



INSTITUTE FOR  
*Oral Health*  
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2011

focus group whitepaper

# Oral Health and Prevention

## Rebranding the Profession



2011 group #2

March 10 & 11, 2011  
San Diego, CA

**:: excerpt ::**

**V. Kim Kutsch, DMD**

# Introduction

*“A common misperception among community health workers [and the public] is that childhood caries is not a problem. They often say, ‘We have a community dental clinic; if we have an emergency, we send kids to you and you see them the same day. As long we get kids to the services they need, that solves the problem, right?’ They don’t understand how important it is to prevent the problem in the first place.”*

*--Dr. Courtney Chinn*

In looking at where disease prevention is in the overall oral health picture, in 2011 the Institute for Oral Health (IOH) is exploring how to “rebrand” the dental profession. During the 1960’s and 70’s, dental care was largely focused on prevention through fluoride use, and has “ridden that wave” for a number of decades. Yet we have come a long way since then, with new dental research and progressive solutions underway across the country that are having a significant impact on dental disease prevention. This year, the IOH is spotlighting some of the best of these efforts and how the dental profession can incorporate new approaches to prevention into everyday dental practice as we look toward the future.

To support our 2011 theme **“Oral Health and Prevention: Rebranding the Profession,”** in March, the IOH hosted the second of two focus groups with expert panel discussions about solutions at the forefront of innovation in health care, aimed to advance how we think about and address dental disease prevention. In follow-up, the IOH will feature special guest speakers to share key findings with a larger audience of critical stakeholders through our annual national conference, to be held October 27-28, 2011 in Chicago, Illinois.

Hosted in San Diego, California on March 10-11, 2011, this focus group was led by IOH Executive Director, Dr. Ron Inge, and featured leading authorities in dentistry and dental research, community oral health programs, and the American Dental Association to discuss innovative approaches to disease prevention to improve oral health for high-risk, underserved populations. The group shared insights on the following key topics:

- **Advancing saliva diagnostics for caries risk assessment** – Increasingly, dental research is pointing to saliva diagnostics as a quick, easy, and accurate method for identifying the oral bacteria that causes caries. While currently results can be used to identify problems and guide treatment decisions, the challenge remains to build scientific evidence on the predictive value of saliva in determining caries risk.
- **Promoting early preventive visits to improve outcomes and costs** – When children receive their first preventive dental services by age one, studies show that the cost of dental care in subsequent years is reduced 50% or more compared with children who have no preventive visits until age three or older. Additionally, preventive care and oral health counseling at an early age helps reduce the number of procedures required and increases continued usage of dental services to prevent early childhood caries.
- **Reducing childhood caries risk by engaging families in behavioral changes** – To improve oral health in low-income, minority children, it is important to recognize the many factors beyond economics –such as societal, social, community, and cultural—that influence how a family attends to health issues. We need to provide supportive, engaging ways to counsel parents about oral health and healthy behaviors that help prevent tooth decay in their children.

- **Increasing prevention awareness through the ADA** – As the nation’s foremost advocate for oral health, the ADA works diligently in the arena of disease prevention such as establishing policies, programs, and public awareness campaigns to advance caries risk assessment and preventive dental care. The ADA also promotes clinical recommendations for evidence-based dentistry, and provides leadership for progressive collaboration across stakeholders for high-risk populations.

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## Join us for the 2011 Institute for Oral Health Conference

In follow-up to this year’s focus groups, Institute for Oral Health is providing whitepapers and promoting relevant news and research through our website, quarterly newsletters, Facebook, and participation at health conferences around the nation. Culminating this year’s theme is our **5th annual national IOH conference on October 27-28, 2011 in Chicago, Illinois** at the Sofitel Hotel. Learn more and register early for discount rates ~ please visit: [IOHWA.ORG](http://IOHWA.ORG).

## About the Institute for Oral Health

The Institute for Oral Health is dedicated to improving oral health in America by bridging the gap between research and everyday dental practice. Serving as a central resource for education and collaboration, IOH brings together nationally recognized experts to focus on important themes of concern in oral health care today, and works to promote innovation and adoption of progressive treatment guidelines, dental plans, and delivery methods.

## learn more

Web: [IOHWA.ORG](http://IOHWA.ORG) ~ Register Online for the 2011 IOH Conference



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## Saliva Diagnostics

In private practice for several decades and a consultant for numerous oral biotech firms, Dr. Kim Kutsch has focused heavily on caries risk assessment as a lever for advancing disease prevention. In particular, beyond disease management, his approach centers on diagnosing disease before patients exhibit symptoms, and ways to prevent disease entirely.

### Rethinking the Bacteria Model for Caries

For this Institute for Oral Health focus group discussion, Dr. Kutsch explained how dental caries research and the biofilm disease model have advanced in how they identify and interpret the key pathogens that contribute to the development of caries. As a prevention strategy, tracking all bacterial contributors is key to understanding the most effective therapeutic measures.

In recent years, a number of compelling studies are helping to advance our understanding of the cellular factors that drive caries development:

- **Specific caries-related bacteria in older adults** – A September 2010 study of older adults in which salivary Bifidobacteria was targeted as the only pathogen significantly associated with caries.
- **New bacterial strain discovered in children** – A February 2011 study of bacteria contributing to severe early childhood caries identified a new strain of acidic bacteria (*Scandovia wiggisiae*) closely associated with *Streptococcus* that should be tracked as an important disease factor in children.
- **DNA testing reveals new levels of bacteria in the 1,000s** – 2008 study used DNA sequencing to track how bacteria in the mouth replicates on an even more granular level. As a result, the previous understanding of 700-800 bacterial strains skyrocketed to 19,000 when viewed from this perspective.

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*“Bacteria research is reaching the CSI stage: in the near future, investigators will be identifying perpetrators based on oral bacteria they left behind at the scene of a crime as it is more accurate and more distinctive than a fingerprint.”*

*– Dr. Kim Kutsch*

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Dr. Kutsch emphasized that, with these new findings, our previous idea that about 30-40 pathogens drive caries development should

now be multiplied exponentially to consider about 600-800 pathogens. Herein lies one of the greatest challenges because as a multi-pathogen disease, we cannot invent a single vaccine to inhibit or prevent caries –biofilm diseases will not respond to it.

- **Taste gene influences caries risk** – A November 2010 study emphasized that a “supertaster” gene, TAS2R38, which influences our sense of bitter and sweet, is particularly strong in children and is significantly associated with caries in primary teeth. The speculation is that these genetic factors play a role in how children select which foods they will eat, avoiding things like bitter vegetables and favoring sweets –which has a

direct influence on tooth decay. The sensitivity of this gene decreases with age and our tastebuds evolve, and as a result, the gene appears not to contribute to caries in permanent teeth.

- **Low pH levels contribute to caries** –1989 and 2006 studies tracked how the biofilm that produces dental caries responded to various levels of pH, concluding that it was “the low pH generated from sugar metabolism rather than sugar availability that led to the breakdown of microbial homeostasis in dental plaque.” A follow-up study in 2009 looked at strategies for maintaining neutral pH to help prevent caries development, including oral care products to inhibit acid production; nonfermentable sweeteners in snacks; and stimulation of saliva flow.

The hydroxyapatite chemistry (pH) in our saliva plays a vital role in how our teeth develop and our susceptibility to tooth decay. As Dr. Kutsch explained, “*The body maintains these super-calcified structures [our teeth] by continually bathing them in a super-saturated pH solution [saliva].*” One reason many seniors experience an increase in tooth decay is the mineral loss from having too little saliva, due to medications causing xerostomia. Another challenge is the American diet of foods made with high fructose corn syrup, which fuels biofilm disease.

Dr. Kutsch noted that, in a “healthy mouth” if one has adequate saliva, about 15-30 minutes after eating something like a sweet pastry, the pH in the mouth returns to neutral. While the biofilm on the teeth remains, this balanced pH helps to inhibit decay. He added that, in fact, it is not so much what we eat, but how frequently we eat that creates a problem. He gave the example of eating a chocolate bar in one sitting vs. nibbling on pieces periodically every 15-30 minutes. This frequent intake makes it difficult for the pH levels to rebalance and continually impacts the biofilm on the teeth. With less frequent eating, we can return to a neutral pH level that helps remineralize the teeth, to counter the demineralization caused by the biofilm.

## Salivary Diagnostics as a Risk Assessment Tool

“*Saliva is a complex liquid with numerous components and functions. It offers the opportunity to measure biometrics as they relate to disease risk,*” notes Dr. Kutsch. Research has shown that nearly 40% of disease markers for cancer, cardiovascular disease, and stroke can be found in saliva, so it represents a valuable target for risk assessment. Furthermore, as a diagnostic tool, it is convenient and non-invasive: readily available, easily collected, and easily stored and processed.

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“40% of disease markers are found in saliva.”

– Dr. Kim Kutsch  
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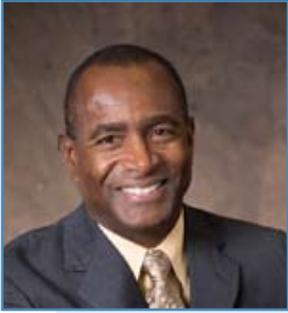
For nearly 20 years, commercial kits have been available for gathering saliva samples to gauge caries risk; and although none have “high predictive value,” they help to explain changes in caries activity and drive treatment strategies for improving disease prevention. In fact, a 2005 study emphasized that saliva tests are routinely used in determining caries risk, yet conceded that additional research is needed to verify the “true clinical value” of saliva as a “diagnostic fluid” in dentistry.

One problem is the time factor. Lab results often take several days, which is not practical for clinicians. Dentists need immediate answers to support them chair-side with patients. While a variety of commercial applications exist for testing saliva, none of them can yet deliver data that can definitively tie saliva results with caries risk, from a predictive standpoint.

As such, Dr. Kutsch and many dental researchers are exploring ways to map salivary pH levels to dental caries to enable dentists to predict disease risk. pH level is quick and easy to test with refined accuracy, so the goal remains to tie it directly to caries incidence for predictive value.

Dentists are now taking advantage of a commercial tool that tracks bacterial activity by monitoring ATP bioluminescence in saliva. The digital readout provides highly accurate ATP levels which are representative of biofilm activity and can be used to establish baselines for patients in determining caries risk. Along those lines, a June 2010 study confirmed that measuring ATP to track levels of bacteria in saliva could serve as a valuable risk assessment tool for caries risk, especially in children.

Looking ahead, Dr. Kutsch emphasized that biomarkers in saliva are already routinely used for diagnostics in major systemic diseases such as cardiovascular disease and stroke, as well as in monitoring responses to breast cancer treatment. The future of salivary diagnostics looks promising for dentistry as well. As studies and chair-side tests advance to strengthen the predictive capabilities, clinicians will be able to more quickly and easily diagnose caries risk, and implement treatment strategies that prevent disease before it happens.



Dr. Ron Inge, IOH Executive Director

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