

A Plea for a Dental Research Institute

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On February 16, 1999, the federal government announced a major change to its science policy. Some \$450 million in public funds will be spent to create research institutes and networks of centres of excellence with the goal of promoting research activities and targeting specific scientific objectives.

In the United States, 24 research institutes belonging to the National Institutes of Health (NIH) develop projects, missions and strategic plans, in addition to training professional researchers. The Bethesda campus in Maryland is home to the National Cancer Institute, the National Eye Institute, the National Institute of Neurological Disorders and Stroke, the National Institute of General Medical Sciences and the National Institute of Dental and Craniofacial Research (NIDCR), among others. According to U.S. budget figures for the year 2000, the NIH will receive \$4.5 billion in government funds, of which 4.8% (\$215 million) will go to the NIDCR.

With the United States as an example and given the federal government's announcement, the time has come to consider establishing an institute of dental research as the first step toward a true science policy that will benefit future generations.

Science: The Endless Frontier

"The longer you look back, the farther you can look forward."
Winston Churchill

In 1945, the U.S. president asked the Director of the Office of Scientific Research and Development, Vannevar Bush, to design a scientific research program for the post-war period. That request led to the publication of a seminal work entitled *Science: The Endless Frontier*.¹ This document is still considered the Bible by some American researchers.

Bush believed that developments in both military and basic research would make the United States a superpower and world leader. He advised the president to financially support research so as to take advantage of the long-term benefits of the new discoveries.

He felt that the government should, among other things:

- Train scientists and increase the flow of new knowledge in colleges, universities and research centres, and foster

solidarity, intellectual freedom and the free play of ideas necessary for growth and development. To this end, the government needed to expand on the opportunities available and find funding for research.

- Keep abreast of research conducted elsewhere by encouraging international congresses and officially receiving foreign researchers in the U.S.
- Promote new scientific knowledge and development of scientists in order to pave the way for public and private scientific endeavours that would create employment.
- Recognize that the basic research conducted in colleges and universities was essential to industrial progress. Without it, industrial research would stagnate, no longer creating either jobs or products.

Now, on the eve of the new millennium, the United States has allocated \$76 billion to research and development: \$40 billion to civil research (\$4.5 billion to the NIH and \$13.4 billion to NASA) and \$36 billion to military research. Year after year, Congress authorizes a significant budget for science and technology that amounts to approximately 2.7% of the gross domestic product (GDP).

The National Institute of Dental and Craniofacial Research

The NIDCR was one of three NIH research establishments first founded in 1945 following the Bush report. Initially, this institute was supposed to address the serious problem of tooth decay faced by the armed forces, given that 10% of army recruits were rejected because of dental problems.

With each successive year and each successive political debate, the NIDCR's strategic plans and missions have been modified to meet the changing needs of dentistry. Today, the NIDCR's mission is to improve and promote dental, oral and craniofacial health through research. Its objectives include science and technology transfer, scientific training and the development of researchers. To this end, the NIDCR has adopted an ambitious strategic plan targeting research programs like:

- the development of research on microbial ecology and mucosal immunity (vaccine development)
- the role of saliva in the body's defence system (xerostomia study, research into the secretory leukocyte protease inhibitor or SLPI protein that prevents HIV from invading the immune cells)
- neoplastic diseases (genetic mutations that cause cancers of the mouth and pharynx)
- biomaterials and biomimetics (i.e., using undifferentiated cells to generate bone and the associated tissues) and tissue engineering
- the dental, oral and craniofacial tissues as models for studying normal functioning and diseases affecting the tissues (osteoarthritis and Paget's disease)
- genome research (genomic mapping)
- epidemiological, behavioural and social research.

With these training and research programs, the NIDCR develops front-line researchers who play an important role in government agencies, universities, research centres and the private sector.

According to an NIDCR immunologist, it is time to stop viewing dentistry as simply the practice of repairing teeth and treating gum disease. The oral system is a very complex one that is intimately connected to the digestive, cardiovascular and respiratory systems. It is essential to recognize the full scope of dental research.

Discussion

In Canada, the National Research Council (NRC) was founded in 1918 to address a shortage of researchers and research activities. At the time, the NRC's mission was to promote industrial research, coordinate scientific activities and contribute to the development of scientists. With the Glassco report of 1960, the government realized that the NRC had abandoned its primary objective of promoting industrial research. It therefore decided to eliminate the NRC's role as a scientific adviser, restructure its laboratories and appoint a senior scientist to oversee its activities.²

Also of interest is the Industry Canada report of 1996 that proposed the Industrial Research Assistance Program (IRAP). It is Industry Canada's objective to give the private sector a larger role in developing research programs so that the government can gradually give up this responsibility.³

Today, science and technology are the responsibility of Industry Canada and the NRC is divided into three structures: the Natural Sciences and Engineering Research Council (NSERC), the Medical Research Council (MRC) and the Social Sciences and Humanities Research Council (SSHRC), with budgets of \$450 million, \$240 million and \$93 million respectively. In Canada, spending on research and development represents approximately 1.5% of GDP.

However, with the February 1999 budget, the federal government made an important change in its approach to research and development. Building on its program for the creation of research institutes and networks of centres of excellence, it is preparing to promote research projects and target specific research objectives.

There are those who will immediately object on the grounds that the medical community and the United States are more experienced in the area of research. They are forgetting the history of Canada and Quebec, and the history of dentistry — our history. They are forgetting such events as the great battle at Vimy Ridge in 1917, during the First World War, and the Quiet Revolution of 1960, as well as the successful crusade we have led over the past 50 years against dental caries and periodontal disease.

Until now, we have persevered, proving our importance, demonstrating our determination and accomplishing our mission. Opening another front in oral health may be vital to future research and science. It is therefore imperative that we be independent of the medical community and the United States.

The profession of dentistry must recognize the importance of research and development for the future and act accordingly. If we want to keep playing with the great ones, we have to make our move now. ♦

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The views expressed are those of the author and do not necessarily reflect the opinions and official policies of the Canadian Dental Association.

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1. Bush, V. *Science: the endless frontier*. Washington (DC): National Science Foundation; 1945.
2. Doern, G. *National Research Council: centre of conflict. Science and politics in Canada*. Montreal: McGill-Queen's University Press; 1972.
3. Industry Canada. *Science and technology for the new century*. Ottawa: Government of Canada; 1996.

Web Sites

Government of Canada: <http://www.gc.ca/>
 Networks of Centres of Excellence: <http://nce.nserc.ca/>
 Canadian Institutes of Health Research: <http://www.cihr.org>
 Budget of the United States Government, Fiscal Year 2000: http://www.access.gpo.gov/su_docs/budget/index.html
 National Institute of Dental and Craniofacial Research: <http://www.nidr.nih.gov/>