A SWOT Analysis by the Canadian Association of Professors of Medicine (CAPM) reveals existential threats to ADMs

Maintaining and Enhancing Canada's Academic Departments of Medicine (ADM) for the Benefit of Canadians: A SWOT Analysis by the Canadian Association of Professors of Medicine (CAPM) reveals existential threats to ADMs

A French translation of this blog will be forthcoming shortly.

Introduction: The Canadian Association of Professors of Medicine (CAPM) is comprised of the Heads of Academic Departments of Medicine (ADM) (Table1). This blog was inspired by two factors: first, a shared observation that the crucial role of ADMs is poorly understood and second, that changes in health care, research funding, unfunded mandates related to medical education, and several other environmental stressors pose existential threats to ADMs. ADMs are comprised of academic physicians (AP). ADMs are the largest Departments within the Faculties of Medicine. CAPM members provide quaternary care, drive healthcare innovation, create and deliver medical education and perform research for the betterment of Canadians.

Goals: Between 2017-2018 CAPM performed a SWOT analysis (Strengths, Weaknesses, Opportunities, Threats) to:

- Better define the current role and value of Canada's ADMs
- Identify and address threats to the health of ADMs
- Identify opportunities to improve the value of ADMs in delivery of complex health care, medical education and health research and address threats
- Identify opportunities to enhance CAPM's role as a provincial and national consultative resource for the benefit of those in ADMs and for the public we serve
- Enhance public and governmental awareness of CAPM and position this organization to promote policies that benefit Canadian healthcare, research and medical education

Process: The following blog is a consensus statement that reflects the results of several face-to-face discussions amongst current and recent past-members of CAPM. The blog has been reviewed by CAPM members for editorial input and then peer reviewed by a group of four leading academics familiar with the role of ADMs, including two current Faculty of Medicine Deans and 2 former Heads of ADMs.

Why now? Academic medicine writ large, including colleagues in all disciplines from anesthesia to surgery, are experiencing the best of worlds and the worst of worlds. They possess new and powerful diagnostic and therapeutic tools and are poised to deliver more innovative care, train more young physicians and perform more research. However, the ability to accomplish these goals is challenged by a number of sociologic, demographic and governmental factors. The point of this
blog is to highlight them, not as a complaint, not as a “woe is me”. Rather, this blog hopefully serves to identify potholes in the road so that they can be avoided, repaired and we (the vehicle of Canada’s academic progress) can accelerate our progress forward. Academic medicine may not be on the endangered species list yet; but there are analogies to the polar bear, a powerful animal to be sure, but one that is struggling with a changing environment that is rapidly altering the ground (ice) beneath its feet!

Table 1: Membership of CAPM April 2018

<table>
<thead>
<tr>
<th>University</th>
<th>Dean/Chair (Deputy/Head)</th>
<th>Academic Health Sciences Centre (AHSC)</th>
<th>Number of Faculty (MFY)</th>
<th>Number of GCT Faculty (MFY)</th>
<th>Hospital in AHSC</th>
<th>Distributed Medical Education Sites</th>
<th>SRC Grants in the past 3 years</th>
<th>Core Residency Program and/or Medical Education in all 3 sectors</th>
<th>Number of Graduate Medical Education Programs</th>
<th>Number of Fellowship Training Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memorial University</td>
<td>Jean M. Gaudry</td>
<td>Hospital Health Sciences Centre</td>
<td>167 (180)</td>
<td>129 (150)</td>
<td>2</td>
<td>10</td>
<td>15</td>
<td>11</td>
<td>4</td>
<td>2</td>
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<tr>
<td>Université de Montréal</td>
<td>François Varin</td>
<td>Centre Hospitalier de l'Université de Montréal Hôpital Sacré-Coeur Centre hospitalier de l'Université de Montréal</td>
<td>263 (240)</td>
<td>150 (140)</td>
<td>2</td>
<td>8</td>
<td>2</td>
<td>202</td>
<td>17</td>
<td>12</td>
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<td>McGill University</td>
<td>James Marra</td>
<td>Health Sciences Centre</td>
<td>263 (190)</td>
<td>199 (150)</td>
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<tr>
<td>Université de Laval</td>
<td>Marie Franquelin</td>
<td>Centre Hospitalier de l'Université de Laval Hôpital Montfort Hospital</td>
<td>212 (190)</td>
<td>150 (150)</td>
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<td>8</td>
<td>8</td>
<td>386</td>
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<tr>
<td>University of Alberta</td>
<td>Humaira Hilgendorf</td>
<td>University of Alberta Hospital</td>
<td>202 (170)</td>
<td>150 (150)</td>
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<tr>
<td>Queen's University</td>
<td>Joanne Aith</td>
<td>Health Sciences Centre</td>
<td>263 (190)</td>
<td>199 (150)</td>
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<td>12</td>
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<tr>
<td>University of Toronto</td>
<td>Gillian Doherty</td>
<td>Hospital for Sick Children</td>
<td>263 (190)</td>
<td>199 (150)</td>
<td>3</td>
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<td>4</td>
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<td>McMaster University</td>
<td>Mark Cronin</td>
<td>St. Joseph's Healthcare</td>
<td>263 (190)</td>
<td>199 (150)</td>
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<td>4</td>
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<tr>
<td>University of Western Ontario</td>
<td>Janet Coates</td>
<td>Hospital for Sick Children</td>
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<td>199 (150)</td>
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<td>4</td>
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<tr>
<td>University of Manitoba</td>
<td>Sandy Brown</td>
<td>Hospital for Sick Children</td>
<td>263 (190)</td>
<td>199 (150)</td>
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<td>7</td>
<td>4</td>
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<td>16</td>
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</tr>
<tr>
<td>University of Calgary</td>
<td>Rosemary Barlow</td>
<td>University of Calgary Hospital</td>
<td>263 (190)</td>
<td>199 (150)</td>
<td>3</td>
<td>7</td>
<td>4</td>
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<td>16</td>
<td>12</td>
</tr>
<tr>
<td>University of British Columbia</td>
<td>Noa Lomax &amp; 1</td>
<td>Vancouver Coastal Health Authority</td>
<td>263 (190)</td>
<td>199 (150)</td>
<td>3</td>
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<td>4</td>
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<td>16</td>
<td>12</td>
</tr>
</tbody>
</table>

Target audience: This blog targets a broad audience, including: colleagues in academic medicine (Deans and University Leadership), the leadership of Academic Health Sciences Centres, Federal and Provincial Governments, the Royal College of Physicians and Surgeons (RCPSC), Tricouncil funding agencies (CIHR, NSERC), and the public.
### Table 2: Definitions

| Academic medicine | A practice that delivers complex patient care, innovates and disseminates new diagnostic, preventative and therapeutic modalities, creates new knowledge, drives knowledge translation, and creates new medical expertise through education of medical students, graduate students, residents and fellows. Its goals include:
  1. **Enhancing human health** through provision of complex, tertiary and quaternary medical care and by being originators or early adopters of health care innovation.
  2. **Educating the next generation of physicians and leading change in educational delivery models**, such as competency based medical education (CBME). ADMs train a substantial proportion of Canada’s medical specialists and are responsible for ensuring compliance with regulatory and accrediting agencies including the Liaison Committee on Medical Education (LCME), which accredits medical schools in the U.S. and the Royal College of Physicians and Surgeons of Canada, which tests and certifies the qualifications of physicians.
  3. **Creating new knowledge and improving education and patient care through Research and Innovation**. We must also apply this knowledge in practical ways, a discipline variably called implementation science or knowledge translation.
  4. **Public and governmental engagement and advocacy**. The implementation of new found knowledge may alter the means of health care delivery, create new forms of health care and/or guide health policy and thus health care budgets. |
| Academic physicians (AP): | MDs with advanced training in complex clinical care, medical education, quality improvement or research that qualifies them to take a leadership role in:
  1. **Knowledge creation** through research
  2. **Knowledge translation** (KT) to promote best medical practices and to educate practitioners, be they MD, RNs, other allied health professionals and/or the public
  3. **Medical education** (creation and evaluation of new models of undergraduate and postgraduate training to train the next generation of physicians)
  4. **Provision of complex clinical care** (including innovation, evaluation and quality improvement). |
| Academic Departments of Medicine (ADM) | ADMs are the largest components of the Faculty of Medicine at each of Canada’s Universities. Many other Departments have faculty cross appointed in the DOM and their trainees spend time on our teaching units. ADMs are collectives of APs organized in Divisions or Sections (by subspecialty): allergy and immunology, cardiology, clinical pharmacology, critical care*, dermatology, emergency medicine*, endocrinology, gastroenterology, general internal medicine, geriatrics, haematology, infectious diseases, nephrology, neurology, nuclear medicine*, palliative care, physical medicine and rehabilitation*, respirology and rheumatology.

* *these specialties are included in some ADMs whilst in others they may be free standing Departments or part of another Department.*
### Academic Health Science Centre (AHSC)

A partnership between a university that has a medical school and an academic healthcare organization and which has as its mission the delivery of world-class research, clinical services, education and training. AHSCs have an implicit social contract to discover new means of preventing, diagnosing and treating diseases and thereby improving the life of people in Canada and beyond. How would one know if one is at an AHSC?

1. If there’s a medical school and it’s attached to a university
2. If it provides a comprehensive suite of advanced clinical care.
3. If the hospital has a large cadre of residents and medical students
4. If it provides tertiary care for people with the following complex conditions: Stroke, movements disorders such as Parkinsonism, multiple sclerosis, amyotrophic lateral sclerosis, leukemia, advanced heart failure, acute myocardial infarction, aortic stenosis, morbid obesity, pulmonary hypertension, pulmonary fibrosis, cystic fibrosis, vasculitis any form of transplantation (liver, lung, heart, pancreas, renal) or renal dialysis. In addition, if you are being treated for major trauma, complications of premature birth or most forms of cancer you will likely be cared for by an AP at an AHSC.

### AHS Networks (AHSN)

The combination of an AHSC plus its partner hospitals.

### Environmental scan:

**Governance:** CAPM, comprised of each Head of an ADM, represents ADMs across Canada. ADMs exist within AHSC, which are broader organizations that include multiple Departments and centers/instiuces. However, based on the size of ADMs (~1/3 of the faculty in most AHSC), their research-intensive nature and their major training portfolios, ADMs are the cornerstone of an AHSCs. Academic medicine has an obligatory and respectful partnership with physicians in community practice and with other academic Departments (e.g. Surgery, Oncology, Paediatrics, Radiology, Obstetrics/Gynaecology). Due to the fact that ADMs exist within a University Faculty of Medicine (or Health Sciences) the Department Head reports to a Dean. However, ADMs or the hospital program they support, also exist in hospitals and the Department Head (or a service chief) report to the AHSC and relevant health authorities (regional or provincial) through a matrix that is regionally heterogenous. In some programs, the ADM leader is unified in a Chair/Chief, who has both academic and clinic leadership roles; whilst in other systems these roles are split with the Chair managing matters academic (and reporting to the Dean) while the service chief leads the clinical operation (and reports to the hospital executive). This complex matrix of reporting is shared by most academic Departments and like most leaders, Heads of Medicine serve 5-year terms, renewable once upon completion of a successful review.

**Academic Medicine’s organizational structure:** The building blocks of Canada’s informal national network of AHSCs and ADMs are similar across the country. There are 17 Health Sciences Universities with medical schools in Canada each with an ADM (represented by a CAPM member). However, there are close to 40 members of the Association of Canadian Academic Healthcare Organizations (ACAHO) who have as their central missions advanced patient care, teaching and research. Most AHSC are part of a larger AHSN, which contains community hospitals that provide primary and secondary health care and participate significantly in delivering distributed medical
education. Medical students are educated at the 17 health sciences university-based medical schools (and at satellite sites for distributed medical education).

**The interrelated nature of Academic Departments of Medicine (ADM), Academic Physicians (AP) and AHSC.** Figure modified from Three Missions One Future report

Of an AHSC’s 3 missions (patient care, education and research) it is research, which is both the greatest differentiator of Health Sciences Universities based AHSCs versus community hospitals or AHSCs that do not have as their primary partner a Health Sciences University. Research, which is all about improving the future, is the least well-funded domain and the one for which there are the least clear lines of accountability within provincial governments. Provinces have Ministers of Health and Education but not Ministers of Research. The Trudeau government recognized this on the Federal level when in 2015 it appointed, Kirsty Duncan as “Minister of Science” and paired her with Navdeep Bains as Minister of Innovation, Science and Economic Development. Duncan’s portfolio was meant to oversee basic research, while Bains was responsible for applied science. ADMs span both, with both basic and applied science missions.

The governance of the partners forming an AHSC (the University and the Hospital Corporation), however friendly or well-intentioned, lack alignment at the governance level with both entities reporting to its own President/CEO and Board of Governors. Partially mitigating this, affiliation agreements exist that link universities and AHSCs around areas of intersection. While the comprehensiveness and quality of these agreements varies across the country they are de facto the means to manage areas of shared interest (e.g. improving medical education, enhancing research, aligning practice privileges with University appointment
**Funding:** ADM's exist within the Canadian universal health system, in which the province has the primary mandate for funding health care and determining the model of health care delivery. Federal transfer payments, provides the federal government with leverage to ensure that provinces adhere to the Canada Health Act. The funding of health care is under the jurisdiction of a provincial Minister of Health (or equivalent). Likewise, across Canada post-secondary education is the domain of a Minister for Post-Secondary Education. The majority of ADM funding relates to just one of their three roles, namely provision of clinical care. Reimbursement of APs is provided by various means in Canada’s ADMs, including fee for service (FFS), alternative funding plans (AFP), alternative payment plans (APP) and blended funding (with funding from both FFS and AFP).

Funding for clinical activity is often repurposed to fund research and education; however, outside an AFP model this often leads to income disparities with APs that have primarily clinical role descriptions garnering the highest incomes. These income disparities are levelled in AFPs, which tend to equally reward clinical, research and educational activities. It is noteworthy that FFS funding can create perverse incentives not only to ignore educational and research mandates but to focus on provision of well-reimbursed services. I have often noted in Medicine (as in business, *“If it makes dollars it makes sense!”*) While AFPs have their own challenges, they are intrinsically better-suited (if well governed) to provision of the spectrum of care and to the education and research mandates of ADMs.

It is unclear (to the blog writer) precisely how many hospitals there are in Canada. However, in 2017 there were 145 public hospital corporations at 231 hospital sites in Ontario, Canada’s most populous province. Only 16 of these are acute academic centres and even fewer are full AHSC (Michael G. DeGroote School of Medicine (McMaster University), University of Ottawa, Queen’s University, University of Toronto, Schulich School of Medicine (Western University). Such classifications are complicated because Northern Ontario School of Medicine also has a school of Medicine and many of the features of an AHSC.

Likewise, the CBC evaluated acute care hospital and noted there were 240 such facilities. This relatively
large number of hospitals across Canada, emphasizes the relative rarity/uniquness of our 17 health sciences universities with faculties of medicine (Table 1); without which neither the long-term staffing nor operation of these important smaller facilities or even the other member hospitals of ACAHO.

Mission: So, what are the unique responsibilities of Canada’s 17 AHSCs and their medical schools (Table1) that (arguably) we ignore or misunderstand at our own peril? For one thing, these 17 AHSCs are responsible for the seed crop, the training of future physicians, nurses, physician assistants, pharmacists and other allied health care professionals. While many centres participate, these centres have primary responsibility for:

1) Operating accredited training programs for medical students thereby producing the doctors that ultimately serve all other hospitals.

2) Administering accredited postgraduate residency and fellowship programs

3) Performing the full spectrum of research, from basic science to clinical trials and population health studies.

4) Leading innovation and providing complex care: In Canada, unlike America (where large private clinics and hospital organizations routinely deliver complex care), health care innovation and complex care largely resides in Canada’s AHSCs.

In addition to the clinical care and discovery that AHSCs and ADMs perform, they are also the crucible in which we forge the next generation of physicians. In this 2010 report from Canada’s Deans, Three Missions One Future, we can see the massive impact of AHSC on provision of service and training. While the precise proportion of this attributable to ADMs is unclear, ADMs are (on average) a third of the size of the Faculty of Medicine and thus major contributors to these metrics. Beyond the scope of work that is the sole responsibility of ADMs they participate in the training of young physicians from many other Departments, through provision of internal medicine rotations that are mandated as part of the training of diverse types of physicians by the RCPSC.
Select AHSC Funding, Training & Health Systems Capacity Indicators circa 2010

Magnitude of the AHSC enterprise: Canada’s AHSCs have a huge, positive impact on the net provision of health care. The National Task Force on the Future of Canada’s Academic Health Sciences Centres issued a report in 2010 called *Three missions, one future*. This survey estimated that in 2009 Canada’s AHSC had a net budget of $24 Billion. If one included the fee-for-service earnings for AP physicians that budget would be ~ $34.5 Billion. They further estimated that AHSCs perform 14.8 million outpatient and day-hospital visits, as well as 5.4 million Emergency room visits and 1.4 million hospital admissions annually. A list of Canada’s AHSCs is in the Figure below. Thus, Canada’s AHSCs have a huge impact on the net provision of health care to Canadians. Canada’s academic healthcare organizations (of which there are ~ 40) include research hospitals, health authorities, academic regional health authorities, and their research institutes (figure below).
Canada's academic healthcare organizations (Figure below)
This network has vast impact on the delivery of healthcare (Figure below).

Moreover, the Canadian public values the system.

- 90% of Canadians feel that health research is part of an evidence-based health system.
- 84% of Canadians are more likely to vote for a candidate that supports health research.
- 71% of Canadians feel that health research should receive the same tax treatment as patient care.
- 92% of Canadians say basic research should be supported by the federal government.
- 85% of Canadians made at least one change to their health behaviors as a consequence of health research.
In case you’re still unconvinced of the value of AHSCs (and their ADMs), consider the HealthCareCAN summary of [AHSC by the numbers](#) (a 2013-14 survey of Canada’s 40 AHSC), below:
1) **Providers of complex patient care**: AHSCs and ADMs are home to the highly-qualified persons (HQPs), including physicians, nurses, technologists, pharmacists and trainees in each of these professions. They are also home to state-of-the-art equipment and facilities required for provision of tertiary and quaternary care. AHSCs embrace provision of “programs of distinction/centres of excellence” or “complex care” and, in so doing, accept responsibility for managing patients with complex, multi-morbidity, rare and/or costly conditions, such as transplantation, poly-trauma, cancer treatments, and those medically complex conditions requiring multidisciplinary management (i.e. heart disease, neurologic diseases, bariatric medicine and immune-mediated diseases). AHSC provide the majority of quaternary care in Canada (as documented in Table 3). Moreover, they often are the originators or early adopters of innovative care paradigms that ultimately become standard of care, after refinement in AHSC. Recent examples include percutaneous replacement of the aortic valve (TAVI), **Endovascular therapy for stroke**, home dialysis, epilepsy surgery, deep brain stimulation, curative drug therapy for hepatitis C.

Of course, AHSC’s are also local resources for residents within the relevant geographic regions. Like community hospitals they provide primary and secondary care hospital services for nearby residents. This is a challenge since many of these patients could theoretically be cared for in community hospitals. Without questioning their intrinsic importance as people, it is clear these more straightforward patients are occupying beds and using resources that at times compete for bed access with patients who can only be cared for in an AHSC. The failure to redistribute patients to hospitals based on illness severity is endemic in most provinces and reflects structural flaws in health care organization. The Report Centre estimates that 97% of the care for 12 rare & complex conditions are provided in teaching and research hospitals (see Table below).
Table 3: **AHSC provide the majority of complex care in Canada**

<table>
<thead>
<tr>
<th>CASE MIX GROUPS</th>
<th>% OF CASES BY AHSCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fetal surgery</td>
<td>100%</td>
</tr>
<tr>
<td>Heart or lung transplant</td>
<td>100%</td>
</tr>
<tr>
<td>Liver transplant</td>
<td>97%</td>
</tr>
<tr>
<td>Treatment of concurrent hip fracture and head injury</td>
<td>94%</td>
</tr>
<tr>
<td>Treatment of concurrent spinal cord injury and chest and/or abdominal procedure</td>
<td>93%</td>
</tr>
<tr>
<td>Neonatal infant (birthweight 1500-1999 grams) catastrophic diagnosis</td>
<td>92%</td>
</tr>
<tr>
<td>Neonatal infant (birthweight 1000-1499 grams) catastrophic diagnosis</td>
<td>90%</td>
</tr>
<tr>
<td>Neonatal infant (birthweight 2000-2499 grams) catastrophic diagnosis</td>
<td>85%</td>
</tr>
<tr>
<td>Treatment of concurrent spinal cord and head injury</td>
<td>83%</td>
</tr>
<tr>
<td>Other musculoskeletal infections</td>
<td>66%</td>
</tr>
<tr>
<td>Non-extensive burn with wound procedures</td>
<td>62%</td>
</tr>
<tr>
<td>Neonatal infant (less than 6 days) with catastrophic diagnosis</td>
<td>60%</td>
</tr>
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</table>
Moreover, they found that patients at AHSCs are sicker, as evident from:

1) A higher complexity score

2) Being more likely to have been referred from other medical centres

3) Having conditions that increase the cost of their hospital stay (see Table 3).

Table 4: AHSC look after the sickest of the sick:

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>AHSC (TEACHING &amp; RESEARCH) HOSPITALS</th>
<th>LARGE (SIMILAR SIZE) COMMUNITY HOSPITALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of all patients in two most complex patient groups</td>
<td>56%</td>
<td>33%</td>
</tr>
<tr>
<td>% of patients transferred from another hospital</td>
<td>12%</td>
<td>7%</td>
</tr>
<tr>
<td>% of all patients with at least one flagged intervention</td>
<td>11%</td>
<td>6%</td>
</tr>
</tbody>
</table>

Within any AHSC the ADM is usually the largest provider of inpatient care. For example, within the Kingston Health Sciences Centre (KHSC) the Medicine Program provides care to almost half of hospitalized patients, including those on Medicine, Neurology and Cardiology services (218/474 on the day randomly sampled in May 2018).

2) **Catalysts of the creation of new knowledge, from fundamental discovery to clinical trials and clinical innovation**: To understand the value of ADMs one needs to only review the scope and magnitude of their research, educational and clinical deliverables. At most Canadian universities the ADM account for ~1/3 of the faculty members in the School of Medicine and account for more than a third of the research funding. This is crucial since the Schools of Medicine themselves account for ~60% of total University’s extramural research funding. In Ottawa, for example, the ADM performs 90% of all clinical research at Canada’s largest teaching hospital, the Ottawa hospital, and hold 15% of all of the University’s CIHR funding. Back of the envelope calculations suggests that the average ADM accounts for over 20% of all University research funding. Many health care organizations outside the AHSC participate in research but it is the AHSCs that uniquely support the full spectrum of research (basic, translational, clinical, population and knowledge translation).

3) **Homes to Medical Schools and Residency/fellowship training programs**: In aggregate, the training programs based in the ADMs, just including core internal medicine training programs accounts for over 1400 trainees/year (table 1). This training enterprise in ADMs is second in size only to that of Family Medicine Departments. ADMs provide the mentoring, teaching and role modelling required to educate the next generation of academic and community physicians. The delivery of our medical education mandate is...
the most distributed of the three missions of AHSCs. Medical students increasingly receive training, in
whole or in part, in settings other than the traditional AHSC. Currently, more than 800 students are enrolled
in satellite medicine programs, such as those in Sherbrook, Quebec, Mississauga, Ontario Saint John, New
Brunswick, and Prince George, British Columbia. However, AHSC’s remain the unique home for
postgraduate training in terms of operational governance that includes oversight of the many specialty
residency and fellowship training positions. While all sites can participate in medical education it takes an
AHSC to make wholesale reform, such as implementation of Competency Based Medical Education. It is
important for the public to understand that the specialist your family doctor refers you to was almost
certainly trained by APs in an ADM in a Canadian AHSC! In addition, many ADMs host graduate training
programs for students who are not MDs who are receiving Masters of PhD training (McGill, UBC, Queen’s).

4) Centres of knowledge translation: Currently, many diseases are not curable or preventable. ADMs are
engines that generate knowledge and advance medical practice through research. Many APs study the
fundamental pathophysiology of disease and engage in discovery and innovation. Canada’s 17 University
affiliated AHSCs are the only training ground for health discipline focused researchers. AHSCs uniquely
offer the faculty expertise and infrastructure to educate the physicians and scientists of tomorrow. In AHSCs
and ADMs one finds the majority of Physician- Scientists MDs who is engaged in advancing the
understanding of health and disease and expands the fundamental knowledge base upon which medicine is
practiced. These physicians are frequently funded by outside sources and 50-75% of their time is allotted to
perform research. They are the trusted sources to inform knowledge that others disseminate. Indeed, there
are many clinical faculty within ADMs who spend much of their time sharing and translating knowledge
through creation of guidelines, continuing professional development etc. ADMs are a source of objective,
unbiased medical information that is crucial for governmental decision makers, health care organizations
and society (legal entities, media, etc.). Society needs knowledge translation (i.e. how to use a discovery in
practice); however, it also needs ADMs and AHSCs to take a lead in ensuring that these best practices are
disseminated nationally and implemented even in smaller centres. The dissemination and implementation of
knowledge are perhaps the least well achieved goals of ADMs.

5) Economic Engines: The mission of ADMs is to enhance the greater good of society; rather than
commercial gain. However, there is substantial spin off from every clinical enterprise and research lab. The
clinical team of health care professionals and support staff is most obvious to the public. However, even the
research labs are small businesses (constituting significant sources of employment). They are also
generators of intellectual property, which ultimately provides opportunities for commercialization, and spawn
start-up companies. The Report From the National Centre has estimated the huge financial impact of the
research and discovery conducted by AHSCs (Table 5 below).
Table 5: AHSCs are home to the full spectrum of research and discovery and generate both new knowledge and serve as training grounds for future physician-scientists

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>TOTAL</th>
</tr>
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<tbody>
<tr>
<td>Total research budgets of AHSC group (2009)</td>
<td>$1,800,000,000</td>
</tr>
<tr>
<td>Minimum dollar value of new clinical trials (2007/08)</td>
<td>$338,000,000</td>
</tr>
<tr>
<td>Total technology transfer income (2003/06)</td>
<td>$27,000,000</td>
</tr>
<tr>
<td>Total license income (2003/06)</td>
<td>$5,000,000</td>
</tr>
<tr>
<td>Minimum number of employees paid from research budgets (2007/08)</td>
<td>55,000</td>
</tr>
<tr>
<td>Minimum number of peer reviewed publications (2007/08)</td>
<td>11,000</td>
</tr>
<tr>
<td>Minimum number of new research ethics submissions (2007/08)</td>
<td>8,900</td>
</tr>
<tr>
<td>Minimum total number of new clinical trials (2007/08)</td>
<td>1,600</td>
</tr>
<tr>
<td>Minimum number of researchers for whom AHSC is primary affiliation (2007/08)</td>
<td>2,791</td>
</tr>
<tr>
<td>Minimum number of post doc researchers (2007/08)</td>
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</tr>
<tr>
<td>Minimum number of PhD &amp; MSc candidates supervised by AHSC scientist/researcher (2007/08)</td>
<td>2,570</td>
</tr>
<tr>
<td>Minimum number of disclosures (2007/08)</td>
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<tr>
<td>Minimum number of patents issued (2007/08)</td>
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<tr>
<td>Minimum number of new spin-off companies (2007/08)</td>
<td>65</td>
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<tr>
<td>Minimum number of licenses (2007/08)</td>
<td>217</td>
</tr>
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6) **Infrastructure resources**: AHSCs and ADMs in Canada are the site where the Ministry of Health places advance health care technology from PET scanners, robotic surgical platforms and cardiac catheterization and electrophysiology laboratories to core clinical laboratories and information technology Departments. The AHSC’s infrastructure is a resource for the entire region, as are the human resources, including technologists allied health professionals (from nurses and pharmacists to physician assistants). APs provide the mentoring, teaching and role modelling required to educate the next generation of academic and community physicians. This infrastructure is a unique enabler for the advancement of medical research and improves medical care and education. One example of infrastructure that resides within AHSC is the information technology that resides in electronic health records and related big data repositories. Although not fully utilized in 2018, they offer great opportunities to inform how we practice, offer the basis for decision
WEAKNESSES

1) Value of AHSCs and ADMs poorly understood by the public, government and tricouncil funders: While academic medicine is demonstrably a critical component of Canada’s healthcare system, this is arguably poorly understood and consequently under-appreciated by the public and by funding agencies. Academic medicine provides unique tertiary and quaternary care and leading-edge services and highly specialized medical care not provided elsewhere. For lay people, there is understandable confusion as to the definition and role of APs, AHSCs and ADMs in the Canadian Healthcare system. In the public eye (and all too often in the minds of government payers) there is ambiguity as to the different roles and capabilities of community hospitals and private practitioners vs AHSCs and APs. Each is important but ADMs and AHSCs require specific conditions to thrive. The misunderstanding of the role of AHSCs is seen with the recent focus on patient-centred care. While this is an important initiative (which CAPM supports), the focus on obtaining the care close to home sometimes ignores or undervalues the importance of accessing state of the art, innovative care. In the past 5 years in Ontario, the Ministry of Health and Long-Term Care (MOHLTC) has focused its limited incremental investments in the health care spending on community care, creating health care teams. They have also invested in new and larger community hospitals to address changing regional population structure. Both investments are understandable; however, the budgets for AHSCs have been flat despite rising labour costs and the obligatory cost of replacing aging infrastructure. These new community hospitals may be larger than some University hospitals and perform some aspects of the AHSC’s mission (distributed medical education and clinical research). however, community hospitals are not independently self-regenerating nor are they fully self-sufficient. Thus, failure to understand the role of AHSCs and ADMs leads to underfunding that will eventually corrode Canada’s healthcare system. Perhaps the governmental funding and its outpatient focus could be expanded to include the move of AHSC care to outpatient centres where they deliver surgeries and other procedures. Canada needs a more potent and well-equipped network of tertiary care outpatient centres staffed by faculty from AHSCs, in addition to our robust family practice, outpatient system.

2) Unmodified, fee for service (FFS), remuneration model a poor fit for ADMs: Because ADM’s are homes to conduct research while providing medical education, complex patient care and promoting programs of clinical innovation, it is critical to have an appropriate funding model. In a FFS model what "makes money makes sense". This model disproportionately rewards clinical activity, particularly procedural activities, while failing to fund many important, time consuming consultative services, and not funding research and educational activities at all. A more global means of funding the ADMs spectrum of activity is the alternate funding plan (AFP). AFPs reward activities in all 3 domains of the APs role relatively equally. AFPs support the focus of faculty on complex research questions, the building and administration of advanced educational programs and provision of non-remunerative (and remunerative) complex care models. However, in many ADMs funding is provided through a FFS model, which can make provision of the tripartite deliverables of an ADM challenging. Most ADMs, with the exception of Queen's University, Dalhousie University, the University of Alberta and the University of Calgary still rely on FFS income for all or part of the revenue stream required to pay physicians and run the research and educational mission. This undervalues research and education and may stunt their development. AFPs are held accountable for the funds received and provide evidence of deliverables, such as shadow billing, to the governmental funding agency. AFPs tend to ensure pay equity and foster advanced educational and research investment. However, even the. AFPs have challenges, often lacking a means to secure support to add new physicians as need arises, and to acquire additional dollars to maintain competitive physician reimbursement. The absence of FFS cash flow can make ADMs less nimble and limit the AFP's ability to be entrepreneurial (i.e. rent office space to support off-site practice locations). Perhaps for these reasons, some CAPM members prefer to maintain a strong FFS component to their funding. These Departments tax their members
substantially to support the research mission, although this usually means research-intensive faculty are financially disadvantaged relative to clinicians. Some ADMs are wholly FFS (e.g. Saskatchewan), others wholly AFP (e.g. Queen's) and some blended (e.g. Western and McMaster).

3) Training pipeline goals misaligned with ADMs’ need for specialized and research-intensive physicians. There is an apparent disconnect between the pipeline of medical students/residents who are being produced at our 17 medical schools and residency programs versus the faculty needs of ADMs. The students are focused by their exposures, and perhaps by their role models, on a generalist model. For example, 45% of the 3100 or so total residency positions available each year are in Family Medicine training programs. Canada needs large numbers of general practitioners; however, ADMs need highly specialized physicians. While we do need more specialists (cardiologists, neurologists, gastroenterologists, nephrologists etc.) we must also recognize the need for more general internists in Canada’s AHSC. While the name of this specialty (general internal medicine, GIM) may suggest a lack of specialization, general internal medicine is indeed a specialty within Medicine. General internists receive an additional 4-5 years of training post medical school. They have broad expertise in all aspects of internal medicine and are key to Canada’s AHSC. A focus of training more general internists is important to the sustainability of ADM, AHSC and our health care system. Given the complexity of care require by aging patients with multiple comorbidities, the broad expertise of the GIM specialist is key.

Moreover, it is the GIM specialists who usually lead the training of the core residency program for residents and students in ADMs. These individuals can play important roles in academic leadership as well. The answer to the question of who to train (generalist/specialist) of course is both—we need balance. Due to the fact the training time of these specialists extends over many years, frequently exceeding a decade, the current “one size fits all” UGME program may not leave time to experience, or provide exposure to, role models of research-intensive or technically specialized disciplines. Compounding this lack of early exposure, trainees must make choices for residency matches early, often before any substantial exposure to research or specialized medical tracks has occurred. Perhaps we need a cadre of learners who are geared towards academic medicine from an early stage of their post-secondary training who could enter an appropriate AHSC track in our medical schools. Canadian medical schools currently have small programs of this nature for MD- PhDs, some of whom may become physician scientists. In Ottawa a pilot program, led by the Department of Medicine, is attempting to fill this gap. Even physicians who specialize often do not train in research or perform deep sub-specialization. As a consequence of the limited availability of physicians with appropriate subspecialized training, CAPM members often must recruit specialists from international sources. It must be acknowledged that the research experiences provided in UGME are far superior to those of previous decades. For example, at Dalhousie University, every student is required to complete and present a research project over the course of their training.

This is called the Research in Medicine program. There is a curriculum that further enhances this course. This broader exposure of all students to research is arguably more effective (or at least is complementary) to having a handful of students take MD-PhD training. Mentorship of clinician scientists starts in Medical School and then is refined and enhanced during the GIM residency training program.

4) Lack of Funding for advanced fellowship training: Related to weakness 3, there is no funding mechanism for training the most advanced learners (so-called fellows). These are trainees who are subspecializing after residency. This is not a luxury. Fellows become the specialists that populate ADMs and Canada relies on them to perform vital, complex care services, such as coronary angioplasty, endovascular therapy for stroke, transplantation medicine or ablation of cardiac arrhythmias. AHSCs would not exist in their current form without interventional cardiologists, therapeutic endoscopists, transplantation specialists, stroke neurologists etc. and yet there is no structure funding for these vital training programs from the Royal College. In the past, NGOs and industry funded these trainees with the balance of funding coming from FFS activities of the trainees themselves. As industry-funded fellowships disappear (both due
to changes in conflict of interest policy and hospital procurement policies) a well-structured and well-financed alternative is required. In 2018, fellowship-training programs should be approved and core-funded by the same RCPSC mechanism as all residency programs. In absence of a fellowship funding mechanism, fellowships are too small, and Canadian AHSCs will rely increasingly on importing international medical graduates to staff its AHSC. Alternatives such as allowing fellows to bill the ministry for service provision during a portion of their training have traditionally been used; however, this strategy has often not formally been acknowledged by the government and does raise concerns regarding the balance between service and education.

5) Lack of recognition of the importance of investing in leadership training and succession planning. Medical leadership is often forged in the crucible of busy clinical service and there is suboptimal attention to succession planning, formal leadership training or developing leaders who are expert in educational and research domains. In most cases AHSCs do not have funding stream allocations for leadership positions; despite the increasing demands upon department and division heads. These jobs cannot be done off the side of ones’ desk and require 50-80% of the ADM Head’s time. The complexity of the Department Head role and the requirement to give up clinical practice time (and often income), contributes to very few qualified physicians willing to take leadership roles. A more formal government-backed arrangement for funding, such as recognition of the ADM Head role through an AFP, as occurs at Queen’s University, is required. Exposure of future Heads of Medicine to leadership experiences and training is invaluable and CAPM now invites Deputy Heads to attend its biannual meetings for this reason. Academic Physician Leadership is essential to Canada’s AHSC network. This is not just leadership on the clinical side; it is what is necessary in a combined academic/clinical leadership program.

6) Responsibility without authority for the management and discipline of academic physicians: There is a perception by some APs that a position in an ADM is a job for life. Department Heads need more latitude to reward faculty based on merit and to potentially remEDIATE or terminate a faculty member based on failure to meet reasonable metrics or to adhere to standards of professional conduct. This requires term limited contracts and fair, transparent role descriptions with fair and well-justified performance metrics. In the latter regard the Canadian Medical Protective Association (CMPA), the national entity providing legal representation for all Canadian physicians, is paradoxically problematic. CMPA was intended to represent doctors in malpractice litigation; however, it is increasingly inserting itself in defending physicians from the disciplinary processes at the hospital or departmental level. While due process is essential, adherence to duly constituted hospital codes of conduct and practice plan dictates are required to ensure a self-regulated medical profession. CMPA representation (a “free” lawyer”) promotes lengthy and expensive disciplinary processes. This concern re CMPA’s role pertains to its intrusion into discipline of physicians in clinical practice matters (not research or educational malfeasance). The question for a small minority of APs is whether the institution exists for their benefit or vice versa. The answer, we believe, is a balance-some academic freedom balanced by a substantial dose of public accountability in all 3 domains: clinical care, research and education.

7) Failure of Hospitals and Schools of Medicine to treat ADMs equitably, relative to other Departments (rather than equally): Many Deans, hospital CEOs and university leaders struggle with recognition that, while all Departments are important, there are differences in size, scope and complexity that make ADMs, which are usually the largest and the most research and educationally intensive Departments, unique engines for any vibrant FHS or AHSC. CAPM believes that ADMs need to be treated equitably (i.e. recognizing their clinical, educational and research footprint). The ADM heads need standing seats at the executive table of both the AHSC and the FHS. These leaders (CAPM members) have responsibility for a large segment of the AHSC’s patient beds and trainees and merit input into creating the institutional vision and strategic plan. This is particularly true as the physician members of an ADM are not employees of the AHSC, indeed most are considered independent contractors or some hybrid of University employed and self-employed. One point for consideration is that the classical ADM includes most medical
disciplines, including cardiology, neurology and critical care. Of late there has been a move toward fragmentation of ADMs into many small, specialized Departments. This balkanization of smaller disciplines into free standing Departments (i.e. Cardiac Sciences, Neurosciences) may ease the tension for practitioners that comes from talking with others who have different subspecialisation; but it is likely not beneficial for the AHSC as a whole. This fragmentation creates many small Departments whose governance and mission are arguably harder to align with larger institutional goals than would be the case if ADMs maintain their classical scope and comprehensive structure.

8) Inadequate research funding models: The creation of a clinician scientist takes ~3 additional years of PGME training. This is followed by 5-years as junior faculty members, during which substantial (>40%) time protection and mentorship are required. This is difficult to provide when CIHR funding rates are below 15%. Indeed, because of inadequate funding, CIHR has been rejecting 80-95% of funding applications, including those deemed outstanding by peer review. CIHR was intended to have a budget equal to 1% of public health spending, but CIHR’s budget has not kept up with health expenditures or inflation. (See graph below).

![Difference Between 1% of Healthcare Spending and Actual CIHR Budget](image)

**CIHR Budget is falling behind its target of accounting for 1% of healthcare spending**

More stable CIHR funding, including salary support, is required to nurture the careers of clinician scientists. CAPM advocates strongly for less targeted research funding by the Tricouncil funders and a return to greater emphasis on CIHR Project and salary awards and Foundation awards, all of which support individual faculty members. In addition, a return to face-to-face peer review is required to give a sense of fairness to the grant awards system. Finally, there is a need for CIHR to increase its funding of overhead to reflect the reality that every research dollar spent requires an additional >$0.40 of institutional funding, to support the buildings, animal care facilities and research staff required for success and for compliance with research regulations. A fair overhead rate would rejuvenate Universities and reward research productivity. The current research funding formula has the unintended consequence of creating University budget models that penalize research intensity whilst rewarding Universities for increasing undergraduate student numbers (which is not permitted in the case of medical schools).

On the positive side there has been improvement in CIHR funding in the 2018 budget as a result of the Naylor report. This report notes “Canada ranks well globally in higher education expenditures on research and development as a percentage of GDP, but is an outlier in that funding from federal government sources accounts for less than 25 per cent of that total, while institutions now underwrite 50 per cent of these costs with adverse effects on both research and education.” They recommended an increase in CIHR funding, as follows: “The recommended investment is $485 million, phased in over four years, directed to funding investigator-led research. This is an increase of about 30 per cent on the $1.66 billion envelope currently..."
committed to direct project funding for both priority-driven and investigator-led research. This would move the balance of funding within this envelope a meaningful distance back towards the 70:30 ratio in favour of investigator-led research”. However, despite some of the report’s recommendations being taken up in the 2018 Federal budget, many outstanding grants will continue to be unfunded and there is no proposal to increase overhead (referred to as “facilities and administration costs in the Naylor report) funding to sustainable levels.

Similarly, the Canada Foundation for Innovation (CFI), which is a successful infrastructure-funding program, would be greatly improved by including increased funding for the HQPs and other long-term operating costs required for the sustained, optimal activity of these vast programs. Many CFI funded programs risk becoming white elephants due to the challenges of long-term funding of the costs of their operation.

9) Limited agility of ADMs and AHSCs: Academic medicine is very slow in its response to a rapidly changing world. Insufficient strategic planning combined with poorly developed accountability frameworks, and multiple layers of bureaucracy, impair timely decision-making. Examples where better vision and more rapid strategic planning is needed include:

1) Retirement: Planning for the transitioning of physicians to retirement at the end of their careers

2) Planning human resource needs in light of the new needs/expectations of young physicians and societal norms around equity and diversity

3) Need for Physician extenders as house staff availability diminishes: Fewer house staff hours of coverage are available in all AHSCs. This relates to many factors, including duty hour restrictions in the contract of this unionized work force. Embracing the proper integration of non-MDs (Advance practice nurses, hospitalists and physician assistants) into roles traditionally performed by APs and house staff is essential to deliver clinical care and provide continuity of care. Implementing multi-professional training programs and embracing support systems into the AHSC for funding PAs, ANP and hospitalists is challenging.

4) Hiring agility: Hiring of APs is a lengthy process at most AHSCs (usually requiring over a year to complete), due in part to uncoordinated hiring requirements of the relevant parties (ADM, hospital and university). Indeed, most APs are technically self-employed and are neither hospital nor university employees and decisions to hire are not informed by a collaborative process. ADMs and AHSCs struggle even more when they cannot identify a Canadian applicant who is qualified and must recruit an international medical graduate. These individuals usually require more than a year to be admitted to Canada due to cumbersome and changing immigration practices.
1) **Enhanced patient care by improving quality and accessibility:** Focused effort to improve safety, quality, and efficiency in clinical care in AHSCs will further elevate the real and perceived importance of these centers to the national health care network. This involves increased attention to quality improvement programs in ADMs and hospitals and increased investment in electronic health records, e-health and other innovations that increase timely access of patients to specialized health care. To achieve this, AHSCs require more investment in infrastructure and decision supporting technology. Quality has become a recognized promotion track within several AHSC, which aligns the promotion goals of faculty with the AHSCs aspirations for a culture of quality improvement. However, care improvement involves investment in people who support the clinical, educational and research mission, such as physician assistants. It is difficult to perform ADM’s tripartite academic mission when patient services are bloated (currently there are often 25 or more patients on each IMU). While endeavoring to shift care to the outpatient setting, it's important to ensure there are sufficient affiliated highly qualified health care providers (including non-academic hospitalists, PAs, extended practice nurses and nurse practitioners (NPs) to allow the APs to be productive). AHSCs are obliged to provide the full spectrum of care from primary (i.e. they are the nearest hospital) to quaternary and they must also do this to some extent to meet their education mandates. As such AHSCs must have an element of the “general hospital” to serve their community and to support training programs. However, more formal regional programs with designation of hospital roles is lacking in many provinces, including Ontario, and thus the hospital networks function loosely, rather than by acknowledging a clear designation of hospital function and transfer/repatriation protocols.

2) **ADM should become more visible, accessible and relevant to stakeholders:** ADMs need a clearer more coherent voice, both within their universities and in the external world. With formal recognition of a nationwide AHSC network (of which ADMs would be part), CAPM could become an organizing nidus, able to assist government and public agencies. ADMs also need to engage the local community and media to more frequently and articulately identify their unique value and contribution to local health care and economic prosperity. Much as every Albertan knows the price of oil; every Albertan should know the value of their two AHSCs in Calgary and Edmonton. This is true across the country.

3) **Creation of new funding models for ADMs:** The time has come to recognize that a FFS model cannot optimally support profound time commitments in the areas of medical education and research. These two
legs of our 3-legged stools are largely unfunded. As part of the formalization of the AHSC network it is recommended that AFPs, in which Ministries of Health provide block grants to FHS for payment of physicians, be adopted nationally. The AFP model has been successful at several Universities in improving retention of APs and equitably supporting the research and educational missions, in addition to providing clinical service. AFPs generally create pay equity amongst faculty with different predominant role descriptions whether their major focus was research, education or clinical practice. This equity is based on a belief system that holds that at AHSCs all 3 parts of the mission are of equal value. AFPs also provide payers with cost certainty. In an era of increased educational mandates (like CBME), and restricted research funding these enterprises require focus and time and cannot be conducted off the side of the desk while focusing on FFS care. One must equitably reward the activities one values. If the clinically earned dollar drives the system the AHSC will disproportionately focus on this mission and fail to maximize their research and educational potential. However, some centres, like McMaster University’s ADM believe strongly that that a blended AFP/FFS model is the best one to incentivize APs to be productive while allowing them some protected time to carry out their academic deliverables. It can be argued however, that if productivity is the concern the solution is not FFS; rather it is a properly administered AFP in which there is a transparent practice plan, where each faculty member has a clear role description and in which metrics are evaluated annually in all relevant domains (clinical care, research, education and quality improvement.

4) Create a federally funded network of federally-accredited AHSCs: Although health care is primarily provincially funded, the federal government’s funding via the Canada Health Transfer accounts for approximately a quarter of the health care budget. Federal funding is both discretionary and growing (at a rate ~6% per year). This funding could be used selectively to develop, advance and unify a national network of AHSCs, in which ADMs could thrive. The redeployed federal funding would acknowledge both the greater complexity of the delivered health care and contribute to the funding of academic faculty through creation, and ever greening, of AFPs. Ever greening is important as once the AFP is in place, there needs to be a rational plan for growth of the faculty in a manner, which is transparent to government, but also acknowledges the need to the ADM to evolve to meet ever-changing demands of providing new procedures, supporting training in new specialties and meeting new patient demographics. There is a crisis in academic funding and the government would be well advised to exploit the instability of a growing, and apparently unsupportable, FFS structure to build a new properly regulated AFP system. AFPs are governed by robust practice plans and mandate deliverables from members thereby ensuring that patient care, education and research deliverables are provided in a transparent means.

5) Enhance community engagement and care transitions: ADMs and AHSCs are guilty of suboptimal communication with stakeholders, including family physicians and community hospitals. The liaison function and partnership model requires attention. Improved bidirectional communication may ultimately be the way forward as we try and limit admission to expensive hospitals and reduce hospital readmissions. CAPM acknowledges (and endorses) the fact that the Canadian health care system is built on the foundation that everyone is entitled to a primary care physician who quarterbacks and manages care. By better collaborating with communities, ADMs can ensure that new academic positions and new training streams are tailored to the perceived and real needs of the community. Enhanced engagement of the community of practice and better care transitions should be developed. Examples include e-consult programs that accelerate access to specialists through asynchronous consultative processes.

6) Expand and invigorate CAPM’s advocacy and policy roles: There is an opportunity to expand on the role of the CAPM, to give it a voice and allow it to serve as a knowledgeable advisory body that engages in advocacy for AHSCs and ADMs. Establishing CAPM as a credible health, research and education advocacy-focused, NGO would ensure the voice of ADMs is heard at provincial and national level. This requires that we, the Professors of Medicine, demonstrate vision and a focus on good stewardship of the academic mission. Among the areas that a more administratively supported and proactive CAPM would be of aid to Canadians is in providing evidence to affect the cost of health care while contributing to the
provision of better quality evidence for benefits of current models of care. This role for CAPM must be linked and aligned with the advocacy coming from the Schools and Universities.

7) Enhance the effectiveness of communication of the “return-on-investment” to the public and governments. There is a need to better state, and more frequently reinforce, the value proposition that results from supporting a robust network of ADMs in AHSCs. This might involve a public education campaign, reminding the public and government of the ADM’s value. This blog is one such attempt to enhance communication.

THREATS

The tripartite mission of ADMs (clinical care, education and research) is challenged by emerging environmental factors in each domain. These include:

1) Changes in population demographics: The world outside the hospital will surely come through the emergency room and find a home on our wards. Canada’s aging population of baby boomers has created a substantial increase in influx of elderly patients into hospitals. Many of these people require alternate levels of care (ALC) and social support, rather than acute, tertiary care. The lack of a comprehensive senior care network in Canada places increased strains on hospitals and creates increasing demands on APs for clinical service. People classified as ALC by definition do not require hospitalization for medical reasons. In many hospitals in Ontario ALC beds. As a consequence of this demographic change, accompanied by the opioid crisis and social challenges, such as homelessness, AHSCs experience tremendous congestion of the Emergency Departments and overcrowding of the inpatient wards, which in AHSCs are run by ADMs and are called clinical teaching units (CTU). Social problems, such as opioid addiction or homelessness, are not well suited to hospital-based solutions. The admission of patients with ALC and social needs to AHSCs complicates the delivery of health care, compromises the training of medical residents and impairs the conduct of research. In addition, it is expensive and does not address the social determinants that underlie these problems. The increased size of CTUs, beyond certain limits, compromises delivery of quality care and is also challenging physician wellness.

2) Continued or worsened budgetary constraints: While health care is a huge expenditure there has emerged a belief amongst politicians, most notably in Ontario, that health care can substantially be delivered on an outpatient basis. When it comes to funding inpatient and outpatient care, it’s not an either-or choice; rather both parts of the continuum require appropriate and coordinated support. Enhanced outpatient services are desirable, and hospitalizations are becoming shorter in duration. However, the
complexity of Canada's aging population and the greater capacity to intervene to improve and prolong life with new techniques has elevated (not reduced) the importance of being able to access AHSCs in a timely manner. Moreover, it is imperative that AHSCs are equipped and staffed to offer the latest in innovative, lifesaving care. Unfortunately, the belief that focusing on less expensive outpatient care has caused some governments, notably in Ontario, to flat-line budgets for AHSCs. This has left ADMs and AHSCs cash-strapped making it difficult to deliver new or innovative programs as they deal with fixed/rising labor costs. Demands for new infrastructure, including medical equipment and electronic health record platforms often go unaddressed, with human consequences. Simultaneously, Ministries of Health have devoted more of a hospital's funding to priority programs, bundled services at fixed cost (Quality Based Performance-QBP-programs for hip replacement, COPD management etc.). This has some benefits but leaves less local autonomy in prioritizing health care expenditures and fails to acknowledge the cost structures of AHSCs versus community hospitals.

3) Failure to implement a new human resource model: While there may (arguably) be enough doctors in Canada, physicians are not deployed in a geographically equitable nature. This is not surprising in light of the vast geography of our country and the physician desire (right) for choice of practice location. The government is not paying for physicians training and most MDs emerge carrying ~$200,000 of education-related debt. Thus, assigning them to locations, or only permitting licensure in specific sites (as is being done in Quebec), is unfair and will likely cause physicians to vote with their feet. In addition, we lack (in many AHSCs) adequate numbers of Canadian trained specialists and subspecialist. These highly trained physicians are required by AHSCs and ADMs. Compounding regional heterogeneity and lack of specialists, in certain jurisdictions physician numbers are being tightly controlled at the inception point (medical school and residency). In light of Canada's focus on general medical training, the numbers of specialists is being reduced relative to population growth at a time when there is increasing demand by the public for increased access to tertiary care services. Time for academic activity is therefore threatened as ADM and AHSC members focus on the clinical imperative. An emerging human resource issue, which requires frank discussion, is staffing for the next generation of physicians, who have grown up with restricted work hours. Moreover, with longer maternity and parental leave, staffing models need to change.

Women now account for ~40% of faculty within many ADMs. They are having children and their partners are taking parental leave as well. A new staffing model is required that supports these important demographic changes. It is uncertain who will pay for the change in staffing models. Will physicians more often work part time and job share? Will physicians work shifts (as colleagues in Emergency Medicine and Critical Care Departments already do)? Will physician work hours (and income) be reduced? A model that maintains excellence while dealing with the balance between patient’s need for continuity of care and physician lifestyle/wellness issues must be found, otherwise our research and educational endeavors will be damaged as we struggle to maintain clinical operations as "mission one".

4) Perceived irrelevance to many different stakeholders: While ADMs are clear on their own value (providing leadership in research, education and complex care) our mission is poorly understood by lay people, colleagues in private practice and some in government. This has, at worst, led to a default perception of some ivory tower irrelevance, or a perceived detachment or elitism. In fact, the practical relevance of academic medicine is demonstrable. The lack of public relations efforts and appropriate communication to our relevant stakeholders exposes ADMs to unnecessary risks. Indeed the Deans of Faculties of Medicine recognized a similar concern about lack of awareness in the foundational value of AHSCs in the larger Canadian system as evident from this quote from their Three Mission One Future report:
5) **We are part of a stressed system of hospital care:** Several external trends in the healthcare system put academic medicine at risk. These include changes in hospital funding models from a more global model to a targeted funding model, as well as a shift in funding rewards from inpatient to outpatient medicine. Hospitals remain unique platforms for training MDs, are the workplace of most academic physicians and are the unique home to complex tertiary and quaternary care. Non-medical hospital administrators may not fully recognize the value of the academic medical enterprise and the connection to the University. The Universities and the Hospitals partners in an AHSC are friendly; however, they ultimately have nonaligned funding models and answer to their own Boards of Directors.

Fiscal constraints are also occurring with other partners of academic medicine. Universities have progressively been downloading expenses (for space, maintenance etc.) to the Faculty of Medicine. The funding model at many universities has become dependent on increasing enrollment of trainees, a luxury not available to the ADMs and AHSCs, which cannot increase the size of medical schools, even though our brisk rate of recruitment of international medical graduates would suggest that this is required. University cost recovery budget models compromise the ability of ADMs to fund facile, administrative teams to support the academic mission and fail to acknowledge our research-intensive structure.

Meanwhile, the medical associations have been unsuccessful in retaining the value of fee codes resulting in cuts to clinical funding of many ADMs. Recent changes in fee codes have resulted in direct cuts in AFPs, which are not counter-balanced by increased clinical activity (more service provided does not translate into more income in an AFP).

In many medical centres, the hospitals control infrastructure and limited clinic and office space (see earlier comments on flat-lined budgets), which have become the criteria used to prevent hiring of new faculty. This dissociates patient need from physician supply and limits the ability of academic medicine departments to recruit faculty.

6) **Undergraduate medical education (UGME) Curriculum:** There is a tension in our medical schools with many mandates (often forms of social engineering mandated by the ACGME). Some changes in the UGME curriculum seem to have favoured acquiring lowest common denominator knowledge rather than exposing medical students to intellectually challenging research and cutting-edge knowledge. This does not position the graduating physician to be more competitive as an advanced practitioner of medicine or a potential clinician scientist. The crowded curriculum de-emphasizes fundamental mechanistic understanding of disease and does not favour broad or sustained exposure to research. Indeed, the average Canadian medical student now spends almost a year doing electives around the country, largely focused on enhancing the chances to successfully match to a residency position in the Canadian Resident Matching Service (CaRMS) process. Moreover, the approach to undergraduate education is more algorithmic and evidence based (which is important) than embracing of discovery and innovation (upon which evidence is ultimately based). There is a danger of losing the connection between supply and demand, between undergrad and post-grad medical education and the HR needs of ADMs.

7) **Rapid implementation of unfunded educational mandates, such as competency-based medical education (CBME):** The RCPSC recently mandated a new program for the postgraduate training of physicians, called Competency by Design. While the goals (increased evaluation to ensure graduating
residents are competent-see recent blog post for more discussion) are laudable, the lack of funding for this expensive program and the attendant increase in human resource and IT demands have stressed ADMs, which are home to large training programs. The RCPSC decided to change the method of evaluating and training residents with minimal consultation with ADMs and AHSCs. While CBME will hopefully improve the quality and competency of medical graduates, its nebulous structure has created confusion about how to implement and evaluate the program. Even CBME proponents acknowledge this new program will likely substantially increase the time committed to evaluations and require additional faculty and administrative support, for which no additional funding has been offered. Unfunded mandates from the RCPSC, including implementation of CBME, may exacerbate the system stressors related to postgraduate medical education (PGME), including frequent handovers and fragmented medical care. These programs may have the unintended consequence of limiting the ability of residents to become advanced subspecialist practitioners and limits their availability for research training. On a more positive note, CBME is well received by trainees and implementation of CBME is occurring ahead of target in AFP-based ADMs (Queen’s completed global implementation of all Departments in July 2017). Whether this can be replicated/sustained in FFS funded ADMs remains to be seen.

8) Flaws in ourselves: Physicians in Canada are well paid by international standards. There are variable funding models across the country. In places where FFS models exist, there is a tendency to prioritize support/delivery of services that are rewarded financially, whether by the fee schedule or programs such as pay for performance of QBP. While the FFS does provide accountability for workload, as noted elsewhere in this blog, FFS billing is inadequate to remunerate many of the roles that APs in AHSCs are required to perform. It is likely that successful maintenance and growth of ADMs can be achieved through accountable, well-managed organizations, whether they are funded by comprehensive AFPs or by a hybrid AFP/FFS mechanism.

9) Confusion in the marketplace of ideas as to what constitutes an AHSC: Community hospitals are very valuable and many are parts of AHSCNs. They not only provide crucial patient care but also support education, primarily through a distributed medical education partnership with AHSCs, and perform Phase 3-4 clinical trials. However, large community hospitals may be confused with AHSCs by the public. In fact, there is an increased financial and human resource requirement to run a true AHSC with the different deliverables and it is important to respectfully but clearly acknowledge the distinctions between town and gown. This requires refinement in the message to the public and to government from groups like CAPM.

10) Distributed educational models: While these programs which send trainees to community centres provide value, particularly in exposing trainees to rural and small-town Canada (increasing the likelihood they will practice in these locales) they remove resources for conventional AHSCs.

There are currently 12 regional campuses in Canada and they offer full medical school programs. If expanded unduly however this diverts trainees and resources required in the core AHSCs. The Australian experience, summarized by Joyce et al, is that these models challenge the conventional AHSCs (MJA 2009; 191: 169–172). They note, “The traditional model of medical education and the sustainability of academic medicine are under strain.” Better coordination is required to overcome fragmentation within the medical education system, to ensure appropriate recognition for teaching and research across all clinical settings. Many community hospitals are vital participants in medical education, providing unique perspectives to applied medical education. However, the seed crop of trainees, the ability to create and lead new educational models and the administrative expertise to run medical schools and residency programs that generate Canada’s physicians is based at (in most cases) or supported by (in all cases) the AHSC and their APs. Within the AHSC the ADMs are usually majority stakeholders in the UGME and PGME enterprise. Many Department Heads strongly believe the distributed educational model has been a success. Perhaps that is not the issue; educational partners are key for many reasons. However, if one takes the longer-term perspective (i.e. what happens in 20 years) the educational model collapses in the absence of healthy AHSCs and ADMs. Thus, the prosperity of Canada’s medical schools also depends on strong,
adequately funded, AHSCs and ADMs.

11) Unintended Consequences of Policies of External Stakeholders: Academic medicine is influenced by many external partners. The RCPSC has created standards for practice which favour lowest common denominator standards and fails to emphasize the importance of research and clinical innovation. The RCPSC has also created an unfunded mandate that is difficult for some ADMs to support without funding, (e.g. CBME with its significant demands for support personnel; educational personnel and IT support). Arriving at the same time as university cut-backs, this is a difficult mandate to self-fund.

12) Underfunding of research and chaotic changes to the CIHR research-funding model: Since ADMs are home to many research-focused faculty, research funding for research-intensive faculty is critical. Overall, the provinces with the fastest and steadiest rates of decline in Mortality from Potentially Avoidable Causes are those that have the majority of federal research funds from CIHR (Ont, Que, BC, AB). This suggests that federal research funding may have an impact on this health outcome measure (http://www.policyschool.ca/wp-content/uploads/2016/03/funding-medical-research-zwicker-emery.pdf). When Alberta made a large investment in research in the 1980s (by investing billions of dollars in the Alberta Heritage Foundation for Medical Research, AHFMR), it too experienced a decline in preventable mortality rate. As summarized in Zwicker and Emery’s position paper, this benefit has attenuated with the dissolution of the Heritage foundation program. This point is further expanded upon under identified weaknesses (here) and provides further emphasis to the multi-faceted concerns and risks associated with decreased research funding and lack of consideration given to overhead expenses. These concerns are real and must be rectified in order for Canada to continue with the pursuit for research and innovation whilst attracting a new cadre of students who have an interest in pursuing science.

Conclusions: ADMs are essential components of a poorly recognized but vital national network of AHSCs. Their contributions include conduct of complex and specialized care, educating physicians running Canada’s 17 Medical schools, and performing fundamental and translational research that improves the quality of life for all Canadians. AHSCs and the ADMs are also powerful financial engines, both in terms of their employment of HQPs and the related science and health innovation spinoffs they foster. We have identified threats to Academic Medicine and noted opportunities to strengthen and formalize the designation of ADMs and AHSCs for the betterment of Canada and Canadians. With appropriate vision and advocacy by physician leaders, and increased understanding and support from Federal and Provincial governments, ADMs and AHSCs can thrive in Canada and serve as a resource for society. However, the status quo is not stable. Attention to the human resources pipeline, development of alternative funding models that optimally support the academic mission, rationalization of deliverables and formalization of the roles/responsibilities of member centres within AHSN is required. Likewise, federal certification and recognition of the designation of ADMs and AHSCs (with definition of attendant responsibilities and resources) would be beneficial. New mechanisms are required for ADMs, through CAPM, to interface with CIHR, the RCPSC and Ministries of Health to address current challenges and be a proactive voice to guide building the future of Health Care, Research and Education in Canada.

We would leave the reader with 3 key points:

1. ADMs need AFP rather than FFS funding: FFS drives poor behavior and does not reward those aspects of the system that generate improvements for the future. Admittedly, AFPs require clear metrics and a robust management structure to ensure accountability. However, FFS models have virtually no accountability other than accurate submission of a bill for a clinical service that has been rendered. This not only fails to address research and educational mandates but does not address whether the service was delivered in a high-quality manner, whether it was the right service etc.

2. Canada’s AHSCs require greater research funding: While there is progress in this regard, related to the Naylor report, reflected in the 2018 budget even this increased funding leaves CIHR far short of its desired funding level. Proper overhead funding associated with increased rates of CIHR grant success is
also required. It is important to recognize that Research Saves Lives.

3. CAPM can be a voice for advocacy

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Acknowledgments: The CAPM writing group gratefully acknowledges the contributions of all its members who discussed the subject matter and/or provided editorial input into this manuscript. We give special thanks to our reviewers who commented on the blog and provided their wisdom and editorial input (Dr. Jon Meddings, Dean, University of Calgary, Dr. Wendy Levinson, Professor of Medicine, University of Toronto and Chair, Choosing Wisely Canada, Dr. Paul Armstrong, Professor and former Head of Medicine, University of Alberta and Dr. David Anderson, Dean Faculty of Medicine, Dalhousie University.