with dental professionals in your community? (probe: pediatric vs general dentists)
8. What conditions would need to be in place to make SDF implementation feasible and successful in your practice? [*skip to Q13*]

Questions: Practice *Has* Implemented SDF

9. Tell me more about how your practice implemented SDF.
 - a. What office or practice staff are involved?
 - b. What types of training did those practice staff need?
 - c. What supplies, equipment and/or space did you have to obtain?
 - d. How is SDF integrated into the office workflow? (probes: how is the information presented to families, how is content obtained, who applies SDF, and how often is it re-assessed/re-applied, how are families connected to dentists)
 - i. What resources, if any, did the practice find helpful when you were first integrating SDF use into the office workflow?
 - e. On a scale from 1 to 5 where 1 is “not at all interested” and 5 is “very interested,” how interested have families in your practice been about SDF as a treatment option for children’s dental disease? (probes: what concerns have they expressed, what percentage of families that you present SDF as an option consent to SDF application)

Appendix C Key Informant Interview Discussion Guide

10. Let's also talk about the financial/fiscal side of SDF. How does the practice currently bill for SDF? Tell me more about the payment the practice currently receives for SDF.
 - a. What has been the financial impact of SDF implementation on the practice?
11. Do you currently make oral health referrals for your patients? What types of relationships do you have with dental professionals in your community? (probe pediatric vs general)
12. What advice would you give to other primary care pediatricians considering the implementation of SDF in their practice?

WRAP UP, INCENTIVE DISTRIBUTION, AND APPRECIATION

What else would you like to share about SDF or children's oral health that we did *not* discuss?