

Queen's University at Kingston
Report to Senate
Advisory Committee on the Human Mobility Research Centre

August, 2009

The Advisory Committee for the Human Mobility Research Centre (HMRC) was appointed by Dr. Kerry Rowe, Vice-Principal (Research) with the mandate to advise him on the present state and future prospects of the Centre. The committee was composed as follows:

Dr. Elsie Culham, School of Rehabilitation Therapy
Dr. John Drover, Critical Care Program, KGH
Dr. Gabor Fichtinger, School of Computing
Dr. Bruce Hutchinson, Chair
Dr. Doug Munoz, Centre for Neuroscience Studies
Dr. Leila Notash, Mechanical and Materials Engineering
Ms. Sonja Verbeek, Secretary

A notice concerning the establishment of the committee and its terms of reference was placed in the Gazette on May 11, 2009 and members of the University community were invited to send comments to the committee by May 25, 2009. No responses were received.

During the review process of the Centre, the committee members reviewed a number of documents, provided by HMRC as follows:

- 1) HMRC Constitution
- 2) Proposed changes to the Constitution
- 3) 5 year Strategic Research Plan
- 4) HMRC White Paper 2006: Challenges and Opportunities
- 5) 2008 Annual Plan Session Highlights
- 6) Annual reports submitted by the Centre from 2003 to 2008

Additionally, the Committee invited the four Co-Directors of the Centre: Dr. Tim Bryant, Dr. Randy Ellis, Dr. David Pichora and Dr. Stephen Waldman, as well as Leone Ploeg, Managing Director to present their views on the current state and future prospects of the Centre. Dr. Tom Harris, Chair of the Board of Directors also participated in the session.

Brief Background

In December 2002, the Human Mobility Research Centre (HMRC), an inter-institutional Research Centre governed by both Queen's University and the Kingston General Hospital was approved by Senate to operate as a University Research Centre.

The impetus for the establishment of the Centre was the expansion of the Clinical Mechanics Group (CMG), established in 1984 with its founding researchers from the Departments of Mechanical Engineering and Orthopaedic Surgery, evolving to include many other disciplines focused on musculoskeletal research: Biochemistry, Chemical Engineering, Computer Science, Information Technologies, Epidemiology, Immunology, Mechanical Engineering, Orthopaedic Surgery, Physical Health and Education, Rehabilitation Therapy and Rheumatology. In establishing the new entity, the Human Mobility Research Centre, the focus was determined to "help people live fuller, more mobile lives through the development of innovative and effective treatment strategies for bone and joint disorders caused by arthritis, osteoporosis, injury and related problems".

At the time of approval in 2002, the Centre had been operating informally for more than one year, developing a governance structure, constitution and strategic vision. Awards totalling over \$12 million dollars (most notably the OR2010 project) from the Provincial and Federal governments, as well as private industry, provided the equipment, space, technical and administrative support for research projects.

The Centre has been operating since 2002 and a five year review of the Centre was postponed due to the departure of the Director of Operations, who had been with the Centre since its inception. Given the change over in this senior position, it was decided to allow some time for a new Operations Manager to be hired and in place for a period of time before the onset of the review. The Committee was struck in May 2009 and has been tasked with a review of the Centre activities, financial and administrative structures for the next five year period.

Current Activities and Future Prospects

The Committee reviewed a number of reports prepared by the Centre and as mentioned previously, also met with its four Co-Directors, the Operations Manager, as well as the Chair of the Board of Directors, who answered a number of questions on the current activities and future prospects of the Centre.

According to reports submitted by HMRC, there are approximately 48 faculty members involved in HMRC, spanning 10 Departments and three Faculties. The Centre has participated with Departments in the recruiting of new faculty members and makes its facilities available to interested new researchers. Additionally, 80 trainees, including 41 Masters students, 30 PhDs and nine Post-Doctoral Fellows are associated with the Centre.

External research funding reached nearly \$6 million over 70 grants and contracts for the year ending 2008 by researchers associated with HMRC. Infrastructure projects accounted for 35% of the total funding, contract research 8%, Tri-Council and other research funding organizations accounted for 30% with the balance from research chairs, research agreements and other grants. Almost 90 journal articles were published covering the four core areas: Computer assisted therapies, regenerative medicine, biomechanical design, rehabilitation and ergonomics, and, clinical studies.

Recently, HMRC was awarded two significant grants:

- o \$1.65 million NSERC Collaborative Research and Training Experience (CREATE) grant for graduate students in the bone and joint health technologies program. This program enables graduates to expand their professional and personal skills so they can make a successful transition from the classroom to the workplace. Dr. Timothy Bryant is the PI on this initiative
- o \$696,481 awarded from the CFI Leading Edge Fund for *Integrated Technologies for Bone and Joint Health: Multi-Centre Infrastructure Development Program Phase 4*, led by Dr. David Pichora. HMRC recently received confirmation of a provincial match, which increases the value of the funding by an additional \$696,481. The announcement of the provincial match was confirmed at the end of July 2009.

HMRC is working with the Departments of Chemical Engineering, Electrical Engineering and Mechanical and Materials Engineering to develop a collaborative graduate programme in Biomedical Engineering. Additionally, the Collaborative Research and Training Experience (CREATE) Graduate Research Programme in Bone and Joint Health Technologies will provide highly qualified personnel trained in the integration of engineering principles, biological sciences, and information technology to solve patient-oriented clinical problems through research that supports medical product development.

In terms of future prospects, the HMRC has identified, through a strategic planning exercise, the following top three priorities and key actions: identifying strategic focus areas, restoring communications and enhancing the intellectual sustainability of the Centre.

Governance

HMRC is governed by both Queen's and KGH, with the Board of Directors as the chief governing body. The members of HMRC form the Scientific Committee and the Scientific Committee elects a single representative from each of the major research areas to act as Co-Director of the Centre. At present, there are four research foci and four corresponding Co-Directors. These Co-Directors also sit on the Executive Committee. Current themes and Co-Directors are:

- **Computer Assisted Therapies:** Dr. Randy Ellis, Queen's Research Chair in Computer-Assisted Surgery; School of Computing, cross-appointed to the Department of Mechanical and Materials Engineering and Department of Surgery
- **Regenerative Medicine:** Dr. Steve Waldman, Tier II Canada Research Chair in Engineering of Human Joints; Department of Chemical Engineering, jointly-appointed to the Department of Mechanical and Materials Engineering
- **Biomechanical Design, Ergonomics and Rehabilitation:** Dr. Tim Bryant, Department of Mechanical and Materials Engineering, cross-appointed to the Department of Surgery and School of Kinesiology and Health Studies
- **Clinical Studies:** Dr. David Pichora, M.D., Interim Executive Director, Hotel Dieu, Chief of Staff, Hotel Dieu Hospital; Division of Orthopaedics; Department of Surgery, cross-appointed to the Department of Mechanical and Materials Engineering

Constitution

Revisions to the HMRC Constitution were submitted to the Senate Sub-Committee, the Advisory Research Committee (SARC) for review in its June meeting. The SARC has delayed responding to the request for the changes in the Constitution until the review of the Centre has been completed. The major change to the

Constitution is the addition of an Executive Committee as part of the organizational structure of HMRC. This Executive Committee will consist of the four Principal Investigators from the Scientific Committee and the Chair of the Board of Directors who acts as Chair. The day to day management responsibility, including personnel, will be delegated to the Executive Committee and the Executive Manager under the new Constitution and it will also be primarily responsible for maintaining the excellence of the research programs.

Budget/Financial Outlook

The Human Mobility Research Centre provided a financial report to the Committee, which included a forecast of expenditures/costs for maintaining the operation of the Centre as it currently exists, as well as with continuing the initiatives that are underway for the next five years. The HMRC Board of Directors has confirmed its mandate to operate within a balanced budget for 2009-10. According to the five year budget and financial overview provided by the Centre, there will be a decrease in salary costs due to the end of an existing two-year commitment. The revenue stream labeled "Cost recovery" includes grants, contracts, billing for equipment and facility usage, etc. If there is a shortfall, the difference will come from the operating surplus, which currently sits at \$92k. The bulk of the operating revenue is supplied through the research contract with Johnson/DePuy.

Committee Deliberations

In its preliminary meeting, the Review Committee identified three main areas for further discussion: the funding model, leadership and vision. The first question raised concerned the funding model of the Centre: "how is the money flowing?" The second issue identified was the Co-Director administrative model of the Centre and the resulting questions, "how are decisions made with multi-director leadership and how cohesive is it as an administrative model?" The third major area for further discussion focused on the questions, "what is the collective vision of the Centre and where is it going in the next five years?"

One of the central concerns for the Review Committee is the Centre's reliance on the Johnson/ DePuy funding, which is critical to the ongoing operations of the Centre for the next five years. According to the Centre Co-Directors and the Chair of the Board, Dr. Tom Harris, the Johnson/DePuy contract is up for renewal in a year's time and it may go to tender. However, all parties have been pleased with the contract and results of the collaboration to date and DePuy has signalled

interest in carrying on with the agreement. Dr. Harris indicated that there are two other companies interested in stepping in to replace Johnson/DePuy should the contract be discontinued for any reason. Without this money; however, it is clear that the HMRC would be hard pressed to continue functioning as a Centre, as there are no current sources from overheads or other revenues that would fill the gap if there was no further private sector funding. After review and discussion of the information presented to the Review Committee, the Committee is satisfied that HMRC has a mitigation plan in place to address the risk of the non-renewal of the DePuy contract.

The reliance on DePuy monies led to a discussion of the overhead model of the university and two issues in particular were raised: the inability to leverage unencumbered money, such as the DePuy contract, without a negative impact (loss of flexibility in spending and decrease in amount available due to o/h charge) and the flow of overheads back to the departments rather than the Research Centre.

The second area of deliberation was the functionality of the four Co-Directors model of the Centre. In the meeting with the key players of the HMRC, it was explained to the Committee that this model of four Co-Directors is, in fact, a very effective way of operating for the HMRC. Although the model is complex, it allows the Centre to be flexible and nimble in addressing opportunities as they arise. Given the growing and new emergent areas, it would be impossible for one person to understand all the research areas and be able to move quickly to address new opportunities. This is a dynamic team and with such cohesion it leads to strong and smooth operations of the Centre. Additionally, new researchers can be integrated easily into a team of researchers for mentoring. This is a very team-based approach modelled by HMRC and it provides great support for everyone involved. The Committee is satisfied that this governance model is working well.

Dr. Harris raised the point that one weakness with this model is the visibility issue for the Centre. There is no one person associated with HMRC and that may be important for raising the profile of the Centre. It is a point of discussion for the HMRC team and is under consideration.

The third focus of the discussion centred on the vision of the Centre. The formal vision of the Centre is to advance technologies to assist people using collaborative and integrative research. The unique feature of the Centre is its interdisciplinarity - the opportunity to link domains that have been previously isolated. An Annual Planning Session undertaken by HMRC in October 2008 identified the unique

strengths of the Centre, areas for improvement, external opportunities and threats that need to be monitored, with key actions for each priority.

While the Centre has not articulated a clear vision of where it wishes to be in five to ten years, the interactions and deliberations of the interdisciplinary team of Co-Directors is well positioned to take advantage of new directions in research quickly and effectively. The Centre has effectively moved into new areas of research in the past and the Committee believes it will be capable of doing so in the future.

The Committee is of the view that one of the Centre's greatest strengths is its interdisciplinarity and the commitment of its four Co-Directors to working collaboratively in a team-based research approach. The Centre unifies researchers from varied backgrounds with a common interest and it was clear to the Committee that this group is very cohesive and each of the Co-Directors takes on an important role in the research mandate of the Centre. This is a complex leadership model and one that could potentially fail if the Co-Directors were not completely committed. The Committee does not identify this as an issue with the current leadership; however, should there be a change in leadership, this is an area to be monitored.

Conclusions and Recommendations

In conclusion, having met with the key players of the Human Mobility Research Centre and having carefully reviewed the documentation provided by the Human Mobility Research Centre, the Advisory Committee has concluded that the Centre is operating well, has a plan to solidify the management structure and has adequate human resources with committed financial resources. The Committee, therefore, recommends that:

- 1) The Human Mobility Research Centre (HMRC) be authorized to continue for an additional five years;
- 2) HMRC be proactive in increasing the external profile of the Centre so that it becomes better known for its multi-disciplinary research;
- 3) To ensure continued financial viability, the Centre seek alternative financial resources to the DePuy funding, upon which it has been heavily reliant to sustain salaries and other operating costs;
- 4) The Constitution should remove all references to "Executive Director", a position that does not exist and it should note that the Executive Committee will be chaired by the Chair of the Board;

- 5) In terms of the inability of the Centre to leverage its private sector (DePuy) funding (without substantial overhead costs), it is recommended that a review of the Queen's overhead policy be undertaken in relation to flexibility and innovation with respect to funding opportunities for Research Centres; and,
- 6) It was also identified that Research Centres such as HMRC at Queen's would benefit from a more sophisticated vision of philanthropy, a relatively untapped market, which will become an increasingly important source of funding for Centres in the future.

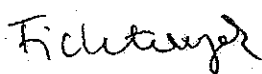
Respectfully submitted,



Dr. Elsie Culham, School of Rehabilitation Therapy



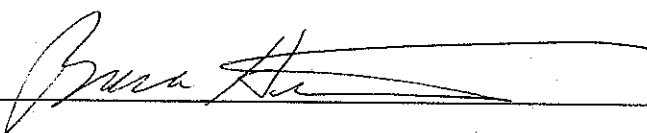
Dr. John Drover, Critical Care Program, KGH



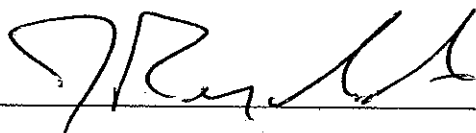
Gabor
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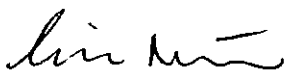
Dr. Gabor Fichtinger, School of Computing



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