

National Dental Practice-Based Research Network [NDPBRN]

The Committee recommends that the NIDCR continues funding support of National Dental Practice-Based Research Networks.

Action taken or to be taken

The National Institute of Dental and Craniofacial Research (NIDCR) supports research conducted within a practice-based setting, the main goals of which are: to streamline the implementation of national oral health research studies in dental practices on topics of importance to practitioners and their patients, to provide evidence useful in daily patient care, and to facilitate the translation of research findings into clinical practice. One of the most prevalent challenges in dentistry is the amount of time it takes private practices to adopt new, evidence-based treatments and protocols. On average, the journey from the laboratory bench to the dental chair can take almost a decade before patients benefit from more effective or durable treatments. One of the most successful ways to shorten this lag time is to conduct research in a practice-based setting, which is designed to bring together patients and practitioners in the study of oral health issues within the real-world environment of a dental practice. The results from studies conducted in this setting have been accepted and adopted much more quickly into clinical practice.

Over 16 years ago, NIDCR launched the National Dental Practice-Based Research Network (National Dental PBRN) to study and answer questions of everyday relevance to dental practitioners and their patients. Since that time, more than 7,000 dental practitioners and 60,000 patients in all 50 states have participated in more than 60 studies. The studies, conducted in participating dental offices with consenting patients, have helped to exponentially expand the profession's evidence base. Overall, the findings have provided robust evidence to better inform oral health treatment decisions. Completed research has covered a wide range of topics, including a study of cracked teeth to record tooth symptoms and treatment outcomes over time, assessing opioid prescribing practices among dental providers, managing pain and functional outcomes involved in temporomandibular joint disorder (TMD), screening for oral human papillomavirus (HPV) positivity in dental offices, leveraging electronic health record data for clinical research, and assessing the prevalence of persistent pain after root canals.²⁶²

The current cycle of the National Dental PBRN received funding in 2019 and has built on the momentum of the previous two cycles of investment. It has maintained a geographically diverse network comprising all 50 U.S. states and has added a Specialty Node to recruit and engage practitioners within dental specialties, as well as a unique Patient Population Node to link practitioners with similar practice types or practitioners who treat patients with disease-specific conditions that affect oral health. The National Dental PBRN infrastructure is supported through 2026 via: a) the National Administrative and Resource Center,²⁶³ which provides study-specific support to practitioners and office/clinic staff and coordinates study deployment across dental practices across the country, and b) the National Coordinating Center,²⁶⁴ which is the central locus for data coordination/management and maintains the practitioner membership database.

The National Dental PBRN has been instrumental in addressing critical knowledge gaps related to the delivery of dental care during the Coronavirus pandemic.²⁶⁵ For example, aerosol measurement studies performed during aerosol-generating procedures in a variety of specialty and general dentistry practices with different clinic configurations found that aerosols were rapidly dispersed within minutes of completing the aerosol-generating procedure, and that standard aerosol mitigation strategies were

²⁶² nationaldentalpbrn.org/study-results/

²⁶³ reporter.nih.gov/search/UnOs19c1OUC0N6A_hq0csg/project-details/10188501#description

²⁶⁴ reporter.nih.gov/search/UZXg2pRENES-5963Qzps7A/project-details/10187547#description

²⁶⁵ nidcr.nih.gov/research/covid19/studies-grantee-institutions

effective in mitigating risk during routine dental clinical practice.²⁶⁶ Other research topics currently being supported and implemented in the National Dental PBRN include studies using mobile technology to improve patient pain experience following dental procedures,²⁶⁷ testing the effectiveness of nicotine replacement sampling in dental practices,²⁶⁸ assessing the biologic and prosthetic outcomes of dental implants,²⁶⁹ and evaluating procedures for integrating mental health screening and referral into dental care workflows and dental management of patients with special healthcare needs.²⁷⁰ NIDCR's steady and strategic support of the National Dental PBRN will ensure that evidence-based interventions are more rapidly integrated into clinical practice and bring large-scale benefits to dental patients across the country. NIDCR has maintained long-term support of the National Dental PBRN and continues to propose new initiatives to support clinical research conducted in the practice-based setting.²⁷¹

²⁶⁶ medrxiv.org/content/10.1101/2021.07.30.21261399v1

²⁶⁷ reporter.nih.gov/search/QUEGajkRwUWYdwcJH55HvA/project-details/10405312#description

²⁶⁸ reporter.nih.gov/search/4Cf8zCMNU0qKn-KErDTovg/project-details/10221673

²⁶⁹ reporter.nih.gov/search/xlkZZS8WdUOLVQMg7MKIXw/project-details/10101988

²⁷⁰ nationaldentalpbrn.org/recruiting-ongoing-upcoming-completed/

²⁷¹ nidcr.nih.gov/grants-funding/funding-priorities/future-research-initiatives/conducting-dental-practicebased-research-dental-schools-provide-clinical-research

SARS-CoV-2

The Committee thanks NIDCR for its commitment to prioritizing research to answer critical research questions related to the novel coronavirus. The Institute's research into high-impact areas such as transmission risk in dental environments is critical for the nation to continue fighting COVID-19 and to ensure everyone is as safe as possible.

Action taken or to be taken

The National Institute of Dental and Craniofacial Research (NIDCR) is committed to its unique role at the National Institutes of Health (NIH) in responding to the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) virus by focusing on oral health and safety in the dental clinic. NIDCR provided approximately \$4 million in supplemental support to current grantees to shift focus to SARS-CoV-2 research,³⁴⁹ and administers six Rapid Acceleration of Diagnostics Radical (RADx-rad) initiative grants.³⁵⁰ The institute is also involved in the NIH REsearching COVID to Enhance Recovery (RECOVER) Initiative, which seeks solutions to the long-term health effects of coronavirus disease 2019 (COVID-19).³⁵¹ NIDCR published two papers highlighting the institute's response to the pandemic outlining its nimble, rapid scientific response³⁵² and shedding light on the impacts of the pandemic on NIDCR staff and researchers.³⁵³

One of the most critical tools in ending the ongoing COVID-19 pandemic is rapid, sensitive, inexpensive diagnostic methods. NIDCR-funded researchers are developing a “smart mask” that changes color in the presence of the virus.³⁵⁴ Another group of researchers is in the process of developing a portable biosensor that utilizes disposable cartridge strips and shows promise as a fast, easy, and low-cost detection method.³⁵⁵ Also, a RADx-rad project is developing a fast cellphone camera-based SARS-CoV-2 RNA detection method for rapid diagnosis.³⁵⁶

NIDCR is investing in research to understand the biology of the SARS-CoV-2 virus, with a focus on transmission and infection. NIDCR intramural scientists discovered that SARS-CoV-2 infects the cells in the mouth as well as saliva.³⁵⁷ NIDCR-funded investigators are exploring the mechanisms that the virus uses to gain entrance into the host cell³⁵⁸ and the role that specific cell receptors located in the oral cavity, called P2Y2 receptors, play in infecting the cell.³⁵⁹ Another study is assessing the effectiveness of certain compounds called probiotics, that are produced by the normal bacteria found in the mouth, in inhibiting the infectivity of SARS-CoV-2.³⁶⁰

NIDCR-supported investigators are also examining ways to keep dental health professionals and patients safe in dental practices. Several of these studies are conducted by members of the National Dental

³⁴⁹ www.nidcr.nih.gov/research/covid19/studies-grantee-institutions

³⁵⁰ www.nidcr.nih.gov/research/covid19/nidcr-supported-radx-awards

³⁵¹ recovercovid.org/

³⁵² pubmed.ncbi.nlm.nih.gov/34044965/

³⁵³ pubmed.ncbi.nlm.nih.gov/33906484/

³⁵⁴ pubmed.ncbi.nlm.nih.gov/34309356/

³⁵⁵ pubmed.ncbi.nlm.nih.gov/34309356/

³⁵⁶ onlinelibrary.wiley.com/doi/full/10.1002/admt.202100602

³⁵⁷ www.nidcr.nih.gov/news-events/nidcr-news/2021/scientists-find-evidence-novel-coronavirus-infects-mouths-cells; pubmed.ncbi.nlm.nih.gov/33767405/

³⁵⁸ reporter.nih.gov/project-details/10221894

³⁵⁹ reporter.nih.gov/project-details/10176830

³⁶⁰ reporter.nih.gov/project-details/10175495

Practice-Based Research network (PBRN).³⁶¹ One is testing the feasibility of several risk-mitigation strategies in dental offices to increase safety in dental office settings,³⁶² while others are evaluating proper usage of personal protective equipment (PPE)³⁶³ and assessing aerosol mitigation strategies in dental environments to limit virus transmission.³⁶⁴ Also, the PBRN COVID-19 Research Registry (CORE) is currently surveying dental practitioners about their approaches to reducing transmission risk, and the associated costs of these approaches.³⁶⁵

³⁶¹ www.nidcr.nih.gov/research/clinical-trials/national-dental-practice-based-research-network

³⁶² www.nationaldentalpbrn.org/recruiting-ongoing-upcoming-completed/#1599667173484-701a56f0-7843

³⁶³ www.nationaldentalpbrn.org/recruiting-ongoing-upcoming-completed/#1595865482318-42bc47a4-441b

³⁶⁴ www.medrxiv.org/content/10.1101/2021.07.30.21261399v1

³⁶⁵ www.nationaldentalpbrn.org/recruiting-ongoing-upcoming-completed/#1627438270053-0d10a7b2-94c1