

Completed Projects

Pre and Post-Doctoral Training in Dental Public Health

The Health Resources and Services Administration (HRSA) awarded a five-year grant totaling \$1,281,653 to the CWRU School of Dental Medicine (CSDM) for pre-doctoral training in Dental Public Health, consisting of two components: a combined Doctor of Dental Medicine/Master's in Public Health (DMD/MPH) degree program through which dental students could earn an MPH degree in addition to their DMD, and a Family First Program where all second year dental students will learn to assess risk for certain oral diseases (dental caries, periodontal diseases, and oral cancer) in underserved populations, supplemented with small group seminars on population health, cultural competency, health literacy, risk assessment, and oral-systemic health links. The grant will pay a stipend for eligible trainees, tuition, and travel expenses for one DMD/MPH student in the first year and two students per year during the subsequent four years of the grant.

CSDM also received another 5-year grant of \$1,294,564 for post-doctoral training (residency) in dental public health. This residency training grant will pay a stipend for eligible trainees, tuition, and travel expenses for dental public health residents along with partial faculty and administrative support. The residency program will be structured in three modules: 1) one-year full-time, 2) two-year part-time, or 3) two-year full-time. Dr. Sena Narendran as the principal investigator of both the training grants.

DMD and Master's in Clinical Research Training

The long-term goal of this joint DMD and Master's in Clinical Research Training (DMD-MCRT) program is to train dentist scholars capable of conducting clinical and translational research that focus on investigating oral health problems at the individual, family and community levels. A unique training program has been proposed that utilizes the NIH road map initiatives to prepare dentists to function in interdisciplinary research teams of the future. The proposed training capitalizes on strengths of the School of Dental Medicine's restructured curriculum, including evidence-based principles, critical thinking, and innovative early clinical experiences. The program is partnering with the school of Medicine to include an established Master's degree program in clinical research that has been highly successful in training health professionals and K12 scholars, and will include collaborations among participating faculty in CWRU's NIH-funded Clinical and Translational Science Center (CTSC).

The trainees will engage in five years of training, with a year off between third and fourth DMD years for graduate research training. The specific aims of the training are to accomplish: (1) a biological, behavioral, and environmental approach to investigating oral health problems in diverse populations; (2) work in inter- and multi-disciplinary teams that promote the dental scholar as an integral part of the health care team; (3) provision of leadership skills to communicate and disseminate research findings at both the local and national levels. Trainees will undergo a structured and rigorous Master's in Clinical Research that consists of core didactic curriculum, research rotations and thesis, and oral health seminar series. Additional training activities include research retreats, seminars, and participation in local and national meetings. This training grant will provide one year of support to 15 dual degree trainees over the five year grant period, admitting three trainees each year for five years. This training is critical to developing the next generation of dentist scholars who are capable of conducting independent innovative clinical research to solve complex oral health problems that can result in early translation of findings to relevant populations, and to address the national shortage in dentists pursuing academic research careers.

Xylitol

This randomized controlled clinical trial addresses the prevention of dental caries (tooth decay) in inner-city school children using xylitol-containing snacks. Dental caries disproportionately affect poor and minority children with a significant proportion of treatment costs borne by Medicaid. The current best practices of oral health education, tooth brushing, topical fluorides and dental sealants have a more limited impact in children with the highest tooth decay rates than in children with lower rates; the newest research shows that an antimicrobial agent is required. Thus, addressing disparities, improving child health (MCH strategic research issue #II and #IV), and reducing caries

rates (Healthy People 2010) are key public health objectives. Xylitol is safe, FDA approved effective preventive agent, but poorly utilized in the U.S.

The goal of this study is to establish the use of an antimicrobial agent, delivered via xylitol gummy bear snacks at school, to reduce the caries rates in the permanent teeth of children from kindergarten to second grade. This age group is chosen because prevention works best when the teeth are just erupting. The aims are to reduce the incidence of caries in first permanent molars and other permanent teeth beyond the effects of oral health education, fluoride varnish, and sealants and to determine the preventive effect of xylitol beyond the termination of its use.

Six hundred children (5 - 6 years, >95% on free/reduced school lunch, 94% African-American) attending kindergarten in 5 East Cleveland City Schools will be recruited and randomized into the xylitol or placebo (sorbitol) control groups. Gummy bears (xylitol/placebo) will be given 3 times daily during kindergarten, and within the supervised school environment. All children will receive the current best public health practices of oral health education, provision of tooth brush and fluoridated paste, fluoride varnish, and dental sealants as recommended by the U.S. Preventive Services Taskforce and the Surgeon General. During the 30 month follow-up until second grade, all cases of caries will be recorded every year. Data analysis for testing the study aims includes the generalized estimating equations (GEE) models. The sample size provides greater than 80% power to compare the two groups in terms of the study aims. The results of this study will be useful in adding a new public health strategy in the prevention of dental caries for children with the greatest vulnerability to tooth decay.

Very Low Birth Weight

This longitudinal study addresses the relationship between birth weight and early childhood caries (ECC) in a cohort of pre-term very low birth weight (VLBW) and full-term normal birth weight (NBW) infants. VLBW and ECC disproportionately affects poor and minority children, costing Medicaid billions of dollars annually for treatment. The improved survival of VLBW children has resulted in greater long-term disabilities and need for health services, thus classifying them as children with special health care needs.

The oral health needs of VLBW children have not been adequately studied. VLBW children are known to have a high prevalence of enamel defects in the primary dentition, which in turn can lead to increased susceptibility to ECC. Socio-behavioral factors that can predispose some children to ECC are unknown in VLBW children. Therefore the primary aims of the study are to (1) assess the incidence of ECC in VLBW and NBW infants; (2) assess mediators such as the incidence of developmental enamel defects, *S.mutans* infection and the extent of oral health behaviors in VLBW and NBW infants; and (3) assess the indirect relationship between birth weight and ECC via mediators after controlling for independent moderating variables.

A total of 200 VLBW and 200 NBW infants will be followed at 8 and 18-20 months corrected age. The proposed study will collect data on caries (decayed and filled surfaces), mediating biological variables (enamel hypoplasia and opacity, *S.mutans* levels) and infant oral health behavior (feeding, diet, oral hygiene practices, and dental access), and independent variables (demographics, parent predisposing, enabling, need characteristics, dental behavior, biological and child medical factors). Data analysis for testing aims 1 and 2 includes the generalized estimating equations (GEE) models, and a two-stage structural equations model (SEM) for testing the role of mediators in aim 3. The sample size provide 85 to 99% power to compare the two groups in terms of the three study aims. The results of this study will provide critical data to address the knowledge gaps in taking care of VLBW children. The clinical implications include primary prevention, early diagnosis, and treatment to prevent further susceptibility to dental decay. It is also of public health interest since interventions to target knowledge, attitude, beliefs, and oral health practices can be implemented in programs for special needs children, and there by improve both oral and systemic health.

Observation Grant: Study of Prevention in Dental Practice

What we know about dental practice comes mostly from self-reported survey data collected by the ADA. While this is an important source of knowledge about dentists, there is little direct information about what dentists actually do in their offices. There are obviously a lot of questions that affect what clinicians do on a daily basis. The Department of Community Dentistry has organized a Practice-Based Research Network of 255 dentists in Northern Ohio. This network has provided help to students for small studies during summer research fellowships and for a pilot project that directly observed what dentists actually do on a daily basis. During the last year, the national Institute of Dental and Craniofacial Research has awarded the School \$2.3 million to directly observe what is actually done in 120 dental practices.

This study will answer several questions concerning efforts of dentists in practice. It has gathered both quantitative and qualitative data using observation, dental records, surveys of dentists and hygienists and billing records. This is the most comprehensive database about dental practice in the country and will be available for studies of dental practice by students and faculty. While the primary questions concern specific activities and behaviors of dentists, the study will also compare the various methods for learning about dental practice, assess factors that influence what the dentist does and focus on similarities and differences between the practices of minority and non-minority dentists.

Prevention Curriculum for Smokeless Tobacco Use

Researchers in the School of Dental Medicine received pilot grant funding from the Tobacco Use Prevention and Control Foundation to develop and test a school curriculum aimed at preventing the use of smokeless tobacco (ST) among youngsters in southern Ohio counties. Drs. Lance Vernon and Catherine Demko will pilot test an intervention program targeting 5th and 7th grade students in 15 schools in the rural Ohio counties of Athens, Hocking, Meigs, Morgan and Vinton, where smokeless tobacco use is higher than in other parts of the state.

The curriculum will be presented to the students over three days and then be evaluated by comparing the responses on surveys given before and after the presentation. The content for the curriculum was adapted from the Ohio Dental Association's program, Operation T.A.C.T.I.C., which stands for Teens Against Chewing Tobacco in the Community. The curriculum focuses on the negative consequences of ST use, understanding nicotine addiction, reading the advertising messages that make tobacco use look attractive, and practicing how to say no to offers of ST. In addition, the curriculum describes how to perform a self-exam to look for mouth sores and provides take-home information on resources for quitting ST use. The in-school curriculum is augmented with a parent-targeted brochure about ST use and a follow-up evaluation survey to be completed by parents.

The health risks associated with the use of smokeless tobacco (ST) products such as dip, oral snuff and chewing tobacco are oral lesions (non-cancerous mouth sores), oral cancer, dental caries, periodontal disease and nicotine addiction. The use of ST by young people in Ohio is of increasing concern. The initial use of these products is reported to be in the pre-adolescent years, ages 10-12, so that education and prevention messages need to be communicated early to assist young people in making healthy decisions about the use of these substances. The purpose of this research study is to develop school-based education modules that address issues of knowledge, attitude, and social norms regarding the use of smokeless tobacco. Analyses of the year-long study results are underway.

Detection of Oral Lesions in Dental Practices

A 3-hour continuing education course about lesions in the oral cavity was recently offered at the CWRU School of Dental Medicine by Dr. Danny Sawyer to 24 community dentists and their hygienists as part of the Detection of Oral Lesions in Dental Practice Study. The objective of this pilot study is to 1) formally train and evaluate the participating dentists and hygienists in order to measure their knowledge, opinions and behaviors regarding oral cancer and oral cancer screening before and after their training and 2) to determine the prevalence and type of oral lesions in patients who present in the general dentist's office.

Screening all dental patients seen over a three-week period in this sample of 24 offices will provide an estimate of the frequency and type of possible lesions in the population of patients who present in the general dentist's office. Currently, it is likely that dentists underestimate the probability of lesions and thus do not routinely look for oral lesions, particularly among young adults where a rise in the incidence of oral cancer has occurred. Importantly, we are including patients seen by hygienists as well as dentists. Improving information about the prevalence of lesions is critical to motivating dentists to implement appropriate screening and diagnostic procedures to identify potentially cancerous lesions. In addition, this study will provide preliminary data on the effectiveness of this type of continuing education course targeting dental providers.

Oral cancer is cancer that starts in the mouth, also called the oral cavity. The oral cavity includes the lips, the inside lining of the lips and cheeks (buccal mucosa), the teeth, the gums, the front two-thirds of the tongue, the floor of the mouth below the tongue, the bony roof of the mouth (hard palate), and the area behind the wisdom teeth (retromolar trigone). Oropharyngeal cancer develops in the part of the throat just behind the mouth, called the oropharynx. The oropharynx begins where the oral cavity stops. It includes the base of tongue (the back third of the tongue), the soft palate, the tonsils and tonsillar pillars, and the back wall of the throat (the posterior pharyngeal wall).

Oral cancer is responsible for almost 30,000 new cancer cases and 8,000 deaths each year in the United States. The five-year survival rate for patients with advanced cases of oral cancer is 19% compared to 78% for patients with early-detected, localized disease. Many cancers of the oral cavity and oropharynx can be found early, during routine screening examinations by a doctor or dentist, or by self-examination. Detection of small, pre-malignant lesions that can be more easily treated should help avoid the late stage diagnosis and poorer prognosis characteristic of many oral cancers.