Reimagining Inpatient Care in Canadian Teaching Hospitals: Bold Initiatives or Tinkering at the Margins?

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Canada's 17 medical schools and their affiliated teaching hospitals are instrumental in serving local communities and providing regional and national access to specialized therapies. Akin to many other countries, patients in Canadian teaching hospitals typically receive care from trainees supervised by attending physicians on teams that Canadians refer to as clinical teaching units (CTUs).[1] For more than 50 years, the CTU model has served trainees, attendings, and patients well.[2] The success of the CTU model has been dependent on several factors including the crucial balance between the number of trainees and volume of patients. However, Canadian teaching hospitals are increasingly challenged by an imbalance in the trainee-to-patient volume equilibrium spurred by increasing patient volumes and declining house staff availability. The challenges we are facing today in Canada are similar to those teaching hospitals in the United States have faced and adapted to over the last 15 years. Can we build a new, sustainable model of inpatient care through attending-directed inpatient services much as has happened in the US?

Canada's population of 36 million people is growing by approximately 1% per year, largely driven by immigration.[3] At the same time, Canada's population is aging and becoming increasingly medically complex; the percentage of Canadians age 65 years and older is anticipated to rise from approximately 17% today to 25% in 2035.[4] Canada's healthcare system historically functioned with relatively few inpatient beds, encouraging efficiency particularly with respect to which patients require hospital admission and which do not.[5] Although data suggest that the number of hospital admissions declined in Canada between 1980 and 1995, recent data documented that General Internal Medicine admissions increased by 32% between 2010 and 2015 and accounted for 24% of total hospital bed days.[6,7] The effects of population growth and aging on admission volumes might be mitigated to some extent by innovations in healthcare delivery such as improved access to primary care (largely family physicians in Canada). However, even with these innovations, a growing and aging population is likely to have a disproportionate effect on the types of undifferentiated illnesses that are typically admitted to General Internal Medicine in Canadian teaching hospitals.

Increasing volumes and complexity are occurring at the same time that residency training in Canada is undergoing an extraordinary shift, mirroring trends in other countries.[8] CTUs in Canada typically have a census of 20 or more patients and are staffed by an attending, one senior resident, two to three junior residents, and medical students. Recognition that physician fatigue is associated with patient safety events and physician burnout has led to shorter resident shifts, though Canadian hospitals typically operate without concrete work hour limits or "hard" caps on team size.[8] To fulfill accreditation standards set by the Royal College of Physicians and Surgeons of Canada, residency programs have required increases in formal teaching sessions during working hours, further reducing resident presence at the bedside. Many specialty training programs (eg, anesthesiology and ophthalmology) that traditionally required trainees to rotate through General Medicine have eliminated this requirement. Moreover, postgraduate training now requires additional time be spent in ambulatory and community hospital settings to better prepare residents for practice.[9] There is little enthusiasm for increasing the number of residents, as postgraduate training spots increased by 85% between 2000 and 2013, before stabilizing in recent years.[10]

These factors are leading to a substantial decline in resident availability on CTUs, shifting increasing amounts of direct patient care to attending physicians in Canadian teaching hospitals across virtually all specialties. Unsurprisingly, increased rates of burnout and decreases in job satisfaction have been reported.[11] The Royal College has yet to impose hard caps on team size, but many see this on the horizon.

Canadian teaching hospitals currently find themselves facing a confluence of factors nearly identical to those faced by teaching hospitals in the United States during 2003 when the Accreditation Council for Graduate Medical Education instituted resident duty hour restrictions to address concerns over trainee wellness, shift length, and patient safety.[8] Instantly, hundreds of US teaching hospitals faced uncertainty over who would provide patient care when residents were unavailable. Virtually all US teaching hospitals responded with a creativity and speed that we are unaccustomed to in academic medicine. Hospitals reallocated money to finance attending-directed services where patient care was provided directly by attending physicians often working without trainees[12] but frequently supported by nurse

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TABLE. **Challenges Facing Canadian Teaching Hospitals and Proposed Action Plan**

Challenge	Champions to Mitigate Challenge	Stakeholders to Engage	Anticipated Resistance	Response
Unsafe patient volumes	• Residency directors • Hospital quality directors	• Hospital CEOs • Patient advocacy groups • Patient safety organizations • Government payers	• Cost	• Cost of patient harms including economic, medicolegal, and reputational damage to hospitals and staff
Reduced efficiency because of high volumes	• Division heads • Chairs • Service line chiefs • Hospital senior administrators	• Hospital finance and operations staff	• Cost	• Costs of excess length of stay and delayed discharges
Costs of a "fix"	• Hospital CEOs • Deans • Chairs	• Government payers	• Cost	• We are already bearing the costs in terms of patient safety events, delayed discharges, and physician dissatisfaction • Canada spends a relatively modest amount of budget on healthcare compared with other developed countries
Staff Physician/ Faculty burnout	• Hospital CEOs • Deans • Chairs	• Government payers	• Cost • Not our responsibility	• Cost of physician burnout is well quantified and tangible

practitioners or physician assistants.[13] Despite the differences between US and Canadian healthcare, 15 years later, we in Canada can and should learn from the US experience.[14]

Attending-directed services offer several advantages. First, attending-directed services offer patient outcomes including ICU transfer, mortality, readmissions, and satisfaction that are similar, if not modestly improved, when compared with traditional teaching services.[15] Results also suggest potential reductions in hospital length of stay and diagnostic testing.[16] Attending-directed services can enhance trainee education by insuring attending physician presence and oversight in-hospital 24-hours per day.[17] Although not well studied, attending-directed services may reduce variation in CTU patient census so that excess volumes can be absorbed by attending-directed teams even with seasonal surges (eg, influenza). Recognizing that many specialties were experiencing the same challenges as General Medicine in 2003, attending-directed services in the US have been designed to care for a wide spectrum of patients drawn from an array of different specialties with evidence of improved outcomes.[12] Building attending-directed services in Canadian teaching hospitals may expand to include patients from multiple specialties and subspecialties (surgery, orthopedics, and cardiology) where patient volumes are increasing and resident coverage is increasingly scarce.

The challenges that accompany the implementation of attending-directed teams must be acknowledged. First, while attending-directed teams solve many problems for teaching hospitals, physician billings may not generate sufficient income to be self-sustaining and require additional financial support.[18] Without investment from hospitals or government, attending-directed models cannot flourish in teaching hospitals. US hospitals typically provide substantial financial support ($50,000-$100,000 per physician) to hospitalist programs, but Canadian teaching hospitals have been reluctant to follow suit.

Second, attending-directed services require a sustainable workforce. In Canada, inpatient care is provided predominately by family physician hospitalists in community hospitals, whereas internists typically fulfill these roles in teaching hospitals.[19] Family physician hospitalists are commonly represented by the Canadian Society for Hospital Medicine, which is the Canadian branch of the Society of Hospital Medicine. Hospital medicine in Canada is typically organized around physician training (family physician vs internist) rather than clinical focus (outpatient vs inpatient). Collaborative models of care that unite hospitalists from all training streams (family physician, internist, and pediatrics) are only just emerging in Canadian teaching hospitals. How these programs are developed will be critical to the successful growth of attending-directed services. Third, if attending-directed services expand in teaching hospitals, the physicians who staff these services must come from somewhere. Either the "production" of physicians will need to increase or physicians will migrate to attending-directed services from outpatient practice or from community hospitals.[20] Canadian teaching hospitals can also explore nurse practitioners and physician assistants, a previously underutilized resource. Though the costs of such programs can be significant,[21] the payoff in safety, quality, and efficiency may be worth it—as demonstrated in the US system. Fourth, teaching hospitals and medical schools must create academic homes to support and mentor the physicians working on attending-directed services. Although physicians hired for attending-directed services primarily provide direct patient care, few will join academic medical centers solely for this purpose. Teaching hospitals and medical schools need to carefully consider job descriptions, mentoring, and career advancement opportunities as they build attending-directed services. Finally, the interactions between teaching and attending-directed services are complex. There is an inevitable learning curve as clinical operations and protocols are built and developed. For example, decisions need to be made about how patients are divided between

services and whether nocturnists are responsible for teaching overnight residents.[17] Successful programs have the potential to benefit hospitals, patients, learners, and faculty alike.

The risks associated with the status quo in Canada must also be addressed. Patient volumes and complexity in Canada are likely to continue to slowly increase, while the number of trainees in Canadian teaching hospitals will remain stable at best. Forcing more patients onto already overtaxed teaching services is likely to worsen hospital efficiency, patient outcomes, and educational experiences.[22] Forcing additional patient care onto overstretched faculty will slowly erode the academic work (teaching and research) that has characterized excellence in Canadian medicine.

The changes we propose to overcome the challenges facing Canadian teaching hospitals are neither cheap nor easy (Table). We expect resistance on many fronts. Implementing them will likely require concerted advocacy from a diverse group of champions shining a bright spotlight on the sizable challenges Canadian teaching hospitals are confronting. We believe that each challenge maps to a discrete group of champions with discrete targets within hospital leadership, medical school administration, and government who will need to be engaged. In our opinion, organizing around these challenges offers the best opportunity to overcome the perpetual resistance around costs. Canadian teaching hospitals and their CTUs are under unprecedented pressure. Do we act boldly and embrace attending-directed models of care or continue tinkering at the margins?

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References

1. Schrewe B, Pratt DD, McKellin WH. Adapting the forms of yesterday to the functions of today and the needs of tomorrow: a genealogical case study of clinical teaching units in Canada. *Adv Health Sci Educ Theory Pract*. 2016;21(2):475-499. doi: 10.1007/s10459-015-9608-y.
2. Maudsley RF. The clinical teaching unit in transition. *CMAJ*. 1993;148(9):1564-1566.
3. Statistics Canada. *Recent Changes in Demographic Trends in Canada*. Ottawa: Ontario, 2015. https://www150.statcan.gc.ca/n1/pub/75-006-x/2015001/article/14240-eng.htm. Accessed December 9, 2018
4. Statistics Canada. *Census, Age and Sex*. Ottawa: Ontario, 2016. https://www12.statcan.gc.ca/census-recensement/2016/rt-td/as-eng.cfm. Accessed December 10, 2018.
5. Papanicolas I, Woskie LR, Jha AK. Health care spending in the United States and other high-income countries. *JAMA*. 2018;319(10):1024-1039. doi: 10.1001/jama.2018.1150.
6. van Walraven C. Trends in 1-year survival of people admitted to hospital in Ontario, 1994-2009. *CMAJ*. 2013;185(16):E755-E762. doi: 10.1503/cmaj.130875.
7. Verma AA, Guo Y, Kwan JL, et al. Patient characteristics, resource use and outcomes associated with general internal medicine hospital care: the General Medicine Inpatient Initiative (GEMINI) retrospective cohort study. *CMAJ Open*. 2017;5(4):E842-E849. doi: 10.9778/cmajo.20170097.
8. Pattani R, Wu PE, Dhalla IA. Resident duty hours in Canada: past, present and future. *CMAJ*. 2014;186(10):761-765. doi: 10.1503/cmaj.131053.
9. Royal College of Physicians and Surgeons. *Specialty Training Requirements in Internal medicine 2015*. http://www.royalcollege.ca/cs/groups/public/documents/document/mdaw/mdg4/~edisp/088402.pdf. Accessed December 12, 2018.
10. Freeman TR, Petterson S, Finnegan S, Bazemore A. Shifting tides in the emigration patterns of Canadian physicians to the United States: a cross-sectional secondary data analysis. *BMC Health Serv Res*. 2016;16(1):678. doi: 10.1186/s12913-016-1908-2.
11. Wong BM, Imrie K. Why resident duty hours regulations must address attending physicians' workload. *Acad Med*. 2013;88(9):1209-1211. doi: 10.1097/ACM.0b013e31829e5727.
12. Flanders SA, Centor B, Weber V, McGinn T, DeSalvo K, Auerbach A. Challenges and opportunities in academic hospital medicine: report from the Academic Hospital Medicine Summit. *J Hosp Med*. 2009;4(4):240-246. doi: 10.1002/jhm.497.
13. Torok H, Lackner C, Landis R, Wright S. Learning needs of physician assistants working in hospital medicine. *J Hosp Med*. 2012;7(3):190-194. doi: 10.1002/jhm.1001.
14. Ivers N, Brown AD, Detsky AS. Lessons from the Canadian experience with single-payer health insurance: just comfortable enough with the status quo. *JAMA Intern Med*. 2018;178(9):1250-1255. doi: 10.1001/jamainternmed.2018.3568.
15. Wray CM, Flores A, Padula WV, Prochaska MT, Meltzer DO, Arora VM. Measuring patient experiences on hospitalist and teaching services: patient responses to a 30-day postdischarge questionnaire. *J Hosp Med*. 2016;11(2):99-104. doi: 10.1002/jhm.2485.
16. Auerbach AD, Wachter RM, Katz P, Showstack J, Baron RB, Goldman L. Implementation of a voluntary hospitalist service at a community teaching hospital: improved clinical efficiency and patient outcomes. *Ann Intern Med*. 2002;137(11):859-865. doi: 10.7326/0003-4819-137-11-200212030-00006.
17. Farnan JM, Burger A, Boonyasai RT, et al. Survey of overnight academic hospitalist supervision of trainees. *J Hosp Med*. 2012;7(7):521-523. doi: 10.1002/jhm.1961.
18. Gonzalo JD, Kuperman EF, Chuang CH, Lehman E, Glasser F, Abendroth T. Impact of an overnight internal medicine academic hospitalist program on patient outcomes. *J Gen Intern Med*. 2015;30(12):1795-1802. doi: 10.1007/s11606-015-3389-0.
19. Soong C, Fan E, Howell EE, et al. *Characteristics of Hospitalists and Hospitalist Programs in the United States and Canada 2009*. *J Clin Outcomes Meas*. 2009; 16 (2): 69-74.
20. Yousefi V, Maslowski R. Health system drivers of hospital medicine in Canada: systematic review. *Can Fam Phys Med Fam Can*. 2013;59(7):762-767.
21. Nuckols TK, Escarce JJ. Cost implications of ACGME's 2011 changes to resident duty hours and the training environment. *J Gen Intern Med*. 2012;27(2):241-249. doi: 10.1007/s11606-011-1775-9.
22. Elliott DJ, Young RS, Brice J, Aguiar R, Kolm P. Effect of hospitalist workload on the quality and efficiency of care. *JAMA Intern Med*. 2014;174(5):786-793. doi: 10.1001/jamainternmed.2014.300.