American Dental Hygienists' Association

NATIONAL DENTAL HYGIENE RESEARCH AGENDA

Leading the transformation of the dental hygiene profession to improve the public's oral and overall health.

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INTRODUCTION

A profession involves the acquisition of knowledge and skills in a unique area through formal training. A discipline is a branch of knowledge studied and expanded through higher education and research, while a profession consists of persons educated in the discipline according to nationally regulated, defined and monitored standards.[1] The regulation of a profession and establishment of clinical standards are important aspects of the social contract between a profession and the society it serves.

The American Dental Hygienists' Association (ADHA) acknowledges the importance of a body of research unique to dental hygiene in defining it as a profession and developing it into a discipline. The aim of the dental hygiene research agenda is to provide a framework to guide those members of the profession who desire to add to the body of knowledge that defines the dental hygiene profession. In recognition of the importance of relevancy of the NDHRA to the dental hygiene profession, ADHA is committed to the ongoing updating of the NDHRA as the dental hygiene body of knowledge expands

ADHA defines the discipline of dental hygiene as the art and science of preventive oral health care including the management of behaviors to prevent oral disease and promote health.[2] The ADHA research agenda proposes to continue to develop and add to the body of knowledge that defines the profession. As research builds the discipline of dental hygiene, the profession demonstrates its value to society through the provision of service and care, and ultimately, improved oral health.

Historically, dental hygiene has drawn in part on other disciplines, such as the disciplines of periodontics and public health, for the evidence used to support its own practice and education. The generation of scientific knowledge and utilization of an interdisciplinary approach to knowledge benefits the profession through shared initiatives and perspectives. The goal of increasing dental hygienists' participation in research is to grow beyond reliance on research originating from other disciplines and, instead, build upon existing research so the knowledge base can emerge from within dental hygiene itself.[3] To this end, the framework of the dental hygiene research agenda directs dental hygiene researchers to contribute knowledge that is unique to dental hygiene. The 5 primary objectives that were the basis for the creation of the National Dental Hygiene Research Agenda still remain applicable today:[4]

1. To give visibility to research activities that enhance the profession's ability to promote the health and well-being of the public;
2. To enhance research collaboration among members of the dental hygiene community and other professional communities;
3. To communicate research priorities to legislative and policy-making bodies;
4. To stimulate progress toward meeting national health objectives; and
5. To translate the outcomes of basic science and applied research into theoretical frameworks to form the basis for dental hygiene education and practice.

The updated research agenda visually illustrates how the areas of dental hygiene research move through discovery, testing and translation into education and practice. Discovery is the phase of research where ideas are generated, testing is where concepts and interventions are implemented and outcomes are

generated and evaluated, and translation disseminates findings to the profession and to the scientific community at large.

Translational research aims to "translate" findings from basic science research into interprofessional medical, nursing and dental practice for improving health outcomes. Decisions for practice or subsequent research are based on all phases: discovery, testing and translation. For example, the discovery phase of research might document barriers, while the testing phase considers assessing interventions and improving application of science to practice. Within the translation level of research, the process of translating or moving findings from research into practice is examined. It verifies that the application of these findings results in improved health for clients and populations. Research hypothesis need to be tested and then applied (translated) in real life settings with outcomes measured and assessed.

Using the three phases of research changes the way we conceptualize the dental hygiene research agenda from a linear design with a list of objectives to a visual display showing the inter-relationship existing between the phases of research and themes or areas of research. The new visual display was designed recognizing that all research is interconnected and multifactorial, while also recognizing that results can influence future need for additional research.

PERSPECTIVES ON THE ADHA RESEARCH AGENDA

Dental hygiene and research have been linked since the early 1900s. In 1914, Dr. Fones' 5-year study in public schools demonstrated that dental hygienists can positively impact oral disease using education and preventive methods.[5] Dental hygienists today are increasingly becoming involved in research at all levels and are helping to provide data that will impact the profession for years to come.

The first ADHA National Dental Hygiene Research Agenda (NDHRA) was developed in 1993 by the ADHA Council on Research and adopted by the ADHA House of Delegates in 1994.[4] A Delphi study was used to establish consensus and focus the research topics for the agenda.[6] This was the first step to guide research efforts that support the ADHA strategic plan and goals. A research agenda provides direction for the development of a unique body of knowledge that is the foundation of any health care discipline and, as such, should be used to drive the activities of the profession.

In 2001, the Council on Research revised the agenda to reflect a changing environment based on two national reports: The Surgeon General's Report on Oral Health and Healthy People 2010. Input from the 2000 National Dental Hygiene Research Conference sponsored by ADHA was considered in the revision. The revised document was released in October 2001 and prioritized the key areas of research.[7]

In 2007, the agenda was revised to reflect current research priorities aimed at meeting national health objectives and to systematically advance dental hygiene's unique body of knowledge. These revisions were based on a Delphi study that was conducted to gain consensus on research priorities.[8]

A goal of the present (2016) revision is to allow greater usability of the agenda across the profession and interprofessionally. The cohesive, coherent visual illustration that constitutes this revision might assist educators in disseminating research concepts to students. By showing the relationships among the priorities, the themes and the research process, the Council on Research hopes to improve understanding of how dental hygienists can use the research agenda. Research is an ongoing process. Contributions can be made to it, and priorities can be revised, at any phase in the model, from discovery through testing, evaluation, dissemination and translation.

In this revision, the Council on Research has integrated feedback on the revised presentation of the agenda received from research meetings with representatives of the International Federation of Dental Hygiene, the Canadian Dental Hygienists Association and The National Center for Dental Hygiene Research and Practice. Feedback from graduate dental hygiene program directors and dental hygiene researchers was included. The revised research agenda allows for ongoing study of specific questions to support the growth of the profession. It also allows for investigation and testing of ideas that will further the transformation of dental hygiene as a profession and facilitates interprofessional collaborations.

RESEARCH AS A FOUNDATION FOR DENTAL HYGIENE EDUCATION AND PRACTICE

Research provides a foundation for continued development of dental hygiene practice guidelines and, ultimately, optimizes care for individuals, groups, communities and global populations through the use of evidence-based practices. Such a foundation supports the development of position papers that inform practice parameters and standards. Clinicians, researchers and educators can thus use the revised research agenda to generate and publish data to support the ongoing transformation of the profession in the various areas proposed, and to drive activities to build upon other areas not yet defined that might emerge as a result of transformation. Educators can use the agenda to support the ongoing growth and development of both clinicians and junior researchers to guide efforts to advance the profession while identifying new research directions that emerge.[9]

Research supports ongoing investigation into fundamental topics of concern to clinicians such as oral and craniofacial diseases and their mechanisms and causation, including inflammation, infection, genetics, neoplasm and the microbiome. Findings might be used to identify strategies to manage or eliminate localized or systemic disease through clinical care; improve delivery of preventive and oral health care services; and identify ways to improve access to care for individuals, groups and populations.

In the same way, research supports transformation of the process of dental hygiene education. It seeks new methods for basic and advanced education of dental hygiene professionals and investigates the outcomes of different programs. For example, research might assess differences between baccalaureate and associate level education with respect to outcomes in the areas of patient care, dental hygiene scope of practice, access to vulnerable populations and career satisfaction.

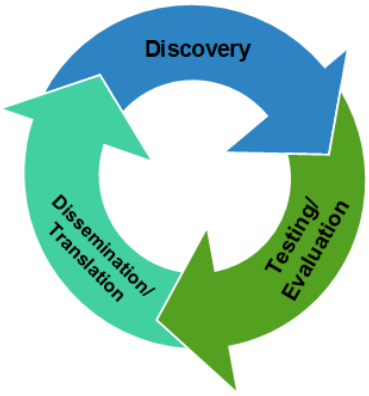
FRAMEWORK FOR DENTAL HYGIENE PRACTICE AND THE DISCIPLINE

As dental hygiene research advances, it is important to formulate research questions within the conceptual framework of dental hygiene theory. Some theoretical models have been developed, but many have yet to be tested. Rogers' theory of diffusion of innovations is an example of a model that might benefit dental hygienists wishing to study the translation or possibly the implementation of research into practice.[10] Models or theoretical frameworks of care delivery allow the profession to develop from the discipline. Before posing a research question, it is important to consider from a conceptual level the approach to be used for any given area or phase of research. Using dental hygiene theory to frame individual research questions will assist in building a strong, scientifically sound foundation.

ADHA DENTAL HYGIENE CONCEPTUAL RESEARCH MODEL

The ADHA Dental Hygiene Conceptual Research Model illustrates the interrelationship of the areas of dental hygiene research as they progress through the phases of research and move from the level of professional development to influence client-level care and ultimately population health. As Figure 1 below illustrates, the phases of research are not linear; each phase asks and answers questions that are intended to allow progression to the next phase, with the study of dissemination and translation effectiveness ultimately circling back to questions of discovery in the search for better answers and methods. It is important to note that in any of these phases of investigation, there may be a need to go back to an earlier level to re-frame or reconsider moving forward. In other words, this model is dynamic, not static.

FIGURE 1: PHASES OF RESEARCH



Areas of research are equally dynamic. Professional development begins with education, which influences how the profession of dental hygiene is regulated and vice versa. Both influence client-level care and ultimately population-level health. As new methods for health services and access to care are realized, the profession must circle back to evaluate the education and regulation of dental hygiene. As illustrated in Figure 2 below, at the intersection of Areas of Research and each Phase of Research, topics of emphasis are illustrated.

As early as 1994, ADHA selected five paradigm concepts to study and has used these concepts to organize previous agendas. The five major concepts are: Health Promotion / Disease Prevention, Health Services Research, Professional Education and Development, Clinical Dental Hygiene Care and Occupational Health and Safety. The dental hygiene conceptual research model captures these five paradigm concepts and illustrates how they might be approached at different phases in the research process.

FIGURE 2: CONCEPTUAL RESEARCH MODEL

Areas of Research		Phases of Research		
		Discovery	**Testing/ Evaluation**	**Dissemination/ Translation**
Professional development	Education	Evaluation	Educational models	Interprofessional education
	Regulation	Emerging work force models	Scope of practice	Interprofessional collaboration
	Occupational health	Determination and assessment of risks	Methods to reduce occupational stressors	Career satisfaction and longevity
Client level	Basic science	Diagnostic testing and assessments	Dental hygiene diagnosis	Clinical decision support tools
	Oral health care	New therapies & prevention modalities	Health promotion: treatments, behaviors, products	Clinical guidelines
Population level	Health services	Epidemiology	Community interventions	Assurances and evaluation
	Access to care	Vulnerable populations	Interventions	Outcomes assessment

Researchers can enter into the process at the intersection of any area of research and any phase to ask and answer questions of importance to the discipline of dental hygiene. The model is intended to help researchers frame how their research has been influenced by a preceding phase of research and how it will lead to the next phase. Additionally, it aims to illustrate how their area of research relates to other areas where research might be conducted. The following descriptions of the topics of emphasis from the

conceptual research model (Figure 2) are organized by area of research and include an explanation of how the topic fits into the phase of research where it appears.

PROFESSIONAL DEVELOPMENT

Education[11-19]

Dental hygiene is based on a specific body of knowledge transferred to new professionals through educational processes. Areas of research associated with education include evaluation of current educational processes during the discovery phase, implementing new educational models during the testing and evaluation phase, and exploration of how interprofessional education as part of the ongoing evolution of dental hygiene as a profession is associated with the translation phase of research.[9]

- **Evaluation** within the **discovery** phase of research for education includes ongoing assessment of curricular content, delivery and adaptation of educational programming for addressing evolving models of health care and practice; assessing educational institutional investment in alternative delivery models; alternative educational programming; community return on investment; articulation; transferability and academic educational laddering for ongoing growth of the profession.

- **Educational models** during the **testing** phase of research for education requires implementation and evaluation of new or redesigned educational delivery models based on evolving global public health needs, direct and indirect assessment of both learners' and educators' performance, examining research associated with the Scholarship of Teaching and Learning (SoTL) and alternative career pathways.

- **Interprofessional education** considers more broadly the **translation** of dental hygiene education as a component of allied health education, the ability of educators to work collaboratively with other health care disciplines, recognizing diversity of faculty backgrounds for creating synergy, promoting lifelong learning and expanding access to care through all means of delivery of health care for global populations.

Regulation

Regulation research occurs at the dental hygiene profession level. It encompasses the body of knowledge related to the practice of the profession of dental hygiene.

- **Emerging workforce models** involve **discovery**. Each state in the nation is a potential source of new models for dental hygiene care delivery. The discovery and development of regulations and rules affect the profession of dental hygiene. Regulation discovery includes new workforce models such as, but not limited to, mid-level providers, advanced dental hygiene practitioners and advanced dental hygiene therapists, as well as their effects on public health and well-being.

- **Scope of practice** involves **testing and evaluation** of potential changes to professional regulations, often through pilot programs. These regulations may have significant impact on the

health of the public and ability of dental hygienists to provide the care they are educated and trained to deliver.

- **Interprofessional collaborations** involve professional regulations that **translate** knowledge into practice through collaborations with other care providers. Collaborations are an endpoint of regulation at the professional level. Areas of interprofessional collaborations include delivery of care in all practice settings, including pediatrician offices, schools and other health care settings that may include hospitals, medical offices, federally qualified health centers and holistic Complementary and Alternative Medicine settings.

Occupational Health

Research in this area focuses predominately on practitioners and their exposure to risks in the oral health care environment. It includes prevention and behavioral issues, as well as compliance with safety measures and workforce recruitment and retention.

- **Determination and assessment of risks** for occupational injury is the **discovery** phase of research. Uncovering potential hazards to occupational health in the workplace may involve investigating ergonomic impacts, as well as those of aerosols, chemicals, latex, nitrous oxide, noise and infectious diseases.

- **Methods to reduce occupational stressors** involve **testing and evaluation** of techniques to reduce or eliminate hazards to occupational health. This includes assessing prevention methods, behaviors, compliance with safety measures and error reduction.

- **Career satisfaction and longevity** research assesses the **dissemination and translation** into practice of methods that reduce the harmful effects of occupational stressors on practitioners. Additionally, it seeks to determine if the successful translation of these methods into practice and the reduction of occupational stressors results in improved careers for dental hygienists.

CLIENT LEVEL

Basic Science

Basic science research is important at the client level for understanding the mechanisms of health and disease, and investigating the links between oral and systemic health. Areas of research range from caries and periodontal disease to immunology, genetics, cancer, nutrition, pharmacology and exposure to environmental stressors.

- **Diagnostic testing and assessments** in basic science research is **discovery** of new tools for diagnosis of conditions and diseases and new methods of risk assessment prior to development of disease.

- **Dental hygiene diagnosis** is the **testing** phase where research is used to evaluate the use of knowledge of emerging science to determine client conditions or needs as related to dental hygiene care.

- **Clinical decision support tools** are the outcome of research validating dental hygiene diagnosis and the **translation** of those outcomes into tools that can be used broadly in clinical practice. Research in this area confirms the usefulness of the tools developed for this purpose.

Oral Health Care

Research regarding the dental hygienist's role in oral health care encompasses all aspects of the process of care at the client level, including assessment, diagnosis, treatment planning, implementation, evaluation and documentation.

- **New therapies and prevention modalities** for oral health care are developed or improved in the **discovery** phase of research. This may include new procedures, treatments, behavioral interventions, and instruments/tools/products for delivering client care, new oral self-care products or improved ergonomics.

- **Health promotion: treatments, behaviors, products** in the **testing** phase means evaluating clinical care products, services, behavioral interventions, and new and alternative treatments developed for these purposes at the client level, often through clinical trials, for safety and effectiveness.

- **Clinical guidelines** are developed as a result of successful treatment and prevention methods and are derived from a strong body of evidence that reflects improved client outcomes. These in turn need **translation** into routine clinical practice and need to be evaluated through research to assess both their adoption and effectiveness.

POPULATION LEVEL

Health Services

Health services research is included as part of the population-level area of research. Past agendas identified many objectives in this area. The revised agenda reorganizes health services and access to care to better show the relationship among the phases of research.

- **Epidemiology** in health services research involves **discovery**. Epidemiological research includes surveys of oral health status and related needs of specific populations and other important health services data related to oral health and dental hygiene.

- **Community interventions** are critical to understanding the **testing** and impact of oral care interventions on population health. Community interventions have the potential to improve oral health by treating groups rather than individuals. Such programs include school-based oral care

programs and public health nutritional campaigns to eliminate or reduce caries, periodontal disease and other preventable oral health problems.

- **Assurances and evaluation** combine as an ongoing strategy to improve **translation** of population health and community interventions. All programs benefit from the knowledge derived from evaluation of program effectiveness and quality and from assuring that best practices represent outcomes data.

Access to Care

Access to care research involves identifying populations that are challenged to achieve positive health outcomes including good oral health due to recognized and unrecognized barriers to care. Systems of health delivery can be developed, adapted, improved and evaluated for effectiveness in improving access to care and health outcomes in identified populations.

- **Vulnerable populations** are identified in the **discovery** phase of research through population-level data that link poor health outcomes to various group characteristics. This phase of research also seeks to discover possible barriers to care.

- **Interventions** are developed and implemented in the **testing** phase of research on access to care. Supporting research might evaluate methods designed to overcome barriers to access or use of risk-reduction strategies in special at-risk populations such as people with diabetes, tobacco users, pregnant women or those identified as genetically susceptible to disease.

- **Outcomes assessment** is a critical aspect of **translation** of research into population-level health. This phase of research involves verification of improved population health outcomes when presumed barriers or risk-reduction strategies have been addressed across a broad group or identified population.

ADHA's STRATEGIC PLAN DRIVES RESEARCH PRIORITIES

Based on the ADHA's Conceptual Research Model and Strategic Plan, priority areas that researchers are encouraged to investigate include:

1. Differences between baccalaureate- and associate-level educated dental hygienists.
2. The impact of dental hygiene mid-level practitioners on oral health outcomes.
3. Development and testing of conceptual models distinct to dental hygiene that will guide education, practice and research.
4. Efficacy of preventive interventions across the lifespan including oral health behaviors.
5. Patient outcomes in varying delivery systems (this can include cost effectiveness, workforce models, telehealth, access to care, direct access etc.).

Focus on these priorities has the potential to accelerate the pace of transformation of the profession to improve the public's oral and overall health. Within these priority areas are research questions to be asked and answered that will impact the future of the profession and the direction of ADHA. Investigators are strongly encouraged to consider how their research might contribute to these priority areas.

APPLICATION OF THE RESEARCH AGENDA

The revised research agenda is intended to guide researchers, educators, clinicians and students who seek to support ADHA priorities for advancing the profession through research and the generation of new knowledge within the discipline of dental hygiene. The model provides novice investigators, especially students, as well as junior and experienced researchers, with a visual framework for conceptualizing how their research topic addresses identified priorities. Additionally, this revision prepares the profession to evolve by acknowledging that dental hygiene research is necessary for advancing the profession and improving the health of the public.

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RESOURCES

ADHA's Research Center
http://www.adha.org/research-center

Institute for Oral Health, Research Grants
http://www.adha.org/ioh-research-grants-main

National Center for Dental Hygiene Research & Practice
https://dent-web10.usc.edu/dhnet/

National Center for Dental Hygiene Research & Practice, Dental Hygiene Research Toolkit
https://dent-web10.usc.edu/dhnet/research_kit.pdf

The National Dental Practice-Based Research Network
http://www.nationaldentalpbrn.org/

American Association for Dental Research (AADR), Student Research Fellowships
http://www.aadronline.org/i4a/pages/index.cfm?pageid=3569#.VT_Er7l0xtQ

Centers for Disease Control and Prevention (CDC), Division of Oral Health
http://www.cdc.gov/oralhealth/

Centre for Evidence Based Dentistry
http://www.cebd.org/

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