Proceedings from the 4th Global Dental Hygiene Research Conference: “Translating Knowledge to Action”

October 19-21, 2017, Ottawa, Canada

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The Journal of Dental Hygiene is the refereed, scientific publication of the American Dental Hygienists’ Association. The JDH promotes the publication of original research related to the profession, education, and practice of dental hygiene and supports the development and dissemination of a dental hygiene body of knowledge through scientific inquiry in basic, applied and clinical research.

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Digital Access to the JDH Supplement

This special print supplement of the Journal of Dental Hygiene includes the complete proceedings of the 4th North American Global Dental Hygiene Research Conference, “Translating Knowledge to Action.” An electronic version of this issue, complete with the full abstracts of the posters and oral free papers can be accessed without charge from the JDH website, http://jdh.adha.org.

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Complete issues of the JDH, dating back to 2004, are also archived on the website. ADHA members have free access to all of the JDH holdings.
On behalf of Procter & Gamble Professional Oral Health, we are pleased to support the Proceedings from the 4th Global Dental Hygiene Research Conference as a special supplement to the Journal of Dental Hygiene. Our relationship with the National Center for Dental Hygiene Research & Practice has been in place for many years and we are proud to have provided four educational grants to support the North American/Global Dental Hygiene Research Conferences. The collaboration of the National Center with the Canadian Dental Hygienists Association presented a unique opportunity to broaden the target audience for the 2017 Conference and allow a richer discussion on “Translating Knowledge to Action.” As a company, we are working to help advance the profession of dental hygiene around the world and we are committed to supporting dental hygienists with the time and place to learn, deliberate and drive action which helps your patients to achieve the best oral health possible.

We believe that in order to deliver the best oral health prevention and patient care for the world’s consumers, the foundation needs to be science based. The National Center for Dental Hygiene Research & Practice shares similar goals with their mission to promote the public’s oral health by fostering the development, implementation and dissemination of oral health research; and strengthening the scientific foundation for the discipline of dental hygiene. A critical goal, which was enhanced by this latest conference, is the translation of research evidence so that it is meaningful and useful in dental hygiene education and practice. Without relevant translation, much of the scientific evidence never reaches the patients that it is designed to help.

The conference continues to bring together the international dental hygiene research community with original research presented by dental hygienists from 14 countries and 4 continents, including Asia, Australia, Europe and North America. The conference was designed to focus on the research agendas of both the Canadian Dental Hygienists Association and the American Dental Hygienists’ Association. The level of scientific exchange is impressive, with a wide range of topics and methodologies used to study problems of direct significance to dental hygiene practice and education. In addition, there continues to be a group of graduate dental hygiene students in attendance. It is essential to continue to fuel their energy and enthusiasm as they are a critical part of the research infrastructure going forward.

For those that had the opportunity to attend the conference, we hope you enjoy revisiting your learning experience and discussions with dental hygienists from around the world. Importantly, for those who were unable to join, we trust that these Proceedings will help you get a sense of the depth and breadth of topics covered (60 posters, 15 workshops and 29 oral sessions) and learn something new from your colleagues. We would be remiss if we did not acknowledge the tireless work of Drs. Jane Forrest and Ann Spolarich in bringing these research conferences to life. These two women exhibit a level of commitment to research and their profession which is unsurpassed!

J. Leslie Winston, DDS, PhD
Director, Global Oral Care Professional and Clinical Operations
Procter & Gamble Oral Health
The 4th Global Dental Hygiene Research Conference was held in partnership with the Canadian Dental Hygienists Association’s biannual meeting, Translating Knowledge to Action in Ottawa, Canada from October 19-21, 2017. This 3-day conference provided an opportunity for dental hygiene practitioners, educators and researchers to convene and explore commonalities in their interests, learn from each other about new and ongoing research programs and foster future collaborations. It is our hope that discussion and interest generated at the conference provided the networking support and intellectual stimulation needed to systematically and purposefully move our knowledge base, educational programs and clinical practice standards forward.

Together with CDHA, we offered scientific sessions featuring 60 original posters and 29 oral free papers on a wide range of topics for the many communities of dental hygienists represented.

Conference workshops were designed based on the key areas identified in the new research agendas of the Canadian and American dental hygienists’ associations: risk assessment and management, capacity building of the profession, access to care and unmet needs, alternative practice in the US and Canada, and seniors’ oral health. Colleagues shared findings from their original research about problems encountered every day in practice so that we can all improve the quality and type of education provided to the next generation of dental hygienists and the care we provide to the public.

This conference has required extensive planning, and we must acknowledge the contributions and support that we have received along the way. First, we thank CDHA for hosting us in their beautiful Canadian capital city, for managing the conference logistics, and most importantly, for their unwavering ongoing partnership with us. Their commitment to advancing the profession and to supporting research is deeply appreciated and admired. Second, we extend our thanks to the members of the National Center for Dental Hygiene Research & Practice Advisory Board, CDHA’s Research Advisory Committee and other invited leaders for serving as abstract reviewers, and to our board member, Ashley Grill, for managing the process. Third, we thank the many volunteers who facilitated the workshops, moderated the scientific sessions, manned the registration tables and helped to make the conference run so efficiently and seamlessly. Fourth, we thank the attendees who came to Ottawa from around the world to participate. Attendees represented 16 countries from 4 continents, including 11 Canadian provinces and territories, and 27 states from the US.

Most importantly, we extend our deepest and most heartfelt gratitude to our corporate sponsors for their
support of the scientific sessions and the National Center for Dental Hygiene Research & Practice – The Procter & Gamble Company, Colgate-Palmolive/Colgate Oral Pharmaceuticals, Philips, Dentsply Sirona, and Sunstar Americas, Inc. This conference would not have been possible without their partnership and educational grant support. We also thank the International Association for Dental Research for its support of the conference and for sponsoring the research awards. Award recipients for best abstracts were Elizabeth Couch, RDH, MS and Deanna Mackay, RDH, BDSc(DH).

We continue to strive to promote the research efforts of dental hygienists in the best way possible and feel privileged that so many of our colleagues return to our conferences to share their work. Collaboration is critical to successfully address our respective national research agendas and to improve the health of the populations we serve. For those of you who were unable to join us in Ottawa, we hope that these proceedings will encourage you to keep learning and perhaps stimulate you to conduct and disseminate your own research.

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Recipient of the “Outstanding Abstract Award,” Elizabeth T. Couch, RDH, MS. Couch and colleagues from the University of California San Francisco were recognized by the International Association for Dental Research (IADR) for their work on “Comparable Nicotine Dependence Between Adolescent Smokeless-only and Dual-tobacco Users.”

Conference ribbon cutting ceremony with Gerry Cool, RDH, Canadian Dental Hygienists’ Association.
The editorial reflects on the successful joint conference between the Canadian Dental Hygienists’ Research Advisory Committee and the National Center for Dental Hygiene Research & Practice. The conference was held in Ottawa during Canada’s 150th Anniversary celebrations, with an attendance of over 500 participants, a record for both groups. The conference featured 60 poster presentations and 29 oral presentations, informing attendees of the latest dental hygiene research findings. The conference aimed to increase the research base specifically as it relates to dental hygiene knowledge, to be considered a true profession. Attendees from various countries mingled and networked, raising awareness of the similarities and differences in dental hygiene practices globally. Future opportunities for collaboration and learning are anticipated, as the collaboration and learning experiences gleaned from this conference are considered just the “tip of the iceberg.”

Sincerely,
Rebecca S Wilder, RDH, MS
Editor-in-Chief, Journal of Dental Hygiene
Salme E Lavigne, PhD, RDH
Scientific Editor, Canadian Journal of Dental Hygiene
Abstracts: Poster Presentations

*Indicates presenter

**Education**

**Critical Thinking in Dental Hygiene Education: Examining Student Perception**
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**Problem Statement:** Empowering learners to effect change implies that learners acquire lifelong learning skills; one such skill is critical thinking. Critical thinking is a high level cognitive function desired in graduates of higher education, including professional education programs such as dental hygiene. Research on the general topic of dental hygiene education is limited; research specific to critical thinking in dental hygiene education is even more rare.

**Purpose:** This research is designed to deepen understanding of dental hygiene students’ perceptions and experiences of acquiring critical thinking skills in their professional education.

**Methods:** A basic qualitative study was selected to start the discussion and data were gathered during a focus group followed by individual interviews. Research ethics board approval was obtained. The purposeful sample was comprised of seven recent graduates of the final two-year cohort of a community college-based, dental hygiene program in Ontario, Canada. Inductive data analysis using an interpretive perspective was conducted to identify categories, patterns, themes, and ultimately meaning to address the research questions.

**Results:** Participants indicated their critical thinking began with acquiring base knowledge on theory related to dental hygiene followed by developing a thought process using case based learning with small group work and discussion. Participants valued being offered a variety of activities to develop their critical thinking, such as problem-based learning, active learning, and cooperative learning. Participants also acknowledged the role of confidence, emotions, and time constraints, thinking outside the box, and reflection as facilitators. The clinical setting was noted as a real and challenging environment to apply critical thinking and to see it modeled.

**Conclusions:** Many of the findings of this exploratory study align with research on developing critical thinking in adult education and professional education. This basic qualitative study provides beneficial preliminary information about how dental hygiene students learn critical thinking.

**E-Textbooks in Dental Hygiene Education: Utilization And Perspectives of Students and Faculty**
Sharon M. Compton, PhD, RDH
Kari Rasmussen, PhD
*Rachelle Pratt, BSc, RDH
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**Problem Statement:** Transitioning from paper textbooks to interactive e-textbooks has been considered revolutionary in terms of enhancing student learning. Students termed the ‘net generation’ have grown up with technology and it is assumed they embrace technological options such as e-textbooks. However, this technology in higher learning has been met with hesitation.

**Purpose:** This research study investigated student and faculty perspectives of mandatory e-textbooks in a dental hygiene program.

**Methods:** Ethics approval was obtained from the University’s Research Ethics Board (#Pro00072859). The student questionnaire utilized a five-point Likert scale (strongly disagree [1] to strongly agree [5]) and examined convenience; compatibility with learning style; perceived enjoyment and usefulness. Student use frequency for each text was collected. Open-ended questions captured benefits and challenges. A focus group gathered perspectives from faculty (5 of 10) who required an e-textbook. Descriptive statistics were calculated for questionnaire data and narrative analysis was used for open-ended questions and focus group transcripts.

**Results:** Survey completion was 48% (50/105). Overall, students disagreed with the utility of this e-textbook platform, scoring all factors below neutral. Results of students’ ratings of four categories showed convenience (M=2.75, SD=0.92); compatibility (M=1.93, SD=0.83); perceived effectiveness (M=2.15, SD=0.90); and perceived usefulness (M=2.36, SD=1.04). A high correlation between all factors suggests the utility factors were uniformly rated by students. On average, 71% of students did not use their textbook greater than once a month. Benefits were few and challenges included technical glitches, eyestrain from...
screens, cost, and inability to choose books for purchase. Faculty’s perspectives aligned closely with the students’ responses, but they appreciated portability of texts and quality of clinical images.

Conclusions: Students strongly dislike e-textbooks; they do not read e-textbooks, but study from condensed, summarized presentations. Faculty felt e-textbooks do not align with positive student learning experiences and mostly preferred traditional paper texts for their teaching.

Conclusions: The enhanced curriculum produced graduates with process improved by 263.1% (p<0.0001). Debridement outcomes were enhanced similarly. This study suggests that an enriched ultrasonic curriculum can be inserted into an existing dental hygiene program with vastly improved results.

Evaluation of Student Competencies Following Implementation of an Enriched Ultrasonic Curricula into a Canadian Dental Hygiene Program

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3 Dentsply Sirona

Problem Statement: Thorough debridement is the basis of periodontal treatment and a profound segment of dental hygiene expertise. Studies indicate Canadian graduates use ultrasonics with an outdated (traditional) approach resulting in an ‘unconsciously incompetent’ clinician.

Purpose: This study tested a revised ultrasonic curriculum aimed at producing a more ‘consciously competent’ graduate.

Methods: This convenience sample study measured both ultrasonic process and outcomes for graduates from an accredited Canadian school (N= 17) vs. the following year’s graduating cohort (N= 18) after implementation of a novel ultrasonic curriculum. Methods were comprised of enrichment of ultrasonic theory, pre-clinic and clinic content, including problem based learning, critical thinking and faculty calibration. Graduates were evaluated ‘in process’ via a validated, indexed rubric on four foci: equipment preparation, infection control, clinician positioning and instrumentation technique by the investigators following calibration exercises. Post scaling, the teeth were removed from the identical typodonts, anonymized and scored for ‘outcomes’ via tested grid calculations for three types of standardized deposits: heavy/tenacious, light and biofilm. Ethics approval was from Niagara College, Ontario.

Results: From a potential 510 points for in process skills, the baseline graduates achieved a mean score of 112.3 vs. 295.6 for the enhanced cohort. Outcomes debridement measured the baseline group leaving 10.5 grids of tenacious calculus, 23.3 grids of light calculus and 60.18 grids of biofilm from a potential of 72 each. The enhanced cohort left 4.1, 7.4 and 39.3 respectively. A two-tailed, unpaired t-test measured statistical significance. All p-values show statistical significance between the mean scores at the 0.01 level.

Conclusions: The enhanced curriculum produced graduates with process improved by 263.1% (p<0.0001). Debridement outcomes were enhanced similarly. This study suggests that an enriched ultrasonic curriculum can be inserted into an existing dental hygiene program with vastly improved results.

Ultrasonic Instrumentation Curriculum in Canadian Dental Hygiene Programs: A Description Of Curricular Elements From Program Directors’ Perspective

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Problem Statement: Contemporary ultrasonic instrumentation (UI) has improved due to biofilm and light deposit removal and enhanced subgingival access. However, it is unknown if dental hygiene curriculum is in keeping with this progression.

Purpose: The purpose of this study was to assess dental hygiene UI curriculum from program directors’ perspectives.

Methods: Thirty-nine Canadian program directors were invited to participate in an electronic survey containing closed- and open-ended items about current UI curriculum, with the latter qualitative items focused on educational objectives and clinical criteria for UI implementation. The study received ethical approval from the University of Manitoba; responses were kept confidential. The survey was pilot-tested with a small convenience sample to establish clarity and validity. Quantitative analyses were primarily descriptive statistics including frequencies, proportions and means. Narrative data underwent inductive qualitative thematic analysis. Sensitizing concepts identified from previous research were used for developing codes. Codes were analyzed for uncovering themes.

Results: The response rate was 47.5%. Timing of the introduction to UI was widely varied. UI theory, preclinical and clinical training ranged from 2 - 20, 0 -12 and > 20 hours respectively. A reliance on guest speakers (90%) and text books (95%) was observed. Student evaluation was reported mostly based on observation, with and without assessment rubrics (21%, 36%) primarily without assessment rubrics (21%). While criteria for ultrasonic use was client based, some
aspects of criteria were not theoretically established. Program objectives were predominantly theory opposed to clinically-focused.

**Conclusions:** The study demonstrated several deficiencies in Canadian dental hygiene UI curriculum. Shortcomings primarily surrounded a lack of instilling evidence-based, contemporary approaches for UI into all curricular elements. The authors recommend careful reviews, modifications and future evaluations of ultrasonic curriculum within Canadian dental hygiene programming.

**Blueprinting Dental Hygiene Competencies to Facilitate Improved Student Feedback**

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Alexandra E. Sheppard, BA, DipDH, Med
Hollis Lai, PhD, Minn N. Yoon, PhD
University of Alberta, Edmonton, AB, Canada

**Problem Statement:** Clinical examinations in dental hygiene education assess a variety of student competencies regarding application of knowledge and skills in an authentic setting. However, this analysis of competence is rarely returned to students in the form of constructive feedback. Confidentiality and time constraints often limit feedback for these intensive examinations.

**Purpose:** To develop an assessment blueprint for providing structured quality feedback following a dental hygiene clinical examination.

**Methods:** One dental hygiene examination at the University of Alberta involves comprehensive client history taking, including identifying risk factors contraindicating or requiring modification to treatment. Using entry-to-practice dental hygiene competencies detailed by the Canadian Dental Hygiene Association (CDHA), an assessment blueprint with test items mapped to competencies was developed. Competencies relevant to the examination were identified and grouped based on similarity into overarching domains. Test items were then mapped to domains, allowing students’ scores by domain to be calculated (without revealing the confidential test items themselves to the students). Feedback was based on student performance per domain and included: overall scores, domain descriptions, how to improve, cohort comparisons, and relevant competencies.

**Results:** The blueprinting process identified four domains as essential to the history taking examination: eliciting essential information, effective communication, client-centered care, and interpreting findings. This process also aided the test development, as an inadequate number of test items for assessing client-centered care was identified through the blueprinting. Feedback reports
were successfully delivered through online mechanisms to all dental hygiene students following their history taking examination, December 2016.

**Conclusions:** Blueprinting dental hygiene competencies and test items to examination domains provides a mechanism for structured, confidential, and efficient feedback following clinical examinations. Additionally, this process further validates the examination itself by revealing missing or irrelevant test items. This assessment blueprinting process can be used to provide feedback for any dental hygiene clinical examination. Funding for this project was provided by University of Alberta, School of Dentistry, Educational Research Scholarship Fund.

### Beyond Assessment: Enhancing Feedback, Interaction, and Peer-Learning with a Student Response System

*Anna Matthews, RDH, MS*  
New York City College of Technology, Brooklyn, NY, United States

**Problem Statement:** Formative assessment is essential to monitor student progress. Quizzes can be conducted using student response systems (SRS), otherwise known as ‘clickers’. Advantages of SRS include increased student participation, interactivity, promotion of class discussion, instant availability of results, and immediate feedback. However, faculty may hesitate to incorporate SRS due to perceived difficulty in learning and using the system by their students.

**Purpose:** This study (CUNY IRB approval #2015-0464) evaluated the students’ perceptions about incorporating SRS and peer-learning using clickers in the first-semester Dental Hygiene course Oral Anatomy (DEN1112).

**Methods:** The SRS (ELMO, New York, USA) was used for weekly quizzes in DEN1112. In Fall 2015, students completed a 6-question anonymous paper-based survey about their experiences with clickers before and after the course and their views about SRS as an assessment tool for quizzes. In Fall 2016, peer-learning activities were introduced in quizzes using clickers. After submitting their initial answer, students were allowed to discuss selected quiz questions in small groups and answer the question again with only their second answer recorded. In 2016, student surveys included two additional questions about these peer-learning activities. Results were analyzed by descriptive statistics.

**Results:** One hundred-sixty students participated in the survey in 2015-2016. Although the majority (74.4%) of all respondents were not familiar with clickers before DEN1112, at the completion of the course 58.8% of them felt ‘very comfortable’ and 32.8% were ‘somewhat comfortable’ using SRS. In 2016, 86.8% of respondents found peer-learning small group activities using clickers ‘very helpful’ and 31 students (40.8%) explained in the optional comments how it was beneficial to them. Most respondents (90.8%) estimated that they changed their initial answer 50% of the time or less following small-group discussions.

**Conclusion:** The majority of students easily adapted to clickers and embraced the interactivity, discussion, and peer-learning augmented by the SRS.

### University of British Columbia Dental Hygiene Students’ Self-Rated Confidence Level Related to the Canadian National Competencies for Baccalaureate Dental Hygiene Education

*Susanne Sunell, MA, EdD*  
Denise Laronde, PhD, RDH  
Zul Kanji, MSc, EdD(c), RDH  
University of British Columbia, Vancouver, BC, Canada

**Problem Statement:** In 2015, the Canadian Dental Hygienists Association published the first Canadian Competencies for Baccalaureate Dental Hygiene Programs. To date, we have no scientific evidence to support that graduates from baccalaureate programs have gained these abilities.

**Purpose:** To explore the confidence levels of senior dental hygiene baccalaureate students in their ability to demonstrate national baccalaureate competencies.

**Methods:** This is a 3-year longitudinal study involving senior students enrolled in the University of British Columbia dental hygiene baccalaureate program. Following university ethics board approval, an online, anonymous survey was conducted with senior students to rate their confidence level based on a 5-point scale ranging from **not confident** to **confident** in the national competencies that include 13 domains with 110 associated sub-competencies. This abstract is directed to the frequency data of graduating students from the March 2017 survey as their data reflects confidence at graduation.

**Results:** Seventeen of 22 fourth year students responded to the survey for a 77% response rate. Ratings of mostly confident and confident scores were summed to explore the number of sub-competencies within each domain in which 75% to 100% of respondents indicated such confidence. The competency areas in which they expressed the highest confidence included collaboration (100%), clinical
therapy (100%), oral health education (90%), disease prevention (86%), professionalism (82%) and integration of knowledge (80%). Areas in which they expressed the least confidence included policy use (20%) and advocacy (11%) where many respondents were not confident, somewhat confident or unsure.

**Conclusion:** These data provide the faculty with important insights to support curriculum revisions to promote deeper experiences in such areas as policy use and advocacy. It also helps to contribute to a broader national discussion about the baccalaureate competencies to explore sub-competencies that may be beyond the scope of baccalaureate education.

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**A Comparison of Evidence Based Practice Between Dental Hygiene Students and Dental Hygienists**

*Risa Handman, RDH, MDH
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**Problem Statement:** Dental hygienists must be competent in evidence-based practice (EBP) to uphold the ADHA Standards for Clinical Dental Hygiene Practice.

**Purpose:** The purpose was to compare EBP knowledge, attitudes, access and confidence (KACE) between entry-level dental hygiene students and registered dental hygienists (RDHs).

**Methods:** A convenience sample of entry-level dental hygiene students and RDHs was used. Participants enrolled in an EBP course completed the validated KACE survey the first week and last week of the course. IRB approval was obtained from Texas Woman's University. Repeated measures analysis of variance (ANOVA) was conducted to determine if there was a significant positive change in knowledge, attitudes, access and confidence from pre-test to post-test and if there was a significant interaction between group and time.

**Results:** Thirty-eight dental hygiene students and 43 RDHs were in each group (n=81). In all 4 dimensions of KACE (knowledge of EBP, attitudes about EBP, accessing evidence and confidence in critical appraisal), there was a significant increase between pre- and post-tests for students (p<0.001). However, for RDHs, there was only a significant increase in 2 dimensions: knowledge about EBP from pre-test (M = 2.67, SD = 1.39) to post-test (M = 5.38, SD = 1.88), p = 0.044 and attitudes about EBP from pre-test (M = 3.78, SD = 0.40) to post-test (M = 4.19, SD = 0.38), p = 0.012.

**Conclusion:** Dental hygienists should engage in formal training in EBP upon entrance into a dental hygiene program and training should continue throughout the program.

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**Comparison of Dental Hygienists’ and Dentists’ Continuing Education Needs for Career Interrupted Dental Hygienists in South Korea**

*Su-Kyung Park, MSDH\(^1\)
Kui-Ok Park, BSDH\(^1\)
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**Problem Statement:** Continuing education (CE) maintains and enhances the job skills of healthcare professionals. Most dental hygienists are women, and in some cases their careers are interrupted because of marriage, child-birth, and child-care. After a certain period, these career-interrupted dental hygienists and dentists will hope to be reinstated and provided CE.

**Purpose:** The purpose of this study was to investigate the CE needs of career-interrupted dental hygienists and dentists.

**Methods:** A total of 154 participants (83 dental hygienists and 71 dentists) completed an online questionnaire. All participants were members of their respective professional associations in Gyeonggi, Korea. The independent variable was occupation, and the dependent variables were reasons for career interruption and type of CE needed. Frequency analysis and descriptive statistics were used to determine participants’ general characteristics, differences in reasons for career interruption and CE needs. Responses were analyzed using an independent t-test with the PASW statistics 22.0 program.

**Results:** All dental hygienists were women (mean working experience: 4.4±18.5), while most dentists were men (95.7%; mean working experience: 18.5±6.0 years). Dental hygienists and dentists were both positive after returning to work. However, dental hygienists showed a higher need for CE for job training in “dental assistance” and “preventive care”. Whereas, dentists showed a high need for CE related to “hospital management” and “administration”. CE needs related to “special needs patient care” was low for both groups.
Conclusions: Dental hygienists and dentists differed in their reported CE needs after career interruption. Funding for this project was provided by the Gyeonggi province branch of the Korea dental hygienists association.

**Perceived Stress and Well-Being in Dental Hygiene and Dental Therapy Students Studying in the United Kingdom and Australia**

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**Problem Statement:** There is a gap in the literature with regards to our understanding of stress and well-being among dental hygiene and dental therapy students (DHDTS). A recent study used the Scale of Positive Well-Being, the Adult Hope Scale, and the Values Questionnaire in conjunction with the widely-used Dental Environment Stress questionnaire to explore stress and well-being in a combined programme of DHDTS in one UK school. The findings showed that students reported high scores of psychological well-being at the same time as high sources of stress, and provided baseline data for this comparative study.

**Purpose:** To compare findings of sources of stress and well-being among DHDTS studying a combined programme in the UK and in Australia, for clearer understanding of what role a country’s institutional environment and curriculum has on students’ perceptions.

**Methods:** A questionnaire which included the: Dental Environment Stress questionnaire (DES); Depression Anxiety Stress Scales (DASS-21); Scales of Psychological Well-Being (SPWB); Valuing Questionnaire (VQ); and the Adult Hope Scale (AHS) was distributed to all students in Years 1, 2 and 3 DHDTS at the University of Portsmouth Dental Academy in the UK, and La Trobe Rural Health School in Australia. Data were collected on students’ perception of levels of stress and well-being. Statistical analyses were undertaken using SPSS™ software. Mann-Whitney U tests with Bonferroni corrections were used as multiple pairwise tests were performed on a single set of non-parametric data, to set significance at $p<0.002$.

**Results:** A response rate of 58% (n=42 UK) and 55% (n=46 Australia) was achieved. Clinical factors and academic work were perceived as stressful for DHDTS in both the UK and Australia. The Australian DHDTS perceived stress in the educational environment was significantly higher ($p<0.002$) than the UK DHDTS. All students reported high levels of positive well-being, with no significant differences between the two groups.

**Conclusions:** DHDTS in the UK and Australia identified sources of stress within their undergraduate education, but also perceived themselves as positively-functioning individuals.

**Pre-Liminal Variation of Experience of Dental Hygiene Diploma Students Embarking on their Degree Completion Program**

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**Problem Statement:** Dental hygiene diploma graduates who immediately continue into degree-completion studies undergo a change from a clinically focused, hands-on learning environment to an experience focused on higher order concepts such as critical thinking, conceptual writing, research use and healthcare advocacy. This shift in learning experience forces students into a ‘liminal space’, suspended between old and new levels of education. Understanding this pre-liminal state will allow educators to better support student learning as they begin their degree studies.

**Purpose:** The purpose of this research project is to examine perceptions of dental hygiene students on the pre-liminal phase experienced when moving from diploma to baccalaureate education.

**Methods:** This qualitative study utilized phenomenography to capture and categorize variation of students’ experience of this pre-liminal state. A purposeful sample of dental hygiene students enrolled in a degree-completion program volunteered to participate in semi-structured individual interviews. Interview questions explored why they decided...
to complete degree-completion studies, what factors influenced their decision, what were their expectations, and how they believe their expectations as a student may change. Qualitative coding utilizing phenomenographical analysis was conducted to determine various ways students experience pre-liminality. Ethics approval was obtained from the University of Alberta Research Ethics Board (#Pro00072407).

**Results:** Students articulated a variety of different reasons for immediately pursuing their degree, including the short-term impact of an additional year of study, as well as long-term implications on their careers. However, students were unclear on the expectations, experiences and cognitive adjustments necessary during this transition.

**Conclusions:** Students entering the degree-completion program do not seem aware of the possible cognitive adaptations that may be required to successfully navigate their new learning environment but can articulate a desire to earn a degree as part of their career goals. It is important to understand this pre-liminal state to implement strategies to support this transition for dental hygiene degree-completion students.

**Assessment for Need of a Master’s in Dental Hygiene Program**

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**Problem Statement:** Since 1988, there has not been a Master in Science (MS) in Dental Hygiene (DH) program in New York State (NYS) to provide educational opportunities for professional growth and alternative employment settings for dental hygienists.

**Purpose:** The purpose of the study was to assess the need of establishing an MS in DH Program in NYS, whose curriculum and design would meet the needs of DH graduates.

**Methods:** A convenience sample of 5,244 ADHA members was used to complete a survey to assess the need, curriculum specialization, and educational design for an MS in DH degree curriculum. The survey contained 11-item questions with closed-ended responses. It was pilot-tested by the DH Research Development Committee to establish content validity. The survey was administered online and all responses remained confidential. Descriptive statistics were used to analyze the data. No IRB approval was needed as per NYU IRB Office.

**Results:** There were 828 (16%) responses, 571 (69%) are currently employed as dental hygienists: 696 (84%) in clinical, 232 (28%) education, 17 (2%) sales and marketing. Reported highest degree earned were bachelor’s (43%), associate (35%), 19% master’s (19%), and doctorate (3%). Interested in a MS program was reported by 24%, while 26% were undecided. Of the areas of degree specialization, 73% selected Educational Leadership, 65% Advanced DH Practitioner (ADHP), 39% Clinical Research, and 25% Sales/Business Management. The preferred delivery of the curriculum was online, selected by 47%, 46% hybrid, and 7% traditional classroom setting.

**Conclusions:** Currently there is no MS degree program in NYS, and survey results indicated that 199 (24%) were interested in earning a Master's degree. The majority of respondents supported the need for an online or hybrid program.

**Faculty Perceptions of Supporting Students’ Delivery of Motivational Interviewing During Patient Care**

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**Problem Statement:** In order to effectively support students’ delivery of Motivational Interviewing (MI) during patient care, faculty should have appropriate training.

**Purpose:** The purpose of this study was to assess the University of Michigan (U-M) Dental Hygiene (DH) faculty members’ perception of the importance of and their confidence in supporting students’ delivery of MI during patient care before and after participating in MI professional development activities.

**Methods:** A convenience sample of 16 U-M DH Program faculty members, who teach in clinic, participated in this study. They participated in
MI training workshops focusing on increasing their understanding of MI, integrating this into their teaching, and supporting students’ application during clinical care. There were four evaluation instruments; three utilizing a Likert scale pre-test, post-test format, and one using a qualitative question design. The U-M Institutional Review Board (IRB) approved this study as exempt (HUM00065102).

Results: Wilcoxon signed ranked test compared importance and confidence in facilitation of MI strategies from T1 (pre-test to post-test 1), T2 (pre-test to post-test 2), and T3 (post-test 1 to post-test 2) and found no statistical significance. In addition, faculty perceptions increased (T1, p=.03) related to students having enough time to incorporate MI during patient care. There was a decrease (T3, p=.03) regarding faculty perceptions of having a positive influence on students application of MI strategies. Faculty perceptions of importance and confidence supporting students’ delivery of MI strategies decreased slightly without statistical significance. Fifty-six percent of faculty participated in team-grading and reported the most helpful professional development activities were team-grading (58%) and in-service (25%).

Conclusions: 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 the longitudinal impact of MI faculty professional development is recommended. Funding for this project was provided by Rackham Block Grant Funding.

Engaging Dental Hygiene Students in Clinical Research

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Problem Statement: Research is a critical component of dental education. While it is accepted that most dental hygiene professional students initially enter practice, clinicians must have a basic understanding of research to support their clinical decision-making.

Purpose: The purpose of this project was to provide student dental hygienists with a hands-on opportunity to participate in a clinical research project to supplement their research course.

Methods: Four dental hygiene programs identified a faculty member to serve as the Principal Investigator at each site. Students recruited 2-3 patient participants with moderate to poor oral hygiene, plaque accretions and gingivitis for two visits. A plaque index, gingival index, percent bleeding on probing and an oral soft tissue examination were collected. Students completed a subjective assessment questionnaire about the participant’s oral health and performed a dental prophylaxis. Participants were provided two tubes of Colgate® Total® toothpaste and a soft manual toothbrush. Home care instructions were provided. Follow-up evaluations scheduled 6-8 weeks later included recording oral health indices and a participant questionnaire. Students completed a questionnaire regarding observations made during the study. Ethical committee/IRB approval was secured at each institution prior to commencement of the study.

Results: Over 100 students engaged a total of 298 participants. Clinical results demonstrated statistically significant (p < 0.05) reductions in plaque index (from 1.44 to 0.55), gingival inflammation (from 1.28 to 0.39) and bleeding on probing (from 31.29% to 8.04%). Principal Investigators reported a high level of engagement, interest and satisfaction by the students who participated as examiners in the study.

Conclusions: This study demonstrated the positive effect of including students, as examining clinicians, in a clinical study can have on their understanding and appreciation of research and bringing discoveries to practice. Funding for this project was provided by Colgate Palmolive, Co., Inc.

Graduate Outcomes of Dental Hygiene Baccalaureate Education

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Problem Statement: There is a scarcity of studies on Canadian baccalaureate dental hygienists. As discussions about baccalaureate education for dental hygiene continue on a national level, examining outcomes of earning a dental hygiene degree is paramount.

Purpose: To investigate the practice outcomes of the University of British Columbia’s (UBC) Bachelor of Dental Science in Dental Hygiene (BDSc) graduates.

Methods: UBC dental hygiene entry-to-practice (ETP) and degree-completion (DC) graduates (n=116; 30% response rate) from 1994 to 2016 participated in an online survey. Survey questions explored motivating reasons for pursuing dental hygiene degree education, abilities gained during their degree, and practice outcomes after earning their degree. Chi-squared tests were used to compare ETP
and DC graduates. Survey results were also compared to the Canadian Dental Hygienists’ Association (CDHA) national employment survey. Ethics approval was received by UBC’s Behavioural Research Ethics Board.

Results: Primary reasons for pursuing a degree were personal satisfaction (82%), increase knowledge base (82%), increased employment opportunities (78%), status/recognition of a degree (76%), access to graduate education (68%), and to improve critical thinking abilities (61%). For DC graduates, abilities strengthened included enhanced skills for appraising research (92%), enhanced critical thinking and problem solving skills (90%), enhanced skills for retrieving scientific information (89%), and increased value for lifelong learning (85%). Respondents reported that the BDSc degree enabled them to expand their career opportunities (75%). More than 30% of all respondents have pursued graduate education, and 40% work in employment settings outside of clinical practice. In comparison to CDHA’s survey, a greater proportion of UBC BDSc graduates earn more than $80,000 annually (44% vs. 16%, p<0.001), receive more benefits (4.0 vs. 3.5, p<0.001), and collaborate more with non-dental health professionals (2.7 vs. 0.8, p<0.001).

Conclusion: The results highlight the impact of UBC baccalaureate education on dental hygiene practice.

Interprofessional Education and Practice

Interprofessional Education within Dental Hygiene Curriculum

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Problem Statement: Today's collaborative health care system calls for dental hygiene academia to adopt interprofessional education (IPE). The commencement of such transformative initiatives are the responsibility of administrators and faculty. However, their viewpoints can prevent the progression of these strategies. Failure to foster IPE can potentially jeopardize the relevance of the profession.

Purpose: The purpose of this study was to assess the attitudes of dental hygiene administrators and faculty towards IPE, and to investigate how perspectives influence the implementation of this educational methodology.

Methods: This quantitative, cross-sectional study utilized a snowball and convenience sample of 91 dental hygiene administrators and faculty who completed a survey about viewpoints towards IPE and the use of interprofessional practices. The survey consisted of 34 items with close-ended responses. Of these items, 28 were adopted with permission and were previously content validated. Survey data was collected through the use of an online software application. All responses remained anonymous and confidential. Descriptive and inferential statistics were used to analyze the data. IRB approval was obtained from Farmingdale State College.

Results: Respondents demonstrated favorability towards interprofessional education (M>3.00 for 26 out of 28 items). Approximately half (47.78%) of them were in the infancy stages of integrating IPE into curricula, while only 5.56% have incorporated it as a major component. There was a significant association between attitudes and use of IPE (rs=-.269), which highlighted student comprehension, course quality, and logistics (p≤0.05).

Conclusions: Although administrators and faculty hold IPE in high regard, most affiliated programs are not structured on interprofessional models. Perspectives have instilled a desire to develop and implement transformative plans focused on incorporating shared teaching and learning into dental hygiene education. Favorable attitudes are impacting the evolution of collaborative educational opportunities contributing to dental hygiene students becoming a part of modern medical practices.

A Collaborative and Inter-Professional Community Outreach Program

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Purpose/Goals: The program goals were to provide oral screenings, patient education and preventive oral health services to children through a collaborative/inter-professional community outreach program. The purpose was to target children in communities without access to oral health care, provide dental hygiene students the opportunity to participate in a valuable community outreach program while honing clinical skills in the dental hygiene care of children and adolescents.

Significance: Provide preventive services to underserved children while incorporating an educational component for patients and students with an inter-professional element to enhance the program through healthcare disciplines.

Approach: Sophomore dental hygiene students provided oral health care, freshman dental hygiene students volunteered as assistants; dental residents provided urgent care while dental hygiene faculty and dentists from
neighboring dental societies supervised the clinic floor. Speech pathologists distributed information to attendees, nursing faculty/students provided blood pressure screenings and medical laboratory technology faculty/students demonstrated proper hand washing techniques. Representatives from oral health and health care companies disseminated information. Appointments were scheduled and children were accompanied by a parent/guardian the day of the event. Sophomore dental hygiene students reviewed health histories, obtained consent forms, completed oral health screenings, patient education, oral prophylaxes and fluoride varnish. Dental sealants, when deemed necessary, were provided. Dental hygiene faculty and supervising dentists reviewed student findings and signed the completed screening forms.

**Evaluation:** Data analysis supported the intended goals in the need for community outreach programs. Post-event data indicated 187 screenings, 180 prophylaxes, 150 fluoride varnishes were provided while 146 dental sealants were placed, two children received urgent care. All children/parents participated in the patient education program. Of the 187 children treated at the events, 66.13% presented with decay and 9.60% presented with recurrent decay. This collaborative/inter-professional program regarding community outreach supports reducing health disparities in preventive dental hygiene care.

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**Training Pharmacists to Counsel Older Adults about Oral Health**

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**Problem Statement:** Patients who lack a dental home consult pharmacists about oral health information and advice.

**Purpose:** The purpose of this study was to evaluate the impact of an interprofessional training program on practicing pharmacists’ knowledge, confidence and perceived preparedness to counsel older adults about oral health.

**Methods:** A convenience sample (n=63) of practicing community-based pharmacists was recruited to attend a training program about oral health, and 44 chose to participate. Prior to the program, forty-one (93%) completed 2 surveys: one assessing experiences and training related to oral health, the other a pre-test to measure knowledge, ability and level of preparedness with counseling older adults. Immediately after training, participants completed the matching post-test. Responses were anonymous to protect confidentiality. Data were analyzed using SPSS 22 (IBM Corp. Armonk, NY). AT Still IRB approval #2015-068.

**Results:** The most frequent oral problem about which pharmacists’ advice was sought was for mouth ulcers (n=10; 24%). Pharmacists perceive dry mouth as the most important oral health problem among older adults (n=11; 27%). An exact McNemar’s test determined that there was a statistically significant difference on 5 of the 12 knowledge measures (p = 0.000) after the training intervention. A Wilcoxon signed-rank test showed that participation in the training program produced a statistically significant change in pharmacists’ confidence in ability to locate oral health information (Z = -4.730, p = 0.000) and available area dental resources (Z = -4.350, p = 0.000); and level of preparedness to counsel older adults about the importance of oral health to overall general systemic health (Z=-4.638, p = 0.000) and about interventions to address oral health needs (Z = -5.066, p = 0.000).

**Conclusions:** Participation in an interprofessional training program improved pharmacists’ knowledge, confidence in ability to locate resources, and level of preparedness to counsel older adults about oral health. Funding for this project was provided by the Dental Trade Alliance Foundation.

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**The Nature of the Interprofessional Practicing Relationships Between Dentists and Oral Health Practitioners in Australia**

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**Problem statement:** Australian oral health practitioners (Oral Health Therapists [OHT], Dental Hygienists [DH] and Dental Therapists [DT]) work autonomously within their scope of practice in a structured professional relationship with a dentist. There is no requirement for standing orders or supervision of practice. How this relationship plays out in practice and the nature of vertical relationships within the dental team can affect cost and access to dental care.

**Purpose:** To describe the inter-professional relationship between oral health practitioners and dentists.
Children's Oral Health Practices of Nurses Following an Educational Intervention: a pilot study

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Problem statement: Performing preventive oral screenings can reduce the “silent epidemic” of early childhood caries. Nurses working in pediatric settings can assist in preventive dental care; however, many report having insufficient skills to perform such tasks.

Purpose: The purpose of this study was to improve nurses’ pediatric oral health knowledge and practices through a theory-based educational intervention.

Methods: This randomized control trial used a sample of 33 nurses. Using the random number generator software, 18 participants were assigned to the intervention group, and 15 to control group. Data collection for the study occurred over a four-week period. An adapted validated 21-question survey designed through Qualtrics© software measured oral health practices at pre and post-test. The electronically delivered continuing education (CE) course focused on children's oral health. Participants in the intervention group received the CE course immediately following completion of the pre-test survey whereas; participants in the control group received the CE course content after completing the post-survey at 4 weeks. A trivia question related to children’s oral health was delivered via email at 3 weeks to keep all participants engaged over the 4 weeks. Participants who completed all portions of the study received 1 free CE credit as an incentive for participating in study. The IRB at Old Dominic University approved this study.

Results: There was no significant difference between control and experimental groups at pre- and post-test for performing OHAs on children, F (1, 30) = 1.70, p=0.20. The following scores significantly increased from pre- to post-test within experimental and control groups: knowledge (F (1, 31) =12.67, p= 0.001), confidence performing OHAs (F (1, 30) =10.17, p=0.003), and confidence providing anticipatory guidance to parents (F (1, 30) = 10.78, p=0.003).

Conclusions: Due to small final sample size, a post hoc power analysis determined a minimum final sample of 61 is needed for future studies to observe differences between groups. However, improvements in knowledge, confidence performing OHAs, and providing anticipatory guidance to parents was observed within groups.

Collaborative Interprofessional Education Models

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Purpose: In 2015, a university dental hygiene program implemented an interprofessional education experience. The purpose was to give students a broader understanding of their scope of practice and collaboration with all relevant health care providers for the delivery of patient-centered interprofessional collaborative care.

Significance: This novel curricular educational experience prepares health profession students for deliberatively working together with the common goal of building a safer and better patient-centered and community/population-oriented U.S. health care system.
**Approach:** Applying adult learning theory, students were put into groups, given one of several case scenarios, and asked to design an interprofessional collaborative care model. Students were asked to answer questions in a paper pertaining to: 1) prior interprofessional collaboration knowledge, 2) medical, dental and psychological conditions of the patient in the case scenario, 3) team member roles and responsibilities, 4) rationale for their particular model, and 5) potential benefits and challenges. A rubric was provided for quantitative evaluation by a dental hygiene faculty member to grade student models and papers. Qualitative feedback was evaluated by content analysis of open-ended discussion in the papers.

**Evaluation:** Sixty-four out of 82 students stated that they did not know much about interprofessional collaboration (IPC) prior to this curricular experience. Grades for demonstration application of IPC knowledge ranged from 90-100% with a mean of 97.3%. Additionally, each group uniquely and creatively depicted an interprofessional model using a poster board, a computer image, or a hand-crafted 3-D model. Some narrative highlights from discussion papers include; “it is important to engage peers, communicate and correct behaviors for patient centered care” and “research will continue to grow, but making sure to collaborate with one another will only speed up the process”.

**Developing Pre-Licensure Intrprofessional Collaborative Care Curricula**

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**Purpose:** The practice standard of ‘collaborate with others’ requires pre-licensure programs to prepare students to be entry-to-practice competent interprofessional collaborative care (IPCC) practitioners. This is a must for program accreditation and a must from a health care perspective. The Rady Faculty of Health Sciences, University of Manitoba (RFHS/UM) offers nine pre-licensure programs via the Colleges of Dentistry (CoD), Medicine (CoM), Nursing (CoN), Pharmacy (CoP), and Rehabilitative Sciences (CoRS) as follows: Dentistry, Dental Hygiene, Physician Assistant, Physiotherapy, Occupational Therapy, Respiratory Therapy, Medicine, Nursing, and Pharmacy. The RFHS/UM established the Office of Interprofessional Collaboration (OIPC) with one IPCC academic/scholar from each of the five colleges. The purpose of the OIPC was to create of a longitudinal undergraduate IPCC curriculum in which students from all nine programs learn about, with, and from each other. Along with creation comes evaluation; hence the OIPC maintained both formative and summative evaluation throughout the iterative development and delivery of year I of the two year didactic curriculum.

**Significance:** If health care providers are expected to be IPCC practitioners then curricula should be designed to best prepare them for this role.

**Approach/key features:** The OIPC curriculum is informed by two models, Academic Plan (Stark and Lattuca, 2011) and IPE/IPC model (D’Amour & Onandasan, 2004). Mixed methodology was used to evaluate the first year delivery. College councils, dialogue with community leads, curriculum retreats, surveys, and student focus groups are examples of data gathering methods.

**Evaluation:** Year I of the curriculum involved 52 first-year student IPCC learning cohorts (>95% participation rate). Respective college curricula councils enabled cohorts to participate, per term, in one face-to-face simulation-based facilitated session, two online guided discussions, one assignment, and one reflection. Focus-groups and survey responses indicate the curricula helped students understand the importance of IPCC to future practice and that authenticity and meaningful learning are critical to IPCC curriculum. Funding for this project was provided by: Rady Faculty of Health Sciences, University of Manitoba.

**Community Health**

**Practice Adaptations of Dental Hygienists in Alberta, Canada, According to Community Water Fluoridation Status**

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**Problem Statement:** Communities across Canada are revisiting their community water fluoridation (CWF)
status, with some opting to discontinue. Understanding the impact of CWF cessation on children’s dental caries requires consideration of other possible changes that may also impact children’s caries rates. One such factor is practice adaptations by dental hygienists, perhaps undertaken in an effort to offset an anticipated impact of fluoridation cessation.

**Purpose:** To examine whether, or the extent to which, dental hygienists in Alberta reported having engaged in practice adaptations according to the CWF status of the community in which they work.

**Methods:** All dental hygienists in Alberta were invited to complete an online questionnaire asking about reported changes to their dental hygiene practice since CWF cessation or, for those in non-cessation communities, during a similar timeframe. Reported practice adaptations were compared between those working in CWF cessation communities versus still-fluoridated communities using chi-square analysis. The University of Calgary’s Conjoint Health Research Ethics Board approved the study.

**Results:** A total of 154 dental hygienists provided information on practice adaptations. Compared to dental hygienists working in still-fluoridated communities, those working in CWF cessation communities were: (1) more likely to report increasing recommendations for more frequent in-office fluoride treatments (e.g., fluoride gel) (p=0.03) and (2) less likely to report decreasing recommendations for more frequent radiographs (x-rays) to detect decay (p=0.03). There were no differences between the two groups on attitudes toward CWF, a potential confounder.

**Conclusions:** CWF cessation appears to be occurring more frequently in Alberta and elsewhere. Research on CWF cessation and its implications for population oral health is complex, and must consider other factors (aside from CWF cessation) that may have changed during the same time. This study found that dental hygienists report having adapted their practice regarding recommendations for frequency of in-office fluoride treatments and dental radiographs.

**Community Oral Hygiene Services on Hypertension and Diabetes Among Middle-Aged and Elderly Koreans**

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**Problem Statement:** Community oral hygiene services for non-invasive periodontal dental care can be applied as a community program to people with hypertension and diabetes.

**Purpose:** This study aimed to evaluate the effects of a community-based oral hygiene service for patients with hypertension and type 2 diabetes mellitus in Korea.

**Methods:** The study used a one-group pretest-posttest and interrupted time-series design and lasted eight months. A total of 151 participants (45% male and 55% women, 63 ± 8.4 years) were included in the study. Participants included patients with hypertension (62%), diabetes (12%), and both (26%). The objective oral hygiene and subjective self-reported periodontal status were compared before and after the study. Changes in HbA1c levels from the first and last visits were analyzed using the paired $t$-test. Blood pressure and objective periodontal status were analyzed using repeated measures ANOVA to evaluate changes. Subjective periodontal status was evaluated using a chi-square test. All analyses were performed using SPSS 21 (Chicago, IL). This study was approved by the IRB of Wonju College of Medicine, Yonsei University (YWDR-15-2-027).

**Results:** Participants maintained stable blood pressures at each of the four sessions, and their HbA1c levels were significantly lower at the fourth session (p <0.05). A lower
frequency of subjective swelling was reported at the fourth (37.9%) compared to the first (55.6%) session. Further, significantly fewer cases of calculus and bleeding were observed at the fourth session ($p < 0.05$), and significantly more patients reported having no gum problems at the fourth session (43.1% vs. 27.2%; $p < 0.05$) than the first session.

**Conclusions:** Community oral hygiene services reduced plaque scores and led to self-perceived improvements in symptoms of gum swelling and bleeding. Findings indicate that community oral hygiene services provided by dental hygienists can promote periodontal health, and may help in the management of hypertension and diabetes.

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**No Cost Dental Care in Exchange for Community Service Hours: Participating Patients’ and Dentists’ Responses**

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**Problem Statement:** Because oral health is fundamental to maintaining overall health, all people should be granted access to receiving oral health care. A lack of access to oral health care exists among vulnerable and underserved populations in the United States.

**Purpose:** The purpose of this study was to evaluate a program in which patients volunteer in their community in exchange for receiving no cost dental care. The motivations, attitudes, and perceptions of the participating patients and volunteer dentists were assessed.

**Methods:** This cross-sectional study obtained background information from 66 adults originally interested in this program. Survey data were received from 27 of 38 patient participants and 10 of 11 dental participants, including demographics, dental treatment received/provided, experiences with the program/volunteering, and recommendations for program improvement. Volunteer dentists received no incentive for program participation. The IRB at the University of Michigan determined this study was exempt from oversight.

**Results:** Types of treatment provided by volunteer dentists as part of the Pay It Forward Program included non-urgent services such as oral hygiene education, examination, radiographs, prophylaxis, scaling and root planning, extractions and simple restorations. The average dollar amount of services provided to each patient was $1,153. Pain was the main motivating factor for 70% of the patients who sought treatment. Patients volunteered an average of 33 hours. Patients reported significant oral health improvements from before (very good/excellent 4%) vs. after program involvement (very good/excellent 44%). The majority of patients and dentists rated the program and all of its aspects very positively. There were no statistically significant differences between those who enrolled in the program vs. those who did not enroll in relation to age, household income or distance from the program.

**Conclusions:** Innovative efforts to increase access to oral health care for underserved and uninsured adults should be explored in addition to advocating for policy changes. Funding for this project was provided by the University of Michigan Rackham Graduate Student Research Grant and the Rackham Block Grant Award.

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**Smiles for Miles – Lessons Learned in Socially and Culturally Responsive Care**

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**Purpose:** The University of Manitoba pledges to contribute to the cultural, social, and economic well-being of Manitobans. Canada received over 300,000 new permanent residents in 2016. Half arrived through economic immigration programs and approximately 60,000 as refugees. The School of Dental Hygiene (SDH) aims to create culturally responsive care curricula, meet community needs, and ensure dental hygiene care plans (DHCP) reflect community- and person-centered needs.

**Significance:** Manitoba received the third largest influx of newcomers. Though immigrants in general experience good health, refugees do not and often have a much lower health status reflective of trauma, malnutrition, and infectious disease. Many have not benefited from oral health care. A key determinant of health is health care (HC) services. Many HC providers lack cultural proficiency and are not prepared for the cultural diversity of the population. Health beliefs and practices are culturally informed. Lacking the understanding of these from a practitioner perspective results in poor person-centered care plans. Both pre-licensure and professional development curricula must ensure HC practitioners enable, advocate, and promote health for all.

**Approach/Key Features:** Four steps were taken to incorporate minimal cultural competence within the pre-
licensure curricula as follows: 1) collaborate with primary HC clinics serving newcomers to offer DH care (DHC); 2) establish a Smiles for Miles donation fund to cover the cost of DHC for newcomers via the SDH Clinic; 3) develop curricula that results in culturally reflective DHCP; 4) explore formative and summative client feedback mechanisms.

**Evaluation:** Since February 2016, 22 newcomers received DHC due to $8,000 in donations from community/industry. Program viability has been established. Measures of client satisfaction are promising based on return rates. A major student theme was heightened awareness of needs of newcomers. Curricula planning is in progress to weave theory with practice to promote culturally responsive care.

Using the PDSA Quality Improvement Model to Provide Dental Hygiene Services to Youth with Type 2 Diabetes

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**Purpose:** College of Dentistry, School of Dental Hygiene, University of Manitoba collaborates with the Diabetes Education Resource for Children and Adolescents (DER-CA) interprofessional collaborative (IPC) team. Dental hygiene (DH) services are provided as part of the education/surveillance of the youth at the DER-CA type 2 diabetes clinic. The majority of children followed in this program are of self-declared First Nation heritage. The first three cycles of the Plan-Do-Study-Act (PDSA) Model for Improvement moved the collaboration from a pre-licensure DH student rotation to Bachelor of Science IPC service-learning (SL) for a registered DH. The goal was to promote IPC dialogue regarding the youth’s oral health and type 2 diabetes management.

**Significance:** There is limited knowledge and research involving youth with type 2 diabetes and their oral health. Incorporating a DH assessment has helped the IPC team consider oral systemic health within the care plan.

**Approach/Key Features:** A fourth PDSA cycle responded to three questions pertaining to what, how and how will you know as follows: 1) advance contribution of DH as part of the IPC team; 2) incorporate DH findings within the electronic record; and 3) DH participation in IPC team dialogue. The PDSA involved creation and implementation of a DH assessment template, participation in the IPC team pre-clinic meetings, oral health assessments and information sessions for the youth, and scheduling of IPC dialogue regarding DH findings to the IPC team.

**Evaluation:** The PDSA resulted in DH weekly participation in IPC dialogue and the incorporation of the DH assessment within the electronic record. Future PDSA cycles are underway to evolve the SL to a DH independent practice within an IPC team. Access to DH care remains an issue for various ethnic youth. Programs such as the DER-CA promote the need for DH care as part of the youth’s overall health.

Effectiveness of Early Pediatric Dental Homes: a scoping review

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**Objective:** The Canadian Dental Hygienists Association, Canadian Dental Association and Canadian Pediatric Society advise that children should see a dental professional no later than age one. The dental home model is based on the concept of developing an ongoing relationship between the practitioner and patient where oral health care is delivered in a comprehensive, continually accessible, coordinated and family-centered way. This scoping review examined literature focusing on the effectiveness of early pediatric dental homes based on clinical, behavioral, and cost parameters.

**Search Strategy/Selection Criteria:** Seven key databases (MEDLINE-Ovid, PubMed, CINAHL, Embase, Cochrane Database of Systematic Reviews, Scopus and BioMed Central) were searched using “dental home” and “dental homes” as key words. No limits were placed on the search strategy. Searches were conducted up to and including April 2016. The inclusion criteria included studies that had examined preschool-aged populations and had focused on parameters to assess effectiveness of dental homes.

**Data Collection and Analysis:** In total, 232 non-duplicate citations were identified for title and abstract review, of which seven articles met the inclusion criteria and were included in the final analysis. Data extraction and synthesis were completed by the first author and verified by the co-author.

**Main Results:** Six primary studies and one systematic review were included in the final data set. Current evidence
generally supports the effectiveness of early pediatric dental homes for improving clinical outcomes (i.e., dmft scores) and behavioral outcomes (i.e., including utilization of future dental care services), and offering potential cost benefits. However, exact quantifications of the impact on clinical and behavioral outcomes as well as cost benefits vary due to heterogeneity of study design and methodological considerations related to level of evidence in the studies.

Conclusions: The current body of evidence predominately substantiates the establishment of a dental home model as an effective practice to improve early pediatric oral health.

Unmet Needs/Access to Care

Predictors of Preventive and Emergency Dental Service Use with Diabetes Status Using Andersen and Newman Framework Model

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Problem Statement: Little is known about the pattern of dental services utilization among adults with diabetes.

Purpose: The purpose of this study was to assess factors that predict the likelihood of adults with diabetes to utilize preventive and emergency dental services.

Methods: A cross-sectional study was conducted, relative to Andersen and Newman Framework of Health Services Utilization dimensions (predisposing, enabling, and illness variables), in predicting dental service utilization using 2001-2002 NHANES dataset, last year of dental service usage inclusion. Target population was U.S. adults, 18 years of age or older; n=4,707 based on inclusion/exclusion criteria. Statistical Analysis Software (SAS®) was utilized to accommodate the NHANES sampling design and weights. Data analysis was achieved using chi-square and multinomial logistic regression with a hierarchical (blockwise) entry of predictor variables. This study has IRB approval (number 757668-1).

Results: Results reveal that individuals with diabetes were significantly (p=0.0002) less likely to utilize dental services in the past 12 months compared to individuals without diabetes. Based on odds ratios, significant predictors in preventive service utilization model were: gender, marital status, age, education, income, regular source of care, dental insurance, self-reported pain and recommended care based on oral exam findings. Significant predictors in emergency service utilization model were: unmarried status, age, education, regular source of care, dental insurance, self-reported painful tooth and recommended care based upon oral exam findings.

Conclusions: Diabetes status is a significant predictor of not having a preventive dental visit, even after controlling for age, gender, marital status, income, race/ethnicity, and education based on the results. These findings are a concern based on evidence supporting integrating oral health with diabetes management care. Further research is needed to compare results with current dental visits by individuals with diabetes.

Children’s Oral Health Care from the Perception of the Caregiver Seeking in Hospital Dental Treatment for their Children

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Problem Statement: Dental caries continues to be the most chronic childhood disease, and treatment of this disease is the most common day surgery for children in Canada. Oral disease is experienced most by the socioeconomically disadvantaged. It is recommended that children first visit a dental professional by age one.

Purpose: The research objectives were to examine the utilization of oral healthcare services by children with unmet dental needs and to determine the caregiver's perception and utilization of the oral healthcare system in Nova Scotia.

Methods: This study utilized a cross-sectional design. A questionnaire based on the Framework for the Access to Care was given to caregivers (n=62) of children undergoing dental treatment at the Izaak Walton Killam Health Centre.

Results: Less than a quarter (23%) of the children visited a dentist by the recommended age of one. The mean age that caregivers perceived to be the recommended age of first visit was 2.29. The mean age that caregivers first sought
dental care for their children was 2.69. Forty-four percent of children had caries at that time. Alternate dental care settings were preferred by over half (51%) of caregivers for children’s dental care. There was an overrepresentation of Aboriginal children (10%); low-educated caregivers (41.2%); and families from rural communities (50.4%) and low-income threshold (53.8%).

**Conclusions:** This study supports current evidence that the socioeconomically disadvantaged are vulnerable to oral diseases. The ability to offer services in settings that are easily accessed by vulnerable populations, such as community and school-based clinics and primary care settings, influences preventive outcomes. Utilizing dental hygienists, dental therapists, and primary care providers in alternate practice settings should be considered. This research study received ethics approval by Athabasca University REB #22011 and the IWK Health Centre REB# 1021493).

**Knowledge, Motivational and Behavioural Effects of Providing Oral Health Information to Pre/Post Natal Parents**

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**Problem Statement:** Despite improvements in oral health status in recent decades, dental decay is still the most common preventable childhood disease worldwide.

**Purpose:** To investigate whether providing an oral health educational intervention results in improvements in oral health knowledge among pre/postnatal parents and caregivers, and to explore the motivations and attitudes of parents towards oral health. (REB#2015-093)

**Methods:** A mixed method design included a pre- and post-intervention component and a semi-structured interview. In Phase I, participants attended an oral health education session where oral health knowledge and attitudes were assessed prior to and immediately following the education session. In Phase II, participants were offered a free dental debridement; they participated in a brief semi-structured interview regarding their oral health motivations and behaviors and completed a second post-questionnaire on oral health knowledge and attitudes.

**Results:** Thirty-three participants attended the oral health education sessions and completed Phase I; of those, five chose to complete Phase II. The education session was effective at improving participants’ total knowledge scores. Scores on 13 questions increased significantly, from 7.70±2.64 (mean±SD) (median 7) before the education session, to 11.24 ±2.27 (mean±SD) (median 12), immediately after the session (p<0.001). This knowledge was retained into Phase II. Despite the limited number of participants, four overall themes emerged: 1) participants are knowledgeable about the importance of oral health, 2) they believe their teeth and their children’s teeth are important, 3) knowledge provides minimal increases to motivation and attitude change; however, 4) factors such as income, education, and social support influence the adoption of positive oral health behaviors.

**Conclusions:** Oral health education is successful at increasing parents’ knowledge; however, new research on clinician techniques and strategies that address the social determinants of health are needed to improve parent and patient motivations towards improved oral health behaviors.

**South Texas Oral Health Network (STOHN) and the Tooth Fairy Project**

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**New Programs:** The purpose of this study is the collaboration of STOHN and The Tooth Fairy Study to collect deciduous teeth for analysis and increase knowledge and awareness of practitioners to grow their confidence in educating their patient population about potential environmental exposure risks. This collaboration of medicine and dentistry provides emerging science to dental practitioners; an important process in engaging families in discussions about environmental exposures. The goal is to enroll 10 dentists, each enrolling 20 parents.

**Significance:** Neurodevelopmental disorders (ND), such as Autism Spectrum Disorder (ASD), affect 1-68 births. Previous studies show that awareness of exposure risk during
pregnancy in South Texas is low. Therefore, it is important to increase provider knowledge and awareness to enable greater communication with their patients. Local practice-based research networks in South Texas are important communities that potentially impact large numbers of patients. This study engages practitioners in an on-going national study with minimal impact on their practice.

Approach/Key Features: Enrollment is through use of continuous recruitment of STOHN members and referred general and pediatric offices. Practitioners are contacted by phone and in person. Upon completion of Human Subject Protection training, each office is provided a training manual and “lunch-and-learn” education on ND and environmental exposure. They are trained in engaging their patients, provided pre-paid packaging for donated teeth and supported in survey completion. Contact lists of interested patients are generated and used to contact them by the study coordinator. Each child who donates will receive a personalized thank you letter from the Tooth Fairy. Providers are highlighted for their participation in our monthly newsletter.

Evaluation: Evaluation is threefold: Practitioner enrollment and retention success and difficulties, survey of increased knowledge, awareness and improved attitude about communicating risks to their patients, and number of completed surveys submitted with donation of teeth. UTHSCSA IRB Protocol # HSC20170132E.

The Need for Independent Dental Hygiene Practice of the Public Dental Hygienists in Korea

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Problem Statement: Globally, interest in independent dental hygiene practice has been increasing. However, in Korea, dental hygienists are only allowed to practice under the direct supervision of a dentist, and the number of public dentists has decreased. This decrease in available supervising dentists has made it difficult to practice public dental hygiene. Further, the supervision requirement does not allow for independent dental hygiene practice. Interest for independent public dental hygiene practice is unknown.
**Purpose:** The purpose of this study was to identify the demand for public dental hygienists to practice independently and the scope of services provided.

**Methods:** A survey was sent to 159 Korean public dental hygienists who were randomly sampled from the 1,531 Korean public dental hygienists. All participants provided written informed consent. Questions on the survey assessed the need for independent practice of public hygienist duties in two categories: public oral health and preventive dental treatment. Participants were asked to select the following options for each task: direct supervision, indirect supervision, or independent dental hygiene practice. (IRB No. CR317015 by Yonsei University).

**Results:** Public dental hygienists were very interested in both independent public oral health practice and preventive dental treatment. Identified high-demand services in public oral health practice included oral health education, fluoride mouth rinsing, and oral health project-related administrative services. In preventive dental treatment, high-demand services included tooth brushing instruction and use of oral care devices. Public dental hygienists were very interested in independent performance of oral health education, fluoride mouth rinsing projects, and instruction about tooth brushing and oral care devices.

**Conclusions:** Public dental hygienists in Korea are interested in practicing independently to provide oral health education, including oral care instructions, and fluoride mouth rinsing projects. This study was supported by the Korea Society of Public Health Dental Hygienists (2016-02).

### A Link Between Diet, Tooth Decay and Periodontal Disease in Underserviced Rural Uganda

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**Goals:** Bridge to Health Medical and Dental, a Canadian humanitarian organization, has built a partnership with a local not-for-profit healthcare organization. Collectively, we conduct outreach missions to underserved communities and provide medical and dental care, improve healthcare delivery systems, train local healthcare workers and educate the residents of these communities. Oral prophylaxis, composite restorations, extractions and dentures are provided; however, our focus is on education, prevention and sustainability.

**Significance:** Greater than 50% percent of the population in rural southern Uganda suffer from oral diseases impacting their overall health, largely preventable with education and proper hygiene. In addition, remote villages are hindered by extreme financial barriers and access to care.

**Approach/Key Issue:** Our mobile team collected and analyzed qualitative and quantitative data from remote villages. Decay rates and severity, acid erosion, calculus formation and gingival inflammation were documented on school-aged children segregated by village and gender. In addition, villagers were questioned on what they grow and eat.

**Evaluation:** Gross rampant decay rates upwards of 98% were linked to villages cultivating sugar cane. Decay rates of 63% with severe acid erosion were found in villages producing pineapple crops. Moderate alkalinity from Irish potatoes and sweet potatoes leads to heavy calculus formation and gingival inflammation. The neutral pH combination found in a village growing bananas and potatoes proved to have the lowest decay rate at 36% combined with the least amount of calculus and gingival inflammation. While efforts must continue to focus on education, it is imperative to include diet along with oral hygiene instructions. Further collaboration with medical providers linking diet, systemic disorders and oral conditions supports enhanced interventions.

### Workforce Models

#### Dental Therapy Practice Patterns in Minnesota: a Baseline Study

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**Problem Statement:** Dental therapy legislation in Minnesota was based on the premise that a differently constituted dental workforce would extend primary oral health services to underinsured and underserved populations. The first cohort of dental therapists (DT) began practicing in 2012, yet little is known about how this provider is used in practice.

**Purpose:** The purpose of this descriptive study was to obtain baseline knowledge of dental therapists’ practice patterns in Minnesota.

**Methods:** Four dental practices were sampled purposefully to obtain various practice types and geographic locations in Minnesota. Secondary data was collected from software
databases in each practice between January-March, 2015. Data were used to describe employment characteristics, types of patients seen and applied scope of practice of dental therapists. Data six months pre-and post-employment of the DT was collected to determine if dentists’ practice patterns changed after a DT was employed. Categorical variables and dental procedure categories were reported using frequencies and percentages. Work undertaken by the dentist pre-and post-employment of the DT was tested within each dental practice for a total of four Chi Square tests. A Bonferroni correction was used to account for the multiple testing (p=0.0125). This study was deemed exempt from IRB review by A.T. Still University, Arizona IRB Committee (IRB # 2014-174).

**Results:** Dental therapists were employed full-time; saw an average of 6.8 patients per day, 90% of whom were uninsured or on public assistance. Restorative services comprised 68% of work undertaken. Dentists delegated a full range of procedures within the dental therapy scope of practice indicating trust and acceptance of the DT. Dentists in two practices began to take on more complex dental procedures after a DT joined the practice.

**Conclusion:** Dental therapists are expanding access to dental care in rural and metropolitan areas of Minnesota.

**Cross-Sectional Assessment of the Practice Patterns of Expanded Function Dental Auxiliaries in Maine**

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**Problem Statement:** To address the oral health access crisis, the State of Maine has enacted independent practice dental hygiene, public health supervision, expanded function dental auxiliary (EFDA) for registered dental hygienists and Dental Assisting National Board Certified Dental Assistants (CDAs), and most recently the dental hygiene therapist (DHT). Limited assessment has been conducted on the effectiveness of any of the workforce models.

**Purpose:** The purpose of the study was to assess (a) the implementation of EFDA in dental practices, (b) geographic practice patterns of EFDA with regard to dental hygiene therapists and Dental Assisting National Board Certified Dental Assistants (CDAs), and most recently the dental hygiene therapist (DHT). Limited assessment has been conducted on the effectiveness of any of the workforce models.

**Methods:** A survey was mailed in December 2013 to a 30% (1231) sample of Oregon dental hygienists (DHs), which included all expanded practice permit (EPP) holders (351). All other survey recipients were randomly selected from the total 4101 registered DHs in Oregon. The 32-question survey assessed scope of practice, midlevel provider, current practice, and demographics. A total of 444 surveys were returned (response rate of 36%). The study was approved by the Pacific University IRB.

**Problem Statement:** As the U.S. faces an increasing demand for oral healthcare, many states are examining alternative provider models and the role of the dental hygienist to meet their access to care crisis.

**Purpose:** The purpose of this study was to assess Oregon dental hygienists’ opinions on scope of practice limitations and perceived need for a mid-level provider in Oregon.

**Methods:** A survey was mailed in December 2013 to a 30% (1231) sample of Oregon dental hygienists (DHs), which included all expanded practice permit (EPP) holders (351). All other survey recipients were randomly selected from the total 4101 registered DHs in Oregon. The 32-question survey assessed scope of practice, midlevel provider, current practice, and demographics. A total of 444 surveys were returned (response rate of 36%). The study was approved by the Pacific University IRB.

**Results:** Over half (59%) of DHs surveyed believe a midlevel provider is needed in Oregon. EPP holders and members of the American Dental Hygienists’ Association (ADHA) were significantly more likely to believe a midlevel provider was needed (p<0.0001). Ninety-one percent (n=400) of respondents agreed or strongly agreed that if a midlevel provider was introduced in Oregon it should be a registered dental hygienist. Forty-three percent (n=186) of respondents were interested in becoming midlevel providers, and 47% of respondents (n=203) believed the education for a midlevel provider should consist of training ending in a bachelors degree. The majority of those interested in becoming a midlevel provider (74%, n=137) prefer to gain their education through online teaching with a clinical internship.

**Conclusions:** Dental hygienists in Oregon believe there is a need for a midlevel dental provider, and that this provider should be a registered dental hygienist. Those interested in developing a curriculum for a midlevel provider should consider including online teaching with a clinical internship component. Funding for this project was provided by a Legislative Grant from the American Dental Hygienists’ Association.
Methods: The study was deemed exempt by the University of Michigan IRB (HUM00121000). A 20-question survey was sent both via email and traditional mail to all 73 licensed EFDA in Maine. SPSS software was used for analysis.

Results: A response rate of 59% (N=43) was achieved. Only 12% of respondents practiced in a community/public health setting, while the majority of respondents practiced in private offices. Regarding access to care, 53% indicated their practice did not accept Medicaid coverage, while 58% reported making a moderate to significant impact on access to care. However, 35% reported working in Penobscot County, which is not a dental provider shortage area. The most frequently provided services were restorative services (72%), topical fluoride (40%), sealants (37%), and child prophylaxis (26%). Over 80% of respondents reported less than half of their continuing education courses being relevant to EFDA practice. Over 20% felt specific, additional topics in preparatory education could increase access to care.

Conclusions: EFDA providers in Maine are providing much needed services, however they may not be providing access to care for the intended at-risk and underserved populations in certain geographic areas. Further research is needed on this topic.

Dental Hygiene Practice

National Study of Oral Cancer Screening Practices

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Problem Statement: Oral cancer has a high mortality rate which is often attributed to delays in diagnosis. Registered dental hygienists (RDHs) are instrumental in detection and referral of suspicious lesions. No national study of Canadian RDH oral cancer screening (OCS) practices has been completed.

Purpose: This study investigates whether RDHs are routinely conducting OCS. Factors that may mediate OCS provision and ability to discuss sensitive topics with patients are also examined.

Methods: A cross-sectional survey design was used. A web-based survey was developed, pre-tested, and validated prior to dissemination. The survey link was mailed out nationally through dental hygiene colleges and associations. Only practicing RDHs were prompted to complete the survey. Descriptive statistics were used to identify data trends. The McNemar test was used for categorical dependent data, nonparametric tests (Mann-Whitney U and Kruskal-Wallis) were used to analyze Likert questions, multiple regression was used for prediction of continuous outcomes, and Spearman's correlation was used for detecting relationships. Bonferroni's correction was applied to reported p-values with multiple comparisons. Ethics approval was obtained from the University of Alberta Research Ethics Board (Pro00055150).

Results: 256 surveys were used for analysis, primarily from Ontario, Alberta and Nova Scotia. Sixty-four percent of RDHs reported conducting OCSs during their regular process of care. Ninety-six percent of intraoral components are inspected in an OCS compared to 73% of extraoral components. Confidence in OCS technique was high (70%) but those with a bachelor's degree reported feeling more prepared than those with a diploma (p = .002). The average time to conduct an OCS was 4 minutes, with the majority agreeing there is sufficient time to conduct the screening (57%). Only 37% felt their education prepared them to discuss sensitive topics.

Conclusions: RDHs are conducting OCSs more than two-thirds of the time, however they lack comfort discussing sensitive topics.

Understanding the Meaning of the Head and Neck Cancer Patient and Partners’ Oral/Dental Lived Experiences

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Problem Statement: Treatment for head and neck (H&N) cancer can lead to experiences of intense symptom distress, particularly within the oral cavity and pharynx. Understanding these and their impact on physical, emotional, and psychosocial effects could support patient and family centered care.

Purpose: The purpose of this study was to develop an understanding of patient and partners’ oral/dental
lived experiences in the context of H&N cancer. This understanding will provide critical insights for healthcare providers and decision makers to support patient and family centered care.

Methods: Hermeneutic phenomenology as described by Max van Manen guided this study. Purposive sampling was used to recruit 13 study participants. Each participant completed a semi-structured interview, which was digitally recorded and transcribed verbatim. A prolonged engagement with the data and interpretive memos led to the phenomenological meaning of the experiences being articulated within the final interpretation. This study received institutional REB and site access approval.

Results: Results indicate that treatment has a profound and sustained impact on the H&N cancer patient and their partner. During treatment, difficulties with eating, pain, xerostomia, and weight loss were reported. Long term, persistent eating difficulties, xerostomia, dental disease and its related cost were distressing to participants. Despite effects that impeded adequate nutritional intake, participants expressed resistance to the placement of a PEG tube. The process of resistance was complex, and influenced by meanings associated with becoming and living as a cancer patient. The symbolic meaning of food and eating impacted the participants’ subjective concepts of self and illness.

Conclusion: The intensity and extent of the patient experiences described suggest that there is a critical need to develop interventions that respond to living with symptoms in H&N cancer. This study has given voice to the participant experiences that should inform and guide the development of clinical practice and recommendations.

Oral Cancer Screening: Breaking the Time Barrier
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Problem Statement: It is an ethical responsibility for dental hygienists to perform oral cancer screenings (OCS). Previous studies have revealed dental hygienists perceive themselves as knowledgeable about OCS, but are not transferring this knowledge into practice. Time constraints have been identified by hygienists as the main barrier to performing OCS on all clients.

Purpose: 1) To determine how long it takes senior dental hygiene students, recent graduates and dental hygiene faculty to conduct an intra/extra oral examination. 2) To determine the time required to complete the salivary gland function (SGF) testing component of the intra/extra oral examination.

Methods: Ethics approval was attained from the Research Ethics Board at Dalhousie University. A convenience sample of 28 participants (13 students, 9 alumni, 6 faculty) completed an intra/extra oral examination as per criteria taught at the School of Dental Hygiene, Dalhousie University while being timed. The total time to complete the exam and the time required for the SGF was recorded by calibrated researchers. Descriptive statistics were used to summarize the data via SPSS Statistics version 23.

Results: The overall mean time (±SD) to perform the full examination was 5min 26s ± 1min 4s (students: 5min 23s ± 51s; alumni: 4min 40s ± 28s; faculty: 6min 42s ± 1min 2s). The mean time (±SD) to perform the SGF test was 49 seconds ± 12s (this time was similar for all groups).

Conclusion: Time has been reported by hygienists to be the main barrier to performing oral cancer screenings, however we have shown a comprehensive intra/extra oral exam takes approximately 5.5 minutes. Performing SGF as part of the exam (considered non-essential for oral cancer screening) accounts for approximately 18% of this time. This translates to less than one minute which may not be clinically significant in practice. Further research is needed on means of reducing barriers (real or perceived) to routine practice of oral cancer screenings.

Dental Radiographic Prescribing Practices: A Survey of Dental Hygienists in the United States
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Problem Statement: Potential harm from ionizing radiation has led to the development of guidelines, which may or may not be followed by clinicians, for the protection of patients and practitioners from unnecessary radiation exposure.

Purpose: This study surveyed U.S. dental hygienists regarding radiology prescribing practices.

Methods: The survey, consisting of 62 knowledge and practice items pertaining to dental x-rays, was based on the 2012 American Dental Association (ADA) and Food and Drug Administration (FDA) guidelines “Dental
Radiographic Examinations: Recommendations for Patient Selection and Limiting Radiation Exposure.” The study was granted exempt status by TAMBCD’s IRB. The survey link was emailed to 10,000 subscribers of Dimensions of Dental Hygiene Magazine and posted for its 40,000 Facebook page followers.

**Results:** Of the 517 survey respondents, 505 confirmed their identity as dental hygienists. Data analysis included descriptive statistics, cross tabulations and Chi-Square analyses. Approximately 46% reported the dentist determined the need for radiographic films or images and 42% reported the decision was made by the dental hygienist. Eighty two percent stated a clinical examination was not performed prior to obtaining radiographs, and 70% reported radiographs were ordered based on a set time interval. Approximately 36% exposed radiographs based on insurance reimbursement. For adult recall patients with no clinical caries and low caries risk, general and corporate dental practices obtained bitewing radiographs more frequently (every 12 months) than educational institutions (P<0.05). For children and adolescent recall patients without caries and low caries risk, corporate dental practices obtained bitewing radiographs more frequently on children (every 6 months) than educational institutions (P<0.05); for adolescent patients, corporate and general dental practices preferred to acquire bitewing radiographs every 12 months, whereas educational institutions preferred every 18 months (P<0.05). 

**Conclusions:** These findings suggest the respondents’ practices were not fully adhering to the 2012 ADA/FDA guidelines for prescribing dental radiographs.

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**Testing the Efficacy of Natural Toothpaste on the Control of the Carious Process: A New Era of Therapeutic Efficacy in Primary Prevention**

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**Problem Statement:** According to recent NHANES stats, the prevalence of caries in at-risk individuals increased between 1994 and 2012, despite exposure to various fluoride products. Likewise, natural dental products are more and more prevalent even though they contain no therapeutic agent and in time would contribute to a rise in carious lesions.

**Purpose:** Proposed trial is a world first aiming to test a natural toothpaste solely containing 25% concentrated xylitol as the anti-carious therapeutic agent as well as an anti-cariogenic antibacterial agent.

**Methods:** A voluntary sample of 201 dyads (mother-6 month old infant) were recruited from Pristina and randomly allocated to either test or control groups. The trial group consisted of twice a day tooth brushing with xylitol toothpaste for 24 months. Control group was exposed to normal preventive toothpaste with or without fluoride. Samples were collected at baseline and endpoint. A longitudinal prospective design was applied. Primary dependent variable was dmfs generated from ICDAS system. Primary independent variable was SM categories of infection from 0 to > 10³ SM/ml of saliva. Analysis used SAS software. Ethical Committee of Pristina University approved this study.

**Results:** Final group composition was 99 for control and 102 for trial group. Twice a day 25% xylitol toothpaste exposure for 24 months led to a mean dmfs of 2.7 units for tested participants compared to 6.7 units for control group by 60% (p=0.001). This toothpaste also significantly reduced SM infection among test group participants between the ages of 6 and 30 months (p=0.001).

**Conclusion:** In the current study, natural strict 25% xylitol toothpaste used daily reduced the caries process, carious lesions, caries risk and cariogenic bacteria. This study was funded by RSQB of Quebec.

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**Use of the ICDAS for Measuring Dental Caries: A Scoping Review**

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**Objective:** To explore how overall caries was summarized for patients examined using the International Caries Detection and Assessment System (ICDAS).

**Search Strategy/Selection Criteria:** A systematic database search up to July 2016 was carried out using PubMed, Ovid MEDLINE, Cochrane library, and ISI Web of Science electronic databases. Only studies that used the ICDAS for dental caries examinations were included. Studies were excluded if the examination was done for the validation/
calibration of the ICDAS and/or if the examination was not done for the whole dentition. Measures used to report patients’ overall caries were considered. Search terms for both caries and ICDAS were used.

**Data Collection and Analysis:** Data extraction was done by two reviewers separately. Indices/measures used to summarize patients’ caries level were evaluated in the selected studies. The index/measure of caries used and how it was calculated were extracted. Studies were grouped and summarized according to the index/measure used.

**Main Results:** A total of 70 papers were finally selected. Out of the selected articles, 56 were cross-sectional studies, 8 were randomized clinical trials, and 6 were cohort studies. A total of 40 different measures of caries were used. Individual ICDAS scores were the most commonly used measures as it was used in 17 studies. A total of 6 different dmft/DMFT and 7 different dmfs/DMFS combinations at different caries cut-off points were used. Two studies used mean ICDAS and one study used mean ICDAS in carious teeth. The Maximum ICDAS score and total ICDAS were used once.

**Conclusions:** Most studies presented caries using categorical characteristics of the ICDAS. There are variations in the utilization of the system in summarizing caries between the studies. These inconstancies do not allow comparison between different studies. Therefore, a consistent summary measure that reflects patient caries level is needed.

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**A Randomized 2-Month Clinical Trial Evaluating Anti-Gingivitis Efficacy of Stabilized Stannous Fluoride Dentifrice versus Triclosan Dentifrice**

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**Problem Statement:** Various antimicrobial oral hygiene products are available to help protect patients against plaque-induced gingivitis, a common oral health disease characterized by gingival bleeding and inflammation. Clinical data comparing treatments would be useful to help assist dental hygienists with home hygiene recommendations.

**Purpose:** To compare the efficacy of two anti-gingivitis dentifrices – one with stabilized stannous fluoride (SnF₂) and a positive control with triclosan – over a 2-month period.

**Methods:** This was a randomized, positive-controlled, double-blind, parallel-group, IRB-approved clinical trial involving generally healthy adults with mild-to-moderate gingivitis. Two hundred qualifying subjects were randomized 1:1 to the 0.454% stabilized SnF₂ dentifrice (Crest® PRO-HEALTH™ Clean Mint) or positive control dentifrice with 0.3% triclosan/0.243% sodium fluoride (Colgate® Total®). Dentifrice was distributed with a soft manual flat-trim toothbrush. Subjects were instructed to brush with their respective dentifrice according to each manufacturer’s instructions. The following efficacy and safety evaluations were conducted at Baseline and Month 2: Gingival Bleeding Index, Modified Gingival Index, and Oral Soft Tissue. Treatment groups were compared using analysis of covariance with Baseline value as covariate. All statistical tests were two-sided with a 5% level of significance.

**Results:** One hundred ninety seven subjects were evaluable; 98 in the triclosan group and 99 in the SnF₂ group. Both groups showed a significant reduction in bleeding sites from baseline (P<0.0001). The mean number of bleeding sites in the SnF₂ group was reduced from 20.7 at Baseline to 11.2 at Month 2, compared to Baseline and Month 2 means of 21.95 and 14.3, respectively, for the triclosan group. The difference between groups at Month 2 represented 21.8% fewer bleeding sites for the SnF₂ group compared to the triclosan group (P<0.0001).

**Conclusions:** In this clinical study, the stabilized SnF₂ dentifrice provided greater gingival bleeding reductions than the triclosan dentifrice.

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**A Randomized Clinical Trial Measuring the Erosion Protection Benefits of a Stabilized Stannous Fluoride Dentifrice versus a Control Dentifrice**

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**Problem Statement:** Dental erosion is a common condition characterized by loss of enamel from external acids, such as acidic foods and beverages. Stabilized stannous fluoride (SnF₂) dentifrice has been shown to offer protective benefits against erosion.
Purpose: To compare the enamel protection efficacy of a stabilized SnF₂ dentifrice and a marketed control dentifrice in a 10-day in situ erosion model.

Methods: This was a single center, double-blind, randomized, 2-treatment, and 3-period crossover clinical study approved by an IRB. The study was conducted with 12 healthy adults. Each study period was comprised of 10 treatment days. Subjects were randomized to one of two treatments each period: 1) Experimental 0.454% stabilized SnF₂ dentifrice (Crest® PRO-HEALTH™ Clean Mint) or 2) Sodium fluoride dentifrice with potassium nitrate marketed for erosion protection (Sensodyne® Pronamel®). Subjects wore an intra-oral appliance retaining 8 polished human enamel samples. Subjects used the assigned dentifrice, brushing lingual surfaces and then swishing, twice a day. Erosive challenge with orange juice occurred a total of four times on each treatment day. Enamel samples were measured using non-contact profilometry at Baseline and Day 10 for surface changes. Statistical analyses utilized a general linear mixed model with period and treatment as fixed effects and subject as a random effect.

Results: The SnF₂ dentifrice provided 26.9% greater erosion protection relative to the control dentifrice at Day 10 (p<0.03). Enamel loss adjusted means at Day 10 were 9.117mm for the SnF₂ dentifrice and 12.471mm for the control.

Conclusion: This stabilized SnF₂ dentifrice provided greater erosion protection than a control dentifrice marketed explicitly for anti-erosion benefits.

Plaque and Gingivitis Effects of an Oscillating-Rotating Electric Rechargeable Toothbrush with an Angled-Bristled Brush Head versus a Sonic Toothbrush
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Problem Statement: Clinical trials have shown advantages for oscillating-rotating (O-R) electric rechargeable toothbrushes versus sonic toothbrushes in reducing plaque and gingivitis. Most studies have evaluated comparable brush models (e.g., premium handles). Comparing a premium model to a mid-range model would further dimensionalize the relative efficacy of these technologies.

Purpose: To evaluate an O-R electric (mid-range model) toothbrush with an angled-bristled brush head to a marketed sonic (premium model) toothbrush in reducing plaque and gingivitis over 8 weeks.

Methods: This was a randomized, examiner-blind, parallel-group, eight-week, IRB-approved clinical trial. Generally healthy adults with mild-to-moderate plaque and gingivitis were assessed for baseline whole mouth, gingival margin and approximal plaque, gingivitis, and gingival bleeding using the Rustogi Modified Navy Plaque Index, Modified Gingival Index, and Gingival Bleeding Index. One hundred fifty subjects were randomized 1:1 to the O-R brush (Oral-B® Professional Care 1000 with Oral-B® CrossAction® brush head) or the sonic brush (Sonicare® DiamondClean with DiamondClean brush head). Subjects brushed twice daily, 2 minutes per brushing, with their assigned toothbrush and standard fluoride dentifrice for 8 weeks. Plaque and gingivitis were reassessed at Week 8 using the same methods.

Results: One hundred forty eight subjects completed the trial (75 O-R, 73 sonic). Statistically significant reductions in plaque and gingivitis (P<0.001) were demonstrated by both toothbrushes over 8 weeks. Differences between groups were statistically significant for all plaque and gingivitis measures (P<0.001) favoring the O-R brush. At Week 8, the O-R brush demonstrated 27.7%-46.8% greater plaque removal and 34.6% - 36.4% greater gingivitis reductions than the sonic brush. There were no adverse events.

Conclusions: The mid-range O-R toothbrush handle with the angled-bristled brush head was more effective at reducing plaque and gingivitis than a premium sonic model.
3-Year Evaluation of Manual and Electric Rechargeable Toothbrush Effects on Pre-Existing Gingival Recession

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Problem Statement: Gingival recession is multi-factorial. It is has been purported that toothbrushes that are highly effective at plaque removal could have a higher risk of trauma, leading to gingival recession.

Purpose: To compare the effects of brushing with an oscillating-rotating (O-R) electric rechargeable toothbrush or a standard manual toothbrush on pre-existing gingival recession over approximately 3 years.

Methods: This was a controlled, parallel group, randomized clinical trial approved by the International Medical & Dental Ethics Commission Freiburg. Healthy subjects with pre-existing recession (>2mm) were randomized into one of two groups: O-R toothbrush or ADA reference manual toothbrush. Subjects brushed their teeth twice daily, for 2 minutes per brushing, with their assigned toothbrush and standard fluoride toothpaste. The same examiner assessed subjects for clinical attachment loss and probing pocket depths at six sites per tooth at Baseline and Months 12, 18 and 35. Gingival recession was calculated at pre-existing sites as the difference between clinical attachment loss and probing pocket depths. Safety was assessed by hard and soft oral tissue examinations.

Results: 109 subjects were enrolled and 75 completed the study (37 in O-R, 38 in manual). Mean gingival recession (SD) for sites with initial recession did not differ significantly between groups after approximately 3 years (p>0.05). Means (SD) at Baseline and 3 years were 2.35mm (0.35) and 1.90mm (0.58), respectively, for the O-R group and 2.26mm (0.31) and 1.81mm (0.66), respectively, for the manual group. The reduction in recession was significant (p<0.001) for both groups. There were no adverse effects on hard or soft tissues in either group.

Conclusions: Pre-existing gingival recession was not adversely affected by brushing with an O-R or manual toothbrush over 3 years. In fact, both groups showed a reduction in recession.

Assessing Periodontal Disease by Measuring Molecular Biomarkers of Inflammation in Gingival Crevicular Fluid

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Problem Statement: There are cases of periodontitis non-responsive to typical treatment strategies. These cases demonstrate a need for novel treatment options focused on molecular interventions.

Purpose: The purpose of this study was to determine the expression of recently discovered pro- and anti-inflammatory mediators: TREM-1, TREM-2, RAGE, HMGB-1, and their soluble forms: sTREM-1, sTREM-2, and sRAGE in gingival crevicular fluid (GCF) during gingivitis and periodontitis to discover an appropriate target for future molecular interventions.

Methods: The research protocol was approved by the Creighton University IRB (#1015786-1). Fourteen participants (5 healthy, 4 gingivitis, 5 periodontitis) were consented and enrolled in this blinded, ex vivo study. GCF samples were collected via PerioPaper® during scheduled appointments. Expression levels of TREM-1, TREM-2, RAGE, HMGB-1 and their soluble mediators in GCF samples were measured using commercially available ELISA kits.

Results: Analysis of ELISA assays revealed greater expression of TREM-1 in GCF from patients with gingivitis (26,672 pg/mL) and periodontitis (15,118.8 pg/mL) compared to healthy subjects (5,091.6 pg/mL). Protein expression of RAGE, sTREM-1, and sTREM-2 were higher in healthy samples (2,323.9; 1,511; and 202,871.5 pg/mL) compared to periodontitis (103.2; 1,229.8; and 37,101 pg/mL) with no expression in gingivitis samples. TREM-2 was found to be expressed only in samples from patients with periodontitis (2790.9 pg/mL) and HMGB-1 only in patients with gingivitis (13,246 pg/mL); sRAGE was not detectable in any of the samples. However, only differences in the expression level of HMGB-1 reached the threshold for statistical significance.
Conclusions: Results from this study highlight potential differences in the expression levels of specific biomarkers between gingivitis and periodontitis. More research is needed, however, with a larger sample size, to draw definitive conclusions or elucidate a target for future molecular interventions to arrest periodontal diseases.

**Efficacy of Sodium Chlorite plus Zinc Gluconate on Volatile Sulfur Compound Halitosis: A Randomized, Double-Blind, Placebo-Controlled Pilot Study**

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**Problem Statement:** There are no published clinical research data on the efficacy of sodium chlorite plus zinc gluconate, whether in the form of a mouthrinse or in any other composition, on halitosis.

**Purpose:** This quantitative study aimed to assess the efficacy of sodium chlorite plus zinc gluconate (SC+ZG) mouthrinse in adults with halitosis.

**Methods:** This randomized, double-blind, placebo-controlled study used the Yaegaki et al. standardized oral malodor clinical research protocol. The study was approved by the MCPHS University IRB and open to adults 18 years and older, who complained of or had been told they had halitosis. Seventeen of 22 recruited subjects followed pre-testing preparation. On test day, baseline measurements of hydrogen sulfide ($H_2S$), methylmercaptan (MM), and dimethyl sulfide (DMS) were obtained using an OralChroma® CHM-2 gas chromatograph. Subjects were randomized to SC+ZG or placebo rinses. Supervised subjects rinsed with 15 mL of SC+ZG or placebo for 60 seconds and subsequently gargled with a second dose of the assigned mouthrinse for 30 seconds. Subjects were not permitted to eat or drink for 3 hours after the rinsing and gargling regimen, at which time measurements were repeated.

**Results:** Using analysis of variance (ANOVA) for continuous variables and Fisher's Exact Test for categorical variables, there were no statistically significant differences in demographics between the groups. Differences in effect estimates between treatment arms were found in mean gas concentrations of $H_2S$ and MM from baseline to post-rinse. Mean $H_2S$ gas concentration decreased by 16.4 ppb (95% CI -54.9, 22.1) in the treatment group, but only by 2.9 ppb (95% CI -11.7, 5.9) in the placebo group and by 28.4 ppb (95% CI -54.8, -1.9) and 11.2 ppb (95% CI -31.8, 9.3) for MM gas in the treatment and placebo arms, respectively. Results were not inferentially statistically significant, for any of the VSCs, likely due to the study being underpowered.

**Conclusions:** Study findings did not support evidence of efficacy of SC+ZG on halitosis.

**California Dental Hygienists’ Knowledge, Attitudes and Practices Regarding Polypharmacy and Off-Label Drugs**

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**Problem Statement:** To date, there have been insufficient studies published concerning the knowledge, attitudes and practices of dental hygienists regarding polypharmacy and off-label drug recognition and use.

**Purpose:** This study examined the knowledge, attitudes, and practices of dental hygienists in California regarding polypharmacy and drugs used for off-label purposes both in medicine and dentistry.

**Methods:** In a cross-sectional design, knowledge, attitudes, and practices (KAP) related to off-label drugs and polypharmacy were assessed via an online survey tool. The sample included licensed dental hygienists registered with the Long Beach and Tri-County Dental Hygienists’ Associations in Southern California (N=360). Participant characteristics were calculated using descriptive statistics. ANOVA was used to assess differences in knowledge, attitudes and practices when compared to three key variables: highest academic/professional degree, experience and license type. This study was approved by the Human Subjects Committee, Idaho State University’s IRB (IRB-FY2016-379).

**Results:** One hundred seven surveys were returned for a 34% response rate. Over half of respondents (53%) held an Associate degree for their license, most (72%) worked in a general dentistry setting and 46% had practiced 15 years or less. Results revealed very low knowledge levels with 25% of respondents answering zero knowledge items correctly.
Furthermore, no significant differences in knowledge and practices related to off-label drugs or polypharmacy were found based on type of licensure, highest degree achieved, or years of experience. However, participants holding a Bachelor degree or higher were significantly more confident (p=0.011) in discussing polypharmacy with patients and colleagues.

**Conclusion:** Participants showed a general low-level of knowledge related to off-label drugs and polypharmacy regardless of their level of education, years of experience, or type of dental hygiene licensure. These results indicate a profound need for increasing content in pharmacology in both entry-level programs and continuing education courses.

### Comparison of Dental Hygienist and Patient Perspectives on Chairside Oral Hygiene Instruction

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**Problem Statement:** Dental hygienists fully embrace their role providing oral hygiene instructions (OHI) and recommendations to improve the health of their patients, and yet acknowledge that most of their patients do not comply with their recommendations. The issue may not be one of compliance but one of understanding and memory of the specifics of the instructions.

**Purpose:** The purpose of the study was to compare perceptions of patients and dental hygienists (DHs) on OHI provided during the patient’s appointment to understand the barriers to effective communication and adoption of oral hygiene recommendations.

**Methods:** After obtaining consent, 8 focus groups were conducted. DHs were interviewed on their OHI protocol and their patient’s adherence to instructions. Patients were interviewed separately regarding OHI provided during their appointments and their memory of the OHI provided. Sitting in a separate room with a one-way mirror, DHs viewed a focus group of patients who were not their own patients.

**Results:** Themes that emerged were: all DHs feel they are effective in providing OHI, however patients revealed they do not understand or remember most of what the DH says. Patients feel vulnerable if OHI was given while they were in a supine position or simultaneously with scaling procedures. Also, many patients indicated that OHI is not remembered from the time of their appointment to the next time they perform oral care at home without digital or printed reminders.

**Conclusions:** DHs need to change the environment in which OHI is given and provide tools to facilitate the conversation with patients to overcome barriers of understanding and memory. OHI should be given separately from other procedures and with patients in an upright position to give them the ability to absorb information and clarify if needed. Printed materials or digital tools and videos may improve understanding and retention which can improve oral health. Funded by Colgate Oral Pharmaceuticals, Inc.

### Implementing The Pediatric Oral Quality Of Life (POQL) Instrument Into Practice: Initial Results

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**Problem Statement:** Combining quality of life measures with traditional oral health assessment measures has been promoted by the World Health Organization and the U.S. Department of Health and Human Services (Healthy People 2020) as a holistic approach to health and healthcare, yet adoption has been slow in clinical practice.

**Purpose:** To evaluate qualitative feedback from practitioners administering the Pediatric Oral Quality of Life (POQL) survey in two community health organizations.

**Methods:** This study was approved by the University of Missouri-Kansas City IRB (#16-086). Modified versions of the POQL were administered to children and parents/guardians by practitioners in the fall of 2016. A 17-item survey investigating best practices for implementing the POQL into practice was completed.

**Results:** Twelve of 19 practitioners (63%) provided full responses. Half were dental hygienists, three dental assistants, two office administrators and one dentist. The majority reported being employed full time, and worked in their organization 2 to 3 years. All child POQLs were completed chairside at various times during the appointment. Practitioners reported it took approximately 5 minutes to administer and that most children were receptive although not always sure why they were being asked about their teeth and mouth. Parents/guardians raised no objections to filling out the POQL. Several practitioners reported that the POQL provided greater insight about the child and their oral health. When
asked about challenges, they noted the need to explain or rephrase questions, fitting the POQL into the workflow, and amount of time to implement.

**Conclusion:** These early results show that implementing an OHRQoL measure in practice requires little time while providing a more complete picture of the impact of a child’s oral condition. Funding source: NIDCR (UH2DE025510).

**Dental Professionals Perceptions of Sugar Consumption and Obesity Advice in Dental Practices**

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**Problem Statement:** The incidence of obesity is rising despite international initiatives. The WHO has challenged all health care providers to contribute to efforts targeting increased awareness of healthy weight dietary choices among their patients.

**Purpose:** The aim of this study was to explore dental professionals’ perceptions of extending advice to patients on sugar consumption and oral health to include overweight/obesity information.

**Methods:** This cross-sectional, international questionnaire of clinical dental professionals collected data electronically between April and August, 2016. The questionnaire was developed using existing validated questions covering these domains: willingness and confidence, knowledge of the association between obesity/sugar consumption and oral health, self-evaluated abilities on screening and giving advice regarding sugar consumption and obesity, and potential barriers to providing advice. IRB approval was obtained.

**Results:** 245 dental professionals (20-65 years) consisting of 79.6% females and 20.4% males completed the survey. Results showed the majority of dental professionals (75.3%) would be willing to give advice on obesity/overweight if a relationship between obesity/overweight and oral health was found. Significant misconceptions about obesity as a disease and its relationships to oral health were evident. Differences based on age, gender and profession were not found. Although 88.3% of dental professionals are already providing counseling for oral and/or general health matters, less than 30% would start a conversation with their patients addressing sugar consumption and obesity. Lack of training and understanding of obesity as a disease was highlighted as a potential barrier to providing advice.

**Conclusions:** Although dental professionals showed willingness to expand sugar consumption counseling beyond oral health messages, confidence is lacking. Further training is indicated to understand the association between sugar consumption, overweight/obesity and/or their association with oral or general health.

**Dental Hygienists’ Attitudes on and Confidence Related to Providing Nutrition and Exercise Counseling**

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**Problem Statement:** The obesity epidemic in the US is of grave health and economic concern. Evidence suggests that consistent messaging should be provided by all health professionals to help patients improve their dietary and exercise habits. As preventive specialists, dental hygienists (DH) are well-placed to take part in the interprofessional promotion of healthy nutrition and exercise habits for their patients.

**Purpose:** The aim of this study was to examine the attitudes and confidence of US dental hygienists in providing nutrition and exercise counseling, and to determine what factors are associated with confidence in providing such counseling. A secondary aim was to compare these national results with those from a previously published study conducted in North Carolina.

**Methods:** A cross-sectional design was used. A 54-question survey, previously used in the NC study and obtained with permission, was emailed by the ADHA to its 13,846 members. Data was collected via SurveyMonkey software. Descriptive statistics were calculated for attitudes and barriers, and compared to the NC results. A regression model was used to determine factors associated with confidence. IRB approval was obtained from Columbia University.

**Results:** The response rate was 11% (n=1575). Ninety-two percent of respondents felt that DH have a role in patients’ overall nutrition; only 40% expressed interest in helping patients with obesity establish a plan toward weight loss goals. Age (p < 0.0001), self-reported obesity (p < 0.0271), and place of work (p < 0.0012) were statistically significant predictor variables of confidence in providing counseling. Primary barriers included fear of offending the patient (94%) and lack of time (93%). Findings between the US and NC studies were generally comparable.
Conclusions: While most US dental hygienists are interested in helping patients with their overall health, they report low to moderate confidence in providing nutrition and exercise counseling for weight management.

Mentoring Undergraduate Dental Hygiene Students in Research: Ultrasonic Tip Selection Practices of Dental Hygienists

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Problem Statement: Faculty mentored research with undergraduates has been identified as a need in U.S. higher education. We will present steps involved in faculty mentored research and the results from one research project. Ultrasonic instrumentation is an important aspect of periodontal therapy and has distinct advantages in comparison to hand instrumentation. However, little is known about the ultrasonic tip selection practices of dental hygienists.

Purpose: The purpose of this study was to examine the strategies and variety of ultrasonic tip selection used by dental hygienists in treating patients.

Method: Using a survey research design, dental hygienists responded to an online questionnaire designed by the researchers that was pilot-tested to improve content validity. All responses were confidential and IRB approval was obtained from Weber State University. The data were analyzed using descriptive statistics.

Results: Dental hygienists were contacted via email with a response rate of approximately 20% (n=44). Names and email were obtained from the professional association. Most respondents (47.7%) indicated they used an ultrasonic 1-3 times a day to treat patients with mild, moderate, or severe periodontal disease. While a large majority (88.6%) of the respondents felt it was clinically beneficial to use more than one tip during the treatment of a periodontal patient, most hygienists (42%) use two types of ultrasonic tips for periodontal instrumentation, and several respondents (37%) use just one tip. Respondents also identified the type of tip used the majority of the time.

Conclusion: While dental hygienists noted the importance of using multiple tips for ultrasonic therapy with periodontal patients, a large percentage appear to limit the number of tips they use.

Mentoring Undergraduate Dental Hygiene Students in Research: Ultrasonic Instrumentation Practices of Dental Hygienists with Periodontal Patients

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Problem Statement: Faculty mentored research to improve authentic learning for undergraduate students has been identified as a need in U.S. higher education. This presentation highlights procedures for faculty mentored research and presents findings from one research project. Ultrasonic instrumentation has been identified as a salient therapeutic treatment for periodontal disease. However, little is known about the actual practices of dental hygienists when using ultrasonic therapy for periodontal patients.

Purpose: The purpose of this study was to ascertain the length of time ultrasonic therapy is used for periodontal patients and obtain information about the strategies dental hygienists use in monitoring ultrasonic tip wear.

Method: Using a survey research design, dental hygienists responded to an online questionnaire designed by the researchers that was pilot-tested to improve content validity. All responses were confidential and IRB approval was obtained from Weber State University. The data were analyzed using descriptive statistics.

Results: Dental hygienists’ names/emails were provided by the professional association and were contacted via email with a response rate of approximately 20% (n=44). The most frequent length of time (full mouth debridement) spent with ultrasonic instrumentation for a patient with mild bone loss was 16-30 minutes (51% of respondents) and for patients with moderate or severe bone loss it was 31-45 minutes (54% and 52% respectively). Time spent on ultrasonic instrumentation for a periodontal maintenance patient was split almost equally between 1-15 minutes (50% of respondents) and 16-30 minutes (47.7% of respondents). Hygienists either monitor tip wear when the tip breaks (32%) or monthly (34%) and monitor tip wear using a wear indicator card (over 70%).

Conclusion: While the literature has suggested that more than 20 minutes of instrumentation per quadrant is needed for adequate removal of light to moderate subgingival calculus, hygienists appear to spend less than this length of time when treating periodontal patients.
**Comparison of Calculus Detection Among Dental Hygienists Using an Explorer and Ultrasonic Insert**

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**Problem Statement:** The main goal of periodontal therapy is to disrupt the calculus harboring biofilm that triggers the inflammatory response. The explorer is mainly used to detect calculus and the ultrasonic instrument is mainly used to remove calculus. The efficiency in dental hygiene care may improve if the ultrasonic instrument could be used in the detection and removal of calculus.

**Purpose:** The purpose of this study was to compare the rater reliability of calculus detection among registered dental hygienists when using the ODU 11/12 explorer and Thinsert® ultrasonic instrument.

**Methods:** Upon IRB approval, this study utilized a repeated measures design that involved three dental hygiene faculty from The Ohio State University Dental Hygiene Program and 30 patient participants from the Ohio State University community. Using the ODU 11/12 explorer and Thinsert® ultrasonic instrument, calculus was evaluated on six standardized teeth and on four possible surfaces per tooth. Data were analyzed to evaluate for intra-rater reliability, inter-rater reliability, sensitivity, specificity, PPV, and NPV.

**Results:** Intra-rater reliability was calculated by comparing calculus evaluations using the explorer and Thinsert® by each rater. Mean Kappa averages were found in the full agreement range (Kappa=0.726, n=2160, p<0.01). Inter-rater reliability was calculated by comparing all raters’ calculus evaluations using the explorer and Thinsert®. The average measure of intraclass coefficient (ICC) value was 0.782 with a 95% confidence interval (CI) of 0.749 to 0.810 (F(1439, 2878)=4.852, p<0.01). When using the Thinsert® to evaluate for the presence or absence of calculus, there was a sensitivity of 75%, specificity of 97%, PPV of 81%, and NPV of 94%.

**Conclusions:** Efforts can be focused on developing the tactile sensitivity when using the Thinsert® ultrasonic instrument in the assessment, treatment, and maintenance of periodontal disease.

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**Developing an Observational Method for Assessing Dental Hygienists’ Injury Risk**

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**Problem Statement:** Dental hygienists have a high prevalence of work-related musculoskeletal disorders (WMSDs) due to repetitive motions and sustained postures, which often begin as a student when learning instrumentation skills. The majority of studies use self-reported methods to measure signs and symptoms, and research has primarily focused on instrument design. Currently, there is no standardized method for evaluating risk factors for developing repetitive hand injuries.

**Purpose:** Develop and pilot-test an observational method, video recordings, for evaluating performance and body positions of dental hygiene (DH) students during instrumentation to determine their risk for developing WMSDs.

**Methods:** With IRB approval and informed consent from participants and their patients, videos of five student DHs were obtained while providing patient care. Two stationary cameras captured a wide-angle view of body positions and a close-up view of the hand and wrist during scaling. Videos were coded by activity, time spent in each clock-position (CP) and area of the mouth (AOM). Sustained postures (i.e., >45-sec in one CP/AOM) were evaluated using RULA (rapid upper limb assessment), a validated instrument to assess the exposure to ergonomic risk factors including arms and wrists, neck, trunk and legs. Scoring ranges from 1 to 7.

**Results:** Average appointment time was 178 minutes (2.9 hours). Instrumentation comprised 57% of the appointment time, 82% of which was spent performing hand scaling. Students worked most frequently in the 9-CP (40% of the time), with equal time in each AOM. Sustained postures were noted in 71 video segments. Overall RULA scores were distributed around modes of 4 and 6, and the most frequent poor postures were wrist and neck flexion.

**Conclusions:** RULA scores indicate moderate risk for these DH students. Video recordings were found to be feasible; however, adding a third view may improve analysis of sustained postures. Additionally, assessing hand strain during scaling will assist in evaluating risk for WMSDs. Funding for this project was provided by CDC/NIOSH Grant R01-OH010665.
**Abstracts: Oral Presentations**

*Indicates presenter

**Education**

**Dental Hygiene Education Exceeds the Degree Granted: A Pilot Study**

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**Problem Statement:** Since 1945, the entry to practice requirement for dental hygiene has remained at a “two-year” level. Dental Hygiene lags far behind other health professions in acknowledging the education required and provided to meet today’s advanced scope of practice and the clinical responsibilities required within the dental hygiene process of care.

**Purpose:** The majority of dental hygienists complete more than two years of college for an associate’s degree. The purpose of this study was to determine if a two-year associate’s degree appropriately represents the current level of dental hygiene education.

**Methods:** This is a retrospective, analytical pilot study comparing three current community college dental hygiene programs to the 1945 standards for two-year dental hygiene programs. Additionally, the curricula of these community college dental hygiene programs and one university program were compared for contact credit hours required, credits earned, credits granted and degrees conferred.

**Results:** Descriptive statistics revealed that community college graduates today complete 112 earned credits compared to 61 credits in 1945, a difference of 51 credits. Today’s university dental hygiene program requires 13 contact credit hours more than the community college programs, 7 earned credits more, and grants 16 more credits for the BS Degree than are granted for an AAS Degree. These differences do not exceed one semester of additional course work for associate degree graduates to achieve a BS Degree. This pilot study is limited by the small sample size of dental hygiene programs included for analysis. Further studies need to include a broad diversity of dental hygiene programs.

**Conclusion:** Dental hygiene education has expanded significantly since 1945, without the requisite degree being granted.

**An Examination of Student Satisfaction and Perceived Community in Utilizing a Text Messaging Mobile Application**

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**Problem Statement:** Increasingly more online courses are offered in higher education. A commonly identified problem with online courses is that students lack a feeling of connectedness and sense of community when taking online courses.

**Purpose:** The purpose of this study was to examine the use of a text messaging application in online dental hygiene courses. The study utilized data analytics, student preferences, and Community of Inquiry (COI) measures to explore the utilization of a text messaging application in online dental hygiene courses.

**Methods:** Institutional Review Board approval was obtained. A text messaging application was implemented into a BS course and a MDH course. Students in three online dental hygiene courses were given instructions and access to a text messaging application. At the end of the semester, the students filled out a satisfaction and COI survey. Data analytics were also collected from the messaging application software.

**Results:** A total of 31 students completed the study. Most students were 20-25 years of age, female and in an entry-level baccalaureate program. Thirty percent of students reported using the application very frequently and 30 percent reported using it occasionally. Seventy-one percent of students agreed or strongly agreed that receiving notifications on their phone was a good way to communicate course information. Students also noted that their course instructor answered messages faster on the application than via email. The COI survey revealed moderate to high levels of teaching (3.0±1.0), social (3.0±.68) and cognitive (3.0±.73) presence. Graduate students reported significantly higher COI than entry-level students (p≤.001).

**Conclusions:** Most students reported a messaging application to be useful, efficient and helpful in facilitating information about their online course. Students who have no face to face classes reported higher COI than those students who attended courses face to face.
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**Problem Statement:** A recent study used the Scale of Positive Well Being, the Adult Hope Scale, and the Values Questionnaire in conjunction with the widely-used Dental Environment Stress questionnaire to explore stress and well-being in a combined programme of Dental Hygiene and Dental Therapy Students (DHDT). The findings of this research showed that students reported high scores of psychological well-being at the same time as high sources of stress, and provided baseline data for this qualitative follow-on study.

**Purpose:** To use a qualitative approach to further explore the stress and well-being of DHDTS during their undergraduate training.

**Methods:** Ethical approval was gained from the University of Portsmouth Science Faculty Ethics Committee. A purposeful selection of eight DHDTS from the University of Portsmouth Dental Academy (11% of total student population) were recruited to participate in semi-structured recorded interviews of approximately 45 minutes duration. A piloted interview schedule designed to explore perceived motivation, goals (in particular, goal failure), and stress in DHDTS was used. Thematic analysis of all data was undertaken by the first author, using Braun and Clarke’s (2006) six phases of thematic analysis. 25% of the data were analysed independently by the two second authors experienced in qualitative methodology, and three themes encompassing twelve sub-themes were identified.

**Results:** Three main themes of ‘fulfillment’, ‘the learning environment’, and ‘perception of stress’ were identified. Within these themes, twelve sub-themes were identified. Analysis suggested that a strong sense of passion to become a clinician mitigated most, but not all, of the stressful experiences of the DHDTS undergraduate learning environment.

**Conclusions:** Fulfillment from the learning environment meant that DHDTS’ perceived sources of stress (positive and negative) during their undergraduate programme were strongly linked to a sense of meaningfulness.

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**Student Wellbeing in the Dental Hygiene Program**

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**Problem Statement:** Student wellbeing can have significant impact not only on their overall health, but also on their learning experience and the quality of patient care they deliver. While stress is an inevitable part of the university experience, previous work has shown that students in the health care professions have higher levels of stress than their non-health care counterparts.

**Purpose:** This work examines whether dental hygiene (DH) students have a different wellness experience than other post-secondary students.

**Methods:** The Research Ethics Board at the University of Alberta approved this work. DH students admitted in 2015 and 2016 (N=80) were invited to complete the National College Health Assessment (NCHA), a survey that examines the health and wellness of university students in February 2016. The results were compared with the Spring 2016 NCHA Canadian Reference Group which consisted of 43,780 responses from students attending 41 post-secondary institutions in Canada.

**Results:** A total of 48 DH students (60%) responded to the NCHA. DH students were more likely to report that anxiety (41.7% vs 32.5%), sleep difficulties (35.4% vs 28.4%) and stress (68.8% vs 42.4%) were affecting their academic performance when compared with the Canadian Reference Group. Similarly, DH students were more likely to report feelings of hopelessness (68.8% vs 59.6%), being overwhelmed (97.9% vs 89.5%), exhaustion (97.9% vs 88.2%) and loneliness (70.8% vs 66.6%) in the last 12 months.

**Conclusions:** DH students report a higher incidence of mental health stressors than the Canadian post-secondary student population and they believe these challenges impact their academic performance. Baseline measures of DH student health and wellbeing will allow educators to design curriculum and health initiatives aimed at promoting self-care and wellbeing.
Exploring the Integration of the Dental Hygiene Diagnosis in Entry-Level Dental Hygiene Curricula

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Problem Statement: Many healthcare professions rely on a preliminary diagnosis, which is later confirmed or refuted by a definitive diagnosis. In dental hygiene, a dental hygiene diagnosis (DHDx) is formulated based on the assessment phase of care. There is currently no research available to show how the concept of the DHDx is utilized in dental hygiene education programs.

Purpose: The purpose of this study was to investigate how dental hygiene educational programs incorporate DHDx into current dental hygiene curriculum.

Methods: An exploratory, descriptive study was designed to assess the extent to which DHDx is integrated into entry level dental hygiene curriculum. A 30-item self-generated survey was designed and content validity established using a subset of dental hygiene faculty and researchers as well as participant team members from the ADHA. Human Subjects Committee approval was received from Idaho State University. Data was collected using the online survey tool Qualtrics®; two mailings were sent. All surveys included a consent form and confidentiality was maintained. Descriptive statistics were utilized to analyze data.

Results: Of the 334 surveys sent, 198 responses were received for a response rate of 59%. Of the responding programs, 98% reported that the dental hygiene process of care and concepts specifically relating to the DHDx were taught in the program. In addition, 79% of programs confirmed they “always” require students to write a DHDx statement for the patients. Of the respondents, 80% recognized that formulating a DHDx would result in improved patient outcomes and 76% indicated that a DHDx increases the dental hygienist’s accountability in patient care. Over 50 individuals provided comments indicating the need for standardization and faculty calibration for DHDx terminology, and that conflict exists surrounding this topic.

Conclusion: It appears DHDx is an integral component of entry-level dental hygiene education.

Who Are We? Exploring Perceptions of Identity and Capacity Building of Ontario Dental Hygiene Educators During National Curriculum Reform

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Problem Statement: The Entry-to-Practice Competencies and Standards for Canadian Dental Hygienists (National Competencies) document was published in January 2010 by the dental hygiene governing bodies and were provided nationally to dental hygiene schools for implementation in the curriculum. However, the current hierarchal structure of dental hygiene education gives dental hygiene educators little opportunity to voice their experiences during a reform that requires them to build new personal capacity to implement the National Competencies.

Purpose: The purpose of this interpretive qualitative study was to explore Ontario dental hygiene educators’ perceptions of how they could build personal capacity during the National Competencies curriculum reform.

Methods: This qualitative study used a purposive sample of five dental hygiene educators of diverse training and teaching organizations who participated in in-person interviews, one participant via telephone interview, and one participant through Skype interview. A semi-structured interview guide framed open-ended data collection. Recorded narratives were transcribed and analyzed, coded, and interpreted using within-case and cross-case thematic analysis. Findings were validated through member checking and triangulation of data. This study received approval from the Brock University Research Ethics Board.

Results: Themes drawn from the data demonstrated that perceptions of collegial identity for all members of the dental hygiene profession is required for building personal capacity. Participants observed that discussions and conversations as educators and as a profession need to occur. They also indicated that standardizing dental hygiene education at the degree level on a national basis and collaboration and communication among educators could establish consistent dental hygienists’ identity.

Conclusions: Despite the literature describing the National Competencies as establishing professional identity, participants described the need for further discussions among educators to build a solid foundation. As the data demonstrate, the building of personal capacity will require the establishment of a more open and collaborative system. Funding for this project was provided by Canadian Institutes of Health Research and Canadian Foundation for Dental Hygiene Research and Education.
Unmet Needs

**Examining how Care Partners Support Daily Oral Hygiene of Community-Dwelling Adults Living with Dementia**

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**Problem Statement:** Community-dwelling individuals living with dementia (ILDs) progressively struggle to perform self-care activities such as daily oral hygiene, and increasingly require support. Care partners’ (CPs) experiences and strategies for supporting oral hygiene is unknown.

**Purpose:** To examine CPs experiences and practices of supporting daily oral hygiene activities of ILDs.

**Methods:** Qualitative exploratory design using focus groups. Twenty CPs, either ILD spouses or a child were recruited through the Alzheimer's Society. In five semi-structured focus groups, participants explored their experiences, practices and strategies in supporting oral hygiene activities of ILDs. Saturation was reached when no new data emerged. Data analysis consisted of content analysis, including open coding, categorization and abstraction. How individuals expressed their practices and the synergistic effect between participants that allowed participants to realize new insights about their current practices was also analyzed.

**Results:** While dementia severity is assessed clinically, there was little correspondence with ILD’s reported level of independence. Oral hygiene practices reflected a continuum of independence ranging from wholly or partially independent to wholly compensatory. CPs contextualized oral hygiene as one dimension of preserving the autonomy of ILDs. Strategies to support oral hygiene included relying on embodied habits, providing supportive aids, verbal reminders, and physical intervention. Difficulties occurred when the ILDs resisted support or could not alter engrained habits. CPs understood that strategies had to change over time, although some realized, during the focus group sessions, their practices were insufficient to meet the current needs of ILDs. Ethics approval obtained from the University of Alberta Research Ethics Board (Pro00060323).

**Conclusion:** CPs struggled to identify key transition points indicating the need for a different level of assistance as oral hygiene was assumed to be an embodied and persistent habit. Accurately determining an ILD’s actual abilities as well as strategies to gain the ILD’s cooperation is needed.

**Oral Health Recommendations and Referrals in Long Term Care: What Happens Next?**

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**Problem Statement:** Poor oral health in long-term care has been well documented; however, understanding how oral health recommendations are being managed by facility staff and how referrals to dental professionals are processed is less understood.

**Purpose:** The purpose of this study was to examine how oral health recommendations made by a Registered Dental Hygienist (RDH) for seniors are managed by facility staff and how referrals to dental professionals are processed.

**Methods:** Ethics approval was obtained from the University of Alberta Research Ethics Board (#Pro00060584). First, a retrospective chart review was conducted to obtain data from oral assessments completed by dental hygiene students with supervision of a registered dental hygienist at four long-term care (LTC) sites. Secondly, semi-structured interviews were conducted with a convenience sample of four healthcare providers, one from each site, and each was selected based on their role as “champions” of oral care at their facility. Three registered nurses and one dietician were interviewed. Interview questions explored how recommendations and referrals for oral care were managed by staff. Interview data was analyzed using content analysis.

**Results:** Data was collected from 317 charts. Recommendations for oral care were made for 241 residents (76%); 165 residents (52%) were given recommendations such as needs assistance or cueing to perform daily toothbrushing; 125 external referrals were made; 56 to dental hygienists, 58 to dentists, 10 to denturists and 1 to other. Interview data revealed families are predominantly responsible for organizing dental appointments for the resident. Finances, level of cognition, resistive behaviors, family member support, staff turnover and time, are reported by staff to be barriers for ensuring seniors in facilities visit a dental professional when indicated.

**Conclusions:** Multiple factors affect implementing recommendations and pursuing dental referrals for residents of...
LTC; therefore, a multipronged approach is necessary to overcome barriers, ensuring seniors receive recommended oral care.

Factors Facilitating Dental Practitioners in The Provision of Infant and Toddler Dental Homes in Alberta: An Interpretive Description

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Problem Statement: The Canadian Dental and Canadian Dental Hygienists’ Associations recommend a child’s first dental visit should occur no later than age one; however, there has been limited uptake within the dental community. Understanding facilitating factors utilized by dental practitioners who have successfully integrated infant and toddler oral health into their practice is an important underpinning to develop strategies to improve uptake of early pediatric dental homes.

Purpose: The purpose of this study was to explore factors used by oral health practitioners that facilitate provision of a dental home for infants and toddlers in Alberta.

Methods: This study employed a qualitative interpretive descriptive methodology and an ecological theoretical framework. Semi-structured, individual interviews were conducted with oral health practitioners who routinely provide a dental home for infants and toddlers. Congruent with interpretive description, data collection and analysis were concurrent, using purposive sampling and a constant comparative method. Ethics approval was obtained through the University of Alberta (#Pro00061569).

Results: Eight dentists and five dental hygienists with diverse practice experience and from varied locations (urban, rural) and practice settings (group, solo) were interviewed. Thematic analysis revealed four categories that facilitate practitioners in provision of infant and toddler oral health care including the practitioner, practice, profession, and population. These categories are interrelated and include factors both endogenous and external to the dental practitioner. Common endogenous factors include the individual practitioner’s comfort with young children and having clinical exposure within dental education; whereas, common external factors include parental awareness and adequate insurance coverage for preventive procedures.

Conclusions: Strategies to improve uptake of a dental home by age one include enhanced practitioner education and public awareness, as well as increased remuneration for preventive early pediatric oral health care. Provision of infant and toddler dental homes is affected by multifaceted variables; consequently, strategies to improve uptake must employ a multi-pronged approach.

The Integration of an Oral Care Protocol on Extubated Patients in the ICU

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Problem Statement: Evidence shows oral care protocols in mechanically ventilated patients are associated with a reduction in ventilator associated pneumonia. This evidence has resulted in adoption of oral care protocols in ICUs as standard practice yet surveys show the majority of nurses use foam swabs while a minority use regular toothbrushes to clean the oral cavity. Limited research has focused on patients’ oral health and satisfaction when oral care protocols are implemented.

Purpose: The purpose of this study was to determine the impact of a standardized, oral care protocol on oral health and satisfaction in post-mechanically ventilated patients.

Methods: In this IRB approved clinical trial, 74 subjects were randomized to a control (tooth brushing, swab rinses) or intervention (battery-operated tooth brushing, tongue scraping, flossing, mouth rinse, lip care) group, administered by nurses, twice daily. The protocol was designed by nursing and dental hygiene faculty. Outcome measures utilized the revised THROAT (R-THROAT: oral cavity assessment) which evaluated lips, gums, teeth, tongue, saliva, smell and mouth comfort. Categories were assessed on a scale from 1 to 3 (3 = poorest oral health). The overall score was the sum of the 7 categories. Assessments were completed by dental hygienists on Day 1 and 4 of each protocol.

Results: As measured by the R-THROAT, the intervention group demonstrated significant oral health improvement over the control group (R-THROAT = 1.97 intervention vs. 0.87 control, \( p = 0.04 \)). Subjects in the intervention group were more satisfied with their protocol than the control group.
Conclusions: This study suggests policies and practices related to oral care of post-mechanically intubated patients merits further attention. Practices should incorporate innovative protocols to improve oral health. Consideration should be given to collaborating with dental personnel to teach clinical nurses oral care delivery or utilizing dental personnel in hospital facilities to help improve the oral health of patients in ICUs.

Evaluation of Nurses’ Knowledge, Attitudes, and Perceptions after Participating in an Oral Health Interprofessional Education Program

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Problem Statement: Epidemiological studies have revealed that older adults who live in residential care facilities (RCFs) have the worst oral health status of all older adults. The scientific literature confirms that one of the main reasons this problem persists is that Bachelor of Science in Nursing (BScN) students have inadequate oral health care education (OHCE). On average, student nurses receive one hour of instruction, and it does not align with best practice guidelines. The existing BScN curriculum has not kept up with the increasing complexity of health care delivery that requires health care providers from unrelated professions to collaborate and deliver coordinated patient-centered care. Developing OHCE for BScN and dental hygiene students is recommended to ensure nurses have the OHK necessary to ameliorate the health status of their patients.

Purpose: The purpose of this study was to evaluate the BScN students’ knowledge, attitudes, and perceptions of an oral health IPE program.

Methods: The study college and Central Michigan University’s Research Ethics Boards approved the study. A quantitative descriptive post-test design was used to survey a convenience sample of 47 year-one students at one community college. Baseline posture calibrations were taken. Tri-axial accelerometers were placed on four locations of the head and trunk (occipital region of head; cervical vertebrae C5; thoracic vertebrae T5; lumbar vertebrae L1) to measure acceleration and the orientation of the body to gravity. Mean accelerations of the three axes were used to compute average forward/backward (AP) and side to side (ML) tilt of each accelerometer. Chair mounted typodonts with artificial calculus were used to represent a simulated oral environment. Participants were randomly assigned to wear loupes during the first or second half of the experiment and instructed to explore all areas of the mouth using an ODU 11/12 instrument. At the end of the study, an end user opinion survey was completed.

Results: No statistically significant differences in posture were revealed between participants wearing loupes and not wearing loupes. However, 74% of all the participants strongly agreed that magnification loupes made exploring easier and 67% strongly agreed that magnification loupes improved their posture.

Conclusions: The study’s findings support an IPE program for BScN and dental hygiene students as a strategy to improve nurses’ oral health knowledge, attitudes, and collaborative skills that may help improve the oral health status of older adults living in RCFs.

Ergonomics / Tobacco / Oral Cancer

The Effect of Magnification Loupes on Posture During Exploring by Dental Hygienists

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Problem Statement: Upper extremity MSDs are common in the dental professional and researchers have been challenged with determining preventive strategies to reduce MSDs in dental hygienists. The use of dental magnification loupes has been suggested to minimize risk factors associated with MSDs.

Purpose: The purpose of this study was to determine the effects of dental magnification loupes on posture during instrumentation.

Methods: This IRB approved study contained a convenience sample of 27 right-handed dental hygienists, with no history of injuries or disabilities of the head, neck, or trunk regions. Baseline posture calibrations were taken. Tri-axial accelerometers were placed on four locations of the head and trunk (occipital region of head; cervical vertebrae C5; thoracic vertebrae T5; lumbar vertebrae L1) to measure acceleration and the orientation of the body to gravity. Mean accelerations of the three axes were used to compute average forward/backward (AP) and side to side (ML) tilt of each accelerometer. Chair mounted typodonts with artificial calculus were used to represent a simulated oral environment. Participants were randomly assigned to wear loupes during the first or second half of the experiment and instructed to explore all areas of the mouth using an ODU 11/12 instrument. At the end of the study, an end user opinion survey was completed.

Results: No statistically significant differences in posture were revealed between participants wearing loupes and not wearing loupes. However, 74% of all the participants strongly agreed that magnification loupes made exploring easier and 67% strongly agreed that magnification loupes improved their posture.
Conclusion: While the majority of participants perceived that magnification loupes enhanced their posture and made exploring easier, the data provided little evidence to suggest that wearing loupes leads to improvement in body orientation. Future research should examine if loupes adjusted with an adequate declination angle can reduce neck and trunk flexion.

Out Of The Loupe: The Prevalence of Co-Axial Misalignment of Surgical Loupes among British Columbia Dental Professionals

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Problem Statement: Surgical loupes have been increasingly popular among dental professionals for their visual and postural benefits. In British Columbia (BC), over 60% of dental professionals practice with surgical loupes and many dental and dental hygiene educational institutions have made surgical loupes mandatory for students. However, dental professionals will only receive the full benefits of surgical loupes if the loupes are fitted to the individual needs of each clinician. Previous research has identified three critical criteria for surgical loupes selection and adjustment: working distance, declination angle of the oculars, and co-axial alignment. While the first two criteria have been thoroughly researched, there remains limited understanding of co-axial alignment of surgical loupes.

Purpose: Surgical loupes misalignment creates a profound visual disturbance which may have serious impact on the quality of care delivered by dentists and dental hygienists. This study is one of the first studies to examine the prevalence of co-axial misalignment of surgical loupes among BC dental professionals.

Methods: A simple quantitative co-axial alignment measurement tool was developed and validated through two pilot studies. The tool was then used to measure co-axial alignment of surgical loupes for 97 practicing dental professionals in BC and for 23 University of BC Dentistry students who currently practice with surgical loupes. Data were analyzed using Fisher's exact test.

Results: The prevalence of co-axial misalignment is 82.5% among the participants. There is no difference in prevalence between dentists and dental hygienists (p=0.792), and between students and professionals (p = 0.937).

Conclusions: This study developed a quantitative tool to measure co-axial alignment of surgical loupes and revealed that a high prevalence of co-axial misalignment is present among BC dental professionals. The results of this study will help dental professionals select surgical loupes best fitted for their practice and will guide surgical loupes manufacturers to develop more evidence-based products.

Identifying Risk of Upper Extremity Injuries in Dental Hygiene Professionals

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Problem Statement: Given the extensive time using scaling instruments and sustaining postures, dental hygienists are prone to developing upper extremity musculoskeletal injuries.

Purpose: To identify risk factors and establish a predictive model of musculoskeletal injury development in dental hygienists to promote preventive techniques.

Methods: This IRB-approved, longitudinal, multi-cohort study has a targeted recruitment of 120 dental hygiene (DH) students (exposed to high-intensity hand activities) and 60 occupational therapy (OT) students (non-exposed control group). Repeated data collection occurs every semester across the two-year training, including: morphology of anatomical structures using sonographic imaging; neurophysiologic function using nerve conduction testing; symptoms/function and exposure to extra-curricular hand/wrist activities using questionnaires; and exposure to hand strain and postural assessment during dental scaling using video analyses.
Results: Currently enrolled DH (n=53) and OT (n=55) students are similar in age (DH, 24.4 yrs., SD=3.5 yrs.; OT, 24.8 yrs., SD=2.6 yrs.) and are primarily right handed (92.5%, 87.3%) females (88.7%, 89.1%). The groups have equivalent grip/pinch strengths, report similar extracurricular activities, and essentially no pain or limitations. A video data collection protocol using three cameras positioned in orthogonal views has been established, and a coding process for descriptive characteristics has been validated. Preliminary analyses indicate that students spend an average of 1 hr. 45 min. (SD = 28.4 min.) actively scaling during a patient visit. Good to excellent inter-rater reliability of exposure measures (Revised Strain Index and Rapid Upper Limb Assessment) has been established (i.e., ICCs > 0.80).

Conclusions: Students in both programs have essentially no pain/limitations, nor indicators of pathology; baseline equivalency ensures that injury development can be modeled due to any disparate changes across time between groups. When combined with risks identified through video observations, these data will illuminate targets for enhanced DH education and inform development of DH self-assessment tools to prevent injuries.

Dental Provider Preferences for Tobacco Clinical Decision Support

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Problem Statement: Tobacco dependency interventions are inconsistently delivered by dental providers. There is a great need to integrate a systematic approach into practice. The introduction of electronic dental records (EDR) offers an opportunity to incorporate best practices using clinical decision support (CDS) to improve care.

Purpose: The purpose of this study was to understand provider preferences for tobacco CDS and explore the feasibility of embedding such a system.

Methods: This mixed method study was approved through Expedited Review at HealthPartners Institute and provided qualitative data in support of an effort to seek funding for a randomized clinical trial (RCT) to test a tobacco CDS. First, the providers were surveyed to identify clinics that systemically address tobacco use, utilize EDRs, and identify providers interested in participating in structured interviews. The structured interviews identified what providers are doing to document and assist their patients in cessation. Based on interview findings, a mock-up system was developed. Iterative face-to-face interviews were conducted to obtain feedback from practitioners leading to the final design.

Results: Among 630 surveys sent, 89 were returned (43 dentists, 28 hygienists, and 5 unknown). The survey responses identified 76 offices using an EDR to record clinical care. In 70 (95%) offices, smoking status is recorded in the health history. Structured interviews (n=11) and face-to-face interviews (n=11) determined that practitioners are interested in a tobacco CDS.

Conclusions: Tobacco cessation is generally conducted by hygienists with support from the dentist. Both have a strong desire for a consistent approach. They see their role as providing resources and referral. The tool must be easy to use, with limited data entry, track patients that are resistant to discussion and fit into workflow. Many supported the use of web-based patient resources. Information gained from this study will be used to further develop a tobacco CDS intervention to be studied in dental practices.

Comparable Nicotine Dependence Levels Between Adolescent Smokeless-Only and Dual-Tobacco Users

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Problem Statement: Tobacco use is associated with adverse oral and systemic health effects. Despite declining cigarette use among adolescents, dual- and poly-use of multiple tobacco products is increasing.

Purpose: This study aimed to assess nicotine dependence according to patterns of current tobacco use.

Methods: 594 adolescent males, a population at high-risk of smokeless tobacco (ST) use, at 36 rural California schools (2014-2016) completed in-person surveys. Participants reported their current frequency and lifetime history of using six tobacco products (cigarettes, ST, snus, e-cigarettes, cigars, and waterpipes). Participant clusters were defined based on frequency of tobacco use across products. The Hooked on Nicotine Checklist (HONC), a validated scale of adolescent nicotine dependence, was administered to all past-month users of any tobacco product. Approval was obtained from the UCSF Institutional Review Board.
Results: Seven classes were identified: never-users (43%), those who never tried tobacco; triers (20%), those who tried tobacco, but never used frequently; experimenters/former users (10%), those who used tobacco, but not currently (past-month); infrequent current users (16%), those who used tobacco <10 times in the past-month; and three classes of frequent current users (combined: 11%), those who reported use of at least one tobacco product ≥10 times in the past-month: ST-only users (n=38), ST/combustible dual-users (n=15), and non-ST users (n=17). HONC scores were low for infrequent current users (mean: 0.8) but were higher overall (mean: 2.8) and comparable between classes of frequent current tobacco users: ST-only users (mean: 3.3), tobacco dual-users (mean: 2.8) and non-ST users (mean: 1.8) (P=0.19).

Conclusions: Nicotine dependence was detectable but low for infrequent tobacco users; among frequent current users, dependence was higher and comparable by tobacco product used. Dental professionals should include all tobacco products in patient assessment and counseling, while tobacco control policymakers should consider dual- and poly-use as a potential addiction risk for youth. Funding for this project was provided by: Grant number 1P50CA180890 from the National Cancer Institute and Food and Drug Administration Center for Tobacco Products and NIH National Center for Advancing Translational Sciences award number KL2TR000143 supported this research.

Molecular Markers, Oral Cancer and South Asians In British Columbia

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Problem Statement: The global rate of oral cancer is increasing at an alarming rate. A significant source of this burden is South Asia (SA), where the incidence of oral cancer is over 130,000 new diagnoses per year. While several cases have been linked to unique socio-cultural habits, many are of unknown etiology. South Asians represent a growing proportion of British Columbia’s (BC) population. Accordingly, a corresponding increase in the number of cancer cases is anticipated. Genetic marker profiling is a validated risk predictor for oral cancer. Loss of heterozygosity (LOH) in key chromosomal loci identified for certain populations remains inconclusive in SAs. Understanding the risk profile of this population is essential to the identification and management of oral premalignant lesions (OPL).

Purpose: The purpose of this study is to examine the LOH profile of SA oral dysplasias in BC.

Methods: This study includes a retrospective cohort of 24 SA patients enrolled in the Oral Cancer Prediction Longitudinal Study, with primary OPLs. Lesion biopsies taken prior to 2010 are excluded. DNA extracted from tissue samples are analyzed for LOH at 3p, 4q, 8p, 9p, 11q, 13q and 17p using polymerase chain reaction and microsatellite assay. DNA extracted from the connective tissue of the same sample acts as control. IRB approval is obtained from the UBC-BCCA research ethics board.

Results: The mean age is 52.2 years; 71% are men; 25% are smokers. The most common site is the ventrolateral tongue at 66.7% with 45.8%, 33.3% and 16.7% presenting as mild, moderate and severe dysplasia respectively. Preliminary results show frequent LOH at 9p and 3p; 4q is infrequently lost.

Conclusions: There may be some variation in the genetic risk profile of SA OPLs in BC. Education, screening and treatment targeted to this ethnic subgroup will be crucial in the management of OPLs. Funding for this project was provided by UBC Dentistry Research Award, BC Cancer Foundation.

Technology/Dental Hygiene Practice

Coaction Benefits of Intra-Oral Camera Use and Short Messages for Dental Hygiene Behaviors and Gingival Health among Adult Patients with Gingivitis: A Randomized Controlled Trial

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Problem Statement: Patients have difficulty adhering to recommendations for biofilm removal, which is important for preventing gingivitis. Images and text messages are promising tools to increase patient motivation and self-
regulatory efforts for dental hygiene behavior, but efficacy needs to be tested.

Purpose: This study investigates the effects of using an intra-oral camera (IOC) during supportive periodontal therapy (SPT), oral hygiene short messages (SMS) between appointments, or both on clinical, behavioral and psychological parameters of patients with gingivitis.

Methods: Adult patients (N=203) receiving an SPT were randomly assigned into four conditions: IOC, SMS, IOC+SMS and Usual Treatment. Bleeding on Marginal Probing (BOMP), brushing and flossing behaviors (primary outcomes), and social cognitive determinants of behavior change (outcome expectancies, action and volitional self-efficacy, intention, and planning) were evaluated at baseline, four and eight months later. Mixed-effect modelling was employed to verify if change occurred in study outcomes. The Ethics Committees of the institutions involved approved the clinical trial (Ethic Committee Docs.No.6/14).

Results: Compared to the control group, all treatment conditions improved flossing (BIOC=-0.446, p=0.001, BSMS=-0.436, p=0.006, BIOC+SMS=-0.611, p<0.001) and revealed a significant decrease in BOMP (BIOC=0.269, p<0.001, BSMS=0.249, p<0.001, BIOC+SMS=0.493, p<0.001) from baseline to 4 months with no differences between 4 and 8 months. When compared to the control group, individuals in the IOC+SMS condition had more positive outcome expectancies, higher levels of action self-efficacy and intention from baseline to 4 months with no differences between 4 and 8 months. Volitional self-efficacy was reinforced in all treatments.

Conclusions: Mixed model results indicate significant interaction effects for primary and secondary outcomes (flossing, dental hygiene, BOMP and psychological determinants). The coaction benefit in using IOC in consultation while being exposed to SMS between appointments improves clinical, behavioral and psychological parameters of periodontal health 4 months after treatment, maintained in 8 months’ follow-up.

Purpose/Goals: Principles of Dental Hygiene I Clinic is an introductory course aimed to integrate foundational scientific knowledge and clinical skills used in delivering comprehensive dental hygiene patient care. A technology-enhanced redesign of the course using multimedia lessons was developed to increase student preparedness for application of dental hygiene skills and collaboration during class sessions and to improve student-learning outcomes.

Significance: A technology-enhanced redesign of the course was developed to provide: prevention of double-teaching; increased practice time; standardized step-by-step instruction to diverse learners; comprehensive demonstration videos with ability to pause, skip, and repeat viewing; close-up views that cannot be seen in group demonstrations; and enhanced 2D and 3D graphic animations of anatomical structures and instrumentation in subgingival tissues.

Approach/Key Issue: This technology-enhanced redesign of the course supports blended learning and flipped classroom environment with the use of multimedia lessons. Students of the Principles of Dental Hygiene I Clinic course review required readings, watch videos, complete knowledge check questions, and online quizzes prior to class. Dental hygiene techniques are practiced on typodonts in the simulation lab, and with partners in a clinical setting.

Evaluation: As a result of the multimedia lessons, the students have shown to be better prepared for application and collaboration during class sessions, having had the opportunity to learn at their own pace in this media-rich environment. Students and faculty were surveyed anonymously. 97% of students stated improvement in their learning/performance of skills compared to topics in the course without the multimedia lessons. 100% of faculty perceived students who viewed the multimedia lessons as better prepared. There was an improvement in student learning outcomes with an 8% increase in course average scores and a 45% reduction in student failures.

Multimedia Technologies used in Pre-Clinical Dental Hygiene
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Combined Dental Hygiene and Dental Therapy (Oral Health Therapy) Education and Scope of Practice in Australia
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Problem Statement: Since 1996 in Australia and New Zealand, the education of dental hygienists and dental therapists has almost exclusively undergone a change
to a combined outcome degree graduating Oral Health Therapists. In parallel, regulatory frameworks have emerged allowing a wider range of practice settings, scopes and business models.

**Purpose:** The objective of this presentation is to examine the education, regulation and practice of Oral Health Therapists in Australia to inform planning and leadership in profession, education and policy internationally.

**Methods:** This paper will draw on Australian accreditation standards, curriculum frameworks, regulation and practice activity research to explore the educational preparation, scope of practice and application to both private and public-sector practice. Research to inform this paper includes studies examining dental therapists’ practice in private sector employment; the ability of dental hygienists to diagnose and treatment plan oral health care for people in residential aged care settings; the ability of dental therapists to provide restorative care to adults, and a recent national Oral Health Practitioner practice activity study.*

**Results:** Dental therapy practice has been readily accepted in the private sector, hygienists are recognized as capable of diagnosing and treatment planning their own care even for high needs people, dental therapists are able to deliver restorative care to at least the same standard as a dentist, and oral health therapists’ practice activity (although varied in different practice settings) reflects their utilization as both therapists and hygienists. Regulation in Australia has also changed over time to reflect this evidence and Oral Health Therapists are now well accepted members of the dental team.

**Conclusions:** The results of these studies offer insights into the utilization and practice of combined dental hygienist/therapists (oral health therapists) and an examination of recent regulatory developments will flag the directions of change in oral health workforce demands in Australia.

*The author has been an investigator on all four of these studies.

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**Dietary Analysis and Nutritional Counselling for Caries Prevention in Dental Practice: A Pilot Study**

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**Problem Statement:** Increased consumption of free sugars is recognized as a risk factor for many chronic health problems; more specifically, studies have demonstrated significant associations between sugary drink intake and caries experience. Dental practitioners agree that dietary counselling is essential for caries prevention; however, they provide advice infrequently due to a lack of confidence and competence.

**Purpose:** The purpose of this project was to improve dental practitioners’ practices through an online training module exploring the use of a brief counselling method and a diet assessment of caries risk form.

**Methods:** This project was conducted as a prospective cohort study, using convenience sampling. Phase 1: Dental practitioners (dentists, hygienists and therapists, n=41) completed a survey on current practices and confidence in providing dietary advice, followed by an online training module that was pilot tested among dental academics. Participants completed a six-month follow-up survey exploring changes in confidence and perceived barriers as a result of their online training. Phase 2: Ten hygienists were then involved in the patient phase of the study, including recruiting patients, eliciting a diet assessment of caries risk, and using brief counselling techniques. Patients were followed up at six-months for a risk assessment review.

**Results:** A statistically significant improvement in the confidence when providing nutritional advice was observed among hygienists participating. A paired sample t-test was performed using the data from the patients that completed baseline and follow up risk assessments. Patients (n=64) showed a significant reduction in high-risk behavior pertaining to quantity and timing of sugar intake, and significant trends in improvement of behaviors relating to frequency, exposure time, and drinking style (p < 0.05).

**Conclusions:** It appears that a simple online learning module can improve hygienists’ confidence in dietary advice provision and have a positive impact on patient behavioural change within a relatively short time-frame.

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**The Role of Loricrin in Aggressive Periodontal Disease**

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**Problem Statement:** AgP comprises a group of rapidly progressive forms of periodontitis generally characterized by an early age of clinical manifestation and a distinct
tendency to aggregate in families. Research has suggested multiple etiologies for AgP, but no common mechanism.

**Purpose:** The overall goal of our study is to determine if down regulation of loricrin leads to impairment of epithelial barrier function and increased levels of inflammation and bone destruction in the periodontium in response to the causative bacteria of AgP. Revealing the underlying mechanism in AgP will dramatically change early diagnosis of this complex disease and ensure that susceptible patients are treated promptly to reduce long term morbidity and quality of life issues. Mechanistic insight will also enable the development of new interventional strategies.

**Methods:** We are collecting gingival samples from periodontal healthy patients and AgP patients undergoing routine periodontal surgeries in which the tissue is normally discarded. We will use western blot and qPCR for protein detection and gene quantification, respectively. These methods will allow us to determine if these AgP patients experience a down-regulation in loricrin. This study was approved by the research ethics board of the University of Alberta (Pro00062112).

**Results:** We have collected 12/40 samples. Using western blot analysis, we have successfully established a protocol which detects loricrin in human skin and mouse oral tissue samples. Next, we will begin developing a qpcR protocol to determine if there are changes in gene expression.

**Conclusions:** Overall, this proposal addresses a devastating childhood illness by testing a novel hypothesis using innovative study designs. Conceptually, it challenges the current focus of research in AgP and may lead to new research and therapeutic directions. This project is funded by the University of Alberta Hospital Foundation, the University of Alberta Dental Hygiene Fund, and the Fund for Dentistry.

**Community Health**

**Increasing Indigenous Cultural Content in Dental Hygiene Curricula: A Pilot Project**

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**Problem Statement:** Studies have shown Indigenous populations feel unsafe accessing mainstream healthcare services due to fear of being racialized and stigmatized. To help improve access to timely health care, Canadian medical and nursing bodies have integrated Indigenous cultural competency and safety training into their curricula, however dental and dental hygiene education focus little on this content.

**Purpose:** The purpose of the study was to bridge the historic context of Indigenous peoples for understanding their contemporary oral issues and inequities into dental hygiene curricula, and to evaluate and measure students’ knowledge, attitudes and feedback.

**Methods:** A talking circle was conducted with eight men and ten women from a Vancouver Indigenous community group to explore their perspectives and experiences towards receiving oral care. Information gained from the talking circle and literature was used to develop nine hours of curricula for 49 dental hygiene students. Indigenous guest speakers strengthen the cultural content for the curricula. At each session, students’ levels of knowledge were evaluated with pre- and post-assessments and measured with t-tests (IBM SPSS Version 22.0). The University Behavioral Ethics Board approved the project.

**Results:** Students’ level of knowledge increased significantly around Indigenous health and oral health, residential school system and intergenerational trauma, and concepts of cultural competency and safe oral care ($p < 0.001$). Connecting cultural content with personal stories shared by Indigenous community members reinforced students’ learning. Students suggested future opportunity to work directly with communities would be most beneficial to their overall learning of Indigenous content.

**Conclusions:** Incorporating Indigenous history and health context into dental hygiene curricula is a plausible approach to help address the knowledge gap in understanding oral health challenges and inequities among Indigenous populations. Dental experiences of Indigenous peoples who have received care by dental hygienists trained with cultural safety require further exploration.

**The Use of Interpreters with Immigrant Patients in a Dental Hygiene Clinic**

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**Problem Statement:** Dalhousie University Faculty of Dentistry provides dental hygiene care to new immigrants who are clients of the Immigrant Services Association of Nova Scotia (ISANS). Research indicates health
outcomes are enhanced when individuals receive care in their own language. ISANS provides a limited number of professionally trained interpreters, therefore recruitment of volunteer dental and health professions students and faculty was necessary to interpret medical histories and explain treatment options. This led to concerns regarding the effectiveness of using untrained interpreters with various healthcare backgrounds in a dental setting.

**Purpose:** Evaluate the perceived benefits of using trained versus untrained interpreters with diverse healthcare backgrounds in an immigrant dental hygiene clinic by exploring the experiences of the care providers, supervising faculty and interpreters.

**Methods:** An original survey containing 13 items was distributed to dental hygiene students (n=26), faculty (n=9), and interpreters (n=35) involved in the ISANS clinic. Close-ended questions were summarized using descriptive statistics. Open-ended questions were examined for common themes. This project was approved by the Dalhousie University Research Ethics Board.

**Results:** All faculty and 95% of students reported interpreters with backgrounds in healthcare were helpful in the ISANS clinic, with 84.6% and 71.4%, respectively, preferring to collaborate with the untrained volunteer interpreters, specifically since many were dental students. Both untrained volunteer and trained ISANS interpreter groups felt they aided in the treatment of patients in a culturally competent manner and their assistance was an overall benefit to both the student and ISANS patient. Faculty (85.7%) and students (66.7%) reported they would not feel comfortable treating an ISANS patient without an interpreter.

**Conclusions:** This study revealed interpreters with various healthcare backgrounds are useful in an immigrant dental hygiene clinic. The untrained interpreters were preferred over professional ISANS interpreters.

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**Price County Analysis of Dental Access Impacting Quality of Life in Northern Wisconsin**

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**Problem Statement:** An examination of epidemiologic data from the partnership between the Robert Wood Johnson Foundation (RWJF) and the University of Wisconsin-Population Health Institute (UWPHI) consistently ranked the studied service county in the lower quartile of the state for both Quality of Care (QoC) and Quality of Life (QoL) measures. Researchers determined QoL might be more accurately measured using a satisfaction survey. Families were asked about their perceptions of care received and if their QoL was impacted.

**Purpose:** The purpose of this follow-up study was to identify how families served through county-based health programs felt about the QoC received, and how QoL was impacted.

**Methods:** A cross-sectional research design was used. An electronic survey was sent to a convenience sample of families with children receiving care (n=108). The survey consisted of 25 closed-ended questions using a four-point Likert scale. Satisfaction survey questions had previously established content validity and reliability. Informed consent was obtained after IRB approval (UWSP-expedited 3242014) before survey administration. Responses were de-identified and kept confidential. Descriptive statistics were used to report the data.

**Results:** A response rate of 27.2% (n=30) was obtained. Overall satisfaction with the public health facility received ratings of either excellent (43.33%) or good (56.67%). Of the 30 participants, 29 reported families’ dental needs were addressed with either an excellent (63.33%) or good (36.67%) overall quality rating. Overall, family members reported complete satisfaction with the care received, and the QoL was positively influenced (100%).

**Conclusions:** Data documented families in county based programs were satisfied with the QoC received and reported that QoL in comparison to state and national epidemiologic data.

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**Challenges and Opportunities in Communicating about Community Water Fluoridation: Perceptions of Dental Hygienists in Alberta, Canada**

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**Problem Statement:** The current impasse in the community water fluoridation (CWF) controversy is problematic for public health. Beyond the issue of best evidence, CWF encompasses other factors—ethics, values, authority, power, and credibility.

**Purpose:** Our objective was to understand key stakeholder views about challenges and opportunities in communications about CWF and broader public health concepts such as equity and health.

**Methods:** This study received Research Ethics Board approval. Dental hygienists from a linked quantitative study, who consented to future contact from the research team, were invited to participate in follow-up focus groups. The discussion guide aimed to encourage participants to share and understand diverse views around health, health equity, population-level policies in general, and CWF. Thematic analysis was guided by literature on the public engagement of science and the expert-lay divide, as well as theory of power relations between health professions and the public. Implications for communication at the client and public health level were drawn.

**Results:** Analysis of data from 4 focus groups revealed several challenges for hygienists when communicating about CWF with members of the public. These centered around three themes—evidence confusion (e.g., breadth of and multiple disciplines involved in fluoridation literature), authority and expertise (e.g., perceived mismatch between public health and private practice about fluoridation, patient knowledge), and messaging issues (e.g., caries risk factors beyond fluoridation). Hygienists viewed health communication as a process that involves building trust over time and recognizes client knowledge as important.

**Conclusions:** This study underscores that dental hygienists are aware of and value two-way health communication techniques in practice. They also have a strong understanding of the impact of trust in the health relationship. Nevertheless, communication challenges around CWF persist, and solutions to those challenges will need to consider the breadth of multi-disciplinary evidence, topical versus systemic fluoride, and explaining population-versus individual-level interventions. Funding for this project was provided by an Eyes High Postdoctoral Scholarship from the University of Calgary and a CIHR Institute of Population & Public Health (Musculoskeletal Health & Arthritis) grant.

**Relationship Between Socioeconomic Status and Self-Reported Periodontal Symptoms Using the Community Health Surveys of 2011and 2013**

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**Problem Statement:** Periodontal disease is a chronic disease worldwide that is highly influenced by socioeconomic status.

**Purpose:** The purpose of this study was to determine the relationship between socioeconomic status and self-reported periodontal symptoms.

**Methods:** This study was conducted after receiving approval from the institutional review board at the Korea Centers for Disease Control and Prevention (IRB No: 2011-05CON-04-C, 2013-06EXP-01-3C). This cross-sectional study used data from 210,432 (weighted n = 36,294,413) and 220,396 (weighted n = 39,067,134) subjects of the 2011 and 2013 Community Health Surveys, respectively. All subjects were community residents aged ≥19 years who lived in the sampled households in each year. Prevalence rates of tooth mobility, gingival swelling, calculus, and gingival bleeding were determined. Independent variables were sex, age, and socioeconomic status (i.e., occupation, education level, and income). Differences in self-reported periodontal symptom rates according to socioeconomic status were determined using independent t-tests and one-way analysis of variance.

**Results:** Approximately 30% of subjects reported at least one periodontal symptom; specifically, in 2013, 11.1%, 10.3%, 4.5%, and 4.4% reported gingival swelling, gingival bleeding, dental calculus, and tooth mobility, respectively. More women (31.4%) than men (29.1%) reported periodontal symptoms. Of the subjects aged ≥60 years, 34.2% reported periodontal symptoms, while only 23.4% of those in their twenties did so; thus, self-reported periodontal symptoms appeared to increase with age. Prevalence of self-reported periodontal symptoms differed by socioeconomic status (p < 0.01).

**Conclusions:** Self-reported periodontal symptoms differed according to socioeconomic status: subjects with a low socio-economic status reported more advanced periodontal
symptoms (e.g., gingival swelling), whereas those with a higher status reported more incipient symptoms (e.g., gingival bleeding).

Development of the Current Issue in Korean Dental Hygiene Research Agenda: Focusing on Social Dental Hygiene

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Problem Statement: To expand the profession of dental hygiene, knowledge translation of research for integration into practice is crucial. Recently, Korea has established an academic classification category for dental hygiene. We identified the research agenda subcategory of “social dental hygiene” as an area needing development. Social dental hygiene considers the community, social, culture, circumstance, and environment surrounding the individual as factors for improving the oral health of the population.

Purpose: The purpose of this study was to develop the subcategory “social dental hygiene” for the Korean Dental Hygiene Research Agenda.

Methods: This study utilized a Delphi survey method. Surveys were sent to the chairpersons of the Korean Dental Hygienists’ Association and its sub-societies via email (n=8). All participants provided informed consent (IRB YWDS2015-03-002). Chairpersons’ opinions were grouped into the following categories: basic science, clinical, social, and educational dental hygiene. The categories were then classified into “Health Promotion/Disease Prevention,” “Health Services Research,” “Professional Education and Development,” and “Occupation Health and Safety,” according to the ADHA National Dental Hygiene Research Agenda (2007). The research agendas were compared with the articles published in two Korean journals (JKDH, JDHS) and one international journal (IJDH) from the first issue to December 2014.

Results: Among 129 identified research priorities on the Korean agenda, social dental hygiene priorities numbered 44 (34.1%) items. Eleven priorities about oral health necessity or epidemiology have already been preliminarily studied to determine factors influencing oral health. Thirty-three priorities about oral health policy have not yet been studied. Priorities related to the newly developed priorities for social dental hygiene have not been studied.

Conclusion: Previous dental hygiene studies in Korea were focused on discovery of new knowledge, including social factors that influence oral health. The new Korean Dental Hygiene Research Agenda aims to enhance knowledge translation to dental hygiene practice.

Recipient of the “Outstanding Student Abstract Award,” Deanna Mackay, BDSc(DH), RDH. MacKay and colleagues from the University of Manitoba, College of Medicine, Nursing and CancerCard, Canada, were recognized by the IADR for their work on “Understanding the Meaning of the Head and Neck Cancer Patient and Partners’ Oral/Dental Lived Experiences.”
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