

# Output from the CIHR Canadian HIV Trials Network international postdoctoral fellowship for capacity building in HIV clinical trials

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**Abstract:** As a response to the human immunodeficiency virus (HIV) epidemic and part of Canadian Institutes for Health Research's mandate to support international health research capacity building, the Canadian Institutes for Health Research Canadian HIV Trial Network (CTN) developed an international postdoctoral fellowship award under the CTN's Postdoctoral Fellowship Awards Program to support and train young HIV researchers in resource-limited settings. Since 2010, the fellowship has been awarded to eight fellows in Cameroon, China, Lesotho, South Africa, Uganda and Zambia. These fellows have conducted research on a wide variety of topics and have built a strong network of collaboration and scientific productivity, with 40 peer-reviewed publications produced by six fellows during their fellowships. They delivered two workshops at international conferences and have continued to secure funding for their research, using the fellowship as a stepping stone. The CTN has been successful in building local HIV research capacity and forming a strong network of like-minded junior low- and middle-income country researchers with high levels of research productivity. They have developed into mentors, supervisors and faculty members, who, in turn, build local capacity. The sustainability of this international fellowship award relies on the recognition of its strengths and the involvement of other stakeholders for additional resources.

**Keywords:** CTN, postdoctoral fellowship, capacity building, clinical trials, networking

## Background

Nearly 37 million people are living with human immunodeficiency virus (HIV) worldwide, an increase from previous years, in part due to new infections, but mostly because people with HIV are now living longer and healthier lives.<sup>1</sup> This is because of advances in research that have led to new drugs and prevention strategies that have helped to curb the spread of disease.

It is well known that HIV infection disproportionately affects the disadvantaged, sometimes because of specific socioeconomic conditions that promote risky behavior and limit access to health services, but also because of the lack of strong health services, including health research capacity in low-resource settings. Late diagnosis and limited access to antiretroviral therapy further aggravate the issue through higher mortality rates in low-income settings.<sup>2</sup>

One approach to disease control that may have brought substantial gains in HIV control is the investment in research capacity building in resource-limited settings.<sup>3,4</sup> Investing in research capacity building is a worthy endeavor in light of the mismatch between disease burden and resources.<sup>5</sup> It represents a sustainable approach to controlling HIV by developing the resources and leadership necessary for resource-limited countries to generate their own solutions to local problems. Many programs that promote research capacity building in resource-limited countries have described benefits

in terms of building individual and institutional capacity, high-quality research productivity and enhanced national and international collaboration.<sup>6-8</sup>

Among the many developed countries that are poised to reduce global health inequalities, Canada directly invests in addressing the Sustainable Development Goals in resource-limited countries through international efforts. Canadian Institutes for Health Research (CIHR)'s framework for international relationships and cooperation has five strategic priorities: research, talent, global health, safety and security, and organizational best practice. The second priority, talent, is a commitment to international health research capacity building.<sup>9</sup> Supporting the Canadian HIV Trials Network (CTN)'s Postdoctoral Fellowship Awards Program and the international fellowship award is one approach through which CIHR can implement this priority.

## The CTN's international postdoctoral fellowship award

The CTN is a CIHR-funded Canada-wide partnership of researchers, governments, health advocates, the innovative pharmaceutical and biotechnology industry and people living with HIV who are committed to developing treatments, management strategies, preventive interventions and a cure for HIV and related comorbidities, through conducting scientifically sound and ethical clinical research (<http://www.hivnet.ubc.ca/>). In addition to supporting research, the CTN also awards postdoctoral fellowships through a yearly

competition. As of September 14, 2016, 144 fellowships have been adjudicated to 80 individuals who continue to be active HIV researchers in Canada. In 2010, the CTN initiated the international postdoctoral fellowship award to support the work of HIV researchers in resource-limited countries to build local capacity for HIV clinical trials (<http://www.hivnet.ubc.ca/research-services/postdoctoral-fellows/>). Since the inception of the international postdoctoral fellowship, eight awards have been given to researchers in Cameroon, China, Lesotho, South Africa, Uganda and Zambia. Six fellowships have been completed and two are ongoing.

Successful international postdoctoral fellows are expected to have a Canadian and a local supervisor. Together, they decide on a work plan, budget and a training program that includes components of research, capacity building and knowledge translation, to be completed within 1 year in their respective countries. Young international fellows agree to spend 75% of their time on research. The award of 25,000 Canadian dollars (CAD), includes some partial salary support, benefits and research expenses. In addition, 10,000 CAD are kept by the CTN to support one visit by the fellow to attend the CTN annual meetings and present his/her research at the Canadian Association for HIV Research annual conference in Canada or to attend a preapproved international conference or training.

The CTN's international postdoctoral fellows have conducted research on a wide variety of research topics, which are detailed in Table 1.

**Table 1** Topics covered by CTN international fellows

Year	International postdoctoral fellow	Country	Research topic	Canadian supervisor(s)	Local supervisor(s)
2010–2011	Lawrence Mbuagbaw	Cameroon	Mobile phone text messages to improve adherence to antiretroviral therapy in low-income resource settings	Lehana Thabane	Pierre Ongolo-Zogo
2011–2012	Frederick Morfaw	Cameroon	Male partner participation in prevention of mother-to-child transmission of HIV	Lehana Thabane	Philip Nana
2011–2012	John Kunda	Zambia	Community-based models of nonignorable missing data for RCTs	Lehana Thabane	Anne Cockcroft Neil Andersson
2012–2013	Jackson Mukonzo	Uganda	Optimizing efavirenz HIV treatment outcomes among Africans	Colin Ross	Nelson Sewankambo
2013–2014	Amy Slogrove	South Africa	South African HIV-exposed uninfected infants: does in utero HIV exposure contribute to increased infectious morbidity?	Joel Singer	Mark Cotton
2014–2015	Wei Cao	China	Evaluation of immunological impact from early ART initiation in patients participating in the primary HIV infection study	Jean-Pierre Routy	Taisheng Li
2015–2016	Gisele Ngomba	Lesotho	Evaluation of adherence to ART in HIV-positive pregnant women in a low-resource setting	Lehana Thabane Lawrence Mbuagbaw	Kyaw Thin
2016–2017	Moleen Zunza	South Africa	Feasibility and effects on interactive weekly mobile phone text messaging versus usual care in promoting and sustaining continued breastfeeding by HIV-infected women in South Africa: a pilot RCT	Lehana Thabane	Mark Cotton Taryn Young

**Abbreviations:** ART, antiretroviral therapy; CTN, Canadian HIV Trial Network; HIV, human immunodeficiency virus; RCTs, randomized controlled trials.

## Research output and impact

Since the CTN began awarding international fellowships, the international postdoctoral fellows have published 127 papers, of which 40 (31.5%) were published during the fellowship and 17 (13.4%) were directly related to fellowship research projects. They were lead authors on 12 and senior authors on 1 publication. The median, minimum and maximum values are reported in Table 2.

The 40 papers published during the fellowship were cited a total of 397 times, giving an average of 10 citations per paper (citation data retrieved from Google Scholar: <https://scholar.google.ca/intl/en/scholar/metrics.html>).

**Table 2** Number of publications for CTN's international postdoctoral fellows who have completed their fellowship (n=6)

Category	Median (q1, q3)	Minimum, maximum
Total number of publications per fellow	13.0 (7, 30)	0, 73
Number during fellowship per fellow	7 (5, 9)	0, 13
Number related to fellowship/fellow <sup>a</sup>	2 (1, 5)	0, 10
Number of fellows as the lead or senior author/fellow	2 (1, 4)	0, 5

**Notes:** <sup>a</sup>On the research topic for which funding was provided by the CTN. q1: first quartile; q3: third quartile.

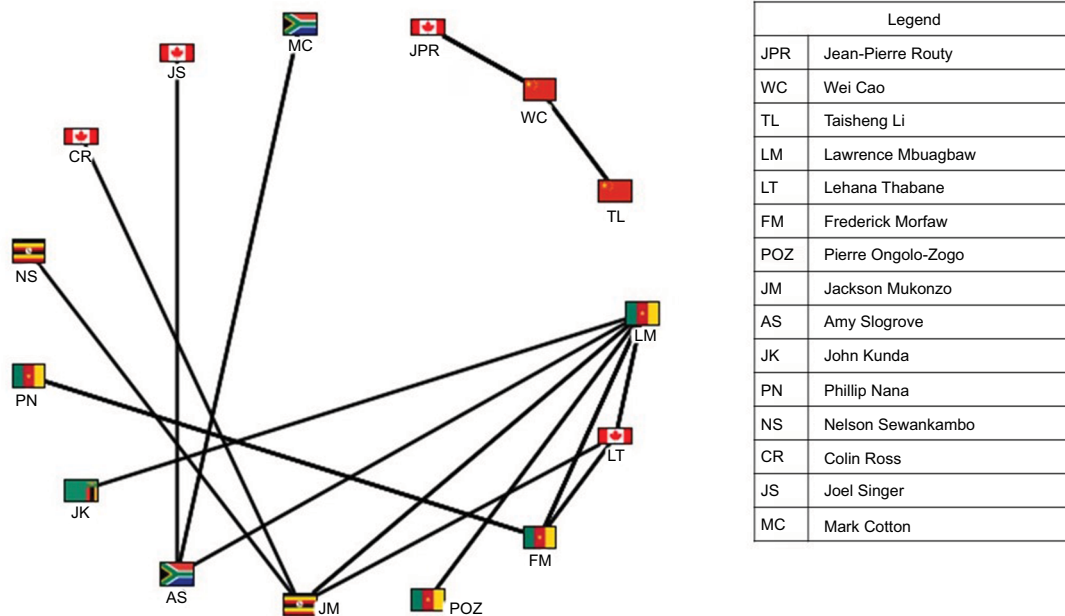
**Abbreviation:** CTN, Canadian HIV Trial Network.

## The international fellows and supervisors network

An important part of the CTN's postdoctoral fellowship is the linkage of HIV researchers around the world. Using the research output from the international postdoctoral fellows, we mapped the network of research. Figure 1 illustrates the research relationships created through and during the postdoctoral fellowship. It highlights the collaborations between the postdoctoral fellows, their local and Canadian supervisors, and among themselves. Fellows and supervisors are indicated by their initials and country flags. The links indicate coauthorship on a peer-reviewed publication during the fellowship, with shorter lines indicating more manuscripts published.

## Additional funds and awards secured due to fellowship research

The fellowship serves as a platform to enhance the fellows' technical skills in study design, analysis and reporting, and provides opportunities for networking and collaboration. Even though fellows are not allowed to hold other major funding during the tenure of the fellowship, they are encouraged to pursue additional resources to support their research after the fellowship. Table 3 is a list of additional funds secured by the fellows.



**Figure 1** Network of coauthorship between CTN's international postdoctoral fellows and their local and Canadian supervisors.

**Abbreviation:** CTN, Canadian HIV Trial Network.

**Table 3** List of awards secured by postdoctoral fellows

Name of the award	Year	CAD
1. Ontario Trillium Scholarship Competition	2011–2014	120,000 <sup>a</sup>
2. Fergus Mills Scholarship	2011–2012	1,000
3. CIHR Canada-Hope Scholarship Program	2011	174,000
4. The Dave Sackett Graduate Scholarship	2013	5,000
5. IDRC Doctoral Research Award	2013	14,000
6. South African National Health Scholarship	2014–2015	75,000 <sup>b</sup>
7. CIPHER Global Cohort Collaboration postdoctoral fellowship	2015	37,000
8. CIPHER	2016–2017	164,303
9. AIDS 2016 Conference Registration Scholarship	2016	235
10. SIDA	2016–2020	708,857
11. US Bureau of Education and Cultural Affairs – Senior Researcher Scholarship	2014	2,626 <sup>c</sup>

**Notes:** <sup>a</sup>For 3 years. <sup>b</sup>For 18 months. <sup>c</sup>For 3 months.

**Abbreviations:** AIDS, acquired immuno deficiency syndrome; CAD, Canadian dollars; CIHR, Canadian Institutes for Health Research; CIPHER, Collaborative Initiative for Paediatric HIV Education and Research; HIV, human immunodeficiency virus; IDRC, International Development Research Centre; SIDA, Swedish International Development Agency.

## Workshops delivered

Since the inception of the international postdoctoral fellowship, a team of mentors, supervisors, former and current postdoctoral fellows have delivered two large workshops at international conferences. These workshops were an opportunity for the fellows to network with the larger scientific community and among themselves, showcase the work of the CTN on the African continent and fulfill their commitment to developing capacity locally.

1. The CTN HIV workshop: Ethical research through community participation and strengthening scientific validity, held at the 17th International Conference on AIDS and Sexually Transmitted Infections in Africa in Cape Town, December 7–11, 2013.<sup>10</sup> At this workshop, participants were introduced to the CTN, the importance of scientific validity in ethical research, the role of capacity building in HIV research, career enhancement strategies and the role of community involvement in HIV research. The workshop was well received and all the sessions highly ranked.
2. The CTN prevention of mother-to-child transmission workshop held at the 21st International AIDS Conference (AIDS 2016) in Durban, July 18–22, 2016. Here, we covered the CTN's role in capacity building, best practices in prevention of vertical transmission of HIV, core research competencies such as research question formulation, study design and sample size estimation.

## Lessons learnt

By initiating international postdoctoral fellowship awards, the CTN has successfully promoted local capacity building in HIV research and created a strong network of like-minded junior low- and middle-income country researchers with high levels of research productivity. They have developed into mentors, supervisors and faculty members, who, in turn, build local research capacity.

The key challenges with keeping the international postdoctoral fellowships alive in the CTN Postdoctoral Fellowship Awards Program are linked to the challenges of channeling funds to postdoctoral fellows in low- and middle-income countries with different financial administrative rules; the diversity in their research interests, making it challenging to find common ground for collaboration; the need to continuously source for funds to keep the group network alive and geographic challenges in linking fellows coming from different parts of the world.

The successes are linked to the dual mentorship approach, sufficient funds provided to engage in research activities and the careful selection of mentors and supervisors with aligned research interests.<sup>11</sup>

The CTN funds were helpful in supporting conference attendance, the purchase of books, securing protected time for research conduct and reporting, and travel to Canada for the annual face-to-face meetings with their Canadian supervisors.

The fellowship creates a much-needed platform for learning and networking, which is expressed as research productivity and career growth.

Other capacity building initiatives that are degree oriented<sup>8,12</sup> can use degrees awarded as an objective metric of knowledge gain. Some use self-assessed research competency.<sup>13</sup> We have chosen to appraise this CTN international postdoctoral fellowship based on research productivity, networking, additional funding secured and capacity building conducted by the fellows. These metrics are good indicators of effective career development and sustainable research potential.

## The future of CTN international postdoctoral fellowships

The CTN has done an enormous service in developing the fellowship program and securing funding for international postdoctoral fellowships. However, the job is not complete until a cure for HIV is found and epidemiologic targets, are met in terms of reducing the number of new infections,

eradicating vertical transmission, ensuring worldwide access to antiretroviral therapy and reducing AIDS-related deaths. Given the high stakes involved and the importance of building research capacity for HIV control, it is crucial that other partners support the sustainability of this growing program. Low- and middle-income country governments, regional groups, donor agencies and industry can play an important role in keeping the postdoctoral international fellowships alive.

## Acknowledgment

This work was supported by the CIHR Canadian HIV Trials Network.

## Author contributions

All authors contributed toward data analysis, drafting and revising the paper and agree to be accountable for all aspects of the work.

## Disclosure

Lawrence Mbuagbaw, Frederic Morfaw, Amy L Slogrove, John Kunda, Jackson Mukonzo and Wei Cao are former CTN international postdoctoral fellows. Gisele Kadima Ngomba and Moleen Zunza are current international postdoctoral fellows. Lehana Thabane, Joel Singer, Jean-Pierre Routy and Collin Ross are Canadian-based supervisors. Pierre Ongolo-Zogo, Philip Nana, Nelson Sewankambo, Anne Cockcroft, Taisheng Li and Kyaw Thin are local supervisors. Jacqueline Sas is the manager of the postdoctoral fellowships and committees. Aslam Anis is the National Director of the CIHR Canadian HIV Trials Network. The authors report no other conflicts of interest in this work.

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