

# A Nutrition Odyssey: Knowledge Discovery, Translation, and Outreach

## 2006 Ryley-Jeffs Memorial Lecture

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### Abstract

**Background:** The 21st-century model of health research is founded on a broad base of multidisciplinary research that is expeditiously and effectively translated into evidence-based practice, education, policy, and advocacy. The key objective is to improve the health of populations.

**Dietitians' roles:** Dietitians, whether they are working in clinical or public health nutrition or food science, have a vital role to play in this paradigm of health research. As dietitians' roles have evolved beyond the traditional ones into subspecialties including epidemiology, nutrigenomics, functional foods, nutraceuticals, toxicology, natural health products, and multidisciplinary research, the need for advanced training in subspecialty fields has become essential.

**Opportunities:** A dietetics background is an excellent foundation upon which to develop a research career in one of these new areas of nutrition. Opportunities for personnel awards and research funding targeted at nutrition clinician-scientists and other nutrition subspecialists have grown tremendously in recent years.

**Conclusion:** The information in this paper is intended to inspire dietitians seeking advanced academic training in one of the new exciting avenues for a career in nutrition. These avenues will permit dietitians to contribute to knowledge discovery, translation, and outreach to improve the nutritional status and health of populations in Canada and globally. (Can J Diet Prac Res 2006;67:150-156)

### Résumé

**Historique.** Le modèle de recherche en santé du XXI<sup>e</sup> siècle repose sur une large base de recherche multidisciplinaire promptement et efficacement appliquée à une pratique axée sur les faits, à l'éducation, aux politiques et à la sensibilisation. L'objectif clé est d'améliorer la santé des populations.

**Rôles des diététistes.** Qu'elles travaillent en nutrition clinique, en santé publique ou en sciences des aliments, les diététistes ont un rôle crucial à jouer dans ce paradigme de recherche en santé. À mesure que les diététistes ont vu leurs rôles traditionnels passer à des sous-spécialités telles que l'épidémiologie, la nutriginomique, les aliments fonctionnels, les nutraceutiques, la toxicologie, les produits de santé naturels et la recherche multidisciplinaire, le besoin de formation supérieure dans ces sous-spécialités s'est imposé.

**Possibilités.** Une formation en diététique constitue une assise excellente pour entamer une carrière en recherche dans l'un de ces nouveaux domaines de la nutrition. Pour les chercheurs en nutrition clinique et en d'autres sous-spécialités liées à la nutrition, les possibilités de recevoir des bourses personnelles et du financement de recherche se sont accrues prodigieusement au cours des dernières années.

**Conclusion.** Cet article a pour but d'encourager les diététistes qui souhaitent acquérir une formation supérieure dans l'une de ces nouvelles avenues stimulantes. Cette ouverture permettra aux diététistes de contribuer à l'acquisition des connaissances, à leur application et à l'intervention pour améliorer l'état nutritionnel et la santé des populations au Canada et dans le monde entier. (Rev can prat rech diétét 2006;67:150-156)

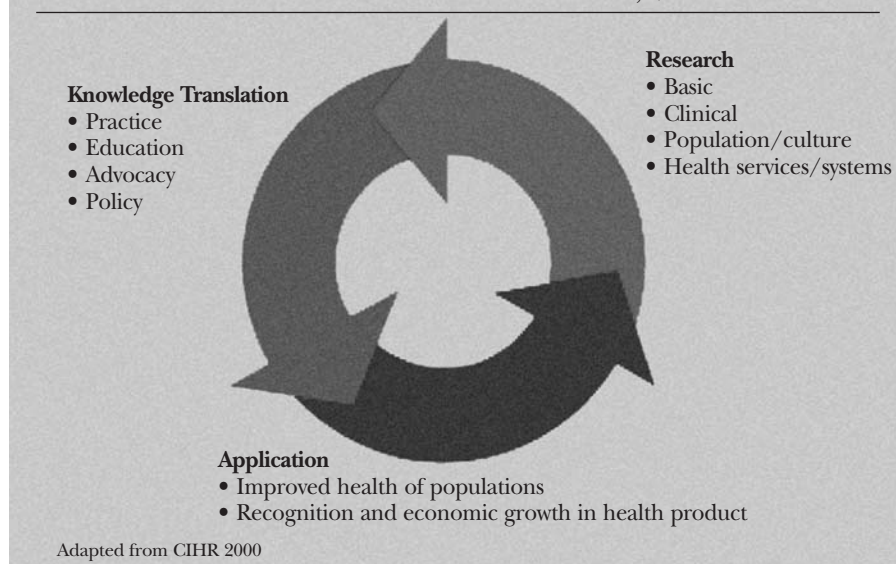
### INTRODUCTION

An "odyssey" is defined in *The Concise Oxford Dictionary* as "a long and eventful or adventurous journey or process" (1). It is derived from the title of a Greek epic poem, attributed to Homer, describing the adventures of Odysseus on his journey home from Troy (1). Through my academic training and career as a dietitian, nutrition clinician-scientist, and professor, I have witnessed an amazing "eventful journey" as the field of nutrition has exploded in diversity and scientific relevance to health and disease prevention/treatment, and has become imbedded in consumer consciousness.

Graduate trainees in nutrition now specialize as clinician-scientists, not only in clinical research but also

in epidemiology, public health, international nutrition, nutrigenomics, or toxicology. Nutrition has experienced a rebirth in the post-genomic era in nutrigenomics, functional and genetically modified foods, nutraceuticals, and natural health products. A general undergraduate degree in nutrition or food science simply does not prepare one for working in these subspecialty areas, or for taking an active role in creating new knowledge through research. The nutrition field of today is exhilarating in its possibilities for career paths, but at the same time daunting: How does one become properly trained in the subspecialty fields, especially as a nutrition researcher?

**Figure 1**  
The Health Research Model proposed by the  
Canadian Institutes of Health Research, 2000



## MODEL OF RESEARCH FOR THE 21<sup>ST</sup> CENTURY

In June 2000, the Canadian Institutes of Health Research (CIHR) came into existence as the major government funding agency for health research in Canada, replacing the Medical Research Council of Canada (MRC). The mission of CIHR is delineated in the legislation that created it: “to excel, according to internationally accepted standards of scientific excellence, in the creation of new knowledge and its translation into improved health for Canadians, more effective health services and products and a strengthened Canadian health care system...” (Section 4, C-6, R.S.C. 2000). This mission evoked a new health research model (Figure 1) that encompassed the continuum of discovery (research) across a breadth of themes designated as biomedical, clinical, health services and health systems, health of populations, societal and cultural dimensions of health, and environmental influences on health.

Not only was the spectrum of health research broadened under CIHR (compared to that under the former MRC), but also the legislation explicitly stated that new knowledge must be translated into improved health, health services, and economic growth in health products. The knowledge

translation aspect includes generation of practice guidelines (such as evidence-based medical practice), education, advocacy, and policy. The paradigm of this health research model can be easily adapted to the nutrition and dietetics profession (Figure 2). However, the model is relatively recent, and the opportunities for dietitians to play a role in this health research paradigm may not be well recognized. The purpose of this paper is to provide insights into this nutrition research mode, through the use of personal professional experiences and opportunities as examples.

### WHY TRAIN IN RESEARCH?

Bedside-to-bench research that is then translated back to bedside or community to improve patients’ or populations’ nutritional care and health (Figure 2) can be effectively accomplished by nutrition clinician-scientists, who are in a position to

- ask research questions relevant to clinical or public health practice.
- conduct research in academic hospital or community environments.
- translate knowledge into clinical practice, health care policy, or consumer messages.
- play a key role in multidisciplinary research teams.

- train future dietitian clinician-scientists, physicians, and other health professionals in nutrition.

Dietitians practising in hospitals or in public health have an opportunity to formulate hypotheses based on real-life observations. If dietitians are trained in research, such observations can lead to knowledge creation through well-designed clinical trials or community-based intervention programs. An example drawn from clinical experiences in neonatology is the observation of severe growth failure in extremely low birth-weight infants who developed bronchopulmonary dysplasia, with little recovery even at one year corrected age; I and a neonatal dietitian who became my graduate student first reported this observation (2). These clinical observations led to the design of a randomized clinical intervention trial aimed at improving nutrition following hospital discharge to benefit long-term growth outcomes. While an immediate benefit of enhanced protein and mineral intakes to linear growth, fat mass, and bone mass occurred (3), the benefit was not sustained after the nutrition intervention ended. Follow-up of these infants at about seven years of age demonstrated that many remained short and light for their age, and had lower lean and bone mass than children of a similar age who had been born at term (4). The initial research question was only partially answered, but the information could be translated back to clinical practice through inclusion in a summary of existing knowledge of nutritional management of preterm infants with bronchopulmonary dysplasia (5); further research questions were then formulated.

Another example of bedside-to-bench research is the clinical observation of frequent bone fractures among children with cancer, which led to an observational study (6) that provided evidence of aberrations in mineral and bone metabolism in children undergoing an aggressive chemotherapy protocol for acute lymphoblastic leukemia. Subsequent research (7,8), conducted by two dietitians who returned for graduate training, contributed to the understanding of the

Figure 2  
Dietitians in the new research model

**Knowledge Discovery, Translation & Outreach**

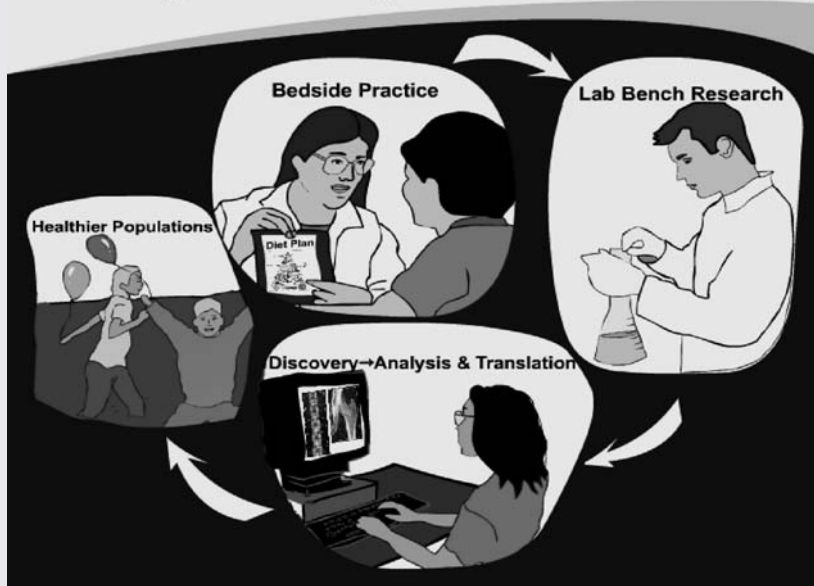


Figure created by S. Atkinson and F. Yousif, 2006

factors underlying the risk of bone abnormalities in this pediatric cancer. Additional longitudinal studies (9,10) and intervention pilot studies (11) provided further evidence of the magnitude of the secondary effects of chemotherapy on bone health, and possible avenues of treatment to attenuate the effect. Again, such discovery of knowledge could be easily translated back to bedside clinical practice.

Dietitians with research training can play key roles in multidisciplinary investigative teams. This approach to research is promoted by funding agencies such as CIHR, in the belief that such teams will expedite the delivery of new knowledge into practice and policy. An example of work by one such multidisciplinary team is the ongoing study **STeroid-induced Osteoporosis in the Pediatric Population – Canadian Incidence Study (STOPP-CIS)**, for which Dr. Leanne Ward, Children’s Hospital of Eastern Ontario, is the principal investigator and I am a site investigator. The research team from ten pediatric centres across Canada includes physician pediatric endocrinologists, a research

nutritionist, a kinesiologist, a health physicist, and a statistician. I developed the food frequency questionnaire, oversee the dietary assessment aspects of the trial, and direct an ancillary study of biochemical bone markers, one of my areas of expertise. Dietitians with a master’s degree and thus trained in research are among the research assistants working on the study.

Another multidisciplinary study is in progress at McMaster University, where Dr. Koon Teo, a cardiologist, and I, as a pediatric nutrition clinician-scientist, are the coprincipal investigators for a longitudinal birth cohort study of 1,000 families. The study is designed to investigate the fetal and early childhood genetic, environmental, and biochemical determinants of obesity development, obesity-related comorbidities, and cardiovascular risk factors. This study involves researchers and staff in neonatology, obstetrics, endocrinology, cardiology, nutrition, allergy, environmental toxicology, pathology, epidemiology, and biostatistics. My experience in co-leading this multidisciplinary team has expanded my knowledge of research

methodologies such as epidemiology, and has provided new challenges and rewards from working with a large investigative team.

**KNOWLEDGE TRANSLATION**

The translation of knowledge discovery into practice applications or policy is a rather new phenomenon in terms of the expectations of who should take responsibility for the end use of research findings. As noted above, CIHR has a direct mandate to ensure knowledge translation of research discoveries. In bygone eras, the major onus on researchers was to publish their investigative findings in a high-quality scientific journal. In nutrition, the key journals include the *American Journal of Clinical Nutrition*, which has the highest impact factor of all nutrition journals worldwide, the *Journal of Nutrition*, the *Canadian Journal of Dietetic Practice and Research*, and the *Journal of the American Dietetic Association*. In today’s world, agencies like CIHR expect not only that research findings will be published in high-impact scientific journals, but also that plans will be formulated within the original grant proposal to translate the research findings into practice or policy. Knowledge translation involves specialized training and expertise, and so including such specialists in a multidisciplinary research team is certainly advantageous.

In addition to fulfilling the requirements of granting agencies for knowledge translation, nutrition scientists must be prepared to contribute to the translation of new discoveries into practice applications. An example is the science base for establishing the Dietary Reference Intakes (DRIs), the latest nutrient-based dietary standard for Canadians and Americans ([www.hc-sc.gc.ca/fn-an/nutrition/reference/table/index\\_e.html](http://www.hc-sc.gc.ca/fn-an/nutrition/reference/table/index_e.html)). In preparing the DRI reports, an extensive review of the literature was undertaken, with an emphasis on classical metabolic studies, epidemiologic research, and randomized clinical trials. Dietitians of Canada (DC) took up the challenge of further translating the DRIs for clinical dietetic practice by developing the DRI course through their Dietetics @ Work Web-based program

**Table 1**  
Strategic training programs funded by CIHR (and other agencies), in which advanced training in nutrition can be pursued<sup>1</sup>

<b>Training program</b>	<b>Sponsor institution and principal grantee</b>	<b>Web address and/or contact information</b>
Canadian Child Health Research Clinician Scientist Program	University of Toronto and 12 pediatric academic centres across Canada: Norman Rosenblum	www.cchcsp.utoronto Dr. Norman Rosenblum, University of Toronto; Dr. Stephanie Atkinson, McMaster University
CIHR strategic training program in maternal-fetal-newborn health	University of Alberta: David M. Olson	john.greer@ualberta.ca
Multidisciplinary research training program in digestive sciences	Queen's University: William G. Paterson	http://meds.queensu.ca/gidru/train.htm
Training program in clinical nutrition	The Hospital for Sick Children: Paul Pencharz	Dr. Paul Pencharz, University of Toronto
Training program in obesity/healthy body weight research	Université Laval: Denis Richard	Dr. Denis Richard, Université Laval
Skeletal health training program	McGill University, McMaster University, and University of Calgary: David Goltzman	Dr. David Goltzman, McGill University

<sup>1</sup>Each program offers funding opportunities for graduate training and/or early career development awards.

CIHR = Canadian Institutes of Health Research

([www.dieteticsatwork.com/coursedelivery/index.asp](http://www.dieteticsatwork.com/coursedelivery/index.asp)). This is an excellent teaching resource for dietitians and students in nutrition. Continuous updating and application of new knowledge must follow as Health Canada, the Food and Nutrition Board, and members of the Federal Steering Committee establish an approach for evaluating how and when sufficient new knowledge is available to justify a revision of the DRI values for a specific nutrient. Open workshops such as “DRI: Framing the Next Generation” (December 2004) and “DRI: Research Synthesis” (June 2006) have occurred to address this issue; deliberations, including PowerPoint presentations, are available ([www.iom.edu/default.aspx?id=3788](http://www.iom.edu/default.aspx?id=3788)).

Knowledge translation is critical for many health agencies. Thus, a role exists for experts in nutrition to contribute to a multidisciplinary team to ensure that accurate nutrition messages are incorporated. For example, Osteoporosis Canada ([www.osteoporosis.ca](http://www.osteoporosis.ca)) produces evidence-based guidelines for clinicians on prevention of osteoporosis; dietary guidelines are included (12). Having nutritionists who are active in bone health research serve on the scientific advisory council ensures that key nutrition issues are identified and critically reviewed. Dr. Susan Barr, Dr. Susan Whiting, and I currently serve on the council.

On a more global level, agencies such as the March of Dimes, whose mission is “to improve the health of babies by preventing birth defects and infant mortality,” often require nutrition experts to develop educational materials such as *Nutrition Today Matters Tomorrow – A Report from the March of Dimes Task Force on Nutrition and Optimal Human Development* ([www.marchofdimes.com/professionals/14480\\_1926.asp](http://www.marchofdimes.com/professionals/14480_1926.asp)).

Other opportunities for involvement are provided by organizations such as the Mother-Child Health International Research Network ([www.mother-child.info/node/3](http://www.mother-child.info/node/3)) and the Heart and Stroke Foundation, as well as by governmental task forces on special nutrition initiatives such as the DRIs and *Canada's Food Guide to Healthy Eating*.

Dietitians can also become involved in translating the just-released results of the nutrition analysis of dietary data collected in the Canadian Community Health Survey (CCHS) cycle 2.2 ([www.statcan.ca/english/concepts/hs/index.htm](http://www.statcan.ca/english/concepts/hs/index.htm)). The results of the CCHS nutrition report reveal that Canadians face some nutritional challenges. This evidence will require translation into messages for the public; these messages may depend on research into effective methods for translation of such information, and on the development of a research agenda.

Very recently, the Canadian Obesity Network (CON) was founded under Dr. Arya Sharma of McMaster University, and funded by a grant from the Networks of Centres of Excellence program. This network aims to unite researchers, health professionals, young professionals, and other stakeholders who share an interest in obesity. The CON Web site serves as a dynamic portal that links members and provides the latest science, opportunities for research funding, employment opportunities, a “who’s who” list of experts in obesity, and information on events and meetings. Dietitians interested in obesity research and practice are encouraged to join ([www.obesitynetwork.ca/home.aspx](http://www.obesitynetwork.ca/home.aspx)).

Involvement in such extracurricular knowledge translation projects is usually on a volunteer basis. However, the rewards more than compensate for the time and effort. These rewards

include opportunities to apply your expertise, and the stimulation of working in interdisciplinary groups often involving international colleagues, for the common purpose of improving the health of global populations.

### AVAILABLE RESEARCH TRAINING

Across Canada, several universities offer graduate programs in nutrition, although the specific focus of nutrition research varies and some institutes are already launching major changes in subspecialty research and graduate training programs. Today's directions in nutrition are reflected in changes in departmental names, such as the University of Guelph's Human Health and Nutritional Sciences, part of which is the Human Nutraceutical Research Unit. At the University of Manitoba, the Faculty of Agricultural and Food Sciences recently launched the Richardson Centre for Functional Foods and Nutraceuticals (<http://umanitoba.ca/research/rcffn>).

In the area of clinical research, the goal of increasing the capacity of nutrition clinician-scientists is served by joint MSc/PhD dietetic internship programs, but only four such programs are accredited in Canada (in Hamilton, Halifax, Toronto, and Winnipeg). Funding support for such an extended training period (2.5 to five years) is a practical limitation that requires novel solutions. Fortunately, funding support resources for graduate training in nonmedical health professions like dietetics have greatly improved in recent years.

In 2003, CIHR established the Strategic Training Initiative for Health Research (STIHR), with the objective of increasing the capacity of the Canadian health research community by supporting the development of innovative, effective, transdisciplinary, and internationally competitive training programs. The identified strategies included diverse research disciplines and methodological approaches to resolve major health issues and scientific challenges by encouraging multidisciplinary training. Such training included the ethical conduct of research, and the development of communication, teamwork, and leadership skills (e.g., grant writing, peer review, and effective research strategies that translate knowledge into practice).

Eighty-six STIHR programs have been funded to date; those relevant to dietitians seeking graduate training are listed in Table 1. An example is the Canadian Child Health Clinician Scientist Program (CCHCSP) ([www.cchcsp.ca](http://www.cchcsp.ca)), involving 12 pediatric centres across Canada and headed by Dr. Norman Rosenblum from The Hospital for Sick Children. I serve as the key mentor for nutrition and contribute as a member of the executive and award selection committees. Candidates for awards for a rising researcher support program (applicable during dietetic internships) and for doctoral, post-doctoral, or early career development awards must be qualified child health clinicians (such as registered dietitians, physicians, physiotherapists, or speech therapists), who wish to extend their research competence in child/youth health research. They must also be mentored by a health professional based in one of the participating Child

Health Research Training Centres of the CCHCSP. This program offers an annual training salary of \$70,000 to attract practising health professionals back to research training.

New opportunities for trainee personnel awards also exist in the central CIHR awards program for health professionals in doctoral and post-doctoral training programs. These awards target all allied health professionals, including dietitians, in a program in which they are not competing with physicians ([www.cihr-irsc.ca](http://www.cihr-irsc.ca), under "Funding Opportunities – Training Programs"). Nutrition clinician-scientists are a target group for funding under the new Clinical Research Initiative (CRI) at CIHR. In *Roadmap to Ensure Canadian Leadership in Clinical and Translational Research*

([www.cihr-irsc.gc.ca/e/pdf\\_22708.htm](http://www.cihr-irsc.gc.ca/e/pdf_22708.htm)), dietitians are included as health professionals for whom increased research funding and salaried positions must be provided because they are investigators close to the interface of patient care and clinical investigation. The initiative aims to build capacity through training and research for bench-to-bedside research that employs translational research models to explore the mechanisms of human health and disease through clinical trials and observational studies of diagnostic, therapeutic, and preventive

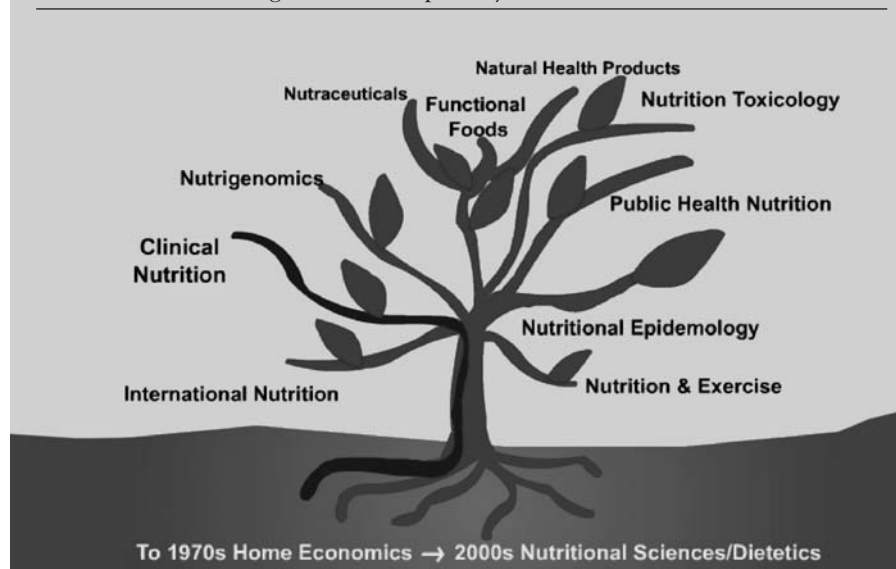
measures. Funding is targeted for awards to "clinically active/currently licensed" health professionals, including dietitians, who undertake training at the master's, doctoral, or post-doctoral level ([www.cihr-irsc.gc.ca/e/22700.html](http://www.cihr-irsc.gc.ca/e/22700.html)). The CRI has spawned interest in Networks of Centres of Excellence, such as the Child and Youth Clinical Research Network, which is poised to coordinate child health research projects across the country with a multidisciplinary platform ([www.med.ualberta.ca/pediatrics/CYCRN/home.htm](http://www.med.ualberta.ca/pediatrics/CYCRN/home.htm)).

The creation of CIHR has escalated the focus on nutrition research in many ways. As a member of the inaugural governing council of CIHR for the first five years, I witnessed with great excitement the emergence of nutrition as a strategic focus for research funding. First, one of the 13 CIHR institutes was named the Institute of Nutrition, Metabolism and Diabetes (INMD). Diane Finegood, PhD, was appointed as scientific director. Dietitians Dr. Kim Raine, Dr. Harriet Kuhnlein, Dr. Lise Dubois, and Ms. Anne Kennedy have been or are members of the INMD advisory board. The INMD key strategic objective is advancing health knowledge through support of excellent and innovative research and training to increase the understanding of obesity and maintenance of healthy body weight ([www.cihr-irsc.gc.ca/e/27112.html](http://www.cihr-irsc.gc.ca/e/27112.html)). The INMD serves as a voice for nutrition research in Canada, as in its support of the report *Addressing Childhood Obesity: The Evidence for Action* ([www.cihr-irsc.gc.ca/e/pdf\\_23938.htm](http://www.cihr-irsc.gc.ca/e/pdf_23938.htm)).

The CIHR-INMD also supports special endeavours in nutrition research. For example, the 2004 CCHS, which provided the first national nutrition survey in more than 30 years, gave rise to requests for proposals for analysis of the dietary survey component. A collaborative funding project of CIHR-INMD and Statistics Canada has just

Funding of nutrition research has dramatically escalated.

**Figure 3**  
The growth of subspecialty areas of nutrition<sup>1</sup>



<sup>1</sup>Before the 1970s, the “root” undergraduate program for a dietetic major was in home economics, and the most common career path was becoming a dietitian in clinical nutrition (dark root and branch). More commonly in the 2000s, the “root” undergraduate degree is in nutritional sciences or dietetics/human nutrition, which leads to myriad options for graduate training and career paths. (Figure created by S. Atkinson and F. Yousif, 2006)

announced awards to seven applicants, several of whom are dietitian-scientists in universities ([www.cihr-irsc.gc.ca/e/31150.html](http://www.cihr-irsc.gc.ca/e/31150.html)).

The value of nutrition as a specialty in health research was underscored by the formation of a new CIHR peer review panel for grant applications named Nutrition, Food and Health; several dietitian-scientists serve as panel members. This panel reviews grant applications related to human nutrition throughout the life cycle and includes a focus on dietetics and obesity. As a result of such targeted initiatives within CIHR, funding of nutrition research (defined by the keywords “nutrition,” “diet,” or “calorie”) has dramatically escalated more than threefold from about \$13 million in 2000-01 to \$46.3 million in 2005-06. This far exceeds the meagre amounts of less than \$5 million funded under the former MRC (personal communication, David Crouch, MSc, senior analyst, CIHR, Institute of Nutrition, Metabolism and Diabetes, July 2006).\*

Of particular note, recent analysis of nutrition research in Canada also elucidates a definite trend from 2000 to 2005 for capacity building among researchers in the nutrition field; the number of trainees funded at the master’s, doctoral, and post-doctoral levels quadrupled, and the number of CIHR-funded nutrition researchers more than tripled.<sup>8</sup> The field of nutrition in Canada therefore is attracting significant amounts of research money from our lead health research funding agency. Now it is up to the nutrition/dietetics community to produce the qualified nutrition/dietitian clinician-scientists to engage in research careers.

### PRACTICE MODELS

While opportunities for research training and the menu for subspecialty areas in nutrition are rapidly expanding, the track for career positions remains a challenge. In the medical model, physicians in academic hospitals can obtain “protected” time for research through departmental allocation of

clinical versus research responsibilities, or through support of external career development awards. This model has not been widely adopted by other health professions for clinicians of allied health specialties working in academic hospital settings. (See a discussion of this issue in the CRI report at [www.cihr-irsc.gc.ca/e/pdf\\_22798.htm](http://www.cihr-irsc.gc.ca/e/pdf_22798.htm).) One avenue for such positions is for a hospital and a university academic department to share the salary for a research-trained dietitian, nurse, or physiotherapist. Alternatively, a hospital-based dietitian may have a cross-appointment in an academic department of nutrition, medicine, or pediatrics to facilitate supervision of graduate students, but the hospital must allow protected time for research.

Career opportunities for research-trained dietitians also exist in research and development divisions within federal and provincial government agencies, the food and pharmaceutical industry, and food consortiums. While such positions may involve conducting or supervising research, for the most part the work is focused on knowledge translation – critically reviewing the science for translation for policy or marketing purposes.

### CHALLENGES

As nutrition becomes an increasingly complex field, it is vitally important that nutrition and food scientists working in all domains speak with “one voice” when translating nutrition discovery into practice, policy, and public information. The tree in Figure 3 symbolizes the evolving subspecialties in the field of nutrition. Before the 1970s, most dietitians came through a home economics (now called human ecology) program and pursued internships leading to clinical nutrition/dietetics or food services. Today, undergraduate programs are more likely in nutritional sciences or dietetics/human nutrition, and graduate training can lead to careers in all of the subspecialties noted on the tree’s branches.

\*The figures were generated as of May 16, 2006, through a keyword search of the CIHR funding database for grants and awards related to nutrition research. The query results were validated by the CIHR Institute of Nutrition, Metabolism and Diabetes. The figures include CIHR’s investment for grants and awards in which the project title, funding keywords, or abstract supplied by the applicant contain any of the following elements: “nutrio” or “diet” or “calori.”

While an exciting menu of opportunities exists, the diversity of nutrition specialists presents new challenges. The recognized importance of integrating the nutritional sciences and of communication between subspecialists in nutrition research was the impetus for three nutrition societies – The American Society for Clinical Nutrition, the American Society for Nutritional Sciences (both founded over 50 years ago), and the Society for International Nutrition Research (founded in the past decade) – to merge into a single society under the name the American Society for Nutrition (ASN) ([www.asnutrition.org](http://www.asnutrition.org)). As the first President of the new ASN for 2006-07, I am exhilarated by the challenges of coalescing the goals of researchers with diverse interests into a concerted mission to enhance research capacity through funding and training young nutrition scientists, and through improved communication of emerging nutrition discoveries that can be translated for use by members, teachers, the media, and the public. To this end, I hope to engage DC and the American Dietetic Association in partnering in projects to achieve this goal.

Dietitians of Canada has “branched out” to address the multiple facets of nutrition as they emerge (Figure 3), thereby keeping members at the forefront of new knowledge and opportunities. Recognizing the need for research, including in the hospital or the community-based workplace, the Canadian Foundation for Dietetic Research was founded 15 years ago. To date the foundation has supported 67 research grants, worth over \$750,000, to dietitians through a competitive grants program. Avenues for translation of new knowledge are provided through position statements and endorsements, as well as through DC-hosted symposia on state-of-the-science “hot topics,” such as the 2005 symposium “Functional Foods and Natural Health Products: Evidence, Usage and Application.” Dietetics @ Work provides valuable online continuing education courses such as those on DRIS and dietary supplements; the latter course includes information on vitamin and mineral supplements and herbal products. Knowledge translation to aid dietetic practice is provided by the online tool Practice-based Evidence in Nutrition (PEN) ([www.dieteticsatwork.com/pen](http://www.dieteticsatwork.com/pen)).

In the future, perhaps DC can take a leadership role in helping newly accredited dietitians to pursue graduate training in research and subspecialization. In particular, DC could develop models for nutrition clinician-scientists to train in research, and then have positions available for hospital or community practice, combined with an academic appointment in a university. Such model positions would encourage bedside-to-bench research and the integration of nutrition-trained health professionals in multidisciplinary research teams.

## CONCLUSION

Nutrition’s odyssey since the days of Ryley and Jeffs has paralleled travel into outer space, although without the same economic investment! Nutrition practice and research in the post-genomic era are no doubt far different from what these pioneers of dietetics could have imagined. As nutrition health professionals today, we should adopt the health research model of discovery, translation, and application

as it applies to our primary professional positions, be they in hospitals, universities, government, public health, or industry. When possible, graduate training in a subspecialty area of nutrition should be pursued, with a view to fostering nutrition as an integrative science in a multidisciplinary platform. There are so many new areas in nutrition and food science that learning everything in a four-year undergraduate program is impossible.

Finally, the concept of outreach for knowledge translation must be embraced. Dietitians can make a difference in raising the profile of nutrition, improving the accuracy and applicability of nutrition information, and ensuring that research improves the health of the population at large and particularly the health of vulnerable groups and patients with illnesses. Credible voices for nutrition are desperately needed, even in unique and novel places beyond borders.

## References

1. Pearsall J, ed. The concise Oxford dictionary. 10th ed. Oxford, UK: Oxford University Press; 1999.
2. Brunton JA, Atkinson SA. Growth in relation to protein and energy intake in infants with bronchopulmonary dysplasia [abstract 5556]. *FASEB J* 1991;5(5):1328.
3. Brunton JA, Saigal S, Atkinson SA. Growth and body composition in infants with bronchopulmonary dysplasia up to 3 months corrected age: a randomized trial of a high-energy nutrient-enriched formula fed after hospital discharge. *J Pediatr* 1998;133:340-5.
4. Wang D, VanderMeulen J, Atkinson SA. Reduced growth and bone accretion at pre-puberty in former premature infants with/without neonatal dexamethasone exposure [abstract 2516]. *Pediatr Res* 2004;55(4):443A.
5. Atkinson SA. Nutrition for infants with bronchopulmonary dysplasia. In: Thureen PJ, Hay WW Jr, eds. Neonatal nutrition and metabolism. 2nd ed. Cambridge, UK: Cambridge University Press; 2006. p. 533-43.
6. Atkinson SA, Fraher L, Gundberg CM, Andrew M, Pai M, Barr R. Mineral homeostasis and bone mass in children treated for acute lymphoblastic leukemia. *J Pediatr* 1989;114(5):793-800.
7. Atkinson SA, Halton JM, Bradley C, Wu B, Barr RD. Bone and mineral abnormalities in childhood acute lymphoblastic leukemia: influence of disease, drugs and nutrition. International Workshop: Nutritional Morbidity in Children with Cancer: Mechanisms, Measures & Management. *Int J Cancer* 1998(Suppl 11):35-9.
8. Wu B, Atkinson SA, Halton JM, Barr RD. Hypermagnesuria and hypercalciuria in childhood leukemia: an additive effect of amikacin therapy. *J Pediatr Hematol Oncol* 1996;18(1):86-9.
9. Halton JM, Atkinson SA, Fraher L, et al. Altered mineral metabolism and bone mass in children during treatment for acute lymphoblastic leukemia. *J Bone Miner Res* 1996;11(11):1774-83.
10. Mandel K, Atkinson SA, Barr R, Pencharz P. Skeletal morbidity in acute lymphoblastic leukemia of childhood. *J Clin Oncol* 2004;22(7):1215-21.
11. Wiernikowski JT, Barr RD, Webber C, Guo CY, Wright M, Atkinson SA. Alendronate for steroid-induced osteopenia in children with acute lymphoblastic leukemia or non-Hodgkin’s lymphoma: results of a pilot study. *J Oncol Pharm Pract* 2005;11:51-6.
12. Brown JP, Josse RG. 2002 clinical practice guidelines for the diagnosis and management of osteoporosis in Canada. *CMAJ* 2002;167(10 Suppl):S1-34.