Improving Access to Preventive Dental Services through a School–Based Dental Sealant Program

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Abstract

Purpose: The lack of access to preventive dental services, such as dental sealants, can be a major barrier to optimal dental health. School–based dental sealant programs can serve as programs to improve access to preventive dental services.

Methods: This school–based dental sealant program managed by a Boston dental school with collaborating partners in the metro west area of Massachusetts provides free dental sealants to second grade children. The number of second grade children having dental sealants was tracked for 6 school years and compared with the Healthy People 2010 objective of 50% of all children aged 8 years to have at least 1 dental sealant.

Results: From school years 2003 to 2004 through 2008 to 2009, 1,609 dental screenings were provided for second grade children. Of those, 1,189 received dental sealants. To determine whether or not the Healthy People 2010 objective was met, the number of children who received dental sealants from the school–based program was added to the number of children who already had their permanent first molars sealed by their own dentist at the time of the dental screening, plus children with sealants per parent report. In total, the aggregate second grade enrollment having sealants during the designated school years was 54%.

Conclusion: The specific Healthy People 2010 objective was achieved over the designated time period. School–based dental sealant programs can help to decrease or eliminate barriers for access to preventive dental services by increasing the number of children who receive dental sealants.

Key words: dental sealants, school–based dental sealant programs, Healthy People 2010

This study supports the NDHRA priority area, **Health Promotion/Disease Prevention:** Identify, describe, and explain mechanisms that promote access to oral health care, e.g., financial, physical, transportation.

Introduction

Healthy People 2010 is a 10 year health promotion program for improving the health of all Americans. Led by the U.S. Department of Health and Human Services, Healthy People 2010 is organized into 28 focus areas with over 400 public health objectives. Health objectives for each focus area, developed and selected through consultation with a broad range of organizations, groups and individuals, provide a framework for monitoring and measuring improvements in the health status of the American population over the 10 year period from 2000 to 2010.[1]

The oral health focus of Healthy People 2010 combines well with with the strong tradition of community–based education and outreach activities at Boston University Henry M. Goldman School of Dental Medicine. Within the Department of Health Policy and Health Services Research, the focus of the Division of Community Health Programs is to improve oral health and enhance the quality of life for the community through strategic partnering, health education and promotion and implementation of public health initiatives, which have all helped in the development of school–based dental sealant programs.[2]

A major theme of the Surgeon General's Report on Oral Health is that oral health means much more than healthy teeth and gums. Oral health means being free from oral pain, oral cancers, birth defects and other diseases or problems that affect our daily functioning. Oral health problems affect our ability to eat certain foods, the way we communicate, how we view ourselves and how we are perceived by others. In advanced stages, oral health problems can affect our performance at work and at school. A recent news report about a young Maryland boy with an untreated dental disease has created a link between oral health and overall general health.[3] The social impact of oral health problems in children is substantial, since more than 51 million school hours are lost each year due to oral health related illness.[4]

Tooth decay remains the single most common chronic childhood disease, occurring 5 times as frequently as asthma, the second most chronic disease in children.[5] In Massachusetts, it is well documented that children are afflicted with oral disease. In 2007, a statewide oral health survey revealed that over 40% of the third graders had experienced dental disease, 17% had untreated dental disease and 5% experienced pain in their teeth or mouth.[6] Given the severe consequences of untreated oral diseases, barriers to dental care and the fact that safe and effective methods to prevent tooth decay are available, the implementation of school–based dental sealant programs becomes more significant in order to help decrease the prevalence of oral diseases.

Lack of access to preventive dental services, such as dental sealants, is a major barrier to optimal dental health. Dental sealants, thin resin coatings that are brushed on the chewing surfaces of teeth by oral health care professionals, are safe, painless and the most effective means of reducing tooth decay on the chewing surfaces of teeth.[7] For as long as the sealant remains on the tooth, the chewing surface of the tooth is virtually protected from developing a cavity. Since many cavities found in school children occur on the tooth's chewing surface,[8] the placement of dental sealants has the potential to greatly improve the oral health status of schoolchildren. Although the purpose of the school–based dental sealant program is to improve access to preventive dental services and serve as a cavity prevention program, it also provides dental health information for schoolchildren, thus increasing dental health knowledge for schoolchildren and their families.

Several studies have been conducted and hundreds of articles have been written about school–based dental sealant programs. Although this review of literature is not inclusive of every article written on this topic, the variety of studies and articles noted are relevant and current. The following concepts related to school–based dental sealant programs are also included in this literature review: the delivery of preventive services for schoolchildren, the effectiveness of using portable equipment in targeted school areas, reducing racial and economic disparities in the prevalence of dental sealants, the unmet need for dental services and an increase in awareness of school–based dental sealant programs as important and effective public health programs that can complement clinical care.[9–12]

Study findings indicate that school–based dental sealant programs can increase the prevalence of dental sealants and can help to reduce or eliminate the racial and economic disparities in the prevalence of sealants.[10] By removing certain barriers, such as cost, time and transportation, school–based dental sealant programs can successfully provide preventive dental services to schoolchildren.[11] Studies show the existence of oral health disparities with individuals from racial and ethnic minority groups, such as immigrants from South American countries, experience higher burdens of dental disease.[13] National data consistently demonstrates that people from racial and ethnic minority groups and individuals living in poverty are disproportionately affected by dental disease.[14] Oral health disparities are evident with the comparison of socio–economic status. Three times as many children from families with incomes below 100% of the federal poverty level have untreated dental decay compared to children from families with incomes above the federal poverty line.[14–16]

Further study is needed to evaluate the fact that school–based dental sealant programs must be both comprehensive and continuous for the maximum dental health benefit for schoolchildren to occur.[17] Following is a description of a school–based program implemented in Framingham, Massachusetts. Initial planning began in 2000, and the school–based dental sealant program is ongoing for school year 2009 to 2010.

Methods and Materials

Framingham, the largest municipality in the Commonwealth of Massachusetts, is an economically developed town located 20 miles west/southwest of Boston, with 66,910 residents living in an area of 26.44 square miles.[18] The Framingham Public Schools system consists of 8 elementary schools, 3 middle schools and 1 high school, with a total enrollment of 8,154 students for the school year 2008 to 2009. The racial and ethnic distribution of students in the Framingham Public Schools system consists of the following: 20.8% Hispanic, 6.3% African American and 6% Asian. White, non–Hispanic students, including those who identify themselves as Brazilian, comprise 65.6% of Framingham's student population.[19]

According to the 2000 U.S. Census, the median family income in Framingham is less than $68,000.00 a year.[18] Close to 33% of the district's 8,154 school children participate in the federal lunch program. Two Framingham elementary schools still participating in the school–based dental sealant program have close to 50% of students receiving free or reduced–cost lunches.[20] Through a partnership with the Framingham Public Schools, planning for the implementation of the school–based dental sealant program began in 2000.

Initial Plans for the School–Based Program

Administrators from one Framingham elementary school requested creation of an oral health program to become part of their summer 2000 health initiative. Acceptance of the request followed with a fun and interactive oral health education program which was implemented for 100 disadvantaged school age children. The following school year, an oral health survey was conducted by the Framingham School Health Services for parents of children enrolled in first and second grade. Parents were asked the following questions:

1. How would you rate the oral health of your child?
2. Has your child been seen by a dentist on a regular schedule?
3. Has your child already had dental sealants placed on molar teeth?

The survey showed that less than a third of the children whose parents responded to the survey had dental sealants placed, which was far short of the Healthy People 2010 objective of 50%.[1] As a result, the plan to implement a more comprehensive program to help eliminate barriers to dental services for uninsured and under–insured elementary schoolchildren who do not have access to a primary care dentist was put into action.

Dental Screenings

In the 2002 to 2003 school year, after positive informed consent was obtained from the parents of each child, baseline data was gathered from dental screenings of third grade children from 3 Framingham elementary schools. Measurable dental variables recorded during the screenings included the following: number of teeth filled, number of teeth with untreated decay, number of teeth extracted, identification of first permanent molars with existing sealants and identification of first permanent molars in need of sealants.

Data from the dental screenings, in particular identification of first permanent molars with existing sealants, was compared to the previous year's survey findings. Although progress was made, only 36% of children had at least 1 sealant.[1] During the following school year, partnership with the Framingham Public Schools system expanded and a town–wide school–based dental sealant program for second grade children was implemented for all 8 public elementary schools. *Guidelines for Sealant Use*, published by the American Association of Public Health Dentistry,[21] were used, and the school–based dental sealant program was modeled after *Seal America, the Prevention Invention* protocol, which was designed with assistance by the American Association of Community Dental Programs.[22]

Equipment and Staffing

The school–based dental sealant program utilizes a portable dental delivery system purchased with funding from a private foundation.[23] Staffing for the program consists of trained and competent dental personnel, including a dentist, dental hygienist and a dental assistant, along with the program director. The dentist's role helps to determine which teeth need to be sealed. The dental hygienist serves multiple roles, such as the program coordinator, the oral health educator and the dental health provider to apply both the sealants and fluoride varnish for participants in the town–wide, school–based dental sealant program. The dental assistant works chair–side with the dental hygienist to assist in sealant placement and fluoride application, and to record the previously mentioned specific dental information on the appropriate forms. The program director provides general oversight to the program.

In order to preserve the fidelity of the school–based dental program, systematic review of professional oral health guidelines and protocols, such as those in the *Guidelines for Sealant Use* and *Seal America, the Prevention Invention* protocol, are scheduled.[21,22] Annual review of equipment maintenance is enforced in order to ensure all portable equipment is working at optimal operation. Internal validity is ongoing with periodic calibrations scheduled for the oral health care team consisting of the following: decay assessment, placement of dental sealants and fluoride varnish applications.

Dental Health Education

The school–based dental sealant program begins with a 20 to 25 minute oral health education classroom presentation for all second grade children in the Framingham school system. This presentation is combined with a tooth brushing demonstration using large–size animal puppets. Age–appropriate classroom lessons on "tooth protection," such as proper tooth brushing and flossing, nutrition, fluoride and sealants, along with an animated video, are presented to the children.

Parents of children attending schools in Framingham may have limited English proficiency or have English as their second language. These cultural barriers have the potential to affect the level of health literacy – the degree to which individuals have the capacity to obtain, process and understand basic health information and services needed to make

Table I: Grade 2 Participants with Filled Teeth and Participants with Decayed Teeth (by school year)

Grade 2	2003–2004	2004–2005	2005–2006	2006–2007	2007–2008	2008–2009	Totals
Total Enrollment	675	653	654	677	642	685	3,986
Number of children receiving dental screening	286	255	258	253	273	284	1,609
Number of children with filled teeth	88	126	97	101	100	115	627
Number of children with decayed teeth	84	132	84	101	93	85	579
Percentage of children screened having decay	29%	52%	32%	40%	34%	30%	36%

appropriate health decisions.[24] People with limited health literacy may have difficulty locating health providers and health services, filling out complex health forms or seeking preventive health care.[24]

In order to help increase health literacy, informed consent packets used in the school–based dental program consist of straightforward language, short sentences and well–defined dental terms. Studies have shown that simplified and less complicated information has improved health behaviors in people with low health literacy.[24] School populations identified as having Portuguese or Spanish as the primary language spoken by the parent receive information in the appropriate language. Therefore, double–sided informed consent packets in the primary language spoken at home and in English are sent home with each child to be reviewed by the parent. The packet includes the following: a letter explaining the sealant and fluoride program, a fact sheet about sealants and fluoride, a medical history and permission form and a return envelope for confidentiality. The program letter clearly states the intention of the program is to target children who do not visit a dentist regularly or do not have access to preventive services.

The dental hygienist/program coordinator works closely with school nurses, teachers and administrators to minimize disruption to classroom activities. The total amount of time spent for the entire oral health prevention program, which includes the oral health education classroom presentation, the dental screening and the application of dental sealants with fluoride varnish, is no more than 60 minutes. Spending 1 hour per year out of the classroom for this program is less time than it would take for 1 off–site dental visit to either place sealants or place a dental restoration. In the long run, this prevention program may actually save children lost time from their school environment. Since it may also serve as the child's initial visit with dental professionals, the program can provide a stress–free and fun–filled introduction to dental visits.

Table II: Grade 2 Participants with Filled and Participants with Decayed Teeth from School Years 2003–2004 through 2008–2009

Variable	Frequency (n=1609)
Percent of children with filled teeth	38.9% (627)
Percent of children with decayed teeth	35.9% (579)

Participation in the school–based program is voluntary. Parents can withdraw the child at any time. Dental progress reports are sent home with each child for parent review – these reports include dental screening results, notification of the dental sealant and fluoride varnish applications and, if needed, a referral list of local area dental providers for children in need of further dental services who do not have a dental provider nor dental insurance.

Results

Frequency distributions of participant variables, in both numbers and percents, obtained from informed consent forms and/or screening sheets, are tabulated to include the following:

- Children receiving a dental screening and children with existing decay
- Children with filled teeth and children with decayed teeth
- Second grade children with dental sealants determined at the time of dental screening
- Parent report of existing sealants and sealants placed via the school–based program compared to goals of Healthy People 2010

Figure 1: Number of Filled and Number of Decayed Teeth in Grade 2

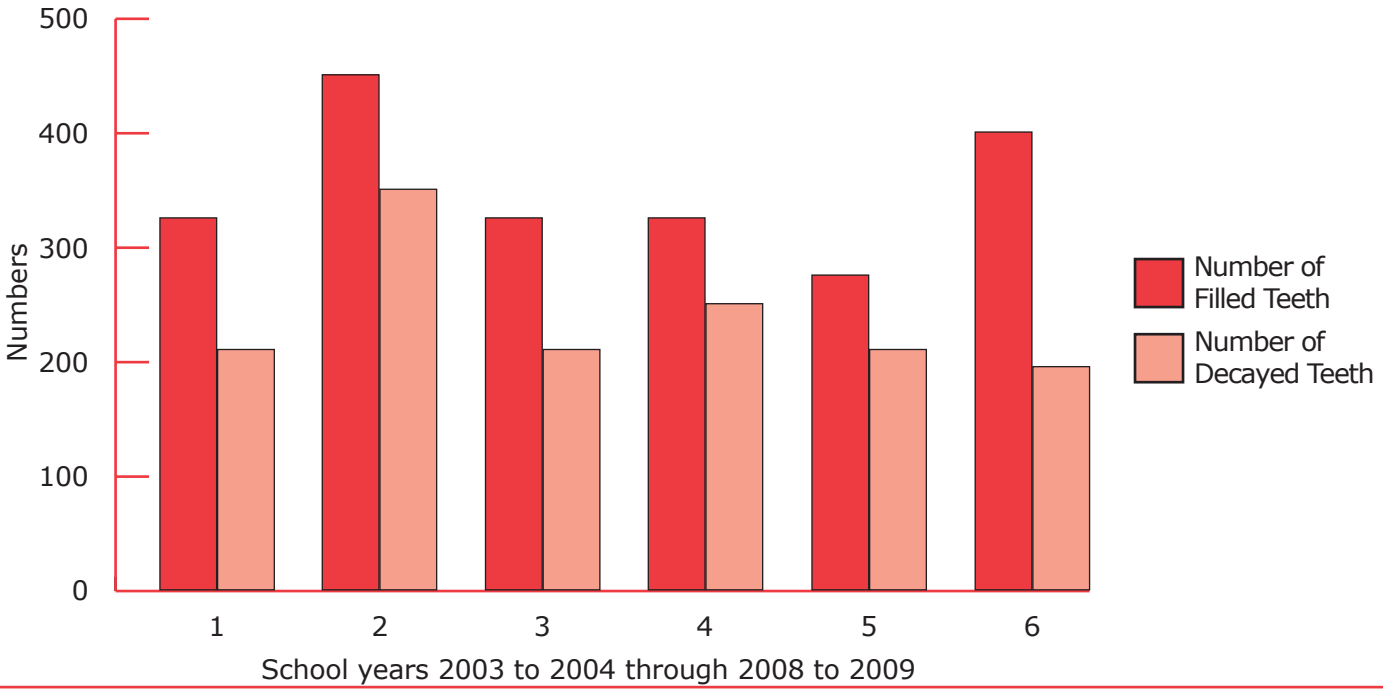
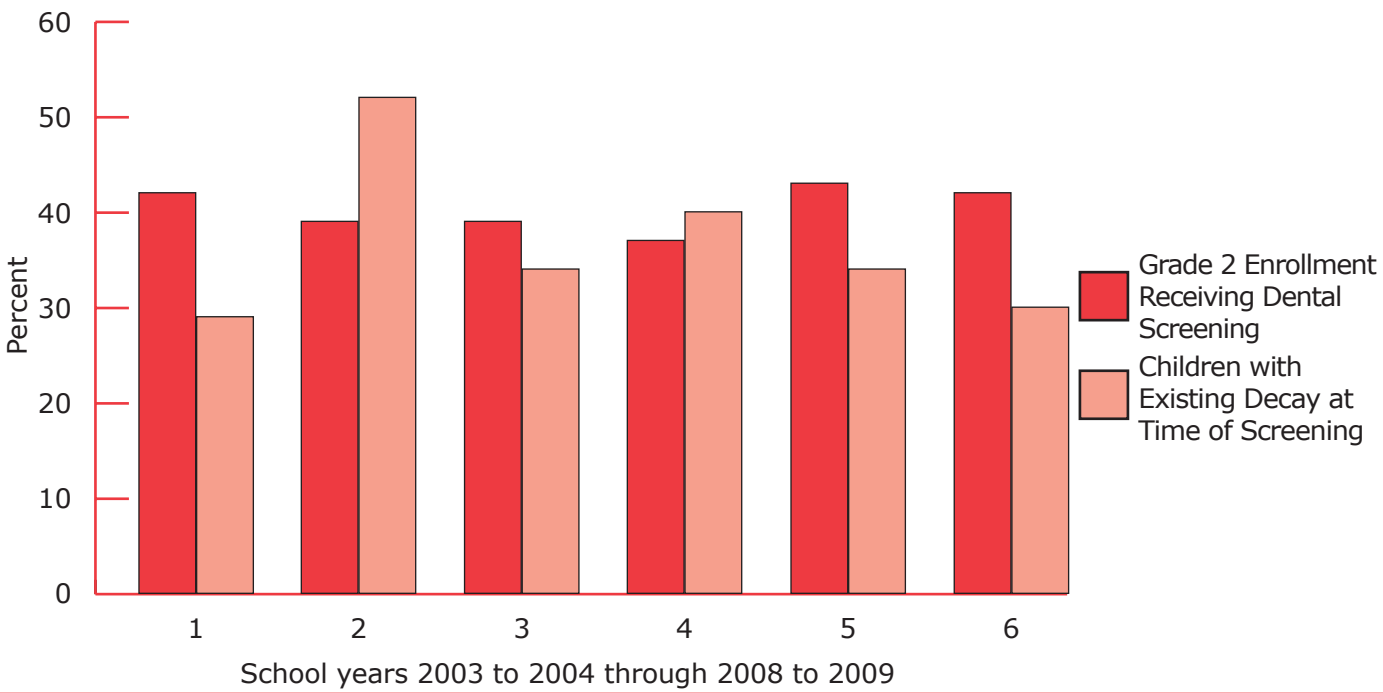


Figure 2: Percents of Children Receiving Dental Screenings Compared with Children with Existing Decay at Time of Screening



Tables I and II and Figures 1 and 2 denote the fluctuating numbers of children receiving dental screenings during the 6 year period. Throughout this period, fluctuations in the numbers of filled teeth and the numbers of decayed teeth are evident. One may wish to assume that this shows an increase in dental awareness, and though dental knowledge has helped in this achievement, this behavior change is beyond the scope of this article. However, we may assume that the increase in the number of filled teeth shows an increase in access to restorative services for the affected children.

Over the 6 year period, the percent of children receiving a dental screening who were shown to have existing decay has fluctuated from a low of 29% to a

Table III: Total Grade 2 Enrollment with Dental Sealants (by school year)

GRADE 2	2003–2004	2004–2005	2005–2006	2006–2007	2007–2008	2008–2009
Total Grade 2 enrollment	675	653	654	677	642	685
Number of children receiving sealants from school–based program	199	213	195	199	219	164
Number of children having had all permanent first molar sealants placed from their own dentist at time of our dental screening	43	16	21	36	27	52
Number of children with sealants per parent report	130	131	147	122	116	117
Total number of children with sealants	372	360	363	357	362	333
Total percentage of Grade 2 enrollment with sealants	55%	55%	56%	53%	56%	49%

high of 52%. In the 2008 to 2009 school year, 30% of children receiving a dental screening were determined to have existing decay at the time of their dental screening.

Although children are accessing the dental care they need, an assumption can be made that not all children are accessing this necessary dental service. The oral health team with the school–based program is hopeful that continued efforts to promote both the importance of oral health and the importance of receiving necessary dental services will help to reach the children in need of further restorative treatment. By continuing to frame oral health problems as an important part of overall health, we can help local health care providers, especially pediatricians, deliver oral health promotion messages to parents and their children.

Table III highlights the total number of children enrolled in the second grade who had sealants placed during the 2003 to 2004 school year through the 2008 to 2009 school year. These calculations are shown in order to measure the achievement of the Healthy People 2010 objective that required 50% of all children aged 8 to have at least 1 dental sealant. Calculations were determined by adding the number of children who received dental sealants via the school–based program to the number of children who already had all first permanent molars sealed by their own dentist at the time of the dental screening, plus the number of children with sealants per parent reported via the informed consent permission form.

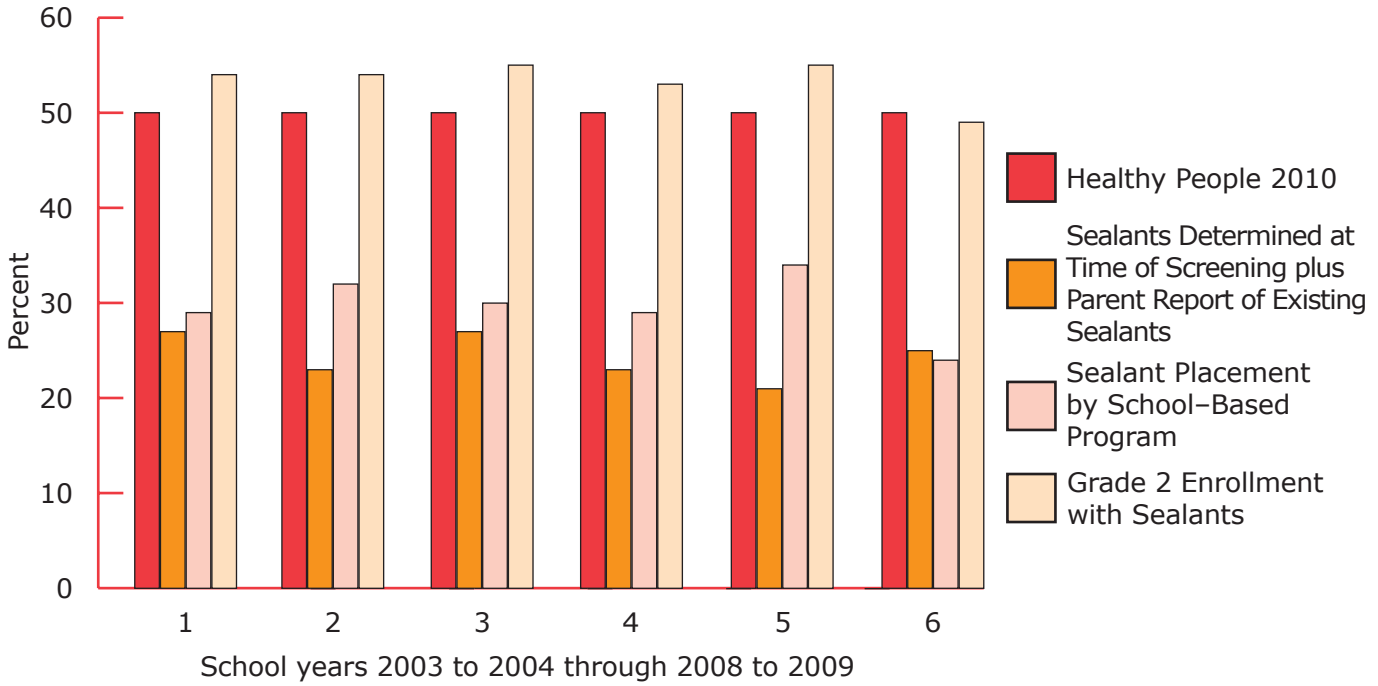
Figure 3 shows that the percent of Grade 2 children with sealants compared to the Healthy People 2010 objective of 50% of children aged 8 years having at least one dental sealant[1] was achieved for school years 2003 to 2004 through 2007 to 2008. However, in the 2008 to 2009 school year, this objective was 1% short of reaching that achievement. Although 49% of all children aged 8 years having at least 1 dental sealant was achieved, there's still work to do to improve access to preventive dental services.

Discussion

Oral conditions are important determinants of general health and well–being. The goal of improving oral health must be an integral component of the mission of a health care system, and services must be delivered in a manner that is socially and culturally responsive and flexible to the ever–changing communities served. School–based dental sealant programs can help children understand the importance of proper daily oral hygiene and reinforce positive attitudes and practices toward improving oral health. Not all children receive the dental care they need which highlights the fact that oral health needs and barriers to care still exist.

To address the needs of 2 ethnic groups, such as children from Hispanic families and those from Brazilian families, the school–based sealant program in Framingham employs a bilingual, culturally appropriate staff. Bilingual and bicultural staff members provide additional support for non–English speaking children and their parents or guardians, which enhances our efforts to help the children get the necessary further dental services. All educational materials and forms have been created at an appropriate literacy level and are available with Eng-

Figure 3: School–Based Program Results of Grade 2 Enrollment with Sealants Compared to Goals of Healthy People 2010



lish on one side and either Spanish or Portuguese on the reverse side.

In order to help ensure that all children who need dental care receive preventive services, community health programs continue to enhance the program's outreach to parents and/or guardians, children and other community groups. Participation in annual health fairs affiliated with the public school system and the local YMCA continue to promote our messages. Pamphlets on children's oral health, dental sealants and fluoride varnish are distributed to local pediatrician offices that provide services to children at the highest risk for dental disease. Additionally, enhancing our collaboration with local health and dental centers, which serve as major referral sites for children identified with dental treatment needs, is a means to increase our promotion of oral health awareness.

Conclusion

Although Massachusetts does not have a statewide dental sealant program at this time, privately funded school–based dental sealant programs can help to decrease or eliminate barriers to access. School–based dental sealant programs can increase the number of children who receive dental sealants on their molar teeth, as well as improve their oral health literacy, especially surrounding the value of dental sealants and preventive dental care for children, parents, teachers and non–dental health professionals.

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