

# 2014 CLL Poster Abstracts

## **A Survey of Clinical Faculty Calibration in Dental Hygiene Programs**

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**Purpose:** This study investigated the calibration efforts of entry-level dental hygiene programs in the U.S. Four constructs were explored, including attitudes, satisfaction, characteristics and quality, to evaluate current practices of clinical faculty calibration.

**Methods:** A descriptive comparative survey design was used. Directors of accredited dental hygiene programs (n=345) were asked to forward an electronic survey invitation to clinical faculty. Eighty-five directors invited 847 faculty, 45.3% (n=384) of whom participated. The 17-item survey contained multiple-choice and Likert scale questions and was available for 3 weeks. Descriptive statistics were used to analyze demographic data and research questions. The Kruskal-Wallis, Spearman Correlation Coefficient and Mann-Whitney U tests were employed to analyze hypotheses ( $p=0.05$ ).

**Results:** The demographic profile for participants revealed that most worked for institutions awarding associate entry-level degrees, had 1 to 10 years' experience, taught clinically and didactically, and held a master's degree. Clinical instructors value calibration, believe it reduces variation, want more calibration, and are not offered quality calibration.

There was a difference between the entry-level degree awarded and the program's evaluation of clinical skill faculty reliability, as analyzed using the Kruskal-Wallis test ( $p=0.008$ ). Additionally, full-time versus part-time employees reported more observed student frustration with faculty variance, as evaluated using the Mann-Whitney U test ( $p=0.001$ ,  $bfp=0.004$ ).

**Conclusions:** Faculty members value calibration's potential benefits and want enhanced calibration efforts. Calibration efforts need to be improved to include standards for measuring intra- and inter-rater reliability and plans for resolving inconsistencies. More research is needed to determine effective calibration methods and their impact on student learning.

**NDHRA:** This study supports the objective: Critically appraise current methods of evaluating clinical competency, under Professional Education and Development.

## **Quality and Efficacy of Preventive Oral Health Care Provided by ECP Dental Hygienists in a School Based Dental Home**

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**Introduction:** Lack of access to oral health care is a growing problem for low income children in the U.S. One proposed solution to this problem is utilizing dental hygienists to the full extent of their education and training. In 2003, Kansas altered the dental hygiene scope of practice, to address this crisis, by creating extended care permit (ECP) dental hygienists. The purpose of this study was to assess the quality of oral health care provided by ECP dental hygienists in a school-based dental home.

**Methods:** Using a case-study design, electronic medical records of children (n=986) who participated in the intervention were mined for data. Numerators and denominators from the Dental Quality Alliance Concept Set provided the framework for measurement. Patient-oriented outcomes were examined using multivariate ANOVA and Kruskal-Wallis, in a multi-encounter cohort (n=295), to analyze decreases in decay, increases in restorations and decreases in treatment urgency.

**Results:** Twenty-six percent of the children eligible to participate in the intervention chose to do so. Nearly half (48.7%) of the program participants had 2 or more topical fluoride applications. On average, 52.8% of the children had sealants placed. The number of encounters with ECP dental hygienists had a statistically significant effect on changes in decay ( $p=0.014$ ), changes in restorations ( $p=0.002$ ) and changes in treatment urgency ( $p=0.022$ ). A statistically significant effect of the number of fluoride applications on changes in restorations ( $p=0.031$ ) was also present.

**Conclusions:** The results suggest that in school-based settings ECP dental hygienists provide high quality care that can positively impact children's oral health status.

Funding for this project and my advanced degree was through the NIH and NIDCR (T32-DE007294).

## **The Effect of the Isolite Suction on Aerosols and Splatter During Ultrasonic Scaling**

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**Introduction:** Aerosols and splatter are a concern in health care due to their potential adverse health effects on both patients and health care workers. Both the CDC and ADA have recommended use of the HVE during dental procedures that produce high amounts of aerosols and splatter, such as ultrasonic scaling. The Isolite™ is an attachment to the high-volume suction hose and may provide the added benefit of aerosol and splatter reduction. This study compared the Isolite™ and saliva ejector on aerosol and splatter reduction during ultrasonic scaling.

**Methods:** Fifty participants were randomly assigned to a control (n=25, saliva ejector) or test group (n=25, Isolite™) and were scaled with a 30 KHZ Cavitron SPS ultrasonic scaler unit with Dentsply 30 KHZ Slimline tip set at 50% power and 50% lavage for all patients in an enclosed room. Plaque extent scores (modified Greene and Vermillion) and exposure times were recorded. Aerosols were collected in a Petri dish placed 6 inches from the patient's oral cavity. After scaling, aerosols were collected in a second Petri dish for 35 minutes. Participants were surveyed regarding device comfort. Bacterial colony forming units (CFU) were counted following incubation in an anaerobic chamber for 72 hours. CFU were log transformed for normalization and data were analyzed using a student t-test.

**Results:** During ultrasonic scaling, no significant difference occurred between groups in aerosol reduction (p=0.25). A significant decline in aerosols after ultrasonic scaling occurred in each group (p<0.0001). Mean+SD of log<sub>10</sub> CFU/ml collected during ultrasonic scaling in the control and test group were 3.60 + 0.95 and 3.30 + 0.88, respectively. There was not a significant difference in plaque extent scores or time spent using the ultrasonic scaling between groups (p>0.05). All samples contained alpha hemolytic streptococcus bacteria and many samples contained strict oral anaerobes. Survey responses indicated that the test device was not well accepted for reasons related to stretching of the cheeks, lips, and causing gagging.

**Conclusions:** A significant amount of aerosol and splatter contamination occurred while ultrasonic scaling in both device groups, as indicated by high CFU and the identification of oral anaerobes in all plates.

As recommended by the CDC and ADA, the HVE

should continue to be used during dental procedures that produce high amounts of aerosols and splatter. Additional measures, such as patient positioning and reducing the patient's plaque load prior to ultrasonic scaling, should be used with these devices to decrease the likelihood of disease transmission risks.

## **An Analysis of Faculty Perceptions on Assessment Methods Utilized to Evaluate Student Competency in Dental Hygiene**

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**Purpose:** The purpose of this study was to evaluate clinical dental hygiene faculty perceptions regarding assessment methods utilized in determining clinical competency among entry-level dental hygiene programs within the U.S. The study also explored the influence of demographic criteria on the type of assessment selected.

**Background:** Competency based education (CBE) has become an integral part of dental hygiene education with the adoption of the Commission on Dental Accreditation (CODA) standards in 1997. CODA standards are not meant to be prescriptive to allow for flexibility with methods of assessment. However, this makes it difficult to determine if methods used are effective in measuring student competency for entry into dental hygiene practice.

**Methods:** This study was a descriptive, cross sectional survey design. The survey instrument was developed based on the literature and contained 31 questions related to the following areas: demographic characteristics, level of knowledge regarding assessment methods and perceptions of assessment methods. An email to all entry-level dental hygiene programs was sent to request dissemination and participation by program faculty. Data was gathered from a convenience sample of dental hygiene clinical faculty (n=181).

**Results:** Results revealed use of objective structured clinical evaluation (OSCE)/practical skill exams (83%) was perceived most effective in assessing competency followed by formative feedback (69%) and daily clinical grading (63%). Demographic characteristics, age and experience were analyzed to determine if there was a significant difference in the choice of methods utilized. As age increased, there was a decreasing interest in OSCEs and practical skill examinations as a good method of assessment. Thematic analysis of qualitative data

revealed formative assessment with the inclusion of summative assessment was rated the highest (44%) among the respondents as an effective method of evaluation followed by comprehensive patient care, summative assessment (16%). The overarching theme of the thematic analysis noted respondents may have a preferred assessment method but feel a blended approach of teaching should be utilized due to student diversity and learning styles.

**Conclusion:** Literature surrounding assessment methods and use of CBE within dental hygiene is limited. Findings from this exploratory study show respondents are satisfied with assessments that they are currently practicing but report a variety of methods are needed to evaluate student competency.

Further research is recommended with a larger sample and more detail on how programs define assessment methods used to assess competency and outcomes to determine what methods are most effective in the evaluation of student competency.

### **Practicum Experiences: Effects on Clinical Self-Confidence in Senior Dental Hygiene Students**

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**Introduction:** Educational methodologies should be continuously assessed for effectiveness. The outcomes of practicum experiences should be evaluated to determine whether goals are being met. The purpose of this study was to determine the effects of a 3 week practicum experience on the clinical self-confidence of University of North Carolina (UNC) senior dental hygiene students.

**Methods:** An embedded mixed methods approach was utilized. Before and after a 3 week practicum experience, UNC senior dental hygiene students (n=32) were asked to complete a 20-statement clinical self-confidence survey based on the dental hygiene process of care. Statements were Likert-scaled, ranging from "not at all confident" to "totally confident." The stratified Mantel Haenszel row mean score test with the subject as strata as a repeated approach was used to assess whether on average across subjects, the pre- and post-surveys had the same mean score. Statistical significance was set at  $\alpha < 0.05$ . Students were also asked to submit reflective journal entries discussing critical incidents during their practicum experience. The reflective journal entries were a requirement for the course. Relevant com-

ments from students' journal entries were used as qualitative data to support survey results.

**Results:** Pre- and post-practicum surveys (31/32) were completed and all 32 students submitted their journal entries. The differences in the row mean scores from pre- to post-practicum survey were statistically significant, showing an increase in self-confidence for each given statement. Students' journal entries provided comments that support these results.

**Conclusions:** The results suggest that a 3 week practicum experience in dental hygiene students' final semester increased UNC dental hygiene students' clinical self-confidence in the dental hygiene process of care. Dental hygiene programs may want to consider the benefits of requiring students to participate in a practicum experience if they do not already do so.

### **In-vitro Determination of the Applied Dose of Diammine Silver Fluoride**

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**Objective:** Diammine silver fluoride (DSF) has been shown effective for tooth sensitivity. In an earlier study (Vasquez et al, 2012), DSF was applied 3 times at one appointment; weight of DSF applied was estimated by determining the difference between the brushes loaded with material and the weight after application. The mean DSF applied was 0.002 g. Although the teeth were isolated to prevent moisture contamination, this method likely grossly overestimates the DSF applied. This study was to determine the weight of DSF applied to a tooth in treatment for hypersensitivity in an in-vitro model.

**Methods:** Twenty hydrated human teeth were dried and weighed. DSF ( $\text{Ag}(\text{NH}_3)_2\text{F}$ , Saforide, Toyo Seiyaku Kasei Co., Osaka, Japan), from a single lot, was applied by microbrush 3 times to a 4x3 mm area at the cervical of the intact facial surface simulating clinical treatment for hypersensitivity, and the teeth were reweighed. Water was applied to 10 control teeth following the same protocol. The difference of pre- and post-treatment weight determined the mean weight.

**Results:** Mean ( $\pm$ SD) of 15 weight gains after DSF was  $0.001 \pm 0.001$  g. Five teeth were excluded because the weight was zero or negative, which may result from evaporative change, and would bias the amount applied lower. Mean ( $\pm$ SD) of 10 weight gains after water treatment was  $0.001 \pm 0.001$  g. Similarity of DSF and water weights is consistent with the specific gravity of DSF close to water and limits of detection.

Conclusions: Weight of DSF was 1 mg per tooth. This value is one-half previously reported and reflects greater control over moisture contamination. The study more precisely estimates DSF applied to the facial surface of hypersensitive teeth clinically. Because the amount applied translates into exposure to fluoride and silver, this study better describes and ultimately enhances the safety profile of DSF.

Supported by a gift from ADP Silver Dental Arrest, LLC.

### **Dental Hygiene Patient's Willingness to Undergo HIV Testing**

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Introduction: In the U.S., an estimated 20% of people living with HIV are unaware of their status. Expanding rapid HIV testing (RHT) in the dental setting may increase the number of individuals aware of their HIV status and can begin treatment and social support early. RHT is an easy and accepted screening tool. It has been introduced in mostly primary care settings. Dental hygienists are committed to patient education and disease prevention and there is evidence they can effectively conduct RHT. This study aimed to determine knowledge and willingness to accept HIV testing in a dental setting.

Methods: A cross-sectional survey was administered among 300 dental hygiene patients at dental hygiene program clinics in New York City from November 2013 to February 2014. Using the Decisional Conflict Theory, patient acceptance of RHT, provider type preference and willingness to pay were assessed.

Results: The mean age of respondents was 38.03 (SD 14.6), 55.5% were female, 41.5% were White and 37.3% Hispanic. The majority (72.1%) indicated willingness to have HIV testing in a dental setting with 87.1% choosing oral RHT, 6.2% finger prick RHT and 8.4% a blood draw; 94.1% of respondents felt sure about the best choice for them, and 71.9% found testing by dental hygienists to be acceptable, 75.3% found testing by dentists to be acceptable and 30.9% found testing by dental assistants to be acceptable. Cost-wise, 84.8% indicated they would only take the test if

it were \$20 or less. The mean decisional conflict score was 3.5/4.0.

Conclusions: Patients are willing to undergo oral RHT HIV testing with dental hygienists. With a high decisional conflict score, patients appear aware of the benefits and risks associated with RHT. Further research is needed to evaluate the public health benefits and logistical challenges facing the provision of HIV testing in the dental environment.

### **Comparison of Communications Styles amongst an Inter-Professional Student Cohort**

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Introduction: Communication between practitioners of different professions is an integral part of working in inter-professional teams. While Health Professions programs are integrating inter-professional education by co-educating students, the implication of different communication styles between students in different professions has not been addressed. In an Inter-professional Education Course at Pacific University, first year students in 10 health professions completed a communication styles survey to understand their own personal styles and to explore population differences in style between professions. The purpose of this study was to investigate the discipline-specific pattern of communication styles amongst students.

Methods: After obtaining IRB exemption through Pacific University, all first year students in the College of Health Professions were required to complete a brief inventory questionnaire on communication styles as part of their campus-wide introductory inter-professional education course. The Personal Coaching Style Inventory (PSCI) is a tool used by personal coaches who work with executives. This questionnaire allowed students to rank their responses to 4 style types: Director (like to be in control), Presenter (know everyone who is important), Mediator (personable people everyone seems to like) and Strategist (the thorough, painstaking, hardworking tacticians). The primary (highest scored) style was reported by students within each profession. In cases where 2 styles were tied, both were counted as "primary." Means scores for each of the PSCI dimensions by profession were calculated. To determine if there were significant differences in PSCI component scores between programs, a series of one-way ANOVA analyses were conducted.

Findings/Results: Pharmacy and Masters of Health Administration had the highest percentage of students

identifying as "Strategists." Other differences suggested that Occupational Therapy and Audiology/Speech Language Pathology students had unique style breakdowns, while the other health professions shared relatively similar profiles. Significant differences between programs were found for the Mediator dimension,  $F(9, 931)=2.61, p=0.006$ . Post-hoc analyses revealed this difference to be between the Physician Assistant (mean=13.47) and the School of Language Pathology programs (mean=18.60).

**Conclusions:** These results suggest that there are in fact differences in the communications profiles of students within different health professions programs, which in the worst case may contribute to difficulties in communications, but, if tapped for its potential, could be used to increase team productivity. With an increased emphasis on working in inter-professional teams, understanding the differences in communication strategies within different health professions can help our students better adapt to these environments.

### **The Effect of Teaching Experience on Service-Learning Beliefs of Dental Hygiene Educators**

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**Introduction:** Service-learning is a teaching and learning strategy which benefits both the student and the community. Service-learning research within dental hygiene education has largely focused on students. There is limited research on how dental hygiene educators are impacted by service-learning pedagogy.

**Purpose:** The purpose of this causal-comparative study was to determine if service-learning teaching experience effects dental hygiene faculty perceived service-learning benefits at the classroom and at the community level, as well as their perceived service-learning barriers at the classroom and at the institutional level.

**Methods:** 581 entry-level dental hygiene educators in the U.S. received the previously validated Web-based Faculty Service-Learning Beliefs Inventory (wFSLBI). The wFSLBI is made up of twenty 5-point Likert service-learning benefit and barrier sub-scale questions. The dental hygiene educators were placed into comparison groups, those with service-learning teaching experience ( $n=230$ ) and those without ( $n=87$ ). Independent samples t-tests and Mann-Whitney U tests were performed ( $n=317$ ). A response rate of 55% was noted and an a priori level of significance of  $p\geq 0.05$  was utilized.

**Results:** There was a statistically significant differ-

ence between entry-level program dental hygiene educator's perceptions of the classroom and community benefits and classroom barriers of service-learning instruction based on their service-learning teaching experience. However, in regards to institutional barriers there was no significant difference between the 2 groups.

**Conclusions:** Entry-level dental hygiene educators who have service-learning teaching experience are more positive about its benefits in the classroom and within the community. These included enriched discussion opportunities, greater enjoyment of the process of teaching, enhanced relationship with their students and emphasis on the value of partnerships, the delivery of beneficial services to special populations and the ability to make a difference within their community. They perceive less difficulty involved in the practice of service-learning pedagogy within their classrooms while participants without service-learning teaching experience perceived greater barriers in regards to overall time constraints, lack of control, and reduced classroom instruction time. Both groups of dental hygiene educators perceived a barrier to service-learning instruction at the administrative level of their institution. Service-learning teaching experience does impact the service-learning beliefs of dental hygiene educators.

**Recommendations:** It is recommended that other investigations into the service-learning beliefs of higher education faculty include additional health professional educators for contrast and comparison.

### **A Survey of Dental Hygiene Collaborative Practice in New Mexico and Minnesota**

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**Introduction:** This descriptive, comparative study examined characteristics, services, models, and opinions of collaborative practitioners (CPs) in New Mexico and Minnesota. CPs were dental hygienists who had entered into a written, cooperative agreement with a licensed dentist(s). Collaborative Practice Dental Hygiene (CPDH) was defined as the prevention and treatment of oral disease without general supervision applying this legal working relationship. Various avenues of direct access care have been developed to broaden practice models and aid the underserved and underinsured. To date, little has been published about CPDH as a model for direct access care. Therefore, the care provided and the opinions of CPs were explored and compared in two states.

Methods: After Human Subjects Committee approval (#3759M), a 43-item self-designed online survey was administered using a multiphase process. Closed and open-ended questions were incorporated as well as Likert items using a 6-point scale of agreement to disagreement. Validity and reliability were established. Descriptive statistics examined six research questions. The Mann-Whitney U, Pearson Chi-Square or Fisher's Exact tests analyzed four null hypotheses ( $p=0.05$ ). Open-ended responses about opinions of CPDH benefits and obstacles were organized into themes.

Results: A 49.3% response rate was achieved (23% New Mexico; 64% Minnesota) ( $n=36$ ). Many participants were experienced clinicians who worked in this alternative setting after 21 years in the profession (66.7% New Mexico; 63.4% Minnesota) and reported "increase access to care" as the reason for practicing collaboratively (33.3% New Mexico; 40% Minnesota). A variety of services were offered and private insurance and Medicaid were accepted, although many practitioners did not receive direct reimbursement. The majority of New Mexico participants worked in private practices, earned advanced degrees and serviced Health Provider Shortage Areas (HPSAs). The majority of Minnesota respondents worked in various facilities, earned associate degrees and were uncertain if HPSAs were served. Improve access to care, autonomy, finances, patient care, and interprofessional practice were benefits of CPDH. Obstacles focused on acquiring or maintaining a collaborative practice agreement, direct reimbursement, employees, facilities, finances, patient follow-up care, and mobile equipment. There were no significant differences between the participants' responses in both states.

Conclusions: New Mexico and Minnesota collaborative practitioners are similar in characteristics, services, and opinions although models of practice vary. CPDH is a viable option for experienced practitioners and offers many preventive and therapeutic services such as prophylaxis, nonsurgical periodontal therapy, fluoride therapy, radiographic assessment, and pit and fissure sealant placement. In New Mexico this care is provided in HPSAs.

### **A New Opportunity for Dental Hygienists: Certified Diabetes Educator**

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Introduction: This year marks the first opportunity dental hygienists can apply for the Certified Diabetes Educator (CDE) credential. A CDE credential

designates a health professional who has additional training, experience, and comprehensive knowledge of diabetes and the ability to effectively educate patients with diabetes. This creates additional opportunities for dental hygienists who may wish to expand their career options by consulting in hospital or community diabetes education programs, conducting diabetes and oral health research, disseminating information through presentations and publications, or attracting patients with diabetes to the dental practice.

Before 2014, only a select number of health care professionals were eligible to apply. Due to the expanding need for CDEs across the nation, the National Certification Board for Diabetes Educators (NBCDE) has created a new pathway, Unique Qualifications Pathway, which includes dental hygienists.

Methods: The requirements to obtain the CDE certification include 30 hours of continuing education in diabetes and achieving 2,000 hours of direct patient diabetes education. An example of practice experience is conducting an assessment of the patient and synthesizing a tailored education plan to meet the needs of the patient, while an example that is not considered to be practice experience includes the actual execution of debridement or polishing. The final hurdle is passing the Certification Examination for Diabetes Educators.

Results: Once completing the requirements, the dental hygienist will be credentialed for a 5 year term. Armed with the specialized knowledge and experience, dental hygienists can be more confident, active and effective in the management of patients with diabetes. As the oral health expert, the dental hygienist will have more opportunities to educate other health providers on dental issues associated with diabetes.

Evaluation Plan: For initial certification, creating or joining online study groups with other dental professionals pursuing the same goal would be valuable. In addition, obtaining a current CDE as a mentor, especially one with a dental background, would provide valuable insight and support. Recertification after 5 years involves 3 options, including taking and passing the examination. Finally, once the value of dental professionals is realized, the certification may be offered to more dental professionals.

Conclusion: The opportunity to become a CDE provides those graduate level dental hygienists with an interest in diabetes to expand their career path and thoughtfully join other health care colleagues in the pursuit of an improved quality of life for patients with diabetes.

## **Development of an Oral Health and Nutrition Practice Paper for the Academy of Nutrition and Dietetics**

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**Introduction:** Oral health is an integral component of overall health and the Academy of Nutrition and Dietetics acknowledged this first in 1995 when an evidence-based oral health and nutrition position paper was initially developed. The position paper has been updated and adopted by the Academy in 2000, 2005, 2009 and 2013. To further enhance the translation of science to practice and to help guide the practice of dietetic professionals, the Academy began developing Practice Papers as companions to Position Papers in 2007. To date, 14 practice papers have been developed as supplements for the 34 position papers.

**Methods:** In November 2012, the Academy Positions Committee (APC) of the House of Delegates identified authors for the new practice paper for Oral Health and Nutrition. A practice paper complements the corresponding position paper by presenting strategies to implement the science into practice. The APC workgroup oversaw the development of the practice paper.

Through a critical review of the evidence, the authors who are credentialed as both registered dietitians and registered dental hygienists developed the practice paper. In addition to review of the paper by the APC work group, external reviewers included the American Dental Hygienists' Association, American Dental Association, Maternal and Child Health Bureau, Health Resources Services Administration, and several dietetic practice group representatives. Revisions were made based on the reviewer comments prior to final submission to the APC workgroup.

**Results:** Following approval of the practice paper by the workgroup, the practice paper was accepted for publication on the Academy web site and the abstract will be published in the Journal of the Academy of Nutrition and Dietetics in the June 2014 issue. The practice paper outlines opportunities for dietetic practitioners to collaborate with oral health care professionals (OHCPs) to prevent dental caries with an emphasis on early childhood caries, support establishment of a dental home, prevention of periodontal disease, minimize dental erosion, and health promotion/disease prevention for special populations at high risk for oral disease.

**Evaluation Plan:** The Practice paper will be republished on a 3 to 5 year cycle by the Academy of Nutrition and Dietetics. Formative evaluation on the benefits of the paper will be gathered from an online survey sent out to the Academy's House of Delegates as well as members of the various Academy of Nutrition and Dietetics Dietary Practice Groups. This qualitative data will be collected prior to the renewal of the practice paper so that these considerations can be taken into account for the updated publication of the paper.

**Conclusion:** This initiative provides guidance to dietetic professionals to include support for oral health as a component of overall health and highlights the need for collaborative efforts between dietetics and OHCPs to provide high quality comprehensive patient care.

## **Analysis of Phone Calls Regarding Fluoride Exposure Made to New Jersey Poison Information and Education System in 2010 to 2012**

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**Introduction:** The American Association of Poison Control Center's annual reports demonstrate that acute fluoride exposure is not an uncommon occurrence. Despite its prevalence, there has been little to no published research on the topic in the last 10+ years. The purpose of this study was to calculate the incidence of acute fluoride toxicity and lethality as it occurs in New Jersey and provide a descriptive epidemiology of acute fluoride exposures.

**Methods:** The study design was retrospective. Records of phone calls made by individuals reporting excessive fluoride exposure to New Jersey's Poison Information and Education System (NJPIES) from the years 2010 through 2012 were extracted from the center's Toxicall® database. This data was analyzed to calculate the incidence of acute fluoride toxicity and lethality. Characteristics of the affected population, and circumstances and medical outcomes of the acute fluoride exposures were also assessed.

**Results:** A total of 2,476 phone call records met the inclusion criteria. The fluoride exposures reported were from toothpaste with fluoride (49%, n=1,214), mouth rinse with fluoride (21.6%, n=536), multivitamin with fluoride (21.4%, n=530) and pure fluoride (0.08%, n=199). Medically speaking, 94.75% of calls were asymptomatic cases (n=2,346), 4.24% were symptomatic (n=105) and 1.01% were informational inquiries (n=25). Adverse symptoms reported were mostly minor (83.9% of symptomatic cases, n=88) and moderate (16.1% of symptomatic cases,

n=17). The age group 18 months to 3 years of age showed the highest incidence of acute fluoride exposure (53.2%, n=1,317). There was a slightly higher incidence of acute fluoride exposures among males (n=1,317) vs. females (n=1,159). Most incidences occurred in the home (93.1% of records, n=2,305) and occurred unintentionally (96.7%, n=2,394). Calls were mainly made by the patient's mother (67.5%, n=1,671).

**Conclusions:** Based on the data, there were no reports of lethality or toxicity due to acute fluoride exposure in New Jersey from 2010 through 2012. Symptomatic reports and informational inquiries were rare. All adverse outcomes due to excessive fluoride intake were easily remedied with a calcium antidote. Dental hygienists should educate patients on safe handling of fluoride-containing products. However, findings in this study suggest that levels of fluoride in available dentifrices will not produce life-threatening events, even if taken in doses higher than recommended.

Funding for this research study was provided by Rutgers University School of Public Health Exploratory Grant Program.

### **School-Based Preventive Dentistry Service Program in Ogun State, Nigeria**

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**Introduction:** The need for oral health care is the most prevalent unmet health care need amongst the school-aged population in Nigeria, especially those from needy and disadvantaged families, who have neither been exposed to dental information nor treatment.

The objective of the study was to determine if the combinations of widely used preventive procedures, which consist of oral health education and screening, tooth brushing instructions, plaque control and advice on diet, modification of school lunch programmes to reduce the consumption of sugar, oral prophylaxis and application of fluoride; would make a significant difference in the oral health of school children.

**Methods:** The oral health status of children aged 6 to 11 years and those between 15 to 19 years were assessed in 55 schools. In each school, approximately 1,000 children were divided into 6 groups, and each group received the preventive procedures. A team of dental hygienists and therapists travelled to selected primary schools in Ogun State to examine each child an-

nually afterwards. The results of the examination were matched with selected groups of preventive procedures used to determine how the oral health status of the children were affected.

**Results:** The effectiveness of the 8 years preventive program was evaluated using the DMFT index. The outcome of the program was also evaluated by clinical signs of gingival inflammation, oral health status, using the community periodontal index or treatment needs (CPITN). Examinations were carried out by researchers at the respective schools. At the initial examination, there was a mean of 3 decayed teeth per child in the experimental group. After 8 years, the DS score for this group was 0.55 (a mean of less than one decayed teeth). The prevalence of the subject diagnosed as CPITN code 3 showed steady decrease from 76% at baseline to 53% after 12 months. Since the programme involved a range of different interventions, the results of the examinations were matched with particular groups of preventive procedures used.

**Conclusion:** The tremendous backlog of unmet dental problems amongst low-income children in Nigeria can be dealt with successfully by a combination of sustained preventive and treatment plans. School-based oral health care programs would help resolve the problems of inadequate care for large portions of our population. It would ensure convenient access to a comprehensive and good quality oral health services for all children.

### **Attitudes of Dental Hygiene Students on Rubber Dam Isolation**

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**Problem Statement:** Dental hygiene students, in states where the scope of practice allows them to place rubber dams, are taught this skill to clinical competence while in school. Scientific literature contains limited data on whether hygienist actually utilize this skill in practice and why.

**Purpose:** The purpose of this study was to assess the knowledge and perceptions of dental hygiene students utilizing rubber dam isolation and if they will continue to use it post-graduation.

**Methods:** The study utilized a convenience sample of dental hygiene students who were selected to complete a survey investigating the knowledge and perceptions on the utilization of rubber dam isolation. Data from 2 separate classes are included in this analysis. Valid data responses were available from 24 students in one class



and 27 students in the other. The instrument used in the study contained 11 items with open-ended and Likert scale questions. Survey information was obtained through the use of an electronic online tool, and all responses remained confidential. Descriptive statistics were used to analyze the data. IRB approval was granted from UDM School of Dentistry (UDM IRB#1213-10).

**Results:** Students felt utilization of a rubber dam was important for a dry field (85%). Educational background and/or training was adequate (50%). Clamp placement was identified as the most difficult task in placing the rubber dam. Additional continuing education post graduation would not be sought (85%). Primary disadvantage of the rubber dam isolation is, it is time consuming (90%) and would prefer other methods of isolation (70%). The number one preferred choice of isolation selected was cotton roll isolation followed by dry angle. Majority felt they would continue to use rubber dam isolation after graduation (60%).

**Conclusion:** The dental hygiene curriculum appears to educate students on the advantages of utilizing the rubber dam isolation. However most dental hygiene students still perceive the utilization of the rubber dam isolation to be a time consuming task. They would prefer other forms of isolation.

### **Inter-Professional Collaboration Between Dental Hygiene and Elementary School Health Nurses in One North Carolina County**

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**Purpose:** Public health dental hygienists, along with the oral health programs in North Carolina, have been utilized for many years to improve the overall dental health for the children of the state. Since 1918, North Carolina has administered oral health programs under the direction of the Oral Health Section (OHS), a division of the North Carolina Department of Health and Human Services. Due to reduction in funding, the number of public health dental hygienists, who staff these programs has decreased, while the public school population has increased. This has resulted in a 33% decrease in the dental public health workforce.

**Rationale:** Orange County, North Carolina was impacted. There was no longer anyone to provide dental screenings and preventive services to the children in the county's schools. As a result, the Orange County Oral Health Collaboration began at Ephesus Elementary School and included the school health nurses, UNC dental hygiene faculty and students from the UNC School of Dentistry.

**Program:** A program was designed to fill the gap left when the county lost its public health dental hygienist and the services she provided. Phase One: school nurses were trained to complete oral health screenings and referrals utilizing methods that had been validated for use in North Carolina counties for more than 30 years by the OHS. Phase Two: created educational guides for school health nurses and/or elementary school teachers to aid in presenting oral health education programs to children.

**Evaluation and Impact:** During spring 2013, dental screenings were conducted at Ephesus Elementary School by the school health nurse and a dental hygiene student intern. The results were utilized to make dental referrals for the children in need. Of the total 490 children at the school, 486 were screened and 42 were found to have obvious decay. Thus, indicating successful implementation of the first phase of the project. The educational guides are currently in use at the school and will also be introduced to another group of school health nurses in an Inter-professional Education session with the UNC School of Nursing in spring 2014. During this IPE session, 30 school health nurses will be solicited for feedback about the possible utilization of this program in their schools. Each nurse will develop an action plan for their school. Follow-up to this action plan will be conducted by the IPE faculty in 6 months to determine utilization rates of the program.

### **Emerging Tobacco Product Use Associated with Perception of Harm in Urban High School Males: A Pilot Cross-Sectional Study**

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**Introduction:** Tobacco use, a major risk factor for oral disease, is the leading cause of preventable death and morbidity in the U.S. Recently, emerging tobacco product use, including electronic cigarettes (e-cigarettes), little cigars and hookahs (tobacco waterpipes) has significantly increased among high school males nationally. Perceived harm associated with these products may be one factor contributing to use, or intention to use. Understanding the relationships of perceived harm to tobacco use, and intention to use, may better prepare dental hygienists to provide effective prevention and cessation counseling of adolescents.

**Purpose:** To explore the associations of perceived harm with tobacco use, and intention to use among urban high school males.

## **Research Investigation of Competence on Oral Assessment and Oral Hygiene Care in Nursing Curriculums in the State of Michigan**

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**Methods:** This cross-sectional pilot study was approved by the University of California IRB. After gaining school permission from an all-male California high school with 750 students, a convenience sample of 138 males attending physical education classes was approached to explain the study and distribute parental consent forms. One week later, an anonymous 30 minute, self-administered web-based survey was completed by students with parental permission.

Prevalence of ever-use (lifetime, even once) and current past month use were determined for cigarettes, e-cigarettes, little cigars and hookahs. Perceived harm was measured for each product, "How harmful is use to general health?" scaled from 0 (not at all harmful) to 100 (extremely harmful). For each product, the Mann Whitney U-test compared perceived harm of: (a) ever-users versus never-users; and (b) participants with no intention to use ("definitely" will not) versus all other responses among never-users.

**Results:** 104 students completed the survey: 23% reported ever-use for little cigars, 21% for e-cigarettes, 20% for hookahs, 20% for cigarettes and 19% reported current use for any product. Overall, perceived harm was highest for cigarettes and lowest for e-cigarettes and hookahs. For each product, individuals who had tried that product reported significantly lower perceived harm than those who had never tried (all  $p < 0.02$ ). Among never-users of each product, those who reported "probably" intending future use had lower perceived harm than those who reported no intention of future use (all  $p < 0.005$ ).

**Conclusions:** In this study, perceived harm was associated with tobacco use and future intention to use among male adolescents. Dental hygienists need to understand harm associated with tobacco products to correct misconceptions among male adolescent clients when providing oral health education and tobacco cessation counseling. Additional research in a larger sample of adolescents is needed.

Research reported was supported by grant number 1P50CA180890 from the National Cancer Institute and Food and Drug Administration Center for Tobacco Products. The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH or the Food and Drug Administration.

**Problem Statement:** Nurses complete Minimum Data Set (MDS) assessments on nursing home residents at initial and monthly intervals which include oral health assessments. This requires nurses to distinguish between oral health and pathology. To investigate that the nursing curriculum adequately prepares graduates to perform the MDS assessment, a survey was designed.

**Purpose:** The purpose of this study was to evaluate didactic and clinical curricula of nursing programs in Michigan regarding oral health assessment and pathology.

**Methods:** Surveys were sent to 56 of the state's nursing programs. Eleven were returned with responses (20% response rate). This single blinded study utilized a convenience sample of 11 nursing programs whose directors were selected to complete a survey about the curriculum and methods used for teaching oral health assessment and oral pathology including clinical experiences and didactic hours. The instrument used in the study contained 15 items with close-ended responses. Survey information was obtained through the use of an electronic online tool, and all responses remained confidential. Descriptive statistics were used to analyze the data. IRB approval was granted from UDM School of Dentistry.

**Results:** Nursing students completed 2 didactic hours or less in oral health assessment training (91%). Students were taught to assess the oral cavity as part of routine patient assessment (81%) but only one-third of the programs perform intra oral examinations as part of the routine patient assessment (36%). Three hours or less was spent on clinical assessment of the oral cavity (81.9%). Most programs teach the use of a penlight to complete an oral health assessment (81.8%). Clinical competencies were required to be completed in brushing a patient's teeth (36.4%), care of an oral prosthesis (80%) and providing oral hygiene care in a clinical setting (100%). One hour was spent in clinical intra-oral pathology (90%).

**Conclusion:** If nurses are responsible for initial and monthly oral health assessments of nursing home residents, additional clinical and didactic experience may need to be incorporated into the curriculum including areas of oral health assessment and oral pathology. An alternative is to have other health care professional such as dental hygienists employed at nursing homes to conduct oral hygiene assessments and oral hygiene protocols.

**2012 Dental Hygiene Practice in North America – The physical, economic and workforce impact of musculoskeletal disorders among clinical dental hygienists**

\*Anne N. Guignon, RDH, MPH; \*Cindy M. Purdy, RDH, BSDH, CEAS

**Problem Statement:** Clinical dental hygiene practice involves physical tasks including awkward positions, static postures, repetitive forces and vibration that increase risks of developing workplace-related musculoskeletal disorders (WRMSD).

**Purpose:** The purpose of this study was to investigate the prevalence and type of WRMSD and injuries among dental hygiene practitioners.

**The study goals included:** determine the type of personal equipment hygienists use in clinical practice to reduce risks of WRMSD, the measures hygienists take to prevent or alleviate pain from WRMSD, and establish short and long-term impact on hygienists ability to continue in clinical practice after experiencing WRMSD.

**Methods:** This study utilized a convenience sample collected through an online survey tool over a 3 week period of time in November 2012. Dental hygienists were invited to participate in the survey via multiple social media sites, including ADHA component and constituent internet sites. Participation in the survey was voluntary. The survey instrument contained 22 close-ended questions including basic demographics, clinical practice activities, perceived risks for injury, strategies to minimize injury and personal accommodations for existing WRMSD. The survey instrument was pilot-tested with 12 dental hygienists. All responses were confidential.

**Results:** A total of 1,217 licensed dental hygienists representing 47 states and 6 Canadian provinces responded. Descriptive statistics were used to analyze the data:

- Mean age 44
- More than 52% practice 25 to 40+ hours per week

The prevalence of injuries reported was:

- One WRMSD (36%)
- Multiple disorders (15%)
- An additional group (19%) worry about developing an WRMSD

Primary injury sites reported included:

- Neck (63%)
- Shoulders (54%)

- Lower back (36%)
- Dominant hand (36%)
- Mid/upper back (28%)
- Non-dominant hand (20%)

Clinicians reported using the following personal equipment to reduce risks for WRMSD:

- Power driven scalers (85%)
- Larger diameter instruments (77%)
- Magnification loupes (58%)

Individual strategies to mitigate discomfort included:

- OTC pain medications (54%)
- Therapeutic massage (51%)
- Stretching during the clinical day (50%)

Clinicians reporting they had reduced their clinical hours also reported temporary reductions (27%) and permanent reductions (38%) to WRMSD and symptoms.

**Conclusions:** The relationships between perceived risk of injury and reported neck, shoulder, mid and upper back injuries are highly significant ( $p < 0.01$ ). Reported neck, mid/upper back and dominant hand injuries during 6 to 10 years of practice are triple that of the first year of practice, lower back and shoulder injuries are double and injury rates stabilize over longer practice terms. Further research needs to focus on solutions to reduce the incidence of WRMSDs, with particular attention on the first decade of practice.

**Geographic Comparisons of Washington State Non-Traumatic Dental Complaint Emergency Department Patients**

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**Objectives:** Individuals who lack access to oral health care use emergency departments (EDs) for their oral health needs. Previous research has shown that care provided to non-traumatic dental complaint (NTDC) patients by EDs is ineffective, expensive, and clinically questionable. The intent of this retrospective study was to describe and compare three variables related to two distinct geographic sites in Washington State: demographic profiles, institutional administrative experiences, and clinical experiences of NTDC patients.

**Methods:** After receiving IRB approval (HSC #4005), the retrospective descriptive comparative study was conducted. Data were provided by two hospitals, one in an urban (URB) location and the other in a rural-to-

urban (RTU) location, from de-identified patient records from March, 2012 to March, 2013. Data were analyzed using parametric and nonparametric to determine geographic differences between the variables at the a level of 0.05.

**Results:** The usable records provided by the RTU site numbered 197 and by the URB site were 1,183. The demographic profiles indicated that more males visited the ED at both geographic sites. Between the sites a significant difference was found between the ages of the NTDC patients at the two locations. The only significant difference in the administrative experiences was the month of the year patients presented to the ED. Clinical NTDC patient experiences varied by diagnosis, treating provider, and admissions.

**Conclusions:** Noted demographic and provider-diagnosis variations might adversely affect NTDC ED patient outcomes, impacting policy development, federal funding, and future research.

### **Dental Hygiene Student Perceptions of an International Learning Experience In Nicaragua**

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**Introduction:** In 2013, faculty at The University of New Mexico (UNM), Division of Dental Hygiene created a volunteer international elective for graduate and undergraduate dental hygiene students. A week-long experience was offered for students to provide direct oral health care with an interdisciplinary team to a culturally different community with high dental need. The community chosen was Solidaridad, an impoverished community near Granada, Nicaragua. Little research exists on the impact of such international outreach programs among dental hygiene students. The purpose of this study is to ascertain students' perceptions of the impact of an international dental hygiene elective on their personal and professional growth.

**Methods:** All trip participants were asked to voluntarily complete pre- and post-trip surveys to evaluate their perceptions of the experience. The surveys stemmed from a previously validated and reliable instrument used to assess the effects of international study abroad programs on student volunteers. Questions investigated the impact of experiential service-learning on student development

across several areas including civic responsibility, personal competency and ability to provide significant contributions to the community. An additional focus of the questionnaires was placed on the influence of self-reflection activities while abroad. Seventeen of the 22 dental hygiene student trip participants completed both the pre- and post-surveys. Responses were analyzed to determine the impact of the experience for the participants.

**Results:** Using descriptive statistics, results indicated that the international experience positively influenced the 17 student participants' growth in the areas of commitment to service, appreciation for domestic resources, and awareness of other communities. Of the student respondents, 81.3% felt quite certain that this international experience would make them a better professional in their field, 62.5% felt it was "extremely important" and 31.3% felt it was "very important" to participate in an international experience in a professional health care education program. Qualitative analyses further revealed that students believed engagement in reflection practices was a valuable contributor to their learning experience and changes in their development.

**Conclusion:** Beyond The UNM Dental Hygiene Program's standard curriculum, this international outreach mission to Nicaragua offered students an opportunity to grow in several aspects. In accord with The American Dental Association Commission on Dental Education Standards, this elective further met several of the required standards for dental hygiene programs including community outreach and diversity. Findings from this study suggest that experiential learning through international electives such as this can benefit professional and personal development of students of dental hygiene.

### **Analysis of Digital and Film Based Radiographic Trends in Kentucky for the Dental Hygiene Educator**

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**Introduction:** As a dental hygiene educator, it is important to understand what trends are seen when using digital and film based radiographic systems in private practice. Knowing this information gives faculty a better idea of which of these systems is more prevalent and reasons why a specific type is implemented. The purpose of the study was to compare digital versus film based radiographic use and interpret the reasoning of selection for each practice.

**Methods:** This cross-sectional study utilized the email addresses of practicing dentists within Kentucky. Data was requested through the use of an electronic survey containing questions pertaining to the type of radiographic system used, reasons why a particular system was integrated into the practice, and practice demographics within each specific office. The survey instrument used in the study contained 21 items with closed-ended responses. Descriptive statistics were used to analyze the data. Data was collected and analyzed from 240 dentists within the state. IRB approval was obtained from Western Kentucky University.

**Results:** Of the respondents, 76.7% of dentists are presently using digital radiography while 23.3% are using film based radiography in their practice. Practice size influenced the rate of use of digital systems with 63.4% of solo practices, 94.5% of practices with 2 to 3 dentists, and 100% of offices with more than 3 dentists using digital systems. Length of time practicing impacted the rate of use of digital systems with 100% of dentists practicing less than 10 years, 88.9% of dentists practicing 11 to 15 years, and 68.6% of dentists practicing greater than 15 years using digital. As the age of the dentist increased, the rate of digital implementation in the office decreased indicating 100% use at 20 to 30 years of age, 96.1% at 30 to 40 years of age, 80.3% for 40 to 50 years of age, and 65.6% for greater than 50 years of age. The specific type of digital systems used were 80.8% CCD digital sensors, 15.3% phosphor plates and 4% other types. The most important reason stated for using digital radiography was the ability to enhance the image after exposure. The most important reason for using film based radiography was its low cost in comparison to digital.

**Conclusion:** A gradual transition is being seen in the private practice setting from film based radiography to digital radiography. Newer dentists and group practices have embraced the digital aspect and are currently using it at a higher percentage. New and future dental hygiene graduates are more likely to encounter digital radiography in private practice because of these numbers. Dental hygiene educators should be aware of this conversion and emphasize the importance of teaching the aspects of digital radiography in both the classroom and clinical settings.

## **First Clinical Patient Care Experiences of Dental Hygiene Students**

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**Introduction:** Creating successful patient experiences for beginning students is essential to provide a strong foundation in clinical patient care for dental hygiene students. The significance of this study was to address the process for ensuring that students receive adequate first year clinical preparation and skill development, which should be a necessary component of effective performance and patient safety. The purpose of this qualitative study was to gain insight into the first clinical experience of first year dental hygiene students.

**Methods:** Data were collected from one cohort (n=38) of students in a dental hygiene associate degree program in the first year of study. A questionnaire was developed and piloted among first year nursing students. Following the survey pilot and a semester of patient care, dental hygiene students were asked to respond in writing to the questionnaire to describe their first patient care experiences. Data were analyzed utilizing descriptive statistics, by reviewing for patterned codes and themes.

**Results:** Data analysis revealed consistent patterns of responses in students, with majority of respondents' identification of specific actions from clinical instructors which enhanced or detracted from the quality of their initial experiences. Three primary themes were revealed: anticipation, processing and affirmation. Anxiety and fear before and during the clinical experience were consistently expressed.

**Conclusions:** Based on the data, specific recommendations for improving the overall experience in the first clinical setting for beginning dental hygiene students were derived and it is suggested that a patient simulation appointment be implemented prior to actual patient care. Improving the quality and nature of first patient care experiences will provide a strong foundation for beginning practitioners, and foster a more positive clinical role development.