Response to External Review of the Centre for Quality Improvement and Patient Safety (C-QuIPS)

Kaveh G. Shojania, MD, Director
(also on behalf of the associate directors, Drs. Brian Wong and Alene Toulany,
And the C-QuIPS staff)

We thank the external reviewers, Drs. Calder and Myers, for their thorough review and positive assessment about the performance of C-QuIPS over the past 9 years. The reviewers highlighted our strong educational programs, which have achieved an international reputation; “phenomenal productivity in terms of the number and diversity of QI trained professionals and scholarly output”, and a return on investment characterized as “nothing short of spectacular”. Given the tremendous efforts of C-QuIPS leaders and core members, these were very gratifying comments to receive. Yet, we also appreciated the constructive recommendations for possible changes related to the vision, governance and funding for C-QuIPS.

Before responding to those recommendations and other minor concerns touched on by the reviewers, I do want to mention one unfortunate oversight related to the contributions of Dr. Trey Coffey, Medical Officer for Patient Safety at SickKids, and the role of SickKids in general. Early in the report, the reviewers wrote: "Significant praise was attributed to Drs. Shojania and Wong in particular, which speaks to not only their strengths as leaders but also the culture that has been created among the various partners who contribute to and receive benefit from C-QuIPS." If the external review had taken place a year ago, I am confident Dr. Coffey’s tremendous contributions to the successes at C-QuIPS and her impact at SickKids would have been more apparent.

Dr. Coffey held the role of Associate Director and SickKids Lead for 4 years (2012-2016). She played a key role in capacity building efforts by attracting and mentoring many professionals from SickKids and broader paediatric community, including physicians, nurses, and pharmacists, to our educational programs, as well as attracting academic paediatricians from across Canada. Dr. Coffey is a patient safety leader who has developed an international profile, especially since taking on the role as Associate Clinical Director of Children’s Hospitals Solutions for Patient Safety, a North American network of over 130 children’s hospitals aimed at reducing preventable harm. In addition, Dr. Coffey leads one of our main C-QuIPS research projects, an externally funded study of the Caring Safely Initiative at SickKids.

We aimed to reflect the importance of Dr. Coffey’s contributions to C-QuIPS by choosing her as one of the several people profiled in detail in the self-study report. The preponderance of attention to the contributions of Dr. Wong and myself in the reviewers’ report likely reflects the fact that Dr. Coffey left her directorship role a year ago and that her successor and mentee, Dr. Alene Toulany, had been on maternity leave until several months ago.

I mention all of this because I do not want to leave the impression, potentially generated by the report, that SickKids has not been an equal partner with Sunnybrook. In fact, SickKids has attracted slightly more people to our educational programs than has Sunnybrook and is the focus of one of our two main research projects, led by Dr. Coffey.

General response

In several places in their report, the external reviewers assessed C-QuIPS as having delivered tremendous return on investment. They characterize the Centre "as an exemplar for national and international centres wishing to build similar programs." They frame their recommendations as intended "to take C-QuIPS to the next level of excellence," as opposed to necessary steps to address problems with the operations or output of C-QuIPS.

Given this extremely favourable external review, one approach moving forward consists of maintaining the status quo. C-QuIPS could continue to deliver roughly what it has done to date, continuing to offer several very successful educational programs in QIPS, producing an ever increasing cadre of health professionals able to develop solutions to quality and patient safety problems in their clinical settings, as well as an impressive body of research.

As documented in our self-study report, from 2012-2017 alone (the 5 years leading up to preparation of the report), we published 276 papers (with an average of 12 citations to each of these publications), and this research was supported by approximately $50M in contracts and grants. We have also had some particularly notable publications in high impact journals, and several of the core members and C-QuIPS directors hold major positions with national and international organizations related to healthcare quality and patient safety, including editing the highest impact journal in the field (*BMJ Quality and Safety*).

In addition to the academic productivity, our educational programs have produced leaders in quality improvement and patient safety at Sunnybrook and SickKids, as well as other hospitals in the GTA. These individuals have undertaken a number of projects which have directly improved care, patient experience and/or reduced costs for their hospitals. This cadre of QIPS clinicians will continue to grow, as will the productivity of specific individuals as they become more experienced, obtain grants to support particularly major improvement projects, and take on more leadership positions.

C-QuIPS has achieved the successes noted by the reviewers despite receiving relatively little funding compared to centres with this sort of output—and this funding has seen no increase in 10 years. While we could likely continue with the status quo, there are risks, including the difficulties retaining current C-QuIPS leaders and attracting news ones with the current funding and workload. Beyond addressing that risk, though, we would like C-QuIPS to evolve in terms of how it functions and the impact it has for the partner hospitals and Faculty of Medicine.

We believe that, with small to modest additional investment, the Faculty of Medicine, Sunnybrook and SickKids have a unique opportunity to develop an internationally renowned model for a 'Learning Health System' to drive QIPS to the next level. Early discussions with potential partner groups in the development of this model have generated excitement about the centre moving in this direction.

Various groups in the Toronto Academic Health Science Network (TAHSN) community have begun to develop 'data warehouses', either at single hospitals or, as in the case of GEMINI, a detailed registry of care delivered to medical inpatients across 7 hospitals affiliated with the

UofT. Similarly, the National Surgery Quality Improvement Project (NSQIP), an adopted North American initiative, currently provides data for surgical outcomes at many hospitals in Ontario, including many TAHSN hospitals. These databases are increasingly identifying important gaps in care. However, the health services researchers and decision support personnel who can analyze these data tend not to have the skillset to develop, refine, and implement interventions to address quality and patient safety problems identified and prioritized in this manner.

We believe that a very productive relationship could be developed between C-QuIPS and groups producing an analyzing quasi-real time data such that we identify problems, develop and implement solutions, and track their impact in real-time. This possible 'learning health system' strategy is discussed further in response to the reviewers' comments under Vision. However, we have not delved into much detail in this response given that developing this model will require active discussions between various stakeholders in the months to come.

In summary, with such a strongly positive review, we could well continue to do what we have been doing. That said, we would like to build on the successes of the past almost 9 years and do so in a way which directly impacts patient care at UofT affiliated healthcare institutions. We think this can occur with additional investments – perhaps not exclusively in the form of extra dollars, but also 'in-kind contributions' and logistic support and infrastructure that result from developing new relationships and governance.

Point by point response

1. Relationships

The reviewers characterize the relationships between C-QuIPS and each of the cognate departments as "supportive and positive", but there remains a relative lack of dialogue between them, quoting one participant who described the SHSC, SickKids, and IHPME as "three solitudes". The reviewers also stated that "there appear to be no formal and very little informal relationships with the research institutes or other universities".

We agree that the current governance tends to reinforce silos, and that changes to the C-QuIPS executive committee structure, as recommended later in the report, would help address this concern. We intend to revamp the current executive committee structure to broaden its membership to include key stakeholder representation tied to our Centre's future vision. These would include individuals both within (e.g., clinical chairs of major departments other than Medicine and Paediatrics, directors of related cognate EDUs such as the Centre for Interprofessional Education (IPE), senior leaders from other TAHSN hospitals, etc.) and outside of the University of Toronto (e.g., senior leaders from Health Quality Ontario). We also intend to bring together the site-specific advisory committee members from SHSC and SickKids at least one to two times per year to foster a more unified vision for C-QuIPS.

We do want to mention, though, that while we did not highlight this in our review, we are starting to work with other cognate EDUs at the University of Toronto. For example, the Director of the Wilson Centre (Dr. Cynthia Whitehead) and one of its senior scientists (Dr.

Ayelet Kuper) are collaborators on our Royal College funded study of advanced QI training programs. In addition, Dr. Joanne Goldman, C-QuIPS scientist, is cross-appointed at the Wilson Centre and currently serves as the Assistant Director of Researchers. We also have begun to work with the Centre for IPE around piloting interprofessional educational activities.

2. Research

We thank the reviewers for acknowledging our research productivity and highlighting C-QuIPS' standing in the international QI research community. Their comment that the "amount of research activity far exceeds the current funding model" highlights one of our major threats, namely the long-term sustainability of this level of research productivity without additional investments in C-QuIPS.

In the response to the recommendations related to Vision below, we outline a plan for C-QuIPS to spearhead a 'Learning Health System', where C-QuIPS partners with hospitals and major clinical departments to address quality and patient safety problems of strategic importance (e.g., resource stewardship/utilization issues). This model would provide direct benefits to the partner hospitals with modest incremental increases in funding and in-kind support. This model would also address the comment from the reviewers that "core members do not identify one or more areas of research focus within the broad field of QI/PS. Rather than selecting a particular focus area (e.g., handovers, healthcare associated infections) which they may not wish to do, there may be an opportunity to unite around a methodological theme."

Briefly stated, this methodological theme will consist of developing and evaluating improvement interventions to address major quality and patient safety problems identified using robust quasi-real time data produced by data warehouses at partner hospitals. Developing this type of model and then implementing interventions, while simultaneously evaluating the effectiveness of the interventions, could serve as the basis for a CIHR team grant, as suggested by the reviewers. It also addresses the "opportunity to work more collaboratively with health services researchers for mutual benefit".

The reviewers' suggestion to establish C-QuIPS as a methods centre is consistent with what we already do on an ad hoc basis and have done formally with the Department of Medicine. C-QuIPS provides the Department of Medicine and Department of Paediatrics support (ranging from 0.1 to 0.2FTE) for four C-QuIPS members to provide expert advice and consultation to other members of their Departments engaged in QI projects.

We believe this coaching/support model could be replicated for other major departments, such as such as Surgery, Obstetrics, Anaesthesia, Psychiatry, and Radiology. However, we do not view the provision of methodological support as a viable revenue generating strategy. Similar to the situation with biostatistics units, academic physicians generally expect ad hoc, limited consultations on projects to occur free for free. Most academic clinicians and departments would not expect to pay for such services. As with biostatistics, ongoing collaboration and consultation with a specific faculty member would ideally result in C-QuIPS being written into a grant, which would generate some cost-recovery revenue for the Centre.

In summary, we hope to have other major clinical departments contribute approximately 0.1 FTE of at least one faculty member appointed to C-QuIPS to provide support for improvement projects undertaken by colleagues in the same department. (We already have this arrangement for three faculty members in the Department of Medicine, one in ENT, and we have had it in the past for one in Paediatrics.) While this sort of arrangement would not generate revenue for C-QuIPS, it would help with capacity building and foster collaboration between C-QuIPS and major clinical departments. It would also relieve some of the burden on existing core members of C-QuIPS to provide this sort of support on an ad hoc basis.

3. Education

As was emphasized in our self-study report, C-QuIPS has invested heavily in capacity building as a key strategic priority. We thus greatly appreciate the reviewers' comments that they "are confident in stating that C-QuIPS is exceeding its educational mandate, particularly given the funding model" and that "C-QuIPS is a national and international model for how an academic medical center can build capacity in QI".

We had worried that our QI training programs may not have had as broad an interprofessional scope as they could, but are reassured by the fact that both reviewers recognized the urgent need to train physician leaders to contribute to local QI initiatives and train others across the learning continuum. It is also worth noting that, with each successive year of our Certificate Course, the percentage of interdisciplinary clinicians and administrators has grown, from only 20-30% in earlier years, to 2017-18, where nurses, allied health professionals, pharmacists, and other non-physician participants make up 50% of the class. However, we will continue to work towards broadening our interprofessional reach without compromising the current focus on physician training. One concrete example is that there are plans underway to implement our Co-Learning faculty-trainee development model in Nursing and Pharmacy at Sunnybrook for the 2018-19 academic year.

We also recognize that graduates of our various programs desire opportunities to network, and acknowledge that we could do more to foster such opportunities. We already have several touchpoints, including our annual year-end event for individuals involved in the Co-Learning programs in Medicine, Paediatrics and Surgery, as well as our annual Quality Improvement and Patient Safety Forum, co-hosted with Health Quality Ontario (HQO), where we are planning a networking workshop for C-QuIPS graduates.

We do garner interest from time to time from other institutions to share our knowledge with respect to how to implement effective QIPS education programs. In addition to advising, we have helped some programs implement replicas of our programs – e.g. the Faculty-Resident Co-Learning Curriculum in QIPS now exists at McMaster, Western, and Virginia Tech in the US. We have avoided charging other groups for our advice in part because some of our research focuses on evaluating our various training programs. Thus, generating revenue from disseminating our educational models might constitute a conflict of interest. We also are not certain that this is a major revenue stream given that many postgraduate medical education offices are constrained financially.

4. Capacity Building

"C-QuIPS has been very successful in creating capacity for QI particularly for SHSC and SickKids. The mentoring within the educational programs is perceived by the trainees and alumni graduates to be of very high quality … [but] several participants including staff highlighted a concern about ongoing mentorship capacity which could limit growth."

We agree that C-QuIPS' growth towards our future vision will depend significantly on our ability to foster and build QI mentorship and coaching capacity. While our QI education programs receive much attention, we have also started to implement dedicated strategies to develop QI mentors and coaches as well. For example, the Co-Learning Curriculum uses a step-wise approach to equip faculty members with the requisite teaching and mentorship skills to oversee QI projects.

Perhaps of equal concern is whether we are doing an adequate job of succession planning at the training program leadership level. Each of our programs rely on a small number of core C-QuIPS members for leadership, and we need to do a better job of ensuring that there is a succession plan in place to bring on new course leaders to ensure sustainability of our various training programs.

The reviewers point out that education for professionals who work in non-hospital settings are "ripe for exploration". Except for the Masters program we run with IHPME, we have promoted our courses primarily to hospitals. Recently, we have engaged colleagues from Family Medicine (Dr. Tara Kiran) and Psychiatry (Dr. Sanjeev Socklingham) for our EQUIP program to help reach more participants in primary care and mental health. We will look for additional ways to reach potential participants from these under-represented areas so that we can educate a broader group of health professionals.

5. Organizational & Financial Structure

The reviewers highlight the concern that "the current financial model does not allow for growth and does not appear to be matched to the recognized value by all of the stakeholders." They added "If this model is not adjusted, not only will growth be significantly challenged, but the University of Toronto should be concerned about the ability to retain current talented leaders and core members".

We agree with this assessment. Both the current reviewers and our previous external reviewers (at 5 years) characterized C-QuIPS has having exceeded its mandate and delivering significant return on investment. But, we anticipate difficulties sustaining tremendous value without increased funding. Existing leaders and core members cannot continue to provide effort so out of proportion with salary support, and we will have trouble attracting new members and developing future leaders.

Over the past 9 years, I have made developing new faculty a priority. For instance, Dr. Wong, the current Associate Director at Sunnybrook, started as a fellow at C-QuIPS. Similarly, Dr. Coffey, who until recently led our efforts at SickKids, also started as a mentee at C-QuIPS and

certificate course graduate. And, the current Associate Director at SickKids, Dr. Alene Toulany, is a junior faculty member who completed both the certificate course and the VAQS program. Many of our core members have also been mentored for years by more senior C-QuIPS leaders, such as Drs. Shojania, Etchells, and Matlow (the first Associate Directors at SHSC and SickKids, respectively). These individuals were highly regarded by their institutions and were able to receive salary support to engage in QIPS work. This support allowed the Centre to benefit from their expertise on C-QuIPS related work without having to provide a salary. They were part of a small cadre of individuals working closely together with a shared spirit of working ‘above and beyond’. But, that funding model becomes harder to sustain as the size of the group grows—the Department of Medicine alone has over 40 faculty members in the QI stream.

We have tried to generate as much revenue as possible through our QI education to allow us to expand our team of talented individuals. This revenue has allowed us to hire and retain staff members who are highly skilled and support our various programs of research with their wide-ranging methodological expertise while at the same time carrying a significant administrative load. We have also explored creative funding models. For example, we have partnered with Sunnybrook and Choosing Wisely Canada to fund a project lead who supports one of our core members to advance QI on antimicrobial stewardship.

That said, we have had limited ability to grow our team because there are limited ways for us to generate revenue (see our previous responses as to why we feel that some of the reviewers’ suggestions may not represent viable ways to generate new revenue). In fact, the physician leads at C-QuIPS, including both associate director positions, have not seen an increase in their stipend over the almost 10-year history of the Centre.

The reviewers also noted that we have a significant amount of retained earnings. However, these funds had previously been retained to allow C-QuIPS to continue to operate for 18 months under the current model in the event that the centre ‘lost’ its funding. In recent years, as we felt that the Centre’s future seemed more secure, we have started to spend down this surplus. We will likely use up these retained earnings over the next 4 years with the addition of new staff and the provision of stipends to some of our core members who help lead our major educational programs.

We believe that future funding models will need to see an increase in both real dollars to retain existing staff and core members and support growth strategically to enable C-QuIPS to sustain its current and achieve the future vision suggested by the reviewers.

We do agree that targeted philanthropy could generate some external funding. But, as the reviewers note, we would need to develop a unified fundraising plan shared and supported by the executive leadership team, partner hospitals, and key clinical departments. We also agree that there might be an opportunity to leverage TAHSN and LHIN resources, especially in connection with the vision of a Learning Health System in which we have C-QuIPS supporting the development and execution of improvement initiatives in response to quality problem identified by TAHSN data warehouses.

The reviewers also suggested expanding the sponsor institutions to include one or two additional UofT hospitals. They named Women's College Hospital and/or Michael Garron Hospital "as the next logical partners". The tension for us in adding new partners has been dilution of the brand recognition for the existing partners, SHSC and SickKids. WCH and MGH share the feature of not being competitors with either existing partner. Assuming we would add only one new partner, WCH represents the more promising choice.

I already partner with faculty engaged in QI at the WCH Institute for Health System Solutions and Virtual Care (WIHV) through some of my activities as Vice Chair Quality in the Department of Medicine. This collaboration includes the recent receipt of Centre of Excellence award/contract to act as the evaluator for telemedicine projects and other such interventions by the Ministry of Health and Long Term Care ($3M over 3 years for this work). The addition of WCH as a partner also adds a partner with a clear focus on ambulatory care.

We also have relationships with MGH. The current Chief of Staff and Chief of Medicine at MGH have participated in our educational programs (as students and occasional guest lecturers since then). But, partnering with WCH brings more obvious opportunities for research growth and practical impact, given the importance of virtual care, digital health strategies, and innovations in ambulatory care in general.

Regarding governance, as already touched on, we plan to expand the membership of the executive committee, and also bring together the two hospital-based advisory committees at SHSC and SickKids once or twice a year.

SPECIFIC RECOMMENDATIONS

The reviewers divided their specific recommendations into three sections: vision governance, and funding. We respond to each of these in turn below.

1. Vision

We appreciate the concrete feedback and the 3 specific suggestions from the reviewers about recommendations for a vision going forward. For clarity's sake, we have quoted their recommendations verbatim, since they are succinctly stated and make it easier to follow our response.

a. **Build on a Focus of Education Excellence:** Continue to build upon the existing excellence in PS/QI education with additional focus specifically on education research. C-QuIPS appears primed to explore opportunities for spread of education efforts within the greater Toronto area, provincially, nationally and internationally. The center has demonstrated experience in engaging in scholarly education efforts and is well positioned to continue to succeed. For this vision there would not be a specific focus on patient safety and/or quality improvement (PS/QI) research.

b. **Create a Center of Excellence in QI Innovation and Implementation**: While efforts are underway to further excellence in PS/QI education, there is an opportunity to mobilize the Dean of the Faculty of Medicine, the CEO of the Toronto Academic Health Sciences Network (TAHSN) and a new executive committee to aim for a new philanthropic donation to support a Center of Excellence in QI Innovation & Implementation Science. This would result in increased prominence for U of T on the international stage and also take advantage of current innovation laboratories and new partnerships with departments such as U of T Computer Science, Medical Anthropology, and Human Factors Engineering. One possibility is that C-QuIPS could become a specific division focused on education and capacity building under this new Center of Excellence. Current leadership would be well positioned to facilitate this effort.

c. **Create a Dedicated PS/QI Research Division:** While excellence in education and scholarly educational activities are well established, there is opportunity to build a focused research program within C-QuIPS. If this vision is selected, we would recommend an education director and a research director. The research director would need new infrastructure and administrative support in order to engage in research grant opportunities and dissemination activities. This could include applying for a large CIHR team grant to support a thematic program either oriented around a methodology or a suite of key pressing quality issues.

We have reflected on options such as these for a few years ourselves as part of strategic planning. The success of our educational programs makes pursuing a), namely research to address important questions in the optimal ways to train individuals and assess competence in this domain, an easy option—one we are already pursuing and have already delivered returns in terms of grants and papers. Yet, we know that hospitals and major clinical departments need more than just individuals trained in QIPS. They need an environment in which these individuals can optimally collaborate with each other, and with the operational arms of provider organizations, in order to address important quality problems. Thus, we would like to pursue a vision that combines our strength in education (and the many individuals we have already equipped with QI skills), with option c), namely dedicated QIPS research. If we are successful in combining these two options, we would transition towards creating an international reputation for C-QuIPS as a Centre of Excellence in QI Innovation and Implementation – in other words, through work to advance options (a) and (c), we believe that we can achieve option (b).

More specifically, we think that a useful model moving forward would be to use our educational programs and some of the many individuals we have trained to collaborate with key groups producing data relevant to describing quality problems and develop a 'Learning Health System'. We have already started conversations with other groups in our local environment who are pursuing promising research related to QI to see if we could pursue new partnerships and create a new program of QIPS research. For instance, Drs. Fahad Razak and Amol Verma, colleagues of Drs. Shojania and Wong in General Internal Medicine at St. Michael's Hospital, have developed GEMINI, a data warehouse for internal medicine patients at 7 hospitals. GEMINI is now being

supported by Health Quality Ontario (HQO) and is planned to expand in terms of the number of hospitals and frequency of data uploads (https://www.geminimedicine.org). The strength of the work led by the GEMINI team lies in measuring problems related to inpatient medical care. They will likely soon be able to generate quasi-real time data from a large group of hospitals in the GTA. These colleagues have the required skills in health services research to develop and analyze this large registry-like dataset. But, they do not have the expertise or bandwidth to actually act and improve on the problems thus identified.

C-QuIPS core members could act as the 'effector arm' to address major quality problems identified by GEMINI or other such data warehouses increasingly being developed at TAHSN hospitals. This 'effector arm' role would occur not only through the cadre of clinician experts in QI affiliated with C-QuIPS, but also the numerous faculty/resident teams and other learners in our various advanced training programs who could be encouraged to tackle problems identified through GEMINI as course projects. We would likely pilot this 'Learning Health System' model with GEMINI, given the many C-QuIPS members in the Department of Medicine. But, we would plan to extend this model to other sources of data such as Caring Safely at SickKids, NSQIP for surgical patients, and the Greater Toronto Area-Obstetrical (GTA-OBS) Network.

Our ongoing commitment to advancing our educational programs would involve iterative improvements which create more deliberate and explicit links between projects undertaken in our various training programs and the problems that our partner organizations care about. This happens to some extent at the moment, but is left largely up to individuals. The growing cadre of clinicians coming out of our programs with QI expertise will achieve far greater impact if they are all rowing in the same direction, clearly informed by the goals of the hospitals.

2. Governance

a. The timing of leadership change

The reviewers suggested that I continue as Director of C-QuIPS for another term. They wrote "We believe the next 5 years are a critical stage for CQuIPS. Consideration of a third term for the current director Dr. Kaveh Shojania should be seriously entertained as well as a clear succession plan to ensure retention of the current leadership talent". I suspect the basis for this recommendation is as follows. The reviewers have suggested some important changes as outlined above under Vision, for instance, applying for a CIHR team grant, partnering more formally with other groups, leveraging resources in the TAHSN community or LHIN. These will be difficult for a new director to pursue while maintaining our current educational and research activities.

Rather than a third term, which is probably not even allowable (or really desired), we think a reasonable compromise would consist of extending my term for one year. I would use that time to focus on developing key partnerships related to the 'Learning Health System' vision touched on above. Specifically, these partnerships might include adding Women's College Hospital as a C-QuIPS partner hospital, establishing a formal collaborative relationship with the GEMINI group, and creating shared support models for faculty members with expertise in QI in major clinical departments.

b. Improve the current governance structure

We had always planned to reconstitute a broader executive committee as existed for the first five or so years of C-QuIPS. As we explained in the self-study report, following the very favourable external review at five years (and the coincident transition to new jobs of several Deans and CEOs who sat on the Executive Committee), full Executive Committee meetings were put on hold. I continued to meet with the Chair of the Executive Committee and the two hospital CEOs to ensure that there were no major concerns and we planned to broaden the Committee once we saw what changes might occur as a result of the review.

We completely agree with the reviewer that the time has come to increase representation by the Chairs of cognate Departments (e.g., Surgery or Anesthesia - Medicine and Paediatrics are already engaged through various channels), and probably a provincial stakeholder, such as a senior leader from HQO, with which we already collaborate in delivering our annual symposium.

c. Expand the organizational structure to support an expanded vision

As previously outlined in the Financial and Organizational Structure section, the tension for us in adding new partners has been dilution of the brand recognition for the existing partners, SHSC and SickKids. The reviewers suggested WCH and MGH, which share the feature of not being competitors with either existing partner. Dr. Shojania already partners with faculty engaged in QI at the WCH Institute for Health System Solutions and Virtual Care (WIHV) through some of his activities as Vice Chair Quality in the Department of Medicine. And, I have had some initial discussion with the Director of WIHV, Dr. Sacha Bhatia, who is very interested in pursuing this and believes the senior leadership at WCH will be as well.

We believe that the considerable activity of WIHV in the virtual care space would benefit from collaboration with experts in QI (as does Dr. Bhatia) and we believe that C-QuIPS would benefit from the addition of a partner primarily focused on ambulatory care.

3. Funding

We appreciate the reviewers' commenting that "The success and productivity of CQuIPS is truly remarkable given the current funding model." They went on to write: "we were surprised to learn that recommendations from the previous external review were not actioned to secure a more appropriate funding model. This needs urgent attention."

Before addressing their specific suggestions, I will briefly recap the funding challenges in this space.

i) Grants are even harder to come by in this space than in the rest of research. Large multisite studies can be funded, but reaching the point of an intervention likely to succeed requires years of more local QI work which almost impossible to fund.

ii) Even when we have obtained grants, the funds cannot be directed towards salaries for physicians, and the major strength of our educational programs has been the direct involvement of so many physicians with expertise in QI.

iii) Typical grant timelines are not nearly timely enough for projects of interest to healthcare organizations. No one on the clinical/operational side of a healthcare delivery organization wants to identify a problem now, then wait 2 years for

investigators to obtain external funds and another 2-3 years for them to execute the project.

iv) We have made occasional inquiries about philanthropy (and we actually did receive a few small donations, including one for $50,000). But we generally had the sense that we just could be put on a list to give to donors who expressed an interest in healthcare quality or patient safety, not be part of a campaign to raise money. That sort of endeavor tends to be reserved for new capital investments.

Since the funding has not increased at all in 10 years, it seems reasonable to expect at least some increase. While some of this increase will likely represent more actual dollars invested, we believe that other in-kind support going to clinicians or support staff with QI expertise at the hospitals would be equally valuable. This could be part of the vision we hope to pursue with C-QuIPS being the effector arm to address quality problems identified using hospitals' internal decision support data and findings from registries such as GEMINI and NSQIP.

The three specific suggestions for increased funding to C-QuIPS included:

a. **Leveraging TAHSN and LHIN resources:** The CEO of TAHSN could work with member hospitals to create a fund to support C-QuIPS with expansion of services across the network. LHIN resources earmarked for research could also support this effort and achieve the MOH goal of improving health quality. Engaging member hospitals using a business case articulating the C-QuIPS value proposition and concomitant cost saving could be a powerful tool.

b. **Targeted philanthropy**: This could be a joint effort by the foundations of the sponsoring organizations similar to the Ted Rogers Center for Heart Research. The proposal could be oriented towards, for example, building a Center of Excellence in QI Innovation and Implementation or oriented towards improving pediatric patient safety.

c. **Expand the sponsor institutions** to include one or two further hospitals (e.g., WCH or MGH)

We would be happy to explore the first option with the CEOs of our partner hospitals, one of whom, Dr Apkon, is also the TAHSN CEO. We would also welcome developing a philanthropic plan. A Chair at one of the two partner hospitals might represent a feasible start—it is not too big of a ticket item, yet it would free up salary support for one of the directors. Finally, as outlined previously, we agree that expanding the partner institutions is worth considering, and plan to discuss WCH in particular with the current partners.

In summary, we agree with the reviewers that an increase in funding for C-QuIPS is needed. This funding will ensure our ability to maintain the important successes we have achieved and support our new vision of a 'Learning Health System" towards the eventual goal of becoming a Centre of Excellence in QI Innovation and Implementation. This increase in funding does not have to come in the form of direct dollars to C-QuIPS. We are happy to explore all of the options outlined above.