AADR®
American Association for Dental Research

August 15, 2019

Martha J. Somerman, DDS, PhD
Director, National Institute of Dental and Craniofacial Research
National Institutes of Health Building 31, Room 2C39
31 Center Dr.
Bethesda, MD 20814

Re: 2020-2025 NIDCR Strategic Plan

Dear Dr. Somerman:

On behalf of the 3,350 individual and 107 institutional members of the American Association for Dental Research (AADR), thank you for the opportunity to comment on the 2020-2025 NIDCR Strategic Plan. AADR engaged its Board of Directors, Science Information Committee, Committee on Diversity and Inclusion and Friends of NIDCR Patient Advocacy Council to develop these comments. Additionally, these comments reflect results from the Fall Focused Symposium, *Advances in Precision Oral Health* (http://www.iadr.org/2018ffs/agenda), where researchers gathered to discuss the promise that precision medicine holds for improving prevention, diagnosis and treatment of dental, oral and craniofacial diseases. The symposium included presentations on pain, the oral microbiome, dental caries and oral cancer, among others. As a follow up, AADR and the J. Craig Venter Institute will host another symposium in November 2019 entitled, *Integrating Omic Datasets Towards Translation* (http://www.iadr.org/2019ffs/agenda), which will focus on methods for understanding the oral microbiome and its role in health and disease.

Please see the recommendations below for accelerating and measuring progress on the five priority areas of the strategic plan. New and continued research investments will result in more data and publications, but ultimately, AADR hopes this will increase the quality and effectiveness of prevention and health care and inform local, state and federal public health policy to improve oral health of the population.

**Oral Health + Overall Health**

**What are the specific initiatives, programs, or research questions that NIDCR should support to accomplish this goal?**

To ensure that oral health is fully integrated into the study of overall health, AADR recommends that NIDCR support research on:

1. The roles of the microbiome and genome in development, health and disease and how these interplay with oral/systemic health.

+1.703.548.0066
+1.703.548.1883
1619 Duke Street
Alexandria, VA 22314-3406, USA
www.aadr.org

2. Correcting the misaligned oral bite in children and adults with craniofacial microsomia/hemifacial microsomia (CFM/HFM). This often involves jaw distraction or reconstructive surgery, but research is needed to yield better results for patients. Furthermore, tooth extraction must be managed in those with CFM/HFM and related conditions like Goldenhar, Treacher Collins and Branchiootorenal Syndromes also due to a misaligned oral bite. This is especially important when using devices such as braces and palatal expanders.
3. Big data, machine-learning methods and novel ways for analyzing -omics data, including workforce development to train researchers in these methodologies and to attract people from non-dental areas with this expertise. Synthesis and interpretation of the data that from -omics studies, e.g., integrating and interpreting different types of -omics data, i.e., genomics, proteomics, metabolomics, etc., and supporting collaborative efforts, resource and data sharing and community engagement and incentivizing team science and systems biology through funding opportunities.
4. Adequate interprofessional education focusing on discipline-oriented training in health. Work with other federal agencies, professional societies and research institutions to create interprofessional opportunities and collaborations.

**How would you measure progress towards accomplishing this goal?**

1. Research findings that build upon one another to progressively increase, change or generate a more solid evidence base for our knowledge of disease mechanisms and interconnectedness of the dental, oral and craniofacial region with other systems.
2. Long-term success will be evident by the 1) high prioritization of oral health on the political agenda as well the development of appropriate oral health policies and 2) the development of successfully integrated health programs.
3. Positive feedback from patient advocacy groups that their needs are being addressed and their health is perceived as being improved.

**Precision Oral Health**

**What are the specific initiatives, programs, or research questions that NIDCR should support to accomplish this goal?**

To accelerate research and application of precision oral health NIDCR should:

1. Support research on dental caries prevention. Research on prevention methods has explored DNA-based vaccines, bacteriophages, probiotics and antimicrobials targeting *S. mutans*. Specifically targeted antimicrobial peptides (STAMPs) for caries prevention are currently in phase II clinical trial testing, but gaining support for caries vaccines clinical trials is often difficult because dental caries has low mortality

although globally caries is the most prevalent chronic disease, has high morbidity and imposes a substantial economic burden.[1]

2. Ensure that oral and craniofacial phenotype data are included in the genomic evaluation of the 1 million participants of *All of Us* Research Program to better understand the genomic influence on oral and craniofacial development, health and disease. This will be a huge lost opportunity if dental, oral and craniofacial health is not included.
3. Build sustainable informatics capacity to enhance connectivity and interoperability of clinical, laboratory, and public health systems.
4. Invest in initiatives to precisely measure oral health and disease endpoints and the development of accurate disease classification systems.[2] For example, the recent data quality evaluation of the dental fluorosis clinical assessment data from the National Health and Nutrition Examination Survey (NHANES) 1999–2004 and 2011–2016 cycles revealed that current methods for diagnosing fluorosis are unreliable and highlighted a need to accelerate research on objective methods to diagnose fluorosis.[3, 4]
5. Support research on biomarkers that predict the effectiveness of immunotherapy in oral cancer[5] and to understand longitudinal trajectories of dental diseases.[6]
6. Population-based information about the importance of precision medicine in oral health.

**How would you measure progress towards accomplishing this goal?**

1. Increased understanding of disease courses, risk factors and treatments from historically neglected or excluded populations to that is implemented in practice.
2. Increased research activity on patient-centered outcomes, comparative effectiveness and communication.

**Regenerative Medicine**

**What are the specific initiatives, programs, or research questions that NIDCR should support to accomplish this goal?**

---

[1] Baker JL, He X, Shi W. 2019. Oral microbiome- Precision guided antimicrobial treatment to re-engineer the oral microbiome for the management of dental caries. Advances in Dental Research. 30(3): xx-xx.
[2] Divaris K. 2019. Searching Deep and Wide: The Molecular Basis of Dental Caries and Periodontitis. Advances in Dental Research 30(3): xx-xx.
[3] National Center for Health Statistics, National Center for Chronic Disease Prevention and Health Promotion. 2019. Data quality evaluation of the dental fluorosis clinical assessment data from the National Health and Nutrition Examination Survey, 1999–2004 and 2011–2016. National Center for Health Statistics. Vital Health Stat 2(183).
[4] AADR Response to New NCHS Evaluation of Dental Fluorosis Clinical Assessment Data from NHANES Over Time. 2019. Alexandria, VA: American Association for Dental Research; [accessed 5 August 2019]. http://ga.dentalresearchblog.org/?p=3344.
[5] D'Silva NJ, Gutkind JS. 2019. Oral Cancer: Integration of mechanistic and clinical studies for diagnostic and therapeutic precision. Advances in Dental Research. 30(3): xx-xx.
[6] Garcia RI. 2019. Advances in Precision Oral Health Research. Advances in Dental Research. 30(3): xx-xx.

NIDCR should support regenerative medicine research focused on:

1. Restoring complete function to oral tissues damaged by disease, treatment or trauma, especially to create a standard of care for preserving normal tissues and interdisciplinary team development of a comprehensive care plan.[7]
2. Opportunities to harvest cells/tissues and genetically correct genetic defects so they can be transplanted back into the individual to help manage genetic conditions affecting development and the generation of bone, skin, teeth, dental pulp and oral/craniofacial conditions caused by disease or trauma.
3. Naturally occurring regenerative materials due to their high degree of safety and cost effectiveness. NIDCR should explore a new grant mechanism (e.g., R21, high risk/reward) an RFA specifically highlighting naturally occurring materials for regeneration in oral tissue.

One potential application of regenerative medicine research is the reconstruction or creation of an outer ear for children and adults with microtia and atresia. Research is currently being conducted for a reconstruction method using 3D printing and stem cell technology. This research could potentially be used toward growing cellular tissue and cartilage that could also help correct CFM/HFM with jaw cartilage and bone using donor tissue from the patient instead of utilizing polyethylene porous implants (which is the current option today for these children and adults).

**How would you measure progress towards accomplishing this goal?**

1. Best practices research to leading to clinical guidelines for normal tissue preservation
2. Increased investigator-initiated applications focusing research efforts on naturally occurring regenerative materials within five years of the RFA's issuance.

**Health Disparities**

**What are the specific initiatives, programs, or research questions that NIDCR should support to accomplish this goal?**

To reduce and eventually eliminate disparities in dental, oral and craniofacial health, NIDCR should:

[7] Zhang Q, Chen C, Chang M, Shanti RM, Cannady S, O'Malley B, Shi S, Le AD. 2019. Multidisciplinary, Patient-Centered Approach to Reconstruction and Oral Rehabilitation of Patients Sustaining Orofacial Injuries: The University of Pennsylvania Initiative. Advances in Dental Research. 30(3): xx-xx.

1. Understanding the oral health of diverse and historically neglected populations (e.g, United States prison population[8]).
2. Support investigations of oral health care approaches that improve health access and ultimately health outcomes in diverse populations across the spectrums of age, socioeconomic and educational status, race and ethnicity, special health care needs, etc.
3. Invest in prevention research and population-based approaches to oral health care.
4. Support research programs directed toward diverse populations and encourage researchers to include those populations in the planning and execution of the research and ensure that those populations benefit from the research.

**How would you measure progress towards accomplishing this goal?**

1. Increased participation of historically underrepresented individuals in all phases of research.
2. Findings on people in those populations that informs and leads to higher quality care and better outcomes.

**Diverse workforce**

**What are the specific initiatives, programs, or research questions that NIDCR should support to accomplish this goal?**

To create a dental, oral and craniofacial research workforce more reflective of the diversity of the U.S. population, NIDCR should:

1. Create a mentoring bridge between undergraduate and graduate training, especially to train more dentist-scientists whose numbers in the workforce pipeline and grant application submissions have decreased.[9] Many of the pipelines from undergraduate education go to clinical dentistry and not towards academic dentistry or research, especially concerning underrepresented individuals. NIDCR should explore a grant mechanism that will enable partnership between dental school and undergraduate faculty to work as a team on a research project that a student could begin as an undergraduate and continue through dental and/or graduate school, creating a mentoring bridge.
2. Increase awareness of research training programs (e.g., NIDCR Director's Postdoctoral Fellowship to Enhance Diversity in Dental, Oral, and Craniofacial Research), funding opportunities and loan repayment programs for underrepresented racial and ethnic groups. Create and support programs aimed at increasing diversity and inclusion at all career stages.

[8] Makrides NS, Shulman JD. 2017. The Oral Health Needs of the Incarcerated Population: Steps Toward Equal Access. American Journal of Public Health. 107(S1): S46–S47.
[9] D'Souza, R. N., Colombo, J. S., Embree, M. C., Myers, J. M., & DeRouen, T. A. 2017. Our Essential and Endangered Dentist–Scientist Workforce. JDR Clinical & Translational Research. 2(1): 10–22.

3. Continue to develop and increase visibility of diverse role models and leaders in the workforce and develop a strong pool of mentors.
4. Increase the number of people serving on study sections that review grants focused on diversity and underrepresented researchers, particularly those who of diversity issues in science.
5. Specifically encourage individuals from underrepresented groups to submit more grant applications for consideration.
6. Facilitate partnerships between the private and public sector to provide a variety of research opportunities and experiences for trainees.

**How would you measure progress towards accomplishing this goal?**

1. Track the number of individuals from underrepresented groups applying to and successfully completing training and/or funding programs and career trajectories of underrepresented researchers, e.g., number of students from underrepresented groups who go on to research programs; how many remain in academia and become independent researchers, publications by URMs, etc., including qualitative research to understand the experience of individual from underrepresented groups in research.

AADR is grateful for NIDCR's leadership in dental, oral and craniofacial research and training as the largest funder of dental, oral and craniofacial research in the world and the largest funder of research at dental schools. AADR looks forward to the development and the finalization of this strategic plan on these five priority areas. AADR stands ready to assist NIDCR in any way it can. Please do not hesitate to reach out to Dr. Seun Ajiboye, Director of Science Policy and Government Affairs, at sajiboye@iadr.org if you need any additional information.

Sincerely,

Christopher H. Fox, DMD, DMSc
Chief Executive Officer

J. Timothy Wright, MS, DDS
President