CariedAway: One solution for a global disease

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DISCLOSURES
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PROBLEM #1
U.S. Caries Across the Life Span
A 30-Year System Outcome Failure*

PROBLEM #2

* NYU
“Increased operating costs due to policies requiring dentists’ supervision of dental hygienists providing sealants in school settings were a barrier to implementing and expanding SSPs”

Patel et al, JADA 153(10); 2022.
Silver diamine fluoride is a minimally invasive medication used worldwide for the control of dental caries (tooth decay).

In addition to second prevention, growing evidence suggests that SDF is effective for primary prevention.

In the US, SDF is approved by the FDA for hypersensitivity, and was awarded breakthrough therapy status in 2017.

Faster and cheaper than dental sealants, able to be applied by a number of clinical providers.

Lower cost and increased access for children lacking access to oral hygiene care.

Results in permanent staining of decayed teeth and temporary staining of the oral mucosa.

Implementation Model

School-Based Caries Prevention Program for Children in Underserved, Low Income, Hispanic Communities
NYU Dentistry CariedAway Provides:

- An oral screening to check the teeth, gums, and mouth
- Tooth cleaning with a toothbrush
  - To remove plaque and food from the biting surfaces of teeth
- Cavity prevention, either:
  - Fluoride varnish on all teeth, sealants and temporary fillings to prevent and arrest cavities
  - Fluoride varnish on all teeth and decay stopping fluoride (silver diamine fluoride) placed on the back teeth to prevent and arrest cavities

Mission

To improve the oral health-related quality of life of New York City's most underserved communities by providing safe, aerosol-free, essential dental caries prevention to children in schools.

Program Planning

- OK, so how does it work?
  - Where do we start?
  - Who is responsible?
  - How long does it take?

Vision

Oral health equity for all children.

NYU Dentistry CariedAway Provides:

- Dental health education to teach children how to have a healthy mouth
- A toothbrush and full-size tube of fluoride toothpaste
- A report to parents on their child’s care
  - Referral to a dentist for further care
  - Assistance in finding a local dentist
- The program follows each child over time using secure electronic records to ensure that oral health is improving
Program Elements

- Research instrument
  - Electronic health record and survey tools

- Recruitment
- Applications to regulatory entities (city and state)
- Subject enrollment
  - Community engagement
    - Health literacy, cultural competency, and primary language
    - Insurance and immigration concerns
    - Thought leaders

Community Engagement

- Communication target
  - School administration, teachers, parent/caregiver, student

- Dissemination channels
  - Interpersonal networks, community and other promotional events

- Content strategies
  - Communication campaign (e.g., marketing mix)
  - Approach (e.g., emotional appeals, message framing, narrative persuasion)

- Executional strategies (packaging)
  - Paper, e-mail, and telephone marketing, leverage of school media platforms

- Incentives
  - Value: define and demonstrate
  - School, class/peer and individual incentives

- Frequency & Temporality
  - Repeat announcements, reminders, and follow-up communications
  - Timing in relation to health fairs, oral health education, etc.

- The most important contribution a school can make
  - Demonstrate buy-in
  - Connect students with available services
    - Parents, teachers, staff, students, and community members are invited to:
      - Meet their school’s dental team
      - Ask questions about and enroll students in the program
      - Engage in meaningful discussions about good oral health
Program Promotion

- Professional Development
  - School Administration
  - Teachers

- Tabling
  - Community members
  - Parents
  - Students

- Oral Health Education
  - Teachers
  - Students

Visit Scheduling

- Once our team receives notice of New York State approval, our Clinical Program Coordinator will work with school administrative staff to schedule our first visit
  - Our calendar fills up quickly!
  - We return to schools on a 6-month recall schedule (tricky!)
    - Fall semester: 4 months
    - Spring semester: 6 months

Patient Flow/Station Turn-Over

- CariedAway is dedicated to its role in supporting school attendance
  - Make every attempt to minimize the amount of time students spend away from the classroom
  - Care is provided:
    - In as little as 10 minutes
    - Twice per year
    - Eliminating up to 80% of cavities!

Space and Storage

- CariedAway strives to provide the greatest impact for New York City school students while minimizing programmatic demands
  - We recognize that physical space is valuable
  - Make every effort to fit our equipment and personnel wherever schools can accommodate us
  - When available, our team works best:
    - In a large classroom or on an auditorium stage*
  - *Subject to availability/circumstances in accordance with COVID-19 guidance
Silver Diamine Fluoride (SDF) Application

1. Dispense 1-2 drops of SDF 38% into a disposable well
2. Isolate teeth to be painted using gauze and cotton rolls
3. Remove debris and plaque with a toothbrush
4. Paint SDF on to the biting surfaces of back teeth (30 sec.)
5. Air dry (60 sec.)
6. Wipe excess material away with gauze
7. Repeat as necessary for multiple teeth
Isolation

Clinical Team Debrief Meeting
- Consolidated Framework for Implementation Research (CFIR)
  - Inner [i.e., school] setting
    - Culture, structural characteristics, implementation climate and readiness
  - Characteristics of individuals [e.g., “dental champions”]
    - Knowledge and beliefs about the intervention
  - Process
    - Planning, executing, engaging, reflecting and evaluating

School [Administration] Debrief Meeting

Process evaluation - Dissemination

Dental Champion Assessment

RESEARCH AIMS

- What are the best treatments?
- What is the etiology of nonresponse?
- How do we measure effectiveness?
- What is the required seat time?
- Effect on quality of life?
Along with an approximate 30% untreated decay prevalence, these statistics suggest a substantial unmet need in the low-income minority child population.

Following a two-year suspension due to COVID-19, approximately 12% of study subjects presented with swelling, fistula, or pulpal involvement.
Children were not significantly different in oral health-related quality of life, whether they received SDF or sealants/ART.

Both treatment arms had nearly identical rates of prevention and similar rates of arrest at two years.
Nurses were non-inferior to hygienists in the 2-year prevention of caries, with an average of 80% non-inferiority.

For the full Caried-Away sample, we showed consistent results for prevention at each study visit.
Prevalence (NI)

Incidence

6%

REDUCTION IN CHRONIC ABSENTEEISM

Cared-away schools, averaged across all years of the program, had between 3.5 and 6% lower chronic absenteeism.

SCHOOL ATTENDANCE

School-based cars prevention and the impact on acute and chronic student absenteeism

JADA (Journal of the American Dental Association), 152 (2021) 369-375.

NYU
STUDY CONCLUSIONS

1. Prevalence of caries is non-inferior over three years, inclusive of all subjects
2. Risk of caries incidence nearly identical across both groups
3. SDF is non-inferior to sealants for caries arrest after two years
4. School-based care may improve academic performance and quality of life
5. Nurses are as effective as hygienists when treating children with SDF in a school program

POTENTIAL BIASES

COVID-19
Due to pandemic restrictions, aerosol-generating procedures in traditional dental offices were severely restricted.

UNIQUE POPULATION
Our focus on low-income, minority children was in part due to historically low utilization of alternative dental care, limiting the role of outside intervention.

ANALYTIC ADJUSTMENT
Our analysis for caries arrest and prevention included not only incidence of observed decay but incidence of fillings, which was conservatively considered treatment failure.

CariedAway 3.0 – Clinical R&D
Incorporating precision medicine into school-based caries prevention
1. Utilize sequential multiple assignment randomized trials for dynamic treatment regimes
2. Further role of school nurses
3. Applications of machine learning for trajectory evaluation based on patient need

PRISMS – Dissemination and Implementation

PRISMS
Promoting Implementation of Sustainable Medicine in Schools
1. Identify the policy barriers and facilitators that influence the universal integration of SDF into school-based dental programs
2. Framework for program implementation using SDF
3. Economic simulation
INTEGRATION OF ESSENTIAL ORAL MEDICINES IN SCHOOLS CAN DRAMATICALLY INCREASE REACH & EFFECTIVENESS, AND OPENS A NEW FRONTIER FOR ORAL HEALTHCARE