Dalhousie University, Faculty of Dentistry

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The Importance of Biomedical Research

An interesting publication in *Quality Assurance Health Care*. 3: 2. 95-114, 1991. by J. W. Williamson, *et al* entitled "Health science information management. An approach to improving quality assurance and clinical practice." brought to mind the importance of biomedical research to society.

The current interest in quality assurance and the need for clinical practitioners to keep up with advances in health care knowledge and technology, led Williamson and colleagues to develop a prototype Health Science Information Management guide. This included: (a) identification of unique science information needs; (b) rapid retrieval of valid needed information; and (c) the use of the information to improve health care benefits. The authors suggested that five specific categories of information would be essential: (1) reports of recent advances in Science Information Management methods; (2) original reports of Science Information Syntheses providing information immediately applicable for quality assurance; (3) previously published reports of "classic" original reports of Science Information Syntheses relevant to quality assurance; (4) reviews of new technologies and products immediately applicable to quality management; (5) cumulative indexing of the above methods and products. It was said that making the above information available to quality assurance professionals might substantially improve the impact of quality management information. Where does the scientific information come from which is required for these types of data base? The important message for the academic biomedical community is that important valid health care information can only be obtained by RESEARCH. Academic institutions and academic professionals are the major providers of this information. It is clear that all academics who have the privilege to work in the health science field have a moral and ethical obligation to provide input to the generation of new knowledge. Those University Faculties which are engaged in health science activities must encompass both teaching and research, they are also mandated to provide a resource knowledge base for their respective professions and the general public. In many respects, the health science field is one which carries with it a heavy moral and fiscal responsibility since health costs and quality health care are a major factor in society. Those health professionals who opt for an academic career in a university are at the same time committing themselves to participating in the generation of new knowledge.

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A Source of Variation for Research

The opportunities for clinical research abound and overwhelm us as we go about our everyday work as academics. A classic area is that of treatment decision making. It has been recognised for many years that treatment decision-making among dentists often shows wide variation. A study by Kay *et al** (1992) sought to examine the effect of dentists' stated treatment thresholds as a source of variation between them. Twenty dentists made 360 treatment decisions about the approximal surface of extracted teeth seen in simulated bitewing radiographs. They also stated their personal treatment thresholds, i.e. the depth of lesion which they intended to restore. One hundred and ninety pairwise comparisons of treatment decisions showed that only 16% of the dentist pairs showed substantial agreement. Dentist pairs who reported that they held the same interventive threshold achieved exactly the same mean level of agreement in treatment decision-making as dentist pairs who disagreed about the appropriate threshold for restorative intervention. The study suggests that restorative thresholds which are reported to be used by dentists may be poorly correlated with the number of positive treatment decisions actually made. So many opportunities for clinical research, what a wonderful world we live in.

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* Reference:
Kay, E. J., Nuttall, N. M., Knill and Jones R. "Restorative treatment thresholds and agreement in treatment decision-making." in Community Dent Oral Epidemiol 20: 5. 265-268. 1992.

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Real Scientists Use Computers.

Biomedical science is often seen as being preoccupied with basic mechanisms in which fundamental studies of the genetic, molecular and atomic structures are the major focus. The perception that real scientists are only those that are involved with such matters has affected attitudes of academics in the medical and dental sciences. Contrary to this viewpoint, politicians and the Provincial Departments of Health are largely interested in those aspects of clinical phenomena involving outcomes, interventions, over-treatment, and effectiveness and efficiency of health care. It is true to say that these aspects of health care have been largely disregarded by biomedical and dental scientists. Until recently such areas of research have not been viewed favourably by granting agencies. However, it is also true to say that within the biomedical sciences, there is a growing interest in 'clinical research.' As has often been stated in the Dental research News, clinical dentists have a wonderful opportunity to use their clinical skills in clinical research, they do not need to learn a whole set of new research skills involving complex theory and equipment. The Medical Research Council have agreed that providing additional funding can be made available, their mandate should be broadened to encompass these areas of health care delivery.

The evolution and development of the small PC computer and the availability of appropriate database programmes with compatible statistical packages have opened up new dimensions for clinical research. In deciding on the appropriate system to replace our current aging dental computer for the clinic we have to pay particular attention to the needs of clinical research. The dental clinic is the clinical investigators research laboratory. Computer and database design and analysis are as much a part of the clinical investigator's needs as are the laboratory equipment and techniques of the biologist or the material scientist. The ideal database should be simple and flexible, but at the same time provide an adequate patient profile. The method of entering data should be standardized by precise inclusion criteria and precise definitions. As much as possible of the data input should be numerical. It is of considerable importance that the database programme should be capable of interacting with a comprehensive statistical programme. The information stored on a clinical database can be used for both observational and investigational studies. Case series, case control studies and cohort studies can all be developed from well developed and maintained databases. Derek Jones argued unsuccessfully for a computer system which would provide a research database at the time when the current clinic system was purchased. If our current clinic computer had been able to collect data for the past 10 years involving the various types of materials used for treatment and the documentation of any problems associated with the treatment and the longevity of the restorative procedures carried out, we would have a very rich resource for dental research. Databases maintained over a number of years can readily yield large numbers of publications. The chance observations or trends for patients undergoing regular dental treatment can provide unexpected bonuses for the clinical researcher.

Epidemiological Mistakes.

A good scientist is one who learns from his or her mistakes. The exceptional scientist is one who learns from the mistakes of others. A very interesting publication by J. A. Davies *et al* [Health Bull (Edinb). 50, 2, 194-205, 1992] will be of special interest to those Faculty members who may be contemplating conducting epedemiological studies. The title of the paper is "The Chief Scientist reports....Problems in mounting and maintaining longitudinal studies--examples from dental health services research."

The authors state that although there already exists a large body of literature on the methods of conducting classical epidemiological studies, such publications lack practical help in pointing out the problems. Guidelines for epidemiological studies most often tend towards detailing how such studies should be conducted and may not prepare the researcher for the less-than-perfect scenarios that will inevitably be encountered. The publication explains that the Dental Health Services Research Unit in Dundee, Scotland, UK, has been involved in longitudinal studies of dental treatment and dental health since its inception in 1979. The problems encountered by the researchers in this programme are itemized under the headings of 1) Mounting the Studies, 2) Samples, 3) Data collection, 4) External changes, 5) Internal changes, 6) Dissemination and 7) Curtailment. The authors state that they hope that a description of the often unpredictable problems associated with a particular set of studies will provide an insight which may assist others embarking on analogous projects in health services research. This very useful publication by Davies et. al. should be read by all faculty members who contemplate undertaking clinical trials or epedemiological studies.

"RESEARCH NEWS ITEMS"

Do you have any research news which you would like to share with your colleagues? If so, please forward such items to the Research Development Office. It would help if submissions were produced on a (Macintosh) disc in Microsoft Word, or simply call 1675.

Seed Funding

The Research Development Committee have reviewed a number of applications for seed money to assist Faculty members in carrying out their research. Clearly our Faculty is not in a position to respond in full measure to the total funding requests which are received from various members of Faculty. As reported in the June Dental Research News the total funds recently requested were in excess of $43,000.

It is important for Faculty to recognize that the MRC Discretionary Research funding is provided by the Medical Research Council to Faculties in order to supplement or support ongoing MRC funded research programmes as well as to provide seed money to allow new projects to get off the ground. The money is provided to individuals with the expectation that a research grant application to an external agency will be forthcoming once some data has been generated and published. This seed funding is not intended to completely support an ongoing research programme, but is aimed at getting individuals started until until such time that they can acquire additional external funding. Such funding can be obtained from the private sector or from one of the federal research funding agencies. The deadlines for application to MRC for funding are shown on this page column 3.

Relativity

When we say that it takes 4 years to educate a DDS student, we are really saying it takes 4 times as long as it takes the earth to circle the sun or 41,333,333 times as long as it takes to sharpen a pencil.

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Spiraling Knowledge

"The rate at which man has been storing up useful knowledge about himself and the universe has been spiraling upward for 10,000 years."

Alvin Toffler.

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Members of the Research Hall of Fame.

The Dental Research News was overwhelmed by the response for providing the missing initials of two of our graduates who had been recipients of NRC Summer Research Awards to enable them to work as Summer Research Assistant during the period 1961-67. The editor and Assistant Editor together with all of the staff of the Dental Research News would like to thank all of those who have taken the trouble to forward the initials of the two individuals. The one individual was **J. W.** Logue (Terri's Father) and the other was **Ian F.** Paul. Just to correct any misunderstanding the use of the expression **Research Hall of Fame** was not referring to Gordie in the Biomaterials Research Laboratory.

Further investigation has now revealed that J. W. Logue and Ian F. Paul were NRC Summer Research Assistants during the summer of 1961 working on research projects with Dr's John Findlay and Sandy Hoffman. As a first year dental student in 1962, Daniel MacIntosh also worked with the late Dr. John Findlay investigating periodontal changes in rats. As a second year dental student in 1963 Danny then worked with an unknown young Dalhousie Dental Faculty member by the name of Ron Jordan in the summer of 1963, investigating tooth development in human fetuses. I wonder what ever became of Ron Jordan? The following year in 1964 Danny MacIntosh worked as a Summer Research Assistant with Dr. R. L. Saunders who was then Head of Anatomy at Dalhousie University. The editor has it on good authority that the reason that Danny worked for a different Faculty member each year is due entirely to the fact that he was such an excellent Research Assistant and was in such high demand. There is no truth whatsoever in the rumor that no one could be persuaded to employ Danny for a second year ir succession.

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A Sober Enterprise

"Outsiders often regard science as a sober enterprise, but we who are inside see it as the most romantic of all callings. Both views are right. The romance adheres to the processes of scientific discovery, the sobriety to the responsibility for verification".

Pat Langley et al.

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On Line for the Future

Harvard University has embarked on an eight year, $20 million project to convert its paper bibliograhic records into a format that can be accessed by computer.

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Deadlines for MRC Grants

New Operating Grants and Equipment Grants, September 15th 1993.

Clinical Trials, September 1st 1993.

AIDS Program at any time.

University-Industry Programs: U-I Operating Grant and U-I Clinical Trials, March 1st, June 1st and October 1st 1993.

International Scientific Exchanges, October 1st 1993.

Deadlines for Abstracts

Seattle AADS -August 6th 1993.

Seattle IADR/CADR 24th September 1993.

Colgate Student Abstract Award November 30th 1993.

CADR student research Awards, August 16th 1993.