

# DENTSPLY SIRONA/ADHA GRADUATE STUDENT CLINICIAN RESEARCH ABSTRACTS

The following abstracts are from the participants of the 2016 Annual Dentsply Sirona/ADHA Graduate Student Clinician's Research Program. The purpose of the program, generously supported by Dentsply Sirona for the past 9 years, is to promote dental hygiene research at the graduate level. Dental hygiene post-graduate programs may nominate one student to participate in the program and present their research at ADHA's annual conference.

\*Indicates poster presenter

## A Descriptive Study of the Experiences of the Kansas Extended Care Permit Providers

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## Salivary Risk Factors for Dental Caries in Individuals with Cystic Fibrosis

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**Problem:** To improve access to basic oral health services for underserved populations 38 states have expanded the role of dental hygienists. In Kansas, legislative changes have resulted in the Extended Care Permit (ECP) designation. The purpose of this study is to describe the experiences of dental hygienists in Kansas who held an ECP certificate as of July of 2014.

**Methods:** Secondary data analysis was performed utilizing data collected from a survey conducted in 2014 by Oral Health Kansas. All registered ECP RDH's were sent the 32-item survey using Survey Monkey®. Descriptive analyses consisted of frequency distributions, and measures of central tendency. T-tests and ANOVA were conducted to compare between groups.

**Results:** A total of 73 responses or a 41% response rate (73/176) was achieved. Of the 73 clinicians that responded 80% worked at least part-time in school settings, 33% in senior housing and 19% in skilled nursing facilities. The most consistent barriers to providing care were the inability to direct bill insurance (52%), financial viability (42%) and physical requirements (42%). Follow-up tests found a significant difference between groups when examining barriers.

**Conclusion:** The ECP does appear to be expanding access to care for citizens in Kansas however significant barriers still exist in making this a viable model for oral healthcare delivery.

**Problem:** Factors like salivary flow rate, pH, and buffering capacity are associated with caries prevalence, but have not been recently explored in U.S. individuals with Cystic Fibrosis (CF). The goal of this study was to test the associations between salivary factors and dental caries in a hospital-based sample of individuals with CF.

**Hypotheses:** Increased salivary flow rate, basic salivary pH, and increased buffering capacity are associated with lower caries prevalence in individuals with CF.

**Methods:** Unstimulated saliva samples were collected from individuals with CF ages 6-20 years (N=83). Salivary flow rate was measured in mL/minute. Salivary pH was assessed using a laboratory pH meter. Buffering capacity was assessed by titration with HCl. The primary outcome measure was caries prevalence defined as the number of decayed, missing, and filled primary and permanent tooth surfaces (dmfs+DMFS). Spearman's rank correlation coefficient and the t-test were used to test for bivariate associations. Multiple variable linear regression models were used to run confounder-adjusted analyses and assess for potential interactions.

**Results:** There was no significant association between salivary flow rate or buffering capacity and caries prevalence. There was a significant negative association between salivary pH and caries prevalence, but this association was no longer significant after adjusting for age.

**Conclusion:** Our results indicate that unstimulated salivary factors are not associated with dental caries prevalence in individuals with CF. Future studies should investigate other potential saliva-related caries risk factors in individuals with CF such as medication use, cariogenic bacteria levels and salivary host defense peptide levels.

### **Missouri College Students' Attitudes and Beliefs Regarding the Profession of Dental Hygiene in Comparison to their Oral Health and Dental Knowledge**

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**Purpose:** This study explored the attitudes and beliefs of minority college students enrolled at Missouri College in Brentwood, Missouri in regards to the dental hygiene profession. Specifically, this study examined whether minority college students' oral health and dental knowledge related to their knowledge of the dental hygiene profession.

**Methods:** One hundred and six students gave their consent to participate in the study via Survey Monkey. The study was conducted over a period of four weeks in May 2015. Four statements were designed to gauge minority students' knowledge of dental hygiene as a career.

**Results:** No differences were found based on gender, age, education and ethnicity. A difference between age groups were found based upon the respondent's program of study.

**Conclusions:** Further research is needed to spread the word about dental hygiene programs and to explain the role of the dental hygienist.

### **The Impact of Community Rotations on the Cultural Competence of Texas Dental Hygiene Students**

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**Purpose:** This study investigated the role of community rotations on the cultural competence of second-year Texas dental hygiene students.

**Methods:** A modified version of the validated self-assessing Clinical Cultural Competency Questionnaire (CCCQ) was given to students at twelve Texas dental hygiene programs with a 100% response rate (239/239). Data analysis was performed using the Kendall tau correlation for associations and Kruskal-Wallis and Mann-Whitney U tests for differences among and between groups.

**Results:** Students scored highest in attitude (86th percentile). Time spent in community rotations ( $p=0.009$ ), number of community rotations ( $p=0.028$ ), ethnic diversity of program clinic patients ( $p=0.042$ ), and training hours ( $p=0.044$ ) were associated with increased cultural competence scores. Students with over 50 community rotation hours ( $p=0.006$ ) scored significantly higher than students with less than 50 hours. Generally, those with four rotations ( $p=0.002$ ) scored highest. Those with public clinic ( $p=0.049$ ) and school ( $p=0.044$ ) rotations scored significantly higher than those without these experiences. Those with nursing home ( $p=0.009$ ) and hospital ( $p=0.026$ ) experience scored lower than those without these experiences. Students seeing the most ethnically diverse patients in program clinics scored higher ( $p=0.014$ ) than students seeing less diverse patients. Those with 6-10 training hours scored higher ( $p=0.013$ ) than those with other training levels. All ethnic minorities, excluding Asians, scored higher than Whites ( $p=0.008$ ,  $p=0.020$ ).

**Conclusions:** Dental hygiene programs should invest time in cultural competence training and choose a robust program of community rotations, while considering the diversity of the student body and clinic patient pool to enhance graduates' cultural competence.

### **Perceptions of California Dental Hygienists regarding Mandatory Continued Competence Requirements as a Condition of License Renewal**

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**Purpose:** To determine the perceptions of California dental hygienists (DHs) regarding mandatory continued competence requirements (MCCRs) as a condition for license renewal.

**Methods:** A quantitative cross-sectional survey was distributed through email by the California Dental Hygienists' Association (CDHA). The CDHA agreed to send a link to the survey and informed consent information to DHs whose email addresses were in the CDHA database. The online survey consisted of 19-items. All survey responses were analyzed using frequency distributions for categorical variables and means for continuous variables. Chi-square tests assessed associations between variables and differences between groups. The Wilcoxon signed rank test assessed relationships between perceptions and support of MCCRs for license renewal.

**Results:** Almost all (93%) believed that they have remained competent to deliver care since licensure. Over half agreed that continued competence should be verified throughout ones' professional career (53%). Most (81%) agreed that continued competence is important for patient safety and well-being. Less than half (47%) supported MCCRs as a condition of license renewal; however, 51% of those who agreed that competence is important for patient safety and well-being and 67% of those who agreed with verification of competence were in support of MCCRs.

**Conclusion:** While California DHs agreed that continued competence is important for patient safety and well-being and verification of competence is important, less than half supported MCCRs. Prior to instituting mandate for license renewal in California, continued competence and methods to ensure continued competence throughout ones' career should be defined.

### The Use of Digital Media by State Dental Boards in Licensure and Enforcement of Oral Health Professionals

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**Purpose:** Studies suggest that the specific consequences of professional and ethical standards violations have not been well established in the area of social media. A literature search conducted using PubMed and ERIC showed that while studies have explored the ways in which social media can affect medical professionals, there has been little research conducted on dental professionals. This study explores the ways in which the licensing of a dental professional can be affected by unprofessional conduct in the area of social media.

**Methods:** This study used a non-experimental descriptive electronic survey research design. A total of 52 surveys were sent to the dental board executive directors and the dental hygiene executive directors in the United States.

**Results:** Eighteen responses were collected for a 34.6% response rate. Overall, respondents indicated a lack of social media usage by state dental boards. Incidents of online unprofessional behavior came to the attention of the board in various ways and with a variety of consequences for the licentiates. Overall, there is a level of concern about online activities by licensees that may be in violation of laws, rules and regulations of the state or the dental board yet no state dental boards in this study reported that they are creating a social media policy.

**Conclusions:** While social media is very common in today's society, specific social media policies are limited at the professional licensing board level. Dental boards should consider developing policies to address potential unprofessional conduct online in order to protect businesses, employers, employees, clients and patients.

### Millennial students' learning preferences compared to faculty teaching methods: A national dental hygiene study

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**Purpose:** The purpose of this study was to compare the learning preferences of millennial dental hygiene students and the teaching methods used by their faculty.

**Methods:** Student and faculty cross-sectional surveys were developed with a 21-item 5-point Likert scale. The surveys asked student preference for and faculty use of lecture, collaborative activities, technology, independent work, and group discussion. Surveys were sent via email in September 2015. The convenience sample response rate was 800 students (9.4%) and 343 faculty (6.8%). A 3x2 Chi-Square for independence table calculated agreement between millennial students and faculty for each question.

**Results:** Faculty (88.7%) used case studies more than students (61.2%) preferred and students (71.4%) preferred games when learning more than faculty (57.2%) used games ( $p < 0.0001$ ). Students (82.1%) preferred handouts for lecture more than faculty (58.8%,  $p < 0.0001$ ). Faculty expected students to read before class 39.3% more than students read ( $p < 0.0001$ ).

Students preferred study guides for exams 39.2% more than faculty provided them ( $p < 0.0001$ ). Faculty (84.0%) had students (57.8%) work in groups more than students preferred, and 92% of faculty used group activities in class ( $p < 0.0001$ ).

**Conclusions:** Millennial dental hygiene students in this study responded similarly to previous research on millennial traits. This study found areas of disagreement between millennial dental hygiene students and dental hygiene faculty on the use of case studies, study guides, and group work. Although millennial students stated they prefer lecture over group work, trends in education stress using active learning over lecture.

### Dental Hygiene Clinical Instructors' Self-efficacy: An Evidence-based Faculty Development Program

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**Problem:** Health care clinicians are often hired to teach in clinical settings with little or no formal educational methodology. Research is limited in evidence-based faculty development programs (EB FDP) specifically addressing the needs of clinical instructors, including dental hygiene clinical educators. Clinical instructors require training to improve teaching efficacy prior to being placed in clinical teaching positions and throughout their careers as educators.

**Purpose:** The intent of this research was to determine if an EB FDP improves dental hygiene clinical instructors' perceived self-efficacy in teaching.

**Methods:** This mixed methods study of dental hygiene clinical instructors ( $N=26$ ) utilized the Teachers' Sense of Efficacy Scale (TSES) as a pretest prior to the EB FDP, and two posttests, one immediately following implementation of the EB FDP, and the second at the end of the 10 week quarter. Two focus group sessions gave insight relating to the outcomes of the techniques clinical instructors applied while teaching in clinic, and teaching challenges faced in a clinical setting while managing client care.

**Results:** A statistically significant difference ( $p \leq .05$ ) in clinical instructors' perceived self-efficacy was found in each of the three TSES subscales and each survey item in two of the subscales. Five of the eight survey items in The Efficacy in Clinical Management subscale showed statistically significant difference. Comments

clinical instructors made during two focus group sessions support the quantitative findings.

**Conclusion:** This study indicates evidence-based FDPs are a viable method to provide clinical instructors teaching methodologies to improve their self-efficacy and teaching strategies.

### Effects of Instrument Handle Design on Forearm Muscle Activity During Scaling by Dental Hygienists

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**Purpose:** The purpose of this study was to determine the effects of 4 different commercially available instrument handle designs (A. 16 grams and 12.7 mm diameter, B. 23 grams and 11.1 mm diameter, C. 21 grams and 7.9 mm diameter and D. 18 grams and 6.35 mm diameter) on the muscle activity of four forearm muscles during a simulated scaling experience.

**Methods:** A convenience sample of 27 dental hygienists used a Columbia 13/14 curet with four different instrument handles to scale artificial calculus from typodont teeth. Each participant's muscle activity was measured using surface electromyography.

**Results:** Similar muscle activity was generated when scaling with instruments at 16, 18, and 21 grams with varying diameter handles. Instrument B generated significantly more muscle activity when compared to each of the other three instrument handle designs ( $p=0.001$ ,  $p=0.002$ ,  $p=0.039$ ). The lower left quadrant displayed significantly less muscle activity during scaling than the right quadrants ( $p=0.026$ ,  $p=0.000$ ), although no significant interaction effect was found with instruments within quadrants.

**Conclusions:** Instrument handle design has an effect on forearm muscle activity when scaling in a simulated environment. The instrument that weighed the most produced the highest muscle activity. Similar amounts of muscle activity were produced by instruments weighing between 16 and 21 g. Results support the need for further research to determine the impact of these results on muscle load related to risk of cumulative trauma disorders in a real-world setting.



## An Evaluation of a School-Based Dental Sealant Program

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## Information-Seeking Preferences for Clinical Decision-making Among California Dental Hygienists

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**Problem:** Dental caries is a preventable infectious disease continuing to affect millions of children with low socioeconomic status.

**Purpose:** There is no statistically significant difference in the *referral treatment rate* at 6 months and at 12 months after implementation of a school-based dental sealant program. This study examines the dental sealant retention rate and dental sealant decay rate at 12 months in a school-based dental sealant program.

**Methods:** Children (n = 54) ages 6-12 were screened for active decay, need for a referral, and sealant placement. Decay rates were analyzed with a t-test for paired samples; whereas, a Chi-Square test was used to determine a difference in referral treatment rates. Sealant retention and sealant decay rates were computed at 12 months (n = 32) using descriptive statistics.

**Results:** A 16 percent decrease in active decay was observed; however, there was no statistically significant difference in decay rates (P = 0.21) at baseline and 12 months. Similarly, referral treatment rates showed no statistically significant difference at 6 months and 12 months (P = 0.75). Sealant retention outcomes were 74 percent fully retained with 0% decay, 13% partially retained with 25% decay, and 13% no retention with 25% decay.

**Conclusions:** Sealant programs can eliminate disparities in accessing oral health care and contribute to attaining Healthy People 2020 oral health objectives.

**Problem:** Many journals and scientific updates are now accessed online; however, previous studies have grouped online resources into one category and not investigated the variety of resources or their frequency of use to answer clinical questions.

**Purpose:** This study examines information-seeking behaviors of California dental hygienists (RDHs) for clinical decision-making and their education related to evidence-based decision making (EBDM) skills.

**Methods:** A convenience sample of 5542 RDHs was invited to participate in an online survey via the California Dental Hygienists' Association email list. Information about respondents' information seeking-behavior, Internet and non-electronic resources used for clinical-decision making, education and confidence in using EBDM skills, and demographics was collected. Statistical tests were performed at the 95% confidence level.

**Results:** Of the 5542 emails, 1974 opened the invitation and 386 responded (19.6%), however 40 were not in clinical practice (n=346). The most frequently accessed Internet resource was Google; whereas, the most frequently used non-electronic resource was consultation with a dentist at work. Use of the Internet was related to the decade in which an RDH graduated and the type of dental hygiene program attended (p<0.001). Respondents who believed they received adequate EBDM education were likely to spend more time searching the Internet, and indicated that the Internet is the most current and relevant information source (p<0.001).

**Conclusion:** RDHs use both Internet and non-electronic resources to answer practice related questions. However, Google may not be the best "go to" resource for answering clinical questions.

## Exploring Factors Associated with Lack of Parental Consent in School-Based Dental Sealant Programs

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**Purpose:** School-based dental sealant programs are one avenue for reducing decay in children 6-8. The Community Dental Care in Maplewood, Minnesota implemented a school-based sealant program four years ago to help manage the dental caries in Minnesota's children called Program to Improve Community Oral Health (PICOH). The purpose of this study was to explore factors associated with lack of parental consent in a local school-based dental sealant program.

**Methods:** In this descriptive study, the sample analyzed included approximately 948 children ages 6-8, who participated in 2013-14 and 2014-15, from 5 out of the 18 schools in the program. The highest percentage of the participants were in the Free and Reduced Lunch Program (FRLP). Basic descriptive data retrieved from "yes" consent forms included the number of participants and the cultural statistics of the schools to examine any associations or trends that may have affected the participation rate of 35%. The 'no' response consent forms provided no information for the study. The dependent variable is the lack of parental consent in the participation of the program. Tables are used to display the data in terms of counts and proportions.

**Results:** The study found that African Americans/Africans and Asian/Other Asian had a higher participation in some schools compared to other races. School with non-Caucasian and non-English speaking had a lower participation. Similarly, schools with mostly Caucasian and English speaking speakers also had lower participation.

**Conclusion:** Race and ethnic groups and primary language spoken in the home are potential barriers to reduced participation in school-based sealant programs.

## Faculty perceptions of supporting students' delivery of motivational interviewing during patient care.

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**Problem:** Motivational Interviewing (MI) is a patient-centered, collaborative counseling approach for eliciting behavior change. In 2012, the University of Michigan (U-M) Dental Hygiene (DH) Program's health behavior change curriculum was enhanced to include a special focus on MI. Faculty participated in MI workshops and became involved in grading of student-patient MI interactions.

**Purpose:** To assess the faculty's perception of importance of and their confidence in supporting students' delivery of MI during patient care.

**Methods:** Convenience sample of sixteen U-M DH Program clinical faculty members participated utilizing a pre-test, post-test and qualitative question design. The U-M IRB approved this study as exempt.

**Results:** Faculty's perceptions of facilitating eight MI strategies with students increased after the 2014 MI Workshop from a mean of 4.6 to 4.8 (importance) and from 4.1 to 4.5 (confidence), but decreased to 4.5 (importance) and to 4.0 (confidence) by the end of the academic year. Wilcoxon signed ranked test compared facilitation questions from T1, T2, and T3. Faculty perceptions decreased (T1,  $p=.03$ ) related to students having enough time to incorporate MI and decreased (T3,  $p=.03$ ) regarding faculty having a positive influence on students. Fifty-six percent of faculty participated in team-grading and reported that the most helpful professional development activities were team-grading (58%) and in-service (25%).

**Conclusion:** Faculty's perceptions of importance and confidence in supporting students' delivery of MI decreased slightly over the academic year. Faculty found professional development activities helpful and recommended more be offered. Research on longitudinal impact of MI faculty professional development is recommended.

## Perceptions and Experience on Cultural Preparedness Among Dental Hygiene Students and Treatment of a Culturally Diverse Refugee Population

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**Purpose:** In a diverse patient population, limited research exists regarding the cultural preparedness of dental hygiene students. This study utilized a phenomenological research design to gain a deeper understanding of the lived perceptions and experiences on cultural preparedness among senior dental hygiene students. This unique design provides an interpretation of cultural preparedness from dental hygiene students enrolled in an accredited dental hygiene education program.

**Methods:** This qualitative research design consisted of a purposeful sample of dental hygiene students (n=18) who participated in a pre-focus group prior to the treatment of a culturally diverse refugee patient and then (n=17) participated in a post-focus group after treatment. The data was gathered and analyzed using the eight step creative process for qualitative research. Demographics were enumerated using frequency percentiles, means, and summary statistics. All statistical analyses were performed in STATA® statistics/data analysis software version 11.2.

**Results:** The majority of the study participants (n=17) were Caucasian (64.7%) with a mean age of (21). The majority of the culturally diverse refugee patients were Haitian (47.1%). Common themes on cultural preparedness in dental hygiene students before the treatment of a culturally diverse refugee patient included professionalism, self-assurance, and resource utilization. Post focus groups themes demonstrated a heightened value of experiential learning and realization of the importance and knowledge necessary to become a culturally competent health care provider.

**Conclusion:** Exposing dental hygiene students to culturally diverse patients in a clinical setting can be an effective method for improvement on cultural competency.

## Comparing the Prevalence of Oral and Systemic Disease Between Bonded Child Laborers and School Children in Bagalur, Tamil Nadu, India.

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**Objectives:** This study compares the prevalence of oral and systemic disease between bonded child laborers and school children living in Bagalur, Tamil Nadu, India. No oral health data currently exist for this city. The research hypothesis was that public school children were less likely to experience oral and systemic disease than bonded child laborers.

**Methods:** School children (N=50) and bonded child laborers (N=52) were examined by a medical doctor and two dental examiners (IRB # 15-3001), who recorded the presence or absence of disease. Chi square analysis was used to compare the two groups of children. Level of significance was set at 0.05.

**Results:** The proportion of children with at least some dental decay was significantly different (p=.001) for child laborers (71%) than school children (36%). Child laborers were 1.9 times more likely to have decay than school children (95% CI, 1.2-2.9). Dental pain was reported by 40% of the child laborers compared to 18% of school children (p=.018) and child laborers were 2.2 times more likely to experience dental pain than school children (95% CI, 1.1-4.4). Fifty-one percent of child laborers required urgent dental treatment compared to 12% of school children (p<.001) and they were 4.2 times more likely to require dental treatment than school children (95% CI,1.9-9.5). Child laborers were also three times more likely to require urgent medical treatment (95% CI,1.1-8.9).

**Conclusion:** Bonded child laborers in Bagalur, India are more likely to experience dental decay, dental related pain, and require urgent dental and medical treatment, than school children.