Dear bOHP Subscribers,

Happy Summer! In this issue, we are highlighting an article in the *Journal of Dental Research* by UNC's Dr. Kimon Divaris, who discusses in depth whether it is possible to predict caries risk in children - the result may surprise you! An interview with Dr. Divaris is included below, where he addresses the major argument he makes in his article. A link to the article can be found here (subscription required).

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Best Wishes,
The bOHP Team

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Interview with Dr. Kimon Divaris:
Predicting Dental Caries Outcomes in Children: A "Risky" Concept

What is the overall message about caries risk assessments that you

want clinicians to be aware of?

Currently-available methods and approaches for estimating caries risk perform poorly at the individual level; in other words, risk assessment tools cannot reliably discriminate between individual patients who are more or less susceptible to develop the disease. Importantly, these tools do not have a solid underlying evidence-base and most have been developed using cross-sectional data comparing individuals with and without caries (*versus* prospectively following them to determine what influences risk and not what is associated with prevalence). Most tools have shown to have acceptable sensitivity but poor specificity (i.e., classify most individuals as 'high risk'). Another limitation of current tools is that they do not consider what teeth or susceptible surfaces are at-risk, at any given time—and we know that different tooth surfaces have vastly different caries lesion development susceptibilities and our decision-making is frequently done on the surface-level (e.g., to seal or not to seal premolars). Finally, it is really not communicated (and left to subjective interpretation) what is 'low', 'moderate' and 'high' caries risk—for some families 20% caries risk over a 2-year period may be high, for others may be low—and if we switched the outcome from caries to something 'more severe', then even 5% risk might be perceived as high.

Why are existing risk assessment models better tools for educating clinicians and families than predicting an individual's risk?

Most tools (e.g., the AAPD Caries Risk Assessment Tool) include modifiable risk factors that have been shown to predictably influence caries development, such as (frequency and amount of) consumption of fermentable carbohydrates and fluoride exposure. Risk assessment tools can serve as guides for clinicians to identify such modifiable factors and as a basis of discussion (or other health promotion/behavior modification approaches, including motivational interviewing) with families.

What changes to risk assessment tools are needed for them to become more acceptable for risk prediction at the individual level?

The point that the paper tries to make is that (contrary to our intuition) risk *cannot* be predicted. I would encourage readers to take a look at Beverly Rockhill's 2001 open-access paper in the *American Journal of Public Health* titled "The privatization of risk". Risk is a population estimate—whenever we talk about, let's say a 50% risk or chance of event, we automatically consider a hypothetical or substitute population followed over time, and a proportion of that population experiencing the outcome. An individual (i.e., a patient in your chair) will either develop the disease ('1') or not ('0'). The methods and parameters for predicting individual case status ('proximal' ones: behavioral, clinical, biological factors) are different from those used to estimate population risk ('distal' ones: socioeconomic status, location, etc.). Risk estimation and

identification of risk factors at the population level typically rely upon multivariate statistical models. On the other hand, at the person-level it has been demonstrated that clinicians' "gut feeling" is a pretty good predictor of individual propensity for caries development. There are methods that closely parallel clinicians' use of prior information, the evidence-base and decision-making process to inform clinical care—these are based on Bayesian inference—which may sound initially exotic, but I bet you will see more and more of this approach used in clinical decision-making support systems. Sports prognostication and weather prediction methods heavily rely on Bayes.