Greater Cincinnati’s Regional Oral Health Crisis

A Report on Needs, Resources, Problems and Recommendations to Improve Access to Oral Health Care for the Underserved in Greater Cincinnati, Northern Kentucky and Southeastern Indiana

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Chapter I: Introduction

The Relationship of Oral Health to General Health

The mouth may be the most misunderstood and underrated part of the human body. Health is far more significant than just a white, shining smile. The mouth is a portal to the human body, a “mirror” to one’s health status.\(^1\)

*The mouth includes not only the teeth and gums and their supporting tissues but also the hard and soft palate, the mucosal lining of the mouth and throat, the tongue, the lips, the salivary glands, the chewing muscles and the upper and lower jaws. Equally important are the branches of the nervous, immune, and vascular systems that animate, protect, and nourish the oral tissues as well as provide connections to the brain and the rest of the body.*


Oral health care has long been considered secondary to, rather than part of, medical care. From the beginnings of health care in America, the oral cavity has been treated separately from the rest of the body. The mouth and the rest of the body are treated in different settings by different health professions, covered by separate insurance. Oral health problems are not viewed by most people with the same degree of urgency or seriousness as medical problems. While most Americans would view medical care as a priority for themselves and their loved ones, dental/oral health care is often viewed as a luxury or a cosmetic treatment reserved for those with resources to spare.

Today, in Greater Cincinnati, nearly a half million people live in third world conditions with respect to their oral health -- they live with pain, face long waiting lists for treatment, and often must rely on hospital emergency rooms, which can provide temporary relief of pain and treat infection, but cannot repair the underlying causes of their oral problems. Routine dental care, in an appropriate setting, provided by the appropriate health professional, is simply not available to them. While many members of our community take their oral health for granted, thousands are uninsured or underinsured and lack the financial resources necessary to get the most basic and fundamental dental treatment services.

“...Oral health means much more than healthy teeth. It means being free of chronic oral-facial conditions, oral and pharyngeal (throat) cancers, oral soft tissue lesions, birth defects such as cleft lip and palate, and scores of other diseases and disorders that affect the oral, dental, and craniofacial tissues, collectively known as the
craniofacial complex. These are tissues whose functions we often take for granted, yet they represent the very essence of our humanity. They allow us to speak and smile; sigh and kiss; smell, taste, touch, chew and swallow; cry out in pain; and convey a world of feelings and emotions through facial expressions. They also provide protection against microbial infections and environmental insults.”


The Regional Assessment & Planning Project

Awareness of local oral health needs began to surface with several events in 2000. The U.S. Surgeon General’s Report on Oral Health in America 2000 was published and the Ohio Health Director convened a state task force to make recommendations to improve access to dental care. In 2001, a dental workgroup of health centers, Head Start staff, United Way representatives, and others who were part of a Health Resources and Services Administration (HRSA) Community Access Program (CAP) grant awarded to the Cincinnati Health Network began to discuss the issue. Just as access to oral health began to be discussed more frequently, United Way began focusing on ways it could achieve greater impact on critical community issues. As a result of the increasing awareness of disparities in oral health status, volunteers and members of United Way’s Healthy People Vision Council (HPVC) identified access to oral health services as a priority for study and development of a strategic initiative. The Anthem Foundation of Ohio, a new conversion foundation, established in 1999, selected oral health as the first area of health care it would choose to fund.

The HPVC recognized that prevention of oral disease and infection, education and treatment services were fragmented and underfunded, and that the need for services far exceeded capacity. With minimal funding available, it was determined that a description of the scope of the problem and a comprehensive and coordinated blueprint or master plan, to address needs was a reasonable next step. United Way’s Board of Directors and The Health Foundation of Greater Cincinnati provided financial support necessary to generate such a report. The Greater Cincinnati Oral Health Council, was selected as the agency to direct this project. The Oral Health Council is a 94-year-old nonprofit organization that currently operates a dental clinic for homeless persons, a regional school sealant program in seven counties, and a regional dental case management program that coordinates 200 private practitioners who provide donated and discounted services.

The nine counties in the project include Hamilton County (Cincinnati), and eight perimeter counties (Butler, Warren, Clermont, and Adams counties in Ohio, Kenton, Boone, and Campbell counties in Kentucky, and Dearborn County in Indiana). Seven of the nine are in the United Way of Greater Cincinnati service area. All share a linked transportation system and media market.
It was determined by the CAP grant dental committee that sufficient data and studies existed, and that no new studies would be done for the report. Existing data needed to be collected and analyzed, current resources inventoried, and best practices throughout the nation examined.

The Regional Assessment and Planning Project (RAPP) was organized with an Advisory Committee of 50 provider and service organizations who were representative of the region. This group met semi-monthly and provided expertise, information, feedback, and input on data, resources, and services. A Steering Committee to oversee the project was also developed. It was much smaller than the Advisory Committee and included the COO of the University Hospital, the CEO of the Greater Cincinnati Health Council, a former Cincinnati mayor and council member, dentists, the Legal Aid Society of Greater Cincinnati, the head of the University of Cincinnati’s Institute for Health Policy and Health Services Research, and representatives of the business community. These individuals provided strategy and policy direction to the project.

Dental public health consultants were retained to provide best practices and evidence-based solutions in the plan. Robert Isman, DDS, MPH, of the California Department of Health Services, co-author of a monograph titled “Access to Oral Health in the United States,” and Raymond Kuthy, DDS, MPH, chair of the Department of Community and Preventive Dentistry at the University of Iowa School of Dentistry. Lawrence Hill, DDS, MPH, project director, is a public health dentist and serves as the dental director for the Cincinnati Health Department, and executive director of the Oral Health Council. Jackie Campbell, who also holds an MPH and has a 20-year background in health planning and policy, was hired as project manager. Together, this group brings more than 100 years of public health experience to this project. A dental public health subcommittee comprised of the above and a public health dental hygienist, a retired pediatric dentist, and the dental directors of both the Ohio and Kentucky state health departments participated in the planning and reviewed the plan at several stages.

This report is the product of RAPP. It describes needs, recommends solutions, indicates where they should be targeted, examines how existing facilities and programs could be expanded, projects costs, suggests mechanisms for financing, and functions as a community masterplan or blueprint for impact on access to oral health care in Greater Cincinnati.
Chapter II: What the Data Tells Us

Greater Cincinnati Has Poor Access to Oral Health Care for its Most Vulnerable Residents.

Difficulties Throughout the Life Span
Poor oral health affects residents of the Greater Cincinnati region throughout their life spans. Beginning with adverse pregnancy outcomes such as low birthweight, through early childhood development, and into school attendance and success, good oral health is critical. For adults, it affects the ability to get and maintain employment, increases risks associated with childbearing, contributes to cardiovascular and pulmonary diseases and further compromises the health of persons with diabetes, AIDS and a host of other medical conditions. Elderly citizens often suffer from pneumonia, oral cancer, and toothlessness, resulting in poor nutrition and a compromised ability to communicate.

Oral health is the number one unmet health care need in the Greater Cincinnati Metropolitan Region.2,3,4,5,6

Those on the Front Lines of Health Care Agree
The United States Surgeon General, the Director of the Ohio Department of Health, emergency room doctors, school nurses, food bank directors, substance abuse treatment staff and others agree that oral health care services in the region are severely lacking for the poor and disabled.1,5,7 Oral health education, prevention programs and treatment services for low-income families and individuals are scarce in the Tri-State.

Disparities Abound
The Surgeon General has drawn much-needed attention to the problem of disturbing disparities in access to oral health care, recognizing a “silent epidemic of dental and oral diseases affecting some population groups.” The Tri-State Region shares these disparities for a number of population groups, and many disparities are worse here than in other parts of the country. Overwhelmingly, it is the low income, disabled, minority, unemployed, rural, and chronically diseased who have both the greatest need and the least access in this region. The Surgeon General’s conclusions are confirmed by State Health Department reports, and local data.2,3,4,5,6 The most vulnerable among us are least able to access the basic dental care they need to maintain good health, and to succeed in school, or on the job. Oral health problems limit one’s ability to function as a productive member of society. Apart from the obvious impact of pain, suffering, and infection, oral health conditions have a negative impact on self-image and quality of life, which affects education, self-realization, employment, family finances, and the economy.8
chronically diseased who have both the greatest need and the least access in this region.

*Nearly 800,000 are uninsured*

Tri-state residents are 2-1/2 times as likely to lack dental insurance than medical insurance. Dental insurance is structured very differently from medical insurance which began as coverage for catastrophic (expensive to treat) events and graduated to more coverage of disease prevention and primary care. Dental insurance, on the other hand, began as an inexpensive benefit offered by employers to cover preventive care. Although coverage in many places later expanded to include basic services coverage for the more expensive services often required by those who have to postpone treatment, it is usually not adequate. Essentially, all dental insurance is under-insurance, as it seldom pays a significant portion of the most needed, and most expensive, work. Therefore for people of moderate to low income who are fortunate enough to find a job with dental insurance, they remain significantly underinsured. While 18 % of Tri-Staters have no medical insurance, 41 % (800,000) have no dental insurance. Those most likely to be uninsured are those who work for small companies (the majority of businesses), are employed part-time, and those who, for a variety of reasons, may not be able to work.

**While 18 % of Tri-Staters have no medical insurance, 41 % (800,000) have no dental insurance.**

**How Poor Oral Health Affects Our Children**

Every night, hundreds of Tri-State children go to bed in pain. Many don’t sleep. Some can’t eat. Others suffer from the loss of self-esteem -- all the result of untreated dental infections. Untreated dental/oral diseases and infections have a profound impact on school performance. Lacking their health and a good education, they are predisposed to perpetuate these poor outcomes into their adult lives.

**Oral Problems Start in Infancy**

Many of the dental problems children experience are related to dental caries resulting in cavities that occur before age 3. Known as Early Childhood Caries (ECC), these cavities can be caused by extended bottle or breastfeeding. Sometimes known as “baby bottle tooth decay,” ECC is a common outcome of putting babies to bed with a bottle, leaving the teeth to bathe for hours in sweetened liquids. Feeding a baby too much sweetened juice or other drinks, and over breastfeeding can also cause ECC. In addition, ECC also occurs when cavity-causing bacteria are transmitted through saliva from a parent or other caregiver to an infant or toddler by sharing food, utensils, or kisses. Cincinnati Children’s Hospital Medical Center reports that many cases like this are seen every week. Because care must often be provided in an operating room under general anesthesia, treatment for such cases averages in the thousands of dollars.
The Most Common Disease in Children

Dental caries is the most common infectious disease among children. It is more common than asthma or allergies. In the Tri-State, nearly half (47%) of poor inner city 2nd and 3rd graders have visible untreated dental decay (caries) compared to 10 to 25% of their suburban counterparts. The same is true when comparing low-income children in surrounding counties to all children in the county. Poor children are much more likely to go without treatment once the decay is detected. (see Table 1, page 8)

Table 1: Children living in low-income areas have nearly twice as much visible, untreated decay as children in counties as a whole, with nearly half of children who were examined having dental problems. This disparity holds true in every county in the Tri-State. However, nearly a quarter of children in higher income or rural areas also have significant untreated decay.

Sources: Greater Cincinnati Dental Sealant Program (Nancy Carter, RDH, MPH), Newport School-Based Health Center (Beth Lange, RN), Kentucky Department of Public Health (Jim Cecil, DDS, MPH), Access to Dental Care in Ohio 2000.

The Consequences of Poor Oral Health on School Performance

The consequences of poor oral health are distraction in school, diminished ability to pay attention, absenteeism, and lower performance. Nationwide, more than 51 million school hours are lost each year to dental-related illness. Poor children suffer nearly 12 times more days of restricted activity (school absences) than children from higher income

\[ \text{Table 1: } \% \text{ of Tri State 2nd or 3rd Graders with an Obvious Need for Dental Care} \]

<table>
<thead>
<tr>
<th>Location</th>
<th>% of 2nd or 3rd Graders with untreated decay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newport City Schools</td>
<td>48</td>
</tr>
<tr>
<td>State of Kentucky</td>
<td>47</td>
</tr>
<tr>
<td>CPS Sealant 8 Year olds</td>
<td>47</td>
</tr>
<tr>
<td>Cincinnati Public Schools Sealant Program</td>
<td>43</td>
</tr>
<tr>
<td>Hamilton County</td>
<td>17</td>
</tr>
<tr>
<td>Butler, Warren and Suburban Hamilton County Sealant Schools</td>
<td>42</td>
</tr>
<tr>
<td>Warren County</td>
<td>24</td>
</tr>
<tr>
<td>Butler County</td>
<td>20</td>
</tr>
<tr>
<td>Clermont County</td>
<td>16</td>
</tr>
<tr>
<td>Brown/Clermont Sealant Schools</td>
<td>42</td>
</tr>
<tr>
<td>Brown County</td>
<td>28</td>
</tr>
</tbody>
</table>
Poor children have five times more untreated dental caries than children in higher income families.22

Jonathan Kozol is a former teacher and now author of social commentaries describing the condition of children living in poverty. In his book, Savage Inequalities, Kozol describes schoolchildren ...24

“Although dental problems don’t command the instant fears associated with low birth weight, fetal death or cholera, they do have the consequence of wearing down the stamina of children and defeating their ambitions. Bleeding gums, impacted teeth and rotting teeth are routine matters...Children get used to feeling constant pain. They go to sleep with it. They go to school with it...Children live for months with pain that grown-ups would find unendurable. The gradual attrition of accepted pain erodes their energy and aspiration. I have seen children...with teeth that look like brownish, broken sticks. I have also seen teenagers who were missing half their teeth. But, to me, most shocking is to see a child with an abscess that has been inflamed for weeks and that he has simply lived with and accepts as part of the routine of life.”

Dental Pain is Commonplace at School
School nurses in Greater Cincinnati and Northern Kentucky schools indicate that dental-related pain is one of the largest sources of children’s visits to the school nurse, and is the most difficult to get resolved because of low accessibility to dental care. In the 2000-2001 school year, the Cincinnati Health Department school nurses at Cincinnati Public Schools saw 532 children with serious dental problems and referred them for care. In follow-up with parents, more than 25% had no resolution. Of those that did get care, many received treatment only for the immediate emergency and were not able to get access to comprehensive care, thus making future episodes of pain likely.25 Newport elementary and middle schools report similar problems with even less resolution due to the lack of providers available to take Medicaid or uninsured children.26

School nurses in Cincinnati and Northern Kentucky schools indicate that dental-related pain is one of the largest sources of children’s visits to the school nurse, and is the most difficult to get resolved because of low accessibility to dental care.

In the past, several area schools and/or local and county health departments sponsored school-based dental screenings and treatment. One such program was in place for more than 70 years. However, due to budget constraints and the lack of a vocal constituency, these types of arrangements have become rare. Although children are required to have preschool medical exams, and vision, hearing and scoliosis screenings at various intervals, there is no requirement for oral examinations or assessments.27
Anecdotally, nurses report that high school students have very poor oral health but parents are generally too overwhelmed with responsibilities to assure that these adolescents get to a dentist. The greatest difficulty noted by the nurses lies with transient students -- the ones who move constantly, have highly dysfunctional families, no social support, and may have special needs. They may not have telephones, may or may not have Medicaid, even if they are eligible, and their home lives are too chaotic for attention to toothbrushing or appointments. These are the children who fall between the cracks.  

I’d like to tell the children of the world – quit eatin’ so much candy. I have 3 rotten teeth, and they’re bad – had to have one of them pulled. I can’t chew my food like I should. Eat natural food, because we must whup Mr. Tooth Decay. 

Muhammad Ali in the 1970s

**Access to Treatment A Major Barrier for Schoolchildren and Families**

Access to treatment is a major difficulty for low-income families. Dentists are located primarily in the suburbs. Only a small percentage of those dentists still in low-income neighborhoods and rural areas will accept Medicaid. Appointments require time out of school for the child, and out of work for the parent. In a 2002 survey of Ohio residents by the KnowledgeWorks Foundation, 64.5% of those surveyed agreed that community services for children such as health and dental services could be located and provided in local public schools. Only 26.6% disagreed.

In national studies, more than 23% of children do not receive the recommended number of well-child visits. Those least likely to receive the recommended visits are non-Hispanic white children from uninsured families with incomes between 200 and 300% of the federal poverty level. Half the children studied in the 1999 national study did not receive the recommended two annual dental visits, with young children being the least likely to receive dental care. Twenty-one percent of all children got no dental visits at all. The least likely to get dental care were Hispanic and African-American children, poor and uninsured children, and children with very young parents or parents with less than a college education.

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**Getting Younger Children Into Care is Even More Difficult**

Local Head Start programs have run into serious roadblocks in trying to help parents find available dental care, especially for very young children. Many dentists won’t see children under the age of 5, even though the American Academy of Pediatrics recommends that the first visit occur by six months (The American Academy of Pediatric Dentistry recommends by age 1 or the arrival of the first tooth). General practice dentists receive little training in the clinical or behavioral management of young children. There are only 38 pediatric dentists in the Tri-State. Most are located in upper-income neighborhoods and few accept Medicaid (see section on Medicaid on p. 29). As a result,
Head Start programs have had to struggle to meet the federal guidelines for assuring dental exams and follow-up treatment. While some Head Start programs have been able to get most of the children screened, others have had difficulty reaching even the 50% mark. Getting follow-up treatment for those identified as having treatment needs is even more of a struggle. Pediatricians and family practice physicians are not accustomed to doing oral assessments that include teeth and gums, and there have been few efforts to include them in providing dental advice to parents or applying fluoride to the teeth of young children, a practice beginning in an increasing number of communities.

General practice dentists receive little training in the clinical or behavioral management of young children. There are only 38 pediatric dentists in the Tri-State. Most are located in upper-income neighborhoods and few accept Medicaid (see section on Medicaid on p. 29). As a result, Head Start programs have had to struggle to meet their federal guidelines for assuring dental exams and follow-up treatment. While some Head Start programs have been able to get most of the children screened, others have had difficulty reaching even the 50% mark. Getting follow-up treatment for those identified as having treatment needs is even more of a struggle.

The Pediatric Dentistry Residency Program at Cincinnati Children’s Hospital Medical Center is almost always at capacity and accepts a limited number of new patients only during very narrow time slots (for example, in 2002, new patients were not taken for several months for routine visits; new patients were permitted to call on December 30 beginning at 8 a.m. to fill a limited number of new slots; however, most slots were taken within one hour). Patients who break appointments are expelled from the system and referred elsewhere. While this is consistent with sound financial and scheduling management, it leaves few to no options for those who cannot comply – a sensitive socio-cultural issue among families in poverty.

A Head Start Study Reveals Reasons Why Few Low-Income Children Get Care
In an effort to discover the barriers families encounter in accessing care and to examine the provider community’s acceptance of this population, a study funded by The Health Foundation of Greater Cincinnati was conducted in 2000 covering Hamilton, Butler, Clermont, and Warren counties. Findings included:
--compared to most Greater Cincinnati residents, more Head Start parents went without family health insurance coverage.
--The greatest reason why children were not covered by health insurance was that the parent’s employer did not offer or had stopped offering it.
--Having no insurance/cannot afford costs was the number one reason why medical or dental care was delayed.
--Parents delayed care for themselves at a higher rate than for their children and delayed dental more often than medical care.

Less than half of Head Start parents had visited a dentist in the last year and only 29% in one to two years. Many of these visits may have been for episodic care because only half of parents had a dental provider.
Poor Nutrition/Soda Pop in Schools
Recent studies show an increase in poor nutrition and obesity in children and teens. A high-sugar diet consisting of sweet cereals, soft drinks, and candy can lead to dental caries. The acid content of soda pop can damage tooth enamel. School contracts with soda companies that provide millions of dollars in revenue to the school in exchange for open access to child consumers have negative effects on childrens’ oral health as well as contributing to a national rise in obesity.  

Studies show that more than half of eight-year-olds drink soft drinks daily and a third of teenage boys drink at least three cans per day. Malnutrition can seriously damage craniofacial development, tooth development, bone structure, and soft tissues. Poor dietary habits in growing children spell disaster for their future oral health.

The soda pop contracts between school systems and soft drink manufacturers are controversial. Los Angeles recently banned the use of such vending machines during the school day. Many Cincinnati area schools are dependent upon soft drink contracts to help fund athletics and other activities. In 2000, Fairfield had a contract with Pepsi that was worth $500,000 per year; Wyoming had an $80,000 contract, and Hamilton City Schools had a $30,000 contract. Lakota, Lebanon, Ross, Cincinnati Public, Milford, Covington, Mason, New Miami, and Princeton schools all have contracts; however most have some restrictions during lunch hours and some have the machines available only after school. Establishing brand loyalty early is the intent of the manufacturers in locating these machines in schools. Schools indicate that it would be impossible to fund many activities without this source of income.

The Risks of Injury
The thousands of children who participate in sports activities in the Tri-State are at a significant risk for mouth and facial injuries. Mouthguards, which can prevent many of these problems, are seldom used in sports other than football. When the use of mouth guards in football was instituted on a widespread level in the 1960s, the incidence of serious mouth injuries dropped from 50% of all football injuries to 1.4%. The National Youth Sports Foundation for the Prevention of Athletic Injuries estimates that during a season of play, athletes have a 10% chance of sustaining an injury to the face or mouth.

Between 13 and 39% of all dental injuries are sports related, and 11-18% of all sports injuries occur to the face or jaw. A 1989 survey of female basketball players found rates of oral injury 15 times higher than male football players. Oral/facial injuries make
up 41% of baseball injuries. The American Dental Association (ADA) estimated that mouth guards prevent as many as 200,000 injuries each year in high school and collegiate football alone. A Minnesota study of high school athletes found that the percentage of athletes suffering at least one orofacial injury per season was 27.6% for soccer, 72.3% for wrestling, and 55.4% for baseball. Athletes with braces were at a higher risk for injuries. The ADA and other dental and sports groups recommend that participants in nearly all sports wear mouthguards.

The Cost of Oral Injuries
Orofacial trauma can result in broken and avulsed teeth, facial bone fractures, concussion, permanent brain injury, TMJ (temporomandibular joint) dysfunction, blinding, eye injuries, and even death. An estimated 5 million teeth are knocked out annually at sporting events. Athletes of all ages are prone to these injuries. The total costs of replacement of a single knocked out tooth can be more than 20 times the preventive cost of a professionally, custom-made mouth guard.

Victims of total tooth avulsions who do not have teeth properly preserved or replanted may face lifetime dental costs of $10,000 to $15,000 per tooth, hours in the dentist’s chair, and the possible development of other dental problems such as periodontal disease. A conservative estimate of the minimum initial cost per dentist referral for treatment of a serious dental injury is $1,000. That does not include the cost of crown replacements about every 10 years. These are all expenses that low-income families cannot afford.

Cincinnati Children’s Hospital Medical Center reports that dental injuries made up five percent of total injury-related admissions in 2001.

How Poor Oral Health Affects Adults
For adults, the results of poor oral health intensify. Those who have had to postpone care for their fundamental dental needs often live in pain, have compromised nutrition and general health, and gradually lose their appearance, their jobs, their motivation, and their hope.

The Impact on Employment
Low-income adults often have no choice but to postpone routine dental treatment, which is financially out of their reach. Some can no longer find employment because of the perception of persons with fractured, missing, diseased, or unsightly teeth. Others try to stay on the job while in excruciating pain for fear that time off will cost them pay or, worse, cost them their job. At the national level, over 164 million hours were missed from work by American workers as a result of dental problems. For all ages, there are more than 41 million restricted activity days per year, or 3.7 days of restricted activity for every 100 employed persons age 18 and over. Even at minimum wage, the cost of these days to the economy represents billions of dollars annually.
**Service Agencies See Huge Dental Need**

A survey of case workers at Talbert House, a multiservice community-based nonprofit agency developing and providing services in mental health, criminal justice and substance abuse systems, reports that access to dental care is the greatest health problem of its clients. Of residents in Talbert House treatment facilities, 20% of residents have having dental-related pain at any given time; 50% have had pain within the last month. Only about 5% have seen a dentist in the last year, and only 5% of the men (who make up 70% of the residents) have access to any kind of dental benefits such as Medicaid. The Center for Chemical Addictions Treatment (CCAT) reports that the need for dental care is the number one reason for referrals, greater even than for sexually transmitted diseases.

For the average Tri-State family, dental care is a luxury rather than a priority.

**Dental Insurance**

The availability of dental insurance coverage is a major factor in whether or not people access dental services. In a recent analysis published in the *Journal of the American Dental Association*, it was noted that 51.4% of Americans have private dental coverage, and only 50% of those without dental insurance reported at least one visit in a one-year period. Even if covered, poor and low-income families were least likely to report a dental visit. The least likely persons to have dental coverage are non-whites, people in poorer families, and the elderly.

The American Dental Hygienists’ Association estimates that every $1 spent on prevention in oral health care saves $8 to $50 on restorative and emergency procedures. Delta Dental estimates that preventive care, early detection, and treatment saves the United States $4 billion annually. This is indicative that regular, ongoing preventive care through dental benefits can reduce the possibility of dental emergencies and keep people on the job.

With the cost of an annual visit to a private dentist, including x-rays, averaging $150, fillings $300, crowns and dentures $500-$1,000 each, extraction of wisdom teeth up to $2,000 and orthodontia in the range of $2,000-$5,000, few budgets are prepared to handle this expense. Most people with dental insurance are underinsured due to annual limits which have not increased over the past 15-20 years although costs, fees, and co-pays have increased. For someone who has dental insurance but has high treatment needs, dental insurance often covers less than 50% of costly bills. Thus many have to delay care, causing problems to worsen and requiring even more expensive treatment. Fewer and fewer dentists are willing to carry the debt of long-term payment plans. While many dentists are understanding when a patient of record runs into hard times, many dentists expect payment in advance for anything not covered by insurance, especially from someone who is low income and a high risk of not being able to meet their financial obligations. While this is a sound business decision, it creates a major obstacle for many families.
Nearly Half of Adult Cincinnatians Have Not Seen A Dentist in the Last Year

The 2000 Greater Cincinnati Health Status Survey, conducted by the UC Institute for Health Policy and Health Services Research, found that 44% of adults in the region have not visited the dentist in the past year versus 33% nationally. Those least likely to have a dental visit in the last year include those living on a household income less than $45,000, below the federal poverty level, educated at less than a high school level, widowed, living alone or in a one-adult household, a home renter, and not registered to vote. 68

Eighteen percent of area adults have not seen a dentist in more than 5 years, if ever. Almost 22% of Greater Cincinnati adults did not get or delayed getting dental care in the 12 months preceding the survey when they thought that they needed it. Those most likely to not get or to delay care are those aged 18-45, living below the poverty level, having less than a college education, employed part-time, living in a 3+ children household, renting rather than owning a home, and not registered to vote. The reason most did not get care was cost. 68

Many jobs offer no sick leave or flex time for dental visits. When the only treatment alternatives are first-come, first-served clinics with lengthy waiting lists or hospital emergency rooms requiring several hour waits only to receive antibiotic or pain medication (and still needing dental care), few people can afford the time or risk of their jobs. Delaying care or resorting to measures such as pulling their own teeth are everyday occurrences. Poor adults are much more likely to have lost six or more teeth to decay and gum disease than higher-income adults. 69

Concerns About Appearance Affect Quality of Life

According to one study, 15% of the population reported that they avoided laughing or smiling because of oral problems, and 19% reported being embarrassed at least sometimes by the appearance or health of their teeth and mouth. 70 Tooth loss in adults can be a serious life crisis with a more difficult period of readjustment than retirement. 71 A quarter of individuals without teeth reported that they had avoided close relationships because of fear of rejection when their toothlessness was discovered. 72

Oral Health Affects Military Readiness

Recent news reports have shown that American adults’ dental health status has a major impact on the country’s military readiness. During the recent call-up of reserve troops high rates of poor oral health had to be corrected before the troops were ready for deployment. As many as one third of reservists could be categorized as having serious enough dental woes to preclude them from active duty. Dental work on reservists was given high priority in the two years before Operation Iraqi Freedom. 73

A young Cincinnati woman who works as a telephone operator making approximately $20,000 per year was a week from her wedding date when she called because “one crown was loose and another was chipping away.” The teeth were originally fractured when she was 13 and root canals performed with temporary crowns placed. She has not been able to afford permanent crowns. Her dental insurance covers only exams and cleanings. She is allowed four absences per year from work and she did not want to miss work to go to a
dental clinic as an emergency patient for fear of needing those days for personal or family illness. The clinics have long waiting lists for routine care. She is quite willing to see a dentist who would set up a payment plan and can see her during non-work hours. Although she has searched, she has been unable to find one.

----August, 2002, phone call to Cincinnati Health Dept.  

**Tobacco Use and the Risk of Oral Cancer**

Nearly 15% of Ohio and Indiana high school boys use spit tobacco daily. In Kentucky and Indiana studies, 28% and 30% respectively of high school boys used spit tobacco at least once in the 30 days prior to the survey. Spit tobacco places these adolescents at greater risk for not only cavities, but also for oral cancer.

The 2000 Greater Cincinnati Health Status Survey found that 4.8% of area adults used smokeless tobacco compared to 3.6% nationally. Kentucky rural residents are more likely to use it than City of Cincinnati residents. White non-Appalachian adults are more likely to use it than African-American adults. Adults employed full-time are more likely to use it than those employed part-time, unemployed or disabled/retired. There are many more male users than female. Cigarette use is higher in the region, with 35% of area adults smoking, compared to 23% nationally.

While tobacco use places people at risk for oral cancer, the combination of smoking and drinking alcohol significantly increases that risk. Half of local adults have had an alcoholic drink in the last month and 10% are acute drinkers.

**Oral Cancer in the Tri-State**

Although oral cancer is almost entirely preventable and curable with early detection, more than 200 new cases of oral cancer were diagnosed in 1998 and 1999 in the Greater Cincinnati region. Butler County in Ohio and Kenton County in Kentucky had the highest rates in the Tri-State. The death rates from oral cancer among African-American men are nearly three times those for white Americans. African-American men also receive diagnoses on average 10 years later than others with oral cancer. Oral cancer is more common than ovarian cancer, stomach cancer, and leukemia.

The Centers for Disease Control and Prevention estimated in 1988 that 16.2 years of life were lost per person dying of oral cancer. This exceeds the average for all cancer sites, which was 15.4 years lost.

**The Impact of Oral Health on People with Disabilities or Other Special Needs**

Oral health problems can affect the general health, ability to eat, appearance, self-esteem, and employability of an individual with a disability. The disability may make oral health problems more severe, can restrict access to some facilities, or may cause behavioral issues that hamper dental treatment.

*May Need Specialized Treatment*
Individuals with disabilities have significant oral health needs that may require services provided in a similar fashion to anyone else, or they may need specialized treatment. In the Tri-State, many children with special needs can receive dental care at Cincinnati Children’s Hospital Medical Center’s pediatric dental residency program although it can not meet all the needs for developmentally disabled children in the region. While pediatric dentists generally get training during their residency to care for children with disabilities, dental school training includes little to none. Few general dentists are trained to provide dental care to profoundly affected persons. Once they become adults, there are no special resources for members of the disability community. Dentists with training and access to hospital facilities where special procedures can be undertaken are very few in number in the Tri-State and not all accept Medicaid. The University of Cincinnati provides limited services for these patients, primarily in the areas of oral and maxillofacial surgery.

*The Connection between Disabilities and Oral Health*

Finding oral health care is most difficult for persons with developmental disorders (DD) such as cerebral palsy, Down Syndrome, mental retardation, autism, spina bifida, and epilepsy. Approximately two of every 100 Americans have a developmental disability. That would represent approximately 35,000 residents of the Tri-State area.\(^{85,86}\)

Persons with Down Syndrome may have cardiovascular issues, spinal instability, an enlarged tongue, missing teeth, advanced periodontal disease, dry cracked lips and teeth that are delayed in eruption or development. Persons with cerebral palsy may have difficulty practicing adequate oral hygiene, experience poor muscular control, clench their teeth, and suffer from malocclusions that affect their oral health.\(^{86}\)

The state and federal definition of a developmental disability is a severe, chronic disability that
--is attributable to a mental or physical impairment or combination of impairments;
--is manifested before the person reaches the age of 22;
--is likely to continue indefinitely;
--results in substantial functional limitations in three or more areas of major life activity: self-care, receptive and expressive languages, learning, mobility, self-direction, capacity for independent living, economic self-sufficiency.\(^{86}\)

Eligibility for disability-related services in Ohio is based on the person’s degree of limitation in various areas of life activity. Ninety percent of people who are mentally retarded (cognitive or intellectual impairment) are in the mild range and not eligible for any services.\(^{86}\) Although these individuals may most reasonably receive services from a community dentist, they often lack sufficient financial resources to pay for care. Even those living in group residential facilities often get no care until the only treatment option is extraction, resulting in the loss of one or two teeth at a time until none remain.\(^{86}\)

*Where Can Persons with Disabilities be Treated?*

The concept of community-based dental care for adults with DD is new to this generation. Twenty-five years ago, adults either lived with family and saw the family
dentist, or lived in large state institutions where some dental care was available (usually extractions only). Those affected also did not have as long a life expectancy as they do today. With deinstitutionalization taking place during the 1980s and 90s, many more adults with DD are living in the community in group homes, supported living, foster care, nursing homes, and Institutional Care for the Mentally Retarded (ICFMR) homes.

The closing of the Orient Development Center near Columbus saw 500 adults with DD return to live in Hamilton County during the 1980s. Since then the population has grown. Few community service agencies were prepared to meet their needs, including dental care. Most adults with DD are poor, unemployed (74 %) or underemployed. This population usually has Medicaid, with its attendant limitation on available dentists, or they are uninsured. They have behavioral needs which complicate dental visits. For example, there may be an inability to sit in the dentist’s chair for an exam, and they may need to be sedated. Facial sensitivity may be an issue. The individual’s behavior in the waiting room can be a concern of the dental staff.

Many private dentists’ offices may not be wheelchair accessible, and some patients may not be able to be transferred to a dental chair. Treatment in the wheelchair is possible; however, special equipment, training, and accommodations may be necessary. Parents often don’t know what the dentist needs to know about the special needs. They often want the disabled family member to use the same family dentist they use. Individuals with DD may have challenges with their communication ability – some do not have verbal language or can’t describe dental pain.

Health insurance plans, including Medicaid, often require an examination and preauthorization of benefits. This requires an unnecessary, risk-associated and expensive visit under sedation. Preauthorizations are required for some Medicaid coverage and lengthy waits are possible. Some institutions experience a high refusal rate from patients due to fears of the dentist. General anesthesia and the extra effort this requires in time, patient and caregiver education, special facilities, risk, provider training, access to operating rooms, extra billing for the hospital and the anesthesia, add to the complexity of serving this population. Much of the extra effort is not reimbursed by Medicaid.

**Other Populations with Special Needs**

Organ transplantation, chemotherapy, and autoimmune disorders are among many medical conditions that may severely compromise oral health. Individuals who have HIV/AIDS, the frail elderly and persons with bleeding disorders such as hemophilia, also have special needs in dental care. Often private practice dentists, who typically treat healthy patients, receive little training in managing these cases. Patients are often unaware of the importance of informing their dentist of their medical conditions.

**Special Issues with HIV/AIDS**

AIDS is often diagnosed through the emergence of oral symptoms. Dentists serving this population must have a willingness and sensitivity to patients and their physical and emotional needs. In an eight county area, there are approximately four known HIV-friendly dental providers in private practice. Such providers do not usually want to be
identified as “the AIDS dentist” because of the potential financial impact on their practice. Patients must therefore rely on informal “word of mouth” networks. HIV positive persons in rural counties are especially difficult to serve because of transportation barriers and confidentiality issues that arise in smaller communities. 

The Ryan White Care Act provides some funds for HIV-related services, but it requires finding dentists who can do the work, and are willing to work with the social service agency to do the complicated paperwork to get paid. Ryan White requires preauthorization for everything, even exams and x-rays. The timeliness of preauthorizations and emergencies is problematic.

### The Impact of Oral Health on the Elderly

Tri-State senior citizens may suffer from a lifetime of accumulated dental needs. For others, serious dental problems are a more recent phenomenon.

**Common Medications Cause Dry Mouth**

Older populations take more prescribed medications than ever before. More than 70 % of independent elders report using one or more prescription medications per day. Over 400 common medications suppress the flow of saliva, the natural cleaning and lubricating fluid for teeth including anti-hypertensives, diuretics, antihistamines, anti-depressants, painkillers, and tranquilizers. Chemotherapy and radiation therapy also causes it. A dry mouth is more susceptible to the very rapid onset of rampant decay and causes a very uncomfortable burning sensation of the soft tissue. At a time in the lives of our loved ones when their self-worth is so critical yet so fragile, and nutrition is so fundamentally important to their well-being, they are most vulnerable to the breakdown of their oral structures.

**Most Lack Dental Insurance**

Nearly 85 % of elderly citizens have no dental insurance. Medicare, the national healthcare program for the elderly, has no dental benefits.

**The Poor Elderly Rarely See a Dentist**

The 1998 Ohio Family Health Survey looked at adults over 65 statewide and found the following:

- Older Ohioans averaged 1.1 dental visits in the prior year. This seems to be a very low rate of visits per person considering the high needs of the elderly. In each area of the state, non-whites had significantly fewer visits than whites. In all but suburban areas, seniors with a family income less than 200 % of the federal poverty level had significantly fewer visits than those with higher incomes.

- More than half had no dental visit in the past year; with Appalachian area adults having the fewest visits. Persons over 75, males, non-whites, persons living below 200 % of the federal poverty level, those who were not high school graduates, and those with poor-to-fair health status, were the least likely to see a dentist. More than 70 % of Appalachians living below the poverty level did not
see a dentist. More than 85% of rural non-white persons had not seen a dentist in the prior year. More than 70% of non-white metropolitan residents had not seen a dentist in the prior year. These figures are all higher than the number of seniors without prescription coverage, a major focus of public policy strategies to improve health benefits for seniors.

**Edentulism**
Nearly a third of persons over 65 in the US are edentulous (have no natural teeth). Kentucky has one of the highest rates in the nation, with nearly half of its seniors without any teeth. Edentulousness has implications for speech, chewing and eating, hence nutrition and diet, as well as the societal perception of a person with multiple missing teeth. Having some teeth extracted doesn’t protect one from gingivitis and periodontal disease, diseases of the gums and supporting structures of the teeth. Some people who have no teeth seem to experience few problems, while for others the condition creates major impediments to proper nutrition, socialization, self-esteem and general health.

**Seniors in Nursing Homes**
Persons in nursing homes or other institutionalized settings have very limited access to the dental care they need, putting them at high risk for compromised nutrition, and for developing infections, including pneumonia. Although a small number of dentists go to nursing homes for occasional visits, the practice is not widespread and isn’t necessarily timely for treatment. The lack of dental care has set up the population and the nursing homes for exploitation by a small number of entrepreneurs. One national study found that of nursing home residents with teeth, 59% had untreated coronal decay and 46% had untreated root decay. An unpublished local study demonstrates that although nursing home administrators thought their contractual dentists were providing appropriate care, instead patients were seen for very cursory services which were easily billable to Medicaid. The necessary follow-up care was seldom completed.

Nursing home personal care staff are low paid and have high turnover rates. The amount of training and time devoted to oral health care is minimal.

### How Do Racial and Cultural Issues Affect Oral Health?

Poor children and adults in the Tri-State, who are disproportionately minorities, are much more likely to suffer from poor oral health due to lack of care, poor nutrition, and the inability to access prevention services. Given regular dental care and open access, there are not many differences in oral health status by race. The most significant factor that determines increased risk for oral health problems is poverty. Non-Hispanic blacks, Hispanics, American Indians, and Alaska Natives generally have the poorest oral health of any racial and ethnic groups in the U.S. population.

**Disparities are Pervasive in Healthcare**
According to a recent Institute of Medicine report, “evidence of racial and ethnic disparities in healthcare is, with few exceptions, remarkably consistent across a range of
illnesses and healthcare services. These disparities are associated with socioeconomic differences and tend to diminish significantly, and in a few cases, disappear altogether when socioeconomic factors are controlled. The majority of studies, however, find that racial and ethnic disparities remain even after adjustment for socioeconomic differences and other healthcare access-related factors.98

There May be Many Reasons for Disparities
Bias, stereotyping, prejudice or clinical uncertainty may be present, consciously or unconsciously, on the part of the provider, and mistrust and refusal may play a part in the patient’s response. Stronger patient/provider relationships can improve with a consistent relationship (a dental “home” for the patient), through an increase in the number of minorities in the dental profession, and by providing improved cross-cultural education in the health professions. Data on racial and ethnic disparities is hard to come by because population differences in oral health have not been widely studied. The Surgeon General’s 2000 Report makes recommendations aimed at increasing these studies at the state and local levels.

African Americans Most Likely to Not Get Care When Needed
A 2002 study revealed that Greater Cincinnati adults who are African-American are most likely to not get or to delay getting dental care when they thought they needed it. These same adults also tended to be covered by Medicaid or uninsured, and the likelihood of not getting care increased as poverty level increased.99

Recent studies have demonstrated that whites are more likely to have dental insurance, and are more likely to have visited a dentist in the last year, regardless of dental insurance and socioeconomic status, than either African Americans or Hispanics.100,101,102 Whites also spent more on dental care than did other racial or ethnic groups, or low-income individuals. Females, African-Americans, Hispanics, individuals without insurance, those with less education, and with low income experience the greatest number of hours lost from work due to dental problems.

Ohio African-American 3rd grade children are less likely to have dental sealants, a highly effective measure for primary prevention of dental caries.103 Even in schools that have sealant programs, nearly half of minority children do not receive them, often due to lack
of permission from parents.

![Graph: Ohio 3rd Graders without dental sealants 1998-1999]

**Growth in Hispanic Families/Language Barriers**

Sometimes the barrier to care is language or perhaps immigration status. In recent years as the numbers of Hispanics in the Tri-State have more than doubled, new projects have sprung up to address the health needs of these individuals.  

A young man who spoke only Spanish had three front teeth damaged in an accident. The cost to fix his teeth was estimated at $800 to $1,000. He was paid hourly and couldn’t afford to miss work. Finding a translator, then a dentist who would accept him and a payment plan, and an office that was open when he could go for services, was a challenge. Without the nonprofit program Bienestar to help fund the care, he likely would have gone without services. These kinds of resources are very limited.  

Increasingly, neighborhoods throughout the Tri-State are reporting new demands for Spanish-speaking health professionals. Quite often the children in families are called upon to be translators for parents who speak no English. This is ineffective in dental settings where a child will have little understanding of dental issues. Hospitals and federally qualified health centers (FQHCs) are required to have translators. This is a major challenge in the Tri-State, which is poorly equipped for these kinds of services.

**Appalachian Families Use Medical Care at Lower Rates**

Studies have shown that persons of Appalachian background may have higher use of smokeless tobacco and poorer diet than those with other cultural backgrounds, putting them at higher risk for oral health problems. Local studies have also documented
that this subculture uses medical care at lower rates than others and that is borne out by a recent study showing that older white Appalachians are least likely to have seen a dentist in the last year.\textsuperscript{109} Specifics around what distinct cultures think about oral health have not been studied. Local dental clinics located in heavily white Appalachian urban areas and black urban areas are always at capacity.\textsuperscript{110}

\textit{The Culture Gap}
Fewer and fewer dentists are located in inner cities where minority populations tend to live. Dental offices are more frequently located in suburbs.\textsuperscript{111} Dentists often have little awareness of the culture of poverty, which is diametrically opposed to the culture of dentistry. Most dental schools provide little education in the behavioral sciences or medical sociology. Rather the education provided to dental students has traditionally placed responsible dental behavior as a primary patient responsibility, which is expected to be universally accepted as a high priority.
Existing Prevention Programs

Water Fluoridation
The Tri-State is fortunate to have much of its public water systems fluoridated. Fluoridation has significantly improved the oral health of generations of Tri-State families. However, surprisingly, there are still pockets of neighborhoods where water supplies are not fluoridated. Many state laws require systems serving more than 5,000 persons to be fluoridated. Smaller systems are not required to do so. As a result, small communities, mobile home parks, those served by wells, and new communities, may not have access to fluoridated water. This can have a long-term impact on the teeth of children and adults.

What Areas Are Not Fluoridated?
Cleves, Addyston, Lockland, and Rolling Acres in Hamilton County are not fluoridated. Cleves will be installing a new fluoridated water system soon. In Brown County, Aberdeen, Lake Lorelei, and the Village of Ripley are not fluoridated. In Butler County, Catalina Mobile Home Park is non-fluoridated. In Clermont County, New Richmond, Williamsburg, and Batavia are non-fluoridated. In Warren County, the city of Lebanon (Plant 1) and the Correctional Institute do not receive fluoridated water. In Northern Kentucky, all public systems are fluoridated, but many persons in rural areas who use wells and cisterns do not have fluoridated water. Southeastern Indiana continues to have some unfluoridated water supplies in addition to private wells and cisterns.

Dental Sealants are an Important Preventive Effort
Southwestern Ohio is fortunate to have a dental sealant program that is helping to prevent dental caries in children from low-income families. Indiana does not have a sealant program in schools. There are no sealant programs in Northern Kentucky schools although Health District and School personnel have cited high caries rates and no sealants as a problem and hope to begin a sealant program soon. In 1984, the Cincinnati Health Department and the Greater Cincinnati Oral Health Council, together with the dental pediatric residency program at Cincinnati Children’s Hospital Medical Center, pioneered one of the first school-based dental sealant programs in the country. With ongoing funding from the City of Cincinnati and grants from the Ohio Health Department and others, the sealant program has been expanded to provide sealants to children in all of the five Ohio counties included in this report.

The plastic coatings or sealants are applied to the caries-susceptible teeth of high-risk second, sixth and seventh grade students. By targeting schools in which a majority of the children are from low-income families, the program has the effect of preventing dental caries in the population that has the highest amount of disease and is the least likely to get sealants in a private dentist’s office.

This program enables sealant staff to refer children in need of follow-up treatment. Outreach to parents takes place to encourage treatment. Fifty public schools in 22 school districts and some religious schools receive this program. Nearly 8,000 children are
screened each year and most of those receive sealants. Because of limited resources, targeted schools are those in which at least 50% of the enrolled children are eligible for the federal free meal program.

More than 77% of children return to the sealant program one year after their initial examination with the same untreated dental caries diagnosed the previous year.

That high figure was the impetus for creating Kids In Need of Dental Services (KIDS), an outreach program that provides case management to encourage treatment. Initiated in Greater Cincinnati and funded by the Ohio Department of Health, this very small program has increased follow-up care. Yet most children needing treatment are still not accessing needed treatment. The number of schools selected is limited by available funds, the school’s willingness to participate, and parents’ willingness to give permission.

Clearly many more children need treatment than are getting it.
Source: Southwestern Ohio Dental Sealant Program, Cincinnati Health Dept and Greater Cincinnati Oral Health Council (Nancy Carter, RDH, MPH).

School-based Health Centers Need Dental Services
The Health Foundation of Greater Cincinnati is funding school-based health centers (SBHCs) that serve 41 schools with high-risk children. These programs are a partnership between a medical provider such as a clinic or hospital, with on-site nurse practitioners and other providers to provide health care for students. While none of the 17 SBHCs has dental services at this time, several of the centers are trying to develop them, mostly in the form of school-linked services. For example, when the Crest Smile Shoppe opened in the Avondale Boys and Girls Club in April, 2003, it provided a dental link for the Rockdale, Taft, South Avondale, and Burton elementary schools. Other schools are linked with the dental clinic in Lincoln Heights. There are issues, however, that complicate their ability to provide these services. For example, most do not have the space to allow for screenings or treatment, and dentists and hygienists are difficult to find and expensive to employ. Dental offices are expensive to capitalize.

Head Start Is an Opportunity To Reach Children Early
Head Start is a federal and state funded comprehensive early childhood program serving at-risk and/or special needs children from birth to five years of age, and their families. Families qualify for Head Start by being at or below 100% of the federal poverty level.
The Head Start program has national performance standards that require staff to assist families in obtaining a medical home, dental home, and insurance coverage. The standards mandate that each child have a dental and physical screening on file within 90 days of being enrolled in the program, as well as a plan in place to obtain needed follow up treatment. Meeting these mandates has been a struggle for local Head Start agencies. By program definition, most families enrolled in Head Start are eligible for Medicaid or CHIP, yet many families have not applied.

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**Fluoride Varnish Application Pilot Projects**

The Anthem Foundation of Ohio is funding two pilot projects with pediatric medical providers where they provide anticipatory guidance to parents about oral health issues, do oral exams of young children, and apply fluoride varnish at regular intervals. These pilots are taking place in Hamilton County at the Babies Milk Fund sites, and at an organization in Dayton called Rocking Horse. The goal is to prevent early decay in children at risk.

**State of the Treatment System**

The capacity to care for those in need requires not only an adequate number of individuals to provide the care, but also an equitable distribution of providers to ensure the availability of care. Currently, there are fewer dentists per 1,000 residents than there were 20 years ago.

**Dental Schools**

Cincinnati does not have a school of dentistry. Undergraduate and postgraduate programs in dental schools are often a resource for indigent care in communities. Nationally, since the 1980s, the number of individuals entering dental school has
declined. Recently, the number of dentists retiring has surpassed the number of new graduates. Pediatric dentists and specialists are in very short supply. Even though dental incomes have risen nationwide by 58% between 1990 and 2000, the number of new dentists is expected to decline by 10% in the coming 18 years.124

**Dental Professional Shortages**

Several areas in the region are federally designated as dental health professional shortage areas (DHPSAs) for dentists and dental care: parts of Campbell and Kenton counties in Kentucky; parts of Brown, and Clermont counties in Ohio; and the Avondale, Lincoln Heights, Millvale, Winton Hills, East/Lower Price Hill/Fairmount neighborhoods in Hamilton County.125 Quirks in the Federal guidelines preclude some areas in great need from receiving a designation. Still other areas may be eligible, but lack a commitment from an individual or agency to prepare an application.

Congress established the National Health Service Corps (NHSC) in 1970 to assist communities which have received a shortage designation in attracting health care providers for the underserved. The program has two components: a scholarship program that underwrites educational costs while in school, and a student loan repayment program that provides licensed practitioners with $25,000 per year for outstanding professional school loans. Both components require participants to work for a minimum of two years in an area designated by the federal government as a health professional shortage area (HPSA). There are specific criteria for each health care discipline that a community must meet for designation. Once designated as a DHPSA, a community can apply for a National Health Service Corps dentist. (Unfortunately, a number of years ago the NHSC eliminated the scholarship program for dental students. Scholarships eliminated the financial barriers for students from low-income and minority families to attend dental school.)126

A licensed dentist or dental hygienist seeking loan repayment can apply for the NHSC and, if accepted, negotiate a contract with a local health department, hospital, community health center, etc., in a designated shortage area. Once employed, the dentist is eligible for the $25,000 per year loan repayment “bonus.” Thus the program can be an effective recruitment tool. A drawback is that many though not all of the dentists in the program lack the experience necessary to provide care to a population that has postponed treatment and has complex treatment needs.

The distribution of dental services in the Tri-State intensifies geographical disparities. Rural areas have few services and fewer Medicaid providers. For example, the 42,285 residents of Brown County are served by only 6 licensed dentists, all of whom take some of the 5,998 Medicaid-eligible patients.127 Next door Adams County has an equal, if not worse, situation. Clermont County has a very small number of providers willing to take Medicaid.127

** Minority Dentists are In Short Supply**

National studies demonstrate that minority dentists are more likely to practice in a minority area, and to accept Medicaid.128,129 The number of local dentists who are
minorities is insufficient. Because much of the available assistance for dental school is based on loan repayment rather than scholarships, it is often difficult for individuals without significant means to get into dental school. The number of minorities in dental schools and among recent graduates is very small. African-Americans and Latinos make up less than 5% of the dentist population while those two races make up nearly 25% of Hamilton County residents.\textsuperscript{130} It may be necessary to start early in schools to encourage minority children to pursue dental careers. Most recent growth in dental schools has been among women and Asian students.

**Dental Salaries in Community Health Centers Are Not Keeping Up**

In an era when dentists are in short supply, the salary gap between dentists working in community health settings and those in private practice is growing, making it increasingly difficult to find qualified professionals to serve in facilities serving the low-income. Salaries in local clinics run significantly less than incomes from private practice.\textsuperscript{131}

**The Dental Safety Net**

“Safety Net” dental care programs provide clinical dental services to low-income and disadvantaged populations who do not have regular dentists, who need a facility that will take Medicaid or provide low cost services, and they allow treatment of pain and infection as well as basic restorative services. They generally are operated by local health departments, community health centers, hospitals, or other organizations that serve the community. They offer sliding fee schedules, reduced fees, or free care to clients who qualify under eligibility guidelines.\textsuperscript{132}

In this region, safety net dental services are often concentrated in city neighborhoods and generally used by those in the neighborhood (although there are a few rural clinics). City residency is required for the clinics operated by the Cincinnati Health Department. In Hamilton County there are only three clinics that accept non-city residents (Lincoln Heights HealthCare Connection, Winton Hills Health Center, and the West End Health Center). Lincoln Heights is the only clinic outside of the city limits in Hamilton County. While it is on a bus line, it is not very accessible to individuals from Mt. Lookout or Cleves. Six of the nine counties in the Tri-State have no clinics for adults. Most of these counties have only one clinic for children. Butler County’s first clinic for adults opened in Middletown in February, 2003. Due to the lack of adult services in Butler and Warren Counties, it is expected to rapidly approach full capacity.

**Hundreds of Thousands Still Unserved**

The 20 clinics in the Tri-State area serve about 25,000 individuals per year.\textsuperscript{133} There are roughly 195,500 individuals eligible for Medicaid in the Tri-State at any given time. An additional 300,000 are uninsured and are living at or below 200% of the federal poverty level.\textsuperscript{134,135,136,137} If only a quarter of the less than 1,000 private practice dentists are willing to see any Medicaid or uninsured individuals that leaves more than 400,000 low income people without resources. If only half of those sought dental care in any given year, that leaves 200,000 people underserved.\textsuperscript{138}
Adult Dental Emergencies are Growing
Dental emergency cases have increased at the Cincinnati Health Department dental clinics by 100% over the last eight years and tripled over the last 12 years. 

Lengthy Waiting Lists
Waiting lists at City clinics number in the thousands with 1-2 year waits. Clinics with higher fees may have shorter waiting lists but getting immediate care is difficult. Many of the clinics take emergencies on a first come-first served basis, with patients showing up at 7:00 a.m. to get in line. Other clinics operate on a call basis, where one can call and try to get one of a limited number of emergency appointments that day. If one does not get an appointment, they are told to try again the next day. It is easy to see why such a system is difficult for working people and parents who have other demands on their time.

Fees Are Too High
Fees at many clinics meant to serve the poor remain beyond the reach of those who need the most assistance. Grant subsidies for the dental components in these clinics is usually lower than for the medical components and more dental patients are uninsured. Funds to sustain and subsidize dental clinics are difficult to find.

People perceive that routine care is unavailable through clinics, that unless they have an emergency, they will be placed on a waiting list, so why not just wait until they have an emergency? That, in fact, has become the reality for many. Sliding scales are
available at many clinics, but in many cases these scales do not slide far enough. A payment of $50 is not unusual for a check-up at some clinics (if one can get an appointment). For many families, there is seldom $50 to spare. Fillings, dentures and orthodontia are significantly more costly than $50, and not always available through safety net facilities.

Clinics are utilized mostly by a patient mix of those with Medicaid and patients eligible for the sliding fee schedules. To be viable, these clinics, some of which receive limited subsidies from federal, state or local government grants, must engineer their patient mix to assure that revenues will meet expenses, thus limiting access to care for the very patients that may be the most in need.142

**What are Dentists Doing To Address the Issue?**

In 1989 the Greater Cincinnati Oral Health Council, in partnership with local dental societies, instituted a program in Greater Cincinnati and Northern Kentucky modeled after a similar program founded in Denver, CO, called Donated Dental Services (DDS). The program utilizes a case management model. People in need (low-income families, the elderly and special needs populations) are referred by social service agencies. After determining program eligibility, case managers make referrals to participating dental offices. Patients, sometimes entire families, receive examinations and all necessary dental treatment at low or no cost. A small number of dental laboratories donate or greatly discount the cost of laboratory services. In 1997, the Ohio Department of Health and the Ohio Dental Association expanded the program statewide, named it OPTIONS, expanded eligibility, and added a sliding fee schedule component. Since 1989, more than 200 dentists have provided dental services to approximately 2,000 people with a value of more than $2 million for Southwestern Ohio. The average value of donated care is approximately $1,300 per case. The Greater Cincinnati Oral Health Council operates the program for 27 Ohio counties and 7 Northern Kentucky counties.143

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Melissa is a single mom who suffers from mental illness. She has two children and has found life to be especially difficult, suffering the pain of many decayed, abscessed and fractured teeth. Melissa grew up the victim of an abusive father. By the time her sister located the OPTIONS program for Melissa, she didn’t speak much anymore, had trouble being patient with her young children, and couldn’t find employment. A local dentist stepped up to take Melissa’s case. An oral surgeon extracted her infected teeth at no cost. The dentist, working with a dental lab, fitted Melissa for dentures. To thank her benefactors, Melissa wrote “You were very understanding and caring, you knew it wasn’t all my fault, that many things contributed to my decay...you gave me so much hope...I would do just about anything, just to get rid of the pain and change my ugly, depressing appearance...you have given me something so precious I will treasure it forever. I don’t have to turn away to talk anymore. When I laugh I don’t have to cover my mouth. Thank you for taking my pain away and giving me a wide open smile.”

----------Cincinnati Dental OPTIONS Program, 2001.143

Other dentists may on their own donate hours to schools, clinics, or provide free care to the needy in their offices. These are extremely important and significant contributions
that are an important part of the dental safety net for the poor, elderly and disabled. The dentists who participate are providing a tremendous service and do so willingly. Cincinnati is fortunate to have a higher rate of participation in OPTIONS than is seen in other areas of Ohio. Programs like this are necessary parts of the puzzle, but cannot, by themselves, serve the vast numbers of people who need care. The oral health crisis is not the fault of the dental profession. The dental professional alone should not be looked upon to solve the access problems. Dentists have rational economic reasons why they don’t accept Medicaid, or why they don’t practice in the inner city.\textsuperscript{144}

The purpose of this report is not to cast blame on hardworking, caring dentists. The oral health crisis is an outcome of complicated interacting policy choices, poor understanding of the problem, medical priorities, poverty, cutbacks in free services, and mistaken beliefs that water fluoridation solved dental problems.

**Emergency Rooms Are Overwhelmed**

Thousands of people come to area hospital emergency rooms annually seeking relief from oral pain and infections, usually the result of postponing care. Of these, only Cincinnati Children’s Hospital Medical Center (CHMC) have dental professionals to address the problem. Yet the charges generated in an emergency room for a dental visit are approximately three times the charge to resolve the problem in a dentist’s office or clinic.\textsuperscript{145}

\begin{quote}
\textbf{The University Hospital reported that in 1999, the single most common complaint was dental pain and infection, representing nearly 10 \% of all emergency room cases.}\textsuperscript{146}
\end{quote}

Local hospitals reported that charges for inpatient, outpatient, and emergency care related to dental/oral disease and infections totaled $17 million in 2001.\textsuperscript{147} Charges for patients admitted as inpatients through the Emergency Room averaged $11,367. Many of these costly complications could be prevented if routine care was widely available.

Emergency room physicians, who can only treat the symptoms of dental problems, have expressed growing frustration.\textsuperscript{148} In 2000, more than $3 million in charges were generated by local hospitals for physician treatment of emergency dental problems. After hospital treatment the underlying problems still required the attention of a dentist because the cause of dental pain, swelling or infection cannot be treated by a physician. The patient may have to return several times to treat the pain before ever getting treatment for the underlying dental problem. The average charge for a physician to assist an emergency room patient with dental pain and infection is approximately $450 per episode.\textsuperscript{147} If the patient had instead gone to a dentist or dental clinic, the charges would have been closer to $150 and the treatment could resolve the dental problem.

There are real societal costs as well to reliance on an emergency system like this – unintended consequences such as reliance on antibiotics that can lead to a decrease in their effectiveness, and overuse of pain medication. Not only is it possible for individuals to become addicted to pain medication, overuse of over-the-counter pain medications
such as ibuprofen or acetaminophen can result in serious health problems and death.\textsuperscript{149} In addition, medications dispensed for dental pain can find their way to the street for sale. In one unpublished study, 9 of 13 patients who came to an area emergency room for relief of pain of dental origin were given hydrocodone, an orally active analgesic and antitussive schedule II narcotic (opiate) with a high street value.\textsuperscript{150}

\textbf{Cincinnati Children’s Hospital Medical Center}

The primary responsibility of the dental program at the CHMC is to train pediatric dental residents. The program has a focus on children with special health care needs and medical patients being treated in the hospital.\textsuperscript{151} While this makes the program an especially valuable resource to the community, it also limits the impact the program can have on the general population. The CHMC pediatric dentistry department is usually at capacity despite the opening of several outpatient clinics and an active pediatric dental residency program. Parents of prospective new patients are given a narrow time period one day a month to call to get a child an appointment – new patient slots are often filled within an hour or two. Parents who missed out must wait another month before trying again.\textsuperscript{152} Children’s has more than 35,000 dental encounters each year at its five sites, but that does not provide all of the access needed.

\textbf{The University Hospital}

University Hospital is the primary provider of oral surgery services for the Tri-State’s adult low income and special needs patients. There is currently a waiting time of up to one month for an evaluation appointment and two months for a treatment visit. Sixty percent of the patients treated in University’s Holmes Oromaxillofacial Surgery Department have no resources to pay for care. More than 9,000 patients are seen in this clinic annually. Changes in the healthcare marketplace may reduce the numbers able to be seen in future years. Shortages of funding for faculty for the residency program and a shortage of skilled assistants are frustrating University’s ability to expand this program to meet the demand. Although the program attracts low-income patients from the entire region, the Hamilton County levy that pays for indigent care does not cover the patients who come from other counties or from Northern Kentucky. If a patient cannot pay, that expense goes on the books as thousands of dollars in uncompensated care each year.\textsuperscript{153} The cost of that uncompensated care is indirectly shifted to employers and individuals who purchase medical insurance.

\begin{center}
\textbf{Why Medicaid for Dental Care is not Solving the Problem}
\end{center}

When the Title XIX Medicaid program was enacted by Congress in the 1960s, it was envisioned as a government health insurance program that would assure access to healthcare for children from low-income families. States have the option to expand the eligibility to adults, the elderly, and those with disabilities. Although the federal government contributes about 60 % of the program cost (although this varies by state), states individually define the scope of services and the level of reimbursement. An exception to this is services for children. Medicaid requires coverage of all medically necessary medical and dental services for children.\textsuperscript{154}
Ohio
Eligibility for Medicaid
Healthy Start or CHIP: Children 18 years and under in families with incomes up to 150% of the federal poverty level regardless of the family’s insurance status and children 18 and under from 150-200% of the federal poverty level only if uninsured. Pregnant women of any age at or below 150% of the federal poverty level.
Healthy Families: Families with a child under age 19 who meet the criteria for Aid to Dependent Children, or are at or below 100% of the federal poverty level.
Aged, Blind or Disabled: Age 65 years or older, blind or disabled under specific financial criteria based on income and assets.
Coverage
Most procedures are covered for children with the exception of orthodontia unless certain very limited standards of medical necessity are met; adult coverage includes basic restorative services, limited endodontics, exodontias and complete and partial dentures. However, there are limits on the number of partials or dentures obtainable over time periods. Most specialty procedures are not covered for adults.
Fees
Reimbursement averages 73% of usual and customary fees for some services to much less for others.155

Kentucky
Eligibility
KCHIP: Children 18 years and under in families with incomes up to 200% of the federal poverty level.
Pregnant women at 185% of the federal poverty level or below.
Parents of a dependent child if one parent has left the home and cannot work due to sickness or disability or has died
Parents living with a dependent child, if the parent who earned the most income in the last 24 months is unemployed.
The income limit is $217 per month and $2,000 in resources.
Aged, Blind or Disabled with income and resource limits.
Coverage
Under age 21, the following are covered: diagnostic services, comprehensive oral examinations, prophylaxis, oral surgery, basic restorative services, extractions, limited endodontics, exodontias and complete and partial dentures.
Over age 21, coverage is limited to: diagnostic services, comprehensive oral examinations, prophylaxis, oral surgery, basic restorative services, limited endodontics, exodontias, but no dentures or partials.
Fees
Reimbursement is 65% of the usual and customary fees.156

Indiana
Eligibility
Hoosier Healthwise (CHIP): children, pregnant women and low income working families with children under 18, premiums available to buy in.
Members of Families with children that would have been eligible for AFDC/TANF.


**Pregnant women and children** at or below 150% of the federal poverty level.  
**Aged 65 or older** if meet the financial criteria, under 100% of the federal poverty level.  
**Blind and disabled** with impairment that will last at least four years under 100% of the federal poverty level.  

**Coverage**  
Broad dental coverage for all eligible persons including exams, x-rays, cleaning, sealants, restorative services, endodontics, gingivectomy, dentures, oral surgery, and limited orthodontic treatment.  

**Fees**  
Reimbursement is among the highest in the U.S.\(^{157}\)

**Medicaid Reimbursement for Dental Procedures**  
A 1996 US Inspector General’s report labeled the dental component of Medicaid a national failure.\(^{158}\) A stipulation of Title XIX is that states accepting the federal share for Medicaid must assure the same access for enrollees as that of the general population. The report stated that most states, including Ohio, Kentucky, and Indiana, had failed to do so. Although class action lawsuits in some states have resulted in increased fees, several of those states, facing budget constraints, have dropped or are considering dropping their optional adult dental coverage.\(^{159}\) Although Ohio fees were increased in 1996 and again in 2000, reimbursement continues to be far less than both the cost to provide care and the rate of reimbursement from other insurance programs.\(^{160}\) Thus, Medicaid cannot financially compete for the dental chair time of a busy dentist. State Medicaid programs are administratively understaffed. Dentists complain that it can take hours of calling to reach the Medicaid Provider Relations Department before contacting a representative. Medicaid’s administrative procedures are often different from those of private insurance companies and many patients do not comply with dental office expectations for punctuality and even making their appointments.\(^{161,162,163}\) Although the Children’s Health Insurance Program (CHIP), beginning in 1997, expanded eligibility for Medicaid, the complexity of the application process has greatly impeded enrollment.\(^{164}\)

The Ohio Director of Health’s Task Force on Access to Dental Care included recommendations that Medicaid reimbursement be increased to 85% of usual and customary fees and that the dental Medicaid program be privatized.\(^{165}\) [A Michigan program has privatized dental care through Delta Dental, resulting in increased utilization which understandably also brought about increased expenditures]. The response of the Ohio Department of Jobs and Family Services has been that it cannot afford either of these recommendations. Studies have shown that when Medicaid fees rise to market rates, children who are already getting care get more care, dentists who take Medicaid begin taking more children, and new dentists elect to participate.\(^{166}\)

The Kentucky Dental Health Coalition issued a report in 2001 calling for an increase in Medicaid reimbursement rates to a “market acceptable” range and improvement in processes. It also called for incentives to get dentists to participate.\(^{167}\) Unfortunately, Kentucky’s budget crisis precludes any immediate changes.

**Disparities in Medicaid Coverage by State**
There are disparities in Medicaid coverage between Ohio and Kentucky. Presently, Kentucky Medicaid will cover extractions for individuals over 19 but not dentures whereas Ohio and Indiana Medicaid will cover dentures with some limits.\textsuperscript{168}

**Lengthy Waits for Coverage**

Medicaid can have lengthy waits for authorizations that cause serious difficulties for people trying to find employment or a job.\textsuperscript{169} There can be waits of several months between extraction of teeth and manufacture of a denture.

**Why Many Dentists Don’t Take Medicaid**

A Head Start study indicated that 64\% of the Tri-State region’s dental providers did not take any Medicaid patients. The majority said they have never taken Medicaid. Only 26.2\% said their caseload was “under capacity,” meaning that three fourths of those responding are able to fill their practices to capacity without taking any Medicaid patients.\textsuperscript{170}

--Although low reimbursement is a very important reason for limiting participation with Medicaid, the likelihood of Medicaid patients missing scheduled appointments seemed more important to area dentists.

In the Tri-State as a whole, 34.2\% of dentists said they would care for Medicaid patients already in the practice but not take any new Medicaid patients, 21.5\% said they would accept Medicaid to a certain percent of their caseload, and 17.7\% said they would accept Medicaid patients if a family member was already being seen in the practice.

The reasons why dentists have set these limitations are as follows:

- 40.4\% low, delayed or unpredictable payments
- 15.3\% higher risk of missed appointments
- 11.1\% complex regulations

These findings were similar to a separate study done in Ohio Appalachian counties.\textsuperscript{173}

Appointments for dental treatment usually require 45 minutes or more whereas physicians see four to five patients per hour. Therefore taking Medicaid or free patients has a greater economic impact on a dental practice than on a medical practice. The
impact of missed appointments and lack of follow-up is very significant in a dental practice.

### Minimal Infrastructure for Continued Growth

Tri-State oral health prevention, education and treatment services are fragmented, underfunded, and have needs far exceeding capacity. Schools, Head Start programs, safety net clinics, and volunteer programs operate without a systems approach to oral health care. Clinics must develop their own quality assurance, productivity benchmarks, staffing, billing and purchasing systems. Such systems are unlikely when there are only one or two dentists. Therefore quality may be compromised and potential efficiencies not realized. Recruitment of dentists, hygienists and assistants is frequently difficult and could benefit from a common system. With continuing new requirements for regulatory compliance as well as continuing education, training costs are being duplicated. With an infrastructure in place, oral health would be much less likely to slip into second class status in comparison to other health care.

The Surgeon General’s report recommends building “an effective health infrastructure that meets the oral health needs of all…and integrates oral health effectively into overall health.” An infrastructure would facilitate partnerships with private practitioners, other public programs, and voluntary groups. It would provide a focus on oral health that would keep it “on the radar screen” of the public, opinion leaders, and policy makers.\(^{174}\)

### County-Specific Needs and Resources

#### Northern Kentucky Needs

The Northern Kentucky counties of **Boone, Campbell and Kenton** share many of the same resources and needs. Despite the hyper-growth of the middle class in Boone County over the last decade, significant poverty pockets exist in Newport, Covington, in the middle of Kenton County, and in southern Boone County. More than a quarter of Northern Kentucky families with children are single parent families.\(^{175}\)

<table>
<thead>
<tr>
<th>Category</th>
<th>Need</th>
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</thead>
<tbody>
<tr>
<td>Sealants</td>
<td>There are no school sealant programs in Northern Kentucky. The State Health Department is trying to remedy the situation by providing a small start-up grant, and the Northern Kentucky Combined Health District expects to start a program in 2003.</td>
</tr>
<tr>
<td>Safety net clinics</td>
<td>There is one safety net dental facility (Covington’s HealthPoint Family Care) and it is at capacity. The facility requires minimum fees that are beyond what many uninsured individuals can afford to pay. Such fees are necessary to pay for the program.</td>
</tr>
<tr>
<td>Treatment for children</td>
<td>There are no public dental programs specific to children – Head Start and the schools are reliant upon a small number of private practitioners who are at capacity.</td>
</tr>
<tr>
<td>School-based health</td>
<td>There are 11 schools that participate in school-based health</td>
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centers, none with regular access to comprehensive dental care.

<table>
<thead>
<tr>
<th>Dentists taking Medicaid</th>
<th>Only 54 of 140 licensed Northern Kentucky dentists have a Medicaid number (which doesn’t mean they will take any new patients), while more than 25,000 individuals are Medicaid recipients.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicaid reimbursement</td>
<td>Medicaid reimbursement is low. There is no reimbursement for dentures for people over 18. Kentucky primary care clinics cannot bill Medicaid for a medical and dental visit on the same day.</td>
</tr>
<tr>
<td>Services for MRDD/elderly</td>
<td>There are no specific dental services for MRDD or other special needs populations, or for the elderly.</td>
</tr>
<tr>
<td>Need for care</td>
<td>More than 20% of Boone County residents reported that they delayed getting dental care last year due to financial reasons.</td>
</tr>
<tr>
<td>Uninsured and uncompensated care</td>
<td>Children’s Hospital Pediatric Dentistry Program and the University of Cincinnati Oral Surgery Program report significant numbers of Northern Kentucky uninsured dental patients. These become uncompensated care as there are no public funds to pay for Kentucky residents.</td>
</tr>
<tr>
<td>Oral cancer</td>
<td>There were 40 cases of oral and pharyngeal cancer reported in the three Northern Kentucky counties in 1998-99, with Kenton County at a rate that is higher than the other counties.</td>
</tr>
<tr>
<td>Health Professional Shortage Areas</td>
<td>Portions of Campbell and Kenton counties are federally designated as Health Professions Shortage Areas for primary care; and a portion of Kenton County is a shortage area for dental care.</td>
</tr>
<tr>
<td>Dentist to Population Ratio</td>
<td>1:2,329</td>
</tr>
<tr>
<td>Dental cases seen at University Hospital</td>
<td>There were 616 dental cases seen at University Hospital from the 3 Northern Kentucky counties in 2000.</td>
</tr>
<tr>
<td>Dental cases seen at Children’s Hosp.</td>
<td>There were 783 dental cases seen in Children’s Hospital Medical Center from the 3 Northern Kentucky counties in 2001.</td>
</tr>
<tr>
<td>Poverty</td>
<td>There are an estimated 34,000 individuals living at 200% of the federal poverty level and below.</td>
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### Northern Kentucky Resources

<table>
<thead>
<tr>
<th>Category</th>
<th>Resources</th>
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<tbody>
<tr>
<td>Dental programs</td>
<td>Campbell County has a County Human Services program to assist low income individuals in the county with paying for a variety of medical and health needs, including dental. It is not heavily used for dental.</td>
</tr>
<tr>
<td>School-based health centers</td>
<td>School-based health centers serve 11 Northern Kentucky schools. These facilities are coordinated by highly motivated school nurses who understand the need for dental services and are determined to improve access.</td>
</tr>
<tr>
<td>Safety net clinics</td>
<td>HealthPoint Family Care operates a dental program in its health care practice on Greenup Street in Covington, which is a federally qualified health center. This is the only safety net program serving adults and children with Medicaid or who are uninsured in Northern Kentucky.</td>
</tr>
</tbody>
</table>
Sliding scale fees are accepted. In 2001, 2,489 persons received dental services there, served by 2 FTE dentists. The majority of these patients were uninsured (53 %) or on Medicaid (44 %). In that time period, 307 emergencies were seen. Emergency patients are accepted daily on a first-come, first-served basis. Waiting lists exist for regular appointments. The number of dental patients is growing by double digits annually.185

| **Head Start** | Northern Kentucky Head Start has 433 children enrolled. Of those, all received dental exams, 95 needed treatment and 87 are in the process of receiving treatment.186 |
| **Water Fluoridation** | All public water supplies in Northern Kentucky are fluoridated. Only those living on wells and cisterns are unfluoridated.187 |
| **Medicaid expenditures** | The three counties report roughly $2.2 million in Medicaid expenditures on dental in fiscal year 2001-2002.188 |
| **Dental Volunteers** | Donated Dental Services booked over a half million dollars in volunteer dental care between 1997-2001 in six Northern Kentucky counties, with 40 dentists participating.189 |

**Butler County Needs**

Butler County is a rural and suburban county with a few medium-sized towns including Hamilton, Middletown, Fairfield and Oxford. There is a new concentration of low income Hispanics in Middletown and Hamilton. While more upper income individuals are moving into Butler County, the poverty population there is not moving out. Nearly a quarter of the County’s population lives at 200 % of poverty or below. Middletown and Hamilton have poverty population concentrations proportionately similar to parts of Cincinnati.190

<table>
<thead>
<tr>
<th><strong>Category</strong></th>
<th><strong>Needs</strong></th>
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</thead>
<tbody>
<tr>
<td>Safety Net Clinics</td>
<td>In February, 2003 one clinic opened in Middletown to serve adults and children.</td>
</tr>
<tr>
<td>Transportation</td>
<td>Some transportation is available within small communities, but it is difficult to get from Hamilton to Middletown and from Warren to Butler County without a car.</td>
</tr>
<tr>
<td>Oral cancer</td>
<td>The oral cancer incidence in Butler County was 28 cases in two years (1998-1999).191</td>
</tr>
<tr>
<td>Dentists taking Medicaid</td>
<td>Only 32 of 143 licensed Butler County dentists take any Medicaid; only 13 take more than 100 Medicaid patients.192</td>
</tr>
<tr>
<td>Need for care</td>
<td>A 2000 study found that one-third of Butler and Warren County residents surveyed have not visited the dentist in the past year.193</td>
</tr>
<tr>
<td>Sealants</td>
<td>14 Butler County schools participated in the sealant program in 2001. There were 1,027 children who were examined; 866 received sealants; 613 needed treatment but only 149 got treatment upon follow-up.194</td>
</tr>
<tr>
<td>School-based Health Centers</td>
<td>There are no school-based health centers in Butler County; however, there are school nurses.</td>
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</tbody>
</table>
Health Professional Shortage Areas

There are areas of health professional shortages in Butler County for primary care. Portions of Middletown, Hamilton and New Miami are federally designated.\(^{195}\)

<table>
<thead>
<tr>
<th>Dentist to population ratio</th>
<th>1:2,733 (for primary care dentists)(^{192})</th>
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</thead>
<tbody>
<tr>
<td>Poverty</td>
<td>80,068 Butler County residents are living at or below 200% of the federal poverty level; 36,295 are Medicaid-eligible.(^{190,192})</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Data on children’s dental needs</th>
<th>Caries experience: 51.2 %</th>
<th>1+ decayed teeth: 19.9 %</th>
<th>Treatment urgency: 20.2 %</th>
<th>1+ sealants on permanent molars: 40.3 %</th>
<th>Sealants received at school: 29.2 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recency of last dental visit</td>
<td>&lt;1 year: 75.4 %</td>
<td>1-2 years: 17.0 %</td>
<td>3+ years: 3.6 %</td>
<td>never: 4.0 %</td>
<td>Was there a time in the past year when you couldn’t get care when needed?</td>
</tr>
<tr>
<td></td>
<td>Yes: 22.5 %</td>
<td>of those, how many actually tried financial reasons: 81.4 %</td>
<td>couldn’t find dentist: 1.7 %</td>
<td>other: 16.9 %</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Self pay: 35.8 %</td>
<td>Medicaid: 12.9 %</td>
<td>Other insurance: 51.3 %</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Oral cancer | There were 28 cases of oral/pharyngeal cancer reported in 1998-99 from Butler County.\(^{191}\) |

**Butler County Resources**

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<thead>
<tr>
<th>Categories</th>
<th>Resources</th>
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<tbody>
<tr>
<td>Safety net clinics</td>
<td>Newly opened clinics in Middletown and Wilmington will help chip away at needs but will require sufficiently low fees, available transportation and capacity. Plans exist for a Hamilton clinic.</td>
</tr>
<tr>
<td>Head Start</td>
<td>Head Start programs in Butler County have done a good job in assuring that enrollees get dental examinations. However, finding dentists to provide treatment to those who need it remains a challenge. In Butler, of the 1,259 children enrolled, only 8% did not get examined, 23% of those examined needed treatment, yet only 31% of those needing treatment received some. Sealants were provided in 14 schools in Butler County to 872 children in 2001.(^{196})</td>
</tr>
<tr>
<td>Treatment for children</td>
<td>Two Butler County clinics serve children: the Oxford clinic, which operates with volunteers and serves only children from low income</td>
</tr>
</tbody>
</table>
families referred by the schools, and Children’s Hospital Fairfield, which is at capacity serving 9,653 encounters in 2001. It should be duplicated region-wide.

Butler’s grant-funded MRDD program is a case management model that works to create capacity in the private sector and assist families and dentists, but it needs continuation funding. It should be duplicated region-wide.

Butler County water is nearly all fluoridated, with the exception of a mobile home park and private wells.

Roughly $48,000 in dental services were provided by 26 volunteer dentists in 2001 through the OPTIONS program.

There were 7,677 Butler residents with Medicaid who were treated for dental in 2001; with a total expenditure of $1,681,968.

Warren County Needs

Warren County is a rapidly developing suburban and rural area between Dayton and Cincinnati. While it is primarily middle and higher income in Mason and the developments just north of Hamilton County, it has pockets of rural and impoverished residents in Lebanon, Franklin, and Springboro.

<table>
<thead>
<tr>
<th>Categories</th>
<th>Needs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety net clinics</td>
<td>As of November 1, no clinics serve low-income adults or elderly in Warren County although new clinics have opened in Middletown and Wilmington in the counties on either side.</td>
</tr>
<tr>
<td>Dentists taking Medicaid</td>
<td>Only 10 of Warren County’s 56 dentists accept Medicaid, while 8,054 persons are eligible for it (only 904 Medicaid patients were treated last year by Warren County dental practices). Only three dentists accept more than 100 Medicaid patients.</td>
</tr>
<tr>
<td>Head Start</td>
<td>In Warren Head Start, of the 318 children enrolled, 305 received exams, but only 50 children of those needing treatment received any.</td>
</tr>
<tr>
<td>Water fluoridation</td>
<td>Population served by fluoride: 100,820 Eight non-fluoridating systems serve 24,432 persons including City of Lebanon and Ohio Lebanon Correctional Institute.</td>
</tr>
<tr>
<td>Data on children’s dental needs</td>
<td>Schoolchildren data (3rd graders screened) Caries experience 47.9 % 1+ decayed teeth 24.5 % Obvious need for care 24.1 % 1 or more sealants on permanent molars 30.1 % Sealants received at school 16.2 % Dental visit in last 12 mos 72 % Last dental visit &gt;1-3 yrs ago 23.8 % Last dental visit &gt; 3 yrs ago 1.8 % Never been to dentist 2.4 % Parents answer yes to time in past year couldn’t get care when needed? 16.3 %</td>
</tr>
</tbody>
</table>
How many of those actually tried? 68.9 %  
Reasons:  
Financial 89 %  
Couldn’t find dentist 0 %  
Other 11 %  
Self Pay 30.6 %  
Medicaid 5.6 %  
Other ins 63.8 %  

| Dentist to population ratio | 1:3,128 (for primary care dentists)  
|----------------------------|---------------------------------|
| Oral cancer                | There were 9 cases of oral/pharyngeal cancer reported in 1998.  
| Poverty                    | 31,043 residents are at or below 200 % of the federal poverty level; 9,987 are eligible for Medicaid.  
| Medically underserved area | Warren County is federally designated as medically underserved (MUA).  
| MRDD                       | There are no programs to assist the MRDD population with oral health care.  
| Transportation             | As Warren County is largely rural and spread out, transportation to dental care is a significant issue in the county.  

### Warren County Resources

<table>
<thead>
<tr>
<th>Categories</th>
<th>Resources</th>
</tr>
</thead>
</table>
| Sealants                    | Students at three Warren County schools received sealants in 2001; 152 students were examined, 120 received sealants; 54 needed treatment and 25 got treatment.  
| Treatment for children      | Children’s Hospital Mason dental clinic is the sole Warren County facility, and is at capacity, with 3,054 encounters.  
| Dental programs             | An Anthem grant funded education/case management program based at the Warren County Health Department pays for a staff person to encourage dentists to accept Medicaid, and to educate and assist vulnerable populations to get care.  
| Dentist volunteers          | Dental OPTIONS providers 9; value of 2001 services: $13,105  
| Medicaid expenditures       | 2,537 Warren County residents used Medicaid for dental services in 2001, with total expenditures at $493,874  

### Hamilton County Needs

While Hamilton County has by far the greatest resources in the region for oral health care for the uninsured, it also has by far the largest population and the greatest density of persons in poverty. It cannot begin to serve the oral health needs of its own population much less others who seek health care in the county.

<table>
<thead>
<tr>
<th>Categories</th>
<th>Needs</th>
</tr>
</thead>
</table>
| Safety net clinics | Its 13 safety net clinics are overwhelmed with emergencies.  

Hospital emergency rooms are similarly overwhelmed. Approximately 9,000 Hamilton County residents were seen in the University Hospital Emergency Department in 1999-2000 for dental-related procedures.  

<table>
<thead>
<tr>
<th>Hospital emergency rooms</th>
<th>Dentists have increasingly moved to the suburbs. The city has five areas that are federally designated as Dental Health Professional Shortage Areas: the homeless (a population designation), Avondale, Lincoln Heights, Millvale, Winton Hills, and East/Lower Price Hill/Fairmount. Portions of the county and Millvale are designated as medically underserved areas and populations.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dental professional shortage areas</td>
<td>Services for MRDD</td>
</tr>
<tr>
<td>Head Start</td>
<td>Efforts to reach the children of working poor parents with oral health screenings through Head Start have met with disappointment when dentists are unavailable to see the children even if they are covered by Medicaid. Some individual Head Start providers have much higher rates of exams than others. Overall, only 73% of those children screened and found to need care were able to obtain it. For those children in inner city programs, these numbers are much more dismal. Some city programs were unable to get many children examined -- as few as 23% of children who were enrolled got dental exams in some programs.</td>
</tr>
<tr>
<td>Dentists taking Medicaid</td>
<td>126,022 persons are eligible for Medicaid; only 21% of licensed dentists will take any Medicaid patients. Most of these providers severely limit the number of Medicaid patients they will take – only a handful will accept new patients.</td>
</tr>
<tr>
<td>Oral Cancer</td>
<td>There were 74 cases of oral/pharyngeal cancer reported in 1998-99.</td>
</tr>
<tr>
<td>Poverty</td>
<td>240,911 Hamilton County residents live below or at 200% of the federal poverty level.</td>
</tr>
<tr>
<td>Dentist to population ratio</td>
<td>The ratio of primary care dentists to the population is 1:1,747, which is considered adequate. The problem is that 28% of persons in the County are below 200% of the federal poverty level, and they live in different parts of the County from where the majority of dentists are located. Only 21% of licensed dentists will take any Medicaid patients. Most of these providers severely limit the number of Medicaid patients they will take.</td>
</tr>
<tr>
<td>Data on children’s dental needs</td>
<td>Caries experience</td>
</tr>
<tr>
<td></td>
<td>1+ decayed teeth</td>
</tr>
<tr>
<td></td>
<td>Treatment urgency</td>
</tr>
<tr>
<td></td>
<td>1+ sealants on perm molars</td>
</tr>
<tr>
<td></td>
<td>Sealants received at school</td>
</tr>
<tr>
<td></td>
<td>Recency of last dental visit</td>
</tr>
<tr>
<td>Time Frame</td>
<td>Percentage</td>
</tr>
<tr>
<td>------------</td>
<td>------------</td>
</tr>
<tr>
<td>1-3 years</td>
<td>19%</td>
</tr>
<tr>
<td>3+ years</td>
<td>2.9%</td>
</tr>
<tr>
<td>never</td>
<td>3.8%</td>
</tr>
</tbody>
</table>

Was there a time in the past year that you couldn’t get care when you needed it? 22.6%
Of those, how many actually tried? 89.2%

Main reason why

Financial: 83.1%
Couldn’t find dentist: 1.2%
Other: 15.6%

Payment type

Self Pay: 29.4%
Medicaid: 21%
Other ins: 49.6%

## Hamilton County Resources

<table>
<thead>
<tr>
<th>Categories</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sealant</td>
<td>Sealants are applied to nearly 4,500 2nd and 6th grade students in the 75 Hamilton County schools where more than half of the students qualify for free or reduced cost lunches. Sealants are applied in these schools only with parents’ permission. In Hamilton County (non-city) schools, 824 children were examined in 2001; 749 received sealants; 348 needed treatment but only 84 got it; city school students received 4,381 exams; 3,738 got sealants; 1,548 needed referrals and only 231 were treated.</td>
</tr>
<tr>
<td>Prevention programs</td>
<td>A fluoride varnish pilot project funded by the Anthem Foundation is underway, working with pediatric providers at Babies Milk Fund clinics.</td>
</tr>
<tr>
<td>Medicaid expenditures</td>
<td>$5,915,275 was spent on dental care by Ohio Medicaid for 26,582 Hamilton County residents in 2001. This works out to roughly $222 per person treated.</td>
</tr>
<tr>
<td>Dentist to population ratio and Medicaid</td>
<td>The ratio of primary care dentists to the population is 1:1,747, which is considered adequate. The problem is that 28% of persons in the County are below 200% of the federal poverty level, and they live in different parts of the County from where the majority of dentists are located. Only 21% of licensed dentists will take any Medicaid patients. Most of these providers severely limit the number of Medicaid patients they will take.</td>
</tr>
<tr>
<td>Treatment for children</td>
<td>Children’s Hospital Medical Center provides dental care at three sites in Hamilton County: Avondale, Harrison, and Anderson. These sites provide 23,025 (roughly 52% of those are Hamilton County residents) encounters annually of which 54% are Medicaid (63,169 children in Hamilton County are eligible for Medicaid). Therefore approximately 6,500 Medicaid encounters take place at Children’s sites, serving an estimated 10% of potential Medicaid recipients. The</td>
</tr>
<tr>
<td>Safety net clinics</td>
<td>Cincinnati Health Network dental clinics in the West End and Winton Hills served 1,763 persons last year, more than 90% with Medicaid or uninsured. These clinics provide care at sliding scale fees, however, there is a minimum charge for the uninsured that can be upwards of $50, beyond the capacity of many working poor. There are only 0.88 FTE dentists at these two clinics. Cincinnati Health Department operates 5 dental clinics in the city and partners with the Oral Health Council for a clinic serving the homeless on East McMicken. These clinics have sliding scales that drop as low as $2 per procedure and serve only city residents. The clinics are located at Elm Street, Price Hill, Northside, Clement (Avondale), Over the Rhine (Homeless) and Millvale. These clinics served 13,469 users in 2001, of which 9,721 (72%) were classified as emergencies. Of the clients, 61.8% are self pay and the majority of those pay the minimum fees on the sliding scale, based on income. This is an indication that most of these clients are poor adults.</td>
</tr>
<tr>
<td>Dental volunteers</td>
<td>The Oral Health Council’s OPTIONS program has 103 Hamilton County dentists who provided $198,499 worth of care last year to approximately 120 low-income individuals.</td>
</tr>
<tr>
<td>University Hospital</td>
<td>The University of Cincinnati’s Oromaxillofacial Surgery Department serves adults with special needs and others requiring special surgical care. More than 9,000 patients were seen in this department last year.</td>
</tr>
<tr>
<td>Water fluoridation</td>
<td>Hamilton County water supplies are mostly fluoridated. Small areas that are unfluoridated include Lockland, Addyston and Cleves.</td>
</tr>
<tr>
<td>School-based health centers</td>
<td>School nurses are available to many Hamilton County children. For example, Cincinnati Public Schools have 34.5 full-time nursing positions serving 56 schools. These nurses are in addition to those in seven school-based health centers, funded by The Health Foundation of Greater Cincinnati at Rockdale, Norwood, Taft Elementary, Northwest, New Miami, West End, and St. Bernard Elementary. The county has nurses in non-city schools, and the Archdiocese of Greater Cincinnati has nurses in some parishes. These nurses are exceptional resources for finding children who need treatment, however, many indicate they have difficulty in finding dentists to treat the children. Of all referrals the nurses make, dental has the lowest rate of resolution.</td>
</tr>
</tbody>
</table>
Clermont County needs

Clermont County is developing as a bedroom community to Cincinnati, with small towns and developments that are gaining in population. While these gains are predominately those with larger incomes, the number of persons living in poverty has not changed. Pockets of poverty remain in parts of Clermont County around Batavia, and in the eastern and southeastern parts of the County, where it reaches 20% of the population.

<table>
<thead>
<tr>
<th>Categories</th>
<th>Needs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Services for elderly and disabled</td>
<td>There are no specific dental services for the elderly or disabled adults in Clermont County.</td>
</tr>
<tr>
<td>Safety net clinic</td>
<td>The sole clinic in Clermont County is focused on children and is at capacity. Clinics for adults are located in Brown, Adams, or Hamilton counties.</td>
</tr>
<tr>
<td>Transportation</td>
<td>County-provided transportation for the elderly will not go to Adams County, where a clinic with capacity is available.</td>
</tr>
<tr>
<td>Sliding scale fees</td>
<td>The sliding scale fees at clinics place the care out of reach of many working poor families.</td>
</tr>
<tr>
<td>Uninsured</td>
<td>Clermont residents cannot come to Cincinnati Health Dept. clinics, nor do they qualify for health care subsidized by Hamilton County’s indigent care levy.</td>
</tr>
<tr>
<td>Dentists taking Medicaid</td>
<td>Only 20 of the 36 licensed dentists in Clermont County accept any Medicaid patients and only 6 take more than 100 Medicaid patients. When a Head Start staff person visited dentists to find out where children could be sent, she found that dentists were largely unwilling to accept Medicaid due to beliefs about complex payment systems, low reimbursement, and high rates of no-show patients.</td>
</tr>
<tr>
<td>Dental professional shortage areas</td>
<td>Clermont has no designated HPSA or medically underserved areas (MUAs) for dental. Parts of eastern Clermont are designated HPSA and MUA for primary care.</td>
</tr>
<tr>
<td>Poverty</td>
<td>Clermont has 42,714 residents at 200% of the federal poverty level. There are 19,259 persons eligible for Medicaid.</td>
</tr>
<tr>
<td>Water fluoridation</td>
<td>Clermont County residents are largely served with fluoridated water (69%). The areas that are not fluoridated are: New Richmond (2,408 population), Williamsburg (2,400 population) and Batavia (1,740 population).</td>
</tr>
<tr>
<td>Head Start</td>
<td>The Head Start program has grown by 66% since 1990. Of the 456 children enrolled, only 249 received dental exams. Of the 59 of those examined who needed treatment, only 22 received treatment. The Early Head Start program has an enrollment of 88. Of those, only 28 received dental exams.</td>
</tr>
<tr>
<td>Oral cancer</td>
<td>There were 8 cases of oral/pharyngeal cancer in Clermont County in 1999.</td>
</tr>
<tr>
<td>Residents using hospitals</td>
<td>551 persons from Clermont zip codes received care for dental codes at University Hospital in 1999-2000; more than 2,000 children from...</td>
</tr>
</tbody>
</table>
Clermont Co. were treated for oral health problems by Children’s Hospital Dental clinics in 2001.231

<table>
<thead>
<tr>
<th>Dentist to population ratio</th>
<th>1:5,417 (primary care dentists)226</th>
</tr>
</thead>
</table>

Data on children’s dental needs

<table>
<thead>
<tr>
<th>Caries experience:</th>
<th>47.7 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1+ decayed teeth:</td>
<td>16.0 %</td>
</tr>
<tr>
<td>Treatment urgency</td>
<td>16.0 %</td>
</tr>
<tr>
<td>1+ sealants on permanent molars</td>
<td>36.3 %</td>
</tr>
<tr>
<td>Sealants received at school:</td>
<td>0.0 %</td>
</tr>
<tr>
<td>Recency of last dental visit</td>
<td></td>
</tr>
<tr>
<td>&lt;1 year</td>
<td>74.7 %</td>
</tr>
<tr>
<td>1-2 years</td>
<td>19.3 %</td>
</tr>
<tr>
<td>3+ years</td>
<td>1.7 %</td>
</tr>
<tr>
<td>never</td>
<td>4.3 %</td>
</tr>
</tbody>
</table>

Was there a time in the past year when you couldn’t get care when needed?

| Yes                           | 23.6 % |
| of those, how many actually tried | 78.2 % |
| financial reasons:            | 83.6 % |
| couldn’t find dentist         | 0.0 %  |
| other                         | 16.4 % |

| Self pay                      | 38.3 % |
| Medicaid                      | 10.2 % |
| Other insurance               | 51.4 % |

Clermont County Resources

<table>
<thead>
<tr>
<th>Categories</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety net clinics</td>
<td>Clermont County has one safety net clinic, run by Clermont County Community Services. It serves primarily children and takes some adult emergencies. It has very low income limits and is located in Batavia. Clermont County residents can go to dental clinics in Brown and Adams Counties but need transportation. Medical and dental clinics in the eastern counties are provided by Southern Ohio Health Services Network, which has 4 medical clinics in Clermont County (but dental clinics only in Brown and Adams counties).</td>
</tr>
<tr>
<td>Sealants</td>
<td>Sealants were provided to 2nd and 6th graders in one Clermont County school (80 students) with more than 50 % of students who qualify for free and reduced fee school lunches in 2001.232</td>
</tr>
<tr>
<td>Treatment for children</td>
<td>A Children’s Hospital location in Anderson provides some care to children, however, it is at capacity, seeing 3,141 children in 2001.231</td>
</tr>
<tr>
<td>Dentist volunteers</td>
<td>Clermont County has 12 OPTIONS providers, who provided $21,172 worth of care last year.233</td>
</tr>
<tr>
<td>Medicaid</td>
<td>5,365 persons used Medicaid for dental care in 2001, expending</td>
</tr>
</tbody>
</table>
expenditures $1,705,773. Clermont County Medicaid recipients received $826,797 worth of dental care in 2001.°

Brown County Needs
Brown County is largely rural with small population centers at its county seat, Georgetown, and in Perry Township. Mt. Orab, which is growing as a bedroom community, has a school-based health center in the Western Brown district. Poverty is significant in the Southeastern corner of the county, with 14 % of the population eligible for Medicaid and 15.7 % medically uninsured. On the edge of the Appalachian region of Ohio, Brown County shares many of that region’s characteristics with regard to a shortage of access to healthcare.°

<table>
<thead>
<tr>
<th>Categories</th>
<th>Needs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dental professional shortages</td>
<td>Brown County has only six dentists and is a federally designated Health Professions Shortage Area (HPSA) and Medically Underserved Area (MUA) for dentists. °</td>
</tr>
<tr>
<td>Safety net clinics</td>
<td>The Ripley clinic is located in a space that will not allow for expansion. It is also located in a floodplain that makes building a new facility difficult. Ripley is in an area of poverty that encompasses the lower Southeast corner of the county where nearly half of the residents are below 100 % of poverty.° The clinic is operated by Southern Ohio Health Services Network, which also has a large clinic in Seaman, in Adams County just over the border from Brown Co.</td>
</tr>
<tr>
<td>Poverty</td>
<td>Brown County has 15,519 residents at or below 200 % of the federal poverty level.° 7,492 persons are eligible for Medicaid.</td>
</tr>
<tr>
<td>Oral cancer</td>
<td>There were two cases of oral/pharyngeal cancer in 1999.°</td>
</tr>
<tr>
<td>Dentist to population ratio</td>
<td>1:8,315 (for primary care dentists) °</td>
</tr>
</tbody>
</table>
| Data on children’s dental needs | Caries experience 53.3 %  
1+ decayed teeth 29.3 %  
had treatment urgency 27.6 %  
had 1+ sealants on permanent molars 69 %  
received sealants at school 74.3 %  
Had last dental visit in less than 1 year 66 %  
Had last dental visit in 1-3 years 21.4 %  
Had last dental visit in 3+ years 7.6 %  
ever seen dentist 5 %  
Of parents said there was time in past year when couldn’t get care when needed. 37.1 %  
of those actually tried to get care 70 %  
cited financial reasons 72.2 %  
cited couldn’t find dentist 4.1 %  
said other 23.7 %  
were self pay 40.1 %  |
had Medicaid 19.6 %
had other insurance 40.3 %

**Brown County Resources**

<table>
<thead>
<tr>
<th>Categories</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sealants</td>
<td>Brown County has six schools in which sealants are provided, with 572 children examined and 530 sealed in 2001.</td>
</tr>
<tr>
<td>Transportation</td>
<td>Transportation is an issue for Brown County residents, although, due to the rural nature of the county, it is likely that residents are accustomed to traveling for healthcare.</td>
</tr>
<tr>
<td>Dentist volunteers</td>
<td>Brown County has one Dental OPTIONS provider, who provided $5,072 worth of services last year.</td>
</tr>
<tr>
<td>Head Start</td>
<td>Brown County Head Start has had some success in getting dental exams for its enrollees. Of the 235 children enrolled, 223 had exams, 65 needed treatment and 40 either had or were in the process of getting treatment.</td>
</tr>
<tr>
<td>Medicaid expenditures</td>
<td>1,708 Brown County Medicaid recipients received $552,438 worth of dental care in 2001.</td>
</tr>
<tr>
<td>Safety net clinics</td>
<td>Southern Ohio Health Services Network (SOHSN) has 4 medical clinics in Brown (two with dental). Its two clinics that include dental are in Ripley (Brown County) and Seaman (just over the Brown border in Adams County). SOHSN is interested in expanding its dental services but has had difficulty finding dentists to serve in its clinics (it has been searching for an additional dentist for Seaman for one year) and to find subsidies enough to lower the fees it must charge to meet costs.</td>
</tr>
</tbody>
</table>

**Dearborn County, Indiana, Needs**

Dearborn County is a largely rural but rapidly developing county with small population centers in Aurora, Lawrenceburg, Dillsboro, and Greendale. Its total population is 46,109 and it has grown 18.7 % since 1990. The vast majority of residents are white (98.1 %), with 6.6 % below poverty.

<table>
<thead>
<tr>
<th>Categories</th>
<th>Needs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sealants</td>
<td>There is no sealant program in Southeastern Indiana schools.</td>
</tr>
<tr>
<td>Dentist to population ratio</td>
<td>Dearborn County has 8 general practice dentists with at least four at or near retirement age, and 5.6 FTE; or 1:8,234.</td>
</tr>
<tr>
<td>Dentists taking Medicaid</td>
<td>It is difficult to impossible to get care for children or adults on Medicaid as few if any of the dentists accept new Medicaid patients. There are only 11 dentists (not all of whom are full-time and 3 are specialists) and only 8 of those take Medicaid.</td>
</tr>
<tr>
<td>Safety net clinics</td>
<td>There are no sliding fee scale or publicly-funded dental clinics in Southeastern Indiana counties.</td>
</tr>
<tr>
<td>Poverty</td>
<td>There are 3,043 residents of Dearborn County living at or below 100 %.</td>
</tr>
</tbody>
</table>
Dental care in hospitals  | 1,234 Children from Dearborn County received care at Children’s Hospital dental clinics, the majority at the Harrison clinic; 34 persons from Dearborn County were treated at University Hospital for dental related codes in 1999-00.  
Water fluoridation  | Currently, a few Indiana communities in the Tri-State area are not fluoridated: Lawrenceburg (portion served by North Dearborn Water Corp.), Aurora (portion served by Aberdeen Pate Water Co. I.), Hidden Valley area (portion served by Hidden Valley MHP), as well as residents on wells or cisterns.

**Dearborn County Resources**

<table>
<thead>
<tr>
<th>Categories</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital</td>
<td>Dearborn County Hospital has some services available for complex dental cases.</td>
</tr>
<tr>
<td>Medicaid reimbursement</td>
<td>Indiana Medicaid reimbursement has increased significantly in the past few years. $369,584 was expended on Medicaid dental care in 2001.</td>
</tr>
<tr>
<td>Available revenue</td>
<td>The influx of casino revenue may provide the area with resources to establish facilities.</td>
</tr>
</tbody>
</table>

**Issues with Impact on Planning**

**Funding Shortages and Medicaid Cuts**
It is unfortunate that as this plan is coming together, the news from states and local jurisdictions is not positive for public funding support. Both Ohio and Kentucky Medicaid are at risk for major cutbacks with adult dental services at high risk. Counties and cities are also strapped. The impact of the falling economy also affects private funding sources, reducing what foundations and companies are able to support. By informing and educating the public about the nature of oral health problems and their impact on individual lives and on the economy, we may be able to compete more effectively for scarce resources, and to secure them when they become available.

**Suburban Growth**
Suburban growth has had an impact on oral health needs. As dentistry has successfully increased its focus on cosmetics, which often isn’t covered by insurance, dentists need patients who can afford substantial out-of-pocket payments. As the suburbs grow and prosper, dentists tend to follow and locate their practices there. This leaves a paucity of providers in the inner city, and creates transportation difficulties for individuals in need. Pockets of poverty and working poor exist in all counties, although they are largely concentrated in certain areas.
Chapter III: What The Community Told Us

As part of the Regional Assessment and Planning Project, a number of meetings were held with various groups and agencies serving populations affected by poor oral health and limited access to care. The RAPP Advisory Council represents many agencies providing oral health care as well as Head Start, schools, hospitals, and others. In addition, four mini-summits were held through the summer and fall of 2002 concentrating on the oral health of specific populations:

- Children of low-income families,
- Low-income adults,
- People with special needs,
- Senior citizens.

In addition, meetings were held with interested parties in each county, and geographically focused meetings were held to discuss specific recommendations. A list of the agencies and organizations participating is in the Appendix. In the course of these meetings, information on the specific needs of persons and groups in the region were uncovered and potential solutions explored. This chapter will report the outcomes of those discussions and detail what oral health services presently exist in the Tri-State.

Children

**Parent Education is Desperately Needed**

Young parents desperately need oral health education. Parents are not well-prepared to educate their children about oral health issues. There is a need for pediatricians to incorporate oral health issues into their anticipatory guidance, including the relatively unknown fact that caries is a bacterial infection that is transmissible. Materials in multiple languages and for those at low reading levels are needed. These materials should be disseminated in areas such as WIC (Women, Infants and Children food supplements) offices, pediatricians’ offices, and social service agencies.

Presently, some poor families do not seem to make oral health a priority. This may be related to a lack of understanding of the problems and/or the transmissibility of caries. It may well be due to conditioning as oral health services have never been accessible to these populations. There is a general lack of hygiene and poor nutrition among children of low-income families. There are a number of opportunities to provide such education when parents are accessing other services such as WIC, Head Start, and day care. Day care providers, dentists, office workers at social service agencies, school staff and others should be educated about the needs in the low-income population and where resources are available.

**The Gap Between Dentists’ Offices and the Poor**

A frequent complaint about low-income families from private practice clinicians is that they often fail to comply with appointments, either being very late or failing to show for the appointment. Even clinics serving low-income families have very high no show
rates; for example, one clinic cited its Medicaid clients as having a no-show rate 25% higher than in the general population. Agencies questioned whether this was possibly in part a cultural issue. Dental and medical office staffs can make families feel “inferior” or cast blame upon parents for not acting more quickly or in line with the staffs’ expectations. This impression on the part of agency representatives is supported by published literature.

**The Culture of Poverty Versus the Culture of Dentistry**

What has become apparent to many professionals working in the human services field is a great gulf between what could be called the culture of poverty and the culture of dentistry. Dentistry has long been associated with the middle and upper classes. Dental students have little opportunity for interaction with their patients. While medical students and residents spend years in training which exposes them to the living situations of low income families, dental students have fewer years of this exposure and conversation is impeded by the nature of treatment. Most dental schools offer no courses in the behavioral sciences or medical sociology. Dental students are encouraged to be entrepreneurial and business-focused to a much higher degree than their peers in medical schools. By virtue of the fact that a typical visit with a dentist may be three times as long as with a physician, it is economically more difficult for a dentist to provide uncompensated care. Dentists’ offices are more likely to be located in suburbs. They are staffed by well-paid hygienists and assistants whose skills are in high demand.

Dentists able to serve the inner-city poor, work in public clinics, accept Medicaid, or even take payments over time rather than requiring full payment in advance are becoming increasingly rare. This may be driven by the high overhead costs to operate a dental practice. One national study reported that national vacancy rates for dentists in public clinics stays around 45% while others report vacancy rates closer to 20%. Dentist incomes in many public and nonprofit facilities are at or below 50% of the average dentist in private practice. This isn’t an issue that can be resolved simply by appealing to the social consciousness of dentists in the private sector. They have very real expenses to cover – equipment, facilities, staff, school loans – all of which may run significantly higher than the loan burdens of their peers in medicine. For example, the retail price of a medical exam table is approximately $1,500, while the price of a well-constructed, reliable dental patient chair can be as high as $8,000-$9,000. The numbers of persons enrolled in dental schools dropped through the 1980s and 1990s, and retirements now too often leave areas in shortage. Dentists are very reluctant to take on the problems they view as associated with an impoverished clientele: the high rate of no-shows for appointments (25-40% compared to 5-10% for other populations), which makes scheduling and assuring income flow difficult; appearance or behavior of patients in their waiting room; what is perceived as a bureaucratic and complicated Medicaid reimbursement system, and low reimbursement for working with what are usually more complicated cases due to the many other health issues associated with poverty.
Theories about the culture of poverty argue that an individual brings with him/her the hidden rules of the class in which he/she was raised. Schools and businesses operate on middle class norms and use the hidden rules of the middle class. Generational poverty and situational poverty have different rules. To be able to work successfully with these populations, a provider needs to understand the hidden rules of their culture and how these hidden rules affect the way people think about time and appointments, the value of education, destiny, driving force, clothing, food, and money. If the norm in the family was to have teeth pulled when you get to adulthood, then there is little rationale to expend effort and scarce resources on their children’s teeth. If transportation or child care is unavailable when one has an appointment, it may not be the norm to call and cancel. In today’s tight dental market, incentives for a dental practice to learn how to work around these norms do not exist.

Dentists may not understand the lives of low-income families and often do not receive training in managing very young children. Many adults have a fear of dental treatment, which may be why many children find it frightening. This does not encourage children or parents to seek care. Cultural barriers and stereotypes add to the fears. Incentives for dentists to take Medicaid children and help for the dental staffs in doing Medicaid billing were suggestions for increasing the numbers of dentists serving Medicaid-eligible children. Wherever possible, other health providers should be trained to do basic oral assessments and to apply fluoride varnish. It was suggested that retired dentists be recruited to do more with children, but issues of insurance, licensure, and pediatric skills are barriers.

Access to care for children is a significant problem in all counties. The impression is that few dentists are willing to accept young children and to take Medicaid. Many Hamilton County Medicaid eligible persons are enrolled in the HMO, CareSource, which has a very limited number of dentists. Many of those dentists do not accept new patients. Transportation is a barrier for many children, leaving school nurses to strongly suggest the use of dental vans that could visit schools and perform exams and treatment. Single parent households have particular difficulty finding time to get children to appointments. Even if a child is taken for an exam, follow-up appointments often do not happen.

**Parents May be Avoiding Tap Water**

Families newly arrived from countries in which tap water isn’t drinkable believe tap water isn’t safe and may avoid it for themselves and their children, missing a critical source of fluoride. WIC program staff report seeing young mothers who think it safer to give their children bottled water. Therefore it is possibly an erroneous assumption to believe young children are getting sufficient fluoride through tap water.

**Should Dental Exams be Mandatory?**

A widely expressed opinion among those working with school-aged children is that dental exams ought to be mandatory, as are vision, hearing and scoliosis exams. However, if care is inaccessible, such mandatory exams may be barriers. At minimum, oral health should be a component of student physicals.
Preferred Methods of Accessing Care
Vans are the most requested method of access to care for children by both school personnel and child/family service agencies because they do not require transporting children, nor depend on the parent to bring a child for a visit. Care coordinators that work with families were recommended to secure access to care for children because they can work one-on-one with families and manage the follow-up needed. Rewarding parents for doing the necessary follow-up works as a strategy for the Head Start program.

It was pointed out that only about 50% of children who are eligible for the sealant program get permission to participate. It was suggested that perhaps permission could be combined with the free lunch program so that parents were more likely to support it. Northern Kentucky schools have no sealant program at present, although there is an effort underway to begin. Recent legislation passed in Kentucky will allow a hygienist to apply the sealants.

Adults

What is Affordable?
The answers to the question of what people can afford to pay for dental care are varied. In focus groups, agencies serving poor and low-income individuals reported that their clients are families that struggle to buy food, pay gas or electric bills, and often have no phone or transportation. Families in poverty have difficulty with the most basic needs. Getting and keeping a job is usually a higher priority than basic health care, even though the two may not be mutually exclusive.

What is the Impact of Oral Health on Employment?
Poor oral health or unsightly teeth inhibit people from successfully obtaining employment. Dirty, cracked and decayed teeth, missing teeth, or gum infections do not create the impression employers seek in workers who serve the public. Individuals with these conditions who interview for jobs do not appear as desirable employees. Local agencies serving welfare-to-work and other employment seeking ventures find that lack of dental care is a significant factor in the success of their clients. People with missing and unsightly teeth are too often stereotyped as being ignorant and lacking responsibility.

Cincinnati Works, an agency helping people find work, reported that it is not unusual to see people seeking jobs with excessive plaque, tooth loss, and decay. Their appearances are extremely affected, resulting in the use of non-verbal cues during interviews such as embarrassment, unwillingness to smile, speaking only with a hand over the mouth, etc. Hotels, front desk, retail, and fast food jobs require people who feel positively about themselves to deal with the public. The jobs that are better paying, with less manual labor, require a good appearance.

Recovering Substance Users Need Immediate Care
Representatives of substance abuse treatment agencies participating in focus groups on oral health reported that clients have a history of self-medication for various kinds of pain, including toothaches. Even when they are prescribed pain medication, they often continue to use alcohol or other drugs in combination, leading to complications.
Chemical dependency can bring about poor oral health whether it is associated with alcohol, crack, or the “sweet tooth” developed by heroin addicts. Drug seeking is a full-time obsession and other issues are ignored. By the time they get to inpatient treatment for their addiction, their teeth are often rotted out. When detoxing, addicts begin to feel the pain of their neglect of oral health. There is no time for the dentist or for basic oral health. According to the Talbert House and CCAT, two Greater Cincinnati agencies providing substance abuse treatment, the majority of passes given from inpatient treatment are for oral emergencies, abscesses, missing and cracked teeth -- more common than for sexually transmitted disease treatment.

**Medicaid Coverage is Spotty**

While the numbers of children eligible for Medicaid/CHIP is rising through new government programs, there is little coverage for low-income adults (only adults who are living at or below 100% of the federal poverty level AND have children are eligible or those who are blind, aged, or disabled). Children living in families at or under 200% of the federal poverty level are covered. For example, an adult cannot have any financial assets and qualify for Medicaid. Adult dental coverage is often cut when state legislatures are looking for ways to reduce costs. Presently, many states, including Ohio and Kentucky, are expecting to cut adult dental coverage to help balance budgets.

While Ohio and Indiana Medicaid programs are fairly comprehensive for adults, Kentucky Medicaid pays only for extractions (not dentures or restorations). Neither state provides many services requiring a specialist. Waiting periods for authorizations are sometimes lengthy. Dentists who will take adults on Medicaid are few. While Medicaid will pay for childcare when an adult who is eligible goes to the doctor for work-related reasons, it will not cover childcare for dental visits.

Parents often realize their own needs for oral health care when they become involved in efforts to help their children. It is a “teachable moment” for mothers when pediatricians give anticipatory guidance for the children. It is significant because when a parent is aware and educated, they are better at reinforcing the child’s dental health as well as taking care of their own needs.

**Homeless and Mentally Ill**

Many people who are homeless and mentally ill have dental needs. One agency representative attending a focus group estimated that perhaps 90% of the street population lacked some teeth. Many are on SSI (Supplemental Security Income) and can be served at the McMicken Dental Center established for homeless but the federal HUD (Housing and Urban Development) criteria that must be met to be served there are restrictive. Many people who do not fit the criteria are essentially without homes yet they cannot be served at McMicken. These individuals often end up having teeth extracted in emergency situations but have no resources to get dentures. Similarly, dental care plans that require multiple visits over periods of time are not realistic for individuals living on the street.
The perception on the street is that Cincinnati’s dental clinics have such long waiting lists as to make routine care unavailable. That may exacerbate tendencies to wait until there is an emergency need to seek care. Some clinics offer a few evening hours per week but few offer any weekend hours. Adults would benefit from expanded clinic hours. Mobile vans available at churches, grocery stores, banks, or community centers on a regular basis could expand services. A van could also travel to substance abuse treatment sites, jails, and other institutions.

**Issues with the Insured: Most Dental Insurance is Underinsurance**

There is also an issue of avoidance of the dentist. Some employers indicate that dental benefits are the least used. Some assume that is because the employees do not value dental services. However, there may well be other reasons, including that dental insurance offers the least coverage and requires much larger co-payments and deductibles than medical insurance. The insurance will however usually cover cleanings, so many adults get cleanings but not treatment. Similarly, cleanings are less expensive than insurance premiums and deductibles, so those who have dental insurance available may choose not to purchase it, paying for cleanings out-of-pocket and waiting until they have severe needs before purchasing the insurance.

**Potential Workforce Solutions**

In every focus group, it was asked why the dental community doesn’t make more extended use of auxiliaries such as hygienists or expanded function assistants. Agencies have become accustomed to working with nurse practitioners or physician assistants in the medical field to extend medical resources. It was strongly recommended that dentistry consider these kinds of options to expand access to care. In other countries, hygienists and expanded function assistants can provide a great deal of care for these populations.257 It is not commonplace in this country and may require the same kind of effort that nurse practitioners undertook years ago to establish the ability to practice independently. Similarly, it was questioned why hospitals do not have dental services given the demand in the emergency departments. It was pointed out that if the University Hospital did provide dental care, it could be paid for by the Indigent Care Levy for Hamilton County residents. Presently, it provides only treatment of emergency symptoms and oral surgeries.

**Special Needs Populations**

Oral health care for adults with developmental disabilities, mental illness, or in substance abuse treatment is a critical need. A Northern Kentucky psychiatrist at NorthKey Community Care said she could immediately identify 200 people in need of urgent oral health care in her system. Similarly, Summit Behavioral HealthCare has tremendous need for dental services, as do correctional facilities. It is difficult for these facilities to employ and operate their own dental clinics; when they have, the clinics have often been inefficient. Although the administrators in these facilities are responsible for providing or arranging for dental care for those in their custody, they often lack the expertise and familiarity with the dental system and access to appropriate providers. Having to transport patients also presents difficulties.
What Special Accommodations are Needed?

Individuals with these disabilities may need special accommodations such as personalized treatment plans, behavior management or general anesthesia in some circumstances, treatment in a wheelchair or on a papoose board, as well as shorter appointments and shorter waiting times.

One significant issue is the need for good communication between caregivers, families, staff of group homes and institutions, and the dental staff. The dentist needs to know about special needs up-front. Rapid turnover in caregivers often results in poor understanding of the oral health needs of special needs patients. It is important to dentists that these patients have knowledgeable caregivers who can communicate to the dental staff, bring the patient to appointments and supply any information needed during the visit, and make sure that post-treatment instructions are followed.

Most people want to stay in their local area for dental services. HIV agencies or other service providers can provide transportation in some cases, but it is not always timely. Often, people can find transportation if it is a mile away, but 20-30 miles is difficult. Cab companies are already providing multiple trips to hospitals, churches, Medicaid providers, etc.

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Brady is a young man with spina bifida. He is a highly intelligent and active person who uses a wheelchair for mobility. When he was younger, he received excellent dental care through Cincinnati Children’s Hospital, where he also received care for his disability. As an adult, he has had great difficulty finding a dentist in private practice who can do the dental work on him while he remains in his wheelchair because transferring to a dental chair is too difficult. He has been increasingly frustrated trying to find oral health care that meets his needs.

---- Cincinnati Center for Developmental Disorders

The Elderly

Opportunities for Reaching the Elderly

Many opportunities exist to reach the ambulatory elderly. Senior centers are very accessible for portable services. Nursing home and retirement housing populations are stable. Many providers who claim to provide nursing home dental services actually do little more than exams – few provide any actual treatment. There is a strong need for outreach to the homebound elderly. Home-delivered meal programs are an obvious source of contact. Coverage of dental care by Medicare would make a substantial difference in the amount of care senior citizens could get. However, prescription drug coverage is the more prominent issue among advocacy groups.

Successes and Resources
Despite the many difficulties described above, in fact the Tri-State has considerable potential to reduce oral health disparities. Local resources do exist to help improve oral health services.

The United Way of Greater Cincinnati’s Healthy People Vision Council has established improving access to oral health services as a priority initiative. This group of community leaders was able to recognize the need for oral health and to capitalize on the Surgeon General’s report and bring together the necessary individuals and organizations to make a difference.\textsuperscript{258}

Other organizations have supported programs that address dental needs in the Tri-State. The Health Foundation of Greater Cincinnati, the Anthem Foundation of Ohio, the Greater Cincinnati Foundation, The Mayerson Foundation, and Impact 100 have recognized oral health needs in their grant-making programs. Cincinnati CAN’s (Community Action Now) Health and Human Services committee named oral health one of the city’s most significant health needs, recognizing its impact on economic success.\textsuperscript{259}

An important facet of oral health in Cincinnati is the presence of The Procter & Gamble Company. This business powerhouse is known throughout the world for its improvements in consumer products to promote good oral health. Throughout the years, P&G has had a number of projects that have advanced dental care in the Cincinnati area. Presently, the Crest Healthy Smiles 2010 campaign is a nationwide effort to “combat America’s oral health epidemic…by going into communities and enlisting the help of others to provide oral care education, tools, and increased access to dental care for millions of children.”\textsuperscript{260} P&G is partnering with Boys and Girls Clubs to create dental clinics, including one in Avondale in conjunction with the Cincinnati Health Department, that opened in Spring, 2003.

Unlike many communities, the Tri-State has the Greater Cincinnati Oral Health Council, a non-profit organization with 94 years of expertise and programs in public health dentistry. It operates programs such as OPTIONS, Donated Dental Services, dental sealants, and the McMicken Dental Center for the Homeless and directs resources toward correcting oral health disparities in partnership with clinics and providers.\textsuperscript{261}

The Cincinnati Health Department’s 30-year history of providing direct dental clinical services to the poor and disadvantaged puts Greater Cincinnati in a good position to create a working dental public health system. Its school-based dental sealant program has been replicated throughout the country. The combined Oral Health Council and Cincinnati Health Department programs are recognized as being among the stronger local dental public health projects in the United States.\textsuperscript{262}

The Ohio, Kentucky, and Indiana State Health Departments have experienced dental public health directors who provide leadership, policy direction, and funding. Ohio is nationally known for its innovative programs.\textsuperscript{263}
Committed organizations and individuals throughout the Tri-State have invested time and energy to address the problem of disparities in oral health services and have energetically supported these planning efforts, e.g., the Northern Kentucky HealthPoint Family Care (formerly Northern Kentucky Family Health Centers), the Southern Ohio Health Services Network, the Cincinnati Health Network, the Butler County HealthCare Coalition, and the Lincoln Heights HealthCare Connection. Nurses from the school-based health centers, school districts, and Head Start personnel are strong advocates. Advocacy and service organizations for children, for the developmentally disabled and for seniors are also vocal in support of increased dental services.

Hospitals including the Cincinnati Children’s Hospital Medical Center are the home of many services to the poor and uninsured. Children’s expertise in dental care and its five operating dental services clinics are an important source of care for thousands of Tri-State kids. It is home to the Children’s Dental Care Foundation, which has provided funds to support dental care for community children at the Medical Center. The University Hospital provided most of the complex adult dental care for the disabled, disadvantaged and low-income in the region.264 The Tri-Health and Mercy Hospital systems have also expressed interest in solving the problems of dental access.

The state dental associations and local dental societies participate in public policy advocacy, volunteer programs, and special events to help expand access.
Chapter 4: What the Experts Say

What Works?
Preventive Dental Services

Introduction

*Individual vs. community-based interventions*

Most public health professionals, including dental public health professionals, tend to characterize interventions aimed at improving the public’s health as either *individual-based*—those that involve a one-on-one interaction between the service provider and the individual, or *population-based* (sometimes referred to as *community-based*)—those that involve interactions with groups of individuals, e.g., in schools, child care settings, nursing homes, or even entire communities.

Public health has been defined as "the art and science of preventing disease, prolonging life, and promoting physical and mental efficiency through organized community effort."\(^2\)_\(^6\)\(^5\) The important concept in this definition is through organized community effort, for it emphasizes public health's focus on the community, rather than the individual. Because this project is primarily focused on the oral health of communities, the interventions that are considered in this report are thus primarily, although not exclusively, community-based.

### Epidemiology of Oral Diseases

To understand why various interventions are proposed for different age groups or types of settings, it may be helpful to first gain some appreciation of the nature of the major oral diseases and conditions.

*Dental Caries*

Dental caries ("tooth decay") is one of the most prevalent of human diseases, and the most prevalent chronic disease of children, approximately five times more common than asthma and seven times more common than hay fever.\(^2\)_\(^6\)\(^6\) Dental caries is an infectious, transmissible disease in which bacterial by-products (i.e., acids) dissolve the hard surfaces of teeth. Unchecked, the bacteria can penetrate the dissolved surface enamel (outermost layer of the tooth), attack the underlying dentin (layer beneath the enamel), and reach the soft pulp tissue ("nerve") and blood vessels. Dental caries (abbreviated to "caries" for the remainder of this report) can result in loss of tooth structure, pain, and tooth loss and can progress to acute systemic infection.

By the time they graduate from high school, almost 80 % of all children in the U.S. have experienced caries.\(^2\)_\(^6\)\(^7\) By middle age, U.S. adults have more than half their teeth affected by caries.\(^2\)_\(^6\)\(^8\) Almost 55 % of 5-17-year-olds have experienced no caries in their permanent teeth, and 62 % of 2-9-year-olds have experienced no caries in their primary
(“baby”) teeth. However, the proportion of children who are caries-free declines dramatically with age, so that while 74% of 5-11-year-olds have never had a decayed permanent tooth, only one-third of 12-17-year-olds have had no decay in the permanent dentition.

Caries is not uniformly distributed among all children. Rather, 25% of the children with at least one permanent tooth have 80% of the caries. Most of the disease is concentrated among those with low income, low educational attainment, and minorities, although there are some exceptions. Among 2-4-year-old children, about three times as many children from poor families have experienced caries as children from middle and high-income families. Similarly, twice as many 15-year-olds from families with less than a high school education have untreated caries as from families with more than a high school education.

Among adults, for every population subgroup, caries prevalence increases with age. Males have lower overall caries experience than females, and non-Hispanic whites have more than non-Hispanic blacks, who in turn have more than Mexican-Americans. The prevalence of root caries increases with age in almost every demographic group. Overall, one out of every four adults who still have teeth has root caries. (As people age, the gums tend to recede, which exposes the roots of the teeth to decay-causing bacteria.) More men than women have untreated root caries, and differences between racial and ethnic groups are small.

### Periodontal Diseases

Periodontal ("gum") diseases are among the most prevalent of all chronic diseases, affecting children, adolescents, adults, and the elderly. Periodontal diseases refer to diseases of the tissues that support the teeth in the jaws. Gingivitis (inflamed and bleeding gums), loss of the bone supporting the teeth in the jaws, receding gums, accumulation of bacterial plaque, calculus (tartar), poor oral hygiene, and tooth loss have all been used in epidemiological studies as surrogates for "periodontal disease." Periodontal disease is often stated to be the leading cause of tooth loss among adults in the United States, although some more recent studies have found dental caries to result in more tooth loss.

More than 90% of persons 13 years of age or older have experienced some clinically evident loss of periodontal attachment (the connective tissue that supports the teeth in the jaws), but only 15% exhibit more severe periodontal destruction (loss of tissue attachment of 5 mm or more). Overall, females have better periodontal health than males, and non-Hispanic whites have better periodontal health than either non-Hispanic blacks or Mexican-Americans.

Periodontal disease occurs by the following process:

- Harmful bacteria increase in mass and thickness until they form a sticky film known as plaque.
• In healthy mouths, plaque itself actually provides some barrier against outside bacterial invasion. When it accumulates to excessive levels, however, plaque sticks to the surfaces of the teeth and adjacent gums and damages the tissues supporting the teeth, with subsequent swelling, redness, and heat.
• When plaque is allowed to remain on the teeth, it hardens into calculus (commonly known as tartar). Calculus has a rock-like consistency and adheres tenaciously to the tooth surface.
• Calculus produces injury and inflammation that eventually destroy the tissues and bone supporting the teeth and can lead to tooth loss.

Periodontal diseases are generally divided into gingivitis and periodontitis.

**Gingivitis**
Gingivitis is an inflammation of the gingiva, or gums. It is nearly always chronic, but an acute form occurs infrequently. It is characterized by tender, red, swollen gums that bleed easily and may be responsible for bad breath (halitosis) in some cases. Treatment is very effective if initiated early in the course of gingivitis. Without good management, however, the problem can progress.

**Periodontitis**
Periodontitis is characterized by the following:
• Gum inflammation, with redness and bleeding.
• Deep pockets form between the gum and the tooth.
• Loose teeth, caused by loss of connective tissue structures and bone.

Although gingivitis always precedes periodontitis, it doesn't always lead to this more severe condition. In fact, some experts believe it is an entirely different disease.

**Tooth Loss and Edentulism**
The overall prevalence of tooth loss and edentulism (loss of all natural teeth) has been declining in the United States over the past several decades, but important differences still exist between different subpopulations. During 1988-1991, about 10% of U.S. adults were edentulous, with no differences by gender. Among race-ethnicity categories, Mexican-Americans were the most likely, and white non-Hispanics the least likely, to have lost at least one tooth. Age was inversely associated with every indicator of tooth retention and directly associated with every indicator of tooth loss.273

**Oral Cancer**
The term "oral cancer" includes a diverse group of tumors arising from the oral cavity. Usually included are cancers of the lip, tongue, pharynx, and oral cavity. The annual incidence of oral cancer in the U.S. is about 11/100,000 population, with rates in males more than twice as high as those in females.274,275 Oral cancer is responsible for 2% of all cancer deaths in the U.S. and is projected to account for more than 28,900 new cases and about 7,400 deaths in 2002. Overall 5-year and 10-year survival rates are 54% and 39%, respectively.
The natural history of each type of cancer can be quite different. Cancer of the lip accounts for 11% of new cases of oral cancer but only 1% of deaths, while cancer of the pharynx accounts for 31% of new cases of oral cancer but 50% of deaths. Ninety-five percent of oral cancer occurs in persons over age 40, and about half of all oropharyngeal cancers and the majority of deaths from this disease occur in persons over age 65.276

Surprising to many is the fact that oral cancer occurs more frequently than many cancers, including cancer of the cervix, kidney, liver, ovary, pancreas, stomach, leukemias, and melanoma.277 Black males have the highest incidence, followed in decreasing frequency by white males, black females, and white females. The mortality rate for black males is double that of white males, and females of both races are considerably less likely to die from the disease.

Use of tobacco in all forms and, to a lesser extent, alcohol abuse are the major risk factors for the development of oral cancer.278 Even with recent advances in prosthetic replacements of orofacial structures, surgery to remove and repair the effects of oral cancer can still be significantly debilitating and have long-lasting psychosocial effects.

Cleft Lip/Cleft Palate
Approximately 7% of children in the U.S. are born with craniofacial deformities. The most common of these is cleft lip and/or cleft palate. The overall incidence of cleft lip and/or palate is one in 700 births, making this deformity the fourth most common birth defect in the U.S.279 Children with clefts may experience speech, masticatory, and esthetic complications as a result of their condition. They may also be alienated or otherwise mistreated by their peers.280 New advances in surgery, however, continue to reduce the previous devastating effects of these conditions.

More than a quarter-million people living in the U.S. have one or more cleft abnormalities. About 50% have both cleft lip and cleft palate, while 30% have only cleft palate, and 20% have only cleft lip. Native Americans appear to have the highest prevalence of cleft lip/palate of any racial group, followed by Japanese and Chinese. Whites and Blacks are affected even less. Males have a higher incidence of cleft lip, with or without cleft palate. Females have a higher occurrence of cleft palate alone.281

Oral Injuries
Although oral injuries comprise injuries to the teeth as well as to the jaws, face, lips, tongue, gums, and other oral soft tissues, most studies of oral injuries have only addressed the teeth. Traumatic injuries to the teeth are among the most serious of dental conditions, because of critical sensory, communicative, taste-related, and psychosocial functions of the teeth and mouth.282

Seventy-five percent of oral injuries have been reported to occur in children less than 15 years of age.283 The most recent national survey found that more than 38 million persons 6 to 50 years of age in the U.S.--about one-quarter of this age group--were estimated to have evidence of trauma to at least one of their incisors (front teeth). Males had more incisal trauma than females, with a ratio of 1.5:1. The prevalence of incisal trauma in all
race-ethnicity categories was very similar and appeared to be positively associated with age.  

### Methods for Preventing Oral Diseases – Prevention of Dental Caries

**Fluoride**

Fluoride is widely recognized as one of the most effective agents for preventing dental caries. More recently, it has also been shown to slow and even reverse the decay process.  

Fluoride works to control early cavities in several ways. Fluoride in plaque (a sticky film of bacteria that forms on the tooth surface) and saliva helps prevent the minerals in tooth enamel from being dissolved by the acids formed by decay-causing bacteria, and helps replace the minerals that have been lost in such dissolved (demineralized) enamel. The resulting enamel is actually more resistant to acid. Cycles of demineralization and remineralization continue throughout the lifetime of the tooth. Fluoride also helps prevent caries by interfering with the process by which decay-causing bacteria use food debris on the teeth to produce acid.

Today, as a result of having many sources of fluoride, all U.S. residents are exposed to fluoride to some degree. Widespread use of fluoride has been a major factor in the decline in the overall occurrence and severity of dental caries. Many forms of fluoride are effective, inexpensive, readily available, and can be used in home, dental office and public health (e.g., schools, clinics) settings. People are probably most familiar with community water fluoridation—the process of adjusting the level of fluoride in drinking water to control caries. The success of water fluoridation in preventing and controlling dental caries led to the development of fluoride-containing products, including toothpaste, mouthrinse, dietary supplements, and professionally applied or prescribed gel, foam, and varnish. These latter products are known collectively as topical fluorides and are usually applied by a dental professional directly onto the teeth.

Tooth decay can begin as soon as the first primary (“baby”) tooth erupts at about 6 months of age and can progress rapidly. Treatment can be very traumatic for the child, the family, and the provider. Treatment often requires hospitalization, and can cost several thousand dollars. Consequently, it makes sense to try to prevent the disease as early as possible. Topical fluorides have been used for this purpose in dentistry for many years. Today, most dental professionals use topical fluoride in gel or foam form.

The U.S. Centers for Disease Control and Prevention (CDC) recently issued guidance and recommendations for health professionals and the public regarding the selection of different forms of fluoride from among the available options. Adoption of such recommendations could further reduce dental caries while saving public and private resources.

**Community Water Fluoridation**
Introduction
Community water fluoridation—the practice of adding trace amounts of fluoride to a community's water supply to prevent dental caries—is considered an ideal caries preventive agent. Indeed, community water fluoridation has been hailed by CDC as one of the ten greatest public health achievements of the 20th century.\textsuperscript{289}

Safety and Effectiveness
Fluoride is safe and effective when used and consumed properly. Numerous studies have proven fluoride's effectiveness in decay prevention in the primary teeth of infants and children, as well as in the permanent teeth of children, adolescents and adults, including senior citizens.\textsuperscript{290} No charge against the benefits and safety of fluoridation has ever been substantiated by generally accepted scientific knowledge. After 50 years of research and practical experience, the preponderance of scientific evidence indicates that fluoridation of community water supplies is both safe and effective.\textsuperscript{291}

Cost-effectiveness
Community water fluoridation is the most cost-effective method for preventing tooth decay. On average, it costs less than $1 annually per person to fluoridate community water systems serving most people in this country.

Fluoridation status in Ohio and Kentucky
The Tri-State region is fortunate in having a much higher proportion of its population receiving the benefits of community water fluoridation than the rest of the U.S. In 2000, Ohio and Kentucky, had 87.6\% and 96.1\%, of their populations on community water supplies, respectively, receiving fluoridated water, compared to only 65.8\% for the U.S.\textsuperscript{292}

Ohio law requires fluoridation of communities of 5,000 or more people. Currently, the only Ohio communities in the Tri-State area that are not fluoridated are four areas of Hamilton County (Lockland, Cleves, Addyston and Rolling Hills), a few villages in Clermont County (including Batavia), and some parts of Warren County (including Lebanon). Otherwise, all public water supplies are fluoridated. Those relying on cisterns or wells for drinking water may not be fluoridated.\textsuperscript{293}

Kentucky administrative regulations require all community water systems serving a population of 3,000 or more to adjust fluoride-deficient waters to protect the dental health of the people served by the supply. Community water systems serving a population between 1,500 and 3,000 must provide supplemental fluoridation only if adequate fluoride feed equipment is available from the State.\textsuperscript{294} Currently, the only Kentucky communities in the Tri-State that are not fluoridated are those operating on cisterns or wells.\textsuperscript{295}

Although Indiana does not have a mandatory fluoridation law, in 2000, 95.3\% of the Indiana population on public water supplies received fluoridated water. Currently, a few Indiana communities in the Tri-State area are not fluoridated: Lawrenceburg (portion served by North Dearborn Water Corp.), Aurora (portion served by Aberdeen Pate Water
Co. I.), Hidden Valley area (portion served by Hidden Valley MHP), as well as residents on wells or cisterns.  

**Professionally Applied Fluoride Compounds**

Persons at high risk for dental caries may require more frequent or more concentrated exposure to fluoride and may benefit from the use of other forms of fluoride (e.g., mouthrinse, dietary supplements, and topical gel, foam, or varnish).

**Fluoride Gel and Foam**

*Description*

In the United States, dentists and dental hygienists have been applying high concentration fluoride compounds (topical gel, foam, or, more recently, varnish) directly to patients’ teeth for approximately 50 years. The primary effect is to prevent deterioration of tooth structure. An additional, but relatively minor mechanism, is the killing of some of the bacteria that cause caries. On the basis of the available evidence, the usual recommended frequency is semiannual.  

**Fluoride Varnish**

*Description*

Fluoride varnish is a newer form of topical fluoride that has been widely used in Europe for several decades but only recently became available in the United States. When used appropriately, fluoride varnish is at least as effective as other topical fluorides in preventing decay, but offers several advantages over them: 1) It is more easily tolerated by infants and toddlers. Other forms of topical fluoride are usually applied in a plastic tray and require four minutes of contact time with the teeth, which young children and some developmentally disabled persons cannot tolerate, whereas fluoride varnish can be swabbed directly on the teeth in just a few seconds. 2) It is less toxic and poses less risk of an adverse reaction than other topical fluorides because less of the product is used and swallowed during application. 3) It is easier to use and faster to apply than other topical fluorides. 4) It does not need to be provided in a clinical setting (e.g., with the child in a dental chair); rather, it can be applied in virtually any setting using a minimum set of supplies.

*Effectiveness*

A number of studies conducted in Canada and Europe have demonstrated that fluoride varnish is effective in preventing dental caries in children. An analysis of almost 50 studies estimated the average effectiveness of fluoride varnish to be 38%. Applied twice a year, it is at least as effective as professionally applied fluoride gel, with some studies suggesting it is even more effective. Other studies report that three applications in one week, once per year, are more effective than the more typical twice-a-year application, and some researchers recommend application as many as four times per year to obtain the greatest effect. However, the evidence of benefits from more than two applications per year is inconclusive. Also, most of the studies of fluoride varnish have involved the permanent (adult) teeth. There have been too few studies done of fluoride varnish to adequately evaluate its cost-effectiveness.
There are fewer studies of the effectiveness of fluoride varnishes when used for primary teeth, leading a recent government-sponsored panel to conclude that the evidence for effectiveness is “insufficient.” This does not mean that varnishes are ineffective in primary teeth, but simply that there are not yet enough supporting studies to warrant a firm recommendation for use. Nevertheless, given what is known about how topical fluorides work to prevent caries, and the strong evidence of effectiveness found in permanent teeth, the current science justifies fluoride varnish use in primary teeth as a best practice.

Because of its ease of use, and because young children are far more likely to see a medical provider than a dentist, several states have begun to encourage non-dental health professionals, e.g., physicians, physician assistants, nurses, to apply fluoride varnish. In at least four states (Washington, North Carolina, Iowa, Nevada), the Medicaid program reimburses physicians for varnish applications. Two state examples follow.

In Washington, the Access to Baby and Child Dentistry (ABCD) (www.abcd-dental.org/index.html) program has been operating since 1994. It focuses on preventive and restorative dental care for Medicaid-eligible children from birth to age six, with emphasis on enrollment by age one. Dentists receive continuing education in early pediatric dental techniques and are certified by University of Washington Pediatric Dentistry staff. This qualifies them to receive enhanced reimbursement for selected Medicaid preventive procedures (including fluoride varnish) for enrolled children. Dental front office staff receive training in communication and culturally appropriate follow-up with the client families. Enrolled families are coached in the need for early and preventive dental care, and in appropriate behavior at the dental office, including the need to keep appointments. Both medical and dental providers are reimbursed $21.18 per fluoride varnish application for up to three applications per year for each type of provider.

Another example is North Carolina, where the Into the Mouths of Babes (www.ncafp.com/PDFs/Overview.pdf) program consists of oral screening, individualized face-to-face parent/caregiver education, and application of fluoride varnish. Both medical and dental providers participate in the program and are reimbursed by the Medicaid program. Reimbursement for the first visit is approximately $43, and approximately $35 for subsequent visits.

One factor that may be partly responsible for the relatively slow development of fluoride varnish programs in the US is that the federal Food and Drug Administration (FDA) requires manufacturers to demonstrate safety and effectiveness of all new drugs for their intended uses, and requires substantial evidence from adequate and well-controlled investigations in order to approve a new drug for marketing. Some fluoride varnish products have FDA approval for other purposes, but not for caries prevention. Use of approved fluoride varnishes for caries prevention therefore is an unapproved use, commonly referred to as "off-label" use, of an approved drug. Such use is not considered unlawful; indeed, the use of drugs off-label is a common practice in medicine. Three-fourths of the prescription drugs currently marketed in the US lack full approval for use
by children. Both physicians and dentists assume the responsibility for justifying off-label use of approved drugs. If one considers that the application of topical fluoride for a patient who is at risk for caries is the standard of dental practice for his/her community, then the selection of fluoride varnish is a reasonable choice.

Cost effectiveness
The application of fluoride gel, foam and varnish requires professional expertise; consequently they are inherently more expensive than self-applied methods. For groups and persons at low risk for dental caries, professionally applied methods are unlikely to be cost effective.

Fluoride Varnish – Overview of Best Practices

What is it? A thin film of fluoride brushed onto the teeth to protect against dental caries. It hardens on contact with saliva and stays in contact with the teeth for several hours or days, but is not meant to be permanent.

Who should receive it? Children at moderate to high risk of caries, beginning as soon as first tooth erupts

How often should it be applied? At least twice a year, more frequently for higher risk children

Who can apply it? Dentists and dental hygienists. Physicians, nurses, physician’s assistants, and medical assistants can apply it but cannot be reimbursed for it under Ohio Medicaid although changes to this exclusion are being discussed.

Effectiveness. On average, caries reductions of 38%. Insufficient evidence to evaluate effectiveness in primary teeth or cost-effectiveness.

Advantages
• Easier and faster to use than other topical fluorides--can be applied in a few seconds
• Well tolerated by infants and developmentally disabled
• Less toxic than other topical fluorides
• Taste more acceptable than other topical fluorides
• Can be applied by non-dental professionals, e.g., physicians, nurses (if state laws permit)
• Can be applied in non-clinical settings

Disadvantages
• Temporary yellow staining of teeth (can be brushed off)
• Temporary varnish smell
Issues/controversies
• FDA has not yet approved fluoride varnish as an anticaries agent, thus use is considered “off-label.” Clinicians can legally use products off-label based on their clinical judgment.

Examples of programs
• Access to Baby and Child Dentistry (ABCD) program in WA (www.abcd-dental.org/)
• Into the Mouths of Babes program in NC (www.nc AFP.com/PDFs/Overview.pdf)

Fluoride Mouthrinse
Description
Fluoride mouthrinse is a concentrated solution of fluoride intended for daily or weekly use. The most common fluoride compound used in mouthrinse is sodium fluoride. Over-the-counter solutions for daily rinsing are available and usually recommended for use by persons older than 6 years, because of the possibility that younger children may inadvertently swallow the solution. In one review, average caries reduction in non-fluoridated communities attributable to fluoride mouthrinse was 31%.

Safety
During the 1980s, approximately 3 million children in the United States participated in school-based fluoride mouth-rinsing programs.

Cost-effectiveness
Fluoride mouthrinsing programs have generally been assumed to be cost-effective, especially in school-based programs, where teachers can supervise weekly rinsing in classrooms at no direct cost to the program. In other programs, volunteers or hourly workers may provide supervision. Under these circumstances, annual program costs have been said to be approximately $1 per child ($1.41 in 1999 dollars). This figure likely is an underestimate because indirect costs are not included.

Dietary Fluoride Supplements
Description
Dietary fluoride supplements in the form of tablets, lozenges, or liquids (including fluoride-vitamin preparations) have been used throughout the world since the 1940s. Most supplements contain sodium fluoride as the active ingredient. To maximize the topical effect of fluoride, tablets and lozenges are intended to be chewed or sucked for 1–2 minutes before being swallowed. For infants, supplements are available as a liquid and used with a dropper. The evidence for the effectiveness of fluoride supplements to prevent caries is mixed, and depends upon the way in which the supplements are used.

Safety
Fluoride supplements must be prescribed by a dentist or physician. Because fluoride supplements are intended to compensate for, not supplement, fluoride-deficient drinking water, the dosage schedule requires knowledge of the fluoride content of the child’s
primary source of drinking water. As a child often has multiple sources of drinking water (e.g., home, child care settings, school, or bottled water), and may also use other sources of fluoride (e.g., toothpaste or mouthrinse), prescribing an appropriate dosage can be complicated. For infants and children under 6 years of age, both a benefit of dental caries prevention and a risk for enamel fluorosis (“mottled” enamel: chalky white areas on the tooth surfaces) are possible.\textsuperscript{318,319,320}

Cost-effectiveness
Prescribed dietary fluoride supplements cost an estimated $37 per year. Fluoride supplements in school programs have direct costs of approximately $2.50 per child ($3.52 in 1999 dollars) for the tablet or lozenge.\textsuperscript{321} Administrative costs and considerations are similar to those in school fluoride mouthrinsing programs.

Fluoride Toothpaste

Description
Fluoride is the only nonprescription toothpaste additive proven to prevent dental caries. Studies of 2–3 years duration have reported that fluoride toothpaste reduces caries experience among children by a median of 15\%–30\%.

This reduction is modest compared with the effect of water fluoridation, but water fluoridation studies usually measure lifetime--rather than a few years’--exposure. Regular lifetime use of fluoride toothpaste likely provides ongoing benefits that might approach those of fluoridated water. Combined use of fluoride toothpaste and fluoridated water offers protection above either used alone.\textsuperscript{329,330,331}

Most persons report brushing their teeth at least once per day, but more frequent brushing with fluoride toothpaste can offer additional protection.\textsuperscript{332,333,334} Brushing twice a day is a reasonable social norm that is both effective and convenient for most persons’ daily routines, and this practice has become a basic recommendation for caries prevention.\textsuperscript{335}

Safety
Fluoride toothpaste contributes to the risk for enamel fluorosis because the swallowing reflex of children under age 6 years is not always well controlled, particularly among children less than 3 years of age.\textsuperscript{336,337} Children are also known to swallow toothpaste deliberately when they like its taste. As a result, multiple brushings with fluoride toothpaste each day can result in ingestion of excess fluoride.\textsuperscript{338} Use of a pea-sized amount (approximately 0.25 g) of fluoride toothpaste less than two times per day by children under age 6 years is reported to sharply reduce the importance of fluoride toothpaste as a risk factor for enamel fluorosis.\textsuperscript{339} Toothpaste labeling requirements mandated by FDA in 1996\textsuperscript{340} also direct parents of children under 2 years of age to seek advice from a dentist or physician before introducing their child to fluoride toothpaste.

Cost-effectiveness
Fluoride toothpaste is widely available, no more expensive than non-fluoride toothpaste, and periodically improved. Use of a pea-sized amount (0.25 g) twice per day requires approximately two tubes of toothpaste per year, for an estimated annual cost of $6–$12, depending on brand, tube size, and retail source. Persons who brush and use toothpaste
regularly to maintain periodontal health and prevent stained teeth and halitosis (i.e., bad breath) incur no additional cost for the caries-preventive benefit of fluoride in toothpaste. Because of its multiple benefits, most persons consider fluoride toothpaste a highly cost-effective caries-preventive modality.\footnote{341}

**Fluoride Prophylaxis Paste**

*Description*
Fluoride-containing paste is routinely used during dental prophylaxis (i.e., cleaning). The abrasive paste, which contains 4,000–20,000 parts per million (ppm) of fluoride, might restore the concentration of fluoride in the surface layer of enamel that is removed during a prophylaxis, but it is not an adequate substitute for fluoride gel or varnish in treating persons at high risk for dental caries.\footnote{342} Fluoride paste is not accepted by the FDA or ADA as an effective way to prevent dental caries.

**Fluoride Combinations**

*Description*
Studies comparing combinations of different forms of fluoride have generally reported that their effectiveness in preventing dental caries is partially additive. That is, the percent reduction in the prevalence or severity of dental caries from a combination of forms is higher than the percent reduction from each individual form, but less than the sum of the percent reduction of the different forms combined.\footnote{343}

*Cost-effectiveness*
Because the caries-preventive effects of a combination of different types of fluoride are only partially additive, estimates of the cost-effectiveness when adding one type must take into account these smaller, incremental reductions in caries. However, there is very little research on the cost-effectiveness of various fluoride combinations, thus limiting the ability to draw more detailed conclusions.\footnote{344}

**Pit and Fissure ("Dental") Sealants**
Dental sealants are plastic-like materials that help prevent decay-causing bacteria from attacking the chewing surfaces of teeth. The sealant forms a hard barrier that keeps food and bacteria from getting into the grooves in the teeth and causing decay.

It has been said that if sealants were applied routinely to susceptible tooth surfaces in conjunction with the appropriate use of fluoride, most tooth decay in children could be prevented.\footnote{345}

Sealants are primarily applied to the back teeth – the molars and premolars, the teeth that have pits and fissures on their biting surfaces. The sealant material forms a protective barrier by bonding to tooth surfaces and covering natural depressions and grooves (called pits and fissures) in the teeth. More than 75 % of dental decay begins in the pit and fissure areas of the back teeth. Though sealants are most often applied to children's teeth, many adults are now seeking the preventive benefits of pit and fissure sealants as well.
The application of sealants is a painless procedure. An acidic solution (etchant) is applied to the chewing surface of the tooth to condition the enamel and help it bond more effectively to the sealant material. The tooth is thoroughly washed and dried. Then the sealant material is applied and allowed to harden, sometimes using ultraviolet light. The procedure takes only a few minutes.

National surveys indicate that sealants are underutilized in the United States. The Third National Health and Nutrition Examination Survey, conducted from 1988-94, found that among U.S. children ages 5-17, only 18.5% had at least one sealant. The percentage of school-aged children with dental sealants has risen in recent years as the public and private sectors increasingly use the procedure. However, no increase has occurred among children in low-income populations -- a group that is at higher risk for caries. An objective of Healthy People 2010 is to increase the proportion of children who have received dental sealants on their molar teeth.

The major concern with sealants has been the inadvertent sealing of dental caries. This misapprehension has been put to rest by a number of studies showing that under intact sealants, dental caries becomes arrested.

A recent report by the Task Force on Community Preventive Services, convened by the Centers for Disease Control and Prevention (CDC), strongly recommended two community-based interventions to prevent tooth decay—community water fluoridation and school dental sealant programs. In examining the effectiveness of school-based or school-linked dental sealant programs, there was typically a 60% decrease in tooth decay on the chewing surfaces of posterior (back) teeth after sealant application. School-based and linked programs in the United States generally target vulnerable populations less likely to receive private dental care, such as children eligible for free and reduced cost school lunch programs.

**Cost-effectiveness**

On average, the cost of placing one dental sealant is less than half the cost of one amalgam (silver) filling. In 1999 the average cost for placing a dental sealant was $29.09, compared to the average cost of $65.09 for a one-surface filling. If cavities that are just beginning to form are sealed instead of restored, the total cost of treatment is lower.

**Barriers to implementing sealant programs**

Major barriers to the adoption or maintenance of school-based or school-linked sealant programs include (1) limited knowledge of oral health promotion among the general population and some health professionals; (2) limited resources and limited political and administrative support in some school districts; (3) state dental practice laws and regulations that limit the authority to apply sealants to selected categories of dental care professionals, require an examination by a dentist prior to applying a sealant, or require the presence of a dentist when or after the sealant is applied (thus increasing the costs of public sealant programs; and (4) resistance of the private practice dental community.
because of concerns about sealing over decay or about the technical ability of allied dental personnel.\textsuperscript{357}

\textit{Other Less Common Preventive Approaches}

\textbf{Chlorhexidine}

\textit{Description}

Chlorhexidine (CHX) has been used as an agent for the prevention and treatment of the two primary diseases of dentistry--periodontal disease and dental caries--since the mid-1970s. Most of the research on CHX has focused on its antimicrobial effects or its ability to reduce dental caries.

\textit{Antimicrobial effects}

For the majority of antimicrobial studies, CHX was found to be effective in controlling or reducing the microbial challenge associated with dental caries. In general, this was an assessment of the impact on \textit{Streptococcus mutans} (\textit{S. mutans}--the bacteria most often associated with causing caries); it is has been generally successful in reducing the \textit{S. mutans} population for a finite period of time.

\textit{Effects on Dental Caries}

In general CHX appears to be moderately effective in reducing the number of bacteria assumed to cause caries in specific populations when applied under the regimen tested. CHX is also useful in reducing the consequences of these infections in that it appears to generally reduce the incidence of dental caries in the tested populations under the conditions tested. In a majority of cases, the materials tested are not available in the United States and the extrapolation of the positive results cannot be made to the currently available rinses.

\textit{Cost-effectiveness}

The literature related to CHX is limited in regards to the economic effects of its application. The clinical trials on dental caries do not generally report the number needed to treat (NNT) or other data that would be useful to policy decision making for payers.

\textbf{Xylitol}

\textit{Description}

The infectious nature of dental caries and its transmission from mother to child have led to interest in interventions that can interrupt the disease process or prevent its initiation. Xylitol is a sugar substitute with a sweetness equal to that of table sugar.\textsuperscript{358} Xylitol is produced commercially from birch trees and other hardwoods containing xylan.

\textit{Safety}

Because xylitol is absorbed slowly by the human gastrointestinal tract, the main side effect is diarrhea; this usually only occurs when it is consumed in large quantities--four to five times that needed for the prevention of dental caries. It is safe for use in children.\textsuperscript{359}
**Effectiveness**

Xylitol is not readily metabolized by microorganisms. However, xylitol does accumulate intracellularly in *S. mutans*, which inhibits the bacteria's growth. This may contribute to a reduction in plaque and saliva levels of *S. mutans* in those consuming xylitol.\(^{360}\) A number of studies have shown that xylitol gum consumption among school children of varying ages reduces caries. Increasing use and higher doses lead to greater reductions.\(^{361}\) However, a major limitation in extending these results to the US is that chewing gum is not considered safe for very small children and is actively discouraged in schools. Xylitol-containing products have the potential to improve success greatly in controlling the problem of rampant decay in the primary teeth.

**Use of xylitol with children at high risk for caries**

Effective strategies to reduce caries risk by modifying the diet of children are not readily applicable to dental practice nor are they typically very effective without significant effort. As a result, the use of xylitol is particularly attractive because its action is not dependent on reducing the amount of other sugars in the diet. Thus, a clinician can recommend adding xylitol to the diet without asking a patient to alter their dietary patterns.

Unfortunately, there is no vehicle available in the U.S. for using xylitol in toddlers and preschool children too young to chew gum. In older children, 4-5 pellets or sticks (1 gram of xylitol per pellet or stick) of xylitol gum per day, chewed for 5 minutes, should markedly reduce dental caries activity.

**Use of xylitol with pregnant women and new mothers**

Previous research has demonstrated that a combination of good dental care, instruction to improve oral hygiene, and chlorhexidine gels and toothpastes lead to a reduction in maternal *S. mutans* levels and reduction in the extent of transmission to the child.\(^{362}\) Whether used alone or in combination with other antimicrobial therapies such as chlorhexidine, xylitol has an important role in the prevention of dental decay among children born to mothers with high levels of *S. mutans*, not only because of its effects on *S. mutans* levels and bacterial properties during the time period of consumption, but also because its beneficial effect on decay reduction in these children appears to persist far beyond the period of consumption.\(^{363}\) Both chlorhexidine and xylitol may be used safely during pregnancy and with nursing mothers.\(^{364,365}\)

The evidence is sufficiently compelling to include xylitol-containing products in the prevention of dental decay in high-risk populations.
Gingivitis develops in healthy adults after 10 to 21 days in the absence of personal plaque removal, providing strong evidence for recommending at least daily toothbrushing. Scientific studies have shown that more frequent toothbrushing is associated with lower levels of periodontal disease. Other studies have shown an association between good oral hygiene and low prevalence of periodontitis.

A clinical trial involving third grade schoolchildren found that toothbrushing alone was as effective as combined toothbrushing and flossing. Nevertheless, flossing is generally recommended to be part of an oral hygiene program for children because of the need to build the skill and establish flossing as a habit.

There is no scientific evidence to support the superiority of any particular technique or style of toothbrushing over another. However, some toothbrushing techniques can have damaging effects. For example, horizontal scrubbing can result in abrasion or systemic bacteremia (bacteria in the blood) and too frequent brushing can lead to gingival recession (movement of the edge of the gum toward the root surface of a tooth, away from the crown), resulting in exposure of the root. Until recently there was no consistent evidence to support the long-term superiority of electric toothbrushes over manual brushes. However, a recent study investigated a variety of different types of electric toothbrush and compared each type with manual brushing (i.e., using a conventional toothbrush). The investigators found that the only powered toothbrushes consistently found to be better than manual toothbrushes were those with a rotation oscillation action. For the other types of powered toothbrush, there was insufficient, good quality randomized evidence for reliable comparisons with manual toothbrushes. The reviewers concluded that powered toothbrushes with a rotation oscillation action achieve a modest reduction in plaque and gum disease compared to manual toothbrushing, but that the clinical importance of this is uncertain.

**Professional Care**

The most common form of professional preventive care for gingivitis and periodontitis is scaling and polishing of teeth in a dental office, usually referred to as a prophylaxis or “cleaning.” During scaling, specially designed sharp dental instruments are used to remove calculus and bacteria located either above the gum (supragingival) or inside the gingival crevice or pocket (subgingival). An abrasive is then applied to remove stains and plaque and to smooth the scaled areas. Another mechanical preventive procedure is root planing. Calculus is removed from the root surface using instruments called scalers. Root planing may be performed either with or without surgical exposure of the root. There is no scientific basis for routinely recalling individuals for professional periodontal preventive care at any set interval.

**Antimicrobial Agents**

An oral rinse with chlorhexidine (0.12 % or 0.2 %), an anti-bacterial agent, has been found to be effective in reducing supragingival plaque and gingivitis. Unsupervised use of chlorhexidine for 6 months was found to be more effective than sanguinarine (the active ingredient in Plax® and Listerine® rinses) in the reduction of plaque and gingival bleeding. Side effects that have sometimes been associated with
chlorhexidine use include increased calculus formation, (although chlorhexidine has been shown to be an effective agent in reducing high bacterial levels that contribute to periodontal disease) bad taste, and staining of teeth.\textsuperscript{379}

There are also short-term studies (6 to 9 months) which have documented the effectiveness of Listerine\textsuperscript{®} in the prevention of gingivitis when compared to a placebo.\textsuperscript{380,381} Two other 6-month studies found that Listerine\textsuperscript{®} was as effective as dental floss in preventing plaque accumulation and gingivitis.\textsuperscript{382,383} Side effects of Listerine\textsuperscript{®} are poor taste and a burning sensation in the mouth. There are no long-term studies documenting the effectiveness of unsupervised use of over-the-counter mouthrinses such as Plax\textsuperscript{®}, Scope\textsuperscript{®}, and Cepacol\textsuperscript{®} in preventing gingivitis. It should also be noted that a number of over-the-counter mouthrinses contain substantial concentrations of alcohol.

The use of antibiotics (tetracyclines) in the prevention of gingivitis and periodontitis in the population at large has not been tested because of possible side effects, and the potential development of resistant bacterial strains and patient hypersensitivity.

\textit{Anti-Calculus Toothpastes}

"Anti-tartar" toothpastes contain soluble pyrophosphates that prevent calcification of plaque. The percentage reduction in supragingival (but not subgingival) calculus is between 32 \textsuperscript{\%}\textsuperscript{384} and 45 \textsuperscript{\%}.\textsuperscript{385} Cases of cheilitis (inflammation of the skin on and around the lips) and mucosal erythema (redness and inflammation of the mucous membranes of the mouth) have been reported\textsuperscript{386} and the long-term value of these products in preventing gingivitis and periodontitis has not been established.

\textit{Smoking and Periodontal Disease}

A large proportion of adult periodontitis may be preventable through initial avoidance and cessation of cigarette smoking. A number of studies have shown an association between smoking and periodontal disease.\textsuperscript{387,388,389} One recent study\textsuperscript{390} found that current smokers are about four times more likely than people who have never smoked to have advanced periodontal disease. However, 11 years after quitting, former smokers' likelihood of having periodontal disease was not significantly different from those who had never smoked. This study showed that smoking is a major risk factor for periodontitis and may be responsible for more than half the periodontitis cases among adults in the United States. In addition, not only are smokers more likely to develop periodontal disease and have more severe cases of the disease than nonsmokers are, they are also more susceptible to treatment failure.\textsuperscript{391}

\textit{Pregnancy and Periodontal Disease}

Preterm infants born with low birth weights (LBW, < 2,500 grams) represent a major social and economic public health problem. Despite an overall decline in infant mortality in the United States over the past 40 years, preterm LBW (PLBW) remains a significant cause of perinatal mortality and morbidity. In the U.S., approximately one in 10 deliveries results in a PLBW infant, usually as a direct consequence of preterm labor
(PTL) or premature rupture of membranes (PROM), accounting for 5 million neonatal intensive care unit hospital days per year at an annual cost of more than $5 billion.

Several studies demonstrating an association between infection and PLBW led to the hypothesis that periodontal infections, which serve as reservoirs for bacteria, endotoxin, and inflammatory mediators, may pose a threat to the unborn child. This concept, further supported by evidence from animal studies, prompted the first clinical investigation of a potential association between periodontal disease and PLBW in humans.

The first, pioneering study was reported in 1996 by Offenbacher and colleagues. Their study examined 124 pregnant or postpartum mothers being seen for routine care at a prenatal care clinic. They found that mothers with periodontal disease had 7.9 times the risk of having a PLBW baby as mothers without periodontal disease, regardless of whether this was their first baby, and 7.5 times the risk for mothers having their first baby. In addition, the study found a strong association between periodontal disease and low birth weight, even after controlling for multiple contributing factors, including smoking and alcohol use. Although the study does not prove that periodontal disease causes PLBW, the authors concluded that the evidence supports the hypothesis that periodontal disease is more than an association, and is contributing to low birth weight. The authors estimated that 18.2% of all PLBW cases may be attributable to periodontal disease, and that if these infections could be eliminated, approximately 45,500 PLBW births a year could be avoided, with a concomitant decrease in intensive care unit costs of almost $1 billion.

A second study compared a test group of mothers delivering low birth weight (LBW) babies with a control group of mothers delivering normal weight babies in Thailand. This study differed from the one by Offenbacher et al. in that low birth weight, as opposed to preterm low birth weight, was studied. The author found that, overall, control-group infants were about 700 grams heavier than the test group infants. Mothers with better periodontal health had a lower risk of giving birth to a LBW infant, while mothers who did not receive prenatal care had a higher risk of giving birth to a LBW infant. The author concluded that poor periodontal health of the pregnant woman is a potential independent risk factor for LBW.

Both of the studies referred to above are known as case-control studies. In a case-control study, patients who have experienced preterm labor (cases) are recruited after the births and are matched with patients (controls) whose deliveries were normal but who otherwise have similar personal and medical profiles. Periodontal examinations usually are performed after the birth, allowing for a clear comparison of the influence of this factor on outcome.

The major drawback of case-control and other studies conducted at a single point in time is that they cannot show that the risk factor and the outcome occurred in a logical temporal order; for example, they cannot show that periodontal disease was present before the preterm birth. A prospective study, in which all evaluations are conducted before delivery, overcomes these limitations.
One such prospective study was recently conducted at the University of Alabama at Birmingham. So far, only a preliminary report of this study has been published. The authors found that patients with severe or generalized periodontal disease had 4.45 times the risk of having a preterm delivery (before 37 weeks gestational age) as those without periodontal disease. Further, the patients with periodontal disease had even higher risks of having preterm births before 35 weeks' gestational age (5.28 times the risk) and before 32 weeks’ gestational age (7.07 times the risk).

| A total of 18.2% of all preterm low birth weight (PLBW) cases may be attributable to periodontal disease, and that if these infections could be eliminated, approximately 45,500 PLBW births a year could be avoided, with a concomitant decrease in intensive care unit costs of almost $1 billion. |

The question of primary importance to the pregnant woman and her dentist is whether there is convincing evidence that treatment of periodontal disease will reduce the risk of preterm birth. The answer, on the basis of existing case-control studies and prospective and uncontrolled intervention studies, is no.

Only a controlled intervention study is capable of unequivocally establishing a causal link between a treatment and an outcome. For this reason, randomized, placebo-controlled, double-blind studies are essential to test the efficacy, if any, of periodontal treatment in reducing the incidence of preterm birth. Jeffcoat et al. recently reported the results of a randomized, placebo-controlled, single-blinded (double blind means that neither the patient nor the examiner knows who is receiving the intervention; this study was single-blind because the patient would obviously know if she were getting a periodontal treatment) intervention trial at a national dental public health conference. She reported that pregnant women who received a single prophylaxis at 22 weeks' gestational age had about a 40% lower incidence of preterm births, and that women who received scaling and root planing had roughly a 75% lower incidence of preterm births than women receiving no periodontal treatment. While Jeffcoat’s findings are encouraging, they must be interpreted with caution as they have not yet been published in a peer-reviewed journal.

Another recently published study also reported on a randomized controlled trial conducted in Santiago, Chile. In this study, 400 pregnant women with periodontal disease, aged 18 to 35, were enrolled in the study while receiving prenatal care. Women were randomly assigned to either an experimental group, which received periodontal treatment before 28 weeks of gestation, or to a control group that received periodontal treatment after delivery. The study found that the women who did not receive periodontal treatment before delivery were 5.49 times more likely to have a PLBW baby than those who did. Analysis of other risk factors showed that periodontal disease was the strongest factor related to PLBW. The authors concluded that periodontal disease appears to be an independent risk factor for PLBW, and that periodontal therapy significantly reduces the rates of PLBW in this population of women with periodontal disease.
Taken together, these studies provide increasingly suggestive evidence, but not yet conclusive proof, that treating periodontal disease during pregnancy can reduce the risk of delivering preterm or low birth weight infants.

**Stress and Periodontal Disease**

There is some evidence that stress is associated with periodontal disease. One study found that high levels of financial stress and poor coping abilities doubled the likelihood of developing periodontal disease. After accounting for other risk factors such as age, gender, smoking, poor dental care and diabetes, those who reported high levels of financial strain and poor coping behaviors had higher levels of attachment loss and alveolar (jaw) bone loss (signs of periodontal disease) than those with low levels of financial strain.

**Periodontal Disease and Other Systemic Health Conditions**

*Cardiovascular disease.*

In addition to preterm births, periodontal disease has been associated with a number of other systemic health conditions, including coronary heart disease, stroke, diabetes, and respiratory ailments. Some time ago, the Finnish government sponsored a comprehensive study of the health risks of the Finnish people published in the British Medical Journal that showed that there was an unexpected correlation between dental disease and systemic disease (stroke, heart disease, diabetes). After correcting for age, exercise, diet, smoking, weight, blood cholesterol level, alcohol use and health care, people who had periodontal disease were found to have a significantly higher incidence of heart disease, stroke and premature death.

More recently, these results were confirmed in studies in the United States, Canada, Great Britain, Sweden, and Germany. The effects are striking. For example Morrison found that people with periodontal disease had twice the risk of dying from cardiovascular disease. By comparison smokers only had a 60% increased risk. So far, most of the studies that have looked for a correlation between dental disease and cardiovascular disease have found that people with periodontal disease have a significantly higher risk of cardiovascular disease.

Not all of the studies investigating the relationship between cardiovascular disease and periodontal disease show an association. In a recent article, Hujoel reviewed the available research and concluded that most of the larger studies suggest that periodontal disease is either not at all or weakly associated with coronary heart disease, and that the associations found in most of the smaller studies (that found higher risk) are due to insufficient control for lifestyle differences. Thus, he concluded that the current evidence supporting a causal relationship between the two conditions is weak. At this point, the jury is still out. There have been no studies to determine whether treatment of periodontal disease results in a lowered incidence of cardiovascular disease.

*Diabetes.*
There is a well-established relationship between periodontal disease and diabetes. People with diabetes are more likely to have periodontal disease than people without diabetes, probably because diabetics are more susceptible to contracting infections. In fact, periodontal disease is often considered the sixth complication of diabetes. Those people who don't have their diabetes under control are especially at risk. Cutler and colleagues found that poorly controlled type 2 diabetic patients are more likely to develop periodontal disease than well-controlled diabetics are. Their study also explains why diabetics are more susceptible to severe periodontal disease. The study found that poorly controlled diabetics respond differently to bacterial plaque at the gum line than well-controlled diabetics and non-diabetics, possibly due to elevated serum triglycerides. Poorly controlled diabetics have more harmful proteins (cytokines) in their gingival tissue, causing destructive inflammation of the gums. In turn, beneficial proteins (growth factors) are reduced, interfering with the healing response to infection.

Research has emerged that suggests that the relationship between periodontal disease and diabetes goes both ways, i.e., not only are uncontrolled diabetics more likely to have periodontal disease, but also periodontal disease may make it more difficult for people who have diabetes to control their blood sugar. Severe periodontal disease can increase blood sugar, contributing to increased periods of time when the body functions with a high blood sugar. Thus, diabetics who have periodontal disease should be treated to eliminate the periodontal infection.

Respiratory Diseases
Some bacterial respiratory infections are thought to be acquired through the inhaling of fine droplets from the mouth and throat into the lungs. These droplets contain bacteria that can breed and multiply within the lungs to cause damage. Recent research suggests that bacteria found in the throat, as well as bacteria found in the mouth, can be drawn into the lower respiratory tract. This can cause infections or worsen existing lung conditions. People with respiratory diseases, such as chronic obstructive pulmonary disease (COPD), typically suffer from reduced protective systems, making it difficult to eliminate bacteria from the lungs.

Bacteria that grow in the oral cavity can be aspirated into the lungs to cause respiratory diseases such as pneumonia, especially in people with periodontal disease. Recent research suggests that periodontal disease may increase a person's risk for COPD. In one study, researchers analyzed the periodontal and respiratory health of 13,792 patients. Patients with periodontal disease were found to have nearly a one-and-a-half times greater risk of COPD. A distinct trend also was noted in that lung function seemed to diminish with increased periodontal attachment loss. This suggests that periodontal disease activity may promote the progression of COPD.

Prevention of Oral Cancer

Oral cancer is responsible for approximately 2% of all cancer deaths in the U.S. and was projected to account for more than 28,900 new cases and about 7,400 deaths in 2002.
Overall 5-year and 10-year survival rates are 54% and 39%, respectively.\textsuperscript{413} More than 90% of cases are squamous cell carcinomas, with the tongue and floor of mouth being the most common sites (75-85%). Despite low disease prevalence in developed countries, survival rates for patients with advanced stage lesions are generally 50% or less.\textsuperscript{414} A preclinical phase is detectable as a white or red lesion, and treatment at an early stage may improve survival rates to above 80%.\textsuperscript{415} Unfortunately, most patients (67-77%) do not seek consultation until advanced cancer is present with symptoms of persistent pain.\textsuperscript{416}

Even with recent advances in prosthetic replacements of oral-facial structures, surgery to remove and repair the effects of oral cancer can still be significantly debilitating and have long-lasting psychosocial effects.\textsuperscript{417}

**Risk Factors**

It has been estimated that approximately 75% of all oral malignancies in the United States are attributable to tobacco (cigarettes, smokeless tobacco, and cigars) or alcohol intake or both.\textsuperscript{418} Evidence from a number of studies indicates a causal relationship between these two risk factors and oral cancer.\textsuperscript{419,420,421,422,423,424,425} Studies in the United States and Canada have documented a fourfold or higher increase in deaths from oral cancer among smokers and alcohol abusers as compared to the general population.\textsuperscript{426,427,428} Both factors are associated with oral cancer in a dose-response fashion and have a synergistic effect (total effect is greater than the sum of the effects of the two factors) when combined.\textsuperscript{429} Although an interaction has been shown, the independent effects of tobacco and alcohol have been difficult to determine, and studies have found conflicting results. Further research is necessary to determine the exact relationship between oral cancer, alcohol use and tobacco use.

Other risk factors for oral cancer include previous upper digestive tract malignancy or oral malignancy,\textsuperscript{430,431} an age of 60 or older,\textsuperscript{432} human papillomavirus\textsuperscript{433} and exposure to ultraviolet light (lip cancer).\textsuperscript{434} There is no known association between oral cancer and denture wearing or denture biomaterials.\textsuperscript{435,436,437}

**Preventive Interventions**

*Counseling to modify risk factors*

Primary prevention of oral cancer may involve counseling on the cessation of tobacco use and/or counseling on the reduction of alcohol consumption. Evidence from randomized controlled trials documents the effectiveness of smoking cessation counseling by health care providers directed toward adults.\textsuperscript{438,439} Counseling by health care providers has been shown to increase smoking cessation rates over 6 to 12 months relative to interventions where there is no provider.\textsuperscript{440,441,442,443} Health care providers in these studies include physicians, dentists, nurses and dental hygienists. However, a lack of training or interest in smoking cessation exists among many health care professionals, especially dentists. Physicians are more likely than dentists to report that they routinely advise smoking patients to quit; 30% to 40% of dentists and 70% to 80% of physicians report doing smoking cessation counseling.\textsuperscript{444} Results from a population-based survey of dental patients also suggest that dentists under-utilize tobacco cessation advice.\textsuperscript{445}
In randomized controlled trials, counseling for the reduction of excessive alcohol consumption, defined as 15 or more drinks per week, has been found to significantly reduce alcohol consumption among problem drinkers and to reduce the frequency of binge drinking and excessive drinking.\textsuperscript{446,447,448,449}

A relatively new diagnostic procedure in dentistry is the use of the oral brush biopsy to assist in the detection of oral cancer. Much as a needle biopsy is used to evaluate a tiny breast lump, the brush biopsy is used in oral cancer detection to identify oral lesions that may need further evaluation. The oral brush biopsy is minimally invasive, requires no anesthesia, and definitively distinguishes benign from pre-cancerous and cancerous lesions. In one study of 945 patients, the oral brush biopsy independently detected every case of histologically confirmed oral dysplasia and carcinoma.\textsuperscript{450}

**Effectiveness of screening**

No randomized controlled studies have yet evaluated the effectiveness of screening for oral cancer.

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**Dental Sealants – Overview of Best Practices**

**Southwest Ohio Dental Sealant Program**

*What is it?* A sealant is a plastic coating that is applied to the chewing surfaces of molar teeth to fill in the deep grooves (sealants are not always limited to chewing surfaces or molars, although that is a focus of the school program). It acts as a barrier to protect the tooth enamel from the bacteria that cause tooth decay.

*Who should receive it?* Children at moderate-to-high risk of caries starting as early as the first permanent molar erupts, usually at age 6 or 7.

*How often should it be applied?* Sealants last for many years. Children should receive sealants as molar teeth erupt so they can be seated before they have a chance to decay.

*Who can apply it?* Dentists, Dental Hygienists, and Dental Assistants with advanced training (AQPs).

*Effectiveness.* Dental sealants are 100 % effective when completely retained. They should be checked periodically to insure that they are intact.

*Advantages*

- Most effective decay preventive measure for the biting surfaces of molar teeth
- Application procedure is non-invasive (involves no shots or drilling)
- Can be applied by dental auxiliaries
- Can be applied in schools and other community-based settings outside of traditional dental offices using portable dental equipment
- Can be applied in about 10-15 minutes
Disadvantages
• Must be applied in a completely dry environment
• Isolation techniques to keep the teeth dry are critical to the success of the procedure

Issues/controversies
• Some dentists and medical providers consider provision of any dental services by non-dental personnel “practicing dentistry without a license” and an intrusion on dentists’ “turf”

Examples of programs
• The American Association of Community Dental Programs published in July, 1995, “Seal America: The Prevention Intervention” in cooperation with a number of other dental organizations to assist those interested in starting school dental sealant programs. This manual was written based on experiences of the staff of the Southwestern Ohio School Dental Sealant Program, Nancy Carter, RDH, MPH, and Lawrence F. Hill, DDS, MPH.
• School-based sealant programs currently exist for eligible schools in Adams, Brown, Butler, Clermont, Hamilton, Highland, and Warren counties in Ohio
• A program is being planned to start in Northern Kentucky in the fall of 2003

What Works? Treatment
Oral Health Care Delivery Systems

The Science/Existing Systems
This section of the report examines various types of oral health care delivery systems and discusses which types may be appropriate for different settings and which have been used effectively in serving different population groups. An oral health care delivery system can be described as a rational mechanism for providing services that meet the oral health-related needs of individuals. Such a delivery system is often described as having three components—consumers, providers of service, and payors—and it is the relationships between those components that determine the ability of the delivery system to meet the needs of its users.

Private Dental Offices
No discussion of oral health care delivery systems can ignore the care that is provided in private dental offices. The vast majority of oral health care that is delivered in the US is provided by independent private dental offices. Of the 149,350 professionally active dentists in the US in 1998, 92.7% were in private practice. Further, unlike medicine, where only 40% of physicians were in primary care practices in 1990, approximately 81% of dentists are general practitioners. Also, the vast majority of dental care is still delivered by single dentists practicing in ambulatory settings. For example, in the most recent survey of dental practice by the American Dental Association, it was found that about 60% of the nation's private practitioners were working in a practice with no other dentists in 1998.
Among the health professions, only dentistry is projected to experience a decline in the ratio of professionals to population over the next two decades if current trends continue.\textsuperscript{452} The more daunting problem facing the profession is how it will serve the oral health care needs of the nation as its numbers decline and its practice modalities remain constant.\textsuperscript{452}

Because such a high proportion of the dental care that is provided in the US is provided in private dental offices, attempts to address barriers to access to dental care are unlikely to have much impact unless they involve and engage the dental profession. This is unlikely to happen unless and until publicly financed dental care programs such as Medicaid reimburse dentists at market-based rates.

To provide some perspective on the magnitude of this issue, it was recently noted that there are approximately 35 million people eligible for Medicaid, and that for all of them to receive regular dental care would mean that, on average, every dentist in the country would have to treat approximately 250 of them each year.\textsuperscript{453} The average general practitioner provided 2,638 visits in 1997, excluding dental hygienist visits, and the average annual number of visits per patient was 3.5.\textsuperscript{454} Thus, the average general practitioner sees approximately 754 individual patients each year. Clearly, it is unrealistic to think that one-third of those patients will be Medicaid enrollees, or to expect that adequate access to private dentistry will ever be available to this population without adequate, market-level reimbursement. Of course, even under the best of circumstances, not all Medicaid enrollees would see a dentist each year, but even if only half of them were able to, it is almost as unlikely to imagine that Medicaid patients would comprise one-sixth of every dental practice. Also, the additional 3.8 million low-income children covered by the State Children's Health Insurance Program (SCHIP) during the second quarter of 2002\textsuperscript{455} are not even counted in this equation.

**Clinics or Dental Centers**
Even when low-income families have some type of health insurance, many still find it difficult to obtain quality health care. In rural communities, geographic isolation restricts access to health care. For many immigrants, cultural and language differences pose problems for patients and caregivers. Health care providers’ hours of operation sometimes force low-wage workers to choose between seeking health care and losing wages. For others, providers are not located near their homes or their workplaces, raising yet another barrier to health care.

Many communities have attempted to address these and other access to dental care barriers through the use of community clinics. Clinics come in a variety of different models. Some are free-standing, some are combined medical/dental facilities that offer “one-stop” health care, some offer care only to certain populations (e.g., elderly, children, migrant/seasonal farm workers, homeless, persons with HIV), and some are limited to a specific specialty. Clinics also vary widely in how they are funded. Some are funded by the federal government, some by state and/or local governments, some by private
foundations, some by donations and fees charged to patients, and some are primarily voluntary efforts. Many rely on a combination of these and other funding sources.

A variety of federal agencies and programs have long supported a broad range of programs aimed at alleviating access problems. One method used by the federal government is to pay for clinics and other providers to care for people who cannot afford to pay. In 1996, more than $758 million was spent to fund programs that provide grants to help underwrite the cost of health care at community health centers and other federally qualified health centers. In Fiscal Year 2002, the federal appropriation for the Community Health Center (CHC) program alone was $1.3 billion.

The mission of CHCs is to provide family-oriented primary and preventive health care services for people living in rural and urban medically underserved communities. CHCs exist in areas where economic, geographic, or cultural barriers limit access to primary health care for a substantial portion of the population, and they tailor services to the needs of the community.

In 2000, a total of 9.6 million people, 3.9 million of whom were uninsured, used CHCs (for a variety of health services – not only for dental services). CHCs employed 977 dentists, who collectively provided more than 2.6 million encounters, and 283 dental hygienists, who provided an additional 402,000 encounters. According to the National Association of Community Health Centers, more than 1,000 CHCs nationwide serve over 10 million people each year, including one of every six low-income children and one of every 10 uninsured persons. However, the 3,000 federally funded clinics (includes community and migrant health centers, some of which have multiple clinic sites associated with them) can meet only 6% of the need for dental care. Many clinics have trouble attracting dentists to work in their facilities; others consider dental services expendable in the face of what they believe are more pressing medical concerns.

Despite the availability and expenditures of these types of programs, the US General Accounting Office (GAO) found that they historically have not been held accountable for showing that access has improved. For example, a review of clinics funded by the Rural Health Clinic program found that 1) the availability of care did not change appreciably for at least 90% of Medicare and Medicaid beneficiaries using the clinics; 2) the federal subsidies had not been used to expand access to underserved portions of the populations; and 3) the clinics did not need the federal subsidies to remain financially viable. Nevertheless, the contribution of community and migrant health centers to increasing access to dental services for the poor is often overlooked. While only 60% of these centers provided dental services in 1996, they served more than 1 million people. They represent an established and successful model for serving hard-to-reach populations that often will not seek care from private dental providers in a community, even if they are available. It should also be noted that, beginning in Federal Fiscal Year 2002, all new federally funded health centers and all health centers without a dental component requesting funding for the addition of new service delivery sites were required to assure that their enrollees have ready access to oral health services.
The federal government's main program for placing health care providers in locations with identified shortages of health professionals is the National Health Service Corps (NHSC). The GAO found that the NHSC does not distribute provider resources as effectively as it could to alleviate health care needs in the greatest number of eligible shortage areas.\(^{464,465}\) In some cases, the NHSC was found to have placed more providers than needed to remove the shortage area designation. This limited the NHSC's ability to address needs in other shortage areas. It was found that in some shortage areas, NHSC providers are requested but not received, and other areas that want NHSC providers face barriers to requesting them. For example, 65\% of the 1,207 shortage areas requesting an NHSC provider in vacancy year 1993 did not receive one, and 143 of these areas had requested but not received an NHSC provider for 3 or more years. The GAO estimated that 22\% of all shortage areas requesting, but not receiving, NHSC providers have obtained shortage area designation at least in part to be eligible for NHSC providers, but lack adequate resources, information on the NHSC, or infrastructure within the community to apply for providers. They concluded that additional efforts may be necessary to address the barriers to accessing NHSC programs faced by many shortage areas with no pre-existing health care infrastructure.\(^{466}\) Recently enacted federal legislation (Health Care Safety Net Amendments of 2002) should help address these barriers, as it is now a requirement that all federally funded health centers be automatically designated as having a shortage of health professionals.\(^{467}\)

**School-based Health Centers**

Another method that has been proposed to help increase access to dental care, at least for school-aged children, is through dental care programs in school-based or school-linked health centers (SBHCs/SLHCs). "School-based" indicates that the services are actually provided in a school facility, whereas "school-linked" refers to services that are linked to schools but provided in off-site facilities, e.g., community clinics. SBHCs/SLHCs improve children's access to health care by removing financial and other barriers in the existing health care delivery system. These centers, which take advantage of the fact that children in or linked to school settings represent a "captive audience," are a unique delivery system option that gives children, especially those who are poor or uninsured, easy access to services. Providing services in such settings is a particularly effective way to reach adolescents and also yields benefits for younger children.\(^{468}\)

A GAO study of how SBHCs expand access to health care found that some SBHCs offer or arrange for students to receive dental care, and implied that, since 50\% of children aged 5 to 17 do not have private dental insurance, and for those with insurance, co-payments and deductibles may be as high as 50\% of the cost of services,\(^{469}\) SBHCs represent a way of increasing access to dental care for children who lack health insurance and whose parents have difficulty paying for needed health services.

While SBHCs could do much to improve children's access to health care, and to dental care specifically, they cannot provide all needed services to all children. They are not always open during the summer or other times when school is not in session. Although more than half of the SBHCs surveyed in 1998-99 provided preventive oral health services in the form of dental screening, a much smaller proportion of programs made
available comprehensive dental care and sealants, and these centers listed dental care professionals the least frequently of all staff members.\textsuperscript{470}

SBHCs generally do not serve children who are not in school, such as those younger than age 5 or adolescents who have dropped out of school. Sometimes, too, students may not be aware of the services offered by their health centers, or there may be organizational aspects of the center that limit optimal utilization.

Recently, The Robert Wood Johnson Foundation launched an initiative called \textit{Caring for Kids: Expanding Dental and Mental Health Services through School-Based Health Centers} to support the development of sustainable models of dental and mental health services organized by school-based health centers. This project is intended to stimulate projects that increase available dental and mental health care organized by well-established school-based health centers using one of three models: 1) sealant programs; 2) comprehensive school-based dental programs (as described above); and 3) school-community partnerships for dental disease prevention and treatment management. This model envisions school-based health centers’ partnering with community providers to offer both preventive and restorative care.\textsuperscript{471}

\textbf{Mobile Facilities and Portable Dental Equipment}

As an alternative to fixed dental clinics, mobile facilities and portable dental equipment are sometimes used to provide dental care. Decisions about which type of facility is preferable depend on a variety of factors, including target population and level of service. For example, in order to provide basic dental services to children located in schools that are geographically isolated, a mobile van or trailer might be the preferred choice. (A mobile van refers to a self-contained motorized van, while a trailer is non-motorized and must be towed from location to location.) If the desire is to provide a wide range of dental services to the general population of a community, the most likely choice would be a fixed facility.

The following table, adapted from a project of the Association of State and Territorial Dental Directors (ASTDD), compares the four dental delivery modes.\textsuperscript{472} The four types are not mutually exclusive, however. As an example, some fixed clinics use portable equipment to provide services in schools and a mobile van to travel to isolated communities.

<table>
<thead>
<tr>
<th>Mode of Dental Care Delivery</th>
<th>Pros</th>
<th>Cons</th>
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</thead>
<tbody>
<tr>
<td>Fixed Clinic Facility</td>
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<td>Indications:</td>
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<tr>
<td>• community-based clinic</td>
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<td>• if space is available and adequate for a clinic:</td>
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<tr>
<td>➢ greater potential to optimize facility design and staffing (efficient and productive)</td>
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<tr>
<td>➢ on-site lab and x-ray</td>
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<td>➢ can be co-located with other healthcare clinics</td>
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<td></td>
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<td>services limited to single geographic area</td>
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<td>occupancy costs</td>
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<td>patient transportation issues</td>
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<td>need for low-income clients to leave work, which may be difficult</td>
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<td></td>
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<td>if available space is inadequate, it may force inefficient clinic design to fit space</td>
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<tr>
<td>Mode of Dental Care Delivery</td>
<td>Pros</td>
<td>Cons</td>
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</tr>
</tbody>
</table>
|                              | • potential for sharing resources (e.g., waiting room, business office staff) | • initial costs/operating costs may be higher  
• storage capacity for supplies and patient records  
• continuity of care  

Mobile: Self-Contained Motorized Van  
Indications:  
• schools  
• rural areas  
• assisted living facilities  
• skilled nursing facilities  
• group homes  
• housing projects  
• other congregate settings (e.g., Head Start, day care)  
• migrant farmworker families  

• serve multiple populations in broad geographic areas (go where services are needed), many of which would not be able to support a fixed clinic  
• few limitations on locations  
• high visibility of program  
  > potential funders: side of van becomes a “moving billboard” advertisement for funder  
  > potential users: name recognition  
• the extent of limitations may depend on size (typical size = 25’-40’ in length)  
• on-site lab and x-ray possible  

• less expensive than motorized van  
• design more flexible than self-contained van (no cab to deal with)  
• less maintenance than self-contained van (no drive train)  
• other advantages are same as  

Mobile: Trailer (Non-motorized)  
Indications:  
• areas that are secure and  

• need to contract with hauler or tow behind truck  
• size would limit where it can be parked and maneuvered  
• unable to move at short notice  
• many of the same disadvantages
### Mode of Dental Care Delivery

<table>
<thead>
<tr>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
</table>
| allow trailer to park for a period of time, such as schools or community centers | motorized van | as mobile van

### Portable Equipment

**Indications:**
- homebound
- schools
- rural
- assisted living facilities
- skilled nursing facilities
- group homes
- housing projects
- other congregate settings (Head Start, day care, etc)
- migrant farmworker families
- hospitals

**Pros:**
- initial costs lower
- can serve multiple communities
- adaptable to community changes (can leave a community if a access to care solution is found)
- can “go where the people are located”
- can expand options of a fixed facility or mobile clinic
- least expensive capital investment
- greatest versatility (reduces physical barriers)
- relatively light
- many options for combinations of equipment
- maintenance sometimes easier
- transportability

**Cons:**
- time and effort in packing and unpacking supplies and equipment each time
- increased coordination required
- may not be seen as “community-based”
- environmental issues (light, temp, humidity)
- reduced efficiency (e.g., lower capacity of vacuum and air compressor)
- generator noise
- requires space in facility
- access to proper utilities
- waste disposal (particularly hazardous materials)
- range of services restricted
- discomfort—patient and practitioner ergonomics
- staff recruitment and retention
- equipment durability
- unlikely to have on-site lab services and equipment
- x-ray processing is limited
- storage needed for records, supplies
- additional staff responsibilities (e.g., moving equipment)

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**Delivery of Dental Care in Non-traditional Settings**

Sometimes it makes sense to look outside of the traditional private dental office or community dental clinic setting in order to bring dental services to individuals or groups in need of dental services. Program sites can take advantage of the presence of groups of individuals to whom services are targeted.

In other situations, the intended target population may be unable to access services in a traditional dental office setting. For example, mobility may be an issue for residents of nursing facilities, or for homebound individuals. Or, for incarcerated individuals, it may be prohibitively expensive to arrange not only for transportation, but also for appropriate
security personnel to accompany them, so it may simply be more efficient to provide the services in the holding facility.

Apple Tree Dental
One example of a hybrid of delivery systems that has been used to deliver dental care to underserved populations as diverse as residents of nursing homes and preschool children in Head Start centers is one developed by Apple Tree Dental, a private nonprofit organization based in Minneapolis, Minnesota. Apple Tree is set up as a charitable nonprofit organization so that it can seek funding outside of Minnesota's publicly funded dental care programs from foundations, corporations and individuals that support its mission of dental access.

Apple Tree Dental – Overview of Best Practices

What is it? Apple Tree's primary mission is to provide dental care for people with special access needs. Dental services provided by Apple Tree are similar to those a person would receive in a traditional dental office, whether those services are provided at one of Apple Tree's special needs clinics or at a satellite clinic set up within a nursing home. Apple Tree brings a complete dental office to the patient, and provides a full range of dental services including cleanings, check-ups, x-rays, fillings, oral surgery, and denture services.

Who receives the services? Persons living in nursing homes.

How does the program work? Apple Tree contracts with nursing homes in a given geographic area. Every patient gets an assessment and oral plan within a short period of time after arrival. A dental hygienist carries a case load of homes s/he visits regularly to handle this task. Each nursing home appoints a staff member to be the “dental liaison,” who is responsible for making sure all residents get the daily care needed, oral plans are followed, and treatment scheduled. Scheduling is handled through an administrative office. A truck is loaded with two operatories of equipment mounted on casters. The truck delivers the equipment at night, wheels it in and out, so it is set up for morning appointments. A dentist and two assistants arrive in the morning to do the work and may spend a few days in each facility. Instruments are transported back in tubs and refilled each evening. One team uses portable equipment and can handle removable prosthetics and urgent care. The equipment is loaded in the trunk of a car and transported by a dental assistant.

What level of care is provided? Apple Tree reports that it provides full comprehensive care to its patients, 75 % of whom are on Medicaid.

How is it funded? Apple Tree is a not-for-profit organization. It raises funds from private sources and foundations, and has revenues from Medicaid and contracts.

Advantages
• Cost advantages and economies of scale
• Assures the facility of comprehensive care, not just exams without follow-up
• Makes optimum use of dental professionals’ time
• Doesn’t require patients to travel or be transported
• Allows dental professionals who specialize in care of the nursing home resident to provide care

Disadvantages
• May be too expensive to provide this care with low Medicaid reimbursement
• Could not be accomplished without adult Medicaid dental coverage
• Requires having specially designed equipment and maintaining vehicles

Issues/controversies
• May be an intrusion on some dentists’ “turf”
• Dependent upon fund raising and state funds

Hospitals
While hospitals are not generally thought of as likely sites for the provision of dental services, there are times when they make sense as service delivery sites. Hospital Dentistry is that segment of the oral health care delivery system located within a hospital or in close association with a hospital. The hospital dental practice represents a special setting that is integrated within regular health care, rather than existing as an area of specialty practice recognized by the medical or dental profession.

The hospital dentist focuses on serving those who cannot receive dental care through traditional delivery systems. Patients who are medically and/or mentally compromised (e.g., those with cancer, heart disease, HIV/AIDS, Alzheimer's Disease), suffer from a debilitating anxiety toward dental treatment, or have schedules which preclude numerous extended appointments may seek care in a hospital setting. In addition, the hospital dental services may provide care for victims of emergency and trauma to the head and neck regions, offer consultation services for other hospital services, and furnish dental care to patients residing in the facility.

Most hospital clinical facilities contain general treatment operatories and at least one surgical suite where oral and periodontal surgical procedures can be performed. Operating room and out-patient facilities are used as needed. The hospital dentist may render treatment in the emergency department, ambulatory care areas, or in-patient rooms. The dentist may admit or co-admit patients with other services to complete in-patient procedures.

Hospital dental services are typically staffed with dentists who have received training in hospital dentistry either through dental specialty programs or hospital-based General Practice Residency programs. Oral and maxillofacial surgeons, pediatric dentists, prosthodontists (especially maxillofacial prosthodontists- the branch of dentistry that deals with the replacement of missing teeth and related mouth or jaw structures by bridges, dentures, or other artificial devices), and oral pathologists are the specialists most frequently found in the hospital setting.
As noted above, hospitals sometimes function as ambulatory dental care facilities. From 1979 to 1983, the Robert Wood Johnson Foundation (RWJF) funded the Hospital-Sponsored Ambulatory Dental Services Program (HSADSP), a $10 million, 4-year program involving 25 hospitals, intended to foster expansion of outpatient dental departments. The primary objective of this program, and a condition of funding, was to improve access of underserved groups, including the poor, those with handicapping conditions, or the severely medically compromised (who were thought to be more conveniently served in hospitals) to general dental care.

An evaluation of the HSADSP found while the volume of new patients increased, the number of disadvantaged persons did not, and continuity of care may have worsened. The policy implications are that hospital dental departments should improve their efficiency and narrow their goals to the special populations best treated in their environment. While innovative financial mechanisms should be explored, the goals cannot be reached without expanded and continuing governmental subsidy.

**Dental professional training institutions**

Dental schools often represent a valuable resource for care, especially specialty care, for underserved populations. However, although Ohio and Kentucky each have two dental schools, and Indiana has one, none of these schools are located in close enough proximity to the RAPP region to be of practical value to its communities.

In the absence of dental schools, dental hygiene schools may sometimes be a source of care, at least preventive care, to the communities in which they are located. In addition, some hygiene schools have extramural programs in which their students get involved in community-based prevention or education programs, e.g., providing oral health education to school children. In the RAPP region, there is only one such school—Raymond Walters College at the University of Cincinnati. It does not have community prevention as a major component although it provides lower cost cleaning services.

**Advanced education programs**

*Advanced Education in General Dentistry Programs*

Most predoctoral dental programs do not offer patient care experiences that reflect the realities of practicing dentistry. Advanced Education in General Dentistry (AEGD) programs are purposely structured to prepare the practitioner to meet these patient care challenges. The AEGD program provides advanced training in clinical dentistry and applied basic sciences. It is a planned, sequential post-doctoral training program specifically designed to meet the needs of recent dental graduates wanting to enhance their skills as general practitioners. The program is an advanced supplement to the predoctoral dental curriculum, not a continuation of that training. The majority of AEGD programs are one year. Several programs offer two-year positions with a primary objective of training academicians.
Generally, AEGD programs are located in dental schools, and do not have affiliations with hospitals, although they may be associated with a General Practice Residency (GPR) program that has such an affiliation. The major distinction between the AEGD and GPR programs is the emphasis that the AEGD program places on clinical dentistry, in contrast to the emphasis on medical management in the GPR program.

The demand for AEGD programs has remained steady. Some predict that an additional year of training in a residency program following the predoctoral program will be a requirement for dental licensure in most states. Over the past 20 years, first year enrollment in GPR programs has remained relatively stable, while enrollment in AEGD programs has gradually increased.

**General Practice Residency Programs**

The General Practice Residency (GPR) program in dentistry is designed for advanced clinical and didactic training in general dentistry with intensive hospital experience at the postdoctoral level. GPR programs provide instruction and experience in the delivery of care to a wide range of ambulatory and hospitalized patients. This training and exposure allows dentists to obtain privileges at local hospitals once in private practice. All GPR programs are sponsored by either a hospital or a hospital affiliated institution such as a dental school or Veterans Administration facility. Like the AEGD programs, the demand for GPRs has increased. GPR programs can be one or two years in length, the majority being one year.

Students and recent graduates continue to express a need for additional clinical experience in the specialty areas and in total patient care as a prelude to general practice. The demand for GPRs may be positively influenced by other factors such as the economy, which may affect a recent graduate's decision to enter directly into private practice. The limited alternatives available to dental graduates during the transition into general practice may also be an influencing factor. Therefore, the increased demand for GPR programs is expected to continue.

A recent assessment of AEGD and GPR programs was conducted, evaluating infrastructure support, populations served, services provided, and trainee stipends. A comparison of AEGD and GPR programs showed that residents in GPRs treated significantly more children, medically intensive, economically/socially disadvantaged, and in-patient/same-day surgery patients. Residents in AEGD programs treated significantly more healthy adults. GPRs treated more lower fee (no pay, Medicaid, welfare/general relief, Medicare, and capitation/HMO) patients, and AEGD residents treated more insurance/private pay patients. No differences existed in comprehensive care and emergency visits between AEGD and GPR residents. GPR residents treated more hospital-based patients.

**Other residency programs**

Many dental graduates elect to continue their education and obtain additional training in one of the nine dental specialties recognized by the American Dental Association. Postdoctoral training is available in Endodontics, Oral and Maxillofacial Radiology, Oral and
Maxillofacial Surgery, Oral Pathology, Orthodontics, Pediatric Dentistry, Periodontics, Prosthodontics, and Public Health. These specialties are recognized by the American Dental Association's Council on Dental Education and regulated by the governing bodies of the individual specialty board associations.

Dentists choose to specialize for a variety of reasons. Many feel the practice of general dentistry is too diverse to develop expertise in all areas, and would rather focus in a specific area. Others prefer to provide care for certain patient populations, such as children and adolescents seen in the pediatric dental practice. Other motivations may include a desire to perform only certain types of procedures (e.g., orthognathic surgery and other surgical procedures in Oral Surgery), or to work in other practice settings (e.g., a histology laboratory with Oral Pathology training).

Although AEGD, GPR, and dental specialty residency programs offer the opportunity for specialized and tertiary-level dental care to communities that have such programs in place. However, there are relatively few such programs, they tend to be located in large urban areas, there is often a long waiting list for their services, they may restrict the level of care they will provide for teaching purposes (i.e., they may only accept patients who they feel represent good "teaching material" for their residents) and they are therefore not always readily accessible to those who may need them the most.

**Use of Expanded Function Dental Auxiliaries and Non-Dental Personnel**

The nation’s ability to provide care that is accessible and acceptable to address the oral health needs of the public is challenged on a number of fronts. Among these are a declining dentist-to-population ratio, an inequitable distribution of oral health care providers, a low number of underrepresented minorities applying to dental schools, the effects of the cost of dental education and graduation debt on decisions to pursue a career in dentistry, the type and location of practice after graduation, current and expected shortages in personnel for dental school faculties and oral health research, and a curriculum with an ever-expanding knowledge base. It is also well known that oral health problems—in particular access problems—disproportionately affect disadvantaged populations, including low-income, minority, homeless, elderly, HIV-infected persons, and disabled individuals.

In the face of these access challenges, many have suggested the need for 1) more dental auxiliary personnel with the ability and authority to provide a broader range of preventive and restorative dental services than is currently allowed in many states, and 2) the use of non-dental health personnel, e.g., physicians, physicians’ assistants, and nurses, to complement the dental workforce by providing oral health counseling, preventive dental services, and referral to dentists. Although efforts to establish such practices have often been opposed by the dental profession, many states have enacted laws or regulations to expand the scope of practice of dental auxiliaries, and/or reduce the level of supervision required for them to practice. Additionally, several states have established mechanisms for non-dental health professionals to provide counseling and preventive dental procedures (fluoride varnish) and to obtain Medicaid reimbursement for these procedures.
Expanded Function Dental Auxiliaries

Many states allow expanded function dental hygienists to provide a broader range of dental procedures than a dental hygienist with no additional training or experience. These are primarily preventive procedures, although a few states allow hygienists to provide some restorative procedures. Thirteen states require direct (the dentist must be physically present in the treatment room while patient care is provided) or indirect (the dentist must be physically present in the office but need not be in the treatment room) supervision of dental hygienists working in dental offices. Thirty-six states plus the District of Columbia permit general supervision of dental hygienists in dental offices, i.e., the dentist need not be present in the office when patient care is provided. However, a number of these jurisdictions require, as a condition of general supervision, that the supervising dentist examine the patient first, develop a treatment plan, issue a written work order and/or evaluate the hygienist's work within a fixed period of time.

Six states have legal provisions allowing dental hygienists to perform services without dental supervision. Except for Colorado, there are strict limits in either the setting in which the services may be performed or in the types of training and credentialing required of dental hygienists by their boards of dentistry. Colorado is the only state that does not restrict either hygienists practicing without supervision or the settings in which they are permitted to practice.

Many states also allow expanded function dental assistants to perform a variety of functions, but the practice boundaries, type of regulation, supervision levels, and educational requirements related to dental assisting vary widely. Some states license dental assistants while others do not address them specifically, i.e., they have no explicit regulatory authority over dental assisting; rather the boundaries that would relate to dental assisting reside within the practice laws and regulations for dentists and describe the types and nature of activities that dentists are allowed to delegate or supervise. Alternatively, many states clearly address dental assisting but regulate it in a variety of ways—some establish very prescriptive scopes of practice that may be closed or termed “permissive” (allowed to perform only those tasks delineated or permitted) while others afford very open or “non-permissive” (may conduct reasonable tasks of the occupation as long as the duty is not prohibited) structures.

Overall, then, the regulation of dental auxiliaries among states runs from highly prescriptive to establishing only the minimum standards for the occupations. And while some states maintain that proof of public harm is a prerequisite to regulation, there is no evidence that lack of regulation or less restrictive regulation of dental auxiliaries has ever resulted in public harm. Under the current legal and regulatory structure in many states, however, it is clear that dental auxiliaries cannot fully utilize the knowledge, skills and abilities that they have been trained, educated, and are competent to provide. Thus, the skills and capabilities developed by these individuals are not fully leveraged to best meet the demand for dental care. The full utilization of auxiliaries is realized when all possible duties are delegated to them, consistent with the protection of public health and safety, so that services are accessible to as many persons as possible.
An optimal regulatory structure would protect and promote public safety and well-being while facilitating a licensed dentist’s discretion to deploy operational, technological, and therapeutic advancements, and leverage the competencies, education, and skills of the dental auxiliary team. To do this, some have suggested that the most effective strategy is to delineate occupational definitions and practice parameters in terms of position, responsibilities, and services in statute, rather than finite tasks and duties in regulation, thereby accommodating flexibility in techniques and tools, as well as allowing appropriate discretion to delegate duties. To appropriately protect the public and delineate practice parameters and boundaries, statutes for each auxiliary category would specifically include prohibited functions and activities. The breadth of scope and level of flexibility afforded in the occupational definitions should be commensurate with the level of education and training; thus the fewer minimum qualifications required for delivering services in the category, the more prescriptive and limited the scope of practice should be.

**Use of Non-Dental Personnel**

Studies showing relatively high caries rates and low use of dental services among preschool age children—especially among low-income children—indicate that even when there are policies in place that mandate dental care when necessary, funding and/or the availability of sufficient providers still sometimes results in children not being served. Further, part of the explanation for the low use of dental services among preschool children is related to the inability or unwillingness of general dentists to see children in this age group. The declining numbers of both general and pediatric dentists compounds the problem.

As a result of this situation, there is increasing interest in training non-dental providers to provide exams, preventive care, and parental counseling/anticipatory guidance for young children. Also, because young children are far more likely to see a medical provider than a dentist, several states have begun to encourage non-dental health professionals, e.g., physicians, physician assistants, and nurses, to look for dental problems, provide patient counseling and referral, and to apply fluoride varnish. At the other end of the age spectrum, there has long been interest in training medical professionals who serve the elderly in early detection and appropriate referral of dental problems.

One factor that limits the participation of non-dental providers is that in most states, there is no mechanism for reimbursing such providers for the provision of these services. However, in at least four states (Washington, North Carolina, Iowa, Nevada), the Medicaid program now reimburses physicians (and in some cases, nurses) for varnish applications.

**Use of Expanded Function Dental Auxiliaries and Non-Dental Personnel**

-- Overview of Best Practices

*What is it?* A means of increasing access to certain (primarily diagnostic and preventive) dental services and increasing the productivity of dentists through the use of 1) dental
auxiliaries (dental hygienists and dental assistants) with advanced training and 2) medical providers (e.g., physicians, physicians’ assistants, nurses).

What services can be provided? Depends on the state. Ideally, an optimal regulatory structure would protect and promote public safety and well-being while facilitating a licensed dentist’s discretion to deploy operational, technological, and therapeutic advancements, and leverage the competencies, education, and skills of the dental auxiliary team.

Who can provide services? Generally, expanded function dental hygienists provide primarily preventive services, while expanded function dental assistants provide primarily restorative-related procedures, but there is some overlap. In some states (including OH and KY), non-dental (i.e., medical) providers (physicians, physicians’ assistants, nurses) can provide some preventive procedures.

Effectiveness. Several studies have shown that use of expanded function dental auxiliaries can increase dental productivity, thus allowing dentists to see more patients. No studies have examined the effects on underserved populations’ access to dental care, and none have examined the effect of non-dental personnel on access to dental care.

Advantages
• Maximizes the competencies, education, and skills of dental auxiliaries
• Maximizes productivity of dentists
• Potential for non-dental professionals to reach children at an earlier age, before many usually see a dentist, maximizing effectiveness of preventive interventions
• Contributes to integration of oral health with general health

Disadvantages
• Opposed by some in the dental community
• Few states have mechanism for paying non-dental professionals for dental services
• Lack of interest, concern about intruding on dentists’ “turf” by many medical providers

Issues/controversies
• Some dentists consider expanded function dental auxiliaries a threat to the public’s health.
• Some dentists and medical providers consider provision of any dental services by non-dental personnel “practicing dentistry without a license” and an intrusion on dentists’ “turf.”

Examples of programs
• Access to Baby and Child Dentistry (ABCD) program in WA (www.abcd-dental.org/)
What Works?

Education

The Science

Introduction
This section explores the concepts of health education and health promotion in relation to the prevention of oral diseases and conditions. The literature is mixed about the direct and long-term effects of group health education programs in reducing oral diseases, nonetheless, it is an essential component in providing health professionals and lay audiences with information about oral diseases so that they can effectively prevent or at least reduce devastating damage from the disease process. There also is an ethical responsibility for health professionals to provide such information to the general public.

Definitions of Health Education and Health Promotion

Health education and health promotion have many definitions. For example, it may include “…any planned combination of learning experiences designed to predispose, enable, and reinforce voluntary behavior conducive to health in individuals, groups, or communities.” It aims to provide information and thus ensure knowledge and understanding about health issues. In turn, it should enable individuals to make informed decisions. Health education provides individuals and groups with basic understanding about diseases so that people have knowledge about their inherent risks of getting the disease. It also provides information about mechanisms and techniques to defend against the disease process so that individuals know what to do to avoid acquiring the disease. Moreover, health education includes concepts that reinforce behavior patterns that reduce individuals’ risk of disease.

Health education is an important part of health promotion, which has been defined as “…any planned combination of education, political, regulatory, and organizational supports for action and conditions of living conducive to the health of individuals, groups, or communities.” The intent of health education and health promotion is to prevent or minimize disease. Health promotion influences knowledge and behaviors at all levels of social organization and it helps to bridge the gap between knowledge generated by scientific studies and its appropriate application.

There has been an increase in health promotion and disease prevention during the past couple of decades and thus, the body of literature in both health education and health promotion has likewise increased. Part of this renewed interest in health education and health promotion is the perceived impact successful educational and promotional activities will have in slowing down the increasing costs of health care. Also, the public has begun to recognize the importance of making some lifestyle changes so that they can reduce the adverse effects of chronic diseases.

The recent Surgeon General’s Report on Oral Health describes components for inclusion in a national oral health plan, one of which is increasing the awareness of the public, policymakers and health professionals of the link between the mouth and other parts of
the body. This report also reminds us that any discussion about either health education or health promotion must take into account the health literacy of the population targeted. Although health literacy is correlated with general literacy, both are affected by other variables, such as language, socioeconomic status, and ethnicity.

**Health Education Concepts**

Newer concepts about health education suggest that clinical and epidemiologic changes are not the only possible or relevant outcomes. Health education outcomes may also include improved decision making skills, positive changes in behavior, improved self-esteem and locus of control orientation, and degree of satisfaction with change. Measurement can be determined by intermediate, and not always final, indicators, such as values, beliefs, awareness of health, self-esteem and locus of control.

**Three Approaches to Health Education**

Health education has generally used one of three distinct approaches in addressing its intended audience. The traditional approach attempts to change the knowledge and attitudes of groups or individuals so that they can adapt a certain behavior. Thus, the intent is to key on individual decision-making. The political perspective focuses on community decision-makers and other leading opinion makers in order to promote health. The radical perspective is not as focused on the individual, but directs its approach to changing the environment. Although the more traditional approach is the most frequently cited in the literature, all three perspectives have been used. For example, the latter two perspectives have been widely used in the promotion and successful implementation of community water fluoridation.

**Behavior Change is What Makes Health Education Work**

To understand how health education works, one needs a basic understanding of behavioral change and the various theoretical models that explain this change. No one approach is successful for all audiences. Education is necessary at all stages of designing, implementing, evaluating, and continuing effective oral health programs.

Although the dental profession is proud to state that “(A)chieving optimal oral health through preventive efforts is a hallmark of the dental profession,” most patient education – individually or for groups – is unplanned, haphazard, not relevant to a particular patient or group of individuals, and difficult to understand.

**Education and Promotion Must Recognize Individual Norms**

Health education and health promotion must go beyond providing materials to individuals or populations. An individual’s behavior is generally shaped by the lifestyle norms that exist in our social environment. Individuals are substantially molded by their social class, educational background, personality and attitude to their own body and health. If we do not create health education and promotion programs that are aware of these norms, then we will be ineffective in changing health behavior. Furthermore,
individuals have varying degrees of receptivity to information that is presented. A more positive response is likely when the individual or group is receptive to the intended message. Timing is critical.

**Links between Health Education and Health Disparities**

There has been a recent surge of research, especially from Great Britain, that suggests a theoretical framework for health education and promotion that recognizes the link between social determinants and health disparities. Moreover, some believe that conventional oral health education is neither effective nor efficient, especially when such programs are created and implemented separately from other health care programs. Sheiham advocates for an integrated, common risk factor approach that combines health promotion for the prevention of several (including oral) diseases with a larger campaign. This approach focuses on the whole population rather than disease-specific at-risk groups.

**Evidence for the Effectiveness of Oral Health Education**

Insight about the varied results from health education efforts can be best summed up by Brown’s review of 57 health education studies. During a review of 10 years of studies (1982-92), she concluded:

> “…that dental health education can result in improvements in objective measures of dental health behaviors and actual oral health measures, but has only limited success in changing attitudes towards dental issues and achieves only short-term gains in knowledge.”

“...The limited use of theoretical frameworks, poor statistical analyses, the use of convenient samples and the short post-intervention follow-up periods diminish the contribution of this research to the development of dental health policy and the formation of strategies to improve the health of communities,” Brown stated.

In addition, another review found that

> ...chairside oral health promotion was consistently more effective than other methods.

Furthermore, previous mass media programs concerning oral health have not been effective. The likely cause of concern has been the design and quality of the evaluation of many of the articles that appear in the dental literature. Notwithstanding the above statements, oral health promotional activities that have included increased fluoride use have been effective for tooth decay reduction.

**Pre-school Children**

Educational or promotional efforts directed at pre-school children directly or indirectly involve the parent or supervising caregiver. Much of the research regarding health education for this age group is synonymous with identifying risk factors associated with Early Childhood Caries (ECC). Mothers of children who have ECC have less knowledge
about some of the determinants of this disease and how to prevent this early development of tooth decay.\textsuperscript{506}

While research has shown that WIC clinic mothers can increase their knowledge and change their attitude about ECC subsequent to an educational intervention,\textsuperscript{507} changing the behavior of the primary caregiver, who usually is the mother, is difficult.\textsuperscript{508} Even with educational programs that are directed at a higher risk (for ECC) community, there have been only modest behavioral changes in infant feeding practices.\textsuperscript{509,510,511}

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A review of the literature about Early Childhood Caries (ECC) indicates that the current evidence does not support wide use of community education programs to reduce ECC; however, there is a need to educate mothers to encourage behavioral changes that influence the risk of their child.\textsuperscript{512} \\
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Dental health education demonstrated substantial reductions in caries incidence, especially for ECC, when there are regular home visits by dental health educators to instruct mothers about the care of their infant’s teeth. This effort, when targeted to lower socio-economic status families, has an additional benefit in that mothers also show improvement in measures of tooth debris and calculus.\textsuperscript{513}

Head Start provides an opportunity for dental health education and promotion. These children also have greater dental treatment needs than children from more affluent families. Surprisingly, there is a dearth of research regarding oral health education for this population even though most Head Start agencies have some oral health educational component. One of the better designed health education projects that has been conducted with Head Start children used four major theoretical constructs (i.e., social class, life stress, self-efficacy and locus of control) in determining tooth decay risk.\textsuperscript{514} These researchers found that S. mutans, the bacteria most commonly associated with tooth decay in children, was the most important predictor of tooth decay risk. Mothers who had more external locus of control beliefs, lower income, more knowledge about tooth decay and higher stress levels had children with greater risk of having caries. Analyses of S. mutans risk showed that socio-economic status (SES) and ethnicity significantly differentiated those with no bacterial colonies from those with one or more colonies while attitudinal and behavioral factors predicted who would be in the group with the highest number of colonies.

There is no known information about whether or not any oral health education is being conducted in other nursery schools, let alone any critical research that addresses the effectiveness of oral health education.

We do not have adequate information on the effect of the media in effecting change in oral health for pre-school children. While children’s television programming may be an interesting vehicle to inform these children, there is no evidence to demonstrate that this will change behavior towards oral hygiene.
School-aged Children
There has been a considerable amount of research relating to school-based oral health education. Unfortunately, much of the research relates only to knowledge gained immediately subsequent to the educational event. Toothbrushing with a fluoride toothpaste is well-documented as an effective means to reduce tooth decay. However, the use of toothpaste in the classroom setting is sometimes problematic. It may be impractical to use because a sink is needed for spitting and rinsing the toothbrush, it is messy, it may require paper products, and there must be space to store toothbrushes between use.

Studies in the 1970s and early 1980s showed that regular, thorough plaque removal under supervision by dental health professionals or teachers could reduce gingivitis among schoolchildren. Similar to the results for pre-school children much of the gain, however, was reduced over the summer when plaque removal was not supervised.515

Even more recent educational efforts demonstrate that short-term preventive educational programs without professional intervention provide only a temporary solution for gingival health.516 Once the instructional period has been concluded, individuals revert back to their original status. Likewise, there is research suggesting that more intensive individual and smaller group sessions has an impact on increasing knowledge about oral hygiene, especially among high-risk elementary school children;517,518 however, there are other studies with home involvement that are not as encouraging.519

Findings support the theory of active participation, visualization, and involvement of parents. Parents function as social models for their offspring well into the adolescent period with regard to several dental health behaviors.520,521

Health education programs seem to do a better with imparting oral health knowledge than either attitudes or behavior. Children appear to understand how a toothbrush works even though they may find the instruction somewhat boring (if not presented in a unique manner) and not related to the disease process.522 At least one study even indicated that too frequent repetition of specific topic (e.g., toothbrushing) may cause more negative attitudes towards oral health education and practices.523

Oral health cleaning habits have been associated with other health behaviors. Flossing frequency was also found to correlate positively with frequencies of washing hands after using the lavatory and bathing, and having a current friend of the opposite sex. Males equated the use of floss with health-related behaviors while females associated flossing more with cleanliness behaviors.524 Interestingly, in this same study flossing frequency declined with age (12 to 16 years of age).

Among children and teenagers education about periodontal diseases has focused on lowering plaque scores and preventing gingivitis.525 There is limited evidence, however, that such education changes its natural history.
Studies during the past decade continue to demonstrate equivocal findings about the effectiveness of oral health education in reduction of oral diseases. While there are some research findings that would indicate that oral hygiene training programs with behavioral modification significantly reduces caries incidence, the preponderance of research would indicate otherwise.

The only major attempt to study the cost and cost-effectiveness of school-based health education programs was conducted in the early 1980s. The National Preventive Dentistry Demonstration Project, a 10-site, school-based preventive care program, concluded that many of the methods used, including health education, were not especially effective in reducing a clinically significant amount of dental decay. Unfortunately, the study did not research other possible oral health outcomes associated with the educational efforts.

What Should School-Based Programs Do?
Despite the equivocal evidence on the effectiveness of school dental educational programs, it is important that they continue to be developed. Schoolchildren are the largest group to whom oral health professionals can promote preventive therapies. In addition, this educational opportunity also provides a direct link with teachers and indirect link with parents. Future health educational activities, as part of a school-based education program, require that the individuals responsible for program development understand the limitations of oral health education with respect to changing health behaviors. Moreover, they need to pay much more attention than others have in the past in developing these dental health education materials.

Adults
The oral hygiene habits of adults have been studied for years. Individuals who have larger annual incomes, more education, a usual source of dental care, and who are female, are generally thought to have better oral hygiene and lower oral disease levels. Additionally, many of these variables are also related to the individual’s desire to maintain their natural dentition for as long as possible. Oftentimes, these same characteristics also relate to a personal set of oral health beliefs and attitude that triggers a pattern of near optimal oral health behaviors.

Most often oral health education for adults is limited to the dental office or brand name advertising by proprietary companies. While dental professionals need to be cognizant about adult learning behaviors and some basic theoretical principles of psychological counseling, there are other mitigating circumstances (e.g., stress, psychological mood) that may influence the results of any personal health education efforts. Still, many different models of patient behavior have been studied, with inconsistent or conflicting findings. However, there is some evidence that variables that measure the gum’s inflammatory process show some association with psychological constructs related to dependence on external factors.
Although there is research that supports the basic usefulness of the theory of reasoned action for oral health behavior reports among adults, most oral health education is only directed at those who regularly frequent the dental office.

**Clearly, there are millions of adults in this country that do not even have the knowledge base in understanding about oral diseases and how they might be prevented.**

**Education in Groups**
Authors call for “determined oral health promotion efforts to inform and encourage increased levels of preventive behaviors” and increasing dental utilization among specific sociodemographic and ethnic groups, but there still is no common agreement about the message that should be sent to the public. Periodontal oral health promotional efforts in this country during the early 1980s did not appear to be as effective as intended. National education campaigns have been tried in other countries, particularly linking self-awareness of the disease process and professional assistance.

Other group methods have been attempted, most of which are directed at improvements in periodontal health. Although they are somewhat novel, group oral health interventions may provide an effective and relatively inexpensive means of helping patients improve their self-care skills and achieve high levels of adherence to an effective self-care regimen. While previous group efforts have been directed to groups of patients, the most logical choice for adult health education and promotional activities is the workplace.

**Workplace Health Education**
There have been several work site health promotional studies during the past decade, many of which demonstrate a positive cost-effectiveness or cost-benefit return. Additionally, targeting high risk employees for health promotional activities has been shown to decrease the level of employee absenteeism. However, oral health educational and promotional research is limited. Within the past decade, almost all of this research has been conducted at various Japanese and Hong Kong work sites. Group counseling at a Japanese shipyard demonstrated that mean annual dental costs increased immediately subsequent to oral health promotional activities, but then decreased during the next two years. Both Hong Kong studies were conducted over 10 months. There were no significant differences found between the groups given the various modes of oral hygiene education. The study does confirm the effectiveness of oral hygiene alone in improving gingival health, but the lack of difference in the outcome of various oral hygiene education approaches indicates that the mode of instruction is not crucially important to the end result. This improvement, however, may be due to factors other than the oral hygiene program itself.

While there are some major obstacles for the inclusion of oral health promotion in the workplace, such activities would benefit employers (e.g., decreased absenteeism, reduced health care costs, increased productivity) and employees (e.g., generally easier access to dental services). However, besides having a limited research base about oral health
education in the workplace, there are few guidelines to develop strategies for effective oral health promotion.548

**Seniors**

As is the case with other age groups, not all educational strategies will work for all elderly. In fact, there is more variation among the elderly than with children and younger adult populations because of the myriad of chronic diseases and conditions, including the dexterity required to maintain a clean mouth. Thus, besides some basic oral health promotion concepts, such as early identification of oral cancers, oral health promotion and prevention may need to be customized to individual needs.549 Educational approaches to the edentulous older patient should focus on prevention and early detection of oral cancer.550

| Oral health promotion for our senior citizens can be immensely improved by an increased understanding of health promotion concepts, integrating oral health issues into other health promotion activities, creating easy to understand health education materials, and improved listening skills so that their needs are addressed.551 Minority senior populations should be targeted for oral health promotional efforts, based on low perceived and evaluated oral health status.552 |

**Oral Health Education in Nursing Homes**

According to those knowledgeable in the field of geriatric education, there is little information and agreement about the content and structure of oral health education programs in nursing homes. There also appears to be more of a time lag concerning inclusion of the most current information into the educational planning. Perhaps the competing time for nursing and other health staff in nursing facilities, apathy by the staff, and a lack of knowledge about the importance of oral health may exacerbate the problem for the residents.553

Other researchers believe that there is a knowledge shift subsequent to the education of nursing staff about oral health care. Findings indicate that nursing staff’s perspective shifts from knowledge regarding the diseased mouth to knowledge regarding the healthy mouth. Interestingly, nursing staff with less formal education seem to favor practical procedures in these educational sessions, whereas the more educated favor theoretical considerations in addressing the patient needs. Oral health education programs need to take the nursing staff’s educational level into account when designing in-service training about oral health education.554

In Sweden researchers found that a limited four-hour oral health education session, offered to caregivers within long-term care facilities had a positive impact on the oral hygiene status of residents.555 The program still had an effect on the participants’ attitudes toward oral health three years later. The data indicate that staff with a low level of formal health care education benefit most.556 Unfortunately, there is a very high turnover of these employees. Thus, there may be a need for frequent in-service presentations about oral health.
**Education of Health Care Providers (Medical/Dental)**

Dentists and most other health care professionals appear to have basic knowledge concerning community water fluoridation and its positive effect in reducing tooth decay. However, non-dental professionals know very little about the oral cavity. Therefore, any opportunity to educate physicians, nurses, etc. about oral diseases would be well served.

Since many oral diseases and conditions originate at a relatively young age, anticipatory guidance for medical and dental professionals is a useful educational concept that can help providers prevent some of the common oral health problems, including tooth decay.\(^{557}\)

There is a vocal group that advocates for educational efforts earlier in the child’s development to prevent tooth decay and functional and developmental conditions.\(^{558}\) These educational messages are directed primarily to non-dental health professionals, but the intent is also to make parents aware of the norms for proper growth and development within the oral cavity.

**Education May Help Spread Information about Technological Advances**

New technologies and new approaches generally require a time lag before there is transfer of the scientific knowledge to the practitioner. This time lag is exacerbated when there isn’t a financial incentive for the practitioner to incorporate new approaches. While many articles have demonstrated sealant effectiveness in preventing dental decay, it has taken an inordinate amount of education and promotion to gain acceptance by the dental community. The Healthy People 2000 dental sealant objective (i.e., at least 50% of 8 and 14 year-old children would have one or more dental sealants) was not achieved. We anticipate similar difficulties in achieving the national objective by 2010. A concerted educational and promotional effort is necessary so that dentists, other health practitioners, consumers, and third-party payers understand the importance of this very effective measure for preventing dental decay.\(^{559}\)

The effects of oral health promotion on health providers are rarely published in the dental literature. For example, there have been statewide or local promotional programs encouraging the use of dental sealants in private practice and in community-based programs. However, there has been little written that attempts to address the impact of such campaigns. A notable exception in Ohio is the effect of direct and indirect methods of educating and promoting dental sealants to dentists.\(^{560}\) During a three year period (1989 to 1991) there was a reported 12 percentage point increase in the number of dentists who used dental sealants in their practices. Unfortunately, it is uncertain whether this increase is partially or totally attributable to the oral health promotion effort.

Similarly, dental practitioners have been alerted to the need to educate patients about periodontal (gum) diseases.\(^{561,562}\) These efforts, however, generally reach only patients of the practitioners and not the general public.

**Tobacco and Oral Health**
This report includes a separate heading for tobacco and oral health because it is a topic on which a substantial amount of oral health education and promotion literature has been published during the past two decades. Tobacco education campaigns rightfully have been targeted at the public as well as preparing health professionals to educate their patients.

In the United States, there have been some well-funded and implemented mass-media campaigns targeted at the general population. These campaigns often are implemented at the state level, in conjunction with a comprehensive tobacco control program. Most have been associated with reduced smoking rates among both adults and youths.\textsuperscript{563} Studies of youth-oriented interventions specifically have shown more mixed results, particularly for smaller, community-level media programs. These studies, however, indicate strong potential to influence underage smoking rates. One of the mixed blessings (from a research perspective) is that tobacco control policies that are initiated during such a campaign often make it difficult to identify the specific influence of media campaigns alone.

More draconian measures, while they are thought to have a more immediate impact, sometimes fail. For instance, a Finnish survey of 15 to 22 year-olds indicated that a snuff sales ban in a population with a high use rate had little effect on obtaining the product.\textsuperscript{564} It may also have had some additional negative short-term negative effects because some of the youth may have substituted cigarette smoking for snuff use.

Dental practices may provide a uniquely effective setting for tobacco use prevention and cessation.\textsuperscript{565} During the past decade, tobacco use cessation strategies have been modified for practical use in the dental setting.\textsuperscript{566}

Most often, tobacco use cessation strategies emphasize a team approach, that minimizes the burden on clinicians, and uses brief counseling by allied health professionals, videos, written materials, and telephone calls to augment clinician advice.\textsuperscript{567} Dental hygienists can serve a vital role in delivering the cessation message as well as encouraging those who have not started.\textsuperscript{568}

Research shows that there is good evidence to recommend that oral health professionals provide cessation counseling.\textsuperscript{569} In general, intervention in the dental office can be effective, and group behavioral treatment may also improve cessation rates over minimal contact. On the other hand, pharmacological treatment, which has primarily focused on 2 mg nicotine gum, has not been found to be an effective treatment.\textsuperscript{570}

Tobacco product quit rates can be improved if clinicians provide more help (e.g., counseling, support) than just simple advice and warnings. By increasing their knowledge about smoking cessation methods, health professionals can support and encourage the large majority of smokers who want to quit.\textsuperscript{571} Unfortunately, there is a dearth of educational materials about oral and pharyngeal cancers for the general public.
Most educational pamphlets and brochures are written at too high a grade level to be effective.\footnote{572}

The good news is that many adults have ceased using tobacco products during the past few decades. The bad news is the adults who continue to smoke may be, as a group, much less receptive to more traditional educational and other intervention strategies.

**Education of Policymakers and Public through Social Marketing**

More contemporary health promotion models stress interventions at several levels, including psychological, socio-environmental and policy components.\footnote{573,574} With the possible exception of community water fluoridation campaigns, policymakers are often overlooked when dental professionals are providing educational information about disease prevention.

There should be a more aggressive social marketing approach that intimately includes policymakers throughout any health promotional effort. Such an approach must combine the use of successful advertising and marketing techniques and apply them to changing people’s ideas and behaviors.

Since social marketing aims to change people’s attitudes about nontangible products, including ideas, services, and practices, dental health professionals must rely on experts in that field to provide guidance about the best strategies. Such strategies also must consider the opportunity costs of adopting a new behavior or change.

**What Information Should be Targeted to Decision Makers?**

Efforts to target decision makers must include accurate information about the relative merits of various disease prevention and control measures; and stimulate group decision-making and action regarding the adoption of effective organized programs. In all likelihood, the message must be simple enough so that it can be easily understood by the decision makers and the public. Too often, educational and promotional campaigns attempt to provide too much information about too many issues. Discussions with key decision makers should consider several of the following in reaching a suitable message for such a marketing campaign: valuing oral health; prevention of oral disease; cost/cost-effectiveness of prevention; oral health and systemic health; disparities in oral health services and access to care; and pregnancy-related issues and oral health.

Any organized oral health promotional campaign must be well conceived, designed, implemented, and evaluated. Otherwise, no one will really know whether such an effort achieved its intended goal. History indicates that most health education and promotional efforts are well intended, but they lack the organizational, pedagogic, marketing, and evaluation skills to know whether they really worked.

**Summary**
Health education programs alone have equivocal findings in reduction of oral disease. When these programs are effective, they are usually intensive (i.e., one-on-one) and must be reinforced on a regular basis.

Health education and health promotion are complementary and efforts to assist in the elimination of oral disease require both activities. An approach that involves community decision makers, along with health professionals, appears to offer the best prospect for long-term success.

This success would be measured not only in increased knowledge, but it would also provide perceptible attitudinal change and quantifiable behavior change at the individual and population level. Current research indicates that adoption of a common risk factor approach, with oral health linking with other disease prevention programs, may provide the best possibility for success. Unfortunately, most oral health educational and promotion programs still use the “empty vessel” approach (i.e., they provide facts that are ‘poured’ into the minds of the intended audience and then expect immediate or near immediate behavioral change) and work in isolation from other disease prevention programs. The public is often confused when there are several health promotional messages being proffered concurrently. A more consolidated approach to health education and health promotion would be more efficient.

The Surgeon General’s Report on Oral Health and the Guide to Community Preventive Services both call for promotional campaigns concerning oral health. Any local community effort that includes educational and promotional activities must be cognizant of national campaigns so that the themes and messages are similar.

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**Health Promotion – Overview of Best Practices**

*What is it?* Health promotion is any planned combination of education, political, regulatory, and organizational supports for action and conditions of living conducive to the health of individuals, groups, or communities. Health promotion empowers individuals and communities by having them work together to achieve greater control over the determinants of their health.

*Who should receive it?* Health promotion can either be community-wide (i.e., the entire population) or community-based (targeted groups comprised largely of individuals with poorer health status and/or higher risks for disease).

*Who can do it?* This is a coordinated program of public education, media campaigns, and communications toward health providers and other key decision makers. Thus, health promotion requires a concerted group effort of allied individuals and organizations who are communicating a common health message.

*Effectiveness*
If health promotion is viewed from the perspective of either health outcomes or controlled, scientific process, then it is less effective than other preventive measures. An exception is when the health promotion activity initiates a mandatory public compliance (e.g., seat belts, water fluoridation). However, if health promotion efforts are considered in the context of process to achieve the intended outcome, then it is quite effective because it substantially raises the community’s awareness about a problem. In turn, there is a higher probability that some interventions will be recommended to correct or reduce the problem.

Advantages

- It engages many individuals and organizations in the process of creating change for the betterment of the community
- Many key individuals and organizations can rally upon a common goal
- It creates a higher level of what is acceptable health in the community by elevating the overall wellness of the community

Disadvantages

- Unless the health promotion activity seeks to mandate a change in the individual (e.g., seat belt use) or community (e.g., water fluoridation), the promotion will be more likely to be undertaken by those less likely to be dramatically effected by such a change
- Not easily replicated elsewhere because of unique societal, political and/or environmental considerations
- Requires sustained, organizational and community commitment

Issues/Controversies

- The health promotional message needs to be simple and easily understood; otherwise, the message may too complex, which may lead to misinterpretation or doubt about the intended outcome
- For the little evidence that is available, at least one component of health promotion (i.e., mass media campaigns) is relatively ineffective for promoting either knowledge or behavioral change

Examples of Programs

- Successful community water fluoridation campaigns (e.g., San Antonio, Texas; southern California)
- Best practices for comprehensive tobacco control programs (http://www.cdc.gov/tobacco/research_data/stat_nat_data/bestprac-exsummary.htm)
- Precede-Proceed model of health promotion (http://www.lgreen.net/precede.htm)

Health Education – Overview of Best Practices
What is it? Health education is any planned combination of learning experiences designed to predispose, enable, and reinforce voluntary behavior conducive to health in individuals, groups, or communities.

Who should receive it? All individuals should be targeted for various health education activities so that they can make knowledgeable and conscious decisions about their individual health. Higher risk individuals, however, should be targeted for both individual and group health education efforts.

Who can do it? Anyone who has sound fundamentals about the disease process can provide some of the basics of health education. Besides dental professionals, physicians, nurses, WIC (Woman, Infant, and Children) providers, health educators, etc., who are properly versed in oral health disease, can impart some knowledge about the disease and how to prevent it.

Effectiveness
Generally, there is an increase in knowledge about the topic immediately subsequent to the education. However, this knowledge is not likely to be sustained without some reinforcement. Health education is less effective in changing either attitudinal or behavioral changes. Individual education is much more effective than group education because the educational process can be tailored to the individual.

Advantages
• It is very inexpensive when compared to any treatment
• There is an increased knowledge about the topic
• Individual educational efforts can reflect the needs of the client

Disadvantages
• Individual patient education only effects those who seek care; thus, it may create a bigger divide in the knowledge, attitudes, and behaviors of those who seek health care versus those who do not
• Individuals have to be willing to be receptive to the health message that is being offered
• Individuals are not likely to convert the knowledge to either an attitudinal or behavior change without some ongoing renewal of the health message

Issues/Controversies
• While providing information to all patients and groups is the ethical high ground, there is little scientific basis that health education alone reduces disease
• Those who may need more information about the problem because they are more susceptible to the disease, may either not be in a position to learn about it (i.e., they do not seek regular health care) or are uninterested about issues that do not have immediate relevance

Examples of Programs
• Oral cancer self-screening
  (http://www.ada.org/public/topics/cancer/cancer.html#ADA's%20National)
• Athletic mouthguards
  (http://www.dentalresourcenet.ca/soap/patient/english/pe_menu.htm)
• NSTEP (National Spit Tobacco Education Program)
  (http://www.nstep.org/nstep.shtml)
Chapter 5: Recommendations

What should be done?

| Basic oral health services should be available to all residents of the Greater Cincinnati region who are at 200% of the federal poverty level or below. |

At minimum, these essentials should include services to preserve and protect the teeth and supporting structures (bone and soft tissue) of the oral cavity. The measures proposed here include education, prevention, and treatment services that are safe and effective, and supported by scientific evidence. These proposed minimum inclusions are reasonable and cost-effective services aimed at eliminating the future need for more extensive and costly restorative and rehabilitative care.

A Regional Approach

According to the 2000 Census, the total population of the region that this report encompasses is 1.9 million. Included are Butler, Brown, Clermont, Hamilton and Warren counties in Ohio, and Boone, Kenton and Campbell counties in Kentucky, and Dearborn County in Indiana. The target populations for this effort are vulnerable populations of the counties listed above who have difficulty with access to oral health services.

Since a groundbreaking report was issued by the Greater Cincinnati Chamber of Commerce in 1999 (Gallis Report), there has been a concentrated effort to do planning regionally based on the pattern of social and economic connections and linkages. A regional approach minimizes duplication and fragmentation, and takes advantage of a common transportation and media market.

A regional approach was selected for RAPP to encompass the service areas of United Way. It was decided to include Warren County (which has its own separate United Way organization) due to its patterns of seeking health care in both Butler and Hamilton counties. Dearborn County was selected because most of its residents seek care in Cincinnati and it has very few dentists and no dental clinics. Grant County, Kentucky, and some Indiana counties may benefit from these recommendations as well but are considered for the purposes of this project to be secondary targets.

The drawbacks of pursuing a regional approach are that state laws and regulations differ significantly, particularly with Medicaid policy, and counties have different needs and resources, making “one size fits all” approaches inappropriate. Despite these issues, clearly some interventions can be county-specific while others benefit from the efficiencies found in serving a larger area.

These recommendations assume that all existing resources will continue to serve those they are currently serving. Given the current economic climate including the budget difficulties being experienced by the states, this is an assumption that may not hold. If adult Medicaid dental coverage is cut, many existing dental programs will be forced to close. Efforts to revamp Medicaid at the federal level, giving the states more flexibility
to choose what will be covered, could have either positive or negative consequences for dental programs.

### The Strategies

**Prevention**

- **Caries prevention**
  - Water fluoridation should be available to all residents on public water supplies.
  - Sealants should be available to all 2nd, 3rd, 6th, and 7th graders in schools with 50% or more of students on free and reduced cost lunches.
  - Fluoride varnish – of the variety of fluoride treatment options, this preventive procedure has the greatest evidence of effectiveness. It should be available to children at or below 200% of the federal poverty level through their health care providers.

- **Periodontal disease prevention**
  This intervention is more consistent with personal care programs. It should be accessible to persons at or below 200% of the federal poverty level, and particularly to pregnant women.
  - Individuals should be educated about how to reduce the risks of periodontal disease.
  - Antimicrobials and prophylaxis should be provided to populations at high risk for problems related to periodontal infection such as pregnant women.
  - Medicaid policy should address periodontal treatment for pregnant women.

- **Oral cancer prevention**
  - Health care providers should be trained/educated about oral cancer risks and conducting regular exams.
  - Regular oral health cancer screenings are recommended for adults over 40. These can be conducted by dentists, hygienists, physicians, nurse practitioners, or other providers.
  - All health professionals should counsel patients and families about tobacco and alcohol use.

- **Oral injury prevention**
  - Mouthguards should be used by children and adults engaging in most of the common sports.

**Education**

- Regular and thorough oral examinations (at least annually) are needed for the early diagnosis and prompt treatment of any abnormal oral conditions, including suspicious lesions that may be cancerous.
Education of the public to:
- Build awareness of the importance of oral health issues:
  -- Of local oral health problems and access difficulties.
  -- Of the association with overall health.
  -- Of the socio-economic implications of oral health.
- Educate about specific oral health areas:
  -- On the risk factors for, prevention and transmission of caries.
  -- On the risk factors for and prevention of oral cancer.
  -- On the risk factors for and prevention of periodontal disease.
  -- On the risks factors for and prevention of oral injury.

Education of policy makers and opinion leaders to:
- Educate/Advocate:
  -- On oral health problems.
  -- On the barriers faced in resolving oral health problems.
- Build support for finding the resources to solve the problem:
  -- To develop champions.
  -- To create support for public funding options.

Education of health care providers:
- Build awareness of oral health issues.
- Develop special training components for many types of health professionals and students including pediatricians, nurse practitioners, nurses, physician’s assistants, ob/gynecologists, geriatrics specialists, internists, pharmacists, physical and occupational therapists, Head Start providers, child care providers, school nurses, case managers in programs for people with disabilities; and early parenting programs.
- Train dentists and dental staff:
  - About the Medicaid system.
  - About the impact of the culture of poverty and how to compensate for its difficulties with practice management techniques.
  - About the rationale for seeing children ages 0-5.
  - About how to assess, treat, manage the behavior of, and refer infants, toddlers, MRDD, and other special needs populations.

Treatment
Acute Care
The provision of these services is intended to eliminate acute infection, control bleeding, and relieve pain. They should be accessible through clinics and centers in or near each county and through at least one urgent care center.
Acute emergency dental services should include:
- diagnosis;
- pulpal (nerve) therapy, when indicated;
- tooth extraction;
- restorative care or fillings;
- periodontal (gum) therapy; and
- prescription of medications.
Basic Comprehensive Care (Preventive and Restorative)
These services are defined as meeting the fundamental needs of restoring health, function and acceptable appearance. The following services should be accessible at clinics and health centers in or near each county and reimbursable by Medicaid:

- routine restorations
- extractions
- partial dentures & complete dentures
- limited root canals and fixed prosthetics (crowns & bridges) in limited instances
- cleanings
- diagnostic
- preventive procedures such as periodontal maintenance services

In the ideal treatment component/personal care programs, private practice dentists provide more root canals, fixed prosthetics, and a fuller range of dental care to individuals with insurance. These minimum recommendations do not duplicate that system for those who are on public insurance or are uninsured, but seek to include services fundamental to people sustaining their health and livelihoods.

Special Populations Case Management
Special populations require special solutions such as access to hospitalization, special equipment, training, sensitivity, and specific accommodations. Case managers can help families make arrangements for the solutions and help dentists and agencies connect patients to appropriate services.

Portable/Mobile Programs for the Elderly
Programs to reach nursing homes, the home bound, and the ambulatory elderly are necessary. The frail elderly, most likely to be in a nursing facility, are also the most likely to have priority needs. Portable programs would have the most success in integrating care into settings where the elderly can be served, minimizing transportation needs.

Assist Dentists with Medicaid Processes
Reach out to private practice dentists to acquaint them with an updated view of Medicaid reimbursement fees and processes. Provide assistance to dentists willing to accept Medicaid to help resolve problems and facilitate smooth reimbursement.

Workforce Development
One answer to the workforce shortage is to provide competitive salaries likely to lure dentists and other professionals into the public sector. The very real scarcity of individuals with dental and public health skills in the region will be a daunting challenge in implementing these recommendations. Long-term efforts must be in place to train or grow our own individuals with the skills needed to develop and run these programs including mentoring programs.

Increase the Dental Workforce Trained to Serve Those with Special Needs and to increase the potential for keeping specially trained dentists in the region.
**Regional Infrastructure**

A regional infrastructure is necessary to develop and maintain services and programs, and handle some of the programs that would be inefficient to operate at the county or local level. These could include:

- Sealant program oversight.
- Management Services Organization for clinics to include purchasing, QA, productivity, training (OSHA, HAZMAT, dental), sharing personnel, staffing patterns, human resources (selection, job description, evaluation), clinical protocols, oversight, billing, information systems, other contracted operations.
- Data collection, research & evaluation (program and community).
- Dental public health expertise.
- Policy advocacy & communications/public awareness campaigns.
- Coordination/allocation of resources, planning, grantsmanship.
- Coalition building.
- Training health providers (see above).
- Case management for Medicaid and MRDD (see above).
- Management of an Apple Tree model for portable care (see above).
- Residency program (see above).
- Workforce issues – programs to recruit and maintain skills of dental staff and career development efforts to increase the public health skills of regional providers.

**Methodology: How Can it Be Done?**

The following are specific programs and services to implement the above recommendations. These programs and services are based on input from the community, best practices, advice from consultants, and are in line with recommendations made at the federal and state levels. Costs are based on average local salaries and costs of similar programs.

Costs for expansion of clinical sites are based on information in a Safety Net Dental Clinic Manual under development by the Association of State and Territorial Dental Directors, the Ohio Department of Health, the Indian Health Service, and the Maternal and Child Oral Health Resource Center. When completed, this manual will be available on line.

**Recommended Regional Programs**

1. **Educational & Advocacy Campaigns**

   Education campaigns should begin with a broad-based public communications effort that uses the media market to reach a wide range of the public and policy makers/opinion leaders. Such a campaign should last 18-24 months and include marketing specialists to target messages, advertising production costs, and coordination. The advocacy piece of the campaign is targeted to decision makers and elected officials, to make changes in public policy that will reduce barriers to oral health, to improve Medicaid, and to secure
public financing for services. This effort must be coordinated with the communications
campaign but may require more targeted efforts over a longer period of time.
Budget: range from $500,000 to $1 million depending on consultants, and type of
advertising venues used. This budget includes 1 FTE (full-time equivalent)
communications coordinator and .25 clerical assistance, fees for a
communications/marketing consultant and an advocacy to produce materials, plan
strategies, and make contacts. The budget includes $144,000 in staff, operating, and
production funds, with the balance for consultants and advertising costs.

2. Health Care Professionals Education
A wide range of health care professionals should have the opportunity for training and
development in oral health care. The recommendation is for a team including a nurse and
a dental hygienist to design and implement the training. The team would bring both
medical and dental expertise to training efforts, along with an understanding of how the
anticipatory guidance and fluoride varnish application can work in a pediatric office
setting.
Budget: $161,722 per year including (1.5 FTE plus .25 clerical); small equipment,
materials, printing/copying, and office operations.

3. Head Start and School Coordination
Head Starts, school-based health centers, and school nurses need assistance with finding
dental services for children. This program would be a collaborative effort with Head
Start and the school systems to provide resources for these educational organizations to
meet their obligations to find families dental homes. Coordinators would be hired to train
the staff at educational organizations throughout the region, to monitor their progress in
assuring that children are examined and treated, and to provide resources to assist where
needed.
Budget: $259,348 per year including 2.64 FTE coordinators, office operations,
educational materials, supplies, and other reasonable expenses. With this number of
FTEs, the region could be served. If less funding was available, it is possible to start in
more limited geographic areas.

4. Special Populations Case Management
The Butler County Case Management model should be duplicated regionally and be
available to both children and adults. In this model, a coordinator attempts to increase
the availability of providers willing to serve patients with developmental disabilities;
provides special training for providers to increase awareness of the unique characteristics
of the population; develop a case management system to assist eligible individuals in
receiving appropriate dental care from community providers; work with hospitals to
provide operating room facilities for ongoing dental services; and create a preventive oral
health program for the consumers and their caregivers.
Budget: The basic cost of this program in one county is $110,000 per year for salaries (1
FTE hygienist and .25 FTE clerical), 28% fringes, overhead, and basic supplies. To
expand to multiple counties, it is estimated that 2.5 FTE hygienists and 1 FTE clerical are
needed, leading to a total annual cost of $241,400.
5. **Portable Program for Nursing Homes and Other Facilities**

The Apple Tree model or a similar portable system should be instituted region-wide to provide services to nursing homes, senior centers, and other facilities.

**Budget:** $81,900 in capital equipment and $222,761 in annual operating costs after Medicaid and other revenue. This includes a dentist, hygienist, and two assistants plus .5 clerical and a driver, supplies, operating expenses including insurance. The capital equipment includes a box truck and the portable dental equipment in addition to the small equipment used by the professionals.

6. **Medicaid/Dentist Liaison**

Following the Dental Options model and building on a pilot project in Hamilton County, test and duplicate a model that provides a Medicaid/Dentist Liaison working throughout the region to recruit dentists into accepting Medicaid patients and provide support to the dentists and their staffs. The Liaison can act as an ombudsperson with Medicaid, train dental staff, teach billing, participate in coalitions trying to improve Medicaid, and provide a resource to case managers who work with MRDD populations, Head Start, foster children, Welfare to Work programs, and others.

**Budget:** $173,000 which includes 1 FTE, benefits at 28 %, minimal overhead, and program costs.

7. **Workforce Development**

- Loan repayment and/or scholarship programs to encourage minorities and others to go to dental school. This effort should take place with the assistance of the State Health Department and other efforts to increase the minority presence in healthcare fields.
- Development of new hygienist, assistant or AQP/EFDA training programs and incorporating public service in current programs. This will be a responsibility of the infrastructure to pursue.
- Public health career development tracks for dental personnel – these efforts should be incorporated into the shared services arrangements.
- Mentorship program for middle school minority children who may be interested in a dental career, working in partnership with existing science and health care mentoring programs and special high school curricula. This program could be a partnership with dental schools, hygiene and assistant programs, or with other health care agencies.

**Budget for mentorship program:** $100,000 in operating costs per year to assist schools in developing the programs and involving dental professionals.

8. **General Practice Residency Program**

This program will provide for dentists to learn more specialized techniques including care for those needing hospitalization. It will allow a greater variety of resources for persons with disabilities, and those who are medically compromised.

**Possible agency:** This program should be based in a hospital such as University.

**Budget:** $279,988 annual operating costs for 2 residents; a .33 FTE program director, .5 clerical and 2 FTE dental assistants. Funds to build facilities would be additional.
9. Building a Regional Infrastructure
The regional infrastructure could be overseen by a central oral health board that would oversee the various service areas where the programs are housed, and interact with the various agencies operating programs. The following is a one model for such a system.

The regional boards will represent the community in guiding the program. The regional coordination organization would be the Greater Cincinnati Oral Health Council. Regional programs may be based there or in other agencies. Efforts to expand existing programs should be undertaken by the agencies that operate those programs, with assistance as needed from the regional bodies.

With the above coordination nucleus, Greater Cincinnati will have an integrated, coordinated oral health system that is planned and directed with significant community input. While there are attempts to accomplish this level of organization at the national and state levels, there is no precedence for creating such a system on the local or regional level. However, it has been done in other walks of life such as transportation planning, business development, and health care planning. Such a system maximizes resources, provides economies of scale, and leverages the strengths of all participants. This kind of infrastructure requires some ongoing sources of funding. For the first two years, the United Way is assuming some of this burden but other sources must be located or costs must be built into any ongoing public funding for programs.
Public Policy Recommendations
The establishment of public policies that effectively address access to oral health services will only occur when the public and political will (commitment) to do so has been created. Areas of public policy that must be addressed to close the disparities in oral health status include, but are not limited to, the following:

a) Re-inventing or privatizing Medicaid, making it more dentist- and patient-friendly to create the access it is mandated to provide,
b) Preserving the adult dental component in Ohio, Kentucky and Indiana Medicaid programs,
c) Examining how state dental practice acts and the current system of providing oral care might be revised to improve access,
d) Providing Medicaid reimbursement to physicians who provide oral health counseling and fluoride varnish to infants and toddlers, and
e) Financing parity for oral care with medical care.

Ohio
- Preserve the adult dental component of Ohio Medicaid,
- Increase Medicaid reimbursement for dental procedures and improve the efficiency of billing and reimbursement procedures,
◆ Allow Medicaid reimbursement to physicians and clinics who provide oral health counseling and fluoride varnish to infants and toddlers,
◆ Expand the Practice Act to permit mid-level practitioners to perform additional procedures to improve access.
◆ Secure ongoing funding for prevention and treatment programs.

Kentucky
◆ Increase Medicaid reimbursement for dental procedures,
◆ Allow payment of MDs and other health professionals for fluoride varnish and dental counseling,
◆ Improve specialty compensation,
◆ Allow FQHC and Medicaid clients to have medical and dental visits on the same day,
◆ Permit stand-alone or satellite dental center compensation through FQHC regulations,
◆ Broaden reimbursement through Medicaid for adults, (e.g., for dentures),
◆ Secure ongoing funding for prevention and treatment programs.

Indiana
◆ Gain state support for a sealant program in schools.
◆ Secure ongoing funding for prevention and treatment programs.

**Treatment Services Recommendations by County**
The following expansions and new construction are considered necessary to expand access to care geographically and to specific underserved populations. It assumes that all current programs will continue to exist and receive at least current levels of funding.

The establishment of these services will increase the region’s capacity for treatment from roughly 50,000 individuals to roughly 150,000.

An important component of this next section is the creation of a subsidy for clinics that will allow fees to be low enough for accessibility, and to allow clinics to pay salaries that will attract dental professionals. As was noted in the previous chapters, it is a struggle to find experienced staff who can handle the complexity of the cases seen in the clinics that serve disadvantaged populations. Subsidies were calculated based on the balance of expanded operating costs after revenues are deducted. The assumption was made that Medicaid reimbursement rates would stay the same costs would increase approximately 5% annually. Revenues were estimated based on the percentages currently represented by each type of reimbursement among current clients. For example, if a clinic had revenue from Medicaid, private insurance, and sliding scale fees, expected revenues were based on the proportion of those payers the clinics reported as served in 2002.

*Hamilton County*
◆ **Treatment**

*Existing facilities*
Lincoln Heights Healthcare Connection - Add 2 FTE dentists, 5 assistants, 1 hygienist, add subsidy to maintain services and allow for lower fees, increase salary support to enable hiring experienced dentists.
Budget: $630,700 in construction assistance to assist with current expansion to 8 chairs; $454,700 in annual subsidy needed to handle additional staff.
Anticipated date for expansion: 2003
Estimated annual increase in patients served: 5,000

West End Health Center - Add 0.5 FTE dentist, add 1.0 FTE assistant, add subsidy to allow for lower fees, increase salary support to enable hiring experienced dentist.
Possible Agency: Neighborhood Health
Budget: $50,645 in annual subsidy needed to handle additional staff.
Anticipated date for expansion: 2004
Estimated annual increase in patients served: 1,250

Walnut Hills/Evanston Medical Center - Expand current 2-chair clinic (currently without dentist) to allow 6 chairs and 2 FTE dentists, 1 hygienist, 5 assistants.
Possible Agency: Neighborhood Health
Budget: One time construction and equipment costs: $846,041
$444,700 in annual subsidy needed.
Anticipated date for expansion: 2006
Estimated annual increase in patients served: 5,000

East End Health Center - Space is available for a 6-chair dental clinic, add 2 dentists, 1 hygienist, 5 assistants, add subsidy to maintain services and allow lower fees, increase salary support to enable hiring experienced dentist.
Possible Agency: Neighborhood Health
Budget: One time construction and equipment costs: $922,954
$602,375 in annual subsidy needed.
Anticipated date for expansion: 2008
Estimated annual increase in patients served: 5,000

CANN Clinic (Madisonville) – This neighborhood has repeatedly requested dental services. Find site for new 6 chair clinic, 2 dentists. 1 hygienist, 5 assistants.
Possible Agency: Cincinnati Health Department
Budget: One time construction and equipment costs: $807,584
$584,570 in annual subsidy needed.
Anticipated date for expansion: 2005
Estimated annual increase in patients served: 5,000

Children’s Hospital Medical Center Department of Pediatric Dentistry - add 6 residents to the current 10, add 2 hygienists, add 6 assistants, add a scheduler and an instrument tech, add 2 faculty, add 2,600 square feet of space.
Possible Agency: Children’s Hospital Medical Center
Budget: One time construction and equipment costs: $729,477
One year operating costs: $1,226,795 (revenue offset unknown)
Anticipated date for expansion: 2005
Estimated annual increase in patients served: 5,000

*Elm Street Health Center* – Renovate to add 3 chairs, 1 FTE dentist, 0.5 hygienist, and 2 assistants.
*Possible Agency:* Cincinnati Health Department
*Budget:* One time construction and equipment costs: $300,000
$235,500 in annual subsidy needed.
Anticipated date for expansion: 2004
Estimated annual increase in patients served: 2,500

*Norwood Health Department Program* - Expand to 1.0 FTE dentist, accept 200% of poverty clients or subsidize local private practitioners to take these clients.
*Agency:* City of Norwood
*Budget:* $109,500 in annual subsidy needed.
Anticipated date for expansion: 2004
Estimated annual increase in patients served: 1,500

*Avondale Boys and Girls Club* – This partnership with Procter and Gamble and the Cincinnati Health Department is slated to open in mid-2003 and will need additional operating funds beginning in 2007.
*Agency:* Cincinnati Health Department
*Budget:* $63,250 in annual subsidy needed.
*Anticipated date for subsidy:* 2007
Estimated annual increase in patients served: 2,500

*Mcmicken Dental Center for the Homeless* – Locate ongoing operating funds to maintain services as government funds are reduced or ended. HUD funds currently operate this clinic but do not increase with inflation and are not expected to last more than 3 years.
*Possible Agency:* Greater Cincinnati Oral Health Council
*Budget:* $133,185 in annual subsidy needed.
*Anticipated Date for Funding:* Beginning in 2004.
*Estimated patients served:* 2,000

**Proposed New Programs**
*Eastern Hamilton County* - Build 6 chair clinic with 2 FTE dentists, 1 hygienist, 5 assistants, billing person, 2,500 square feet.
*Possible Agency:* open.
*Budget:* One time construction and equipment costs: $999,866
$715,945 in annual subsidy needed.
*Anticipated date for expansion:* 2009
*Estimated patients served:* 5,000
- **Western Hamilton County** - Build 6 chair clinic with 2 FTE dentists, 1 hygienist, 5 assistants, billing person, 2,500 square feet.
  
  **Possible Agency:** open.
  **Budget:** One time construction and equipment costs: $1,038,323 $751,742 in annual subsidy needed.
  **Anticipated date for expansion:** 2010
  **Estimated patients served:** 5,000

- **Urgent Care Center** - To serve 10,000 emergencies per year. Open 8 a.m. to 8 p.m. with alternating shifts, needs 2.5 FTE dentists, 9 chairs, 4 assistants, 2.5 front desk personnel, security, equipment, facilities, billing.
  
  **Agency:** University Hospital/Health Dept./Other
  **Budget:** One time construction and equipment costs: $958,400 $599,900 in annual subsidy needed.
  **Anticipated date for expansion:** 2004
  **Estimated annual increase in patients served:** 10,000

- **General Practice Residency** - 2 residents, 1 FTE director, 1 FTE education director, 6 assistants, receptionist, administrator. Focus on special needs adult patients.
  
  **Possible Agency:** The University Hospital
  **Budget:** $279,988 annually; with some offset by revenue and federal funding.
  **Anticipated date for implementation:** 2005
  **Estimated annual increase in patients served:** 2,000

- **Two Mobile Vehicles** - For use by Head Start and school-based health centers, need 2 FTE dentists, 4 assistants, driver, and coordinator.
  
  **Possible Agency:** Oral Health Council or others
  **Budget:** One time capital costs of $739,780 for two vans (one is already funded by the Ohio Dept. of Health and Anthem Foundation of Ohio).
  **$241,928 in annual subsidy needed for each van.**
  **Anticipated date for implementation:** Van 1 in 2003; Van 2 in 2008
  **Estimated annual increase in patients served:** 5,000

- **UC Department of Oromaxillofacial Surgery** - Expand UC’s Holmes OMFS Center Facility, increase by 1 attending staff, recruit 1 resident, add 2 surgical assistants, develop a psychosocial component to assist patients and staff including social worker is added to maximize patient compliance and assist residents in dealing with the population to be served.
  
  **Possible agency:** University Oromaxillofacial Surgery Center
  **Budget:** Renovation costs of $99,000 and annual operating costs of $497,903. Some annual operating costs may be offset by revenue.
  **Anticipated date for implementation:** 2006
  **Estimated annual increase in patients served:** 500
  **Costs provided by Robert D. Marciani, D.M.D., professor of surgery and chief of the Division of Oral & Maxillofacial Surgery at the University Medical Center.**
• **Policy Issues**
  ▶ Hamilton County government does not currently support any dental facility, although it has done so in the past.
  ▶ Families/Children First programs do not require oral exams or education.
  ▶ None of the current levies specifically support dental.
  ▶ Workforce – salaries at public facilities are not competitive enough to attract professionals. There is a need for increased salaries, loan forgiveness programs, and increased use of auxiliary providers.

**Clermont and Brown Counties**

• **Treatment**
  ▶ **Clermont County Community Services Pediatric Dental Center** - this clinic could increase from .67 to 1.0 FTE dentist and expand its hours.
    
    *Agency:* Clermont County Community Services  
    *Budget:* $50,688 in annual subsidy needed.  
    *Anticipated date for implementation:* 2004  
    *Estimated annual increase in patients served:* 600

  ▶ **1 Dental Van** - A van would allow outreach to those unable to get to clinics. The Van should focus on access for children in Head Start, the sealant program, and the school-based health center, freeing up clinic time to see adults.
    
    *Possible Agencies:* Southern Ohio Health Services Network and a Clermont/Brown counties partnership.  
    *Budget:* $406,879 in capital expenditures, and an annual subsidy of $154,157 is needed.  
    *Anticipated date for implementation:* 2006  
    *Estimated annual increase in patients served:* 2,500

  ▶ **SOHSN (Southern Ohio Health Services Network) Ripley Dental Center** needs new site - this clinic cannot be expanded in its current site, which is an historic building. It has only 2 chairs. The clinic is at capacity but it is tough to build new due to flood plain issues. The fees are too high for many of the uninsured in this high poverty area, so it needs some subsidy. The recommendation is for a new 6-8 chair facility, with 2 teams, and expanded hours.
    
    *Agency:* SOHSN  
    *Budget:* $846,041 in construction and capital expenses; $398,791 in annual subsidy needed.  
    *Anticipated date for implementation:* 2006  
    *Estimated annual increase in patients served:* 5,300

  ▶ **SOHSN Seaman Dental Center** - This new facility has 12 chairs, and is not at capacity. There is capacity for 2 more FTE dentists. If fees were lowered with an increased subsidy and hours were expanded, two additional dentists could be utilized.
    
    *Agency:* SOHSN  
    *Budget:* $408,837 in annual subsidy is needed.  
    *Anticipated date for implementation:* 2004
Estimated annual increase in patients served: 4,300

- **Policy Issues**
  - Fluoridated water in New Richmond, Batavia, Williamsburg – 6,500 people affected.
  - Transportation not allowed to cross county lines, crippling efforts to use Seaman Center.
  - The counties provide limited support for dental safety net clinics; additional support would help maintain these facilities.

*Warren/Butler Counties*

- **Treatment**
  - *Children’s Hospital Fairfield and Children’s Hospital Mason Dental Clinics*
    No recommendations.

  - *Butler County Dental Health Clinic* (opened February, 2003) - This clinic will start with 3 chairs and 1 FTE dentist. There is expansion potential. It is predicted that emergencies will quickly swamp this facility. There will be a rapid need for higher salaries to attract staff, ongoing support to maintain services, and subsidies to keep fees low. An additional 3 chairs, 1 FTE dentist, .5 hygienist and 2 assistants will be needed as soon as possible.
    **Possible Agency:** Butler County Health Coalition
    **Budget:** $520,376 in construction expansion costs; $258,778 in annual subsidy needed.
    **Anticipated date for implementation:** 2006
    **Estimated annual increase in patients served:** 2,500

  - *New clinic in Hamilton* - Space exists at the Hamilton City Health Dept. for at minimum a 3 chair clinic with 1 FTE dentist. It might be possible to squeeze another 2-3 chairs in the space, with another FTE dentist and staff. Subsidies will be needed to keep fees low, and ongoing support may be needed.
    **Possible Agencies:** Butler County Health Coalition, City of Hamilton
    **Budget:** $769,128 in construction costs; $459,157 in annual subsidy needed.
    **Anticipated date for implementation:** 2004
    **Estimated annual increase in patients served:** 5,000

  - *Oxford Pediatric Dental Program* - Space is needed space for 1 FTE dentist (3 chairs), .5 hygienist and 2 assistants. It will require subsidy, salary support, and ongoing funding. Building with space for future expansion is recommended.
    **Possible Agency:** Butler County Health Coalition or other
    **Budget:** $567,683 in construction costs; $267,350 in annual subsidy needed.
    **Anticipated date for implementation:** 2008
    **Estimated annual increase in patients served:** 1,800
Lebanon - Lebanon is a site for a clinic in the future. Currently, usage data is insufficient to support building a clinic there, and there is no agency immediately willing to start one. New clinics in Wilmington and Middletown will serve some of these clients.

- **Policy Issues**
  - Fluoridation of non-fluoridated areas in Warren County affecting 25,000 persons.
  - Continued support of model MRDD program.
  - Butler County provides some limited support for dental programs; Warren County has a grant funded case management program but does not support any clinical dental services.

**Northern Kentucky**

- **Prevention**
  - **Sealants** - Sealants should begin in the school year 2003-2004, with one dental team, to reach 2,000 2nd, 6th, and 7th graders in Boone, Kenton and Campbell counties. The program should expand to include a 2nd team to reach all schools with more than 50% of children receiving free or reduced cost lunches. It should also expand to Grant and other surrounding counties. Target: By 2010, all 2nd and 6th graders in schools with at least 50% of children on free and reduced cost lunches will have the opportunity to have sealants applied.
    
    **Possible Agencies:** Northern Kentucky Independent Health District, school-based health centers, and school districts

    **Budget:** $10,000 in equipment (already secured from Kentucky Department of Public Health). $8,000 in annual subsidy after revenue.

    **Anticipated date for implementation:** September, 2003

    **Estimated annual increase in patients served:** 2,000

- **Treatment**
  - **HealthPoint Family Health Care Center,** Newport/Belevue, has space for up to 6 dental chairs (2 dentists). Subsidy will be needed to reduce fees. Salary support is needed to find and keep experienced dentists.

    **Agency:** HealthPoint Family Care

    **Budget:** $769,128 in construction/expansion/capital expenses; $565,084 in annual subsidy needed.

    **Anticipated date for implementation:** 2004

    **Estimated annual increase in patients served:** 5,000

- **Van for schools** - School-based health centers are very interested in a dental van to provide services on site. It is very difficult to take children en masse to a health center for care. A van parked on school grounds would allow care to be available to a wide range of students in the Northern Kentucky area. It could start with one dental team (1 dentist, 0.5 hygienist, 2 assistants and a driver). Administrative and billing support would be necessary.
Possible Agency: HealthPoint Family Care or Northern Kentucky Independent Health District, or a partnership.

Budget: $425,374 in capital expenses; $224,988 in annual operating subsidy.
Anticipated date for implementation: 2007
Estimated annual increase in patients served: 2,500

New clinic in Erlanger area - There are pockets of poverty in Southern Boone and Central Kenton counties that could be served by a site in Erlanger/Florence. An accessible site might be near St. Luke Hospital West, where there are a number of health care providers. A six chair clinic with 2 dentists, 1 hygienist and 2 assistants, front desk receptionist would be preferable.

Possible Agency: HealthPoint Family Care or St. Luke Hospital West.
Budget: $846,041 for construction/capital equipment; $539,891 in annual subsidy needed.
Anticipated date for implementation: 2006
Estimated annual increase in patients served: 5,000

Covington HealthPoint Family Care Dental Center - There is no space for expansion in the current HealthPoint dental site. It is recommended to explore the possibility of a satellite facility with 6 additional chairs and 2 dentists. If it is possible to expand this site (and the other two dental care centers), it would be important to incorporate emergencies in the centers. If they cannot all be developed, there will be a need to have facility for emergencies. Adequate salaries to recruit dentists will be needed, as will subsidies to lower fees.

Possible Agency: HealthPoint Family Care.
Budget: $591,336 in construction/capital expenses; $181,040 in annual subsidy needed.
Anticipated date for implementation: 2009
Estimated annual increase in patients served: 1,800

Policy issues

Explore the need for training programs in hygiene, assisting and EFDA (expanded function dental assistants) in the Northern Kentucky area.

Explore a state loan repayment program to attract dentists to the region.

Counties do not provide support to any clinical dental services.

Dearborn County

Prevention

Sealants - Sealants should begin with one dental team, to reach 2nd, 6th, and 7th graders in Dearborn County, to reach all schools with more than 50% of children receiving free or reduced lunches.

Target: By 2010, all 2nd and 6th graders in schools at 50% on free and reduced lunches will have the opportunity to have sealants applied.

Possible Agencies: Open
Budget: $10,000 in equipment; $8,000 in annual subsidy after revenue.
Anticipated date for implementation: September, 2006
Estimated annual increase in patients served: 2,000

- **Treatment**
  - New clinic in Lawrenceburg - There are no sliding fee scale clinics in Southeastern Indiana, and few dentists take many Medicaid patients. An accessible site might be downtown Lawrenceburg, where the city is building a medical professional building. A six chair clinic with 2 dentists, 1 hygienist and 2 assistants, front desk receptionist would be preferable.
  
  **Possible Agency:** Open
  
  **Budget:** $769,128 for construction/capital equipment; $565,048 in annual subsidy needed.
  
  **Anticipated date for implementation:** 2004
  
  Estimated annual increase in patients served: 3,600

- **Policy issues**
  - Fluoridation of non-fluoridated areas in Dearborn County.
  - Dearborn County provides no support for dental programs.
## Oral Health RAPP Recommendation Costs 2003-2010

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<tr>
<th>Year</th>
<th>Hamilton</th>
<th>Butler County</th>
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### Hamilton

- **Van 1 Operating**: $26,278 in 2003, increasing by $15,534 per year.
- **Van 1 Capital**: $417,000.
- **Van 2 Operating**: $15,534.
- **Van 2 Capital**: $443,868.
- **Children's Hospital Expansion**: $829,477, increasing by $192,200 per year.
- **OC Residency**: $35,000.
- **Elm Street Expansion**: $630,700.
- **Norwood Expansion**: $109,500.
- **Eastern HC New Construction**: $499,866.
- **Western HC New Construction**: $1,083,323.
- **Urgent Care Center**: $958,400.
- **McKendree Center for Homeless**: $133,185.
- **Lincoln Hi1s expansion**: $630,700.
- **West End Expansion**: $50,645.
- **Walnut Hills/East Expansions**: $846,041.
- **Avondale Boys & Girls Club**: $63,250.
- **East End Expansion**: $922,954.
- **Madisonville New Construction**: $807,584.
- **Butler County**:
  - **Middletown Expansion**: $250,376.
  - **Hamilton New Construction**: $769,128.
  - **Oxford Expansion/New**: $507,683.
  - **Avonlea New Construction**: $846,041.
  - **Van**: $425,374.
- **Clermont/Brown**:
  - **Clermont Med Expansion**: $50,688.
  - **Van**: $406,879.
  - **Riley Expansion**: $846,041.
  - **Seaman Expansion**: $408,837.
- **Deafness County**:
  - **Lawrenceburg Clinic**: $769,128.

### Regional Program

- **Project Management**: $100,000.
- **Communications/Advocacy Campaign**: $100,000.
- **MRDD Case Mgmt**: $110,000.
- **Mgmt Services Organiz**: $100,000.
- **Genl Prac Residency**: $279,688.
- **Medicaid Laison**: $186,200.
- **Workforce programs**: $70,000.
- **Senior Portable Program**: $81,900.
- **Provider Ed/Fluoride Varities**: $161,722.
- **Head Start/School**: $259,348.
- **Total with Capital costs**: 1,823,320.

### Total Costs

- **Total Operating Costs only**: 765,626.
- **Total Capital Costs Only**: 1,057,700.
Early Achievements

The synergy of the RAPP process has helped bring about some early achievements toward achieving our goals of improving oral health. The following projects are in process at press time.

1) State and local funds have been secured for a dental van to serve school children in Hamilton County beginning in September, 2003.

2) University Hospital is building an expanded dental clinic and initiating a dental residency program. The clinic will eventually include 10 chairs and serve University employees as well as the community. Portions may open as early as January, 2004, with the general practice dental residency program beginning in July, 2004.

3) The Lincoln Heights HealthCare Connection is raising funds and building an expanded 8-chair dental clinic that will increase access to care outside of the city for children and adults.

4) The City of Cincinnati Health Department, Procter & Gamble and the Boys and Girls Club of Greater Cincinnati are partnering in the Crest Smile Shoppe in the US Bank Boys and Girls Club (Avondale) to expand access to dental care for children and adults.

5) A sealant program is beginning in selected Northern Kentucky schools in September, 2003.

6) An Anthem Foundation grant has enabled Babies’ Milk Fund to conduct a pilot program applying fluoride varnish to toddlers and oral health advice to parents at pediatric visits.

After the Year 2010

The plan detailed in these recommendations increases the treatment capacity by 140 % by 2010, a significant accomplishment, but by no means a complete solution to all needs. The following recommendations should be considered to increase capacity 300 % by the year 2015.

- Additional vans/mobile vehicles for each county that can serve both children and adults, perhaps stationed for periods in neighborhoods, at schools, shopping centers, or community centers.
• Additional centers that will work in tandem with schools to improve access to care for children. These centers or clinics might be located in or near school facilities.
• Expanded mobile/portable capability to reach homebound seniors and persons with disabilities.
• Open new clinics offering sliding scale fees in underserved areas such as Lebanon, Fairfield, Clermont County, Southeastern Indiana, and the Southern portions of Northern Kentucky.
• Develop 2-3 urgent care dental facilities outside of Cincinnati.
Chapter 6: Financing Options

Clearly the prospect of financing the needed services to improve access to dental care for a half million people in Greater Cincinnati is a daunting one. In this era of tightening government budgets, dipping foundation endowments, and challenging fundraising for charitable efforts, it is difficult to fathom where the funding might be found.

Varied Sources Are Needed
For a region that encompasses nine counties, three states, and multiple local jurisdictions, finding one method of financing this effort appears to be impossible. Multiple and varied funding sources will be necessary. It is also apparent that funding for all of the recommended projects will not be available at the same time. A long-range plan is being proposed and while it will not meet every need, it is a reasonable and possible plan that uses resources judiciously and capitalizes on what is already available. Tight budgets now make the initial steps a true challenge when the need is so immediate and overwhelming. The most urgent and easily accomplished tasks must take precedence.

Funding Must be Long-Term
Of utmost concern is that funding be ongoing. Efforts will be defeated if projects are funded for 1 or 2 years and then disappear due to lack of ongoing support. Health care for the poor is neither profitable nor even cost neutral. While clinics and other programs can earn some revenue through Medicaid and modest fees, by virtue of the target population, it is not possible for programs serving the disadvantaged to be self-sustaining. Reliance upon short-term funding will lead back to the current situation or worse, with un- or under-funded, fragmented, inaccessible services that leave poor families in jeopardy.

Further, short-term funding risks create the false impression that programs are mismanaged or solutions selected unworkable. The fact is, in most cases they were simply underfunded. Proposals for funding must be well thought out over the long-term.

Piecing Together Small, Short-Term Grants Will Not be Sufficient
Applying for the occasionally available government grant or local philanthropic funding will not provide stable, ongoing funding for many of the needed services. It must be understood that ongoing public funding sources will be needed so that access to oral health care continues to exist.

Local Sources Must Support Local Projects
Several local foundations have demonstrated their interest in oral health projects and are funding several efforts. It is hoped these foundations will continue to support oral health and will find ideas or projects within these recommendations that they are willing to sustain. With a regional infrastructure, there can be assistance for clinics and programs by pursuing federal or state grants, billing for maximum Medicaid revenue, and applying for dental training grants. These will be an important part of the effort to build a comprehensive, collaborative system.
Potential Sources of Public Funding
The following alternatives assume that each county will have to determine a method to raise its own funds in order to participate.
1. Levying taxes on items that have high concentrations of sugar and are known to be detrimental to oral health such as soda pop and other sugary drinks, or candy. This may require enabling legislation.
2. Setting aside portions of existing tax levies to pay for oral health services. While Hamilton County has several of these levies (Senior Services, MRDD, Indigent Care, Children’s Services), other counties may have few to none. Setting aside money for oral health will necessitate cutting some other essential services or examining what portions of the levy funds are supposed to support services like this in the community. Agencies dependent on these funds whose clients are experiencing severe consequences from poor oral health should consider the potential benefits of a minimum investment.
3. Dividing the costs of programs by county and asking each county to contribute funds. This method would mean that counties not choosing to pay would get no services.
4. Assessing all insurance companies that are underwriting medical (and/or dental) policies in the region. If each policy were assessed $2.00 per month, and $000,000 policies were assessed per year, the resulting $12 million could amply fund oral health access and new construction costs. This may require enabling legislation.
5. Creating a new, regional tax levy. It would have to be passed county by county, but only those counties that passed it would have access to services. It could capitalize on a common media market and have elections in each county on the same day.
6. Voting an increase in an existing levy. For example, the Hamilton County Indigent Care Levy could be increased and a portion dedicated to oral health care. Then other counties would have to pass similar levies or increase other taxes to contribute their share. The Indigent Care Levy isn’t up for renewal for four years.
7. City, county, town and village governments deciding to appropriate funds for the purpose of supporting oral health services. The City of Cincinnati current supports the five city dental clinics and the Dental Director’s office. Other jurisdictions can help to support the services to their citizens.
8. Collaborate with other organization to get laws passed in each state to fund X dollars per head for oral health and grant the proceeds to the counties to provide services. This would require passage by three states rather than multiple counties.
9. Working with national organizations to get oral health care funded by Medicare, and to improve coverage under Medicaid.

A Communications Campaign Is the Start
Any of the above alternatives will require a major effort to educate the public, opinion leaders, and policy makers about the importance of oral health care and why funds are needed. The political will to solve the problem must be summoned. This calls for a creative communications campaign to reach throughout the region and send a reinforced, consistent, and clear message about the importance of the oral health problem and how it can be solved.
Multiple Voices Must be Heard
This campaign must start immediately, using multiple sources of media, reaching out to grassroots and community organizations and institutions (for example, The Junior League, Women’s Political Caucus, Rotary, Kiwanis, etc.). It must use the wide range of people and organizations on whom poor oral health has an impact -- health care providers, school nurses, day care providers, employers, parents, MRDD, children’s and senior citizens’ advocates – who must be willing to plead this case publicly. Funders must be willing to support this campaign in addition to supporting programs and services. Only by capitalizing on the expressed community need can we reach those who have the power to make change happen.
Chapter 7: Evaluation

Outcomes and Benchmarks by 2010
(Based on Healthy People 2010\textsuperscript{466})

**Oral Health Status Objectives**

- Reduce dental caries experience in children
  - From 45\% for inner city school children ages 6-8 to 35\% by 2010
  - Reduce the number of Head Start children ages 0-5 who do not receive dental exams prior to enrollment to no more than 30\% of enrollment in any program in the region. (See page 25 for chart with current percentages).
- Reduce untreated dental decay in children and adults
  - By 7\% for ages 2-4 in Head Start programs (range from 10\% to 29\% in 2002, reduce to range of 9.3\% to 27\%)
  - By 20\% for third graders in school sealant programs (from an average of 50.8\% of African American students in schools with sealant programs to 60.9\%).
- Reduce by 6\% adults over age 65 who have lost all their teeth by state report (e.g., KY adults from 48\% to 45\%)
- Reduce new cases of oral cancer by 5\% (from 200 to 190).

**Prevention Intervention Outcomes**

- Increase sealants by 27\% in 8-year-old first molars and by 35\% in 14-year-old first and second molars in selected Northern Kentucky schools with a high rate of free and reduced lunches.
- Increase utilization of the oral health system for ages 3-18 by 18\%; from an average of 24\% to 28.3\%.
- Increase utilization of dental services for those with MRDD or other special needs by 10\%.
- Increase preventive dental services for poor children by 32\% (capacity measured as screenings and treatment slots).
- Reduce the number of inpatient stays related to dental problems (admitted through the Emergency room) from 420 by 10\% to 378.
- Nursing home patients get a dental evaluation within the first 14 days and get follow up care.

**Infrastructure and Capacity Building Outcomes**

- Increase the number of school-based health centers with an oral health component to 75\% of centers in the region (currently none have oral health components).
- Increase the oral health capacity of community health centers and local health departments with oral health components by 98,550 patients annually by 2010 in the best case scenario (an increase of 140\% in treatment capacity).
- Increase by 10\% the number of dental professionals in the region serving vulnerable populations (increase from 27.5\% of dentists taking Medicaid to 37.5\%).
- Reduce emergency room utilization from 10,100 cases by 10\% to 9,090.
**Community Response to the Plan (Process Outcomes)**

- Increase in donations to dental-related charities and projects
- Voter and legislative support for changes to dental services.
- Achievement of long-term funding for programs and projects.
- Increased public awareness of oral health and the need for access.
- Implementation of recommendations.
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196. Butler County Head Start Health Coordinator Barbara Houchins.

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Clermont County Child Focus (Head Start) Health Coordinator Karen Balon


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Southern Ohio Health Services Network, Batavia, OH, Kim Patton, CEO.


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Appendix II: Advisory Committee

Chair: Karen Bankston, Vice President, University Hospital
Deborah Anderson, Assistant Health Commissioner, Cincinnati Health Dept.
Kay Atkins, Healthy People Vision Council Manager, United Way & Community Chest
Nancy Carter, Assistant Dental Director, Cincinnati Health Department
James Cecil, Administrator of Oral Health Programs, Kentucky Department for Public Health
Jack Collopy, Executive Director, Regional Head Start Children’s Health Collaborative
Eileen Cooper Reed, Director, Ohio Children’s Defense Fund
Barbara Crawford, Dental OPTIONS Program Manager
Robert Creedon, retired Pediatric Dentist, Project Director, Butler Co. Dental Care Program
Trey Daly, Attorney, Legal Aid Society
Yvonne Fryberger, Director of Outreach, Cincinnati Children’s Div. Of Developmental Disabilities
Randy Garland, Director, Cincinnati Health Network
Steve Gibbs, CEO, FreeStore/FoodBank
John Gillespie, Executive Director, UC Medical Center Fund; Director of Marketing & Development, UC Physicians
Chris Goddard, Executive Director, Northern Ky Healthpoint Family Care Centers
Thomas Goeke, Private Practice Dentist
Carol Graves, Cincinnati Public Schools Early Childhood Program
Alicia Habermehl, Warren County Health Department
George Hagen, Health Care Consultant, Progressive Health Care Systems
Lawrence Hill, Dental Director, Cincinnati Health Dept., Executive Director, Greater Cincinnati Oral Health Council, Project Director, RAPP
Tim Ingram, Health Commissioner, Hamilton County
Alan Kalos, Health Planner, Northern Kentucky Independent Health District
William Karwisch, Public Health Director, City of Hamilton
Michael Kehoe, Oral Products Worldwide, Procter & Gamble
Kate Keller, The Health Foundation of Greater Cincinnati
Beth Lange, Manager, Newport School-Based Health Center
Dolores Lindsay, Manager, Lincoln Heights Health Care Center
Leshia Lyman, United Way Northern Kentucky office
Kaki McGeary, The Anthem Foundation
Tricia Montgomery, Brand Manager, Crest, Procter & Gamble
Darla Moore, Community Action Council, Head Start
Ron Murray, Health Commissioner, City of Middletown
Victoria Nixon, Executive Director, Cincinnati Dental Society
Lynn Olman, CEO, Greater Cincinnati Health Council
Kim Patton, CEO, Southern Ohio Health Services Network
Jackie Phillips, Middletown Health Department
Terrence Poole, private practice dentist
Kara Ringer, Hamilton County Head Start
James Rogers, United Way & Community Chest Healthy People Vision Council
John Romer, Adult Outreach, Cincinnati Children’s Division of Developmental Disabilities
Mark Siegal, Dental Director, Ohio Health Department
James Steiner, Director, Pediatric Dentistry, Children’s Hospital Medical Center
Bobbie Sterne, Community Advocate, (former Cincinnati mayor and member of city council)
Julie Southers, United Way Eastern Area office
Alfred Tuchfarber, Director, University of Cincinnati Institute for Health Policy & Health Services Research
Matthew Van Sant, Clermont County
Diane Vasiliadis, Butler County MRDD Dental Program
Karen Walker Jones, Cincinnati Public Schools Early Childhood Program
Barbara Winter, Hamilton County Head Start
## Appendix III: Participating Agencies and Individuals

<table>
<thead>
<tr>
<th>Name</th>
<th>Agency</th>
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<tbody>
<tr>
<td>Bob Creedon</td>
<td>Retired pediatric dentist</td>
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<tr>
<td>Fred Valerius</td>
<td>Butler County Board of MRDD</td>
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<td>John Conboy</td>
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Trey Daly  Legal Aid Society
Marlena Richards-Cox  Butler County DJFS
Pat Dressman  Campbell Co Human Services
Rhonda Freeze  Butler Co DJFS
John Cosby  City Gospel Mission
Janet Gates  Service Coord, Tender Mercies
Carrie Farquhar  Ohio Health Department
Pat Noll  Northern Ky Head Start
Ron Murray  Butler County Health Commissioner
Concepcion A. Reyna  Outreach Coordinator, Butler County DJFS
Mary Jo Roberts  Dental Options
Ann McDonald  Women Helping Women
Cheryn Hackworth  ODH/BOHS
Bernadette Reich  Transitions/Drogee House
Phil Latham  SOS
Linda Goldenhar  UC Institute for Health Policy & Health Services Research
Sandy Bernard  McMicken Homeless Dental Clinic
Lawrence Williams  Talbert House
Judy Gissy  CCAT
Neil Tilow  Talbert House
Deanna White  Cincinnati Works
David Logan  Prospect House
Jody Christerson  Northern Kentucky Health Dept.
Maritza Dyer  Bienestar
Tina Osso  Shared Harvest
Randy Garland  Cincinnati Health Network
W. Faye Timmerman  Ky. Cabinet for Families & Children
Judy Wheeler  Ky. Cabinet for Families & Children
Michael Oberdoerster  Talbert House
Vicki Nixon  Cincinnati Dental Society
Susan Ball  VA Medical Center
Kay Atkins  United Way
Dr. Reed  Health Commissioner
Alan Kalos  No. Ky Health District
Mary Burch  School Based Health Center
Pam Erekson  Oxford Talawanda Dental Services
Judy Van Ginkle  Every Child Succeeds
Jack Collopy  Regional Head Start Children's Health Collaborative
Kara Ringer  Regional Head Start Children's Health Collaborative
Kaki McGeary  Anthem Foundation of Ohio
Rachelle Wagner  Automated Health Systems, CHIP
Karen Balon  Health Coordinator
Debbie Canfield  Babies Milk Fund
Melody Menger  Dearborn, Indiana, Head Start
Carol Clements  School Based Health Center
Leisha Lyman  No. Ky United Way
Carol Clements  School Based Health Center
Leisha Lyman  No. Ky United Way
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