

Trainee Section

Trainees: How to Incorporate Research Into Practice?

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Introductory Words From the Editors

Clinical trainees—are you looking to incorporate and balance research into your practice? Undecided which path is recommended for early career researchers who strive to become successful investigators? Should we stay away from industry-sponsored research? We, the editors of the Trainee Section of the *Canadian Journal of Cardiology*, have asked for advice from Dr John Cairns, a late career cardiologist. We hope you will find it useful!

Dr John A. Cairns is an experienced clinical cardiologist with a focus on invasive cardiology and broad, well funded research interests (in infarct size measurement and modification in dogs and humans, clinical trials of antithrombotic therapies for acute coronary syndromes and atrial fibrillation, and clinical trials of antiarrhythmic therapies). Dr Cairns has held a number of leadership roles, including coordinator of the Regional Cardiovascular Program and then Chair of Medicine at McMaster University, Dean of Medicine at the University of British Columbia, and President of the Canadian Academy of Health Sciences.

Clinical trainees are almost fully occupied gaining the knowledge and skills necessary for cardiology practice. However, most programs encourage and increasingly require some involvement in research. I think your goal should be the design, conduct, and completion (presentation and publication) during your 3+ years at your training site, of at least 1 study on which you are the first author. The most fulfilling experience is likely to come from pursuing a patient-related question that you have raised yourself, and for which there appears to be no clear answer available in the literature. The question should lead to a research proposal that is feasible, interesting, novel, ethical, and relevant.

Select an Appropriate (and Feasible) Study Design

Feasibility is a huge issue for trainees. You have limited resources and time (generally less than 3 years). Prospective

studies are often the most interesting and innovative, but unpredictability and long enrollment times mean that except for the simplest of designs, a prospective design might not be feasible. The preexistence of an accessible registry or database might create the opportunity for a retrospective cohort or cross-sectional study. What is possible depends on the quality and size of the registry or database, but such studies are often ideal for a trainee. They are generally inexpensive, adaptable to your schedule, and allow for a predictable time frame. These are also features of a systematic overview and if appropriate, a meta-analysis, which should be a key step preceding a clinical trial and can be undertaken with publication in mind. Issues of interest and relevance should be explored with your senior, experienced colleagues. Test out your question with them; their inputs might lead you to modify your draft design or might lead you to search for a better question.

Write and Polish Your Protocol

When you have the question (carefully formulated and in written form), you need to write a formal protocol, including a pertinent literature review, specification of methods, and sample size. Doing so will protect you from investing time in a project that is ill-defined and potentially unfeasible. As a clinical trainee who intends to pursue a clinical career, you should look for a research project that is closely integrated with your clinical training. A research elective might give you the time to spend in the library, on designing the study, and on putting in place all the requirements to implement the study. A prospective study will usually need to be conducted while you are on clinical rotations. If you can be enrolling research subjects and conducting a study while you are doing your training, this parallel processing can be very efficient and your clinical knowledge and skills will advance in concert with attainment of your research goals. Retrospective cohort and cross-sectional studies can often be actually conducted away from your clinical work, another reason for their feasibility.

Seek Out a Research Mentor

Find yourself a formal mentor. Some training programs embody formal mentoring arrangements, but even if yours does not, seek out a mentor. Such a person will be senior, a good role model, and will usually be known to colleagues in your institution as being generous with their time, empathetic, and supportive of the careers of young people. A good

mentor can provide a sounding board for exploration of ideas and of problems you might be experiencing in your training program and personal life, but accountability is only in relation to what you agree on as goals for the mentor-mentee relationship. The relationship is distinct from that with a research supervisor, who should be expert in the discipline of your interest and have a track record of successful supervision, but their focus in your relationship is likely to be subsidiary to their own research interest.

Consider Formal Research Training

If you hope to make research a significant component of your career, you will need formal research training. For a clinical cardiologist, this usually means advanced clinical training, optimally at an institution other than where you have done your basic clinical training. There is great value in broader perspectives gained from experiences in more than one institution, particularly if you plan to take up an appointment at the institution where you did your basic clinical training. I did all of my clinical cardiology and research training in one large, multihospital institution which, at the time, was at the Canadian forefront, but if I had it to do over, I would go away for the research training. These advanced training experiences are often designed to confer advanced clinical skills to allow you to practice in a consultative capacity at a university centre, while integrating relevant research training. A formal research methods course during this time is increasingly a necessity if you wish to conduct meaningful clinical research.

Combining Clinical Duties With Research, Progression to Independence, and Persistence

If you are an early-career clinical researcher, I would urge you to do everything possible to integrate your research with your clinical and educational activities, and later on with your administrative responsibilities. Time is a scarce commodity—academic success demands efficiency in time allocation. Most clinical cardiologists will have great difficulty sustaining a basic or animal research laboratory while becoming a successful referral cardiologist. Sustaining a clinical research interest that is distinct from your clinical responsibilities can also be a challenge. As you launch your independent career, you will need to balance your need for advice and guidance from more senior, established investigators with the requirement to demonstrate to peer review granting agencies and the promotion and tenure process, that you have matured as an independent investigator. This needs to be clear by 3-6 years from your first academic appointment. Don't miss the value of a kick-start from associating with

successful senior colleagues, but also ensure that you are charting a course that will be distinct and independent by the crucial 3-6 year interval to independent funding and your first promotion. Seek out a mentor with the personality and expertise to provide relevant, effective career counselling. Remember that collaboration is fundamental to most clinical research; a true collaboration with a clinical epidemiologist/biostatistician is particularly desirable. Do not give up when your grant is turned down—today's difficult funding environment requires you to find ways to continue your research and that you use the reviews and comments from a failed application as a recipe for success when you apply again. Not every publication is of equal value—try to publish fewer articles but aim for quality journals.

As Early Career Investigators, Should We Stay Away From Industry-Sponsored Research?

Industry-sponsored research has good and bad aspects. Often the available resources are better and more readily available than are those from severely constrained peer review agency sources. If you are undertaking new drug or device-based studies, an effective relationship with industry is vital, and in any clinical trial, the additional resources might allow you to achieve a level of quality not possible with only peer-review funding. However, purely industry-funded research tends to carry less weight in the evaluation of your peer review grant requests and career achievements toward promotion and tenure. If your involvement is confined to carrying out protocols designed by industry, you are less likely to advance academically than would be the case with peer review funding of your own and colleagues' proposals. I believe the best results come from effective pursuit of peer review and industry sources of funding and when approaches are made to industry, it is for support of one's own ideas and protocols ("investigator initiated-trials").

Any Other Words of Wisdom for Newcomers in Clinical Practice and/or Research?

Involvement in research is an enormous privilege for the clinical cardiologist. There is a thrill to the pursuit of new knowledge, beyond that of mastery of what has already been discovered. It is satisfying to make a contribution that transcends the care of an individual patient and can influence the care of multitudes. It is exhilarating to know more about a given field or problem than most and to have one's opinion sought when there are no clear answers. I hope these few thoughts based upon my personal experiences might be of value as you prepare for and launch your own careers.