

Project Title: Partnering to establish emergency medicine in Ethiopia: development, implementation and evaluation of a postgraduate residency training program at Addis Ababa University

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The Research Problem

The morbidity and mortality of acutely injured and ill patients in Ethiopia is staggeringly high. The reasons are multifactorial, including a high burden of illness, a lack of trained emergency medical providers and a persistent and severe diaspora of trained medical professionals. To address these issues, the Ethiopian government identified emergency medicine (EM) as an educational and development priority and the Addis Ababa University (AAU) School of Medicine invited University of Toronto (UT) EM faculty to partner and develop a postgraduate EM residency training program at AAU.

Objectives

The overall objective of the Project, as laid out in our grant contract, was to establish a centre of Emergency Medicine excellence in Ethiopia that will improve emergency patient care and ultimately serve as a resource and model for other low-income countries.

The specific objectives of the Project as listed below and each have been commented on with regards to its achievement.

- 1.1. To graduate a first-ever cohort of competent Emergency Medicine (EM) specialists equipped with the knowledge, research skills and leadership capacity to lead the development of EM in Ethiopia;

The first cohort of Emergency Medicine specialists did graduate as expected in October 2013. Two of these graduates are now working as staff physicians at Black Lion Hospital and have been directly involved in teaching activities for the residency program. In October 2014 we expect the second graduating cohort of six more faculty.

In addition to the education and research training that was core to their residency training, all of the graduates also participated in an Administration and Leadership course (offered via telesimulation). This course focused on a number of critical issues the graduates would face in their new roles upon graduating.

- 1.2. To develop and evaluate a model of north-south university collaboration which provides context-relevant in-country opportunities for training and career development to optimize graduate retention in a country that suffers greatly from a diaspora of its health care professionals;

After careful consideration of other frameworks beings used by other north-south partnerships, an evaluation framework was developed to evaluate the TAAAC-EM model. At the completion of the granting period (March 2014), a full assessment was completed in order to determine how TAAAC-EM was completing its expected results (See Appendix 1). The use of this tool will be ongoing as new residents enter the program, other residents graduate, and the new graduates continue to help to build the emerging emergency medicine system in Ethiopia.

- 1.3. To build capacity among Addis Ababa University faculty to design and execute operational research studies that inform departmental, institutional, and national policy regarding evidence-based emergency care and services in low-resource settings

We launched collaboratively, with faculty from both AAU and UofT, several operational research projects during the course of this grant period. Faculty jointly developed research proposals, shared in the writing of ethics board applications, designed the data collection process and procedures and monitored data collection, with current work focusing on analysis and dissemination. These initial studies will provide vital information to the emergency department and are the stepping stone to further work with a multi-country trauma registry in collaboration with the African Federation of Emergency Medicine (See Appendices 2-5 for abstracts and papers that have been and will be presented with regards to these research projects)

- 1.4. To create high quality opportunities for Canadian EM faculty and trainees to participate in international development in health care through collaborative education and research

Throughout the time period that this grant operated TAAAC-EM successfully undertook 6 teaching and research trips, which involved 14 different faculty members, 6 residents and 1 program manager. Through these trips over 95 didactic lectures and 25 practical sessions were delivered at Black Lion Hospital. Through a rigorous process of post-trip debriefing we have found that faculty and trainees consistently describe the value of this experience in enhancing their clinical skills, increasing their knowledge of disease burden in low-resource settings and very highly regarding the satisfaction of being part of an organized, sustainable educational collaboration in global health. We have attached two unsolicited letters in Appendix 6 as well as evaluations by our resident participants of their rotations in Appendix 7.

- 1.5. To increase Canadian institutional capacity to share knowledge and innovative educational practices with developing country institutions through novel and accessible knowledge-sharing platforms such as our on-line, open-access, peer-reviewed EM teaching modules compendium

The Teaching Modules project continues to grow, with 50 modules in various stages of development, including peer review by as many as 100 peer reviewers from the Canadian EM community and abroad. A new website is nearly complete to house the growing compendium of peer-reviewed, low bandwidth, open access emergency medicine teaching modules with monitoring and evaluation capabilities built in to allow for future improvements (See Appendix 9). New authors and peer reviewers are continually being recruited from Canada, Ethiopia and other countries involved in EM development around the world.

- 1.6. To build a network of competent Canadian EM faculty experienced in context-appropriate curriculum development, delivery and research that will encourage innovation in health care delivery through academic engagement with universities in low-income countries in which EM is currently lacking

TAAAC-EM has built a strong, and yet still growing, network of Canadian EM faculty and trainees experienced in curriculum development, delivery and research through this project. Over 20 faculty have been involved in curriculum development, over 100 have worked on teaching modules, 15 have been involved in research development and implementation and over 20 in teaching trips to Addis. Most notably, our faculty and resident retention in the project is very high, with after returning from a month in Addis many stay involved via committee work, research, curriculum development or with repeat trips to Addis

- 1.7. To evaluate the effectiveness of the educational model to be used, and to share lessons learned with other north-south partnering institutions; and

TAAAC-EM is continuing to use the framework it developed in order to evaluate the effectiveness of its model on an ongoing basis (See Appendix 1). Lessons learned through this framework have been presented at many different national and regional conferences throughout this granting period and beyond. This includes the ESEP 2012, CAEP 2012, CAEP 2014 and AFEM 2014. A dissemination plan for work emerging from this project was determined with our colleagues at AAU. Emphasis was placed on presenting to both Canadian and Ethiopian audiences and following this to focus on publication. We believe that this will allow our work to have the highest impact with the types of audiences we are trying to reach. (See Appendices 2-5 for abstracts and papers that have been and will be presented with regards to our lessons learned)

- 1.8. To minimize environmental costs, and maximize effectiveness, by focusing on fewer trips of longer duration, and relying on volunteerism of visiting faculty.

All 6 TAAAC-EM teaching and research trips that took place during this grant period took place over a one-month period. Funds from this grant were not used to pay faculty for their participation in this program. Our partners at AAU were able to coordinate and cover the cost of airport transfers and local travel by coordinating with the university transportation department and our team leaders also received additional coverage in the form of small travel and volunteer grants for their flights and accommodation.

Methodology & Project Activities

Due to the complex mixed methods nature of this project we have combined these two sections for the ease of reading.

This project's activities can be divided into three main components: 1) training of postgraduate EM trainees at Black Lion Hospital during four annual month-long teaching trips by UT faculty and trainees including lectures, bedside teaching and research supervision as well as distance-bridging innovative educational activities like videoconferencing and one-on-one mentorship, 2) the development of an operational research program, consisting of three prospective cohort studies launching at AAU in October 2012, intended to build capacity among AAU faculty and trainees to design and execute research studies that inform departmental, educational and national policy regarding evidence-based emergency care and services, and 3) the development of an on-line, open-access knowledge-sharing platform through which the educational materials developed for TAAAC-EM will be peer-reviewed and made accessible to other EM training programs in low-resource countries.

This program is being co-monitored and evaluated by faculty and residents at both institutions. The TAAAC-EM model, innovative among educational partnerships because of its local administration, comprehensiveness and sustained focus, will graduate a critical mass of competent, qualified physician leaders to establish a centre of EM excellence at AAU that will improve emergency patient care and ultimately serve as a resource and model for other low-income countries.

Collaborative development and implementation of a three-year curriculum

To bridge the gap in qualified EM teachers in Ethiopia, TAAAC-EM delivers month-long teaching trips each year consisting of a multidisciplinary team, who deliver a three year curriculum, based on the AAU Senate approved EM curriculum and the principles of the International Federation of Emergency Medicine. Twelve trips complete one three-year program. The curriculum spans the clinical competencies of EM and includes dedicated lecture series in clinical epidemiology and health administration. All UT faculty are fully licensed to practice EM at Black Lion Hospital (BLH) – thus allowing for the program keystone – bedside supervision, case review and clinical mentorship.

Throughout the granting period, TAAAC-EM has successfully completed 6 teaching trip months at Black Lion Hospital, delivering over 95 didactic lectures and 25 practical sessions. With the addition of a volunteer who served a 3-month post in Addis Ababa (March-June 2013), residents have received 9 months of valuable bedside supervision and clinical mentorship. Teams from Toronto have included staff physicians from University of Toronto affiliated hospitals, experienced EM nurses, senior EM postgraduate residents, and research support persons. In October 2013, a class of 5 residents began their training, increasing the number of trainees in the program to 17.

With support from members of the TAAAC-EM team, our Ethiopian colleagues at AAU developed the first ever board exam that was used to assess the competence of the third-year EM residents in October 2013. We are excited to report that after successfully completing the three-year EM curriculum, research component, clinical competence evaluation, and written and oral exam, the 4 first-ever Ethiopian-trained EM physicians

graduated in October 2013, a true landmark for Ethiopian Emergency Medicine and testament to the TAAAC-EM collaboration and supporters.

Videoconferencing & Mentorship

To maintain contact when TAAAC-EM teams are not in Ethiopia, we organize regularly scheduled two-hour videoconferencing sessions with the residents and faculty at AAU. The sessions encompass case presentations and assigned lecture topics by AAU residents and guest lectures given by UT faculty, all allowing for more time to cover different EM topics and maintain mentorship relationships more easily. By involving a larger number of Toronto-based EM physicians from Toronto we are actively growing our network on interested and knowledgeable Toronto-based physicians.

In the last year, we have increased the number of videoconferencing sessions with residents at AAU. The Temerty/Change Telesimulation Centre based at the University Health Network (a UT affiliated hospital in Toronto) offer virtually accessible training programs for physicians in developing or remote regions. Through a new partnership, we are able to have access to free videoconferencing technology, which has been an incredible opportunity for our program (*See Appendix 2c and 3b for our Telesimulation abstracts*).

In addition to our videoconferencing sessions, TAAAC-EM has set up a formal mentorship program. In the first year of their program each AAU Emergency Medicine resident is paired up with a UT faculty mentor. These one-on-one relationships provide an additional level of support and a specific contact with whom the residents can discuss their ongoing education as well as their experiences in the Emergency Department.

Additionally, we have begun exploring the use of telesimulation for teaching emergency medicine procedures in Addis Ababa. Our first teaching module encompassed instruction regarding the placement of central venous catheters and was well received by the student and new faculty in attendance. This is a pilot program that if successful may be used to expand the reach of telesimulation from Addis to other parts of the country for similar training (*See Appendix 2c and 3b for our Telesimulation abstracts*).

Online, open-access, peer-reviewed EM teaching modules compendium

The development of an online, open-access, peer-reviewed EM teaching modules compendium is ongoing. This unique resource will be invaluable in offering high-quality EM educational materials that are context-appropriate to low-resource health settings and that minimize replication of work to develop such materials. At least 50 teaching modules are in various stages of development and peer review, supplemented by lectures developed specifically for the TAAAC-EM curriculum.

Nine section editors have been chosen for their expertise in each respective section and are overseeing the development of 5-20 modules per section. One expert pharmacist has been appointed to review each module for medication and dosing accuracy as well as context specificity prior to publication. Each module will be or has been reviewed by two peer reviewers from the Emergency Medicine community, involving more than 100 peer

reviewers and 50 authors across Canada and other countries. The Teaching Modules website is in the final stages of development and is nearly ready for launch, with monitoring and evaluation capabilities built into its design (*See Appendix 9*).

Establishment of an operational research platform

AAU faculty identified the value of increasing EM research capacity to address and influence ED operations, hospital system issues and Ethiopian EM policy. For each project, a bilateral team of Ethiopian and Canadian faculty members of TAAAC-EM was identified (see below). Protocols were developed jointly and ethics approval was sought where appropriate and from both institutions. Additionally, each project has been approved by the TAAAC research committee, a committee of the larger TAAAC organization to ensure that projects reflect a collaborative and capacity-building approach to research and to define bilateral authorship from project inception.

A dissemination plan has been discussed and agreed upon by all partners. These studies will first be presented at the Canadian Association of Emergency Physicians Conference in May 2014, then at the African Federation of Emergency Medicine Conference begin hosted by our AAU colleagues in November 2014 and then finally submitted for publishing. This strategy ensures maximum reach of the information (*See Appendices 2-5 for abstracts and papers that have been and will be presented with regards to these research projects*).

- a) Study Title: Epidemiology and clinical outcomes of head trauma
Study Team: Landes (co-PI), Azazh (co-PI), Venugopal

A prospective cohort of 204 consecutive cases of head trauma presenting to the ED. Outcomes of interest include: socio-demographic and clinical characteristics, mechanism of injury, investigations, interventions and clinical outcomes at 6 hours, 24 hours and 7 days. Findings will help define the scope of head injury in the ED and the current practices and outcomes of these patients. We expect this information to improve care of head trauma patients in the ED as well as lead to improved ED protocols for head injury, which would be ultimately scalable to other low-resource emergency medicine settings.

This research project is in the final phase of data analysis. An initial abstract describing epidemiology and outcomes has been submitted and accepted to the Canadian Association of Emergency Physicians conference in May 2014 and is attached in Appendix 2a.

- b) Study Title: Early All-Cause Mortality in the Emergency Department: A Prospective Cohort Study at Black Lion Hospital, Ethiopia
Study Team: Teklu (co-PI), Hunchak (co-PI), Meshkat, Puchalski-Ritchie

A prospective cohort study of all patients who died within 72 hours of ED presentation to Black Lion Hospital. This study seeks to characterize early ED mortality and to identify groups of patients that may benefit from evidence-based standardized ED protocols targeting the conditions and predictors of early ED mortality, toward reducing

preventable deaths. This will have a direct impact on care in the Black Lion ED and may be ultimately scalable to other hospitals in Ethiopia and other low-resource emergency medicine settings.

Data collection for this study ran from October 2012 to April 2013 (n=220) and is currently being analyzed by the study team. A manuscript is expected to be finalized by summer 2014 and the results will be appropriately disseminated by seeking publication in an open access journal and submissions to present at international emergency medicine society conferences. Specifically, the findings will first be presented at the upcoming African Federation of Emergency Medicine (AFEM) meeting in Addis Ababa in November 2014.

- c) Study Title: Pilot – Trauma Registry
Study Team: Landes (co-PI), Azazh (co-PI), Maskalyk, MacKinnon

A prospective cohort study of patients who are admitted to the Black Lion Emergency Department. Trauma is a significant cause of morbidity and mortality in Ethiopia and in the region. During the pilot we will test the feasibility of introducing a data collection form that has been adopted at several other centres in the region, including sites in Dar Es Salaam, Tanzania and Goma, Congo, allowing for shared information in the care of trauma patients across sites. The registry will allow for a greater understanding of the epidemiology and outcomes of patients with trauma. The information gathered will inform clinical practices, curriculum for emergency medicine specialty training, and operations in the ED and supporting hospital services at Black Lion Hospital.

A revised trauma form for inclusion in patient charts has been approved by Black Lion Hospital. Training and initiation of data collection will occur in April 2014 with an expectation of the registry being fully operational by July 2014. As this is a project in collaboration with the African Federation of Emergency Medicine, support will be drawn from AFEM in using their existing databases and data analysis capacity. It is expected in the next year that we will have read a descriptive paper for publishing, as well as launch several context specific research proposals.

- d) Study Title: Examining graduate retention within the new emergency medicine system in Ethiopia: A contextual analysis
Study Team: Landes (co-PI), Azazh (co-PI), Lockwood, Maskalyk

Understanding previous failures in the development of the Ethiopian health system through attrition following foreign training and poor retention in domestic programs, the TAAAC-EM collaboration has identified graduate retention as an important component to potentiate the successful development of a functioning EM system in Ethiopia.

This project aims to improve the contextual understanding of the health care and human resources environment that the new graduates will be entering as Ethiopia's first emergency medicine doctors. The project will also explore specific challenges around graduate retention including financial, workplace (including concerns about supplies and

resources), career expectations and unmet needs that may exist and act as forces encouraging emigration. Finally, the project will examine cohesive forces including social familiarity and return to service agreements that encourage graduates to pursue careers within Ethiopia.

To date, 10 interviews have been completed and transcribed, with a subset analysis of residents only having been completed. The final data analysis will include key stakeholders from the Faculty of AAU, the hospital administration and the Ministry of Health and will be presented at the upcoming AFEM 2014.

Lessons Learned

The strength of this project lies in the collaborative nature of our work. All activities have been undertaken with a view to bilateral capacity building and as such our successes are truly jointly shared.

Project Outputs

The following outputs were laid out in our initial application and each have now been commented upon with regards to their completion.

1. Eight teaching trips of UT EM faculty to AAU including:
 - a. 150 didactic lectures and 40 practical sessions
 - b. 8 months of bedside supervision and clinical mentorship
 - c. 8 pre- and post-departure debriefing sessions for Canadian teams
 - d. Professional development of 16 UT faculty and 8 RNs in global health emergency medicine
 - e. Provision of 8 structured, supervised electives in global health for Canadian EM UT postgraduate residents

Items b, c & e were successfully completed during the granting period as stated in our application. In relation to item a, over 95 didactic sessions and 25 practical sessions were delivered. And in relation to item d, during the course of this grant, the UofT School of Nursing made a strategic decision to focus its involvement in the development and implementation of a Masters in Critical Care/Emergency Medicine Nursing through AAU. We fully support this shift of focus as it encourages a longer term, more sustainable solution to building nursing capacity at AAU, but as a result were not able to include as many nurses with our teams. However, the stated number of professional development opportunity for faculty was provided.

2. Graduation of 5 first-ever Ethiopian-trained EM physicians (October 2013), with a smooth transition into a career, and >90% graduate retention in the country, with the majority working, at least part-time, in the public health system.

We are excited to report that 4 of the Ethiopian trained physicians completed all of their requirements and graduated in October 2013. Currently 2 of these

physicians have been hired to work in Emergency Department at Black Lion Hospital, 1 physician is working at the Korean Hospital (another hospital in Addis Ababa) and will soon be going back to Hawassa to create an Emergency Department there, and the final physician is working at a public hospital in Bahir Dar.

3. Completion of three-year teaching trip cycle for second resident cohort, that will graduate 6 new Ethiopian EM physicians, two of whom will remain at Black Lion hospital through sponsored positions and the remaining who will take the specialty to their respective regional public hospitals and expand emergency care throughout the country (June 2014)

Although this will be completed after the formal granting period is over, the program is on track to meet this output as of June 2014.

4. Completion of a comprehensive set of online peer-reviewed open-access teaching modules for EM in low-resource settings (54 modules)

TAAAC-EM has developed 50 modules in various stages of development, which have been peer reviewed by as many as 100 peer reviewers from the Canadian EM community and abroad

5. 12 videoconferencing sessions

TAAAC-EM held 16 videoconferencing sessions with the AAU residents. In addition to this an administrative course (consisting of 6 sessions) as well as a teaching module (consisting of 5 sessions) instructing on the placement of central venous catheters, were both delivered via videoconferencing.

6. 11 AAU resident-UT EM faculty pairs participating in mentorship program

This has occurred and is ongoing. We have currently matched the most recent residents in the first year class with new mentors and have a total of 17 ongoing relationships with current residents and 5 further with newly graduated faculty.

7. Three completed operational research studies including:
 - a. 3 collaborative REB processes, data collection and analysis
 - b. 3 (minimum) publications in relevant open-access EM journals with 1 (minimum) Ethiopian faculty as first author and universal shared north-south partner authorship for all studies
 - c. Dissemination to ED leaders, hospital administration, Ministry of Health and international organizations at relevant conferences.

A dissemination plan has been discussed and agreed upon by all partners. These studies will first be presented at the Canadian Association of Emergency

Physicians Conference in May 2014, then at the African Federation of Emergency Medicine Conference being hosted by our AAU colleagues in November 2014 and then finally submitted for publishing. This strategy ensures maximum reach of the information to key stakeholders. Publications will be targeted to open-access EM journals and plans include at least 4 papers with 2 Ethiopian faculty as first author.

8. Supervision of 11 postgraduate research projects

TAAAC-EM faculty to date have supervised 5 resident research projects. Our third partner, the University of Wisconsin, had undertaken several research courses for the graduates and adopted these research projects for their supervision.

9. Formal evaluation of TAAAC-EM progress via two annual reports with AAU partner approval and with an official, program-wide, Monitoring and Evaluation tool to measure costs, savings, and outputs

2 annual reports have been developed and disseminated (See attached Investor Reports for 2012 and 2013 in Appendix 8a and 8b). TAAAC-EM has also developed a Monitoring & Evaluation Framework during this granting period that has been and will continue to be used on an ongoing basis (See Appendix 1. TAAAC-EM Monitoring & Evaluation Framework).

10. Dissemination of TAAAC-EM model and progress at six national and international conferences and one institutional grand rounds

Please see the Appendices 2-5 for all presentations and abstracts disseminated at the following conferences:

- 1. Ethiopian Society of Emergency Practitioners (ESEP) October 2012*
- 2. Canadian Association of Emergency Physicians (CAEP) May 2014 (and planned for AFEM 2014)*
- 3. Division of Emergency Medicine Faculty and Resident Research Day, University of Toronto, 2013*
- 4. Division of Emergency Medicine Faculty and Resident Research Day, UofT 2014*
- 5. Department of Family and Community Medicine (DFCM) Conference, 2014*

Discussion of the TAAAC-EM model also occurred during the following lectures:

- 1. Global Health in Emergency Medicine (GHEM) Open Meeting – “How to Help Others Without Hurting Yourself”, presented by James Maskalyk (December 17, 2013)*
- 2. Morbidity & Mortality Rounds, Division of Emergency Medicine, Department of Medicine, Faculty of Medicine, UofT – “Cases from the Field – Medicine in Low-Resource Settings”, presented by James Maskalyk & Raghu Venugopal (January 21, 2014)*

3. *Global Health in Emergency Medicine (GHEM) Open Meeting – “Trauma: Life in an Ethiopian ER”, presented by Dave MacKinnon & Andrew McDonald (March 18, 2014)*

11. Formal report on the EM human resources policy context for Ethiopia and presentation to key stakeholders to further high level advocacy through AAU and the Ministry of Health for graduate retention. (October 2013)

A context analysis was developed by this collaboration and during the past 18 months, over 10 interviews have been conducted with residents, graduates, faculty and key stakeholders regarding the human resources context that new graduates are entering. Interviews have been transcribed and analysed. An initial presentation has been developed with the specific sub-set of residents and will be presented at CAEP 2014 and AFEM 2014 (See Appendix 2b). With our colleagues, we have planned that a full report will be ready for AFEM in November 2014. This will allow all members of the collaboration to be present for the initial presentation of the results in Addis, as well as to engage in important meetings with key stakeholders.

12. One formal ESEP Graduate Retention Symposium (October 2013)

A seminar, attended by key stakeholders in Ethiopia, including decision-makers at Addis Ababa University and the Ethiopian Ministry of Health, as well as TAAAC-EM discussed long-term strategies about retaining new graduates, both in the country, and the public health system. The consultants delivered concrete ideas at the policy level for the AAU and MOH representatives to enact, as well as to the graduates, such that they might support their clinical activity through engagement in scholarship, research, and as consultants, such that they can imagine a career dedicated to public service, without sacrificing a living wage.

Project Outcomes

In our initial application, our project outcomes were described as follows:

The TAAAC-EM project, a Canadian-Ethiopian university collaboration, will graduate a critical mass of highly trained EM specialists who will improve emergency patient care at BLH and throughout Ethiopia, and train future generations. Endeavors taken to train postgraduates outside of the country has led to post-training retention rates of less than 10%. The main outcome, should the success follow the similar approach taken in psychiatry, would be to reverse this ratio and have more than 90% of these physicians remain the country, where they can provide stewardship of the public health system in a country where nearly all of the resources lie in the parallel, private system.

TAAAC-EM provides a structured, impactful way for Canadian faculty and trainees to engage in global health work, improving their career satisfaction and Canada's expertise

in this field, TAAAC-EM endeavours to deliver an innovative and effective model for meaningful north-south engagement to address major challenges in human resources and global health emergency medicine. Knowledge generated from this partnership will be widely disseminated within Canada, Ethiopia and other African countries to benefit other similar educational endeavours.

We expect knowledge sharing to take place through the following channels:

1) As Ethiopian faculty and EM residents emerge as national and international leaders in EM they will disseminate EM knowledge to other hospitals and health care workers in Ethiopia and other similar low-resource environments that will influence EM policy and practice (specifically pre-hospital providers, nurses and trainees in other medical specialties). By developing leaders in EM, Addis Ababa University can position itself as a centre of excellence for emergency care in Ethiopia and other low-resource settings and become a focus for improving its body of EM practice and research.

The work of this project has allowed for this expected outcome. We can see further evidence of the developing leadership role that our AAU colleagues are taking on – initially through the development of the Ethiopian Society of Emergency Practitioners (ESEP) and the hosting of the first inaugural and scientific meeting of ESEP in October 2013, and now acting as hosts and organizers of the African Federation of Emergency Medicine Conference in 2014.

2) Ethiopian-Canadian faculty and trainee knowledge exchange occurs both formally and informally during teaching trips regarding clinical EM knowledge and practices in their respective practice settings, enhancing the clinical skillset and experience of individuals within the TAAAC(EM) partnership from both institutions.

This bilateral exchange is one of the great benefits of this collaboration. Not only do Ethiopian physicians and nurses in training improve their clinical skills, but Canadian delegates enrich their knowledge about how to care for sick and injured people, with few resources. This leads to new innovations on both sides. In Ethiopia, because of TAAAC-EM, regular emergency medicine rounds occur weekly, even when teaching teams are not in the country, discussions at all levels of the hospital have started that consider the emergency department as a unique and integral place for medical care and learning. In Toronto, medical rounds are delivered by former delegates to Canadian audiences about illnesses common in Addis, and rare in Canada, that increase awareness and capacity.

3) Canadian EM faculty and residents have the opportunity to become leaders, educators and innovators in their respective Canadian hospitals and departments by developing unique skills in global health emergency medicine education, health systems development and human resource capacity building.

As evidenced in our outputs, we have involved a large and continually growing number of Canadian faculty who are learning, growing and developing expertise in the field of global health emergency medicine.

Overall Assessment and Recommendations

Each year, between ten and thirty percent of people pull themselves up, from below the poverty line. This success is countered by a similar number of people falling back below it. The most common cause of this fall is from a health emergency. The Toronto-Addis Ababa Academic Collaboration in Emergency Medicine (TAAAC-EM), has allowed for this to be addressed, not just by training local experts who can address the consequences of an emergency quickly and safely such that it impacts a person's life as little as possible, but by providing a meaningful livelihood for those who are skilled in practicing it. The effort united both Universities, but also interested capable partners in the United States, namely the University of Wisconsin and the American Institute for Health Alliances, and Canadian sponsors like CUSO international. The University of British Columbia has sent delegates through TAAAC-EM and are looking for a broader collaboration in Ethiopia, and during the time TAAAC-EM has spent in the country, we have mentored students and residents from all over the world.

The collaboration made possible from the IDRC grant allowed us, most importantly, to graduate the country's, and East Africa's, first emergency doctors. Already, they are engaged in training future cohorts, doctors, nurses, and paramedics. They teach in the medical school at AAU, and soon, other universities throughout Ethiopia. In addition to this, TAAAC-EM has engaged in meaningful research on the methods used to deliver necessary training in this environment, that will be applicable not just in Ethiopia, but in countries with similar low-resource environments. It is common for universities to form academic partnerships to strengthen their provision of educational opportunities for the faculty and staff at both institutions. These efforts are occasionally done, particularly in north-south partnerships, by partners with different means. As such, unless a true spirit of collaboration is sought, agreed upon, and both parties given equal authority to determine its success, imbalances can prevent each from achieving its goal. Using a collaboration between Addis Ababa University (AAU) and the University of Toronto as an example, the facets of what makes an appropriate and successful partnership were explored, and generated outcomes that were meaningful to both institutions.

The engagement of AAU and its emergency community will continue. What was unforeseen, and became clear with time, was how significant the burden of organization was on local partners, particularly with travel and accommodation logistics. Often, the capacity of a local partner relies on a few individuals with modest means, and though keen to share in the work necessary to make it successful, are often drawn in many directions. In the future, it is likely that TAAAC-EM will need to assume costs related to travel, and accommodations, and have a local expert, who can facilitate this instead of taxing already drawn resources at AAU. The advantage of the approach we have taken thus far, however, is that our local partners have ownership of a key component of the activity, which increases our understanding of their limits, and obligates us to follow through as intended. This balance will need to be maintained, whatever portion is shared. The outcomes of this endeavour are clear, and the most important kind: they accrue from an initial investment. The capacity of these young doctors to train others will, in turn,

create many more skilled practitioners than TAAAC-EM could train alone. Their wise stewardship of their resources will be an exemplar for allocations in other sectors. Their presence will encourage investment by foreign companies concerned about the safety of their employees, allow for large meetings, like the African Union meeting, to proceed with safety and oversight by a capable community. There are few other investments that hold as much promise, whose outcomes will carry so far.

The IDRC has made, in our opinion, a small investment whose outcome will extend far beyond what this document can describe. It has enriched the lives of Canadian doctors who are able to travel, safely, to teach medicine that matters. It has provided a livelihood for passionate young professionals, intent on transforming the public health system into one that serves as many people as well as possible, and through that, the lives of thousands of Ethiopians already, with millions more in the future. The process, from application through disbursement was simple, and effective. It is with deep gratitude that TAAAC-EM has been able to carry out this great work, with such great partners, on the behalf of the IDRC and its supporters.