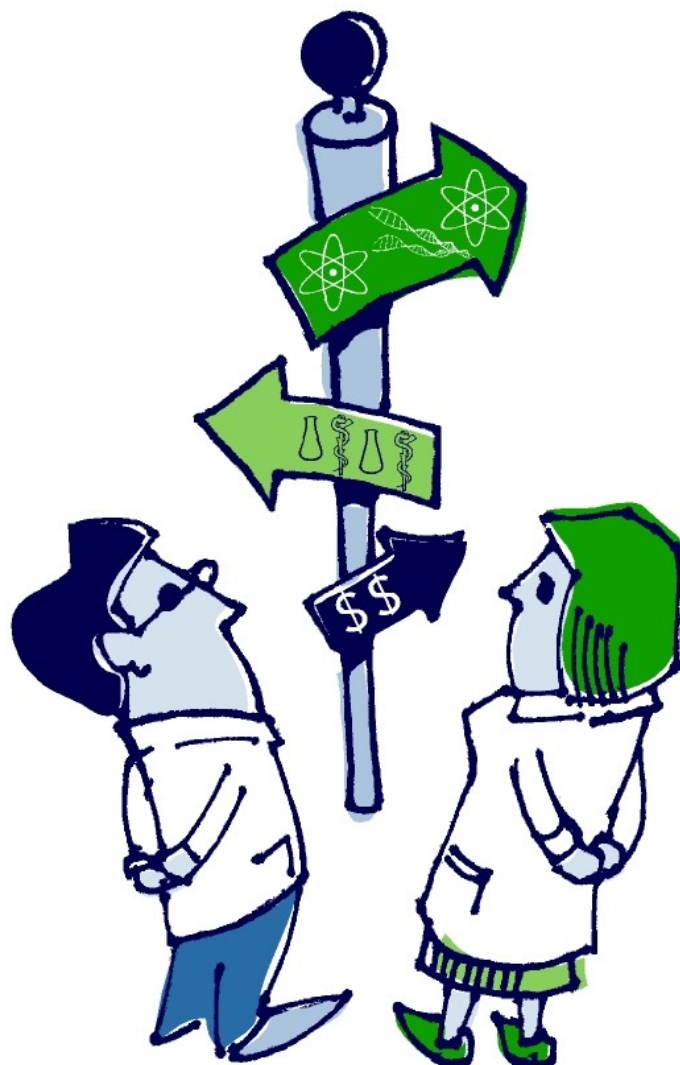


FRIENDS OF CANADIAN INSTITUTES OF HEALTH RESEARCH

ADDRESSING THE ACUTE
SHORTAGE OF
CLINICIAN
SCIENTISTS
IN CANADA

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ABSTRACTS

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Respiratory Health


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MESSAGE FROM CIHR:

THE CLINICIAN-SCIENTIST AND CIHR'S ROLE IN SUPPORTING THEIR DEVELOPMENT

Nancy MacLellan

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The Canadian Institutes of Health Research (CIHR) have played an important role in the development of the "clinician-scientist" in Canada. Since its inception, CIHR has provided funding through innovative programs to encourage clinicians to engage in research. We have focused on developing policies, programs and additional funding opportunities that will better support clinician scientists working throughout all health related research disciplines starting at the undergraduate level. The creation of the Clinical Research Initiative (CRI) in 2004 is CIHR's response to a clear need and opportunity to strengthen clinical research in Canada. CRI has significantly increased the success rates of clinicians who have applied to the research personnel award programs. For example in the Fall 2005 New Investigator competition, the success rates of clinicians increased from 17.4% to 32.6% with the induction of CRI funds. *Undoubtedly, clinician scientists have a key role to play in the delivery of the Canadian clinical research enterprise given that they contribute to the pool of health research knowledge and facilitate the translation of this knowledge into improved health services and products for all Canadians.* (ICRH Annual Report, 2002-03)

A PERSPECTIVE

Much has been written about the vanishing species of clinician scientists, more specifically, physician scientists. Many conferences and symposia have attempted to address the failure of our educational institutions to support, encourage and sustain this vital cadre in the health care system. It would appear that graduates in the biological, health and medical sciences are dissuaded from careers in clinical research because of insecurity, under-funding, and a competitive style that is absolutely Darwinian. Furthermore, personal priorities have evolved over the past twenty years giving the amenities of quality living a higher value than the prestige and stature of academic life. Shared family responsibilities win out (and for good reason) over a career that provides little reassurance of success or support during challenging times. Women in science have a particularly difficult time, because family obligations and maternity leaves create subtle barriers to promotion and success. A research career that is internationally competitive is more challenging now than in the past. This problem is not unique to Canada, but our ability to furnish solutions has lagged behind our American colleagues, and there are consequences.

The joy of medical discovery is no longer sufficient to convince young researchers to become clinician scientists. The number of people exploring careers in the health sciences is shrinking despite the explosion of knowledge in the fundamental biological sciences. Translation of new knowledge for the benefit of human kind is delayed because the required number of practitioners who might apply this research to important clinical questions is nowhere to be found. Demand is further increased by the emergence of exciting new areas of enquiry that did not exist twenty years ago: genomics, proteomics, structural biology,

nanotechnology, pharmacogenetics, and the evaluative sciences. The implied promise of publicly funded biomedical research cannot be fulfilled because the pipeline of human resources is drying up. Because demand far outstrips supply, classic economic theory would predict rich rewards and inducement for the clinician scientist: the brightest and the best should be flocking to health science disciplines for the opportunities that abound. Instead, young people are dissuaded from this pathway and are choosing more predictable career options that are within reach and sustain a satisfying lifestyle.

The purpose of the Third Annual FCIHR Symposium at the YI Forum is to draw attention to the fact that there are recent research training models that introduce novel methodologies that could prove successful in nurturing the development of clinician scientists. The Institute of Circulatory and Respiratory Health has been innovative in this regard by developing several prototypic initiatives (TORCH, IMPACT and FUTURE) to support trainees as they gain laboratory experience. Thus, necessity has fostered the creation of unique Institute-based strategies and specific programs that provide structured educational experiences and mentoring systems to assist young trainees. Will they work? Can they be generalized?

We look forward to hearing more about these as well as CIHR's clinical research initiatives, which address the growing deficiencies in patient focused health research.

Dr. Aubie Angel, President FCIHR



CLINICIAN SCIENTISTS IN TRAINING: SUCCESSFUL MODELS

Dr. Melvin Silverman

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There continues to be concern that renewal of the pool of clinician scientists is inadequate to meet the needs of academic medicine and to sustain Canadian clinical research capacity. The purpose of this paper is to demonstrate that this pessimistic view is inaccurate. We describe our experience with two nationally distributed clinician scientist training programs: the MD/PhD Program and the Royal College Clinician Investigator Program. The current census from these two programs is just under 300 trainees. We will discuss how the education requirements of the clinician scientists are met adequately by each of these programs. In addition we will present outcome data of both programs, along with the USA more than 35 years of experience with MD/PhD Programs. Collectively the outcome data indicate that both models are successful in producing clinician scientists covering the full spectrum of clinical research. Interestingly, at completion of training, the graduate of an MD/PhD program typically enters into a molecular/cellular physiologic research stream, whereas the graduate of the CIP enters primarily into the physiologic/clin epi health outcome research stream. Thus the products from these two programs are complementary with respect to the future needs of sustaining Canadian clinical research capacity. The data further show that there is no evidence to support the pessimistic view the next generation is less interested in pursuing the clinician scientist career path. Rather the rate-limiting steps occur at two levels: (1) adequate/full funding, and (2) continuity of funding through to the point of transition to independent investigator. When these requirements are met, the performance indicators based on the quality of research produced by the trainees in both the CIP and MD/PhD programs indicate clearly that their productivity and impact is competitive with the very best internationally.



OPPORTUNITIES AND CHALLENGES FOR WOMEN IN HEALTH RESEARCH

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This year marks the tenth since women achieved gender parity among graduating Canadian medical students. Yet few pursue careers as clinician-scientists and as one climbs the academic ladder, successive rungs comprise fewer women. The woman clinician-scientist faces challenges during training, when seeking her first appointment and at promotion. Discrimination on the basis of gender, pregnancy and marital status is illegal. However, certain challenges persist while others evolve as one attempts to balance career and personal life. One challenge is the “biological clock.” Pregnancy, maternity leave and returning to work are stresses often conflicting with and sometimes derailing a career. A second challenge is to obtain a supportive personal, professional and academic network. Granting agencies and academic institutions must develop innovative research and personnel funding strategies. A third challenge consists of improving our negotiation and leadership skills, for which special mentoring would greatly benefit women. Funding organizations and academia have a unique opportunity to improve the overall quality of life by considering the special needs of women clinician-scientists. By becoming exceptional clinicians, scientists and leaders who advance medicine and science, women can stimulate a paradigm shift that impacts how subsequent generations of clinician-scientists practice medicine and perform research.



THE CLINICIAN-SCIENTIST PIPELINE: INCREASING THE FLOW

John A. Cairns

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The clinician-scientist was first identified as an endangered species in the US by Wyngaarden in 1979. During the 1990's, the issues were delineated by the NIH, the AAMC and the IOM. Benefiting from massive budget increases, the NIH implemented measures to better support the training and careers of clinician-scientists, complemented by broad programs to strengthen clinical research. The UK has also implemented a range of measures to strengthen clinical research. In the 1990's in Canada, the dire plight of the clinician-scientist, in an era of decreasing funding of health research, was articulated in a series of conferences and publications. The tide began to turn with a series of visionary federal initiatives (CFI, CIHR, Genome Canada, Canada Research Chairs, Canada Graduate Scholarships, Indirect Costs of Research). Compared to the late MRC days, CIHR's funding of research trainees has doubled, as has career support (when CRC's are included there is a 5-fold increase of career support). The Clinician: PhD ratio is about 1:2. 65% of the clinicians were MD's in 2000, falling to 55% in 2003. The CIHR Clinical Research Initiative has recommended expanded, modified and new personnel awards for clinician-scientists (with doubled funding by 2010), a focus on career paths, and collaborative planning and programs with other funding agencies, institutions and professional groups. However, the CRI strategies have not been implemented, the CFI/CIHR clinical research infrastructure competition is on hold, CIHR increases have leveled off, and Canada remains much below the health research funding target of 1% of total health expenditures.



FOSTERING CLINICIAN SCIENTISTS: LOOKING FORWARD

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The Unique Role Assumed by the Clinician-Scientist in the 21st Century

Health related sciences in the 21st century are at an exciting cross roads. The new interdisciplinary health research and the need to fast track innovations to the bedside and health care systems put clinical-scientist directly at the critical interfaces across traditional disciplines. The ability to pinpoint the critical clinical knowledge gaps, identify new and emerging problems, and addressing them with innovative diagnostic and therapeutic tools with post-genomic or system based tools promise to transform the face of medicine in the next decades. There is a dire need for the well-trained clinician-scientists who are well versed either in clinical research, health system research, or basic discoveries and translating them successfully into bedside benefits.

Clinician-Scientist, the Endangered Species

Unfortunately, fostering clinician-scientists within our health care and training system has been a major challenge in North America, with diminishing number due to transformations of academic centres with ever increasing clinical demands, after going through an era of cut backs in medical school enrollment in Canada. This is compounded by the challenges that face the clinician-scientist as a career choice – ever increasing complexity of clinical care, and increasing competitiveness of research, and older students at entry into medical school. Training the clinician-scientist is a long haul, yet the remuneration once they are on faculty is often a non-competitive disincentive. The considerations of raising a family, looking after your patients, compete for research grants with a funding success rate of 25% or less make the whole process discouraging.

The Fun of Being a Clinician-Scientist

Therefore, training to be a clinician-scientist seems to be an impossible career path - but once you are there, it can also be an exhilarating experience. Understanding science makes one a better clinician. For example, when I look after a patient with heart failure or congenital heart disease in the clinic, each patient is incredibly complex. But I will try to apply all of my epidemiological, clinical, physiological and biomolecular knowledge and tools to solve problems for that patient. The challenges in the clinic become the questions that we take back to the laboratory, developing cellular or animal models trying to understand the mechanisms of the phenomenon. The results and insights then can be developed into biomarkers for clinical diagnosis, or novel therapeutic tools. The syntheses of clinical trial results become guidelines for clinical practice and quality indicators supporting health policies. We can work with Statistics Canada and Canadian Institute of Health Information to examine changing epidemiology and outcomes of what we do.

The advantage of clinician-scientist is the ability to talk different languages to different communities – the ultimate test of interdisciplinary research. At the same time, there is tremendous freedom to ask questions, ever expanding array of tools to answer them, greater community of investigators to foster collaboration, and better opportunities for support to explore these ideas.

Improving Environmental Support to Foster Clinician-Scientists

Traditionally the academic medical centres while valuing clinician-scientists, have struggled with their support. Recruitment of clinician-scientists into a faculty position is

expensive – they require both salary and infrastructure support, while generating less clinical income than purely clinical colleagues. The training is also a long haul, and support for the training is not always stable. The support for the new young faculty members is not always optimal, while the young faculty struggles to cope with multiple competing priorities.

However, the environment is changing, with most faculties now realizing the strategies, support and resources needed to make clinician-scientists successful careers. From training point of view, the CIHR and volunteer agencies have an expanding array of post-doctoral fellowships dedicated to the health professionals seeking a research career training, junior Scholarship or Career support awards. A dedicated career support program – the Clinician-Scientist Award pathway from CIHR supports the candidate both during the training period, and also continue into junior faculty member. This program is currently severely undersubscribed – representing a unique opportunity to foster more candidates.

CIHR also supports a number of Strategic Training initiatives (STIHR) that foster interdisciplinary training for the clinician-scientists. For the Institute of Circulatory and Respiratory Health, we currently support of 6 STIHR programs represents the largest single investment to date of the Institute's budget, thanks to Dr. McManus' vision. The STIHRs not only provide monetary support, but also the mentorship and interdisciplinary environment for the new trainee.

The faculties are also more proactive in supporting and recruiting clinician-scientists. Many divisions have practice plans that allow the flexibility to support clinician-scientists. The more recently developed alternative payment systems, for example those available in Alberta, are so attractive for the academic investigator, that the reimbursement rivals many colleagues in private practice. The faculties are also realizing that time protection during the initial 3 years of the young clinician-scientist start up as independent investigators are most critical for success. Finally, the availability of role models, as mentors for the trainee and junior faculty, is one of the most important factors of success. This is value of meetings such as the Young Investigators' Forum right here in Winnipeg.

Strengthening the Individual to Succeed as a Clinician-Scientist

At the same time, there are now realizations of critical skills required to succeed as a Clinician-Scientist. Melding 3 careers in one (Researcher, Clinician and Teacher), with additional family and administrative responsibilities, the ability to manage time is most critical. There are 3 rules for good time management – Prioritize, focus and 80/20. The latter refers to the need to spend 80% of one's time on the top 80% of one's priority list that really matters, rather than often the 20% of the priorities. For the junior investigator, the ability to establish a successful research path in the first 3 years on faculty is most critical. Clinical duties should be aggregated in time, streamlined, sparing and extremely focused. Because the clinician-scientist also needs to compete with the best PhD scientists in his or her discipline, it is important to have a network of excellent collaborators both for intellectual connection, and practical conduct of research and training of students and fellows. The advice from a role model or a passionate mentor is most invaluable for sustained success of the junior investigator, beyond the training stage.

Inspiring the Next Generation

With the changing environment, there is now some hope that clinician-scientist can be rescued from extinction. However, there is still a dearth of interested candidates who are willing to commit to the long haul. The best way to foster students into this career path is by inspiring them early – lighting that fire that becomes the passion for research, the drive to answer interesting

and important questions, and uniquely translating them into practice or products that matter to the health of Canadians.



REALIZING OUR VISION

Gregory Downey M.D.

Professor and Vice-Chair, Department of Medicine, and
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The clinician scientist, defined as someone with clinical training in medicine, nursing or pharmacy who also has a significant (greater than 50%) research component to their job description, is a fragile and perhaps endangered species. Clinician scientists sit at the interface between the basic biomedical sciences and the clinical arena and are essential in facilitating ('translating') basic science research developments into clinical practice in a timely and integrated manner. Many problems exist in the training and development of clinician scientists. At the early stages of training, we are asking people who already have 10-12 years of university and/or professional training to take an additional 2-5 years to complete a graduate degree. This additional training and qualification will enable them to vie for funding in a fiercely competitive peer reviewed grant support environment. Without this training, they surely will not be able to obtain independent grants, which are required for a successful research career. A second barrier is salary support for this additional graduate level training: while there are funds available from the provincial government for clinical training, there are no such provincial funds to support the salaries of trainees for this final phase of their education. The federal funds from the CIHR and non-governmental organizations that are available are insufficient to provide them with an income commensurate with their level of training (PGY5 salary level and above), and are highly competitive. Additionally, clinician scientists often have very little research training at the stage of their careers and find it difficult to compete for these awards with traditional graduate students or post doctoral fellows who often have several peer reviewed publication at this stage. Further, clinician scientists are often older, and at stages of the careers where spouses and children must be factored into the time commitments and salary support of this phase of their training. Women may be particularly disadvantaged in this system as they may have delayed having children until completion of their clinical training and maternity leave and salary support are crucial issues. Challenges remain for clinician scientists after their initial faculty appointment including that they have sufficient 'protected' time to maintain a focus on their research while maintaining clinical competence. This involves salary support to defray lost clinical income as well as being in a supportive research group where their time and mental energy is protected. In the more senior phases of the careers, salary support continues to be an issue due to the scarcity of senior level salary support awards and endowed chairs. Each of these phases must be addressed in a seamless and comprehensive manner for a career as a clinician scientist to be a viable one.



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