

Department of Surgery - University of Toronto
Research Strategic Planning Retreat: Research Beyond the Cutting Edge
Monday, January 23, 2017

Part 1: Our Research Environment

1. Objectives
2. Survey Overview
3. 2012-2017: Achievements
4. Our Scientists: A Profile
5. Spotlight on Innovation and Discovery
6. Panel: Our changing education, training, and mentoring environment
7. Panel: Advancing research and innovation in surgery

Part 2: Goals, Deliverables, and Metrics for Change

1. Creating a collaborative and integrative research enterprise
2. Advancing our strategic directions

Part 1: Our Research Environment

1. Objectives (MGF)

1. To highlight our achievements in research over the past five years
2. To consider future key trends in research
3. To identify both barriers and enablers to a successful and productive research environment
4. To establish priority goals for research in surgery for the next 1-5 years

2. Survey Overview (MGF)

- Intent:
 - To ask trainees and faculty members what they consider to be key enablers and goals in establishing a collaborative research enterprise in the Department of Surgery
- Demographics:
 - 30% response rate
 - Balanced mix of trainees and faculty
 - Wide variety of research interests
- Results and prevalent themes:
 - a. The need for leveraging interdisciplinary research to promote collaborations, particularly with Engineering
 - b. The need for sustainable funding
 - c. The role of mentorship along the career trajectory
 - d. The changing nature of resident education and its implications for the SSTP
 - e. The growing importance of Quality Improvement in both research and clinical care
 - f. The need for openness towards new directions

3. 2012-2017: Achievements (MGF)

- 63 endowed Chairs, bringing in over \$150 MN invested
- 7000+ publications over past 5 years
- Underwent successful Annual Review
- Research funding continues to climb, at over \$55 MN
- CIHR funding seems stable, although increasing our reliance in funding in other sources: May reflect a move towards commercial efforts and innovation
- SSTP enrollment continues to grow with largest cohort of 44 trainees
- Gallie Day topics/trends over past 5 years:
 - 2012: Regenerative and tissue engineering
 - 2013: Personalized medicine
 - 2014: Commercialization
 - 2015: Big Data
 - 2016: Knowledge translation

4. Our Scientists: A Profile (AK)

- Overarching theme: How do scientists contribute to the well-being to the Department? How does the Department contribute to the well-being of the scientists?

- Profile:

- 34 different disciplines currently being undertaken by our Scientists
- 52 scientists working in 13 different institutions across the city

a. Funding

- 2014: 8.4 MN, 2015: 18.6 MN, 2016: 14.6 MN
- 27/52 Scientists reported funding, comparable to the Clinician-Scientists
 - Average 1-4 grants per PI
 - What about the 25 without funding? May either be due to under-reporting, or because they aren't the primary PI thus the funding isn't attributed to their name
- CIHR grants two foundational long-term grants each year. This year, both were captured by Departmental faculty (Ren-Ke Li and Geoff Fernie).
- 9 new Scientists since 2014

b. Clarity of Status & Job Security

- There is an urgent need to address the Scientists whose appointment to a particular institute is not clear, as it results in a lack of their primary funding
- How research is conducted at the Department:
 - Projects that are directly relevant to surgery (Ex. Rehabilitation, osteoarthritis)
 - Biologically-focused with indirect basic science relevance (Ex. Sepsis, fibrosis)
 - Surgical problem in a multidisciplinary focus (Ex. Spine, burns)

- Overall, the Scientists represent a strong presence in the Department and an above-average grant capture in comparison to other Canadian institutes, with a significant impact factor in terms of our publications.

5. Spotlight on Innovation & Discovery

Dr. Cari Whyne spoke about her team's development and commercial trajectory for Bone Tape, a polymer-based tape that can be used for craniomaxillofacial structure damage. A multi-disciplinary team allowed for the early identification and remediation of potential challenges, and the overall presentation of a successful product to potential companies. The team began with small local teams (Bayliss) and was recently purchased by MedTronic, with whom they are currently in the negotiations stage.

Dr. Allan Martin spoke to his application of quantitative MRIs to the cervical spine. The technique has had great clinical application as it can be used for identifying tissue damage through microsutural-level changes, even in the absence of clinical symptoms. This was an excellent example of innovation at a clinical level that was used to change patient practice.

6. Panel: Our changing education, training, and mentoring environment

Dr. Benjamin Goldstein spoke about competency-by-design and its implication on trainee education, using the implementation within the Department of Psychiatry as an example for what the Department of Surgery can expect over the next few years. The topic facilitated a discussion about whether CBD was appropriate for each surgical specialty, and whether this would impact trainee research. Many believe that it will impact the time allocation and expectations.

Dr. Cindi Morshead spoke to the importance of mentorship and career guidance for a successful and satisfied career experience. Faculty are shown to display less isolation at work, greater career satisfaction, more reflective long-term career decisions, reduced time to promotion, and more confidence in their academic progression. She also emphasized the importance of transparency in promotion and evaluation criteria for early-stage faculty.

Dr. Paul Greig complemented the discussion by describing the newly-formalized mentorship program for new recruits in the Department of Surgery. The program uses a dual mentor model; an academic advisor guides the specific research and clinical goals while a career development mentor offers confidential lifestyle guidance.

7. Panel: Advancing research and innovation in surgery

Dr. Richard Hegele discussed the development and prioritization of innovation in the Faculty of Medicine's research agenda. He spoke to the converging trends of decreasing CIHR rates, the need to diversify the educational experience, and the pursuit of alternative sustainable funding sources. Several Faculty of Medicine resources were described, such as the Centre for Innovation (currently focusing on antibodies and regenerative medicine), H2I (Health Innovation Hub), the McLaughlin Centre (early project funding in genomics), NSERC grants, and price-matched funding of the Faculty of Medicine and Faculty of Applied Science & Engineering for student projects.

Dr. Shaf Keshavjee spoke about his personal experiences with the lung preservation technology and the various commercial endeavours to which it led. These included the 2012 development of Perfusix Technologies out of Toronto General Hospital, which led to a brand new job description and opening of several centres across the continent. He also spoke to XOR Labs which creates systems for assessing and preserving the lungs, which eliminates the need for new operating rooms to be opened every time the procedure must be done. He emphasized the need for the Department of Surgery to help new innovators in identifying potential conflicts of interest along the way, such as IP ownership rights.

Mr. David Grieco wrapped up the discussion by speaking to the various efforts of the Advancement Offices over the past several years, including the capture of large donor gifts and their importance in sustainable program funding.

Part 2: Goals, Deliverables, and Metrics for Change

1. Creating a Collaborative & Integrated Research Enterprise

a. What changes are required for achieving a collaborative & well-integrated research enterprise where all researchers (surgeons and scientists) are productive and performing at their optimal levels?

Required Change	Action Items
Foster alignment between a. All hospital-based research institutes b. Research institutes and the University	<ol style="list-style-type: none"> 1. Harmonize the evaluation criteria for productivity and performance across the research institutes, REBs, legal and ethical frameworks 2. Harmonize the IP and commercialization standards across the hospitals & RIs
Address barriers that challenge a culture of collaboration	<ol style="list-style-type: none"> 1. Encourage internal and external integration across different disciplines and departments (Ex. Undergraduate programs, Engineering) 2. Implement an online database of research projects in progress, including associated needs and requests for resources/collaborative partners 3. Leverage social media participation to encourage networking between scientists and the showcasing of new work 4. Run a variety of multi-disciplinary networking events: "Speed Dating" style showcases, Rounds, etc.
Address barriers that challenge high performance and productivity	<ol style="list-style-type: none"> 1. Harmonize the evaluation criteria for scientists, with particular attention towards the CIHR vs. non-CIHR grants, and pending patents 2. Establish realistic and specific funding structures for all types of scientists at different stages of their careers 3. Revisit the career expectations with respect to specific protected time arrangements
Implement a department-university wide infrastructure	<ol style="list-style-type: none"> 1. Establish a university-wide clinical trials unit 2. Develop research initiatives that are Department-supported, rather than hospital based
Recognize the contributions of the scientists and incentivize the behaviours that encourage high-quality work	<ol style="list-style-type: none"> 1. Revisit the hiring process and working dynamic of scientists under surgeons 2. Create more independent positions

	<ol style="list-style-type: none"> 3. Develop the presence of specific research areas (Ex. Big data, nano-medicine, materials, engineering) and establish funds for scientists in these fields 4. Offer incentives (monetary or other) for cross-lab collaborations 5. Allow investigators to retain IP ownership and monetary royalties of their commercial efforts
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b. How can we measure the success of these changes?

Area of measurement	Metrics
Research networking events	<ol style="list-style-type: none"> 1. Attendance figures 2. Feedback surveys on relevance, usefulness, etc. 3. Number of new collaborations that develop after the event
Profiles of collaborative teams	<ol style="list-style-type: none"> 1. When and how they were developed 2. Diversity of team members (academic position, research field, etc) 3. Extent of collaborative effort
Research activity	<ol style="list-style-type: none"> 1. Number of RCTs or prospective observational trials that develop as a result of cross discipline or institutional collaboration 2. Number of successful grant captures from collaborative teams 3. Extent of clinical impact resulting from the research activity (Ex. New devices, techniques, patient practice, etc.), emphasizing productivity over funding
Knowledge translation	<ol style="list-style-type: none"> 1. Number of technologies and techniques that are brought to market 2. Monitor and evaluate knowledge translation at each stage of development (may aid in developing a practice model for prospective scientists)
Qualitative vs. quantitative evaluations	<ol style="list-style-type: none"> 1. Thorough review of research quality, including 360* feedback and peer review. Emphasize quality, creativity, and productivity - rather than a predetermined list of items. 2. Consider IP development, patents, papers, grant capture, foundational and philanthropic support 3. Consider activity involvement such as committees, lectures, mentorship, and journal clubs

2. Advancing our Strategic Directions

Strategic Direction	Priorities	Action Items
Innovation and Discovery	<ol style="list-style-type: none"> 1. Foster collaboration between the hospitals and RIs to encourage cross-discipline research & knowledge translation (to commercialization, clinical trials, and/or patient practice) 2. Develop a structured process for new innovators at U of T 	<ol style="list-style-type: none"> 1. Leverage relations with the Innovations Committee and experienced innovators, and encourage their accessibility for more junior innovators 2. Facilitate direct representation from Department of Surgery or Faculty of Medicine to advocate on behalf of researcher efforts with respect to IP management and clinical trials 3. Create a manual for navigating the commercial and innovative process, such as IP rights, technology transfer, patent applications, etc. 4. Facilitate mentor pairings between experienced and junior innovators (Ex. 'Structured Expert Engagement' process) 5. Host semi-annual innovation showcases where innovators can bring ideas forth to Departmental staff for product & process advice

Collaboration and Partnerships	<ol style="list-style-type: none"> 1. Harmonize the REB approval process across institutes 2. Increased funding for collaborative teams 3. Implementation of networking events 	<ol style="list-style-type: none"> 1. Encourage the value of productivity from collaborative efforts, rather than the amount of funding or grants obtained 2. Encourage division chiefs to review the Sick Kids model of collaboration and implement it in their own divisions 3. Assemble committee to engage with the RIs to streamline the REB, IP, and materials transfer processes 4. Increased funding for cross-discipline/institution teams from the Department, hospitals, or institutions (ie. A co-funding or price-matched model) 5. Revisit IP ownership rules & encourage their transparency in order to incentivize new innovators to collaborate outside of their institutions 6. Run networking events 7. Leverage social media to showcase collaborative projects 8. Online database of projects & request for collaborators
Education and Support for the SSTP	<ol style="list-style-type: none"> 1. Address the challenges that CBD poses on research progress 2. Revise the metrics and feedback process 3. Obtain sustained funding for the SSTP 	<ol style="list-style-type: none"> 1. Advocate for urgent petition to the Royal College to emphasize the strain that CBD puts on technical specialities and research 2. Work with the Advancement Office and Department staff to develop a sustained funding plan for the SSTP, such as a tiered funding model based on divisional and departmental priorities 3. Revisit the review process and the definition of success; Ensure that all graduates (not just those in SSTP) are both good surgeons and good researchers. 4. Organize networking events to foster cross-discipline integration at the trainee level
Funding	<ol style="list-style-type: none"> 1. Increase the support for early-stage innovators 2. Improve philanthropic outreach 3. Seek alternative stable source of funding 	<ol style="list-style-type: none"> 1. Develop metrics that recognize funding and grants obtained from non-traditional sources 2. Collaborate with the Advancement office to offer philanthropic education (Ex. how to pursue potential donors) and facilitate direct connection between donors and innovators 3. Increase the number of seed funds available for high-needs innovators, such as trainees and junior faculty 4. Offer bridge funding between grant obtainment 5. Leverage global partnerships for potential donor/collaborative opportunities 6. Streamline the grant submission process through administrative assistance 7. Offer competitive internal awards/prizes
Mentorship	<ol style="list-style-type: none"> 1. Facilitate mentorship early in residency 2. Facilitate mentorship for scientists 	<ol style="list-style-type: none"> 1. Build on the existing mentorship program by pairing residents and scientists with both academic advisors and career development mentors 2. Offer mandatory mentor training sessions