ADA Science and Research Institute

Kessler, Brett, 2023, Colorado, chair
Boyan, Barbara, executive director, Institute for Engineering and Medicine, Alice T. and William H. Goodwin, Jr. Professor, Department of Biomedical Engineering, Virginia Commonwealth University
Boyle, Jim, 2025, Pennsylvania
Cohlmia, Raymond, ADA executive director
Dolan, Teresa (Terri), chief dental officer, Overjet, Massachusetts
Geisinger, Maria (Mia), professor and program director in Periodontology, University of Alabama at Birmingham School of Dentistry
Khajotia, Sharukh, associate dean for Research and Innovation, President's Associates Presidential Professor, Division of Dental Biomaterials, University of Oklahoma College of Dentistry; affiliate associate professor of Chemical, Biological and Materials Engineering, University of Oklahoma College of Engineering
Klein, Ophir, executive director, Cedar-Sinai Guerin Children's, California
Somerman, Martha, field chief editor, Frontiers in Dental Medicine, Maryland
Winston, Leslie, vice president, Global Health Care, Procter & Gamble, Ohio
Preble, David, interim chief executive officer
Lyznicki, James, director, Science Governance

Areas of Responsibility as Set Forth in the Bylaws or Governance and Organizational Manual of the American Dental Association

In October 2019, the ADA Board of Trustees (BOT) created a new wholly owned ADA subsidiary, in the form of a single member limited liability company, called the ADA Science and Research Institute LLC (ADASRI). Similar to its other ADA subsidiaries, the ADA is the sole member of the LLC, and controls ADASRI Board elections and removals, as well as approvals and amendments to the ADASRI Operating Agreement. As an ADA subsidiary, the BOT deemed that ADASRI allowed greater flexibility for science and scientific research activities, staffing, and resources than could be provided under the existing or alternative organizational structures.

The objective of the BOT in creating ADASRI was to provide for centralized, coordinated leadership of all ADA science and research activities. This was accomplished by combining the operations of the research laboratories, based in Maryland (the former Volpe Research Center) and the ADA Science Institute (based in Chicago) to allow for a renewed focus on the creation and translation of scientific knowledge and the development of new dental products and technology, and the enhancement of clinical care outcomes through scientific research, innovation, and collaboration.

As ADASRI began to move forward it became apparent that the LLC form hampered its goals and operations. Specifically, to fulfill its research institute mission, ADASRI seeks a wide range of grants, both public and private, seeks to hire top quality researchers, including those with burdensome school loan obligations, and wishes to compete for researchers from overseas who have the requisite visas. Important grants, programs to aid researchers, and unfettered access to research candidates from other countries were not available to the LLC. It became apparent that another organizational form was needed, and legal research disclosed that converting to a not-for-profit organization, and specifically a charitable organization of some type under Section 501(c)(3) of the United States Code, would overcome the problems the LLC had encountered.

At its February 2023 meeting, the ADASRI Board of Directors voted to recommend to the BOT that the LLC be transitioned to a 501(c)(3) public charity. The BOT approved this recommendation at its April 2023 meeting.

ADASRI Core Functions. In May 2021, the ADASRI Board of Directors approved the following core functions of ADASRI:
1. Operate as an independent Center of Excellence through original research and the translation and dissemination of scientific knowledge to improve oral health outcomes and advance the dental profession:
   A. Conduct innovative scientific research, focused on select high priority oral health topics;
   B. Maximize the ability to develop patents through innovative scientific research;
   C. Apply for and receive government and private sector funding to support basic, applied, and translational scientific research;
   D. Work with government agencies, universities, industry and other groups on scientific research programs and activities; and
   E. Provide a mechanism to build a designated science and research reserve fund for investment in future projects/capital.

2. Provide support and expert advice to the ADA on science and research matters, according to the specifications in the ADA/ADASRI Intercompany Services Agreement:
   A. Provide scientific expertise to ADA for achieving public health goals and objectives specified in the ADA Strategic Plan; and
   B. Provide infrastructure and capacity to support the operations of the ADA Council on Scientific Affairs (CSA) to ensure the optimal conduct of the Council’s assigned duties and responsibilities.

**Advancing ADA Strategic Goals and Objectives: Agency Programs, Projects, Results and Success Measures**

ADASRI serves as the primary contact for scientific support for the ADA to ensure alignment with its strategic plan, Common Ground 2025. Specifically, ADASRI staff support the following objective in the ADA Strategic Plan:

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<tr>
<th>Objective 9: The ADA will be the preeminent driver of trusted oral health information for the public and profession.</th>
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**Outcome:** The leadership role of ADASRI in supporting the ADA strategic plan, specifically the Public goal, is a key focus of ADASRI. “Science and evidence based” is a core value of the ADA and ADASRI continues to show commitment to the science-related tasks presented by the parent organization. Until his resignation and departure from ADASRI in April 2023, as the ADA chief science officer and ADASRI Chief Executive Officer (CEO), Dr. Marcelo Araujo, played an important role as a member of the senior staff executive team aiming to establish the strategy that allows the ADA to meet the goals for the strategic plan. More specifically, Dr. Araujo was a key contributor to the group focused on the Public Goal in partnership with the Government Affairs team and the Dental Practice and Health Policy Institute leaders for:

- Providing scientific support for the overall advocacy, education and policy development plan of the ADA.
- Providing scientific support through the development of science-based resources for the ADA in accordance with the ADA/ADASRI Intercompany Services Agreement; and
- Leading the recognition of advancements made to the profession and/or public through execution of sponsored science and research award programs

In addition, ADASRI provided staff expertise and effort to:

- **Support the Council on Scientific Affairs (CSA).** ADASRI staff continue to focus on specific deliverables for CSA including policy development, the ADA Seal of Acceptance program, scientific support for dental standards development, and the ADA Clinical Evaluators (ACE) Panel program. In the past year, ADASRI staff provided ongoing and active participation in the development of ANSI/ADA and ISO standards, including technical reports to address the cleanliness of dental
instruments and on laboratory methods for assessing the safety of orthodontic aligner materials. The ADA Seal of Acceptance Program contributes considerable non-dues revenue for the ADA and continues to help dentists and consumers distinguish safe and effective products from unproven trends. Please refer to the CSA’s Annual Report for more information on these programs.

- **Sustain ADA Scientific Collaborations.** In 2022, Dr. Araujo, ADA chief science officer, played an important and involved role in working with US-based and international organizations, such as the American Association for Oral, Dental, and Craniofacial Research (AAODCR), International Association for Dental Research (IADR), World Health Organization (WHO), National Institute for Dental and Craniofacial Research (NIDCR), Centers for Disease Control and Prevention (CDC), and the FDI World Federation (FDI). This was accomplished by participating in key meetings, as well as by defining strategy that can impact policy worldwide. An example was his involvement as part of the delegation that is working towards the Congress of the Parties 4, of the Minamata Convention. The goal is to continue to support the phase down of amalgam globally and understanding the opportunities for the creation of new restorative dental materials that can be used by dentists, as well as ensuring that regulations are implemented to avoid a negative impact on the environment due to the release of mercury when existing amalgam restorations are removed.

**Advancing ADASRI Strategic Goals and Objectives: ADASRI Programs, Projects, Results and Success Measures**

In July 2020, the ADASRI Board adopted a three-year Strategic Plan (2020-2022), aligned with its Purpose Statement. This section presents ADASRI key accomplishments and outcomes for the past year related to that plan.

**Goal 1: Support ADASRI Board governance operations, structure, and business plan to finalize the establishment of the ADASRI.**

**Metrics:**

1.1. Submit the process for approval of non-budgeted special project requests from ADASRI stakeholders (ADA Board, HOD, ADA agencies) to the ADASRI Board by the end of Q2.

   **Results:** COMPLETED. The process was developed by an ad hoc Workgroup appointed by the ADASRI Board chair in December 2021; the Workgroup’s recommendations were approved by the Board of Directors in April 2022.

1.2. Submit IP marketing goals to the ADASRI Board by the end of Q2; submit the IP marketing strategy to the ADASRI Board by the end of Q3.

   **Results:** COMPLETED. The full plan was developed by ADASRI staff and approved at the July ADASRI Board meeting.

1.3. Complete all tasks related to the work of the joint ADASRI Board/CSA Workgroup to define the respective roles and responsibilities of the ADASRI Board of Directors and the Council on Scientific Affairs for science and research by the end of Q2.

   **Results:** COMPLETED. The ADASRI chair appointed an ad hoc Workgroup to deliberate this issue. The work was managed entirely by members of the ADASRI Board and CSA, along with external consultants, and was completed by Q3. The Workgroup’s findings were communicated by the ADASRI chair to the CSA chair in Q4.

1.4. Develop and approve the 2023-2025 ADASRI Strategic Plan by Q3.

   **Results:** COMPLETED. A five-year Strategic Plan (2022-2027) was developed by the ADASRI Board of Directors and senior staff and approved by the Board of Directors in Q2 2022.
Objectives and metrics were approved by the ADASRI Board at its February 2023 meeting. The Strategic Plan (2023-2027) is provided as Attachment 1 to this report.

1.5. Submit the 2023-2025 Business Plan to the ADASRI Board by Q4, following approval of the 2022-2027 ADASRI Strategic Plan.

Results: POSTPONED TO 2023. This task was postponed to 2023 pending approval of metrics for the new strategic plan by the ADASRI Board.

Goal 2: Establish and maintain a research plan and portfolio to fulfill the ADASRI Operating Plan based on high priority topics that most effectively and efficiently utilize existing ADASRI personnel strengths, facilities and financial resources.

Metrics:
2.1 Publish 20 manuscripts by Q4 in peer reviewed journals to disseminate research findings and enhance accessibility of such findings to dental professionals and external stakeholders. (Range: 18-22)

Results: COMPLETED EXCEEDING METRICS. A total of 25 manuscripts were published by the first week of November 2022. (see Attachment 2)

2.2 Develop 55 additional scientific resources by Q4 to be used by the ADA, including Oral Health Topics, abstracts to scientific conferences, dental product standards, patents, and other resources. (Range: 50-60)

Results: COMPLETED EXCEEDING METRICS. A total of 114 resources were developed by the first week of November 2022. (see Attachment 3)

2.3 Submit 15 external grant proposals by Q4 based on the needs of the ADASRI to supplement the annual funding provided by the ADA. (Range: 13-17)

Results: COMPLETED BELOW METRICS. Due to the changes in staff at ADASRI, a total of 10 proposals were submitted this year. Some of these grants were brought to ADASRI by newly hired staff members.

2.4 Establish and maintain 10 ADASRI-initiated external collaborations, including dental student research projects, government, private, industrial and/or academic research facilities, agencies, and professional organizations by Q4.

Results: COMPLETED EXCEEDING METRICS. A total of 18 collaborations were established in 2022. (see Attachment 4)

2.5 Address the ADASRI Board’s recommendations for ADASRI science and research programs derived from the three External Review Panels by Q4.

Results: COMPLETED. During the July 2022 ADASRI Board meeting, senior directors representing the departments of Evidence Synthesis and Translational Research (ESTR) and Innovation and Technology Research reported back with responses to the recommendations from the respective external review panels. At the December ADASRI Board meeting, the senior director of Applied Research will provide a similar report to the Board. An update on ESTR programs and activities, as requested by the ADASRI Board chair, also will be provided to the Board during the December Board meeting.

Goal 3: Develop and enact strategies to effectively and efficiently utilize available financial resources based on approved ADASRI research priorities.
Metrics:
3.1 Complete the ADASRI staff Career Path Project by the end of January 2022 and implement changes to the ADASRI organizational chart by the end of February 2022.

Results: COMPLETED.

3.2 Submit the 2023 ADASRI budget to the ADA by the end of Q2.

Results: COMPLETED. The 2023 budget proposal for ADASRI was initially submitted to the ADA by April and further revisions were incorporated to the proposal after receiving feedback from the ADA Board of Trustees. The total budget request for 2023 is $9,739,071.

3.3 Use of ADASRI Reserves Fund.

3.3.1 Submit a structure and process for use of the Reserves Fund for ADASRI Board approval by the end of Q2

Results: COMPLETED. The work was done throughout the year and the structure was presented to the Board of Directors at the December 2022 meeting.

3.3.2 Submit a process for the review and funding of pilot research project proposals to the ADASRI Board by Q2.

Results: UNDER DEVELOPMENT, TO BE COMPLETED IN 2023. The development was put on hold while the Budget and Finance Committee concentrated on the investment policy in 2022 and put discussion of allocations from the Reserve Fund and associated policy into the parking lot for 2023.

3.3.3 Submit an investment strategy for the Reserves Fund to the ADASRI Board by Q3

Results: COMPLETED. The ADASRI Budget and Finance Committee worked with ADA finance staff and investment consultants throughout the year to develop a comprehensive Investment Policy, which was approved by the ADASRI Board at its December 2022 meeting. This was a priority deliverable for the ADASRI Board in 2022.

3.4 Manage the approved 2022 budget to a tolerance of +3% by the end of Q4.

Results: COMPLETED. Per the October 2022 ADA accounting report, the budget variance was within the threshold established by the ADASRI Board. The largest variance was for Salary and Fringe Benefits, which is attributed to the number of open positions that occurred throughout the year. Hiring has been challenging due to the high level of competition for dental researchers in the United States and the lack of individuals with the requisite training and qualifications for posted ADASRI research positions.

3.5 Complete four performance-related conversations annually for all ADASRI employees (2021 performance results, 2022 goals setting, career development and midyear) focusing on retention of high performing talent and team development, to achieve business objectives, in accordance with ADA policies, processes and core values.

Results: COMPLETED. All employees participated on all steps of the performance process in 2022.

Other Key Accomplishments

Recognition
• Dr. Spiro Megremis was named as one of the 2023 American Association for Dental, Oral, and Craniofacial Research (AADOCR) class of Fellows, honored in March during the 52nd Annual Meeting and Exhibition of the AADOCR in Portland, Oregon. The AADOCR Fellows Program recognizes leaders who have achieved research excellence and served AADOCR throughout their careers.
  o Dr. Spiro Megremis was awarded the “Leroy Wyman Award” by the ASTM for his contribution to the Medical and Surgical Materials and Devices work, recognized during the ASTM F04 meeting in Denver, Colorado.
• Dr. Kevin Byrd was named Chair of the Scientific Information Committee, American Association of Dental, Oral, and Craniofacial Research.
• Dr. Kevin Byrd was named an Associate Editor, Journal of Clinical Periodontology.

Awards
• Dr. Kevin Byrd was awarded a grant from the Chan Zuckerberg Initiative (CZI). This prestigious grant is a multi-million dollar, multi-institute, multi-national project to understand oral and airway development in children with a goal to advance single-cell and spatial biology in oral tissues.
• Dr. Derek Smith was awarded a grant from the National Institute for Dental and Craniofacial Research (NIDCR) to develop an oral health screening tool for an integrated model of care to reduce treatment-related oral morbidity in head and neck cancer survivor.
• Dr. Simone Duarte received an NIDCR award to study low-temperature plasma as an approach for the treatment of peri-implantitis.
• Dr. Ruth Lipman received an award from the Hu-Friedy Business Group sponsored research project to address challenges and barriers to compliance with dental waterline infection control guidance.
• Ms. Ashley Bowers received a 2023 Multi-Centre Collaborative Research Travel Award to study oral microbiome changes after exposure to charcoal-containing dentifrices.
• Led by Dr. Xiaohong Wang and Dr. Phil Dowd, ADASRI successfully executed a collaborative research agreement with the University of Maryland School of Dentistry on dental restorative materials.

Science in Seconds. ADASRI launched a new, well-received, video series in 2022 titled Science in Seconds. Each video in the Science in Seconds series explains an ADASRI research project in one minute or less. These videos are initially posted as a paid social media campaign on the ADA’s social media channels. Then, after a campaign ends, the video is posted to the ADASRI homepage as well as to the ADASRI YouTube playlist, where the video are an enduring asset.

Seal of Acceptance Program. In 2022, the ADA Seal of Acceptance Program received 15 new submissions, and 22 flavor additions to the current family of products. ADASRI staff efforts to process these submissions and receipt of maintenance fee payments, resulted in $1,314,000 in revenue for the ADA.

American Association for Dental, Oral, and Craniofacial Research (AADOCR) 2023 Meeting. ADASRI was a silver sponsor of the 2023 AADOCR meeting, which was attended by over 2,000 individuals. ADASRI hosted an exhibit booth at the meeting where ADASRI-branded resources were distributed, and booth hosts fielded questions about the Institute’s current research and collaboration opportunities. This was the first time that ADASRI hosted a reception at the AADOCR meeting. The reception was attended by approximately 150 individuals and was a useful opportunity to raise awareness about the research institute.

Approval of Proposed Terms to be Included in the Exclusive Patent License Granted by ADAF to ADASRI. Prior to the formation of the ADASRI, research activities were carried out under the American
Dental Association Foundation (ADAF). This includes research activities from the group based in Maryland, as well as the IP created that was (and still is) assigned to the ADAF. To accomplish a transfer of IP-related duties, an agreement was required between ADAF and ADASRI to give ADASRI the right to engage in patent prosecution and licensing. Led by Dr. Phil Dowd, ADASRI-ADAF successfully executed an agreement for the management of the ADAF Intellectual property (IP) portfolio. This resulted in the development of a marketing plan for ADASRI IP (and ADASRI-managed IP) assets. The plan includes the generation of marketing materials for all technologies, active marketing of technologies, and the initiation of and successful negotiations of industry-sponsored research agreements based on our intellectual property and intellectual capital (people).

ADASRI will derive feedback from marketing activities to determine which technologies likely have merit and are worth continued investment, while also identifying those technologies that likely have no return on investment, where patent prosecution and maintenance can cease. This will allow good stewardship of the IP portfolio and the associated budget. Furthermore, ADASRI has selected appropriate patent counsel, who also have experience in connecting clients with potential licensees, technology and licensing assistance, and litigation, to further enhance ADASRI’s technology commercialization activities.

**ADASRI Research Priorities (2023-2027).** To fulfil the goals outlined in the ADASRI Strategic Plan, the ADASRI Board of Directors adopted the following research priorities, arranged in four overarching pillars:

**Cell and Molecular Biology**
- Clinically relevant biology of the oral cavity:
  - Oral biofilms: model development and biofilm/host interactions;
  - Oral biofilms: model development and biofilm/host interactions;
  - Cell population and molecular expression dynamics of oral tissues, and when appropriate and/or available, other tissues of the body;
  - Effects of host interactions and environmental stimuli on the human oral microbiome; and
  - Advancing our understanding of factors regulating oral-dental tissues in health and diseased states.

**Clinical Science and Prevention**
- Oral biofilm mediated diseases: modeling and biofilm comparisons to include development of dysbiosis models
- Home oral hygiene
- Define mechanisms that explain interactions between oral tissues and other tissues of the body in health and diseased states
- Novel and non-traditional oral therapies and oral care products
- Over-the-counter dental hygiene product testing: efficacy and safety

**Dental Materials and Devices, Biomaterials, and Biomineralization**
- Bioengineering and dental/oral devices
- Biomaterial: interactions with host and/or biofilm; and effect of biomaterials on host response
- Biosensors/integrated devices for management of oral health and overall health, to include home use devices
- Development, characterization and restoration of dental materials, mineralized tissues, scaffolds, and their associated tissue interfaces
- Development and characterization of oral products and devices

**Evidence Synthesis and Dissemination Research**
- Translational research (systematic reviews, support for the development of clinical practice guidelines and recommendations, evaluating success of dissemination efforts)
- Dental knowledge and dental practice knowledge gap analysis with respect to caries, periodontal disease, and head and neck cancer prevention, detection, and treatment
- Dental service delivery research with respect to the epidemiology of, and access to, care issues for caries, periodontal disease, and head and neck cancer
- Occupational health research related to affects the practice of dentistry has on dental care
professionals, as well as the effects of home oral hygiene practices on the health and wellbeing of the public.

These priorities are intended to guide the cumulative efforts of ADASRI. It is incumbent upon the ADASRI CEO and senior staff to identify ways to operationalize these priorities on an annual basis with consideration of ADASRI personnel, budget, and resource constraints. To help ensure alignment with these priorities, a review of research conducted within each of the ADASRI departments will be conducted in 2024 by external review panels under the oversight of the ADASRI Research Committee.

**Emerging Issues and Trends**
ADASRI researchers study and report on critical and emerging oral health issues that are relevant to the practice of dentistry and improvement of oral health. Ongoing issues that are of concern for ADASRI include laboratory space issues, information technology infrastructure needs for researchers, and the recruitment and retention of researchers.

**Board Minutes**
For more information on recent ADASRI activities, see the minutes of the ADASRI Board of Directors, which are posted on the House of Delegates ADA Connect site, or the minutes of the CSA as posted on ADA.org.
ADASRI STRATEGIC PLAN (2023-2027)

ADASRI Vision Statement
“To be a leading research institution that advances clinical practice to enhance oral and overall health.”

ADASRI Purpose Statement
“Improving lives through research that transforms oral and overall health of individuals and populations.”

Core Values
The ADASRI Board adheres to the following core values as established by the ADA:
- Commitment to members
- Integrity
- Excellence
- Commitment to the improvement of oral health
- Science/Evidence-based
- Diversity
- Inclusion

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<th>GOAL 1</th>
<th>To conduct innovative dental, oral and craniofacial research that advances clinical practice and is aimed at improving overall health for all.</th>
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<tbody>
<tr>
<td>Objectives</td>
<td>1.1 <em>Publications</em>: publish manuscripts in high quality peer-review journals.</td>
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<td>1.2 <em>Grants</em>: submit grant proposals to external funding sources.</td>
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<td>1.3 <em>Grant quality</em>: Increase and sustain the submission/funding rate of grant proposals on an annual basis.</td>
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<tr>
<th>GOAL 2</th>
<th>To be a public and professional resource for accurate, up-to-date scientific information on dental, oral, and craniofacial diseases and conditions</th>
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<tr>
<td>Objectives</td>
<td>2.1 <em>External resources</em>: develop and publish scientific resources for dissemination to clinical and/or public audiences, based on ADASRI priorities. (Include abstracts, conference presentations, invited presentations, standards and other materials not requested by the ADA)</td>
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<tr>
<td></td>
<td>2.2 <em>Internal resources</em>: develop and publish scientific resources for dissemination to clinical and/or public audiences, based on ADA science priorities.</td>
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<td>2.3 <em>Standards development</em>: serve as project lead for the development of work items of the Standards Committee on Dental Products (SCDP) over the next 5 years.</td>
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<th>GOAL 3</th>
<th>To develop and implement a marketing and communication plan for ADASRI, focusing on dissemination of research and scientific advancements.</th>
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<td>2023 priority</td>
<td>Objectives</td>
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<th>GOAL 4</th>
<th>To provide expertise and facilities for the evaluation of technology and products that advance oral and overall health.</th>
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| Objectives | }
4.1 Engage dental or other health sciences students in the conduct of ADASRI-sponsored basic, applied, or epidemiologic research.

4.2 Formalize scientific collaborations to foster ADASRI research.

4.3 Define an ongoing strategy for laboratory occupancy in Maryland and Chicago. **2023 priority**

**GOAL 5**

Objectives

5.1 Submit yearly a plan for the development and marketing of IP to the ADASRI Board.

5.2 Increase and sustain the number of executed research-related agreements (e.g., disclosures, provisional patents, license agreements, patent applications) on an annual basis.

**GOAL 6** To operate under a governance and organizational structure that allows efficient and effective work.

Objectives

6.1 Define, review, and maintain policies and processes to guarantee high quality and effectiveness of ADASRI governance.

6.2 Define, review and maintain policies and processes to guarantee high quality and effectiveness of ADASRI research, within the realm of the ADASRI governance and organizational structure.

6.3 Fully transition the ADASRI from an LLC to a 501(c)3 non-profit organization.

**GOAL 7** To attract, develop and retain talent with expertise in the areas of focus for the organization. **2023 priority**

Objectives

7.1 **Staff recruitment:** implement and sustain a strategy for the recruitment of high-quality researchers.

7.2 **Staff retention:** develop and maintain a plan and tools for the retention of high performing staff.

7.3 **Career development:** focus on the expertise and skills development of the staff to help ensure opportunities for continual professional growth and development.

**GOAL 8** To increase annual funding year over year. **2023 priority**

Objectives

8.1 **Reserve fund:** increase the ADASRI Reserve Fund year over year.

8.2 **External funding:** by 2027, awards will equal at least 1/3 of the annual funding for ADASRI.

8.3 **Grants management:** implement an effective and efficient financial reporting system for ADASRI grants.

8.4 Submit a detailed budget to the ADASRI Board with justification for increases above the budget for the previous year.
Publications of the American Dental Association Science & Research Institute for 2022

1. “Diagnosis and Management of Oral Extraintestinal Manifestations of Pediatric Inflammatory Bowel Disease” by Kevin Byrd et al. in the *Journal of Pediatric Gastroenterology and Nutrition* (January 1, 2022)

2. “Validating Cleanability of Dental Rotary Diamond Instruments Soiled with 2 Clinically Relevant Dental Test Soil Components” by Prema Gopal (first author), Erin Claussen, Kristy Azzolin, and Spiro Megremis in the *Journal of the American Dental Association* (January 6, 2022)

3. “COVID-19 Vaccine Intention and Hesitancy of Dental Hygienists in the United States” by Laura Eldridge, Cameron Estrich, Marcelo Araujo et al. in the *Journal of Dental Hygiene* (February 1, 2022)

4. “Employment Patterns of Dental Hygienists in the United States during the COVID-19 Pandemic: An Update” by Cameron Estrich, Laura Eldridge, Marcelo Araujo et al. in the *Journal of Dental Hygiene* (February 1, 2022)

5. “Infection Prevention and Control Practices of Dental Hygienists in the United States during the COVID-19 Pandemic: A Longitudinal Study” by Cameron Estrich (first author), Marcelo Araujo et al. in the *Journal of Dental Hygiene* (February 1, 2022)

6. “Effect of Heating on Physicochemical Property of Aerosols during Vaping” by Taejun Ko (first author) and Shinae Kim in the *International Journal of Environmental Research and Public Health* (February 8, 2022)

7. “An Inkjet Printed Flexible Electrocorticography (ECoG) Microelectrode Array on a Thin Parylene-C Film” by Yoontae Kim (first author), Stella Alimperti, et al. in *Sensors* (February 8, 2022)

8. “Multifunctional Periodontal Probes and Their Handheld Electronic System for Simultaneous Temperature, pH, and Depth Measurements” by Nicole Ritzert (first author), Taejun Ko, Shinae Kim et al. in the *Journal of the Electrochemical Society* (February 17, 2022)


10. “Potentiometric Rotating Ring Disk Electrode Study of Interfacial pH during Carbon Dioxide Reduction and Hydrogen Generation in Neutral and Weak Acidic Media” by Nicole Ritzert et al. in the *Journal of Physical Chemistry C* (April 21, 2022)

11. “Effects of Thermal Cycling on Mechanical and Antibacterial Durability of Bioactive Low-Shrinkage-Stress Nanocomposite” by Xiaohong Wang et al. in the *Journal of Dentistry* (July 8, 2022)

12. “U.S. Dental Healthcare Workers’ Mental Health during the COVID-19 Pandemic” by Laura Eldridge (first author), Cameron Estrich, Marcelo Araujo et al. in the *Journal of the American Dental Association* (August 1, 2022)


16. “Improve Dentin Bonding Performance Using a Hydrolytically Stable, Ether-Based Primer” by Xiaohong Wang (first author) et al. in the Journal of Functional Biomaterials (August 26, 2022)

17. “Assuring the Safety of Dental Materials: The Usefulness and Application of Standards” by Spiro Megremis (first author) in Dental Clinics (September 10, 2022)

18. “Novel Antibacterial Low-Shrinkage-Stress Resin-Based Cement” by Xiaohong Wang et al. in Dental Materials (September 15, 2022)

19. “Strategies for Developing Evidence-Based Clinical Practice Guidelines to Foster Implementation into Dental Practice” by Sarah Pahlke et al. in the Journal of the American Dental Association (September 17, 2022)


24. “Low-Temperature Plasma Short Exposure to Decontaminate Peri-Implantitis-Related Multispecies Biofilms on Titanium Surfaces In Vitro” by Simone Duarte et al. in BioMed Research International (October 26, 2022)

25. “Impact of Curcumin Loading on the Physicochemical, Mechanical, and Antimicrobial Properties of a Methacrylate-Based Experimental Dental Resin” by Simone Duarte et al. in Scientific Reports (November 4, 2022)
Attachment 3.

Additional ADASRI Scientific Resources Developed in 2022 (includes Oral Health Topics, abstracts to scientific conferences, dental product standards, patents, and other resources)

American Dental Association Clinical Evaluators (ACE) Panel Surveys and Continuing Education
1. “Dentist-Administered Vaccines” by Olivia Urquhart et al. in the Journal of the American Dental Association (January 1, 2022)
2. “Dentist-Administered Vaccines” online CE course (January 3, 2022)
3. “Oral-Systemic Health Considerations in Dental Settings” online CE course (March 24, 2022)
4. “Oral-Systemic Health Considerations in Dental Settings” by Olivia Urquhart et al. in the Journal of the American Dental Association (April 1, 2022)
5. “Oral Health Care Practice Patterns for Geriatric Patients” by Olivia Urquhart et al. in the Journal of the American Dental Association (September 1, 2022)
6. “Oral Health Care Practice Patterns for Geriatric Patients” online CE course (September 22, 2022)
7. “Intraoral Appliance Use in Dental Practice” by Olivia Urquhart et al. in the Journal of the American Dental Association (December 1, 2022)
8. “Intraoral Appliance Use in Dental Practice” online CE course (December 15, 2022)

“For the Patient” Columns in the Journal of the American Dental Association
9. “Key Points for Your Child’s Teeth” by Anita Mark (January 1, 2022)
10. “Options for Making Your Dental Treatment More Comfortable” by Anita Mark (February 1, 2022)
11. “Caring for Dental Instruments” by Anita Mark (March 1, 2022)
12. “Keeping Your Dentist Up to Date” by Anita Mark (April 1, 2022)
13. “Shopping Smart: Look for the Seal” by Anita Mark (May 1, 2022)
14. “Staying in the Game with Mouthguards” by Anita Mark (June 1, 2022)
15. “Keeping Your Gums Healthy” by Anita Mark (July 1, 2022)
16. “Returning to Good Health Care Can Start with a Smile” by Anita Mark (August 1, 2022)
17. “What Are Dentists Seeing in Older Adults?” by Anita Mark (September 1, 2022)
18. “The Basics of Mouth Sores” by Anita Mark (October 1, 2022)
20. “Oral Piercings and Gems: Know What You’re Getting Into” by Anita Mark (December 1, 2022)

Abstracts at the 2022 Annual Meeting of the American Association for Dental, Oral, and Craniofacial Research (AADOCR), March 21–26, 2022

27. "Fluorapatite and CaF₂ Formation in Low Concentration Fluoride-Calcium-Phosphate Complex Solutions," presented by Shozo Takagi and coauthored by Eaman Karim and Laurence Chow
29. "Metal Analysis in E-cigarette Aerosol Produced at High Power," presented by Taejun Ko
31. "A Self-applied Fluoride-Calcium-Phosphate Complex Treatment Reduced Dentin Hydraulic Conductance," presented by Laurence Chow and coauthored by Anthony Giuseppetti
34. Symposia "The AADOCR Code of Ethics" and "Ethical Translation of Research to Clinical Practice" organized by Marcelo Araujo
35. Workshop "Single-Cell and Spatial Multiomics Resources to Advance Salivary Research" included presentation by Kevin Byrd titled "Spatial Proteomics: an Emerging Tool for Diagnosis and Discovery in Salivary Research"
36. Symposium "Evidence-Based Clinical Practice Guideline for Managing Acute Dental Pain" included presentation by Olivia Urquhart titled "Evidence to Inform the Management of Acute Dental Pain"

Abstracts at the 2022 Annual Meeting of the International Association for Dental Research (IADR), June 20–25, 2022

37. “3-D Printing Technology to Build Vascularized Tissues,” presented by Yoontae Kim
38. "Bone-on-a-Chip Platform Reveals New Mechanisms Involved in Endothelial-Osteoblast Interaction," presented by Stella (Stylani) Alim perti
39. "Corticosteroids for Postoperative Acute Pain Due to Tooth Extraction," presented by Olivia Urquhart
40. "COVID-19 Vaccine Hesitancy among Dental Healthcare Workers in the U.S.," presented by Laura Eldridge and coauthored by Cameron Estrich, Marcelo Araujo et al.
42. "Enhancing Dentin Bonding Durability Using a New Additive," presented by Xiaohong Wang
43. "Local Anesthetics for Postoperative Acute Pain Due to Tooth Extraction," coauthored by Olivia Urquhart et al.
44. "Postoperative Acute Pain Due to Tooth Extraction in Adult Population," coauthored by Olivia Urquhart et al.
46. “Quality of Data for When Translating Science to Clinicians,” presented by Marcelo Araujo
47. “Strategies to Reduce COVID-19 Risk in U.S. Dental Settings,” presented by Cameron Estrich and coauthored by Laura Eldridge, Marcelo Araujo et al.

New Oral Health Topics Webpages
48. Periodontitis by Anita Mark (June 9, 2022)
49. Cancer Therapies and Dental Considerations by Kathleen Ziegler (August 30, 2022)

Updated Oral Health Topics Webpages
50. Antibiotic Prophylaxis Prior to Dental Procedures by Kathleen Ziegler (January 5, 2022)
51. Diabetes by Roger Connolly (January 24, 2022)
52. Dental Unit Waterlines by Kathleen Ziegler (March 4, 2022)
53. Forensic Dentistry and Anthropology by Joseph Krecioch (March 16, 2022)
54. Hepatitis Viruses by Roger Connolly (April 1, 2022)
55. Tobacco Use and Cessation by Kathleen Ziegler (June 27, 2022 and November 1, 2022)
56. Amalgam Separators and Waste Best Management by Anita Mark (August 8, 2022)
57. Whitening by Roger Connolly (August 16, 2022)
59. Oral Analgesics for Acute Dental Pain by Kathleen Ziegler (September 6, 2022)
60. Oral Anticoagulant and Antiplatelet Medications and Dental Procedures by Kathleen Ziegler (September 28, 2022)
61. Cancer (Head and Neck) by Roger Connolly (September 30, 2022)
62. Infection Control and Sterilization by Joseph Krecioch (October 5, 2022)
63. Toothbrushes by Anita Mark (October 7, 2022)
64. Occupational Safety and Health Administration by Joseph Krecioch (October 25, 2022)
65. Hypertension (High Blood Pressure) by Kathleen Ziegler (November 1, 2022)
66. Antibiotic Stewardship by Kathleen Ziegler (December 31, 2022)
67. Bisphenol A by Joseph Krecioch (December 31, 2022)
68. Home Oral Care by Anita Mark (December 31, 2022)
69. Sleep Apnea (Obstructive) by Roger Connolly (December 31, 2022)

Patent Activity
70. Filed U.S. Provisional Patent Application “Enhancing Dentin Bonding Durability Using Quaternary Pyridinium Salts” by Xiaohong Wang (June 8, 2022)

Book Chapters

Published Standards with ADA Staff Recognized in Foreword

Lectures
77. “Battles at the Barrier: Applied Multiomics for Precision Oral Medicine” presented by Kevin Byrd at the University of Illinois School of Dentistry (January)
80. “Organ-on-a-Chip and 3-D Printing: Emerging Paradigms in Tissue Engineering and Regenerative Medicine” presented by Stella Alimperti at the Georgetown University Dean’s Seminar Series (January 14, 2022)
81. “Organ-on-a-Chip and 3-D Printing: Emerging Technologies for Tissue Engineering and Regenerative Medicine” presented by Stella Alimperti to the Institute for Bioscience & Biotechnology Research and the National Institute of Standards & Technology (February 2022)
82. “The COVID-19 Catalyst: Re-imagining Host-Viral Interactomics at the Inhalation Interface” presented by Kevin Byrd at the University of North Carolina at Chapel Hill as part of the First Friday Microbiome Seminar series (February 4, 2022)
83. “Applied Multiomics in the Era of Precision Medicine” presented by Kevin Byrd at the George Washington School of Medicine & Health Sciences Department of Biochemistry & Molecular Medicine McCormick Genomic & Proteomic Center Seminar Series (March)
84. “Dental Zirconia,” presented by Yifeng Liao at the University of Illinois, Chicago, class “Biomedical Engineering 494: Special Topics in Biomedical Engineering IV” (March 7, 2022)
85. “Clinically Informed Multimomic Approaches to Advance Precision Periodontal Medicine” presented by Kevin Byrd at Nihon University (April)
86. “Deciphering Governing Motifs in the Upper Airway from Single Cell and Spatial Multiomics” presented by Kevin Byrd at Duke University (April)
87. “Enemy at the Gates: COVID-19 as the Catalyst for Precision Oral Medicine” presented by Kevin Byrd at the Center for Innovation & Precision Dentistry (CiPD) Inaugural Symposium (June 2, 2022)
89. “Drafting the First Human Oral and Craniofacial Cell Atlas” presented by Kevin Byrd at the 2022 FaceBase Community Forum (June 14, 2022)
90. “Facing Forward: Creating a Sustainable Culture of Creativity, Innovation, and Discovery to Advance Oral and Craniofacial Research” presented by Kevin Byrd at the University of Michigan Oral Health Sciences Open House (June 21, 2022)
91. “Data-Driven Dynamics of Immunoregulation and Epithelial Regeneration across the Inhalation Interface” presented by Kevin Byrd at the Virginia Commonwealth University Philips Institute for Oral Health Research (July)
93. “Characterization Techniques and Testing of Dental Materials” presented by Spiro Megremis at the University of Iowa College of Dentistry & Dental Clinics (August 31, 2022)

94. “Host-Microbial Interactomics at the Inhalation Interface” presented by Kevin Byrd at the Colgate-Palmolive Technology Center in Piscataway, NJ (October)

95. “Host-Microbial Interactomics at the Inhalation Interface” presented by Kevin Byrd at the Rutgers School of Dental Medicine Research Seminar Series (October)

96. “The Intersection of Materials Product Development with the Standards and Regulatory Processes” presented by Spiro Megremis at the Academy of Dental Materials 2022 Conference (October 1, 2022)

97. “Big Data: An Introduction for Beginners” presented by Derek Smith to the Multinational Association of Supportive Care in Cancer (MASCC) Oral Care Study Group (October 18, 2022)

98. “Single Cell and Spatially Referenced Immunophenotyping of the Gingival Barrier” presented by Kevin Byrd at the annual meeting of the American Academy of Periodontology in Phoenix (October 29, 2022)


100. “Single Cell and Spatially Referenced Immunophenotyping of the Gingival Barrier” presented by Kevin Byrd at the annual meeting of the American Academy of Periodontology in Phoenix (October 29, 2022)


102. “Relevant Issues with ASTM F04 Medical Device Corrosion Standards” presented by Spiro Megremis at the Symposium on Medical Devices of the Future (November 2, 2022)


104. “Biostats/Study Design Refresher” presented by Derek Smith at Edge for Scholars (November 10, 2022)

105. “Optimizing Caries Management with Surgical and Non-Surgical Care” presented by Vineet Dhar at the 2nd Global Summit of the International Association of Paediatric Dentistry (November 13, 2022)


Miscellaneous

107. Webinar “New Research Reveals Impact of COVID-19 on Dental Hygienists” includes presentation by Cameron Estrich (February 22, 2022)

108. Ask Me Anything with Kevin Byrd on “Cell Atlases as a Blueprint for Human and Craniofacial Health and Disease Research,” sponsored by the International Association for Dental Research (February 28, 2022)

109. “Clinical Practice Guideline for Management of Acute Dental Pain” online CE course


111. Symposium “Oral Health Sciences Graduate Programs in a Future and Diverse Workforce”
includes participation by Kevin Byrd at the University of Michigan (June 20, 2022)

112. Abstract “US Dental Healthcare Workers’ Mental Health during the COVID-19 Pandemic” submitted by Laura Eldridge and coauthored by Cameron Estrich was presented at the International Symposium on Dental Hygiene 2022 in Dublin, Ireland (August 12, 2022)

113. Abstract “Employment Patterns of US Dental Hygienists during the COVID-19 Pandemic: A 12-Month Study” coauthored by Laura Eldridge, Cameron Estrich, et al. was presented at the International Symposium on Dental Hygiene 2022 in Dublin, Ireland (August 12, 2022)

114. Webinar “Mental Health in Dental Professionals: The Pandemic & Beyond” features presentation by Laura Eldridge (September 20, 2022)
Attachment 4.

ADASRI External Collaborations 2022

Applied Research Collaborations in 2022

1. Collaboration on NSF MRI grant awarded to Dr. Kristin Krueger, Loyola University, Chicago for “Acquisition of Artificial Resynthesis Technology for Research, Training, and Experiential Learning”

2. Member of the Research Excellence Cluster: Advancing Multifunctioning Dental Materials, sponsored by the University of British Columbia

3. Consultant on NIDCR/R01 “Osmotic pressure-mediated control of cariogenic oral biofilms”, Dr. Kenichi Kuroda, the University of Michigan

ITR Collaborations in 2022

4. Ether-based monomers for dental composite restoratives; Christopher Stafford, Vivek Prabhu, Chad Snyder, Carlos Beauchamp, and Yun Liu, National Institute of Standards and Technology (NIST); Dr. Michael Weir and Prof. Huakun Xu, University of Maryland School of Dentistry.

5. Enhancing the durability of dental restoration by adding new additives; Christopher Stafford, National Institute of Standards and Technology (NIST).


7. Development of Fluorapatite-Titanium Composites for Dental Implant applications; Russell Maier, National Institute of Standards and Technology (NIST).

8. A Multimodal Atlas of Chronic Oral Inflammation Over the Lifespan; Blake Warner, Paola Perez, and Shyh-ing Jang, NIH/NIDCR; Alexander Predeus, Sarah Teichmann, Wellcome Sanger Institute; German Stark, Biomage; Ana Caetano, Diana Pereira, and Inês Sequeira, Queen Mary University; Katarzyna Tyc, Xufeng Qu, and Jinze Liu, Virginia Commonwealth University; Luiz Ferraz da Silva and Marisa Dolhnikoff, University of Sao Paulo Medicine School; Bushra Alghamadi, Min Liu, and Dana Graves, University of Pennsylvania.


10. Oral Structural Immunity of Host-Viral Interactions; Blake Warner, Paola Perez, Shyh-ing Jang, Salivary Disorder Unit, NIH/NIDCR; Luiz Ferraz da Silva and Marisa Dolhnikoff, University of Sao Paulo Medicine School; Alexander Predeus, Sarah Teichmann, Wellcome Sanger Institute; German Stark, Biomage; Katarzyna Tyc, Xufeng Qu, Jinze Liu, Department of Biostatistics, Virginia Commonwealth University.

11. AADOCR Position Statement on Electronic Nicotine Delivery Systems (ENDS) by Kevin Byrd et al. for AADOCR Committee

12. AADOCR Position Statement on Tobacco by Kevin Byrd et al. for AADOCR Committee

ESTR collaborations in 2022

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13. Health physicist Drs. David Spelic (retired) and Smita Kakar, from US Food and Drug Administration (FDA) are working with ESTR staff on the safety and regulatory aspects for updating the 2012 ADA/FDA recommendations on dental radiographs.

14. Drs. Ethan Fechter-Leggett and Suzzanne Tomasi at National Institute for Occupational Safety and Health (NIOSH) are providing access to the National Death Index and working with us to determine whether idiopathic pulmonary fibrosis is over represented among dentists in the population.

15. Dr. Natalia Chalmers at the US Department of Health and Human Services (CMS) was instrumental in connecting us with Ali Russo and Eric Okurowski at fairhealth.org from whom we obtained the dataset to exam amalgam utilization rates among the population of privately insured patients.

16. Work to design and develop the DERE database has included engagement with Jesse Green and Christian Stephens at IQVIA and Peggy Ragan and Phil Langthorne from the parent company, Quintiles.

17. Joan Bardsley, RN MBA, a diabetes care and education specialist and Dr. Michelle Magee, an endocrinologist, both at the Medstar Diabetes Institute affiliated with George Washington University are collaborating on the scoping systematic review on toothbrushing and oral health and glycemic control in people with type 2 diabetes.

18. Dr. Joann Gurenlian at the American Dental Hygienists Association (ADHA) has been an active partner in COVID-19 projects exploring the pandemic related engagement of dental hygienists.