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Facing the Future: the NIDCR Celebrates its 60th Anniversary

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This year, the US National Institute of Dental and Craniofacial Research (NIDCR) celebrates its 60th anniversary. A “Diamond Anniversary” presents an ideal opportunity for a government agency to reflect on its past accomplishments, and the NIDCR certainly has much to showcase—from its prominent role in providing the scientific foundation for prevention to greatly expanding our fundamental understanding of oral health and biology.

In this anniversary editorial, however, we would like to address a larger question that looms on the horizon: How can oral health research and our traditional research community best position itself for the future? The next generation of technological innovation will soon be upon us, from the maturation of labs-on-a-chip, pharmacogenomics, nanotechnology, molecular imaging, and tissue engineering to the development of systems and computational biology. This emerging wave of scientific and technological advances will accelerate the development of molecular-based oral care, a change that has been *en route* for the past decade and which will likely dominate future NIDCR accomplishments and anniversaries.

So how can oral health research best position itself for the future? This question is complex in part because our education, research training, and health care delivery remain largely separate from the rest of medicine. Yet, solving the daunting biologic complexities of oral diseases and treating them effectively will require increased interdisciplinarity, collaboration, and innovation. We must first and foremost fully realize our role as part of the primary health care network. Achieving greater interaction and collaboration with other scientists, educators, and clinicians will require us to step beyond our comfort zone and be willing to embrace different ways of framing questions and finding solutions. New strategies for the early detection of many common diseases afford us the opportunity to be part of the solution of ever-increasing health care costs. Increased emphasis will be placed on affordable, easily dispensed, novel interventions to ensure that all persons benefit. No doubt emerging technologies, such as saliva-based point-of-care diagnostics, will play a large role in achieving this goal.

We must continue to broadly engage the biomedical research community at large. As a discipline, oral health research offers a unique window of accessibility to study inflammation, microbial biofilms, bone metabolism and repair, and exocrine glands and their secretions in real time. The head has always been connected to the body, and we must remind our more tradition-bound medical colleagues of this fact. We must think beyond the boundaries of academic departments and disciplines and seek to integrate our most pressing research questions into the larger biomedical construct. One potential route of support is through large trans-NIH initiatives, such as the NIH Roadmap. Through participation, we will continue to break down the traditional and false divide between dentistry and medicine. And, from a practical standpoint, during times of minimal budget growth, this resource set represents a new and much-needed funding avenue for our community.

The NIH Roadmap and other trans-NIH programs typically involve access to cutting-edge techniques and/or research infrastructure that may be less accessible *via* other funding

mechanisms. Why wait a few years for these tools to become the *status quo*? Let's get involved now and reap the benefits. For instance, in the May 2008 issue of the *JDR*, a team of NIDCR grantees looked in a new research direction. They reported the results of the first GWAS, or genome-wide association study, on dental caries. A melding of genomics with relatively low-cost DNA sequencing technology, GWAS studies can produce rapid genome scans of large cohorts of people with a predisposition to a specific disease. Computer algorithms then pour over the sequence data and sometimes detect shared variations in utterly unexpected genes. The scientists reported preliminary data that listed several candidate genes of caries risk that, quite unexpectedly, are involved in salivary flow and diet preference. More work must be done. But this research, supported by the NIDCR *via* a trans-NIH initiative, likely marks the beginning of a new set of leads that can be incorporated with past leads to tell a fuller biological story.

Oral health care must become more biology- and evidence-based in the coming years. Thus, dentistry and the broader oral health community would be wise to begin preparing now for this fundamental shift. In the United States, where quality control is a dominant factor in making healthcare decisions, the oral health community must prepare to stand upon a solid clinical research base. This fact was a major reason for NIDCR's substantial investment to create practice-based research networks. The networks will not only generate data to advance patient care today, they will also provide needed infrastructure to assist dentistry in adopting more biology-based diagnostics and treatment in the future. Moreover, these networks also will facilitate more seamless integration with existing medical practice-based systems and position oral health to be an integral component of 21st century medicine.

Down the hall from our offices hangs a black-and-white photograph of President Harry Truman seated in the Oval Office. Behind him stands a row of public health officials looking down at a legal-sized sheet of paper placed on the leaf of the President's desk. It's June 1948, and the ensuing stroke of the President's black fountain pen will establish the National Institute of Dental Research (NIDR) and launch America's fight against chronic dental disease. At the far right in a loose-fitting white suit stands Dr. H. Trendley Dean. By the following September, Dean would be appointed the Institute's founding director and accept the daunting task of organizing an NIH institute, establishing its research priorities, and leveraging them into viable solutions to eradicate the rampant tooth decay and periodontal disease that left edentulous three out of every 10 Americans age 45 and older.

As this photograph and history attest, where there is a national will to improve public health, there is most certainly a way. Today, thanks in great part to the research priorities that Dean and our predecessors at NIDCR set in motion, chronic dental conditions and tooth loss are no longer viewed in the United States as inevitable facts of life and longevity. For readers in developing nations or those who treat underserved populations, this is a powerful message indeed.

When one views this photograph, it's inspiring to consider just how far we have traveled 60 years later. Most of the scientific questions and laboratory tools now on the table could never have been seriously contemplated when Truman prepared to sign his name. We now can realistically envision a day when damaged oral tissues will be reengineered and molecular medicine will be routinely dispensed. This legacy of progress reminds us that science is fluid, and research agencies and communities must be, too.

In 2008, let's celebrate the past but remain cognizant of the future and its demands. All in our community will benefit from a future in which the best is truly yet to come.

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