Separating the Mouth from the Body: A Growing Concern for Overall Health

by

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ABSTRACT

Over the past few decades we have seen an improvement in the oral health of Americans. Advances in technology and science have provided a greater understanding of the etiologic factors involved in dental disease and the preventive measures necessary and available to improve oral health. In spite of the improvements in dentistry, there continues to be a disproportionately low utilization of dental services for poor children and children of some ethnic/racial communities. There is a strong correlation between dental insurance and utilization. Children from families without dental insurance are 3 times more likely to have dental needs than children with insurance. Among low-income children, almost 50% of tooth decay remains untreated with devastating effects. Oral diseases are progressive and cumulative and become more complex over time. Because dental disease starts early in life and has health consequences across our life span, prevention needs to start early as well. Integrating primary care medicine and dentistry would increase opportunities to improving access to dental care for underserved children.
Dental disease is a prominent health problem in the United States affecting Americans of all ages. About 20% of 2-4 year olds, greater than 50% of 8 year olds, and close to 80% of 17 year olds are affected by tooth decay (Centers for Disease Control and Prevention [CDC], 2004). About 3 of every 10 adults over the age of 65 have lost all their teeth due to dental disease (CDC 2004). Tooth decay is a preventable infectious disease that starts early in life and has devastating affects when gone untreated. Dental care has been recognized as the most prevalent unmet health need of US children (Newacheck, Hughes, Hung, Wong, & Stoddard, 2000). Even though Americans overall have enjoyed improvements in oral health, this is not true for segments of the population, particularly poor children. The current disparities that exist need to be addressed from individual, community, organizational and population perspectives to develop a socio-ecologic framework from which to understand, improve and evaluate public health interventions. “In spite of the fact that dental disease is primarily preventable through the use of fluorides, sealants, balanced diets, good home care routines, and regular dental check ups, dental disease continues to affect children” (Kenney, Ko & Ormond 2000). One explanation for the low utilization of dental care services, particularly among poor children, is inadequate access to these services (Mouradian, Wehr, & Crall 2000).

Access to care. The concept of “access to care” is broad and encompasses many levels of health determinants; it is much more than just a “building” to get dental care. It is recognized that access is not only the ability to pay for dental services but
includes, the awareness and knowledge of preventive dental care among its users, an adequate dental work force, and the ability to attain the services available. The lack of financial means to pay for dental services is directly correlated with its utilization, low income children showed greater deficits in the use of dental services (Kenney et al., 2000). So, the ability to afford or be afforded preventive dental services may be a good place to begin.

*Universal Health Care.* Since the United States does not provide universal health care we look to other countries for data to support best practice models. Research from other countries supports that oral health access barriers are complex with many contributing factors such as knowledge and awareness, access to care, health disparities and adequate dental infrastructures and workforce. Ismail and Sohn (2001) have shown that universal care alone does not appear to change the disparities in caries experience in children. This is not surprising; focusing on only one aspect of access to care is not expected to yield a simple solution. Strategies and interventions need to include multiple determinants of health in order to impact the disparities in oral health for children. US children will continue to be seen in emergency rooms across America until they can afford to access preventive dental care.

*Dental disease is a public health issue.* Untreated dental disease is a serious public health problem with increasing inequities and disparities, for US children, which leads to needless pain and suffering. Referred to as a “silent epidemic”, dental disease is robbing children of play and the ability to succeed in the classroom. More than 51 million school hours are lost each year because of dental related illness (U.S. Department of Health and Human Services [DHHS], 2000). Without access to regular
preventive dental services, children are not seen for dental care until symptoms become so severe that they end up in the emergency room for a temporary fix. The dental problem is never really addressed in the emergency room and proves to be costly. According to the Children’s Dental Health Project (2005), a three year comparison of Medicaid reimbursement for dental services provided in emergency rooms ($6,498) were 10 times more expensive compared to preventive treatment ($660) in the dental office. According to the CDC (n.d.), almost 50% of tooth decay, a preventable infectious disease, remains untreated with devastating results. Tooth decay remains one of the most common chronic diseases of childhood, five times as common as asthma and seven times as common as hay fever (CDC n.d.). Advances in research have been revealing the connection between chronic oral disease and systemic diseases such as diabetes, heart disease, lung disease and stroke; premature births and low-birth-weight babies are also showing associations (DHHHS 2000). Since the release of the first ever Surgeon General’s report on Oral health in America in 2000, and three years later the release of the National Call to Action to Promote Oral health, attention is being drawn towards policy makers, oral health providers, public health leaders and communities for action.

Oral health. Oral health is not only having healthy teeth but also being free of disease and conditions that affect the oral, dental and craniofacial tissue. Good oral health allows us to do things that we take for granted everyday such as smile, speak, smell, taste, touch, chew, cry, and convey emotions through facial expression. Somewhere along the way, the mouth has been disconnected from the rest of the body and has been thought of as being separate from or not connected to our overall ability
to be healthy. Dr. C. Everett Koop, former U.S. Surgeon General has stated that “you’re not healthy without good oral health” (DHHS 2000). Oral health is not only important to overall health, it is integral to well-being.

**Consequences of poor oral health.** Poor oral health behaviors in childhood follow into adulthood. Children with serious oral health problems are in pain, have trouble eating and sleeping, paying attention to parents and concentrating in school. Their ability to learn, participate in social interactions, and communicate to succeed in life is hindered. We live in a society where we are judged based on our appearance. We are more accepted if we are the ideal weight and height, born with the right color skin, and don’t have any missing teeth. Self-esteem, embarrassment and self-conscious issues are associated with tooth loss and deformities to the face and mouth. Increased economic costs are a consequence of poor oral health due to the high costs associated with treatments such as oral cancers and birth defects. 30,000 Americans are diagnosed with oral cancer annually, 8,000 will die from it in that year. Approximately 50% of those diagnosed will be dead in 5 years (Oral Cancer Foundation 2005). According to Delta Dental of Michigan (2004), “Oral Cancer is one of the most expensive cancers to treat with the average cost for treating an advanced case is about $200,000”. Repairing a Cleft lip or palate, the second most common birth defect, costs more than $100,000 per child (Lasker Foundation n.d.). Chronic dental disease is also associated with other medical problems. Dental disease needs to be seen as much more than just an oral health problem, but as an overall health risk (American Academy of Periodontology 1998).
The connection between dental disease and other medical conditions.

Continued good oral health practices, learned early in life, could prove life saving later in life. Mounting research shows that dental disease is linked to heart disease and stroke, respiratory diseases, diabetes, and pregnancy problems. Theories point to; oral bacteria entering the blood stream, attaching to fatty plaques in arteries and contributing to clot formation; inflammation caused by dental disease (periodontal disease) increases plaque build up, possibly contributing to the swelling of arteries (American Academy of Periodontology 2004). For dental procedures that cause bleeding, the American Heart Association (1997) recommends antibiotic prophylaxis to protect against infective endocarditis in some existing heart conditions. Bacteria common to periodontal (around the tooth) disease is found to be aspirated in the lungs and causing or exacerbating existing respiratory disease (American Academy of Periodontology 2004). The relationship between dental disease and diabetes appears to be one that works both ways. Advanced periodontal disease can increase blood sugar and uncontrolled diabetics are found to have a higher risk of developing periodontal disease (Taylor, Manz, & Bognakke, 2004). Infections in general pose a risk to babies of pregnant women, women with periodontal disease are found to be seven times more likely to have preterm low birth weight babies (American Academy of Periodontology 2004).

Etiology. Dental disease strikes both the hard and soft tissues of the oral cavity. The tooth and surrounding tissues (periodontal) are identified in Figure 1. The mouth is colonized with hundreds of bacterial species, but only some of these (in high concentrations) are active participants in the process of dental decay and periodontal
(gum) disease. Although there are bacterial tests available to indicate the estimated number and type of bacteria present, are of limited usefulness; the number of bacteria needed to cause dental disease in individual mouths is unknown and only one factor in a multifactorial disease (Malmö University 2000-01).

Figure 1

*Parts of the tooth*

1. Crown
2. Pulp/nerve
3. Root
4. Enamel
5. Dentin
6. Gums
7. Bone
8. Roots
9. Abscess


Streptococcus mutans is the primary bacterial cause of tooth decay. An infant does not have colonized bacteria until the eruption of the first primary tooth, at about 6 months. As bacteria adhere to the tooth surface forming a film called plaque, acid is formed from food containing fermentable carbohydrates and released causing demineralization of the tooth surface. Remineralization of the tooth surface occurs with the washing of saliva between acid attacks. When there is more demineralization than
remineralization, cavitation occurs. As the decay continues, bacteria migrate through the dentin into the pulp/nerve of the tooth. Our body’s natural immune response to infection causes the surrounding blood vessels to enlarge and press against nerves of the tooth causing pain. As the infection proceeds a build up of bacteria in the pulp occurs, causing the nerve to die. Once the nerve dies the immediate pain will subside, but the problem is far from over. Our body will continue to fight the existing infection causing an abscess to form. Extreme pain when chewing will now occur. The spreading of infection can result in general blood poisoning, fever, swelling in the face and neck and a general feeling of being ill. In rare severe cases, death has occurred (Sandor, Low, Judd & Davidson, 1998).

Bacterial plaque is the primary cause of periodontal disease. There are many forms of the disease. The most common forms of periodontal disease include gingivitis, which is the mildest form of the disease; Aggressive Periodontitis appears in primarily healthy individuals; Chronic Periodontitis is the most common of the forms, it is mostly seen in adults but can occur at any age; Periodontitis as a Manifestation of Systemic Diseases often has an onset at a young age, commonly associated with diabetes; Necrotizing Periodontal Diseases are commonly associated with individuals with systemic conditions involving immunosuppression. Treponema denticola and Porphyromonas gingivalis are anaerobic bacteria that are commonly found in periodontal infections. Bacteria in plaque cause an inflammatory response that causes the gums to detach from the tooth surface. As the tissues detach from the tooth surface a pocket (space between the tooth and gum) is formed. Slowly the bacteria move down the tooth infecting the gum tissue and dissolving bone that supports the tooth. A
progressive loosening of the tooth occurs and without treatment, the tooth may be lost (American Academy of Periodontology 2004).

The accumulation of dental plaque is a causative factor for both oral diseases of dental decay and periodontal disease. Unlike other medical problems, there is no early warning sign of pain in either dental decay or periodontal disease. Once pain is felt in a cavity it has already reached the sensitive inner layer of the tooth, called dentin. The dentin is soft and susceptible to bacteria allowing decay to travel faster than in enamel. Pain due to a gum infection comes late in the disease process, many times too late to save the tooth (American Dental Association 2001).

Prevention. Daily thorough removal of plaque and other preventive measures lowers the risk of dental disease. The American Dental Association, American Dental Hygienists Association, and the American Academy of Pediatric Dentistry have established recommendations (Table 1) for preventing dental decay and periodontal disease.

Table 1

Recommendations for the Prevention of Dental Disease

<table>
<thead>
<tr>
<th>Recommendations for the Prevention of Dental Disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Dental education</td>
</tr>
<tr>
<td>- Daily tooth-brushing with a fluoridated toothpaste</td>
</tr>
<tr>
<td>- Daily flossing to clean between teeth</td>
</tr>
<tr>
<td>- Eat a balanced diet and limit snacking</td>
</tr>
<tr>
<td>- Use of fluorides</td>
</tr>
<tr>
<td>- Use of dental sealants</td>
</tr>
<tr>
<td>- Routine dental care for exams and cleanings</td>
</tr>
<tr>
<td>- A child should have a dental home by 12 months of age</td>
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</tbody>
</table>

Education to gain awareness and knowledge about dental disease is only the beginning, education needs to engage communities, policymakers, health providers, educators and individuals alike. Americans need to understand that oral health is essential to overall health.

Public perception needs to connect oral signs and symptoms with being unhealthy. The understanding of the relationship of the mouth as part of the whole body needs to be reconnected. In order to reach communities and individuals, education and the messages conveyed need to take into account cultural diversity.

Policymakers at the local, state, and federal level need to be educated about the importance of including oral health services in health promotion and disease prevention programs. Changing the perceptions of policymakers at all levels of government is essential to effecting policy that deals with the oral health of Americans.

Health providers and health educators need to find a way to come together to provide overall health care. Medicine continues to be broken down separating the body into parts; eyes, teeth, feet, ear and nose and throat (ENT), hands and more. If physicians are not screening for oral diseases such as decay and periodontal disease and dentists are not screening for potential health concerns such as medication use, smoking and high blood pressure, patients will experience poor health outcomes (Mouradian, Berg & Somerman 2003).
Essential to public health is the ability to educate and collaborate, to collectively fill the gaps to achieve social justice. Although the science and technology is available to promote health and prevent disease, not all Americans are benefiting (DHHS 2003).

Toothbrushing and flossing (interdental cleaning) may seem basic; plaque removal is essential to preventing decay and periodontal disease. Without proper toothbrushing and flossing techniques appropriate for age, dexterity, and oral condition, dental disease will flourish. Oral hygiene routines for home care should be reviewed and discussed with a dental professional to optimize its purpose.

Nutrition is essential to well being and is no different for oral health. New focus is being put on the topic of soda and junk food sold in schools. The high sugar content of these great tasting drinks and snacks are causing health problems such as obesity, dental disease, and are contributing to and exacerbating systemic disease such as diabetes. Philadelphia schools have taken a stand and banned the sale of soda starting in July 2004. The school district is aware that they will lose about $500,000 a year from soda sales but are sticking by their mission to do everything possible to keep students safe and healthy (Cable News Network [CNN] 2004). Many people do not understand how to read labels on drinks so they do not understand how much sugar is really in there. Education and awareness about bad food choices needs to be strong and supported by all educators and health providers across all areas of medicine to impact health outcomes.

Fluoridation of drinking water is a major public health achievement of the 20th century. In 1945, a prospective field study was conducted in four pairs of cities to
include an intervention and control group. Sequential cross-sectional surveys were conducted in these cities over a 13-15 year period revealing that dental decay was reduced 50-70% among children in the fluoridated communities (CDC 1999). Fluoridation of the drinking water is not without controversy. Concerns about long term effects, toxicity, constitutional and civil liberty issues, and environmental impacts are still being discussed today. An important public health advantage of water fluoridation is that anyone, regardless of socio-economic level can enjoy its benefits. Realizing the benefits of fluoride, other delivery mechanisms such as toothpaste, gels, and drops, have been and continue to be developed. Fluoride continues to be a major preventive factor in the fight against decay (CDC 1999).

The clinical effectiveness of pit and fissure sealants is well documented (Simonsen 2002). A dental sealant is a plastic coating that is applied to the chewing surface of posterior teeth to prevent cavities. First permanent molars erupt about age 6; sealing these teeth soon after eruption protects them from developing decay in the food and bacteria retentive surfaces. Sealants are safe, effective, and prove to be a major factor in reducing a child’s risk for untreated decay. Healthy People 2010 calls for 50% of US children to have sealants placed by 2010, currently less than 25% of children under 15 do (DHHS n.d.). Simonsen (2002) acknowledges in his literature review that the procedure for placing a sealant is painless, safe, and requires little training.

The combining of these preventive measures is essential to fight the battle against dental disease. In order to reach poor children, those with the greatest disparities in oral health, Public health strategies, interventions and collaborations need
to address access to care issues that continue to keep children from early preventive dental care.

**Risk factors for dental disease.** There is a wide range of overlapping factors to consider. Diets high in sugars and starches lead to demineralization of the tooth surface. Frequent snacking increases the time that acid are in contact with the surface of the tooth. Saliva is our natural cleansing system to wash away food and debris, a child with impaired salivary flow or composition is at risk for increased caries. Families of children with special health care needs find themselves overburdened with specialized health care requirements putting their children at risk for poor oral hygiene. A child’s mother (most often the primary caregiver) that has active decay and a low socioeconomic status puts a child’s risk of decay high on the scale. The vertical colonization of *S. mutans* from mother to child is well documented (Li & Caufield, 1995). The lack of fluoride in the child’s toothpaste, drinking water or by prescription increases a child’s risk of tooth decay. Whether a child uses dental care services and the frequency of these visits, also influences a child’s risk of developing decay. A clinical evaluation indicating plaque present, inflamed gum tissue, areas of demineralization (white spots on teeth) and susceptible enamel characteristics are all signs of being at risk for dental decay. Other factors to consider would be the presence of existing decay, orthodontic appliances, and behavior management issues. The American Academy of Pediatric Dentistry has put together a “Caries Risk Assessment” tool to identify children’s risk indicators. (Table 2) As risk indicators are identified, a child’s oral health treatment and preventive measures can be appropriately provided. Risk factors
## RISK FACTORS TO CONSIDER

### Part 1 - History
(determined by interviewing the parent/primary caregiver)

<table>
<thead>
<tr>
<th>Risk Indicator</th>
<th>High</th>
<th>Moderate</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child has special health care needs.</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Child has condition that impairs salivary flow/composition.</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Child’s use of dental home</td>
<td>None</td>
<td>Irregular</td>
<td>Regular</td>
</tr>
<tr>
<td>Time lapsed since child’s last cavity</td>
<td>&lt; 12 months</td>
<td>12 to 24 months</td>
<td>&gt; 24 months</td>
</tr>
<tr>
<td>Child wears braces or orthodontic/oral appliances.</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Child’s mother has active decay present.</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Socioeconomic status of child’s caregiver</td>
<td>Low</td>
<td>Mid-level</td>
<td>High</td>
</tr>
<tr>
<td>Frequency of exposure to between meal sugars/cariogenic foods (include ad lib use of bottle/sippy cup containing juice or carbonated beverage)</td>
<td>≥ 3</td>
<td>1 to 2</td>
<td>Mealtime only</td>
</tr>
</tbody>
</table>

### Part 2 - Clinical evaluation
(determined by examining the child’s mouth)

<table>
<thead>
<tr>
<th>Risk Indicator</th>
<th>Present</th>
<th>Absent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visible plaque on anterior teeth</td>
<td>Present</td>
<td>Absent</td>
</tr>
<tr>
<td>Gingivitis</td>
<td>Present</td>
<td>Absent</td>
</tr>
<tr>
<td>Areas of demineralization (white-spot lesions)</td>
<td>More than 1</td>
<td>None</td>
</tr>
<tr>
<td>Enamel characteristics: hypoplasia, defects, retentive pits/fissures</td>
<td>Present</td>
<td>Absent</td>
</tr>
</tbody>
</table>

### Part 3 - Supplemental assessment (optional)

<table>
<thead>
<tr>
<th>Risk Indicator</th>
<th>Present</th>
<th>Absent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiographic enamel caries</td>
<td>Present</td>
<td>Absent</td>
</tr>
<tr>
<td>Levels of mutans streptococci</td>
<td>High</td>
<td>Low</td>
</tr>
</tbody>
</table>

### Risk Indicators
- **HIGH**
  - Does not use fluoridated toothpaste; drinking water is not fluoridated; not taking fluoride supplements
- **MODERATE**
  - Uses fluoridated toothpaste; usually does not drink fluoridated water; does not take fluoride supplements
- **LOW**
  - Uses fluoridated toothpaste; drinks fluoridated water or takes fluoride supplements


Each child’s overall assessed risk for developing decay is based on the highest level of risk indicator (i.e., a single risk indicator in any area of the “high risk” category classifies a child as being “high risk”).
for dental disease are not merely the health of the teeth and gums, but an assessment of many contributing factors.

As with dental decay, periodontal disease also has a wide range of overlapping risk factors to consider. Poor nutrition is a risk factor for many medical conditions including periodontal disease. A weakened immune system will only worsen an infection in the gums. Tobacco use may be one of the most significant risk factors in the progression of periodontal disease. The limiting of blood flow that delivers oxygen and nutrients to the gum tissue causes delay in healing. Without the ability of the periodontal tissues to heal, the infection will progress resulting in poor treatment outcomes. Women have a unique risk factor for periodontal disease due to the hormonal changes that affect many tissues in the body including the gums. Hormonal changes occur during several stages in life from puberty, through menstruation, pregnancy, and menopause. Recent studies suggest that women with periodontal disease are at higher risk for delivering preterm, low birth weight babies (American Academy of Periodontology 2004). Ongoing research in the field of genetics suggests that some segments of the population may be genetically susceptible to periodontal disease (Michalowicz et al., 2000). The ability to have beforehand knowledge increases the need for available preventive services. Uncontrolled diabetics have a higher risk of developing periodontal disease due to the body's inability to fight infection. As with dental decay, the lack of good oral hygiene and the utilization of dental services on a regular basis highly influence the risk of developing an infection in the gums. Other factors to consider would include: stress and depression decreasing the ability to fight off infection and influence treatment outcomes as supported by evidence in studies.
(Wimmer et al., 2002); medications and their affects on gum tissues; clenching and grinding of teeth may be important to the speed at which periodontal tissues are destroyed, due to the extreme forces applied to teeth while grinding that cause damage to the surrounding attachments of tissue.

Risk factors common to both dental decay and periodontal disease are the lack of oral hygiene, utilization of dental services, and an individual’s host response. The American Academy of Pediatric Dentistry, The American Dental Association, CDC and many other organizations support early dental disease prevention. In spite of the fact that dental disease is primarily preventable, dental disease continues to endure among Americans.

*Impact of prevention.* Caries and periodontal disease are, by and large, preventable. Preventive dental services are identified and available and have proven to be cost effective. Children that received preventive dental care by age one were shown to have dental care costs almost 40% lower than children who received their first preventive care visit after age one. Water fluoridation shows a cost savings of $38 for every $1 invested saved in fewer treated cavities (Children’s Dental Health Project 2005). The cost of a dental sealant is about 50-65% less than the cost of a single surface restoration, according to the Arizona Health Care cost Containment System [AHCCCS] (2005), this is the Medicaid program in Arizona. Restoring the tooth surface, most often, involves the injection of a local anesthetic to prevent pain during the procedure. There is no pain associated with the placement of dental sealants. Periodontal disease treatment involves multiple initial visits, use of anesthetics (most likely), and more frequent follow up to maintain health. The initial treatment for gum
Separating the Mouth and Body 18

disease costs about 60% more than a routine cleaning (AHCCS 2005). Prevention efforts would not be successful without including an education component. Knowledge and awareness about dental disease will allow for more informed decision making. A knowledgeable and informed patient is a healthier patient. Children will continue to face needless pain and suffering throughout life if early intervention is ignored. Evidence supports preventive oral health to be cost-effective and necessary for general well-being. The impact of preventing dental disease will not only rid children of needless pain, contribute to overall health, it will begin to close the gap of inequalities faced by poor children. In order to affect the oral health of US children preventive dental services must be attainable.

Attaining dental services. While most Americans have been able to enjoy the benefits of improved oral health, children of low economic families have not. Medicaid and State Children's Health Insurance Programs (SCHIP) are available in all states for families that meet established income level criteria. Most states use between 100% and 200% of the Federal Poverty Level (FPL) as guidelines for eligibility (CDC n.d. b). The federal government subsidizes state programs with matching funds based on the number of covered Americans and services provided. Other criteria and co-payments may be attached to other available state programs seen in some SCHIP programs. Each state is able to determine the design and use of funds in their own programs.

According to the New Health and Human Services Secretary, Mike Leavitt, “Medicaid is not meeting its potential, it is rigidly inflexible and inefficient and not financially sustainable” (Connolly 2005). There still remains a gap in which children are not eligible for state funded programs, their families cannot either afford private or employer
sponsored plans, or do not have opportunities for employer sponsored benefits. Children from families without dental insurance are 3 times more likely to have dental needs than children with either public or private coverage (DHHS 2000). The Early and Periodic Screening, Diagnostic, and Treatment (EPSDT) service is Medicaid's comprehensive and preventive child health program for children. This program refers to itself as preventive however the services provided under this program are temporary fixes at best. It is set up more like a referral program. A "screening" and any pain relieving procedures that the physician is comfortable in performing are provided.

Under the description of dental services, "maintenance of dental health" is included and in the same paragraph it states that a "direct dental referral is required for every child". (Centers for Medicare and Medicaid Services 2005). And here lies the challenge, where are these children being referred to? Is there a Medicaid provider available?

The U.S. Surgeon General's National Call to Action to Promote Oral Health 2000, has identified 5 action steps to promote oral health, improve quality of life, and eliminate oral health disparities. (Table 3) The intent is that these actions will be integrated with plans to enhance general health and well-being. Many states are working hard to find a way to provide access to preventive dental care services. New innovative initiatives are being implemented at the state and local level raising awareness to oral health.
Table 3

Call to Action Steps

<table>
<thead>
<tr>
<th>Call to Action Steps</th>
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<tbody>
<tr>
<td>Action 1: Change Perceptions of Oral Health</td>
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<tr>
<td>Action 2: Overcome Barriers by Replicating Effective Programs and Proven Efforts</td>
</tr>
<tr>
<td>Action 3: Build the Science Base and Accelerate Science Transfer</td>
</tr>
<tr>
<td>Action 4: Increase Oral Health Workforce Diversity, Capacity, and Flexibility</td>
</tr>
<tr>
<td>Action 5: Increase Collaborations</td>
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Connecticut commissioned the Children's Dental Health Project (CDHP) to come up with a strategy to improve access to dental services for their underserved populations. The focus of this project is to have Federally Qualified Health Centers (FQHCs) contract with private practice dentists to provide needed dental services. Many of the challenges faced by private practice dentists, participating in federally funded programs, were alleviated in the project. Dentists did not have to register as a Medicaid provider, most of the responsibility for billing of dental services was up to the FQHC, can choose the number of patients to treat, and services could be provided in the FQHC reducing overhead costs (Edelstein 2003).

State programs that are designed to raise awareness of oral health's importance to overall health include but are not limited to Illinois and South Carolina. Illinois has taken a bold stand and has passed into law an amendment to the school code.
mandating students in public, private or parochial schools to receive a dental exam or report cards will be withheld. South Carolina has initiated a comprehensive social marketing campaign, “More Smiling Faces”, in hopes to accomplish social change by using traditional marketing and advertising methods (Oral Health America 2005).

In states such as Arizona and California where budget deficits and local resistance is high, water districts have voted to fluoridate its water systems (Oral Health America 2005; Arizona Department of Health Services 2004). Both states are working on technology and other details required for this effort to occur. This action will have a profound effect on reducing dental caries in the communities affected. New Hampshire and Utah communities have been successful in passing measures to continue the process of fluoridating their drinking water (Oral Health America 2005).

Building the science base is seen in programs that are occurring in Washington and Arizona. Washington’s program, called Access to Baby and Child Dentistry (ABCD) is a model program designed to see Medicaid eligible children from birth to age 6. This program is “based upon the premise that starting dental visits early will yield positive behaviors by both parents and children, thereby helping to control the caries process and reduce the need for costly future restorative work” (Oral Health America 2005). The ABCD program and the Indian Health Service program in Arizona has taken the use of topical fluoride to the next level by training Pediatricians to apply fluoride varnish on children during routine medical appointments.

California has put together a report, Policy Issues in Dental Workforce Diversity and Community-Based Dental Education (Oral Health America 2005). This collaboration between policymakers and state dental school officials was to come to an
understanding about topics such as dentist shortages, diversifying the workplace, recruitment of minorities and rural students, among others. Agreed in this collaboration was that there is a serious access to care problem, an unequal distribution of dentists and a shortage of dentists to treat low-income populations.

New Mexico's oral health coalition has been recognized for its hard work in achieving the support of New Mexico's governor Bill Richardson who has issued an executive order in creating an Oral Health Council. This achievement puts oral health issues, including access to care, in for forefront of political priority (Oral Health America 2005).

The problem of inadequate access to dental care is a complex situation without a simple solution. Not only do families need to have a way to pay for services, there needs to be an adequate work force to provide the needed services. Economic markets tend to determine the distribution of dental providers, resulting in gaps where the cost of running a practice is more than it can produce. As seen in the previous state initiatives to increase access to dental services, this challenge will need to involve collaborations with communities, private organizations, government entities with the integration of medicine and dentistry.

Medical and Dental Connection. Medicine and Dentistry have long been considered separate in regards to reimbursement, making appointments and responsibility for health. Reimbursement for medical and dental procedures are processed differently and insurance policies are separate. A single "check up" appointment does not provide overall health services. One would need an appointment
with the physician and a separate appointment with the dentist. The responsibility for the oral health of children lies with the Pediatric Dentist and general dentists that choose to treat children, this concept is recognized by both disciplines. Dentistry faces challenges today such as dentist shortages, according to The American Dental Education Association (2000), “the number of dentists per 100,000 U.S. population has continued to decline since 1990”. It is predicted that this decline will continue past the year 2020. A growing population magnifies the continued shortage of dentists. Unlike dentistry, medicine is showing an increase in the number of pediatricians and family practitioners (Children’s Dental Health Project 2004). Low reimbursement rates from government sponsored programs makes participating in these programs an economic hardship. Strategies need to be pursued to improve the oral health of children. Integrating primary care medicine and dentistry could have a serious positive impact on the oral health of children (Children’s Dental Health Project 2004).

Incorporating oral health assessments for children, by age one, during routine medical appointments will identify those children at risk and prompt early referral. Even further involvement could include providing oral disease education, oral hygiene instructions, nutritional guidance, and applying fluoride varnish. Shown earlier, fluoride application by pediatricians is already being done in some states. There is even further discussion about providing training to medical professionals for the application of dental sealants (Children’s Dental Health Project 2004).

Conclusion. The lack of dental providers, knowledge and awareness of dental needs, and the means to pay for care encumber access and utilization of dental services by children. Access to dental care is a necessity and a major barrier to good
oral health which links to poor overall health, thus reinforcing the need for formative research to continue to develop strategies and interventions that involve multiple determinants of health levels in order to achieve parity among US children. With increasing shortages of dentists it is even more imperative that dentistry and medicine find a way to reconnect the mouth to the rest of the body in order to treat patients for overall health and well-being.
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