



# **National Center for Dental Hygiene Research & Practice (NCDHRP)**

## **Best Practices for Incorporating Research & Evidence Based Decision Making (EBDM) Into Dental Hygiene Curricula**

**An Educators' Guide Developed for the NCDHRP  
Updated January 2020**

**Denise M. Bowen, RDH, MS, Editor**

## ACKNOWLEDGEMENTS

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We wish to thank all of the Advisory Board members who contributed to this Guide by sharing the resources that they have found helpful in teaching research and evidence-based decision-making. We hope that you find these resources helpful in preparing your students to use of the best available evidence to provide quality care and to keep current throughout their careers. We invite you to share resources with us that may not be included so that we can incorporate them in future updates. Also, please note that current website addresses appear in this Guide at the time of this compilation, however, as we all have experienced, they often change.

Just before this update was completed, Denise Bowen, RDH, MS, who compiled, organized and edited *Best Practices for Incorporating Research & EBDM into Dental Hygiene Curriculum Guide* passed away. Denise served on the Advisory Board for the National Center and was instrumental in shaping our mission and facilitating workshops at several of our Global Dental Hygiene Research Conferences including those on promoting education and research. We already miss her enthusiasm for dental hygiene and advancing the profession.

Finally, would like to thank Colgate-Palmolive/Colgate Oral Pharmaceuticals for their generous support for this project.

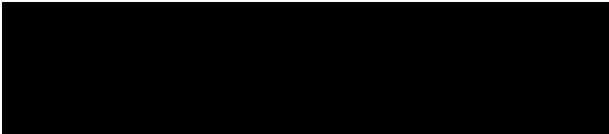
Sincerely,

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# **NCDHRP Best Practices for Incorporating Research and EBDM into Dental Hygiene Curriculum**

## **TABLE OF CONTENTS**

<i>Acknowledgements .....</i>	<b>2</b>
<i>Introduction .....</i>	<b>4</b>
<i>The DHNet .....</i>	<b>6</b>
<i>Teaching Strategies: Competencies....</i>	<b>7</b>
<i>Teaching Strategies: Course Design, Topics, Assignments &amp; Activities ...</i>	<b>13</b>
<i>Mentoring in Research.....</i>	<b>19</b>
<i>Appendices .....</i>	<b>21</b>

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## **Introduction**

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### **The National Center for Dental Hygiene Research and Practice (NCDHRP) – About the Center: Mission, Goals and Projects**

The National Center for Dental Hygiene Research was established through a 3-year grant from the Bureau of Health Professions (BHP), U.S. Department of Health and Human Services in 1993. Development of the Center is based on a collaborative model that brings together researchers, educators and clinicians to develop and conduct studies related to national dental hygiene research priorities:

[http://www.adha.org/resources-docs/7111\\_National\\_Dental\\_Hygiene\\_Research\\_Agenda.pdf](http://www.adha.org/resources-docs/7111_National_Dental_Hygiene_Research_Agenda.pdf)

The National Center also focuses on translational research to enhance clinical practice. The name of the center, National Center for Dental Hygiene Research & Practice (NCDHRP), reflects that goal. A national panel of dental hygiene leaders and accomplished researchers serve in an advisory capacity to assist in attaining the Center's mission and goals.

#### **Mission**

In 2019 the National Center for Dental Hygiene Research & Practice, Inc. was incorporated as a non-profit organization. The mission is to promote the health of the public by fostering the development, implementation and dissemination of oral health research; establish an infrastructure to support dental hygiene research; and, strengthen the scientific foundation for the discipline of dental hygiene.

#### **Goals**

1. Create and facilitate opportunities that promote leadership, research and scholarship among dental hygienists.
2. Foster research efforts among dental hygienists that address the oral health of the public by increasing oral health literacy and decreasing oral health inequities.
3. Promote the translation of research evidence so that it is meaningful and useful for the public and dental hygiene education and practice.

### **Best Practices for Incorporating Research and EBDM into Dental Hygiene Curriculum**

Research and evidence-based practice content is required in the dental hygiene curriculum at all levels of instruction. Curriculum in entry-level educational programs might include content across the curriculum in various courses, contained primarily within a single course, or blended with another course such as community oral health. In baccalaureate degree-completion programs and master's degree programs, research methods and statistics content generally is presented in one or two courses, and mentoring or independent study allows for completion of capstone or thesis projects. Faculty members responsible for teaching research are challenged to develop creative and interesting approaches to avoid students' perceptions of research as boring, dull, not for them, or irrelevant to what they really want to do. Nonetheless, the acquisition and use of the best available evidence is critical to quality of care in dental hygiene practice and life-long learning,

and an understanding of the research process is important for preparing students with the interest and desire to seek advanced degrees and, perhaps, become scholars in the discipline.

The National Center has worked since its inception to train dental hygiene and other health professions faculty in research and evidence-based practice. Collaborative efforts between researchers, faculty, and clinicians have provided a foundation for interprofessional research.

*Best Practices for Incorporating Research & EBDM into a Dental Hygiene Curriculum*, designed as a helpful resource for teaching introductory research methods and statistics, is a guide for educators. The goal is to suggest learning activities and teaching resources that will help dental hygiene faculty to create engaging course content. Ideally, this manual will appeal to novice and experienced educators and graduate students who teach research methods and/or statistics. A practical orientation will help the teacher to include strategies that have the potential to engage students in meaningful activities and discussions related to course content and assignments.

The manual begins with an overview of content and competencies for consideration at each level of the dental hygiene curriculum: entry level, baccalaureate degree completion, and master's degree. National dental hygiene professional and educator associations also have suggested competencies for entry level and master's degree programs.

Subsequent sections outline curricular content, teaching-learning activities, and student assignments for use by dental hygiene faculty members for teaching research methods and statistics to students at each level of the dental hygiene curriculum. The suggestions are not exhaustive but do provide options for consideration. Our hope is that this resource will spark the educators' own creativity and offer ideas for challenging students to learn the foundational skills needed for continued competency throughout their careers.

These fundamental textbooks may be worthwhile for dental hygiene faculty members teaching research methods and evidence based decision.

### **Selected Research Methods Textbooks and Manuals**

1. Blessing DJ, Forister JG. *Introduction to Research and Medical Literature for Health Professionals* (4th ed.). Jones and Bartlett Learning; 2016.
2. Forrest JL, Miller SA. *EBDM in Action: Developing Competence in EB Practice*. (2<sup>nd</sup> ed.). Cave Creek, AZ; 2020.
3. Gallin JL, Ognibene FP. *Principles and Practice of Clinical Research* (4th ed.). San Diego: Elsevier; 2017.
4. Giannobile WV, Burt BA, Genco RJ. *Clinical Research in Oral Health*. John Wiley & Sons; 2010.
5. Glanz, Krieger and Lewis. *Health Behavior and Health Education: Theory, Research and Practice* (5th ed.). Jossey-Bass; 2015.
6. Jacobsen KH. *Introduction to Health Research Methods: A Practical Guide*. (2<sup>nd</sup> ed.) Sudbury, MA: Jones & Bartlett Learning; 2016.
7. Leedy PD, Ormrod JE. *Practical Research: Planning and Design* (11th ed.). Upper Saddle River, NJ: Pearson; 2014
8. Patten ML. *Understanding Research Methods: An Overview of the Essentials*. (9<sup>th</sup> ed.) Glendale, CA: Pyrczak Publishing; 2016.
9. Portney LG, Watkins MP. *Foundations of Clinical Research. Applications to Practice*. (3rd ed.). Upper Saddle River, NJ: Pearson Education Inc; 2015.
10. Creswell JW. *Qualitative, quantitative, and mixed methods approaches*. 4th ed. Thousand Oaks, CA: Sage Publications; 2014.

11. Pyrczak F. Making Sense of Statistics. A Conceptual Overview. (5<sup>th</sup> ed.) Pyrczak Publishing; 2017.
12. Bannon WM. The 7 steps of data analysis: a manual for conducting a quantitative research study. Brooklyn, NY: Stats Whisperer Press, 2013. At:  
<http://www.statswhisperer.com/wp-content/uploads/2012/10/Intro-The-7-Steps-of-Data-Analysis-WM-Bannon.pdf>.

## The DHNET

Explore the DHNET at <http://dhnet.org>

Another resource designed to be of value to dental hygiene educators teaching research and evidence based decision-making is the **DHNET**. The **DHNET** serves as the home base for the National Center for Dental Hygiene Research & Practice, Inc. (NCDHRP or Center) and your connection to resources that support dental hygiene education, practice and research. Within each section, there are several categories and quick links to major resources for your convenience. The section on Education & Community includes a new section on community planning and an opportunity to share your outreach programs. Two examples of international programs are provided by the director of the Oral Hygiene Initiative.

To view and link to all the **DHNET** resources click on each section and then on the topic listed on the dropdown menu.

**DHNET** Research & Topics Evidence-Based Concepts Education & Community Mentoring & DHNetwork About Us

**National Center for Dental Hygiene Research & Practice, Inc**

Explore the DHNet! The DHNet serves as the home base for the National Center for Dental Hygiene Research & Practice, Inc. (NCDHRP or Center) and your connection to resources that support DH research, evidence-based practice, education and community outreach.

Learn more about Mentoring and join the DHNetwork to explore commonalities in research.

The [About Us](#) section provides you with information about the Center.

5<sup>th</sup> GLOBAL Dental Hygiene Research Conference  
"Overcoming Challenges of Conducting Research & Measuring Patient Care Outcomes"  
September 2020  
Plan to ATTEND!  
WHEN: Sept 24-26, 2020  
WHERE: Bethesda, MD  
Qualities Conference Hotel  
Global DH Research Conference

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# **Teaching Strategies: Program Competencies for Research and Evidence-based Decision Making**

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## **Entry Level**

**Relevant Commission on Dental Accreditation (ADA CODA) Accreditation Standards for Dental Hygiene Education Programs, Effective January 1, 2013; revised September 2018.**  
<http://www.ada.org/en/coda/current-accreditation-standards>

At the entry level, several CODA standards directly apply to research and evidence-based decision making.

2-13 Graduates must be competent in providing the dental hygiene process of care which includes (a listing of a - f with d related to evidence-based care:  
d) provision of patient-centered treatment and evidence-based care in a manner minimizing risk and optimizing oral health (p 25).

2-19 Graduates must be competent in the application of the principles of ethical reasoning, ethical decision making and professional responsibility as they pertain to the academic environment, research, patient care and practice management (p 28).

One example of evidence to demonstrate compliance includes evidence-based treatment strategies.

An understanding of basic statistics also is needed to meet accreditation standard 2-16 (p. 27) requiring that graduates must be competent in assessing, planning, implementing and evaluating community-based oral health programs including, health promotion and disease prevention activities. Another example is standard is 2-22 (p. 29), which states, "Graduates must be competent in the evaluation of current scientific literature." The intent is to assure competence as the "basis for life-long learning, evidence-based practice, and as a foundation for adapting to changes in healthcare."

Finally, standard 2-23 (p. 29) states "Graduates must be competent in problem solving strategies related to comprehensive patient care and management of patients." Examples include ...demonstration of the use of active learning methods that promote critical appraisal of scientific evidence in combination with clinical application and patient factors.

**Relevant American Dental Education Association (ADEA)**  
**Competencies for Entry into the Profession of Dental Hygiene, 2011**  
<http://www.adea.org/cadpd/toolkit/>

Core Competencies (C):

- C.4 Use evidence-based decision making to evaluate emerging technology and treatment modalities to integrate into patient dental hygiene care plans to achieve high-quality, cost-effective care.
- C.5 Assume responsibility for professional actions and care based on accepted scientific theories, research, and the accepted standard of care.
- C.7 Integrate accepted scientific theories and research into educational, preventive, and therapeutic oral health services.

## Professional Growth and Development (PGD)

PGD.1 Pursue career opportunities within health care, industry, education, research, and other roles as they evolve for the dental hygienist.

### **Relevant American Dental Education Association (ADEA) Curriculum Content in the Compendium of Curriculum Guidelines for Allied Dental Education Programs May 2015–2016** <http://www.adea.org/cadpd/toolkit/>

All faculty teaching research and evidence based practice content should review the Research in Dental Hygiene Education Section (p 143-149) of this ADEA document including:

- Introduction
- Interrelationships
- Overview
- Primary Educational Goals
- Prerequisites
- Core Content Outline (pp. 143-144) follows:

The following major subject areas are suggested for a curriculum in oral health research:

- A. Oral health research, science and the scientific method.
  1. Science: purposes and methods.
  2. Scientific method: process and concepts.
  3. Oral health research: evidence-based approach to systemic problem-solving.
  4. Research process, related concepts and terminology.
  5. Research problems.
  6. Hypotheses.
- B. Literature search: value, approaches and sources.
- C. Types of research and approaches to research.
- D. Legal and ethical concerns in research.
  1. Responsibilities of researcher.
  2. Human subject protection.
  3. Belmont Report.
- E. Control of confounding effects.
  1. Validity.
  2. Threats to internal validity and their control.
  3. Threats to external validity and their control.
  4. Confounding/extraneous variables.
- F. Research design: definition, purpose, types and avoiding bias.
- G. Sampling: purposes, types and their relationship to study design and bias.
- H. Data collection and measurement.
- I. Analysis of research findings.
  1. Ways to organize data: descriptive statistics.
  2. Inferential statistics
    - a. Statistical decision-making.
    - b. Clinical decision-making.



- J. Interpretation of data.
  - 1. Explanations of data.
  - 2. Protocol for thorough interpretation.
  - 3. Clinical versus statistical significance.
- K. Presentation of findings.
  - 1. Research report format.
  - 2. Written communication.
  - 3. Oral presentations.
  - 4. Poster presentations/table clinics.
- L. Critical analysis of the literature.
  - 1. Importance of the literature.
  - 2. Art of criticism.
  - 3. Criteria used for evaluation.
  - 4. Elements in the research critique
- M. Application of research to profession and practice.
  - 1. Application of an evidence-based decision-making approach to patient care.
  - 2. Careers in research.

**Relevant Canadian Dental Hygienists Association (CDHA) Entry-To-Practice Competencies and Standards for Canadian Dental Hygienists: Critical Thinking**

[https://www.cdha.ca/cdha/The\\_Profession\\_folder/Resources\\_folder/Entry-To-Practice\\_Competencies\\_and\\_Standards\\_for\\_Canadian\\_Dental\\_Hygienists\\_folder/CDHA/The\\_Profession/Resources/Entry-To-Practice.aspx](https://www.cdha.ca/cdha/The_Profession_folder/Resources_folder/Entry-To-Practice_Competencies_and_Standards_for_Canadian_Dental_Hygienists_folder/CDHA/The_Profession/Resources/Entry-To-Practice.aspx)

- Analyze the strengths and limitations of different research approaches and their contributions to the knowledge base of dental hygiene.
  - *Example: Identify the strengths and limitations of a survey conducted to assess the use of research by dental hygienists.*
- Access relevant and credible resources through various information systems.
  - *Example: Conduct a literature search about tongue piercing using PubMed. Search the Internet for credible sites related to infection control guidelines.*
- Differentiate between more and less credible types of information including written statements and other representations of data such as figures and tables.
  - *Example: Use Health of the Net web page to guide critique of internet websites. Assess an article from MacLean's magazine about tooth whitening agents for possible misinformation.*
- Explore complex issues from many points of view recognizing biases and assumptions.
  - *Example: Analyze local newspaper articles related to fluoridation of a new community to determine the arguments made against fluoridation. Review existing literature to determine the credibility of evidence to support or refute community water fluoridation. Examine dental hygiene regulatory issues from the perspective of the dental hygiene profession, other health professionals and the public.*

- Apply theoretical frameworks to the analysis of information to support practice decisions.
  - *Example: Apply human needs theory to the assessment of client information. Use the hydrodynamic theory of dentinal sensitivity to assess the potential value of a new desensitizing agent.*
- Support conclusions based on a variety of resources with sound rationales.
  - *Example: Develop recommendations for infection control protocols based on information from the Centers for Disease Control and professional associations.*
- Apply evidence-based decision making approaches to the analysis of information and current practices.
  - *Example: Use the best evidence available when formulating individualized treatment plans. Use reviews by the Cochrane Collaboration to make decisions about toothbrushing recommendations for clients.*
- Apply the principles of research ethics to the analysis of literature and practice issues.
  - *Example: Explain to participants how the collected information will be used when collecting information from well seniors for a national health database. Review websites related to informed consent to determine issues to consider when documenting clients' refusal of radiographs.*
- Apply the behavioral, biological and oral health sciences to dental hygiene practice decisions.
  - *Example: Make decisions about supporting water fluoridation based on the evidence related to its safety and efficacy. Discuss clients' fears about breastfeeding leading to increased caries rates for their children.*
- Assess the appropriateness of study methods including common descriptive and inferential statistical tests to sets of data.
  - *Example: Explain why studies finding positive correlations between periodontal disease and low birth weight babies should not be framed into a statement that says periodontal disease causes low birth weight babies.*
- Compare and contrast the strength and limitation of studies pertaining to dental hygiene services and public policies regarding health care delivery.
  - *Example: Critically review the evidence to determine if self-initiation improves access to care. Review studies comparing full mouth debridement and quadrant debridement to determine the sample size of the studies and the factors that might have influenced the results.*

### **Suggested CDHA Competencies Related to Knowledge Application with Sample Performance Indicators**

[https://www.cdha.ca/cdha/The\\_Profession\\_folder/Resources\\_folder/Entry-To-Practice\\_Competencies\\_and\\_Standards\\_for\\_Canadian\\_Dental\\_Hygienists\\_folder/CDHA/The\\_Profession/Resources/Entry-To-Practice.aspx](https://www.cdha.ca/cdha/The_Profession_folder/Resources_folder/Entry-To-Practice_Competencies_and_Standards_for_Canadian_Dental_Hygienists_folder/CDHA/The_Profession/Resources/Entry-To-Practice.aspx)

- Each dental hygienist uses current and relevant information to inform client care and practice decisions.
- Competencies related to *Knowledge Application* include the ability to:
  - Access relevant and credible resources through various information systems.
  - Apply evidence-based decision making approaches to the analysis of information and current practices.
  - Critique literature findings to determine their potential value to dental hygiene practice.

- Support conclusions based on resources with sound rationales.
- Integrate new knowledge into appropriate practice environments.
- Disseminate findings to colleagues and other professionals.
- Apply critical thinking to decision-making process and make choices to ensure optimum client outcomes.
- Examples of Performance Indicators – Illustrate how the standards could be demonstrated within the dental hygiene practice; provided as suggestions and are not considered an exhaustive list. A dental hygienist demonstrates competence by:
  - Analyzing the strengths and limitations of different research approaches and their contributions to the knowledge base of dental hygiene;
  - Differentiating between more and less credible types of information;
  - Exploring complex issues from many points of view recognizing biases and assumptions;
  - Comparing and contrasting the strength and limitations of studies pertaining to dental hygiene services and public policies regarding health care delivery;
  - Conducting a literature search about an oral health question;
  - Accessing databases that provide profiles of different populations;
  - Using Web-based 'Point of Care' resources to support informed and efficient clinical decisions;
  - Acting as a knowledge broker for dental hygiene and oral health information;
  - Sharing relevant information to support collaborative care and interprofessional relationships;
  - Practicing critical thinking and displaying information literacy skills;
  - Using information ethically.

## **Baccalaureate Degree**

(See also entry-level competencies.)

- Describe the steps in the research process.
  - Appendix A. Overview of the Research Process**
- Understand the basic principles involved in research design and methodology.
- Understand theory and conceptual models and their relationship to research
- Research Designs, Validity and Reliability
  - Variables – threats to internal and external validity
- Apply basic principles of research design and methodology to the critical analysis of contemporary health related literature.
- Demonstrate research/scientific writing skills.
- Apply principles of ethics in research to scenarios provided and/or to projects being planned
- Analyze and synthesize research findings to evaluate the safety and efficacy of oral health products, interventions, and/or treatments; effectiveness of educational approaches; and/or the outcomes of public health programs.
  - Interpret Research Findings
- Participate in interprofessional research activities affecting oral and systemic health leading to the discovery of new knowledge of contemporary dental hygiene practice.
- Discuss the impact of research on society, healthcare delivery, and dental hygiene
- Share research findings with other dental hygienists and other healthcare providers.

## Master's Degree

Related ADEA Core Competencies for Dental Hygiene Graduate Education (Developed as a Collaboration between ADEA and the ADHA; approved by the ADEA HOD in 2011)  
<http://www.adea.org/cadpd/toolkit/>

- Selected from *Health Care Policy, Interprofessional Collaboration, and Advocacy*
  - Determine evidence and data needed to support the development of new workforce models including their impact on oral health and overall health from a policy perspective.
  - Examine methods of facilitating access and partnerships to enhance health care and education.
- Selected from Health Informatics and Technology
  - Demonstrate the ability to access, evaluate, and interpret data from various information systems.
  - Demonstrate effective written, oral, and electronic communication skills.
- Selected from Health Promotion and Disease Prevention
  - Use epidemiological, social, and environmental data to evaluate the oral health status of individuals, families, groups, and communities.
  - Incorporate health promotion theories and translational research into developing teaching and oral health counseling strategies that preserve and promote health and healthy lifestyles.
- Scholarly Inquiry and Research
  - Apply the research process to an identified problem.
  - Demonstrate professional writing and presentation skills in the dissemination of research findings.
  - Conduct a comprehensive systematic literature search relevant to a specific topic and critically evaluate the evidence gathered.
  - Demonstrate skill in proposal development and writing.
  - Interpret quantitative and qualitative data from the research literature to guide problem-solving and evidence-based decision making.
  - Synthesize information from evidence-based literature to apply to a community health, education, clinical practice, and/or research problem.
  - Design and implement a scholarly project in an area of emphasis.

## Teaching Strategies: Research Course Design, Topics, Student Assignments and Activities

**Goal for Entry Level:** Students can find and use scientific evidence and are aware of dental indices to measure oral health outcomes

**Goal as Student Level Advances:** Students understand and apply basic research principles and methods; scientific writing skills; critical analysis and/or synthesis of literature; plan and/or conduct a research project (e.g., thesis, capstone, research poster or presentation).

### Suggested Topics: Entry Level

<b>Entry Level Dental Hygiene Curriculum: Options for Incorporating Suggested Topics for Research and Evidence Based Practice Basic Skill Set</b>	
<b>Across the Curriculum</b>	<b>Single Course</b>
<i>First-Year Didactic Clinical Course(s)</i> <ul style="list-style-type: none"> <li>Evidence-based decision making               <ul style="list-style-type: none"> <li>Formulating a good clinical question</li> </ul> </li> <li>Using PICO to answer a clinical question</li> <li>Searching the literature to find credible evidence               <ul style="list-style-type: none"> <li>Use of two databases (e.g., PubMed, Cochrane)</li> <li>Levels of evidence</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Linking dental hygiene practice and research</li> <li>Impact of research on society, healthcare delivery, and dental hygiene</li> </ul>
<i>Second Year Didactic Clinical Course, Literature Review, or Seminar Course</i> <ul style="list-style-type: none"> <li>Linking dental hygiene practice and research</li> <li>Critical appraisal of literature               <ul style="list-style-type: none"> <li>Validity and reliability</li> </ul> </li> <li>Ethics in Research</li> </ul>	<ul style="list-style-type: none"> <li>Searching the literature to find credible evidence               <ul style="list-style-type: none"> <li>Use of two databases (e.g., PubMed, Cochrane)</li> </ul> </li> <li>Levels of evidence and research approaches</li> <li>Critical appraisal of literature               <ul style="list-style-type: none"> <li>Validity and reliability</li> </ul> </li> </ul>
<i>Community Health Course</i> <ul style="list-style-type: none"> <li>Common dental indices used for measurement of oral health               <ul style="list-style-type: none"> <li>Dental caries, periodontal disease, gingival bleeding, oral plaque biofilm</li> </ul> </li> <li>Introduction to statistics               <ul style="list-style-type: none"> <li>Descriptive and inferential statistics – central tendency and variability (e.g., mean, median, mode, % and frequency, standard deviation)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Common dental indices used for measurement of oral health               <ul style="list-style-type: none"> <li>Dental caries, periodontal disease, gingival bleeding, oral plaque biofilm</li> </ul> </li> <li>Introduction to statistics               <ul style="list-style-type: none"> <li>Descriptive and inferential statistics – central tendency and variability (e.g., mean, median, mode, % and frequency, standard deviation)</li> </ul> </li> </ul>
<i>Student Orientation, Professionalism, or Ethics Course</i> <ul style="list-style-type: none"> <li>Ethical use of information               <ul style="list-style-type: none"> <li>Plagiarism &amp; appropriate use of references, obtaining permission</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Ethical use of information               <ul style="list-style-type: none"> <li>Plagiarism &amp; appropriate use of references, obtaining permission</li> <li>Ethics in Research</li> </ul> </li> </ul>

## **Sample Activities and Assignments: Entry Level**

- See CDHA examples listed under competencies and ADEA learning activities
- Have students work in pairs or small groups to design a well-developed PICO questions
  - Forrest JL, Kupiec L. Evidence-based Decision Making: Introduction and Formulating Good Clinical Questions, course #311; Access via <https://www.dentalcare.com/en-us/professional-education/ce-courses/ce311>
- Schedule class in computer lab for pairs of students to use PubMed to search for current abstracts at higher levels of evidence related to a PICO question after online demonstration
  - Forrest JL, Miller SA. Searching the Literature Using PubMed, course #340; Access via <https://www.dentalcare.com/en-us/professional-education/ce-courses/ce340>
- Analyze results of a community-based oral health program using a testlet format with data collected using dental indices
- Invite a dental hygienist involved in research to class to discuss this role and answer student questions.
- Debate classmates assigned to groups regarding literature on both sides of a controversial topic.

## **Sample Assignments: Entry Level**

- Use PubMed to search for current abstracts at higher levels of evidence related to a well-developed PICO question; submit PICO question, search strategy and abstracts (See links to related resources listed above.)
- Have students go to the Cochrane library and read a systematic review on a current topic of interest
  - Anywhere Systematic Review, The Cochrane Library <http://www.cochranelibrary.com/help/anywhere-systematic-review.html>
- Ask students to locate abstracts depicting each of the higher levels of evidence on the Evidence Pyramid.
  - Guide to Research Methods: The Evidence Pyramid <http://library.downstate.edu/EBM2/2100.htm>
  - Have students write an annotated bibliography on a current topic of interest and include examples of common knowledge, paraphrasing and quotes.
- Give students case(s) describing community health programs to reduce caries and/or periodontal disease including baseline and post-intervention dental index scores. Have them analyze success of the program.
- Ask students to use an online plagiarism checking software program to determine whether they have adequately paraphrased and referenced information in a written assignment, correct errors if applicable, and submit printed results indicating ethical use of information.
  - **Appendix B. Online resources for Plagiarism Resources and Programs.**
  - How to Recognize Plagiarism: Tutorials and Tests, University of Indiana <https://www.indiana.edu/~academy/firstPrinciples/index.html>

## Additional Topics, Activities and Assignments for Baccalaureate Degree Students

(See also entry-level curriculum content if applicable)

### Topics

- Basic principles of research
  - A systematic process of identifying a question or problem, setting forth a plan of action to answer the question or resolve the problem and rigorously collecting and analyzing data.
  - Important to choose the appropriate approach, method and design for a specific research problem.
- Scientific writing
  - Purdue University Online Writing Lab (OWL) <https://owl.english.purdue.edu/>
  - Hofman AH. Scientific Writing and Communication: Papers, Proposals, and Presentations. Oxford University Press; 2010.
- Research requirements (e.g., IRB, ethics, human subjects, informed consent)
- Research approach and design
  - Qualitative and quantitative research
    - University of Wisconsin-Madison Center for Clinical and Translational Research <https://sites.google.com/a/wisc.edu/qualitative-and-mixed-methods-resources/>
    - Video: Understanding the difference between concepts, models and theories <https://www.youtube.com/watch?v=XLMwtNDi1ok>
  - Primary vs. secondary research
  - Types of research questions and studies related to levels of evidence
  - Types of variables studied in various research designs
- Types of research
  - Experimental, Randomized Controlled Trial (RCT), or Clinical Trial
    - CONSORT (Consolidated Standards of Reporting Trials) <http://www.consort-statement.org>
  - Systematic versus Narrative Literature Reviews
    - **Appendix C. Comparison of Characteristics of a Systematic Review and a Traditional Literature Review**
  - Survey, questionnaires and interviews
    - Survey Research. Web Center for Social Research Methods <http://www.socialresearchmethods.net/kb/survey.php>
    - Indiana University Bloomington. Center for Survey Research <http://csr.indiana.edu/>
  - Comparative or correlational cohort studies
    - Longitudinal vs. Cross-sectional studies
- Critical analysis of the literature
  - Key questions and critical appraisal tools (e.g., CASP)
- Statistical analysis
  - Non-parametric and parametric tests – measures of association, t-tests, analysis of variance, p values and statistical vs. clinical significance



- Trisha Greenhalgh. How to read a paper series, Statistics for the Non-statistician.
  - Part I: Different types of data need different statistical tests. BMJ 1997; 315: 364-366. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2127256/pdf/9270463.pdf>
  - Part II: Significant relations and their pitfalls. BMJ, August 16, 1997; 315(7105): 422-425. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2127270/pdf/9277611.pdf>

### **Sample Activities**

- Conduct a small group activity to discuss and describe steps needed to meet protocol requirements for a given proposed study involving human subjects using your institutional review board's guidelines.
- Provide a topic or research agendas for students to brainstorm about research questions involving quantitative and qualitative approaches to one particular research question or area in need of inquiry.
  - CDHA Research Agenda [http://www.cdha.ca/pdfs/Profession/Policy/research\\_agenda\\_102603.pdf](http://www.cdha.ca/pdfs/Profession/Policy/research_agenda_102603.pdf)
  - ADHA National Dental Hygiene Research Agenda <http://www.adha.org/research/nra.htm>
- Have students work in pairs or small groups to use key questions to critically analyze a research article.
- Provide a data set of data collected using dental indices to correlate or compare two interventions and ask students to select possible approaches to statistical analyses.
  - **Appendix D. Flow Chart for Choosing a Statistical Test**

### **Sample Assignments**

- Critique a research article using key questions and/or critical appraisal tools.
  - See Miller SA, Forrest JL. Translating Evidence-Based Decision Making into Practice: Appraising and Applying the Evidence. J Evid Base Dent Pract. 2009;9:164-182.
  - CASP (Critical Appraisal Skills Programme): <http://www.casp-uk.net/>
- Develop a research protocol or brief prospectus (including the purpose of the proposed study, significance, theoretical foundation, research questions and objectives, sample description, methods, data collection methods, time frame, and bibliography), and design a research poster or oral paper for presentation. Selected potential resources follow:
  - Stanford School of Medicine. Program on Prevention Outcomes and Practices. Posters and Oral Presentations. <http://ppop.stanford.edu/ResearchPresentations.html>
  - OWL Purdue Writing Lab. Designing an Effective PowerPoint Presentation: Quick Guide. <https://owl.english.purdue.edu/owl/resource/686/01/>
- Complete a structured peer review on other students' research assignments.
- Develop a research-based poster presenting evidence pertaining to a health condition, preventive approach, or therapy that has interdisciplinary appeal and present it at a campus event for dissemination of undergraduate student research.

### **Sample Bachelor's Degree Research Course Syllabus**

- **Appendix E. Univ of Southern California (USC) DHYG 424 Research Methods Syllabus**
- **Appendix F. Idaho State University (ISU) DENT 4401 Syllabus**



## **Additional Topics, Activities and Assignments for Master's Degree Students (may also include baccalaureate level curriculum content)**

### **Topics**

- Implementing the steps in the research process (See Appendix A.)
- Determining theoretical foundation and significance of a proposed research project
- Research questions and objectives or goals and hypothesis formulation
- Research protocol training (as indicated for types of projects required)
- Data Collection, sampling, validity and reliability – sampling methods, sample size, bias, threats to internal and external validity
  - Review information regarding instrument validity and reliability online at <http://researchrundowns.wordpress.com/quantitative-methods/instrument-validity-reliability/>
- Data treatment and storage
- Preparation for statistical analysis consultation
- Scholarly writing
- Funding sources and grantsmanship
- Conducting a capstone or thesis research project
- Data Analysis
  - Holcomb, Z. C. (2016). SPSS basics: Techniques for a first course in statistics. 6<sup>th</sup> edition. Los Angeles, CA: Pyrczak Publishers.
  - Introduction to Biostatistics Course <https://www.citiprogram.org/>

### **Sample Activities**

#### **See also baccalaureate degree resources and activities**

- Provide sample research problems with summarized scholarly background information, and ask students to work in pairs or small groups to develop research questions and objectives or preliminary hypotheses, as appropriate, that might be studied to address those problems.
- Ask students to select a conceptual model and discuss the underlying concept and related constructs that might be used to test that model and to search for a related theory that has been developed based on research findings.
  - **Appendix G. From Concept to Conceptual Model to Theory**
- Have students complete an application for IRB approval of a research study involving human subjects that they are proposing or using a published study.
- Have students complete training in research ethics
  - The Collaborative Institutional Training Initiative (CITI Program) for Human Subjects Research <https://about.citiprogram.org/en/series/human-subjects-research-hsr/>
- Discuss how one would approach identifying the order of authorship for a collaborative research study.
  - International Committee of Medical Journal Editors. Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals, Updated December 2013. <http://www.icmje.org/recommendations/>

- Create an online venue where students from different health related disciplines can interact, learn about other professions, and find common areas of interest through a variety of activities including discussion groups, journal article reviews, and peer writing critiques.
- Provide a research question, data collection instrument (e.g., oral health-related quality of life or level of collaboration scale) and ask students to select possible approaches to statistical analyses.
  - **See Appendix D. Flow Chart for Choosing a Statistical Test**

### **Sample Assignments**

See also baccalaureate degree resources and assignments

- Develop a table listing the details of five research articles related to a narrow topic including purpose, sample, methods, findings and conclusions, then synthesize what is known and what needs to be studied based on the compilation of knowledge.
  - **Appendix H. Synthesis of Research Findings Template**
- Write a well-developed prospectus that can be used for a small scale or pilot study as a thesis research project.
- Plan and conduct a field study to be used for a capstone project.
  - **What is a Capstone Project in Graduate School?**  
<http://www.gradschoolhub.com/faqs/what-is-a-capstone-project-in-graduate-school/>
  - **UCSF MS in Dental Hygiene Program and Capstone Project**  
<http://dentistry.ucsf.edu/admissions/ms-in-dental-hygiene>
- Write an article to submit to a dental hygiene publication, participating as an author or co-author, if possible, using interprofessional collaboration.
- Develop a research prospectus for a research project to convince a reader (e.g., professor, funding agency) that the research can be carried out and will yield worthwhile results. The prospectus includes a working title, research question, overview of related scholarship from the literature, a brief summary of research methods and theoretical approach and a reference list.
  - **Appendix I. Prospectus Guide**
  - **Appendix J. Sample Prospectus**

### **Sample Master's Degree Level Research Course Syllabi**

- **Appendix K. Sample MS Level Research Course Syllabus ISU**
- **Appendix L. Sample MS Level Clinical Trial Course Syllabus**

## **MENTORING IN RESEARCH**

Novice and beginning dental hygiene researchers, such as graduate students or faculty members beginning an academic career, need effective mentors. The following information outlines elements of the mentor-protégé relationship and provides suggestions for resources.

- Definition
  - Relationship between more experienced and less experienced individuals
    - Goal is growth of protégé
  - Dynamic relationship
  - Mentors are distinct from other potentially influential people
    - Role models, advisors, teachers, supervisors, coaches
  - See Eby LT and Allen TD. Moving Toward Interdisciplinary Dialogue in Mentoring Scholarship: An Introduction to the Special Issue. *J Vocat Behav.* 2008; 72(2): 159–167. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2390903/>
- See Mentoring Graduate Students, Vanderbilt University Center for Teaching and Learning [https://cft.vanderbilt.edu/guides-sub-pages/mentoring-graduate-students/#what\\_is](https://cft.vanderbilt.edu/guides-sub-pages/mentoring-graduate-students/#what_is)
- Responsible Mentoring of Research
  - American Psychological Association Responsible Mentoring in Research, Guidance for Mentors, and Guidance for Trainees <http://www.apa.org/research/responsible/mentoring/>
- Mentoring Guidelines NIH Office of Intramural Training and Education <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2390903/>
- Advantages
  - Attitudes (e.g., work satisfaction, attitudes toward school, career expectations), interpersonal relationships, motivation/involvement, improving performance and attitudes toward school and decreasing withdrawal behavior
  - See Eby LT, Allen TD, Evans SC, Ng T, DuBois D. Does Mentoring Matter? A Multi- disciplinary analysis comparing mentored and non-mentored individuals. *J Vocat Behav.* 2008 April;72(2): 254–267. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2390903/>
- Situational Mentoring Model - flexibility in mentoring: the key to success
  - Gray's Mentor-Protégé Relationship Model
    - Four mentoring styles – informational, guiding, collaborative, confirming
    - Six step mentoring process
      1. Understand protégé's needs, goals, attitudes and perceptions
      2. Review protégé's actions and consequences
      3. Identify protégé's real issue
      4. Develop more productive goals, attitudes and perceptions
      5. Expand protégé's thinking to consider new options
      6. Agree on and commit to complete a workable action plan to achieve the revised protégé's goal
  - See Situational Mentoring by William A. Gray, available at Smashwords, ©2012.

- Overcoming Mentoring Challenges
  - It is important, manage the mentor-protégé relationships appropriately and be aware of early signs of potential problems to avoid potential damages.
  - See Chandler DE, Eby L, and McManus SE. When Mentoring Goes Bad: A good relationship can help both mentor and protégé. Here's how to make sure that happens. WSJ, May 24, 2010. See video at:  
<https://www.wsj.com/articles/SB10001424052748703699204575016920463719744>
- Resources for Mentoring Graduate Students, Vanderbilt University Center for Teaching and Learning  
[https://cft.vanderbilt.edu/guides-sub-pages/mentoring-graduate-students/#what\\_is](https://cft.vanderbilt.edu/guides-sub-pages/mentoring-graduate-students/#what_is)
- Faculty/Staff Toolkit for Mentoring Graduate Students, University of Illinois
  - See Introductions and links to multiple Comprehensive Guides at:  
<http://www.grad.illinois.edu/faculty-staff/toolkits/mentor>

## **Appendix A. Overview of the Research Process**

### **Designing the Research Plan**

- Identifying a broad area of interest and potential problem(s)
  - Conducting an initial literature review to narrow the focus of the research and problem to be studied and determine a theoretical approach
- Defining and formulating the specific research problem
  - Continuing a more comprehensive literature review to fully understand what is known and where gaps in knowledge exist
- Stating the hypothesis or research question(s)
- Selecting the research approach and potential valid and reliable measuring instruments
- Seeking statistical consultation regarding sample size, study design, and general plan for data analysis
- Identifying the population, sample, sampling and recruitment strategy as well as planning for protection of subjects as needed
- Designing the methods including investigator training or calibration, selection and administration of data collection instruments and data collection plan
- Finalizing the data analysis plan: data coding, entry, management, and storage

### **Conducting the Study and Analyzing the Data**

- Conducting a pilot study as needed
- Implementing the research plan
  - Institutional Review Board review and approval
  - Subject recruitment and enrollment
  - Data collection
- Data management
- Data Analysis and interpretation
- Preparing the research report

### **Disseminating the Study Findings**

- Research Presentations
- Journal Articles

## Appendix B. Online Resources for Plagiarism Information and Programs

- **Plagiarism:** What It Is and How to Recognize and Avoid It: What is Plagiarism and Why is it Important? <https://wts.indiana.edu/writing-guides/plagiarism.html>
- **Turnitin** is a comprehensive cloud-based solution (turnitin.com). It requires registration and an account for access to:
  - Check students' work for potential plagiarism by comparing it against the world's largest comparison database.
  - Give students legible, timely feedback while saving instructor's grading time.
  - Help students learn by facilitating personalized feedback.
  - Streamline peer review of manuscripts; simplify the process of checking references
- **Anti-Plagiarism** is software designed to effectively detect, and thus hopefully prevent, plagiarism. It can be used to identify copy-pasting of information from the Web, checking documents in \*.rtf, \*.doc, \*.docx, \*.pdf formats.
- **DupliChecker** is a tool designed for the user to copy-paste, or upload essays, theses, website content or articles, and obtain analysis reports quickly.
- **Paper Rater** offers three tools developed and maintained by linguistics professionals and graduate students: Grammar Checking, Plagiarism Detection and Writing Suggestions.
- **PlagiarismChecker.com** is a faculty resource to check whether a student's paper has been copied from the Internet. Authors can also use an "Author Option" to check if others have plagiarized their work online.
- **Plagtracker.com** checks whether similar text content can be found on the Web. It scans Internet pages and over 20 million academic works for plagiarized copy and generates a report.
- **Viper Plagiarism Checker** is a fast plagiarism detection tool with the ability to scan a document downloaded by Microsoft Windows users only. The software compares the document to more than 10 billion resources and provides side-by-side comparisons for plagiarism.
- **Grammarly** checks for plagiarism and also proofreads the entire text. It offers the option to correct more than 205 types of grammatical errors. This tool can check plagiarism against more than 8 billion web pages in just a few seconds and instantly provides you the report.
- **PlagScan** provides an easy and accurate alternative to check plagiarism and gather reports. The user experiences constant and excellent customer support services.
- **Adapted from: Top 20 best free online plagiarism checker tools and websites {2017}, Digital GYD**  
<https://www.digitalgyd.com/top-20-best-online-plagiarism-checker-tools-free/>

## Appendix C. Comparison of Characteristics of a Systematic Review and a Traditional Literature Review

<i>Characteristic</i>	<b>Systematic Review</b>	<b>Traditional Narrative Review of the Literature</b>
<b>Focus of the Review</b>	<ul style="list-style-type: none"> <li>• Specific problem or patient question;</li> <li>• Narrow focus</li> <li>• <b>Example:</b> Effectiveness of fluoride varnish as compared to topical SnF fluoride in preventing root caries.</li> </ul>	<ul style="list-style-type: none"> <li>• Range of issues on a topic</li> <li>• Broad focus</li> <li>• <b>Example:</b> Measures for preventing root surface caries; can include many types of FI; may not make comparisons between methods</li> </ul>
<b>Who conducts</b>	Multidisciplinary team	Individual
<b>Selection of studies to include</b>	<ul style="list-style-type: none"> <li>▪ Pre-established criteria based on validity of study design and specific problem.</li> <li>▪ All studies that meet criteria are included.</li> <li>▪ Systematic bias is minimized based on selection criteria</li> </ul>	<ul style="list-style-type: none"> <li>▪ Criteria not pre-established or reported in methods. Search on range of issues.</li> <li>▪ May include or exclude studies based on personal bias or support for the hypothesis, if one is stated.</li> <li>▪ Inherent bias with lack of criteria.</li> </ul>
<b>Reported findings</b>	<ul style="list-style-type: none"> <li>▪ Search Strategy &amp; Databases Searched</li> <li>▪ Number of studies that met criteria; number that did not meet and why studies were excluded</li> <li>▪ Description of study design, subjects, length of trial, state of health/ disease, outcome measures</li> </ul>	<ul style="list-style-type: none"> <li>▪ Literature presented in literature review format and crafted by the individual author.</li> <li>▪ Search strategy, databases, total number of studies pro and con not always identified</li> <li>▪ Descriptive in nature reporting the outcomes of studies rather than their study designs</li> </ul>
<b>Synthesis of Selected Studies</b>	<ul style="list-style-type: none"> <li>▪ Critical analysis of included studies</li> <li>▪ Determination if results could be statistically combined, and if so, how meta-analysis was conducted</li> </ul>	<ul style="list-style-type: none"> <li>▪ Reporting of studies that support a procedure or position and those that do not rather than combining data or conducting a statistical analysis.</li> </ul>
<b>Main Results</b>	<ul style="list-style-type: none"> <li>▪ Summary of trials, total # of subjects</li> <li>▪ Definitive statements about the findings in relation to the specified objectives and outcome measures</li> </ul>	<ul style="list-style-type: none"> <li>▪ Summary of the findings by the author in relation to the purpose of the literature review and specific objectives</li> </ul>
<b>Conclusions or Comments</b>	<ul style="list-style-type: none"> <li>▪ Discussion of the key findings with an interpretation of the results, including potential biases and recommendations for future trials</li> </ul>	<ul style="list-style-type: none"> <li>▪ Discussion of the key findings with an interpretation of the results, including limitations and recommendations for future trials</li> </ul>

## **Appendix D. Flow Chart for Choosing a Statistical Test**

**Developed By Kathryn Bell, RDH, MS, Pacific University, Dental Hygiene**

See the last page of this Guide



## Appendix E. Sample BSDH Level Syllabus – USC

### I. BASIC INFORMATION

<b>Course Number/Title:</b>	DHYG 424 / Research Methods
<b>Department:</b>	Dental Hygiene
<b>Course Director:</b>	Jane L. Forrest, RDH, EdD Chair, Behavioral Science Section, Division of Dental Public Health & Pediatric Dentistry Director, Nat'l Center for Dental Hygiene Research & Practice
<b>Course Type:</b>	Lecture / Computer
<b>Term(s) Offered:</b>	Summer 2017
<b>Students:</b>	DH-2, Class of 2018
<b>Units:</b>	2 units
<b>Day/Place:</b>	Tuesdays: 10:00 a.m.- Noon, Guggenheim (except on 7/25 – DH Lab)
<b>Office Hours:</b>	By Appointment
<b>Room Number:</b>	DEN 4338
<b>Phone Numbers:</b>	213-740-8669
<b>E-mail Addresses:</b>	<a href="mailto:jforrest@usc.edu">jforrest@usc.edu</a>

### II. COURSE DESCRIPTION

This course is designed to help students understand the research process and how it applies to evidence-based practice. The first part of the course focuses on the basics of evidence-based decision-making (EBDM) and research design and methods, scientific database searching and evidence-based resources. The second part of the course emphasizes the application of EBDM, basic research design methodology and statistical techniques to the critical analysis of current literature in order to become a good consumer of the research literature.

### III. COURSE OBJECTIVES

Based on readings, materials presented in class, and literature and Internet assignments, the students will be able to:

1. Explain how research informs knowledge development and daily practice.
2. Explain how an Evidence-based Decision-Making approach enhances critical thinking and professional decision-making regarding patient care.
3. Describe the scientific method and research process.
4. Discuss different research designs and when each is appropriate to use.
5. Explain the role of the Internet and electronic resources in research and how they relate to dental hygiene education, practice and research.
6. Critically analyze different written/paper and electronic information sources.
7. Conduct an effective literature search using electronic databases [PubMed, Trip, and Cochrane], professional association websites and journals, government documents, product literature and other "paper" publications, video and other forms of multimedia.
8. Evaluate oral health research articles applying concepts of research design and methodology.
9. Gain an appreciation for the role of research in evidence-based dental hygiene practice.

**Specific objectives for each session/topic are listed at the end of the syllabus and also are found in the beginning of each chapter in the required course textbook.**

### Course Competencies

1. Assume responsibility for dental hygiene actions and care based on accepted scientific theories and research as well as the accepted standard of care.
2. Students must be competent in the evaluation of current scientific literature.

### Specifically

1. Accept responsibility for solving problems and making decisions by accepted scientific principles.
2. Critically analyze published reports of oral health and apply this information to the practice of dental hygiene.
3. Demonstrate the ability to communicate professional knowledge verbally and in writing.
4. Demonstrate the ability to find clinically relevant information using electronic technology.

## IV. DH PROGRAM GRADUATION COMPETENCIES and CODA Standards

**DH GOAL #4: To prepare dental hygienists who will use scientific research in problem solving and critical decision making for all professional activities.**

### COMPETENCY 4

The student will utilize principles of research methodology in order to evaluate the scientific literature, synthesize the information in a critical and effective manner to apply evidence-based approaches to patient care.

**Patient Care, 2-13:** Graduates must be competent in providing the dental hygiene process of care, which includes: ... d) provision of patient-centered treatment and evidence-based care in a manner minimizing risk and optimizing oral health (p. 22).

**Critical Thinking, 2-21:** Graduates must be competent in the evaluation of current scientific literature.

**Intent:** *Dental hygienists should be able to evaluate scientific literature as a basis for life-long learning, evidenced-based practice and as a foundation for adapting to changes in healthcare.* (p. 25)

**Critical Thinking, 2-22:** Graduates must be competent in problem solving strategies related to comprehensive patient care and management of patients. (p. 25)

**Intent:** *Critical thinking and decision-making skills are necessary to provide effective and efficient dental hygiene services.*

**Example:** *demonstration of the use of active learning methods that promote critical appraisal of scientific evidence in combination with clinical application and patient factors.*

**V. LEARNING FORMAT:** Traditional Didactic, Online EBDM Courses, Group Discussion, Cases, Exercises and Use of Computer Technology and Electronic Databases

## VI. LEARNING RESOURCES:

### REQUIRED BOOK

1. Forrest JL, Miller SA. EBDM in ACTION: Developing Competence in EB Practice. Colbert WA: EBD Library, ©2016.

### REQUIRED Articles and Digital/ Online Resources:

2. Forrest JL: DHYG 424 Research Methods Course Syllabus, Module sections, Learning Objectives, PowerPoint slides and activities (**SEE BLACKBOARD**)
3. **NBC News**, <http://video.msnbc.msn.com/nightly-news/47010764/#47010764>
4. Guide to Research Methods, The Evidence Pyramid  
<http://library.downstate.edu/EBM2/2100.htm>
5. Online CE Course on EBDM: Intro and Formulating Good Clinical Questions, course 311. Access via <http://www.dentalcare.com/en-US/conteduc/index.aspx>. Enter access code #\_\_\_\_\_. Make sure you print out a certificate showing successful completion of the course.
6. Complete online CE Course on Searching the Literature Using PubMed, course 340. Access via <http://www.dentalcare.com/en-US/conteduc/index.aspx>. Enter access code: #\_\_\_\_\_. Make sure you print out a certificate showing successful completion of the course.

7. Wilson Dental Library, <http://wdl.usc.edu> for EBD Resources and PubMed; ADA Center for EBD: <http://ebd.ada.org>, Translating Research Into Practice (Trip): <http://tripdatabase.com>,
8. Assigned articles on e-Cigarettes, Lasers, Prosthetic Joint Infections and Flossing Controversy

#### **Critical Appraisal Tools and Statistics for the Non-Statistician (PubMed through USC)**

1. Trisha Greenhalgh. **How to read a paper series, Getting your bearings** (deciding what the paper is about), BMJ 1997; July 26;315(7102):243-6.
2. **CASP** (Critical Appraisal Skills Programme) - <http://www.casp-uk.net/>
3. **CONSORT** (Consolidated Standards of Reporting Trials) – <http://www.consort-statement.org>
4. **PRISMA** (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) <http://www.prisma-statement.org/>

## SCHEDULE and ASSIGNMENTS

WEEKS & DATE	TOPIC	ASSIGNMENT DUE
<b>PREP FOR SESSION on 5/16/17</b>	<p><b>Course Introduction</b>  <b>Course requirements &amp; expectations</b></p> <p><b>Intro to Self-Assessment, the Continuum of Competence, &amp; Evaluation Rubrics</b></p> <p><b>Be prepared for a Quiz each week</b></p>	<ol style="list-style-type: none"> <li><b>1. READ BOOK</b> Intro, Accreditation Standards for DH</li> <li><b>2. READ CHAPTER #1:</b> Becoming a Competent EB Practitioner</li> <li><b>3. Complete the Assignments</b> – these are included in the email, type answers, bring to class. Future Critical Thinking(CT) / Self-Reflection (SR) assignments will be posted on Blackboard for you to download and complete.</li> </ol>
<b>Session II.</b> 5/23/17 10:00 am-Noon <b>Guggenheim</b>	<p><b>Introduction to EBDM</b>  Definition, Principles &amp; the 5 Steps/Skills</p> <p><b>Quiz</b></p>	<ol style="list-style-type: none"> <li><b>1. CHAPTER 2 - Intro to EBDM</b></li> <li><b>2. Complete online course- see slides</b> Access via <a href="http://www.dentalcare.com/en-US/conteduc/index.aspx">http://www.dentalcare.com/en-US/conteduc/index.aspx</a> Enter course #xxxxx</li> <li><b>3. Printout Certificate-bring to class</b></li> <li><b>4. Answer questions on p. 12, Clinical Application</b></li> <li><b>5. Download CT/SR from Blackboard</b>, type answers, bring to class</li> </ol>
<b>Session III.</b> 5/30/17 10:00 am-Noon <b>Guggenheim</b>	<p><b>THE PICO PROCESS</b>  <b>Asking Good Clinical Questions</b></p> <p>Identify Types of PICO Questions  Correcting PICO Components &amp; Qs  Writing a Specific Question</p> <p><b>Quiz</b></p>	<ol style="list-style-type: none"> <li><b>1. CHAPTER 3, PICO PROCESS, Skill 1</b></li> <li><b>2. Complete Exercise 1, CT &amp; SR Qs</b> –download forms from Blackboard</li> </ol>
<b>Session IV.</b> 6/6/17 10:00 am-Noon <b>Guggenheim</b>	<p><b>Research Designs</b>  <b>Primary Research</b>  Quantitative and Qualitative  Experimental and Non-Experimental  <b>and</b>  <b>Secondary Research</b>  Systematic Reviews &amp; Meta-Analyses</p> <p><b>Quiz</b></p>	<ol style="list-style-type: none"> <li><b>1. CHAPTER 4, Primary Research (+ page 44)</b></li> <li><b>2. Complete Exercise 1, CT &amp; SR Qs</b> –download forms from Blackboard</li> <li><b>3. Review Guide to Research Methods</b>-Graphic displays of EBDM and Study Designs: <a href="http://library.downstate.edu/EBM2/2100.htm">http://library.downstate.edu/EBM2/2100.htm</a> through/2700.htm</li> <li><b>4. NBC News,</b> <a href="http://video.msnbc.msn.com/nightly-news/47010764/#">http://video.msnbc.msn.com/nightly-news/47010764/#</a></li> </ol>
<b>Session V.</b> 6/13/17 10:00 am-Noon <b>Learning Resource Center</b>	<p><b>Searching the Literature</b>  Online Searching Activities</p>	<p><b>CHAPTER 6-Finding Evidence, Skill 2</b></p> <ol style="list-style-type: none"> <li><b>1. Complete CASE EXAMPLE on page 60</b></li> <li><b>2. Complete Exercise 1, CT &amp; SR Qs</b></li> <li><b>3. COMPLETE Online Course</b> Access via <a href="http://www.dentalcare.com/en-US/conteduc/index.aspx">http://www.dentalcare.com/en-US/conteduc/index.aspx</a>. Course #yyyyy  <b>Printout Certificate-bring to class</b></li> </ol>
<b>Session VI.</b> 6/20/17 10:00 am-Noon <b>Learning Resource Center</b>	<p><b>Secondary Research Sources</b>  Hierarchy of Evidence Information  Sources, Database Searching</p>	<ol style="list-style-type: none"> <li><b>1. CHAPTER 5, Secondary Research</b></li> <li><b>2. Complete Exercises 1 &amp; 2, CT &amp; SR Qs</b> – download forms from Blackboard</li> </ol>
<b>Session VII.</b> 6/27/17 10:00 am-Noon	<p><b>Mid-term Exam</b>  <b>DH Lab (not Guggenheim)</b></p>	

WEEKS & DATE	TOPIC	ASSIGNMENT DUE
<b>Session VIII.</b> 7/4/17	<b>Happy Birthday America!</b> <b>Enjoy the Holiday</b>	
<b>Session IX.</b> 7/11/17 10:00 am-Noon <b>Guggenheim</b>	<b>Critical Appraisal</b> Research Hypothesis Key Questions Critical Appraisal Tools Article Critique  <b>Quiz</b>	1. <b>CHAPTER 7, Skill 3:</b> Critical Appraisal 2. <b>Complete Exercise 1, CT &amp; SR Qs</b> 3. <b>Greenhalgh:</b> "How to read a paper- getting your bearings..." 4. <b>CASP</b> – Statistical Terms
<b>Session X.</b> 7/18/17 10:00 am-Noon <b>Guggenheim</b>	<b>Descriptive &amp; Inferential Statistics</b> Data Collection, Sampling, Central Tendency and Variability, and Scales/Levels of Measurement  <b>Statistical Analysis</b> Common Statistical Tests t-Tests, Analysis of Variance, p values	1. Intro to Statistics; Descriptive Statistics; and Central Tendency; Sampling 2. <b>Levels of Measurement</b> 3. <b>Discrete and Continuous Data</b> 4. Inferential Statistics
<b>Session XI.</b> 7/25/17 10:00 am-Noon DH Lab	<b>Applying the Evidence</b> Absolute & Relative Risk Presentation of Results/Evidence Clinical vs. Statistical Significance <b>Quiz</b>	1. <b>CHAPTER 8, Skill 4:</b> Applying the Results 2. <b>Complete Exercises 1-3, CT &amp; SR Qs</b>
<b>Session XII.</b> 8/1/17 10:00 am-Noon <b>Guggenheim</b>	<b>Final Exam: Comprehensive</b> Article Critique: PICO, Research Hypothesis, Research Design, Independent/Dependent variables, Statistical Analysis	1. <b>Final Exam Study Questions</b> 2. <b>Article analysis</b>

## VII. Evaluation Methods

Grades will be composed of the following components and weighted on the following basis:

<b>5 Quizzes</b>	= 25%
<b>Homework</b> – Exercises, Critical Thinking/Self Reflection Qs	= 20%
<b>Specific Assignments</b>	
• Completion of EBDM Online course/Quiz	= due 5/23 <b>prior</b> to class
• Completion of PubMed Searching course/Quiz	= due 6/20 <b>prior</b> to class
<b>Conducting a PubMed Search Activity</b>	= 5% 6/20/17
<b>Mid-Term</b> on Sessions I - VI	= 25% 6/27/16
<b>Comprehensive Final Exam</b>	= 25% 8/1/16
A = 90-100    B = 80-89.9    C = 70-79.9    F = under 70	

### Remediation:

All assignments must be completed at a passing level, 70%. Students who not meet the course requirements must re-do the assignment and/or attend a remediation session and complete the requirements at a Passing level. Those who do not achieve an average of 70 on their assignments/quizzes or exams will be given a comprehensive make-up exam on which they must earn a minimum grade of 70. Failure to do so will result in not passing the course. All assignments and requirements must be satisfied by July 25, 2017, to take the final exam.

Active participation in class sessions and activities is incorporated into the weekly homework and in-class activities as part of 20% of your grade.

Active Participation	Moderate Participation	Low Participation
Exhibits evidence of having completed all assignments and activities according to guidelines that were assigned.	Attempts to participate and has completed most assignments and activities	Exhibits lack of preparation and non-completion of required assignments. Has other work out during class and/or is on a mobile or computer device.
Initiates discussion and supports points using page specific references to readings or specific reference points in film/videos	Supports points during discussion but uses general references to readings and other materials	Rarely initiates discussion and is not able to reference required readings or other materials
Furtheres the discussion and builds on the ideas of others; comments and questions reflect having thought deeply about the material	Furtheres the discussion and builds on the ideas of others; general or limited references to course materials	Comments do not further the discussion and do not exhibit careful reflection on the material

### COURSE POLICIES:

1. **Attendance:** Students are expected to arrive prior to the start of each morning and afternoon session. All excused and unexcused missed session must be made up in order to receive a grade for the course. Attendance is factored into your grade.

In case of an emergency, Dr. Forrest must be notified prior to the start of class at [jforrest@usc.edu](mailto:jforrest@usc.edu) or (213) 740-8669 in addition to notifying the Office of Academic Affairs, 740-1001. As courtesy to faculty and classmates, please be prompt to all class sessions. It is your responsibility to make up assignments and missed work.

2. **Assignments:** You are responsible for completing all assignments prior to the start of class and for participating. Students are expected to abide by the ethics policies and are required to do their own work.
3. **Instructor Help:** Please ask questions during class. If there are concepts you do not understand, others also may have the same question. If you feel the need for more in-depth assistance, we can make an appointment to meet at a time outside of class.
4. **Use of Electronic Equipment**  
Cell phones, pagers, personal data devices, computers and other electronic equipment must be turned off at all times while class is in session, unless otherwise directed by the course instructor. Sending and retrieving email or text messages, instant messaging and surfing the Internet while in class is prohibited and will be treated the same as an unexcused absence. Recording devices for taping class sessions may be used upon the approval of the session presenter.

### Statement on Academic Conduct and Support Systems

#### Academic and Professional Conduct:

Should there be any suspicion of academic, professional or ethical dishonesty, students are referred to the Ostrow Student Professional Performance Evaluation Committee (SPPEC). The review process can be found in the [Code of Ethics and Behavioral Guidelines](#) on the School intranet.

**Plagiarism** – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Part B, Section 11, "Behavior Violating University Standards and Appropriate Sanctions" <https://policy.usc.edu/scampus/part-b>. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct>.

### **Scientific Misconduct, Policy, USC ([policy.usc.edu](http://policy.usc.edu))**

July 30, 2013. Scientific Misconduct 1. Purpose. USC faculty, staff and students are expected to conduct research in accordance with the highest ethical standards.

**Discrimination, sexual assault, intimate partner violence, stalking, and harassment are prohibited by the university.** You are encouraged to report all incidents to the *Office of Equity and Diversity/Title IX Office* <http://equity.usc.edu> and/or to the *Department of Public Safety* <http://dps.usc.edu>. This is important for the health and safety of the whole USC community. Faculty and staff must report any information regarding an incident to the Title IX Coordinator who will provide outreach and information to the affected party. The sexual assault resource center webpage <http://sarc.usc.edu> fully describes reporting options. Relationship and Sexual Violence Services <https://engemannshc.usc.edu/rsvp> provides 24/7 confidential support.

### **Support Systems**

A number of USC's schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the *American Language Institute* <http://ali.usc.edu>, which sponsors courses and workshops specifically for international graduate students.

*The Office of Disability Services and Programs* <http://dsp.usc.edu> provides certification for students with disabilities and helps arrange the relevant accommodations.

If an officially declared emergency makes travel to campus infeasible, *USC Emergency Information* <http://emergency.usc.edu/> will provide safety and other updates, including ways in which instruction will be continued by means of Blackboard, teleconferencing, and other technology. In addition, the Herman Ostrow School of Dentistry provides the case library, intranet, email listserv, and other technologies specific to the school. Ostrow students should access the Ostrow School of Dentistry Intranet for additional specific information in the event of an emergency.

## **DHYG 424 RESEARCH METHODS LEARNING OBJECTIVES**

Each chapter of the required book, **EBDM in ACTION: Developing Competence in EB Practice** lists the learning objectives for that chapter as well as the related accreditation standards. In addition, objectives related to statistics include the following:

### **Descriptive & Inferential Statistics:**

Data Collection, Sampling, Central Tendency and Variability, and Scales/Levels of Measurement

After completing this section, learners will be able to:

1. Explain the difference between descriptive and inferential statistics.
2. Identify the category of data described in a research study and whether parametric or non-parametric statistics should be used.
3. Given a study, identify whether the data is discrete or continuous.
4. Given a case or a working hypothesis, write a null hypothesis.
5. Discuss the characteristics of the 4 scales of measurement: nominal, ordinal, interval and ratio.
6. Given a description of different variables, identify the appropriate scale of measurement to use.
7. Define the mean, median and mode and explain when it is appropriate to use each one.
8. Define the range and standard deviation.
9. Given a data set, calculate the mean, median, mode, and range.
10. Discuss why it is important to know the types of data [nominal, ordinal, interval and ratio] to be analyzed.

### **Statistical Analysis, Common Tests:**

Non-parametric & Parametric tests; Measures of Association, t-Tests, Analysis of Variance

After completing this section, learners will be able to:

1. Discuss what hypothesis testing, bias, the role of chance, and the purpose of blinding a study mean.
2. Discuss why a randomized controlled clinical trial [RCT] should be used.
3. Discuss what is meant by probability (p-value) and given a p value, determine the likelihood of a result happening by chance.
4. Identify commonly used parametric and non-parametric statistical tests, their purpose.
5. Given an example of data, identify what commonly used statistical test should be used.
6. Understand the purpose of correlation and regression analysis and when each is used.
7. Explain when Chi square is the appropriate statistical test to use.
8. Discuss the p value and when a null hypothesis is rejected.
9. Given an article in which the data are analyzed using Chi square, interpret the findings.
10. Given a normal curve, identify the mean and standard deviation.
11. Given the mean and standard deviation, calculate the number of scores that fall between +1 and -1 sd.
12. Differentiate between statistical and clinical significance.
13. Identify when following tests would be used for data analysis: t-test (paired, unpaired), ANOVA, Kruskal-Wallis, chi square, Fisher's exact test, Mann-Whitney U, Wilcoxon matched pairs test



## Appendix F. Sample BSDH Level Course Syllabus – ISU

Idaho State University  
Department of Dental Hygiene  
Fall Semester, 2017

**Course Title:** DENT 4401, Research Methods  
**Instructor:** Tara Johnson, RDH, MEd, PhD  
Email: [johntara@isu.edu](mailto:johntara@isu.edu)  
Office Phone: 282-2792  
Cell Phone: 705-5514  
Office: Dental Arts 140  
Office Hours: Monday 1:00 to 4:30

**Course Credit:** 2 Credits

**Course Hours:** Monday, 10:00 am to 12:00 pm

**Location:** REND 213

### Course Description:

This course is designed to acquaint students with research methodology and its application to the dental hygiene profession. Emphasis is placed on heightening student awareness of the need for dental hygiene research, developing student capabilities to identify research problems, encourage evidence-based decision-making, and enable accurate appraisal of literature. PREREQ: MATH 1153 and ENG 1102

### Broad Goals:

1. Cultivate an appreciation for the integral importance of research to the dental hygiene profession.
2. Develop student competence in evidence-based decision making for dental hygiene practice.
3. Strengthen the student's ability to critically evaluate current literature in the oral healthcare field.
4. Cultivate an understanding of the research process and ethics research involving human subjects.

### Required Text(s):

Forrest JL and Miller SA. EBDM in ACTION: Developing Competence in EB Practice. ebdLibrary, Colbert, WA, 2016.  
*Publication Manual of the American Psychological Association, 7th Edition*, 2010.  
ISBN: 9781433805622

### Supplemental Texts/Reading:

Patten, M. L. (2014) *Proposing Empirical Research, 5<sup>th</sup> edition*. Glendale, CA: Pyrczak Publishing.  
Jacobsen, K. H. (2017) *Introduction to Health Research Methods: A Practical Guide, 2<sup>nd</sup> edition*. Fairfax, Virginia: Jones & Bartlett Learning.

Pyrczak, F. (2010) *Making Sense of Statistics: A Conceptual Overview. 4th ed.* Glendale, CA: Pyrczak Publishing.

2016 ADHA National Research Agenda; [www.adha.org/research](http://www.adha.org/research)

*Additional readings and handouts are assigned as needed from current literature (see Moodle postings).*

### GRADE SCALE

A - 4 points 93-100  
A- - 3.7 points 90-92  
B+ - 3.3 points 87-89

B - 3 points 83-86  
B - 2.7 points 80-82  
C+ - 2.3 points 77-79  
C - 2 points 73-76  
C- - 1.7 points 70-72  
D+ 1.3 points 67-69  
D 1 points 63-66  
D- - .7 points 60-62  
F - 0 points Below 60

**Course Policies: See attached**

**Course Requirements and Evaluation (Due Date):**

**Students receiving less than an 80% average in the course or who do not pass competency based assessments will be required to seek remediation before repeating the assignment.**

**Critical Analysis of Scientific Literature Competency: 20%**

**Criteria:** After carefully reading an assigned research article, each student will critique the article by providing: 1) one to two paragraphs analyzing the Introduction, 2) one paragraph addressing the Methods/Materials, 3) one to two paragraphs critiquing the Results, Discussion and Conclusion(s), 4) two to three sentences about the References, and 5) one brief paragraph about the Abstract. (See attached Grading Rubric.) See remediation section above regarding a passing competency score. If a retake is needed, scores will be averaged. Students earning less than an 80% on this competency assessment will be required to remediate and repeat the competency assignment. Students who do not pass the second attempt will earn a D as the final course grade.

**Evidence-Based Practice Competency: 20% (Nov. 14)**

**Criteria:** Based upon a case, each student will use the PICO process to formulate a focused question, conduct a computerized search for the best evidence to answer the question and identify a minimum of three relevant sources of clinical evidence that would be used to answer the question. (Grading Rubric attached) See remediation above for passing competency score; if a retake is needed, scores will be averaged. Students who do not pass the second attempt will earn a D as the final course grade.

**Ethical Considerations in Research Competency: 15% (Nov. 7)**

**Criteria:** Based on the ISU Human Subjects Committee guidelines, apply the ethical principles to a case and determine whether the requirements have been met in various areas of research requirements. (Grading Rubric attached) See remediation above for passing competency score; if a retake is needed, scores will be averaged. Students who do not pass the second attempt will earn a D as the final course grade.

**Weekly Assignments: 15% (Weekly)**

**Criteria:** Exercises from Topics in Patten and Research Methods Worksheets will be assigned throughout the semester. All assignments are due on Moodle by 9 pm on Thursday evenings. (Grading Rubric for weekly assignments attached)

**Midterm Exam: 15% (Oct. 17)**

**Final Examination: 15% (Week of Dec. 12)**

**Criteria:** Examinations are multiple-choice, comprehensive and cover material from the textbook, handouts and lecture

**Detailed information about competency based assignments is attached.**

## **Learning Objectives:**

Upon successful completion of the students will be able to:

1. Begin to cultivate an appreciation for the purpose of dental hygiene research and its role/importance in oral health care provided by dental hygienists through participation in EBDM, critical evaluation, and research ethics learning experiences.
2. Explain how research informs knowledge development and daily practice.
3. Explain how an Evidence-based Decision-Making approach enhances critical thinking and professional decision-making regarding patient care.
4. Demonstrate competence in evidence-based decision-making by completing the EBDM competency.
5. Describe the scientific method and research process.
6. Discuss different research designs and when each is appropriate to use.
7. Explain the role of the Internet and electronic resources in research and how they relate to dental hygiene education, practice and research.
8. Critically analyze different written/paper and electronic information sources.
9. Demonstrate competence in critical analysis of a selected research study published in a journal using accepted criteria for critical appraisal.
10. Conduct an effective literature search using electronic databases [PubMed, Trip, and Cochrane], professional association websites and journals, government documents, product literature and other "paper" publications, video and other forms of multimedia.
11. Use citations to grant appropriate credit to sources and authors cited in the literature review.
12. Evaluate oral health research articles applying concepts of research design and methodology.
13. Gain an appreciation for the role of research in evidence-based dental hygiene practice.
14. Demonstrate competency in identifying the researcher's ethical responsibilities in protecting human subjects in research.
15. Identify basic statistics and scales of measurement commonly employed in health research, including descriptive, inferential, and comparative statistical tests.

**\*\* See companion DENT 4401 syllabus documents: Course Schedule and Evaluation Forms and Rubrics**

## **DENT 4401 Course Policies:**

**Attendance** – Refer to Dental Hygiene Student Handbook for departmental policy.

**Extended Student Absences** - Refer to Dental Hygiene Student Handbook for departmental policy.

**Spelling and/or Grammar** – Spelling will be evaluated on written examinations, competencies, and assignments, and a 0.5 deduction will be made for each error.

**Late Assignments** – Assignments are due on the dates specified in the course syllabus. Late assignments will be penalized with a 5-point per school day deduction. Late assignments with previous arrangements for alternate due dates due to excused absences are due on the specified alternate date with the same penalty applying for late assignments.

**Posting of Grades** – Grades are recorded on each assignment, competency-based assessment, and exam for each student when returned to students following evaluation; therefore, there is need for additional posting of grades.

### **Electronic Devices in the Classroom**

Use of cell phones, computers, and other handheld devices during class time is permitted only for academic purposes.

**Tardiness** – Students are expected to be on time for class. Should an unexpected event occur resulting in late arrival, please enter the class quietly to minimize interruption of instruction. Repeated tardiness

(three or more) will result in a request to not enter class when tardy, and the unexcused absence policy will apply.

**Guests in the Classroom Facilities**

Personal guests are not permitted in the classrooms and lab facilities during class sessions. At times it will be appropriate for pre-dental hygiene majors to observe. In these cases, the course director(s) will make decisions about guests.

**Food in The Classroom** - Student lounges in the building are available for this purpose.

**Academic Dishonesty** - Dishonest conduct in the classroom, laboratory and clinic is unacceptable. The university policy on academic dishonesty, contained in the Student Conduct section of the Faculty and Staff Handbook states, "Academic integrity is expected of all individuals in academe. Behavior beyond reproach must be the norm. Academic dishonesty in any form is unacceptable." Penalties that may be imposed by the instructor are a warning, resubmission of work, grade reduction, failing grade assigned for the course, a failing grade with notation is assigned for the course, suspension from the university or academic expulsion from the university." Combinations of penalties may be imposed; however, any penalty imposed shall be in proportion to the severity of the offense."

## Appendix G. From Concept and Conceptual Model to Theory

### Starting with the Most General

**Concept** – a general notion or idea that is shaped by one's mental view or combination of all of its characteristics or particulars

**Example** – Health and Wellness or Illness, Aging, Caregiving (may mean different things to different people because they are broad notions shaped by various images one has).

**Construct** – an entity, or something we think about) that is conceived and defined in a direct way or given a specific label; to describe a phenomena.

**Example** – Quality of life, optimal oral health; operational definitions are specific means of defining constructs, not as a dictionary would but specifically related to a particular concept, model or proposition (hypothesis). Constructs related to oral health might include periodontal disease and dental caries, both of which can be defined and measured by various indices and assessment tools depending on the operationalization of the terms. In a given study: Would a smooth white spot lesion be included as caries? Would bleeding or bone loss be necessary for periodontal disease? How would these disease characteristics be measured?

**Conceptual Framework and Model** – a school of thought or schematic developed to identify component elements of a concept by listing or integrating the constructs or concepts being considered as its parts; the configuration might take the form of a diagram with the concept at the top and the specific components diagramed to provide meaning or outline propositions. A *conceptual framework and model* is used in research to outline possible courses of action or to present a preferred approach to an idea or thought.

**Example** – One looking at health and wellness might examine particular components of exercise, diet, and stress as they relate to given constructs such as morbidity and mortality or quality of life. Another model might involve deterrents to health such as smoking, obesity, and substance abuse. An oral health professional might include daily oral self-care as an element of health and wellness. One looking at aging might consider ambulatory or non-ambulatory status, or need for better end-of-life options, or edentulous versus dentate.

**Paradigm** – a pattern that affects the lens with which one looks at a concept or conceptual model.

**Example** – An individual who views a dental hygienist as a “member of the dental team who cleans teeth and performs this list of functions with dentist supervision” would develop a different *conceptual model* than someone who conceives of a dental hygienist as a primary oral health care provider who is responsible for preventing oral disease, maintaining health, and non-surgically treating oral disease. This difference in viewpoint would shape the conceptual model, even though both relate to the concept of health and wellness and consider the construct of oral health, periodontal disease and dental caries.

Paradigm concepts are the actual concepts selected for study in a given conceptual model, depending on the viewpoint embraced in that model. In dental hygiene, there are four paradigm concepts: the client, the environment, health/oral health, and dental hygiene actions.

### Moving Into the More Specific

**Theory** – is a set of statements, based on related research findings, that explains, predicts, or controls a given phenomenon. Because there is evidence to support the interrelationship

stated between variables, a theory is more concrete than a concept because there are findings to support it. It falls short of a *fact*, however, because cause-and-effect cannot be proven.

**Example** – *Theoretically*, smoking causes lung cancer; however, 40% of all people diagnosed with lung cancer never smoked, and not all smokers get lung cancer. One *theory* to explain this phenomenon is related to the potential impact of second-hand smoke. Another is related to air quality or chemical and radiation exposure as a child. Individuals with these differing *paradigms* and constructs in their *conceptual model* of *illness*→*cancer*→*lung cancer*→*etiology* would study this *theory* differently.

In sum, a *theory* should be able to explain, predict, and control phenomenon(a); a *conceptual model* hasn't gotten that far yet –it is a well-informed maybe.

**Proposition or hypothesis** – to study something, one must propose something is going to happen (or not happen) given a phenomenon and a related set of constructs or variables. A *hypothesis* makes a proposition that is based on theory or theories documented in the literature and stated in such a way that it can be tested. Independent variables might be manipulated to see whether the dependent variable are impacted or not impacted, and a proposed outcome is tested. The outcome of that study impacts the *theory* or adds to it, so further study will consider all possible propositions from differing viewpoints or *paradigms*. This process is how theories are developed or built. Findings from these studies become a part of the theoretical basis for a given study and, as such, are related back to the theory and related research findings when discussing them.

ADHA Theoretical Framework for Theory Development  
[http://www.adha.org/resources-docs/7614\\_Policy\\_Manual.pdf](http://www.adha.org/resources-docs/7614_Policy_Manual.pdf) (page 27)

*Developed by: Denise M. Bowen, RDH, MS, Emeritus Professor in Dental Hygiene, Idaho State University, April 2011, updated October 2017*

*Based in part on: Darby ML. Theory development and basic research in dental hygiene: review of the literature and recommendations. Report for American Dental Hygienists Association, 1990, 1–86.*

## Appendix H. Synthesis of Research Findings Template

### SYNTHESIS OF RESEARCH FINDINGS

*Literature Review Subtopic 1: (Specify) \_\_\_\_\_*

Author(s), Year, Title, & Instrument	Study Sample/Topic, Purpose of Study and Study Type	Major Findings and Conclusions	Strength of Evidence/ Recommendations for Future Study	Agrees/ Disagrees With Related Sources
<b>Synthesis (bottom line)</b>  <b>What is Known/ Agreement</b>  <b>Unknown/ Disagreement</b>				

*Form developed by Denise Bowen, RDH, MS, Professor Emeritus in Dental Hygiene, ISU, 1/2011, Revised 2017*

# Appendix I. Research Prospectus General Guidelines

## Research Prospectus General Guidelines

### Research Overview

Research, in general, is a quest for knowledge through diligent literature searching, investigation and/or experimentation. It is aimed at discovery and interpretation of new knowledge, or at resolving debatable existing knowledge. It involves a systematic set of procedures for investigation targeted toward identification of new information. At this level of professional education, in the field of dentistry and dental hygiene, one goal is to look beyond what is written and **contribute to the scientific body of knowledge** that directs our discipline. As a beginner, one is usually unsure of how exactly to go about research.

The purpose of these guidelines is to outline the main steps in producing a standard prospectus for a research project. The research proposal is an expanded version of the prospectus, providing more detail about the research project and plans, to be developed after approval of the prospectus by a funding agency, thesis or dissertation advisor, or other interested parties.

### Identifying a Focused Research Topic

Identification of a pertinent topic cannot be accomplished without becoming familiar with the literature within a general area of interest. A thorough review of the literature will help you define the problem that needs to be addressed. You can draw inspiration from other researchers and make use of similar ideas, rather than coming up with your own completely new, unique idea. You can also repeat or reproduce what someone else has done, especially if there are conflicting results within the literature. For example, one can challenge the hypothesis of certain studies or confirm if the study is true for a population of a different ethnicity from the original study.

**Subsequently, the initial literature review will help you identify if your question has already been answered.** Therefore, a **thorough** literature review is mandatory. You do not want to put a lot of time and energy into a project only to find out later that there have already been a substantial number of trials, quantitative studies, or reviews performed, and your research question has been answered. It is not only important to know how much was already published on your topic, but also what the quality of the current evidence is. The idea that leads to your research question not only needs to be **fresh**, but also needs to be **feasible** regarding the availability of adequate subjects, technical expertise, time, money and most importantly **scope**. The idea most definitely needs to be **interesting to the investigator**, **relevant to scientific knowledge** and, last but not least, **ethical**.

### Components of a Research Prospectus

A prospectus is a document that explicitly states the reasoning behind and the structure of a research project.



**A research prospectus usually includes the following components:**

- Project Title Page
- Background
- Statement of the Problem
- Purpose of the Study
- Hypothesis or Research Questions
- Significance of the Study
- Definitions
- Literature Review
- Research Design
- Description of Setting
- Sample Population/Participants
- Instrument(s)
- Procedures and/or Protocols
- Proposed Statistical Analysis
- References

### **Background**

The background section is your opportunity to **briefly** (3-4 paragraphs) introduce readers to your topic and show that your research is relevant. In other words, the background section should be a carefully constructed, subtle argument for the fact that your research simply **needs** to be done.

### **Statement of the Problem**

The purpose of this section is to provide a concise, clear statement(s) (2 sentences) of the problem. What is the problem that the proposed research will help resolve?

**Example:** To date, there have been insufficient studies published regarding acculturation and its impact on oral health behaviors and attitudes. An investigation of a relationship between different acculturation patterns and oral health behaviors and attitudes is needed to identify potential factors that may ultimately clarify the complex relationship between acculturation and oral health.

### **Purpose of the Study**

Clearly and precisely (1 sentence) describe the **intent** of the study.

**Example:** "The purpose of this study is to investigate the efficacy of multiple applications of a 25% silver nitrate (AgNO<sub>3</sub>) solution followed by 5% sodium fluoride (NaF) varnish in the arrest and prevention of caries among high risk children age 5 to 9 over a twelve month period."

### **Hypothesis or Research Questions**

The goal of your study is to find the answer to your hypothesis or research question(s).

In general, experimental, comparative, or quasi-experimental, and cohort studies have hypothesis predicting an outcome of the findings whereas a descriptive or exploratory study such as a survey or qualitative study would have research questions. They are going to

provide the framework for the methodology of the study. Make sure that the content (words and phrasing) of the hypothesis or question(s) reflect the study goals and procedures (1 to 3 bulleted sentences plus an introduction).

### **Significance of the Study**

This section of the prospectus (1-2 paragraphs) indicates **why** the proposed research is important. What is the potential impact of the study? What area of a specific professional, government or health organization's specific objectives or research agenda/priorities will the study address (ADHA, Healthy People 2020, NIH, NIDCR, etc.). It is essential that research address a significant issue needing study as identified by the profession.

### **Definitions**

Each term used in your hypothesis or research question(s) will be defined in this section. Definitions will include one sentence defining the concept with a reference from the literature. It also will include a second sentence that describes the actual method, tool, group or technique to be used in your proposed study; it clarifies the general concept definition specific to your study.

### **Literature Review**

The literature review (approximately 4-5 pages) shows readers/reviewers that you understand your field and have the base knowledge to perform the tasks you propose. Make sure your review includes the most recent publications in the field and the majority of references are from **primary sources**. As a general rule, citations more than 10 years old should **not** be used unless they are absolutely necessary in making the case for the proposed study (such as foundational or landmark studies). The topic of the research prospectus should be selected only **after** you have reviewed the literature and found some gap in it. At this stage of preparing a prospectus, a somewhat more extensive and critical review of the existing knowledge about the research problem is essential. You must find out whether or not others have investigated the same or a similar problem. This is important because it helps further your understanding of the problem and leads to formulating the "statement of the problem". By analyzing relevant literature, it helps identify what others have reported on the issue, including highlights of ongoing research and gaps in existing knowledge. Critical review of the literature and expansion of this section into a chapter occurs when writing the proposal.

It also helps you become familiar with various methods and instruments that have been used, which could also be used in your proposed study. The parameters to be assessed and various end-points to be observed during a study can be proposed in the prospectus only after reading and studying the methods of previous researchers in the topic. The details of the methods section are expanded with Appendices added in the full research proposal.

### **Methods (Description of Setting, Sample Population/Participants, Instruments, Validity and Reliability, Procedures and Protocols)**

The study design (approximately 1.5-2 pages) is the researcher's overall plan to obtain the answer(s) to the hypothesis and/or research questions. The design spells out strategies

for obtaining information that is accurate, objective, and meaningful, and explains the methods that will be used to collect the data. Once the study design has been described, it is necessary to include the sampling methods (study settings, sample size, inclusion/exclusion criteria, etc.); the instrument to be used (survey/questionnaire, indices, diagnostic technique, skill measurement, etc.); and what procedures or protocols will be followed in administering the instrument.

An outline format may be used for the methods section of the prospectus.

## **References**

Use APA format for in-text citations and listing of the references.

*The prospectus guide was developed by Dr. Tara Johnson, Associate Professor, Idaho State University Department of Dental Hygiene*

## Appendix J. Prospectus Example

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Oral Hygiene Behaviours and Attitudes among East Asian Immigrants in Vancouver,  
British Columbia, Canada

Keiko Ogami

Idaho State University

### Background

Acculturation is one of the major factors that influence general and oral health when people move from their home countries to other countries, especially from less developed to more developed countries (Lassetter & Callister, 2009; Gao & McGrath, 2011). Although there has been extensive research in acculturation and general health for over 40 years, there are limited studies published regarding acculturation and oral health. Nonetheless, the influence of acculturation on oral health has received attention in recent years (Gao & McGrath, 2011).

When people migrate from their native countries to other countries, they are exposed to new and sometimes unfamiliar cultures. The term *acculturation* refers to the “phenomena when groups of individuals having different cultures come into continuous first hand contact, with subsequent changes in the original culture patterns of either or both groups” (Redfield, Linton, & Herskovits, 1936, p. 149). Berry (2003) observed that people experience four possible acculturation outcomes after they reside in new countries for a period of time: assimilation (adoption of the dominant culture), rejection (reconfirmation of the traditional culture), integration (combination of the two cultures), or marginalization (detachment from both cultures). Based on these constructs, Barry (2001) developed the East Asian Acculturation Measure (EAAM) as a useful tool for researchers and clinicians to investigate the acculturation patterns of East Asian immigrants. These different outcomes and levels of acculturation are important indicators in assessing health-related knowledge, attitudes, beliefs and practices that possibly influence health status, the utilization of the healthcare system, and clinical outcomes. Mariño, Stuart, Wright, Minas, and Klimidis (2001) found that focusing on cultural factors might be more important than focusing on immigrants’ socioeconomic status (educational level, employment status, or language) when developing public health programs or treatment approaches.

Currently, oral health disparities exist in subpopulation groups including, First Nation populations (indigenous people), the elderly, and new Canadians (landed immigrants) in Canada (Asadoorian, 2009). Oral health disparities are often observed as differences in dental caries rates, periodontal disease, tooth loss, edentulism, oral cancer, and tobacco use. Although strategies for improving general and oral health outcomes have been identified and implemented, these disparities still exist (Charbonneau, Neufeld, Craig, & Donnelly, 2009). Based on findings from two recent studies, certain ethnic groups in the United States, for example, had higher levels of oral disease without regard to income level (Kreps, 2006; Vazquez & Swan, 2003). Charbonneau et al. (2009) stated that addressing level of income and access to care may be only part of health disparity problems. Researchers have explored differences in cultural values, how different ethnic groups view dental professionals in oral care settings and access to oral care (Dong, Loignon, Levine, & Bedos, 2007; Lai & Chau, 2007). Dong et al. (2007) found that Chinese immigrants in Canada had a strong traditional belief in

regards to swelling and bleeding of gingiva. Chinese immigrants believed that gingival swelling was associated with poor oral hygiene as well as *internal fire*, a general factor “which signals an imbalance of body humors in traditional Chinese medicine” (Dong et al., 2007, p. 1346). These researchers suggested that healthcare providers have to be aware of oral health beliefs of Chinese immigrants and acculturation processes in order to understand and provide culturally competent health care to those immigrants (Dong et al., 2007). In addition, researchers working with older Chinese immigrants in Canada reported that most of the top barriers to services were associated with language, cultures, or ethnic difference between the immigrants and healthcare providers or the services provided by those healthcare professionals (Lai & Chau, 2007).

The literature indicates that different levels of acculturation have affected immigrants’ oral health. For example, one study found that immigrant students in Canada have a lower rate of dental visits and poorer oral health status, including gingivitis and caries, than Canadian-born students. However, immigrants who had been in Canada more than six years had better oral health than those who migrated less than two years ago (Locker, Clarke, & Murray, 1998). Mariño et al. (2001) studied acculturation and oral health in depth. They observed that immigrants with a medium level of acculturation had significantly higher decayed, missing, and filled surfaces (DMFS) scores than those with low or high acculturation as both original and mainstream cultures may have protective effects on oral diseases.

### **Statement of the Problem**

To date, there have been insufficient studies published regarding acculturation and its impact on oral health care behaviors and attitudes. An investigation of a relationship between different acculturation patterns and oral health care behaviours and attitudes, therefore, is needed to identify potential factors that may ultimately clarify the complex relationship between acculturation and oral health.

### **Purpose(s) of the Study**

The purpose of this study is to examine relationships between different acculturation patterns and oral hygiene behaviors and attitudes among East Asian adult immigrant populations in Vancouver, British Columbia (BC), Canada.

### **Significance of the Work**

As mentioned, immigrants in Canada have exhibited oral health disparities. Dental hygienists should be able to positively impact these disparities through advocating for policy changes, performing preventive interventions, providing oral health education, including cancer screenings or tobacco cessations, and providing oral health education for other health professionals who deliver their services to underserved populations.

Because dental hygienists are responsible for reducing barriers to care for ethnic minorities by providing culturally appropriate care, knowledge of psychological and behavioral acculturation may provide essential information for public health programs and practitioners. Researchers and dental professionals may be able to identify factors that influence different patterns of acculturation and are linked to specific oral health behaviours and attitudes, leading an improvement in culturally-related oral health behaviors and attitudes of ethnic minority groups.

This study will address one of the pillars of the Canadian Institute of Health Research (CIHR): Social, Cultural, Environmental and Population Health (Canadian Dental Hygienists Association [CDHA], 2003). As examples of research areas associated with this pillar, CDHA (2003) indicated social and economic impact of oral health and disease on populations, barriers and opportunities for oral care for all populations, and cultural and linguistic relevance of dental hygiene services. This study will address one aspect of these research areas that focus on social, cultural environmental and population health rather than traditional biomedical and clinical research. Focusing on this pillar will follow a trend of oral health research in Canada away from the cellular level and towards a focus on individual/population health (CDHA, 2003).

**Note: This study was proposed for Canada. Similar document in the US might be the ADHA Research agenda or Health People 2020.)**

As a result of dissemination of the findings of this study, awareness of patterns of acculturation and oral hygiene behaviors and attitudes of East Asian immigrants may increase among dental hygienists. Ultimately, dental hygienists may utilize the findings from this study in their patient care and education.

### **Research Question(s)**

- Are patterns of acculturation in East Asian adult immigrant populations in Vancouver, BC, Canada related to self-reported oral hygiene behaviors and attitudes scores?

### **Definitions**

**Acculturation.** Phenomena when groups of individuals having different cultures come into continuous first hand contact, with subsequent changes in the original culture patterns of either or both groups (Redfield, Linton, & Herskovits, 1936, p. 149). The focus of this study will be patterns of acculturation.

**Patterns of acculturation.** Framework of acculturation that consisted of assimilation (adoption of the dominant culture), rejection (reconfirmation of the traditional culture), integration (combination of the two cultures), or marginalization (detachment from both cultures; Berry 2003). This variable will be measured by the EAAM to explore patterns of acculturation in this study.

**East Asian adult immigrant populations.** Eastern Asia includes China, Hong Kong, Japan, Korea, Macau, Mongolia, North Korea, Paracel Islands, South Korea, and Taiwan. This study will include landed immigrants who are over 18 years old and came from two East Asian countries, Japan and China. In this study, this population will be the target population from immigrants residing in Vancouver, BC, Canada.

**Self-reported oral hygiene behaviors and attitudes.** Responses of individuals regarding their dental health beliefs s, perceptions, and practices (e.g., toothbrushing, interdental cleaning, home fluoride and frequency of use, which consists of a dichotomous response format (Kawamura, 1988). These variables will be measured by a questionnaire developed by Makoto Kawamura called Hiroshima University-Dental Behavioral Inventory (HU-DBI) and contains 20 items which are related to tooth brushing behaviours and perception about one's oral health (Kawamura, 1988.)

## **Literature Review**

This literature review will provide a discussion regarding the importance of oral health behaviors and attitudes of adult immigrants. Subtopics include: (a) acculturation related to general and oral health, (b) oral health status and dental care utilization in Canada: native vs. immigrant populations, (c) oral hygiene behaviors, attitudes, and health beliefs in East Asian populations. Databases searched for this literature review included MEDLINE through PubMed and CINAHL using combinations of the following search terms: acculturation, Asian ethnicity, oral health, oral disease, behaviors and attitudes, health disparities, oral health disparities, and Canada.

### **Acculturation Related to General and Oral Health**

An acceleration of international immigration occurred during the last century. The number of people who live outside their birth countries increased from 80 to 185 million worldwide between 1970 and 2002. As a result, ethnic and racial diversifications exist in many different countries (Martin & Midgley, 2006). Immigrants normally encounter new cultures when moving from countries of origin to other countries. As mentioned earlier in chapter I, different patterns of acculturation (assimilation, rejection, integration, and marginalization) are exhibited over the time among immigrants (Berry, 2003). The speed and extent of acculturation depends on individuals. Nonetheless, acculturation has practical implications on people's health (Gao & McGrath, 2011).

Researchers have been investigating the impacts of acculturation on general health since the 1960s. There have been many studies of health and behaviours, but results of these studies were inconclusive. For example, one systematic literature review identified a lack of association between culturally and linguistically diverse (CALD) migrants and sport and physical activity (O'Driscoll, Banting, Borkoles, Eime, & Polman, 2013). Another systematic literature review revealed that acculturated immigrants experienced unhealthy weight gain particularly in men, but not in women (Delavari, Sønderlund, Swinburn, Mellor, & Renzaho, 2013). Moreover, in a study involving a Latino population, the association between generation and diabetes was significant; however, the association between acculturation and diabetes was not significant (Afable-Munsuz, Mayeda, Pérez-Stable, & Haan, 2013). Published articles of research findings contain information about limitations of existing published studies, and the authors of published articles have made suggestions for further acculturation studies. The concept of acculturation, for example, was not well understood in the field of study of minority ethnic groups. Developing a valid and reliable instrument of measuring acculturation also has been difficult and complex because different variables such as age at the time of immigration or length of residence in new countries influence the process of acculturation, and there has been also a lack of uniformity in measurement used in studies (O'Driscoll et al., 2013; Delavari et al., 2013; Afable-Munsuz et al., 2013). Therefore, utilization of a standardized international acculturation scale has been recommended by some researchers (Delavari et al., 2013; Afable-Munsuz et al., 2013).

Research of the impact of acculturation on oral health has increased over last two decades, and findings appear to be inconclusive. A study of Somali refugees living in Massachusetts, for example, found that acculturation is a more important factor for preventive dental care utilization than language skills (Geltman et al., 2013b). Another study of the effects of acculturation on oral health in Haitian immigrants in the United States (US) revealed low

caries rate in those immigrants, possibly due to reliable access to dental care (Cruz, Shore, Le Geros, & Tavares, 2004). However, as mentioned, Mariño et al. (2001) reported that moderately psychologically acculturated people tended to have higher DMFS indexes than lower or higher acculturated groups since original and mainstream cultures may have protective effects on dental diseases. Further research of the impacts of patterns of acculturation on oral health self-care behaviors and attitudes, therefore, is necessary in order to provide better information for effective delivery of oral health interventions and reducing oral health disparities (Gao & McGrath, 2011).

Although there have been various acculturation studies in Western countries, for example, Australia, Canada, and the United States, there are limited or no studies published based on the immigrant populations in Vancouver, BC, Canada. The studies conducted in other Western countries or cities have revealed that acculturation impacts general and oral health and utilization of dental services (Locker et al., 1998; Gao & McGrath, 2011; Lassetter & Callister, 2009; Newbold & Patel, 2006; Mariño et al., 2001). The studies also identified factors that influence acculturation such as length of residency and proportion of life in host countries, age at the time of immigration, languages, countries of birth, socio-economic status, cultures, traditional health beliefs, and ethnic difference between the patients and service providers (Cruz et al., 2009; Dong et al., 2007; Lai & Chau, 2007).

(Note: This is only the first subtopic of the literature review. The student would ultimately add the remaining two subtopics: (b) oral health status and dental care utilization in Canada: native vs. immigrant populations, (c) oral hygiene behaviors, attitudes, and health beliefs in East Asian populations.

### **Study Design**

Participants will complete two different valid and reliable instruments of self-administered questionnaires: the Hiroshima University-Dental Behavioral Inventory (HU-DBI) and the East Asian Acculturation Measure (EAAM) or the East Asian Acculturation Measure-Chinese version (EAAM-C) if participants are Chinese. The HU-DBI will consist of 20 questions regarding tooth brushing behaviours and perception about one's oral health (Kawamura, 1988). The EAAM will consist of 29-item and the EAAM-C will contain 16 items of self-administered questions related to different status in acculturation: assimilation, separation (rejection), integration and marginalization (Barry, 2001; Kuo, Chang, Chang, Chou, & Chen, 2013).

### **Sample**

Participants will be East Asian immigrants in Vancouver, BC, who are older than 18 years old and whose primary languages are not English. Those participants, however, should be able to understand English sufficiently, or be able to obtain someone else's help, to complete questionnaires. The participants also must have migrated to Canada less than 30 years ago (*I may need to consult with a statistician regarding appropriate resident years of participants in Canada*). Asian immigrants can be Chinese, East Indians, Philippines, Korean, Japanese, and others who are from South East Asia. Thirty (*this is tentative numbers and need to discuss with a statistician*) participants will be recruited as a convenience sample through local churches, community-based organization, and other social groups in Vancouver, BC. Newspaper advertisements, especially in those published for Asian audiences, will be used for recruitment as needed. A snowball sample in which subject identify other potential participants also may be



used. An incentive such as a drawing for a gift card may be offered as an incentive to enroll in and complete the study.

### **Methods of Data Collection and Analysis**

An application for expedited review and approval of the study will be submitted to the Idaho State University Human Subjects Committee for approval prior to conducting the survey. Before completing questionnaires, the individuals who agree to participate in the project must sign consent forms. Participants will have opportunities to ask questions and address concerns about the project. Instructions will explain that participants need to be able to read and understand English, or when the participants do not understand English, someone else has to translate from English to the participants' language in order to obtain informed consent. Questionnaires are available in English, Chinese and Japanese languages, so one of those three languages would be required for enrollment. Other inclusion criteria included 18 years of age or older and immigration from Japan or China to Canada. As outcomes of the HU-DBI, EAAM, and EAAM-C are dichotomous variables, these results will be analyzed through logistic regression models (Jacobsen, 2012). *I will ask a statistician if there is simpler analysis for the project and will need to find out how to analyze data.*

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## Appendix K. Sample MSDH Level Research Course Syllabus

### Idaho State University Health Research DENT 6646 - Fall 2017

**Professor:** Tara Johnson, RDH, Ph.D. Office: Dental Hygiene Sciences, Office 140; Phone: 208.282.2792 / email: johntara@isu.edu

**Course:** 3 credits/online

**Course Description:** Development of foundations in health research and design. The focus will be on effective research design with critical analysis and synthesis of evidence-based literature leading to identification of problems for research. **Prereq or coreq: Undergraduate statistics or biostatistics course.**

### Course Aims

*Aim 1:* To acquaint the student with the process of scientific research in the health sciences. Research plays a critical role in advancing our basic and clinical knowledge in the health sciences. While not all students in health science programs become researchers, the majority of health science professionals make use of research to guide their clinical decisions. Familiarity with the research process will help the student apply research results to the student's clinical and teaching endeavors. However one views research, it is imperative that health professionals becomes good consumers of research in that the student is able to read, analyze, interpret, and understand research processes and results.

*Aim 2:* Facilitate the identification of a thesis topic and help the student begin writing a prospectus document. The purpose of writing a prospectus document is to provide an avenue to develop a clear and concise overview of the proposed study, so both the student and thesis faculty committee can determine the feasibility and conceptualization of the planned study.

Specifically, the prospectus document will include: Background, Statement of the Problem, Purpose of the Study, Research Questions, Significance of the Study, Definitions, Literature Review (brief, current and high quality), Study Design, Population/Sample, and Overview of Proposed Methods. The thesis project is a major component of a graduate student's course of study. Learning to write well is a continual process and is helped through practice and external input. Therefore, the course is designed with opportunities to enhance writing skills through practice and constructive peer and instructor feedback.

*Aim 3:* Create an online venue where students can interact, and find common areas of interest through a variety of assignments and activities including, for example, online discussions, journal article reviews, and peer writing critiques.

### Specific Course Objectives

1. Students will understand the process of research and the scientific method.
2. Students will apply the principles of the evidence pyramid and use the highest quality of evidence to select and support chosen research topics.

3. Students will critically analyze research articles, including the abstract, review of literature, methods, results, and discussion sections.
4. Students will become familiar with commonly used principles and terminology in statistical analysis.
5. Students will be familiar with ethical considerations when conducting research.
6. Students will understand the application of quantitative and qualitative research methods
7. Students will complete the course with a written clinically relevant research prospectus (Background, Statement of the Problem, Purpose of the Study, Research Questions, Significance of the Study, Definitions, Literature Review) that is clinically relevant, using sound methodology, written in APA format that can form the foundation for a master's thesis project.

### **Important Notes**

The benefit of an online course includes the freedom it gives each of you to access the course and its instructional materials at any time from any location with an Internet connection. A potential drawback is the need for the student to be self-directed and motivated to complete the work in a timely fashion. Please pay close attention to the weekly readings, course activities/assignments and prospectus development assignments and provide enough time to thoroughly “digest” and learn the information. Individual telephone conferences with the faculty are available when needed. Please email to request one and provide options for date and times.

### **Required Texts**

Patten ML. *Proposing Empirical Research*, 5<sup>th</sup> edition. Pyczak Publishing, 2014.  
*Writing the Winning Thesis or Dissertation: A Step by Step Guide*. Randy L. Joyner, William A. Rouse, Allan A. Glatthorn. 3<sup>rd</sup> edition, 2013. ISBN-13: 978-1452258782.  
*Publication Manual of the American Psychological Association*, 7th Edition, 2010. ISBN: 9781433805622

### **Recommended Texts**

*Introduction to Health Research Methods: A Practical Guide*, 2<sup>nd</sup> edition. Kathryn H. Jacobsen; Jones & Bartlett Learning, 2017.

### **Course Format**

This online course will consist of weekly assignments, online discussion and peer reviews, drafts of each section of the research prospectus, and the final research prospectus.

### **The Research Prospectus**

A significant aim of this course is to have the student become familiar with the research process. In order to accomplish this goal each student will be responsible for writing a research prospectus, which will include the following areas: Background, Statement of the Problem, Purpose of the Study, Research Questions, Significance of the Study, Definitions. Literature Review (brief, current and high quality)), Study Design, Population/Sample, and Overview of Proposed Methods; a more detailed explanation and examples of these areas will be provided within the first few weeks of the semester. Pay attention to the due dates for different sections of the research prospectus assignments. The final prospectus will be 10-12 pages not counting the reference pages.

A shorter version (5 pages maximum) will be submitted to the graduate program director, excluding the literature review and other information chosen by the student, for assignment of dental hygiene faculty to serve on the thesis committee.

The assignments related to the research prospectus consist of a sequence of activities that will move the student through the process of writing the prospectus. Writing is a process and, generally, the more time you give to writing practice, the better you'll become at writing. The weekly assignments listed in Moodle will provide the student with the information to help complete each portion of the research prospectus. It is recommended that students plan in advance for submission of prospectus sections and use the ISU Online Writing Center.

- Weekly assignments, Online peer discussions, Article Reviews, and Writing Critiques: 25%
    - Optional open forums are not required, but this area is a good place to ask questions of your classmates or help each other, so please check weekly to see if anyone has posted discussion items or questions.
    - Draft of Background Information, problem Statement, Purpose, Research Questions/ Hypothesis, Significance of the Study, Definitions: 10%
    - Draft of Literature Review Section: 20%
    - Draft of Methods Section: 10%
    - Final Written Research Prospectus: 35%
- Refer to evaluation criteria or rubrics provided on Moodle for each assignment. All assignments will be due Sunday at 11:00pm MT at the end of the week posted on the syllabus and Moodle. Students are encouraged to complete exercises in the Patten text earlier in the week to facilitate completion of related assignments.

A = 95-100%	A- = 90-94%	B+ = 87-89%	B = 83-86%	B- = 80-82%	
C+ = 77-79%	C = 73-76%	C- = 70-72%	D+ = 67-69%	D = 63-66%	D- = 60-62%

### **Reasonable Accommodation**

Our program is committed to all students achieving their potential. If you have a disability or think you have a disability (physical, learning disability, hearing, vision, psychiatric), which may need a reasonable accommodation, please contact Disability Services located in the Rendezvous Complex, Room 125, 282-3599 as early as possible (<http://www.isu.edu/ada4isu/>). Topics, assignments and readings subject to change; consult Moodle for updates and for writing and other assignments.

**The course schedule for the semester follows. Additional details will be posted on Moodle regarding readings and assignments. Students should access this information on a weekly basis.**

**Week 1: 8/21 – 8/27**

**Introduction to Research/ Selecting a General Topic Area / The Evidence Pyramid**

Readings: Patten: Topics 1-3

Handouts: 1) Levels of evidence related to type of research; 2) overview of the research process, 3) Narrative vs. Systematic Literature Reviews

Assignments: (to be evaluated but non-graded) – Due Friday at noon

- Introduce yourself to classmates on Moodle, post one (or two) idea(s) on your broad topic of interest
- Complete and post exercises for Topic 3, Patten using your one or two broad problem area(s) – 3 is not required.
- Search the electronic database, **PubMed**, found on the lists of databases available on the Health Science Library locate 5 abstracts related to your broad topic area of interest and published in credible journals, during the last 5 years. Remember the highest levels of evidence include systematic review or meta-analysis, randomized controlled trial/clinical trial OR cohort study OR case-control study, official government or professional association position paper; submit to assignment folder.
- Note the areas within that broad topic that need future research. Also, note the directions these researchers have taken to study a specific aspect of the broad topic and whether these aspects of study might interest you for your prospectus.
- Submit your Search History by selecting Advanced link under the **PubMed** search box, locate the History under the search boxes, download it on right side of screen (requires Excel) or copy and paste it into a Word document.

**Week 2: 8/30 – 9/5**

**Narrowing Broad Topic of Interest and Finding Literature to Support the More Specific Aspect of the Broad Topic / Theoretical Foundations in Research / Qualitative vs Quantitative Research Overview**

Readings: Patten Topics 8, 9, 10, 11, & 12

Video: Understanding the difference between concepts, models and theories

<https://www.youtube.com/watch?v=XLMwtNDi1ok>

Handouts: Qualitative vs. Quantitative Handout Worksheet, ADHA Research Agenda, ADEA Strategic Directions

Assignments:

- Complete exercises for Chapter 9 and 10 and submit
- Complete the qualitative vs. quantitative research work sheet and submit
- Continue searching PubMed as needed to locate at least one abstract (preferably more) that addresses a specific aspect of your topic area that you might be interest in pursuing. Use the MeSH terms listed for that abstract (or abstracts). Submit at least 5 abstracts representing the highest quality of evidence and assuring direct relationship to your more focused topic (may include some from week 1 as appropriate) (non-graded).
- Submit Search History #2 including revised MeSH terms used, adding those terms that are more directly related to your topic of interest (updated and downloaded from PubMed) (non-graded)

- Obtain full text articles for the 5 selected abstracts, review them and consider the discussion and recommendations for future research, and complete the Recommendations for Future Research assignment worksheet

**Attend video conferencing session to discuss how your work to date is helping to move your general topic into a revised, more focused idea that you might pursue in your prospectus. (Details TBA.)**

**Week 3: 9/4 – 9/10**

**Literature Review / Prospectus Overview**

Readings:

- Patten: Topic 19 and review the exercises
- Handout regarding Points to Consider for Outlining Topics and Subtopics for Literature Review
- Handouts regarding Literature Review Outline and Example

Assignments:

- Review prospectus examples and the entire prospectus guide, especially pertaining to first sections of prospectus prior to literature review section.
- Continue to search databases (e.g., PubMed), locate at least 8 full text articles from the highest levels of current evidence related to your more focused topic area (some may be from previous weeks if appropriate). (Note: As you are moving forward, you will be building your resources and references beyond what is submitted for evaluation.) Cut and paste the abstracts into one document and submit.
- Narrow your broad topic area into a more focused research topic. Using your articles and abstracts collected to date (include at least the 8 above but may also include others), submit the following:
  - A description of your more refined topic
  - An outline including major and minor headings (subtopics) that you have identified as potentially related to your overall topics in your literature search
  - Place bibliographic references under each heading to demonstrate organization of literature into these subtopics

**Week 4: 9/11 – 9/17**

**Building a Knowledge Base through the Literature Review; Writing the Prospectus: Background and Problem Statement; Purpose of the Study**

Readings:

- Patten: Topic 4, 5, 6, and 7 and consider the exercises
- Handout: Guide to the Literature Review, Examples of Literature Review Paragraphs

Assignments:

- Discussion forum via online conferencing to pose questions and discuss progress to date.
- Submit first draft of background information, problem statement and purpose of the study, prospectus (non-graded); use rubric for informal self-evaluation
- Begin building and organizing literature related to your topic and subtopics and enter into bibliography (APA style).
- Work with ISU's Online Writing Center as needed for writing assignments. (Note: Students referred to ISU's Online Writing Center may be required to document consultations)



**Week 5: 9/18 – 9/24**

**Significance of the Study / Research Questions or Hypothesis / Definitions**

Readings:

- Handouts: Significance of the Study/Definitions Explanations – Satisfactory significance statements MUST be directly linked to the research objectives, agenda or priorities of a major professional or governmental agency.
- Website and links available regarding developing research questions and hypothesis  
[https://cirt.gcu.edu/research/developmentresources/research\\_ready/quantresearch/question\\_hypoth](https://cirt.gcu.edu/research/developmentresources/research_ready/quantresearch/question_hypoth)

Assignments:

- Submit non-graded draft of significance of the study, research questions and/or hypothesis, and definitions sections of prospectus; use rubric for informal self-evaluation
- Continue work on literature searching and review and organizing chapter sections
- Open discussion forum available to pose questions and discuss progress to date.
- Open discussion forum

**Attend video conferencing session for Q&A.**

**Week 6: 9/25-10/1**

**Synthesizing the Literature and Writing the Literature Review / Critical Analysis of Literature**

Readings:

- Patten Topics 20, 22-26 and consider the exercises
- Handout Tips for Completing Literature Review
- Review literature review handouts, focus on literature review sections of the prospectus guide and prospectus examples
- Critical Analysis of Research Article Guide, JDH article, Critical Analysis Checklist & Rubric

Assignments:

- Submit draft of background, problem, purpose sections of prospectus for initial grading and evaluation
- Begin writing first draft of literature review section of the prospectus
- Work with ISU'S Online Writing Center as needed for writing assignments.
- Submit Critical Analysis Checklist based on the assigned JDH article

**Week 7 10/2 – 10/8**

**Research Ethics and CITI training / Experimental vs. Non-Experimental Studies / Causal-Comparative**

Readings:

- Patten Topics 16 & 17 and 36, 39
- Human Subjects Committee (HSC) Overview Slide Series and Website  
<https://www.isu.edu/research/research-support/research-outreach-and-compliance/human-subjects/>
- Introduction to CITI <https://about.citiprogram.org/en/series/human-subjects-research-hsr/>  
(Note: Training can be completed any time before thesis: Human Subjects Research (HSR), Information Privacy and Security (IPS) and Responsible Conduct of Research (RCR), and any other applicable areas)

Assignments:

- Submit draft of research questions or hypothesis, significance, and definitions sections

- of prospectus for initial evaluation and grading.
- Complete Research Ethics discussion thread Q&A
- Continue work on literature review section of prospectus and with ISU'S Online Writing Center as needed

#### **Week 8: 10/9 – 10/15**

##### **Survey/ Questionnaires and Interviews/ Correlational**

###### Readings:

- Patten: Topic 13, 14
- Jacobsen PowerPoint Presentations (posted on Moodle): Ch. 18 Questionnaires, Chapter 19 Surveys and Interviews

###### Assignments:

- Submit a paragraph or two in the discussion thread. Include the purpose of your proposed research project, briefly describe its significance, and identify the variables to be assessed. Other students should make suggestions, pose questions, and provide substantive comments.
- Begin to write literature review section of prospectus

#### **Week 9 10/16 – 10/22**

##### **Sampling and Estimating Sample Size**

###### Readings:

- Patten: Topics 27, 28, 29, 30, 31 and consider the exercises as applicable

###### Assignments:

- Submit non-graded draft of literature review section of prospectus; use rubric for informal self-evaluation; use rubric for self-evaluation
  - Complete the Research Approach and Sampling Worksheet
- Attend open discussion by video to pose questions and discuss progress to date.**

#### **Week 10 10/23 – 10/29**

##### **Selecting a Methodology / Validity and Reliability**

Readings: Patten: Topics 32, 33, 34, 35, 37, 38

Handout on Content Validity, Face Validity vs. Pilot Study

Review information regarding instrument validity and reliability online at

<http://researchrundowns.wordpress.com/quantitative-methods/instrument-validity-reliability/>

###### Assignments:

- Begin to write the methods section of prospectus, reviewing those prospectus examples and the related section of the prospectus guide
- Complete Validity and Reliability Worksheet and submit

#### **Week 11 10/30 – 11/5**

##### **Selecting a Methodology (continued) and Writing the Methods Section of the Prospectus**

###### Assignments:

- Submit literature review section of prospectus for evaluation and grading
- Begin to finalize the methods section of the prospectus
- Review the methods section of the critical analysis checklist you used earlier in the semester as a means of planning your own methods.

**Week 12      11/6 – 11/12**

**Critically Revising Your Writing and the Prospectus**

Reading:

Jacobson: Ch. 32 PPT (posted on Moodle)

Assignment:

- Submit non-graded draft of methods section for evaluation and complete rubric for informal self-evaluation
- Write, revise and edit prospectus sections evaluated to date (through literature review) to begin to prepare for peer review (to be submitted next week).

**Week 13      11/13 – 11/19**

**No new topics of discussion**

Assignments:

- Submit draft of methods section for grading/evaluation

**Week 14      11/20 - 11/26**

**Thanksgiving Break**

Assignment

- Submit draft of entire prospectus online for peer review (students will be assigned one other student for prospectus peer review assignment) and complete the final prospectus rubric for informal self-evaluation

**Week 15      11/27 –12/3**

**No new topics of discussion**

**Advising phone session with Dr. Tara Johnson required / Discussion and questions regarding finalizing prospectus (schedule to be posted the week previous to this one)**

Assignments:

- Submit peer review edits/comments included on draft of the assigned classmate's prospectus
- Submit prospectus rubric for that other student

**Week 16      12/4 – 12/10**

**Finalizing the Prospectus**

Assignment:

- Finalize all sections of prospectus for submission as final assignment

**Week 17      No final exam due to prospectus submission on 12/10**

## **Appendix L. Graduate Level Course On Clinical Trials**

### **COURSE DESCRIPTION:**

Clinical trials are those studies conducted in human populations in order to systematically determine what factors (new drugs, treatments or biopsychosocial factors) impact specific health outcomes. In this course, we will explore the theoretical and practical knowledge required for the design of, and ethical conduct of clinical trials. Key concepts of clinical trial design will be discussed relative to various health topics. The implications of clinical trials in clinical decision making, patient care and public health practice will be explored. In this course, experienced clinical researchers will demonstrate how the core elements of clinical trials are adapted to special situations depending on the discipline under study, research question, target population or ethics of human experiments. Assigned exercises (both in and out of class) are designed to give the student an opportunity demonstrate application of principles of good clinical practice, and to increase students' competency in evaluating and planning clinical trials. This knowledge is indispensable for certificate, masters or doctoral level programs in the health sciences. This course is intended for all health professional students who desire advanced training in methods to help them plan, conduct and interpret findings from clinical studies.

### **COURSE OVERVIEW AND OBJECTIVES**

Cognitive psychology has shown that students learn most effectively when they participate in active construction of both meaning and application of materials. Therefore, this class will be primary experiential with class sessions organized to include an initial review of key concepts of the clinical trial "system", followed by either group discussion or guest presentations from clinical trials researchers from various disciplines.

Specifically, the course will enable you to:

1. Apply principles of human subjects' research to the critical evaluation of clinical trials designs in various health-related disciplines.
2. Describe the designs and phases used in clinical trials and identify appropriate application of these designs to various research questions.
3. Understand the relationship between theory and the identification of a meaningful research question and research design principles needed to answer it.
4. Define and appropriately use clinical trials terminology.
5. Analyze and discuss the potential impact clinical trials have on the practice of medicine or allied health.
6. Estimate the sample size for a clinical trial given multiple contingencies such as availability of subjects, meaningful effect size estimates and study design.
7. Describe role of ethics committees, HIPAA and Data Safety Monitoring Boards in oversight of clinical trials.
8. Utilize current guidelines for conducting and reporting results from clinical trials (ICH Guidelines, ClinicalTrials.gov, CONSORT Statement).

## Appendix D. Flow Chart for Choosing a Statistical Test (moved to last page)

**Developed by Kathryn  
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