

# Preventing Dental Caries: School-Based or -Linked Sealant Delivery Programs (2000 Archived Review)

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## Review Summary

### Intervention Definition

These programs provide direct delivery of dental sealants to children in school-based or school-linked (clinic or private practice) settings.

### Summary of Task Force Finding

The Community Preventive Services Task Force recommends school-based and school-linked dental sealant delivery programs based on strong evidence of effectiveness in preventing or reducing tooth decay among children.

### Results from the Systematic Review

Ten studies qualified for the review.

- Dental caries outcomes: median 60% decrease in cavities on the top and bottom surfaces of molars and premolars among children 6 to 17 years old (interquartile interval: 5% to 93%; 10 studies)
- Studies compared results from programs where sealants were applied to programs in which no sealants were applied.
- Children were examined for tooth decay from 2 to 5 years after the program.
- Applying sealants in school-based or -linked programs was found to be effective among children at different risk of tooth decay and in families of varying economic means.
- Six studies provided information on the economic efficiency of school-based or school-linked programs. Results of the review of these studies are published in Truman BI, Gooch BF, Sulemana I, et al. (2002).

These results were based on a systematic review of all available studies, conducted on behalf of the Task Force by a team of specialists in systematic review methods, and in research, practice and policy related to oral health.

### Publications

Truman BI, Gooch BF, Sulemana I, et al. [Reviews of evidence on interventions to prevent dental caries, oral and pharyngeal cancers, and sports-related craniofacial injuries](http://www.thecommunityguide.org/oral/oral-ajpm-ev-rev.pdf) [www.thecommunityguide.org/oral/oral-ajpm-ev-rev.pdf]. *Am J Prev Med* 2002;23(1S):21-54.

Task Force on Community Preventive Services. [Recommendations on selected interventions to prevent dental caries, oral and pharyngeal cancers, and sports-related craniofacial injuries](http://www.thecommunityguide.org/oral/oral-ajpm-recs.pdf) [www.thecommunityguide.org/oral/oral-ajpm-recs.pdf]. *Am J Prev Med* 2002;23(1S):16-20.

Task Force on Community Preventive Services. [Promoting oral health: interventions for preventing dental caries, oral and pharyngeal cancers, and sports-related craniofacial injuries: A Report on Recommendations of the Task Force on Community Preventive Services](http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5021a1.htm) [www.cdc.gov/mmwr/preview/mmwrhtml/rr5021a1.htm]. *MMWR* 2001;50(RR21):1-13.

Task Force on Community Preventive Services. [Oral health](http://www.thecommunityguide.org/oral/Oral-Health.pdf) [www.thecommunityguide.org/oral/Oral-Health.pdf]. In: Zaza S, Briss PA, Harris KW, eds. *The Guide to Community Preventive Services: What Works to Promote Health?* Atlanta (GA): Oxford University Press;2005:304-28 (Out of Print).

## Task Force Finding

### Intervention Definition

School-based or school-linked pit and fissure sealant delivery programs directly provide pit and fissure sealants to children unlikely to receive them otherwise. School-based programs are conducted entirely in the school setting, and school-linked programs are conducted in both schools and clinic settings outside schools. Such programs define a target population within a school district; verify unmet need for sealants (by conducting surveys); get financial, material, and policy support; apply rules for selecting schools and students; screen and enroll students at school; and apply sealant at school or offsite in clinics. Many programs target what are referred to as high-risk children with high-risk teeth. High-risk children include vulnerable populations less likely to receive private dental care, such as children eligible for free or reduced-cost lunch programs. High-risk teeth (i.e., those with deep pits and fissures) are the first and second permanent molars that erupt into the mouth around the ages of 6 and 12 years, respectively.

### Task Force Finding (February 2000)\*

School-based and school-linked sealant delivery programs are strongly recommended on the basis of strong evidence of effectiveness in reducing caries on occlusal surfaces of posterior teeth among children.

Other potential positive and negative effects of school-based or school-linked sealant delivery programs have been mentioned but remain unsupported by empirical evidence of effectiveness. For example, successful programs may lead to the positive effects of (1) increased support for coordinated school-based programs to address related dental and nondental needs of children from low-income families (e.g., immunization and better nutrition); and (2) increased willingness of third-party payers to pay for sealants applied in all settings. Potential negative effects are expressed in concerns that (1) sealants containing Bisphenol-A may have estrogenic effects in the recipient; and (2) effective delivery of sealants (from all sources) might encourage recipients to ignore other anticaries interventions (e.g., use of fluorides).

Economic evaluation studies reported sealant program costs per person served ranging from \$18.50 to \$59.83 (median=\$39.10). The cost effectiveness ratios (adjusted cost per averted decayed surface) ranged from cost saving (<\$0) to \$487. A hypothetical school-based sealant program that sealed first permanent molars would be cost saving if unsealed molars were decaying at the average rate of >0.47 surfaces per year.

\*From the following publication:

Task Force on Community Preventive Services. [Recommendations on selected interventions to prevent dental caries, oral and pharyngeal cancers, and sports-related craniofacial injuries](http://www.thecommunityguide.org/oral/oral-ajpm-recs.pdf) [www.thecommunityguide.org/oral/oral-ajpm-recs.pdf]. *Am J Prev Med* 2002;23(1S):16-20.

## Supporting Materials

### Analytic Framework

See Figure 1 on page 24 of Truman BI, Gooch BF, Sulemana I, et al. [Reviews of evidence on interventions to prevent dental caries, oral and pharyngeal cancers, and sports-related craniofacial injuries](#)

[[www.thecommunityguide.org/oral/oral-ajpm-ev-rev.pdf](http://www.thecommunityguide.org/oral/oral-ajpm-ev-rev.pdf)]. *Am J Prev Med* 2002;23(1S):21-54.

### Evidence Gaps

#### What are Evidence Gaps?

Each Community Preventive Services Task Force (Task Force) review identifies critical evidence gaps—areas where information is lacking. Evidence gaps can exist whether or not a recommendation is made. In cases when the Task Force finds insufficient evidence to determine whether an intervention strategy works, evidence gaps encourage researchers and program evaluators to conduct more effectiveness studies. When the Task Force recommends an intervention, evidence gaps highlight missing information that would help users determine if the intervention could meet their particular needs. For example, evidence may be needed to determine where the intervention will work, with which populations, how much it will cost to implement, whether it will provide adequate return on investment, or how users should structure or deliver the intervention to ensure effectiveness. Finally, evidence may be missing for outcomes different from those on which the Task Force recommendation is based.

#### Identified Evidence Gaps

##### *Community water fluoridation (CWF)*

Most of the evidence indicates that CWF is safe and effective in reducing dental caries in communities. However, important research questions with practical applications remain unanswered, including:

- What is the effectiveness of laws, policies, and incentives to encourage communities to start or continue water fluoridation?
- What is the effectiveness of CWF in reducing socioeconomic or racial and ethnic disparities in caries burden?
- What is the effectiveness of CWF among adults (aged >18 years)?
- What, if any, are the effects of the increasing use of bottled water and in-home water filtration systems (which may not be fluoridated or may remove fluoride, respectively) on the benefits gained through CWF?
- How effective is CWF in preventing root-surface caries?

##### *School-based or school-linked pit and fissure sealant delivery programs*

The evidence is clear and convincing that sealants delivered through schools and school-affiliated clinics are safe and effective in preventing dental caries among children. Important research questions yet to be answered include:

- What is the effect of sealant delivery programs among adults aged >18 years (e.g., military recruits)?
- How do state dental practice laws and regulations affect use of sealants in school-based programs?
- How do school district oral health policies and curricula affect use of sealants?
- What is the effectiveness of sealants in primary teeth?

### *Statewide or community-wide sealant promotion programs*

The available evidence of the effectiveness of statewide or community-wide sealant promotion programs was insufficient to support a recommendation by the Task Force. Therefore, research in the following areas is a high priority:

- What is the effect of public education on awareness, community mobilization (through coalitions), and resource allocation for sealant promotion?
- What is the effect of professional education, combined with provider reminders and other system-oriented strategies, on knowledge, skills, and appropriate use of sealants?
- What is the effect of insurance coverage and managed care plans on access to and use of sealants?
- How cost effective are models of sealant delivery other than school based?

### *Ecologic Approaches Using Multiple Interventions with Many Targets of Change*

Research on ecologic approaches in various settings might involve multiple interventions with many targets of change and desirable health. Estimates of effectiveness might focus on increase in knowledge, behavioral intentions, and behaviors in the short term and the desirable health outcomes mentioned above in the long term. Questions such as the following need to be answered:

- What is the effect on several oral health outcomes of community-wide interventions that combine environmental change, legislative action, policy change, and social support within families to encourage behavior change?
- What is the effect on several oral health outcomes of community development coalitions, partnerships, mass media advocacy, and social marketing?
- What is the effect on several oral health outcomes of multicomponent interventions in selected settings?

### **Included Studies**

Bagramian RA. A 5-year school-based comprehensive preventive program in Michigan, U.S.A. *Community Dent Oral Epidemiol* 1982;10:234–7.

Bravo M, Baca P, Llodra JC, Osorio E. A 24-month study comparing sealant and fluoride varnish in caries reduction on different permanent first molar surfaces. *J Public Health Dent* 1997;57:184–6.

Burt BA, Berman DS, Silverstone LM. Sealant retention and effects on occlusal caries after 2 years in a public program. *Community Dent Oral Epidemiol* 1977;5:15–21.

Horowitz HS, Heifetz SB, Poulsen S. Retention and effectiveness of a single application of an adhesive sealant in preventing occlusal caries: final report after five years of a study in Kalispell, Montana. *J Am Dent Assoc* 1977;95:1133–9.

Klein SP, Bohannon HM, Bell RM, Disney JA, Foch CB, Graves RC. The cost and effectiveness of school-based preventive dental care. *Am J Public Health* 1985;75:382–91.

McCune RJ, Bojanini J, Abodeely RA. Effectiveness of a pit and fissure sealant in the prevention of caries: three-year clinical results. *J Am Dent Assoc* 1979;99:619–23.

Messer LB, Calache H, Morgan MV. The retention of pit and fissure sealants placed in primary school children by Dental Health Services, Victoria. *Aust Dent J* 1997;42:233–9.

Selwitz RH, Nowjack-Raymer R, Driscoll WS, Li SH. Evaluation after 4 years of the combined use of fluoride and dental sealants. *Community Dent Oral Epidemiol* 1995;23:30–5.

Songpaisan Y, Bratthall D, Phantumvanit P, Somridhivej Y. Effects of glass ionomer cement, resin-based pit and fissure sealant and HF applications on occlusal caries in a developing country field trial. *Community Dent Oral Epidemiol* 1995;23:25–9.

Sterritt GR, Frew RA, Rozier RG. Evaluation of Guamanian dental caries preventive programs after 13 years. *J Public Health Dent* 1994;54:153–9.

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## Disclaimer

The findings and conclusions on this page are those of the Community Preventive Services Task Force and do not necessarily represent those of CDC. Task Force evidence-based recommendations are not mandates for compliance or spending. Instead, they provide information and options for decision makers and stakeholders to consider when determining which programs, services, and policies best meet the needs, preferences, available resources, and constraints of their constituents.

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