A House on Fire:
Scientifically Based Strategies for Battling Tooth Decay in America's Young Children

A White Paper on

The Institute for Oral Health's

Conference on Early Childhood Dental Care

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Introduction:

In the last decade, despite America's rising standard of living and many new advancements in dentistry, the oral health of our young children has not improved, especially among low-income and minority groups.

Caries is the most common form of childhood infection, five times more prevalent than asthma. From 1994 to 2002, the prevalence of tooth decay has remained unchanged at 41 percent in the primary teeth of children between the ages of 2 and 11. One in five children in this age group has untreated decay. And low-income kids are about three times more likely (34 percent) to have untreated decay than kids from wealthier families (13 percent).

Far from being close to a solution for the caries problem, we could, in all likelihood, witness a continuation of this disappointing trend in the next decade–despite the fact that caries is almost entirely preventable.

It's clear that the current paradigm of dental care is failing to help a large segment of the American population. What strategies can health care providers, government officials, the academic-scientific community, the health insurance industry, employers, and the public pursue to arrest and reverse this trend?

This question was at the core of the Conference on Early Childhood Dental Care, conducted by the recently inaugurated Institute for Oral Health (IOH). Based in Seattle, the Institute is dedicated to speeding the adoption of progressive treatment guidelines and delivery methods, based on the latest scientific evidence, to the front lines of dentistry. Its goal is to improve oral health in America. The conference was held November 13th and 14th, 2006, in Seattle.

A group of nationally recognized speakers addressed various issues and challenges, and offered a range of possible solutions. Most agreed on several important facts:

- Dental decay (caries) is the most widespread infection in the population and yet, for the most part, it is preventable.
- The traditional surgery-oriented dental model of "drilling and filling" does little or nothing to stem early childhood caries (ECC).
- The current model of health insurance for the poor, Medicaid, is broken and inadequate in dealing with ECC.
- Our health care system doesn't do a good job of integrating education, prevention, and treatment across healthcare providers, nor is it effective in sharing information among providers.
- Paradigm shifts and creative problem solving in several arenas are essential if headway is to be made in improving oral care for millions of the nation's young children.

Several speakers made use of the same incendiary metaphor: If a house were consumed in flames, they asked, would any sane person consider rebuilding the roof while the fire raged? This was a reference to the situation dentists face today when they see a young child with caries. Rather than attempting to put the fire out first (taking steps to reverse the transmissible, bacterial infection that causes dental caries), most dentists

simply try to build a new roof (filling a cavity), only to see it engulfed in flames (more caries and cavities) a short while later.

This is not to deride the dental community. After all, dentists are a function of their training, environment, and the numerous constraints they face in the daily practice of dentistry. What is called for is a new model for approaching the prevention, diagnosis, and treatment of caries, and this can only happen through fundamentally changing the way dental education and service delivery occurs today.

The burning house metaphor, as it turns out, is also apt for describing the general state of dysfunction in delivering health care in general, and dental care in particular, to the nation's poor. A large portion of the young children eligible for Medicaid-funded treatment rarely if ever see a dentist. Lack of dental care, poor diet, and inadequate oral hygiene are the main reasons why caries runs rampant among the poor.

This white paper outlines the presentations of each of the IOH conference speakers. At the end is a list of action points and solutions they offered. These items form a blueprint for extinguishing the flames once and for all, and for building stronger, more effective models to support optimum oral health for America's children.

Mr. Ron Sims—King County (state of Washington) Executive and Chair of the Puget Sound Health Alliance–"Early Childhood Oral Health: Ready For Innovation"

Mr. Sims was the catalyst behind the formation of a unique state-wide coalition of health care purchasers and providers called the Puget Sound Health Alliance (PSHA). Its goal is twofold: To improve the quality of health care–including dental care–while reducing its soaring costs. Preliminary reports indicate the experiment has been successful, and may be worth duplicating in other parts of the country.

The PSHA was born in 2003, sparked by Sims's concern about the skyrocketing cost of health care for King County employees. He wanted a solution that would corral the county's health care expenditures without passing the burden on to employees themselves, as other employers have done as a short-term fix.

Sims was aware of studies that demonstrated vast waste and misfeasance in the practice of health care. For example, a Rand Corporation study found that in the Seattle area about 41% of patients didn't receive the recommended treatment from their doctors, instead getting too much, too little, or the wrong kind of care. Sims asked a couple of provocative rhetorical questions: "Would you get on board a plane if the pilot said to you that we will get to your destination 59 percent of the time? Would you drive home if you knew that 59 percent of the time your home was going to be there? The answer is no. We want certainty. In health care, the most intimate thing that we face, evidence shows that we get a correct diagnosis and recommended treatment plan consistent with that diagnosis only 59 percent of the time." Yet in Sims' airline metaphor, that would clearly be unacceptable.

That simply wasn't good enough, and Sims and his team wanted to bring more evidence-based guidelines into the arena. If recommended treatments were followed, they reasoned, the quality of health care would improve and costs would go down. And costs would be further contained if providers themselves could be measured by objective standards of quality. People would then tend to use providers that offered the most effective care.

These were revolutionary ideas that had not been tried before. In order to exert reform pressure on medical providers, Sims knew he would need more clout than his county's health plan alone could apply. So he added muscle by gathering together a team of businesses and other health care purchasers, including heavyweights Starbucks and Boeing, who shared the same imperative to lower health care costs.

The alliance is now in the process of evaluating clinical guidelines in a number of different areas, with the aim of helping medical providers choose the best possible treatment protocols. It is also preparing qualitative standards and tests for hospitals and doctors, so that businesses, insurance companies, and individuals can make informed decisions about how to spend their health care dollars. "We are putting the power in people's hands," Sims said. "The bottom line is that people will be able to make informed decisions."

King County is also focused on another major health care problem among its citizens, Sims told the conference. And that is how to reach the county's 8,000 children who don't have health insurance yet are eligible for existing publicly funded insurance programs. In 2006, he convened a task force charged with creating an innovative children's health program that searches out and provides care for these neglected

children. “Children represent the best chance to invest in preventive services,” he said, “so they can grow up and lead healthier and more productive lives.”

Sims believes that a child’s oral health requires as much, if not more, attention than any other aspect of health. After all, it has a direct correlation with a child’s ability to eat a normal diet, learn in school, be free of pain and suffering, and function normally in social settings. The correlation between oral health and such diseases as heart disease, diabetes and obesity is further evidence that it deserves more attention.

Oral health, he asserts, is an important component of psychological health as well. As evidence he points to the fact that 80 percent of inmates in King County juvenile institutes have advanced tooth decay. How can these individuals be expected to re-enter society and obtain employment if their oral conditions and poor appearance exacerbate their low self esteem and make them unemployable?

The issue of poor oral health in children is an especially important one for Sims. Many years ago, he tutored junior high school students and found that he could predict a child’s performance by looking at their smile. Children with rampant tooth decay were usually too embarrassed to smile.

“Rather than talk or discuss in class or have people see their teeth,” Sims said, “they tend to act out. It may be rebellious but to me a lot of it is just a defensive mechanism. They know their teeth are decaying and it has destroyed what little self-esteem they had. It just rips it. And I always said that if I could fix their teeth, I would have a chance then of being able to tutor and bring children to age in terms of their learning. I want those smiles because smiles are lifetimes, they create lifetimes. They create the ability to move a child to a higher performance, and have them feel good about themselves. It allows them to walk and ascend the mountains of their life.”

When his talk was over, a member of the audience from California asked Sims how programs like the Puget Sound Health Alliance could be created in parts of the nation, such as his own state, where new taxes are virulently opposed. Sims responded that the alliance is an easy sell to taxpayers because its aim is to reduce overall costs. The greater emphasis on prevention, for instance, will cost less than treating diseases. It was through a desire for fiscal conservatism that the program began, he said.

Although it’s too early to tell how successful Sims’s visionary programs will be, many observers believe the county’s innovative philosophy and methods may become a model of national health care reform.

Dr. Burton Edelstein—Professor of Dentistry and Health Policy and Management, Columbia University; Director of the Children's Dental Health Project of Washington D.C.–"Understanding Pediatric Dental Caries As A Basis For Establishing Progressive Policies And Programs"

The issue of Early Childhood Caries (ECC) should have been solved long ago, argued Dr. Edelstein, an advisor for the Institute for Oral Health and a nationally recognized authority on pediatric dental care and policy. Yet it not only persists in the United States but the problem has actually grown in the last 10 years. Today, one out of every four children between the ages of two and five has ECC, according to the Centers for Disease Control and Prevention. Edelstein asserted that there is no other disease in America as widespread as ECC that we do so little to prevent.

Because the current model of dental care has proven inadequate to the task of dealing with ECC, Edelstein said it's time to start thinking "outside the box." He offered several "what-if" scenarios that illuminated the problems inherent in the current paradigm. The most provocative was this: if ECC were discovered today, in 2006, what would our response to it likely be? He suggested we would probably treat it much as we do HIV, by searching for the root of the problem and applying medical solutions.

"We would medicalize the problem, not dentalize it," he said. "Politicians would get involved. We would ask, where did it come from? What kind of disease is it? What do we do with it? Why do some kids have it and other kids not? The question would not be how do we repair the tooth? We would take an epidemiology approach." (Later we'll hear more about the role of physicians in managing ECC from another speaker, Dr. Russell Maier.)

Underlying ECC is a transmissible, infectious, bacterial disease. Dentists have traditionally treated ECC with surgical interventions–restoring teeth already ravaged by the infection. By the time dentists enter the picture, it's too late. All they can do is treat the physical manifestation of the disease, not its root cause. Studies have shown that 40 percent of surgical measures fail. Caries returns within two years. To solve the ECC problem, interventions need to occur much earlier in the cycle–perhaps even before the child is born.

Edelstein said that "health behaviors" account for about half of what we consider health. (The other half being made up of genetics, the environment, and access to health care.) Oral health services make up just ten percent of a person's oral health status, he said.

With ECC, health behaviors are multifactorial. They consist of:

- Creating an environment within the mouth that fosters the growth of cariogenic bacteria, through frequent and sustained contact with carbohydrates.
- Lack of consistent, effective oral hygiene.
- Lack of consistent, effective professional oral care.

The problem of how to change these behaviors is made more difficult by the fact that "80 percent of decay is found in 25 percent of kids," he said. Most of those kids are in low-income families, which often don't have the knowledge of or access to dental care necessary to effectively treat ECC.

Somehow, parents need to be educated about how to properly care for their children's teeth. Yet the current crop of dentists emerging from dental schools may be uniquely *un*qualified to perform this function, Edelstein said. Many have backgrounds in biomolecular sciences, and often don't possess robust communication skills. "They can explain dental caries on a molecular level," Edelstein stated, "but can't explain to parents what to do to prevent it."

Left untreated, early onset caries can have a devastating affect on children. It results in a higher lifelong disease risk, he said. And the pain often associated with it can cause sleep disturbances, eating disorders, and behavioral problems. Making matters worse, the very young are usually unable to communicate the pain they feel. Children cry for many reasons. Who knows how long their dental pain is endured before they are take to see a dentist?

Edelstein revealed that two months before, for the first time, he himself had developed a toothache that caused unbelievable pain.

"I had never experienced the kind of distraction that comes with the intensity of dental pain," he acknowledged. "So many kids between the ages of two and five are experiencing dental pain that is severe and significant and compromising to their ability to function. Every pediatric dentist has experienced the joy of having a parent say, 'How did you do a personality transplant at the same time you were repairing my child's teeth?' Because just getting them out of that pain allows them to go back to normal function."

Edelstein outlined six different levels where changes can be made in the battle to fight ECC: society, community, family, child, mouth, and tooth. To effect the greatest and most rapid changes, one needs to target the broadest levels first. That's why he's working with federal legislators to instigate a society-wide shift in how we look at ECC: as a bacterial scourge that's eminently manageable–if people understand its etiology and the most effective way to control it.

Dr. Rob Compton–Chief Dental Officer, Delta Dental of Massachusetts–"Controlling Insurance Costs By Investing In Healthy Communities"

Delta Dental of Massachusetts has a strong interest in finding ways to reduce the cost and improve the quality of dental care it provides. What would be the most efficient and effective ways to achieve this goal? This was the core challenge faced by Delta Dental and a consortium of other organizations who banded together in 1998 to improve oral health in the state, according to Dr. Compton.

Because 75 percent of dental health expenditures go toward just 30 percent of the "utilizers," it made sense to focus on that group. If the oral health of these people could be improved, much of the drain on the insurance system would be reduced. Questions had to be resolved at the outset about how best to approach the problem. A limited budget ($4 million a year) wouldn't allow for trying to "bail the boat" by treating all the existing symptoms of tooth decay (i.e. filling countless cavities). So the group decided to "plug the holes" by improving systems already in place, through education and prevention strategies.

The logic was that if the caries cycle could be broken early in a person's life, preferably in early childhood, then the lifetime cost of treating that person would plummet. But how could they communicate with and provide care for people from low-income families who either had no insurance or didn't have access to Medicaid-supported dental care in the towns where they lived?

One strategy was to deploy a state-wide public education program about the importance of children's oral health called "Watch Your Mouth." Core messages were relayed via radio, television, and newspapers around the state. The program's effectiveness was measured by public surveys, which showed that public knowledge was significantly increased.

Another method was to develop pilot projects to build a community-based, sustainable early childhood oral health delivery system in two rural communities. If successful, the model could be exported to other communities.

To increase the number of dentists in rural areas where there were few or no dentists, programs were funded at three of the state's dental schools to encourage graduates to practice in underserved communities. "We have a scholarship program for students," Compton said. "In some cases it starts in the undergraduate years. We help minority students get through their undergraduate program, get provisional acceptance into dental school, and then fund them for four years. Then we move them into the communities that need the most help."

A partnership with the Forsyth Dental Hygiene Program is another measure designed to increase the number of dental practitioners in underserved areas of the state. (Some 80 cities and towns in Massachusetts have no dentists at all.) Compton believes there's a need for a dental professional somewhere between a hygienist and a dentist, similar to the role of a nurse practitioner in medicine. "We're working on setting up a masters program in dental hygiene [at Forsyth] to train these folks," he said, "to give them the extra skills that they need." Then they'll be qualified to go out and provide expanded oral health services in these underserved areas.

Perhaps the most significant and revolutionary reform was the creation, in 1998, of a statewide oral health advocacy taskforce. With a goal of improving oral health

through public policy, the group has now expanded to 66 organizations and 1100 members. “Most of these organizations are not dental,” Compton stressed. “We bring in all the stakeholders in the community. Its much more powerful than just dentists, dental hygienists, or dental assistants coming forward. It’s the community speaking, that this is important to us.” Among its roster are groups such as ABCD Head Start, Greater Boston Legal Services, Massachusetts Public Health Association, and The Women’s Union.

The most striking example of the power of the taskforce was the successful lawsuit it filed against the state for failing to meet its own commission’s recommendations for improving Medicaid coverage. “The legislature was simply going to shelve the recommendations,” Compton explained. “We weren’t going to accept that. We decided enough’s enough.”

Taskforce lawyers demonstrated that the health outcomes of the state’s Medicaid recipients were substantially lower than other residents. And the cause of the problem was the “structure and processes of the Medicaid department itself.” The judge ruled that the only solution was to outsource the department’s job to a third-party administrator.

Another important victory for the taskforce was the formation of an oral health caucus within the state legislature, to raise awareness about oral health issues. Sixty six out of 200 legislators are part of the caucus. When the task force sought to put a cap on the number of Medicaid patients a dentist saw, the legislature readily complied. (Previously, if dentists accepted one Medicaid patient, they were forced to see every one who sought service. Where there was only one dentist in a community with several thousand Medicaid recipients, dentists often refused to see any.)

“The task force has been very effective at creating change,” Compton said.

Although much remains to be done, the innovative strategies employed by Delta Dental of Massachusetts, the Oral Health Advocacy Task Force, and the state have moved Massachusetts into the forefront nationally in the battle to improve oral health care for children.

Dr. John Featherstone–Professor in the Department of Preventive and Restorative Dental Sciences, University of California at San Francisco–"Caries Balance: The Basis for Caries Management By Risk Assessment"

Midway through Dr. Featherstone's talk, he paused for an unscripted moment. "I'm always fascinated when I come to a meeting like this," he told the audience, "and I reach out my hand in front of me and there's a bowl of sucrose-glucose containing candies." He was referring to the hard candy placed in front of each conference participant. "What if they were all Xylitol candies? Wouldn't that make a difference in the world?"

But before the day arrives when candy is routinely made from substances that inhibit rather than promote tooth decay, a paradigm shift needs to occur in the way dentists and patients view oral health, according to Featherstone. His groundbreaking research on the etiology of caries is leading us toward this goal.

Featherstone is an internationally recognized expert in the chemistry and biochemistry of the tooth decay process. His research over the past 30 years has covered fluoride's mechanisms of action, caries risk assessment, de- and remineralization of teeth, apatite chemistry, salivary dysfunction, caries prevention, and caries management by risk assessment. In 2002 he was recognized by the European Organization for Caries Research for his life long research in dental caries. His work in promoting the application of research in practical dentistry was honored by the American College of Dentists, also in 2002.

After three decades of studying caries, he said he'd like to "change the face of dentistry" by incorporating the fruits of his research into practice. The centerpiece of this new paradigm is the view that caries is a transmissible, bacterial infection. Traditional methods to fight tooth decay–including fluoridated water, standard fluoride toothpastes, and restorative dentistry–do not address the root cause. To do that requires knowledge of a person's so-called "caries balance," a measure of factors that either contribute to or lessen the effect of cariogenic bacteria.

On the "pathological" side of the equation are acid-producing bacteria (S. mutans, S. sobrinus, and lactobacillus species), sub-normal saliva flow and function, and the frequent ingestion of fermentable carbohydrates. On the "protective" side are salivary components and flow, remineralization from fluoride, calcium and phosphate, and antibacterials from extrinsic sources.

When he broached the topic of saliva, Featherstone became almost reverential, calling it "the most amazing fluid in the body." Contained within it are calcium and phosphate, which, when combined, continually remineralize the tooth's hard enamel surface. (Fluoride speeds this process, plus protects against demineralization–a process that slowly removes the mineral content from tooth enamel, leaving it more vulnerable to decay.) Saliva also conveys proteins and lipids that create a protective substance on the tooth's surface. There are even antibacterial chemicals contained in saliva, though not enough to fend off the onslaught of bacteria that form in the mouths of most people with a serious caries problem. Either due to disease, side-effects of some common medications, or genetics, some people don't have good saliva flow, reducing its beneficial effect in the mouth.

Fluoridated water and toothpastes have helped bring the caries rate down, but haven't solved the problem, Featherstone said. For people at high risk for caries, office-applied fluoride products–in the form of gel, foam or varnish–provide extra protection. They have the benefit of slowly releasing fluoride in the mouth for several weeks, regardless of what else a patient does for his oral health. Good results have also been recorded in patients who use high-fluoride toothpastes and over-the-counter fluoride rinses.

Featherstone also extolled the benefits of Xylitol, a sugar substitute used in some foods, chewing gum, and candy. It has the astounding and somewhat incredible characteristic of being as sweet as sucrose by weight, but inhibiting the formation of cariogenic bacteria. It not only enhances remineralization of the tooth surface, it also reduces the transmission of bacteria from one person to another, and inhibits future recolonization of the bacteria.

But although Featherstone and others have gathered a mountain of solid evidence in the past 30 years about techniques to control caries, how does this translate into real world programs to fight tooth decay? That will happen, Featherstone said, when dentists begin making accurate risk assessments of every patient's caries balance, by measuring their pathological and protective factors and taking steps to balance them.

In someone with a high risk of caries, for example, every possible protective factor would have to be employed. They'd ideally visit a dentist every three or six months for an application of topical fluoride; brush with high-fluoride toothpaste (most likely prescription strength), rinse with an antibacterial mouthwash, chew Xylitol gum, and perhaps rev up their flow of saliva, either through chewing Xylitol gum or by using one of several products available over the counter.

Because the "caries balance" approach is new and non traditional, it is "an uphill struggle" to get dental school faculty and students–as well as practicing dentists–to accept it. But its validity has been amply demonstrated by clinical research, and patients who have undergone this kind of treatment are grateful for the improvement in their oral health.

According to Featherstone, patients who acquire perfect caries balance early in their lives and maintain it will, in the long term, need fewer restorations as well as less prosthodontic and endodontic work. When this happens on a wide scale, total expenditures for oral care should drop significantly.

Ms. Regina Herzlinger–Professor, Harvard Business School; author of *Market Driven Health Care: Who Wins, Who Loses in the Transformation of America's Largest Service Industry*–"Insights On The Dental Health Care Delivery System"

Three decades ago, Professor Herzlinger, a widely recognized health care researcher and the first woman to be tenured and chaired at Harvard Business School, came up with a bold idea. Predicting the gradual unraveling of managed health care, she foresaw the rise of what she called a "consumer-driven" model that would offer more choices for consumers, improving health care quality and lowering costs.

Although the U.S. hasn't openly embraced her ideas, there are a few signs that consumer-driven health care is starting to gain footholds, both here and in Europe.

In a consumer-driven health care world, instead of an employer essentially taking several thousand dollars from an employee's salary each year and depositing it with a health insurance company, employees would have the freedom to spend that money as they saw fit. Under this model, Herzlinger believes, insurance companies would be compelled to offer plans more in tune with what people wanted, forcing health care providers to be more efficient and productive, and thus lowering costs.

The best example today of this new paradigm can be found in Switzerland, she said. Recently the Swiss switched to a health care model in which every citizen (except the poor, whose policies are covered by the government) must buy their own health insurance. The result is a health care system that provides excellent quality of care with costs substantially lower than in the U.S.–40 percent less in fact.

One unusual feature of the Swiss program is that people must sign on with an insurance plan for a minimum of five years, to ensure that any investments the insurance company makes in a person's health–such as preventive medicine–will be "rewarded" by lower costs in the future. At the outset, each person undergoes a thorough health examination. If after five years a person's level of health improves or remains unchanged, half the premiums, or about $25,000, are refunded. This is a powerful incentive, she said, for a person to maintain (if not enhance) his or her health during the course of the contract.

A similar incentive is built into another offshoot of consumer-driven health care, high-deductible insurance plans, which are becoming more popular in the U.S. Insurance reimbursements only kick in once the consumer has paid out-of-pocket for treatment up to the deductible amount (ranging from $1,000 to $5,000). This lowers monthly premium costs and dampens the incentive to use marginal or unnecessary services. Herzlinger cited studies that have shown that under this system people use hospitals less, tend to pay more attention to their own health, and overall health care costs decline.

One major stumbling block to adopting consumer-driven health care is that under the current system, the incentive is for insurance companies to reimburse providers for treating the sick, not for preventive measures. Even though it's clear that prevention is cheaper in the long run than treating an illness once it manifests itself, health care providers don't get sufficiently rewarded for keeping people healthy. So there's no financial incentive for them to do so. This paradigm needs to change in order for consumer-driven health care to work, Herzlinger argued.

She said she believes the logic of consumer-driven health care will ultimately prevail in the United States, though it may take some time. "Eventually this country will

adopt universal health care with a consumer-driven framework," she said. "But a move toward a single-payer system is unlikely unless the consumer model fails."

Dr. Joel Berg–Professor and Chair of the Department of Pediatric Dentistry, University of Washington School of Dentistry–"New Developments in Caries Management, Caries Detection And Diagnosis in Young Children"

Like several other speakers at the conference, Dr. Berg, a board-certified pediatric dentist, thinks a paradigm shift in the treatment of early childhood caries is of the utmost importance. It needs to change from a model that relies on restoring caries-ravaged teeth to one that looks at caries as a preventable disease.

"Dentists like to cut teeth," Berg said, "We're surgeons, not internists." As evidence he cited a list of what most dentists would consider the profession's major developments: anesthesia, the high-speed handpiece, the acid etch technique, light polymerization, fluoride, and CAD/CAM (Computer Aided Design/Computer Aided Manufacturing). Among the six items on the list, all but one–fluoride–has to do with restorative dentistry. In addition, he said that most research papers emerging from university labs investigate treatments of the late stages of caries, rather than its prevention.

It's easy to see how this situation arose–people who become dentists usually consider themselves craftspeople and like working with their hands–and why it may be difficult to change. Berg said that in the U.S., restorative dentistry is big business, worth around $42 billion a year. Filling cavities makes up a large percentage of a dentist's income. Contributing to the situation is an insurance industry that reimburses dentists only for procedures, not for oral health advice or efforts to determine caries risk factors.

Berg predicted that within 10 years, caries treatment will undergo a fundamental change: It will shift to a medical approach.

One key element of this new strategy will be the early detection of caries risk, using diagnostic tools now in development, that will be highly specific and accurate. Today a baby, in its first three years of life, routinely receives 13 to 15 medical exams. These are excellent opportunities to do a quick scan with a device that measures caries risk.

A sign that the paradigm shift is starting to happen is the success of a much-honored program called ABCD, which stands for Access to Baby and Child Dentistry. A collaboration between local health jurisdictions, dental societies, the Washington Dental Service Foundation, and the University of Washington, the program aims to use a preventive approach to improving the oral health of young children in low-income families.

The ABCD program accomplishes this in two ways. First, it trains general dentists to treat young children, which they traditionally have been loathe to do because of their lack of training and the perceived difficulty of handling kids in this age group. A survey found that before going through the ABCD program, only 2 to 4 percent of dentists would see a child under 4 years of age. After the program, 42 percent said they would.

Second, the program educates parents about the best ways to care for their children's teeth. For instance, instead of just telling parents to brush and floss their children's teeth, a dental professional would demonstrate the techniques. Unique to the program is a means to reimburse dentists who engage in this sort of family oral health education, something that wasn't possible before.

Evaluations of the program's efforts have been uniformly positive: more kids are being treated, and more dentists are willing to see young children. "ABCD has worked," Berg reports. "And local, grassroots effort is what makes it work." ABCD's success has caused it to be adopted by other states, and it is part of what makes Washington State one of the national leaders in dental care reform.

Dr. Russell Maier, M.D.–Program Director at Central Washington Family Medicine–
"The Role of Primary Care in Oral Health"

Dr. Maier is the director of the University of Washington (UW) family practice residency program in the city of Yakima, located in a mostly rural, agriculturally-based, part of the state. Thanks to innovative programs like the pediatric oral health module he helped foster, Maier sees "the beginning of a sea change in the way medical care is provided." The change involves family practice providers who are starting to pay as much attention to a child's mouth as they do to the rest of the body. If this sea change sweeps across the nation, it could vastly improve oral health for all children.

The UW family practice residency program began in 1992 as way to address the problem of how to attract more physicians to rural areas like Yakima. When Maier assumed his job as director, he took aim at another serious health problem in Central Washington: the generally poor oral health of children, especially children from poor families.

The causes of poor oral health, particularly in a rural setting, are manifold. Access to care is one issue. For instance, children are 2.5 times more likely to lack dental insurance than medical insurance. In a nation of 50 million people without health insurance, more than 100 million are without dental coverage. Also, not only is there a shrinking supply of dentists per capita in the U.S., but most of them are concentrated in urban areas.

So Maier, knowing that by age two most babies have seen a medical provider about seven times, figured that family practice physicians and their staff could assume the prevention and education role of oral health providers for these children. Medical providers could perform such functions as assess caries risk, apply fluoride varnishes, and instruct parents in proper oral care–well before a dentist might enter the picture.

But there was one problem. Studies showed that although 90 percent of physicians believed that oral health should be addressed in well-baby visits, half had little or no training in oral care (the average training was a paltry two hours). And, according to one survey, only nine percent of physicians could correctly answer four simple true-or-false oral health test questions:

- A 3-month old living in an unfluoridated area needs fluoride supplementation.
- Only bottle-fed children get early childhood caries.
- Cavity-causing bacteria can be transmitted between mother and child.
- Dental sealants are usually applied to a child's primary teeth.

The solution Maier and his cohorts devised was to use federal grants to fund oral health training for medical school residents. Forming an alliance with local dentists and the University of Washington Department of Pediatric Dentistry, the program's directors selected Yakima as the pilot site.

Family practice residents came out of the training–covering subjects such as public health, normal dental development, caries, dental emergencies and oral systemic health–with significantly more likelihood of practicing oral care on their patients than residents who didn't receive the training, studies showed.

The program has been so successful that it's being duplicated in other states, under the auspices of the Society for Teachers of Family Medicine. In the future, when the "mouth gets put back into the body," as Maier said–a nod to the disconnect that currently exists between oral health and systemic health–there may come a time when family physicians and their staff make a huge impact in preventing oral disease among young children across the country.

When that happens, the burden of poor oral health–52 million hours of missed school, pain, loss of self esteem, and systemic complications–will begin to ease for the nation's children.

Dr. David Noel–Chief Dental Program Consultant, State of California Department of Health Services–"How To Have No Tooth Decay"

No tooth decay? Dr. Noel actually believes it's possible to eradicate caries–using technology available right now. Among the strategies he promotes are sucking on "Dr. John's Herbal Lollipops," made from two Chinese herbs, chewing a sweet-tasting but impossible-to-pronounce gum several times a day, and thinking of your mouth as a toilet!

How can such a respected dental professional, with over 40 years of experience in the field, make such provocative claims? Turns out there's plenty of science to back them up.

It all goes back to understanding how caries works, he said. Only by viewing tooth decay as a bacterial problem can we learn to fight it effectively. One has to know how the cariogenic bacteria live and die, what makes them happy and what ruins their day. Armed with this knowledge, people can make things miserable for the little beasties–and improve their own oral health.

Though the etiology of caries has been known for many years, the best ways to combat it are still a well-kept secret to many people–especially those from lower socioeconomic groups. Noel has worked hard to spread the gospel of zero tooth decay in his 15-year career as the chief dental consultant for the largest Medicaid program in the nation. He remains a passionately enthusiastic proselytizer.

Here are the steps Noel said that anyone can take to prevent or reverse tooth decay:

- First thing in the morning, before eating or drinking anything, brush teeth and tongue with a toothpaste containing fluoride. Then floss and finally rinse with water.
- Immediately after eating, snacking or drinking anything but plain water, chew gum sweetened with 100% Xylitol.
- Keep the intake of fermentable carbohydrates to a minimum. Replace ordinary sugar with Xylitol.
- Rinse the mouth vigorously and often with water.
- Before going to bed, repeat early morning procedure.
- Twice a year for a ten-day period, suck on Dr. John's Herbal Lollipop twice a day as directed.

Noel defied the conventional wisdom that says the most important time to brush and floss is in the evening, after dinner. That's the *second* most important time. The reason why morning brushing and flossing is so critical is that cariogenic bacteria have had all night to multiply. Your mouth is teeming with billions of hungry bacteria clamoring for their breakfast–and you thought it was *your* breakfast. If you don't spoil their party before you eat that toast and bowl of cereal, those bacteria will wreak havoc. Within just one minute of encountering a fermentable carbohydrate, bacteria will be excreting waste products–acids–that break down tooth enamel.

Chewing Xylitol gum after meals and snacks has proven to be an effective strategy for reducing tooth decay in Finland and other Scandinavian countries, where it has been used for 25 years. Xylitol's effect on cariogenic bacteria has been well

documented by research. It disrupts the metabolism of bacteria, preventing them from sticking to teeth. It also increases salivary flow, which washes away bacteria. And it raises the oral pH to a level that inhibits tooth decay and promotes remineralization of the enamel. Xylitol appears to be an amazingly powerful tool for fighting tooth decay, yet has not yet been endorsed by the American Dental Association and is almost unknown to most Americans.

Although the benefits of brushing with fluoride toothpaste, rinsing frequently with water, and minimizing sugar intake are well-tested decay-busting measures, another of Noel's recommendations hasn't received much if any notice: Dr. John's Herbal Lollipops. Turns out that there's solid science behind that advice as well. The herbs from which the suckers are made have a centuries-long history of medicinal use. Their scientifically proven antibacterial properties are effective against Streptococcus mutans, one of the primary cariogenic bacteria. And the optimal dosage is apparently quite small. According to the company that produces the lollipops, run by a Washington State dentist and an oral biologist in the UCLA School of Dentistry, it's only necessary to suck (not bite) two herbal lollipops a day for a 10-day period–once every six months!

Recommendations and Call to Action:

In summary, several important "re-curing" themes appeared throughout this conference. They amount to a call to action for America's health and dental care providers, the academic-scientific community, educators, and public policy makers. They include the following:

- ***Focus*** on the cause of ECC, not the end-stage problems it creates.
- ***Put the mouth back*** in the body and treat holistically. Several speakers noted that too often in America, oral health is separated from the health of the rest of the body. Russ Maier stated that on the order of 100 million Americans–one out of three people–lack dental insurance. Perhaps Ron Sims said it best when he called for the integration of the "totality" of health care. "One day," he said, "it will dawn on people the interconnection between the mouth and digestion and the intestines and psychological [elements]. It's all tied together. The body doesn't segment itself." In the future, health insurance should always cover the mouth and teeth, and people should pay as much attention to their mouth as they do to other parts of their bodies.
- ***Reach out*** to the poor and disenfranchised, educate and engage them. Because 80 percent of the problem of ECC occurs in just 20 percent of the population, mostly children in families of low social-economic status, it's of paramount importance to attack the problem at its source.
- ***Realize*** that the prevention of ECC is far less costly than treating the disease once it has manifested itself, and work to provide insurance compensation as an incentive for providers to deploy greater preventive measures earlier on, before disease occurs.
- ***Educate and enlist*** the aid of legislators and recognize their value as advocates for change. Politicians help shape social policy. As Dr. Rob Compton demonstrated, "Good things happen when politicians are advocates for oral health."
- ***Treat ECC*** as a medical, not solely a dental, problem. Do this by applying an epidemiological approach instead of the traditional "drill and fill" dental model. Don't wait until it's too late to stop the cycle of the disease. Get kids treated as early as possible, perhaps even before they're born (which means educating the parents) by someone in the medical profession if necessary, to stop the spread of caries before it can effect damage on children's teeth. Continue to improve the medical-dental interface.
- ***Involve*** the entire community in thinking about and promoting oral health. Education campaigns must target and bring on board a wide coalition of organizations and groups, so that they in turn can exert maximum political influence to effect changes in oral health policy and practice.
- ***Recognize and reward*** employers in driving change via the 3rd party payer system. While employers fund about 50 percent of dental expenditures in the

United States today, ECC is too often ignored, due to the renewed emphasis on the link between periodontal disease and serious adult-related illnesses, such as diabetes and cardiovascular disease. Re-engage employers to also think about their employees' children as part of their fiduciary responsibility.

- ***Shorten*** the time that it takes for valid research results to find their way into common dental practice. Engage the entire dental community to act, and to act quickly.
- ***Make efforts*** across the country to replicate best practices in arresting ECC. Use existing successful models such as the programs created in Washington State and Massachusetts. Spread the wisdom.