A Discussion Paper On The Clinician-Investigator in the Department of Paediatrics

By

Norman Rosenblum M.D.
Associate Chair of Paediatrics (Research)

And

William Trimble Ph.D.
Associate Director, Faculty Development
Research Institute

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Objective of this project
The objectives of this project are to:
• identify factors that are critical for success in research by clinical investigators whose participation in research accounts for 50% (i.e. 5 half-days) or less of their weekday work time, and
• recommend changes to the conditions related to the Clinician-Investigator Job Activity Profile in the Department of Paediatrics, The Hospital for Sick Children.

Preamble
The demands of a research career. It is widely accepted that the fundamental and clinical sciences are becoming increasingly complex, thus placing new and increasing demands on scientists. Thus, it is appropriate to ask what types of research roles support a capacity to engage successfully in a scientific career. This question is particularly poignant for individuals for whom science is not the predominant focus of their work. Such is the case for clinician investigators whose job activity profile consists of a variable mix of scientific, clinical, and educational activities.

Clinician-Investigator Job Activity Profile (JAP) in The Hospital for Sick Children (HSC) Department of Paediatrics. In 1996, the Department of Paediatrics created 5 Job Activity Profiles (JAP) to help outline a physician’s role within the Department. Following a dialogue between the physician, his/her Division Chief and the Chief of Paediatrics, individuals were assigned to a JAP that most closely matched their activities at that time. One of the JAPs, the Clinician-Investigator, represented individuals who had a major component of their activities focused on research (average 50%, range 30 – 70%) with the remainder devoted to clinical care, education and administration. An Associate Scientist appointment was designed and implemented by the Research Institute to both recognize a Clinical Investigator's contributions to research and to facilitate excellence in research by Clinician-Investigators and other members of The HSC who had comparable amounts of time devoted to research.

Evaluation of the Research Component of the Clinician-Investigator Job Activity Profile. The research productivity of Clinician-Investigators is evaluated by the Department of Paediatrics via its Research Advisory Committee (RAC) and by the Research Institute via an independent review process. In the Research Institute, Associate Scientists are expected to generate research similar in quality to that generated by a Scientist but to produce quantitatively less research, consistent with the time spent in research.

The Clinical-Investigator JAP in the context of the current practice of science. Preliminary to a more complete analysis of the issues that impact on the Clinician-Investigator JAP, we identified the following factors that may impact the research performance and / or assessment of Clinician-Investigators:
• Clinical, educational and administrative activities have the potential to devour large amounts of time.
• As science advances rapidly, productivity in research increasingly requires concentrated attention to one's research program, mentorship and interaction with scientist colleagues. All of these activities require time.
• The scientific community places higher value on controlled experimentation vs. descriptive research. Controlled experimentation aims to identify mechanisms or diagnostic/therapeutic approaches by hypothesis-based manipulation of variables. Descriptive research aims to test hypotheses concerning the status of a group at one time or over time via a process of measurement.
• Although individuals may participate in a given research project as a “leader” or a “collaborator”, assessors place different, but ill-defined, relative quantitative values on leadership vs. collaborative research activities. For the purposes of this review, "leader" is defined as an individual who is primarily responsible for both the development and
execution of a research project, while a "collaborator" is an individual who works either with a HSC based or a non-HSC based leader.

- The categories of achievement in research detailed by the Department of Paediatrics’ RAC associate highest levels of success with outcomes that signify recognition and leadership at a national and international level. This most frequently occurs when individuals have a “leadership role” in their research.
- Research is increasingly being performed within networks of investigators with diverse roles. The nature and value placed in these roles and the manner in which they are to be supported and evaluated must be specified.

Specific objectives of this project
In the analysis phase of this project, our aims were to determine:

1. The commitment of time (expressed as the number of weekday work days/week) that is usually needed to successfully establish (entry level clinician researcher) and maintain (established clinician researcher) a primary role as a (i) a leader or (ii) as a collaborator, in laboratory-based and in clinical research.

2. The appropriate types of institutional supports (e.g. infrastructure, collaborative networks) that will facilitate success for researchers who participate in laboratory-based or clinical research but who do not spend the majority of their time in research and who do not lead nationally funded research programs.

3. The measures of success that are to be used to evaluate the quality of research for laboratory-based and clinical investigators whose primary role is leading or collaborating in research.

Method
The method employed was qualitative and consisted of individual and group interviews/discussions. The following steps were employed:

- Ten investigators (clinician-scientists, clinical investigators – lab and patient based) (see attached list) from the HSC and the University Health Network, University of Toronto were asked to participate. These names of these individuals and their roles in research are attached (Appendix).
- We interviewed each of 10 investigators individually for approximately one hour. A guided discussion occurred based on the rationales and questions posed above. Detailed minutes of these interviews were recorded.
- A summary of the content of all interviews was written and circulated to the participants.
- A meeting of participants was held on July 31, 2002 with the objective of verifying the accuracy of the summary of interviews and developing recommendations.

Factors affecting the success of Clinician Investigators

Summary of Feedback from Individual Interviews.
Clinical Investigators/Associate Scientists (CI/AS) with 30-50% time for research are a unique resource to medical research. They have a unique perspective on clinical questions and have optimal access to patient resources. Their value is unquestioned. Yet to some extent, individuals with this JAP have suffered low job satisfaction, in part due to difficulties in meeting the expectations placed on them with respect to the research component of their JAP.

Traditionally, research contributions have been measured by the role that scientists have taken in leading cutting-edge research programs. Leadership in this context would be defined as holding and renewing national grants as principal investigator, designing and directing an active research program, being principal or senior responsible author on publications of high impact appearing in
major international journals and training graduate students and postdoctoral fellows. Following from this would be international recognition of the research program and invitations to present the research in seminars and international symposia.

As CI/AS individuals have limited time available for research and many other commitments impinging on this time, their ability to achieve leadership roles in their research area may be impaired. While the research of CI/AS individuals can be of high quality and have impact in specific research fields, it is unlikely to have broad impact of the type expected of scientists. Further, they are unlikely to function as methodologists but rather as scientists who apply scientific methods to a particular area of interest. Similarly, the profile of research grant support is unlikely to be qualitatively similar to that of scientists since this support may be obtained from more specialized or local sources rather than national agencies, and often less funding is required for small research programs.

CI/AS individuals can obtain leadership status with ~50% of their time protected for research, although specific factors, discussed below, may enhance the probability of obtaining this type of leadership. However, for those individuals with < ~50% of their time protected for research, the situation is less positive. In the area of clinical research these individuals can make important collaborative contributions to research programs of others, and may obtain small local grants, but are unlikely to be successful in obtaining or maintaining funding from national agencies. Their time limitations preclude them from effectively managing research groups or directing large projects - it is difficult for them to mentor graduate students or post-docs. They can make significant contributions within a very narrow discipline and publish as senior responsible authors, but this work will not have broad impact. For those individuals with ~30-50% time for research carrying out laboratory-based research, or anyone with <30% protected time, the probability of success is even less.

The following factors were identified as being critical to the probability of success in research for CI/AS individuals.

- **Mentorship.** This can take the form of division heads or senior scientists introducing new scientists to appropriate colleagues and helping them establish collaborative networks. Guidance regarding research directions and focus can also be helpful. Some successful laboratory based CI/AS researchers have worked within the lab of a senior scientist in a long-term collaborative program.

- **Team Interactions.** As an extension of mentorship, many successful CI/AS individuals have established collaborative relationships with successful scientists, applying as co-applicants for national funding and sharing senior authorship on major papers. Such interactions occur spontaneously and cannot be prescribed.

- **Prior Training.** Most successful CI/AS individuals have had a significant exposure to research during training. A productive, excellent research experience is a necessary basis to begin a career with ~50% time for research. In the case of Clinical Epidemiology, a M.Sc. with a strong research thesis component may be sufficient to establish a research program. However, several factors may soon converge to raise the type of training required of clinical investigators: (i) the science of clinical investigation and epidemiology is becoming increasing sophisticated, (ii) thesis-based Ph.D. programs in Clinical Epidemiology are being implemented in a ever-increasing number of Canadian universities, and (iii) an increasing number of clinical investigators are engaged in Ph.D. level training.

- **Research Focus.** Universally, successful CI/AS individuals carry out research that is directly linked to a clinical population in their clinical specialty. Further, these individuals confine their clinical practice, in large part, to this patient population. In this way, the clinical and research components of a career act in a synergistic manner.
Clinical researchers find it easier to establish such a synergistic relationship than do laboratory based researchers.

- **Specific Personality Traits.** Like all successful scientists, CI/AS individuals are intelligent, highly motivated and industrious. More importantly, they are highly focused, able to handle pressure and are resilient.
Recommendations regarding the CI/AS JAP in the Department of Paediatrics/Research Institute.
Developed by Norman Rosenblum and Bill Trimble based, in part, on feedback received.

Preamble. In the document that served as a basis for discussion of this issue, we defined the roles, ‘leader’ and ‘collaborator’. Like all scientists, the CI/AS acts as a leader and collaborator at different times and to different degrees during a research career. Therefore, it is artificial and arbitrary to classify these individuals as ‘leader’ or ‘collaborator’ with the expectation that resources and rewards will be dictated by these labels.

We believe that it is more helpful to classify roles based on the resources that are generally required to achieve specific types (controlled vs. descriptive) of research. We distinguish here between two types of research: (i) research that combines description with hypothesis-driven experimentation, and (ii) research that does not progress beyond the purely descriptive.

Specifically, feedback by clinical investigators suggests that
- It is unlikely that research achievements by CI/AS individuals will be qualitatively similar to those of Clinician-Scientists/Scientists. The latter have more research training, more protected time, and research programs with greater breadth - the ingredients needed for publications in very highly rated journals, national grants and career awards.
- Leadership in hypothesis-based clinical research in which variables are being manipulated in controlled experiments will be facilitated by the factors including: excellent research training, ~50% protected time, careful attention to mentorship, team interactions, and research focus, and accountability among researchers and their leaders for ensuring that commitments are fulfilled. Individuals with this role in research will require grants to support their research efforts.
- Individuals with 30% research time are likely to perform focused disciplinary research of a descriptive nature and to collaborate with scientists who perform research aimed at identifying mechanisms or use controlled methods to identify diagnostic and/or therapeutic approaches. These CI/AS are likely to publish in discipline-specific journals as a senior responsible author and as a collaborator in journals with more general appeal. These may harness an external grant on occasion and are unlikely to play a primary role in the training of graduate students and post-doctoral research fellows. The value of these contributions should be recognized and supported.
- The likelihood that individuals with <50% dedicated time in research can lead a laboratory based research program is extremely low. Circumstances may exist in which such individuals perform research successfully within the context of another laboratory scientist’s research program.
- We should recognize that individuals with limited training and resources can exceed expectations. It is not in the best interest of individuals or an institution to create a situation where expectations determine outcomes. That is, opportunity for change in roles should be seen as a means to support achievement beyond initial expectations.
- As of June, 2002, 26 clinicians in the Department of Paediatrics have research time between 30-50%. Of these, 7 have 30-35% research time; the remainder (N=19) have a ≥ 40% research time.

Recommendations.
1. Role definitions should be dependent on research time allocated - a surrogate for prior research training and expectations regarding the nature of research to be performed:

   - Clinical Investigator/Associate Scientist - 50% research time.

Clinician-Investigators will be expected to:
- Engage in hypothesis-driven novel research in which variables are being manipulated.
- Obtain funding needed to support the implementation of the research program.
- Demonstrate leadership and recognition of leadership in the field of study.
- Publish scientific work in leading scientific journals.
- Present scientific work via invited presentations that reflect scientific stature.
- Play a role in research training. In some cases it may be desirable to train graduate students within a university graduate faculty.

This model refines the CI/AS category with respect to the time commitment needed to meet the expectations in the Department of Paediatrics and the Research Institute (see below). This model continues to value research contributions for individuals with considerably less dedicated research time and evaluates these contributions in a manner more suited to the nature of the research that can generally be accomplished.

Recommendations regarding JAPs are specified in #2 and #3, below.

2. Existing CI/AS with 25-30% research time
   - Existing Senior Associate Scientists (SAscSci) (N=4): these individuals should be able to maintain their RI status as a SAscSci recognizing that they will be adjudicated for re-appointment on the basis of RI criteria (see below).
   - Existing Associate Scientists (AscSci) (N=5)
     - Following review and discussion with Department of Paediatrics Division Heads, a determination will be made whether these individuals should be given the opportunity to increase their dedicated research time to 50% and maintain their AscSci status. These individuals must recognize that promotion to SAscSci will be dependent on fulfilling the RI criteria for promotion. Failure to achieve promotion will result in loss of AscSci status. These individuals will also be evaluated on an annual and triennial basis by the Department of Paediatrics CDCP.
     - Individuals who do not increase their dedicated research time to 50% should change their JAP to that which more appropriately describes their activities. Simultaneously, these individuals will change status to that of a Project Director in the RI.

3. New recruits:
   - should be assigned either of these positions depending on prior training/productivity and expectations for role and performance in research.
   - Recruits into the CI/AS JAP should have a significant amount (at least 2 and preferably 3 years) of high quality, hypothesis driven research training with clear evidence of productivity i.e high quality publications. In most cases this will have been obtained during the acquisition of an advanced degree.
   - Wherever possible, recruits should be specifically chosen for their potential to fit into existing groups. This will facilitate their establishment of the networks that are essential to initial and ongoing success.
   - New CI/AS should be protected from educational and administrative duties during the first two years after appointment.
   - Recruits into JAPs other than CI/AS or Clin Sci/Sci who seek appointment as a Project Director in the RI are expected to have completed research training as a component of their clinical program and to have published scholarly work.
4. Establish mechanisms to ensure that Clinical Investigators dedicate allocated time to research and that Division Heads ensure that the time allocated for research is indeed protected for this purpose.

5. Division Heads/mentors need to remind recruits to take advantage of existing academic leave opportunities to augment their research programme.

6. For new CI/AS: a formal system of mentorship should be established by a team including a research advisor, the clinical division head and the program head for the first three years after appointment.

7. Individuals with JAPs including Clinician-Specialist, Clinician-Teachers and Clinician-Educators who are also Project Directors, mentorship in research should be provided via the newly implemented Department of Paediatrics mentor program.

8. The RI should apply existing criteria for re-appointment and promotion of Associate Scientists with renewed 'confidence' with particular emphasis on whether the Asc or AscSci is:
   - Successfully pursuing funded research in which they are testing hypothesis by manipulating variables in addition to generating descriptive research.
   - Attaining and/or maintaining leadership status in the field of study.
   - Generating publications in leading journals and invitations to present scientific work.
   - Playing a role in training of post-doctoral fellows and/or undergraduate students and graduate students.
Appendix

Members of Ad Hoc Committee on the Clinician-Investigator in the Department of Paediatrics

- Khosrow Adeli – Associate Scientist, HSC
- Doug Bradley - Clinician Investigator, UHN
- Joe Clarke – Senior Associate Scientist, HSC
- Brian Feldman - Clinician Scientist, HSC
- Anne Griffiths - CI, Associate Scientist, HSC
- Gillian Hawker - Clinician Investigator, UHN
- Debbie Katzman - CI, Associate Scientist, HSC
- Brian McCrindle - Clinician Scientist, HSC
- Keith Steward - Clinician Scientist, UHN
- Rosanna Weksberg – Senior Associate Scientist, HSC
- Norman Rosenblum – Senior Scientist, HSC
- William Trimble – Senior Scientist, HSC