



**CIHR International Infectious Disease &
Global Health Training Program**
Canada • Colombia • India • Kenya



**UNIVERSITY
OF MANITOBA**

**Canadian Institutes of
Health Research**

**International
Infectious Disease
& Global Health
Training Program**

**ANNUAL REPORT •
2012**

2012 At a Glance

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IID&GH Training Program in Nairobi, Kenya for the 2012 major course Clinical Trials and Research Ethics in a Developing Country

ABOUT US

The International Infectious Disease and Global Health (IID&GH) Training Program is hosted by the University of Manitoba under the direction of Dr. Keith Fowke, a Professor in the Department of Medical Microbiology.

The IID&GH Training Program seeks to enhance existing PhD and Post-Doctoral Fellow research training programs by linking trainees from four international research sites (Canada, India, Kenya and Colombia). This linkage provides an opportunity for the trainees to explore international infectious disease and global health issues from a multidisciplinary approach.

OBJECTIVES

1. To equip trainees with the research, scientific knowledge and skills to become **outstanding researchers** in infectious diseases and global health.
2. To create a novel and stimulating **multidisciplinary** and **truly international** research training environment that fosters creativity, opportunity, and innovation, and one that demands excellence.
3. To harness the unique opportunity offered by the **critical mass** of infectious diseases and global health infrastructure, research opportunities and outstanding scientists in the training of the next generation of infectious disease researchers.
4. To make available collaborative international research sites for the trainees' primary research projects, sites for research practica and major course offerings.
5. To offer a **shared learning environment**, where trainees and mentors from all four of CIHR's research pillars and the four international training sites work cooperatively to explore issues of international infectious diseases and global health.



TRAINEE SPOTLIGHT

Welcome to the IID&GH Training Program's 2012 class of new trainees

Julie Ambia was born and raised in Kenya and ever since she was a child she looked for ways to help others. This is why she chose a career in healthcare and medical research. Julie graduated with a Bachelor of Science in Nursing from the University of Eastern Africa, Baraton and completed a Masters of Public Health from the University of Nairobi. During her Masters project, Julie was awarded a research grant from the International Development Research Centre (IDRC) to study Cryptosporidiosis and Gender Dimensions in Urban Dairy Farming in Dagoretti Division, Nairobi, Kenya. At present, Julie is currently pursuing a PhD on Barriers of and Facilitators of Adherence in User Dependent Trials. Julie became interested in understanding the contextual factors affecting product use in clinical trials while working in a phase 3 biomedical HIV prevention clinical trial in western Kenya.



Having been in the training program for one year, Julie said the key event she feels that has greatly influenced her research project was the IID&GH Training Program's major course, Clinical Trials and Research Ethics in a Developing Country, which she attended in Nairobi, Kenya. During the course she was able to experience first-hand the challenges faced when conducting a clinical trial. As well, she thought the perspectives shared during the course helped to guide her in some of her own research and ideas she has developed in the course of her PhD project. Furthermore, being a trainee in the IID&GH Training Program gave Julie the opportunity to interact with other researchers and mentors working on infectious diseases and has helped her to learn about different facets of infectious diseases - epidemiology, basic, clinical and social science.



Julie Ambia

TRAINEE SPOTLIGHT, continued

Satyanarayana was born in a small village in Hullinakhal in Shivamogga District, Karnataka, India and later moved to Sagara. He graduated with a Masters in Social Work from Karnataka University, Dharwad in 2002 and a post-graduate diploma in Epidemiology from the Public Health Foundation of India in 2012. Currently, Satyanarayana is a PhD student at the Center for Multidisciplinary Development Research in Dharwad, which is supported by the Indian Council of Social Science Research. His thesis topic is “Migration, Mobility and HIV/AIDS: a comparative study of urban and rural female sex workers in northern Karnataka, India”. The study is being conducted with migrant and mobile female sex workers (FSWs) in Bagalkot, Bijapur and Belgaum districts in northern Karnataka as a way to better understand FSWs’ migration/mobility patterns, and to describe the individual, structural, societal and contextual factors that contribute to the risks and vulnerabilities to HIV for urban & rural FSWs.

As well as completing a PhD, Satyanarayana is also involved with Karnataka Health Promotion Trust (KHPT) and its predecessors. He has been there for the last ten years and is actively involved in HIV prevention research and program implementation in Karnataka. Recently, Satyanarayana has been awarded an HIV Research Trust award to fund his visit to the Center for Global Public Health (CGPH) at the University of Manitoba where he will receive training on Qualitative Research Methods.

Satyanarayana’s most valuable experience gained from being in the training program has come from his exposure to the multidisciplinary aspects of global health research. In particular, the Infectious Minds scientific discussions and the “Clinical Trials and Research Ethics” course in Nairobi, Kenya. He said “the visit to the Migori clinical trial site during the Nairobi course was one of the most memorable experiences in my life. It provided me with a deeper understanding of clinical trial design and implementation, as well as the complex ethical issues involved in conducting these trails.”



Satyanarayana



Recent Graduates of the IID&GH Training Program

Dr. Catherine Card

Catherine participated in the IID&GH Training Program for over two years while completing her PhD under Dr. Keith Fowke's supervision. Catherine recently graduated from the training program in April and is currently employed as a post-doctoral fellow in Prof. Melody Swartz laboratory at École Polytechnique Fédérale de Lausanne (EPFL) in Lausanne, Switzerland. Her post-doctoral project focuses on the interactions between lymphatics and intestinal homeostasis.

Dr. Catherine Card during the IID&GH Training Program's first major course Eco-ID

Catherine said "participating in the IID&GH training program was a great experience for me. I gained exposure to other fields of study and learned about the importance of interdisciplinary research. The international component of the program was particularly interesting, as it allowed me to interact with trainees from around the world, and gave me the opportunity to visit sites of particular relevance to my studies in HIV, including India and Kenya."

Dr. Yoav Keynan



Dr. Yoav Keynan

Yoav's PhD, mentored by Dr. Fowke, focused on understanding cross-reactive responses to influenza virus and determinants of disease severity. Currently Yoav is employed as a clinician-scientist; Assistant Professor in the Depts. of Internal Medicine, Medical Microbiology and Community Health Sciences at the University of Manitoba; and a visiting lecturer in the Dept. of Medical Microbiology, University of Nairobi.

Yoav said "the training program was instrumental in shaping my career as a clinician-scientist. The major courses contributed to increasing my ability to be involved in multi-disciplinary research and provided me with excellent exposure to the diverse aspects of epidemiology, research methods, programmatic issues, conduct of clinical trials and research

ethics. The site visits in particular were to be illuminating and the first hand experiences will have a long lasting impact, far greater than attending any class taken during my combined training.”

Yoav also said “although the courses were clearly important, it is the interaction with the other trainees from different backgrounds and with diverse research projects and expertise that made this training program special.” These interactions led to research collaborations with other trainees (Souradet Shaw, Dr. Lyle McKinnon, Dr. Zulma Rueda), several manuscripts in progress, and one funded grant. Yoav is certain that these projects will form the foundation for future collaborative work that will continue to enrich his research career.

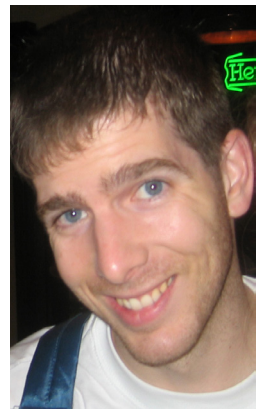


Dr. Yoav Keynan in Kenya during the major course

Dr. Michael Stobart

Michael successfully completed a PhD in the department of Medical Microbiology under the supervision of Dr. David Knox and is just starting his second year as a post-doctoral fellow at the University of Zurich, in Zurich, Switzerland. His current research focus is on axon guidance cues unique to particular subsets of sensory neurons using chickens as his model organism. Concurrently, Michael is developing viral vectors for delivery of miRNA-adapted shRNA knockdown molecules, expressed under the control of cell-type specific promoters.

Michael stated, “I am grateful for having had the opportunity to participate in the IID&GH Training Program and am very appreciative of the knowledge gained throughout my time in the course. Keith (Fowke) and the other organizers did an amazing job, ensuring that we as trainees were exposed to a variety of topics, usually far from what we were studying. I feel my time in the program has benefited me and will continue to do so throughout my career. I would also like to thank the training program for supporting me financially. In the future, I hope to contribute back to the program in some way.”



Dr. Michael Stobart



Trainees and mentors during the opening reception at the restaurant The Carnivore

RECRUITMENT

2012 Trainee Intake

Bangalore, India Site, Social Science Pillar, PhD Student
Satyanarayana

Nairobi, Kenya Site, Social Science Pillar, PhD Student
Julie Ambia

LIST OF TRAINEES AND PROJECTS

PhD Trainees



Trainees: Kaveri Gurav, Zulma Rueda, Sajid Mahmood and Natalia Taborda at the U of Nairobi

Julie Ambia

Barriers and Facilitators to Adherence in User-Dependent Trials

Winnie Apidi
Catherine Card

The glycolysis pathway in HIV-1 resistance
Regulatory T cells and Immune Quiescence: a model for resistance to HIV infection

Nadia Chanzu

Secretor Status, FUT2 Polymorphisms and the Risk of Infection by HIV and HPV in Female Sex Workers in Kenya

Dhanunjaya Rao Chintada

Interrelation between stigma, discrimination and impact on utilization of care and support services - A study among HIV Seropositive Men having sex with Men and Transgender (MSM-T) in Karnataka

Suresha Sanjeeva

A study on violence among women living with HIV/AIDS in Karnataka

Elizabeth J. Cooper

Culturally relevant HIV/AIDS prevention programming within Canadian Aboriginal contexts

Kallesh Danappa Jayappa The molecular mechanism of HIV-1 nuclear import: the role of HIV-1 integrase in targeting host nuclear import machinery and delivering viral cDNA into nucleus

Melissa Herman

Heterogeneity in progression to AIDS: The role of antigen specific CD8⁺T cells

Jennifer Juno

The role of genetic polymorphisms at the CD4 locus in HIV disease progression

Yoav Keynan

Immunogenetic factors associated with Influenza cross-protection and disease severity with HLA subtypes



Trainees: Aida Sivro, Ifeoma Okwor and Winnie Apidi

TRAINEES AND PROJECTS

PhD Trainees continued

- Marion Kiguoya** A study to correlate long-term non progressors HIV-1 isolate viral fitness in highly exposed persistently seronegative (HEPS) versus low risk negative individuals and its association
- Sajid Mahmood** Examining NK – DC crosstalk in NK differentiation and functional properties of NK cells
- Cisily Meeme** Evaluation of drug resistance profiles and viral characteristics in HIV-1 viruses from infected patients before and after receiving antiretroviral therapy
- Ifeoma Okwor** Regulation of secondary anti-leishmania immunity
- Robert Were Omenge** Linkage of innate and adaptive immunity in HIV-1 resistant women in Nairobi.
- Michael Babu Raj** PPTCT Services: Are we reaching out? From human rights perspective
- Meika Richmond** Polyfunctionality and proliferation of CD8⁺ T cells in chronic and acute HIV infection
- Zulma Rueda** Epidemiologic and clinical characteristics of Mycobacterium tuberculosis in prisoners at four different jails, Colombia 2010-2012
- Satyanarayana** Migration, mobility and HIV/AIDS: a comparative study of urban and rural female sex workers in Northern Karnataka, India
- Souradet Shaw** Understanding autoimmune diseases: combining traditional epidemiological techniques and complex systems approaches
- Alex Silaghi** Identification of virulence determinants in the 1918 Influenza Hemagglutinin (HA) and H1N1 flu
- Aida Sivro** The role of IRF-1 polymorphisms in susceptibility to HIV-1 infection
- Derek Stein** Mass spectrometry based characterization of HIV-1 resistance in the female genital tract
- Michael Stobart** Identification of non-essential host genes required for PrP106-126 mediated neurotoxicity
- Natalia Taborda** Evaluation of genetic and immunological mechanisms involve in resistance to HIV-1 exhibited by chronically infected individuals who control viral replication without antiretrovirals
- Yingfeng Zheng** Functional role and molecular mechanism underlying the interplay of HIV-1 integrase with host cofactors



Kalleth Danappa Jayappa, Sajid Mahmood, and Satyanarayana during tea break



Kaveri Gurav and Natalia Taborda at the Elephant orphanage



Trainees: Zulma Rueda, Yoav Keynan, Lyle McKinnon, Jennifer Juno and Julie Lajoie



Trainees: Satyanarayana and Suresh Sanjeeva

TRAINEES AND PROJECTS

Post-Doctoral Fellow Trainees



Trainees: Aida Sivro and Julie Lajoie at the Elephant Orphanage outside Nairobi, Kenya



Trainees: Jennifer Juno, Melissa Herman and Catherine Card

Zhujun Ao

Investigation of the mechanism underlying anti-HIV action of R88-A3G:
Development of a potent anti-HIV approach in primary CD4⁺ T cells and macrophages

Kaveri Gurav

Vulnerabilities associated with migration of female sex workers (FSWs) in India

Jayanna Krishnamurthy

Integrating HIV into general health systems; Opportunities and challenges in Indian context
Community-based ownership and uptake of future HIV vaccine Programs among MSM and FSWs in India

Shamshad Khan

Mucosal immune activation in commercial sex workers

Julie Lajoie

Effect of antiretroviral therapy on mucosal immunology in female sex worker cohorts

Lyle McKinnon

Characterisation of a novel candidate gene for the HIV-1 Resistance Phenotype in the Pumwani Sex Worker Cohort

James Sainsbury



Trainees: Satyanarayana, Shamshad Khan, Dhanunjaya Rao Chintada, Sajid Mahmood, Suresh Sanjeeva, Jayanna Krishnamurthy, Michael Babu Raj, and Kaveri Gurav during the 2012 Kenya Course.

ACADEMIC PROGRAM

Clinical Trials and Research Ethics in a Developing Country Setting

by Lyle McKinnon

The International Infectious Diseases and Global Health Training Program (IID&GHTP) held its annual 2012 course in Nairobi, Kenya from January 29- February 11 at the Kenya AIDS Vaccine Initiative (KAVI). The course, Clinical Trials and International Research Ethics provided an overview of the design, implementation, and ethical issues surrounding clinical trials for infectious diseases, with a focus in particular on the opportunities and challenges of doing so in a developing country. In addition to the course there was a Scientific Symposium giving the trainees an opportunity to summarize and present their research project to the group in a manner that could be appreciated by the multidisciplinary audience.

The design of the 2-week course included lectures from local and international experts on the chosen course topics; visits within Nairobi; and visits to clinical trial sites in various regions of Kenya. Aside from the trainees in the IID&GHTP, an individual from each clinical trial site was chosen to participate in the course.

The first week of the course involved a partnership with Dr. Eric Meslin's NIH Fogarty International Centre BioEthics Training Program hosted at Illinois University. Guest lecturers from the Universities of Manitoba, Nairobi, Toronto, Illinois, Moi University and Johns Hopkins presented topics such as the history, role and future of bioethical research in the context of international research.

The second week of the course included visits to 6 clinical trial sites that were evaluating: prevention of bacterial vaginosis, HIV vaccine, HIV pre-exposure prophylaxis, malaria prevention in pregnancy, and integration of antenatal care/HIV prevention. The purpose of the field assignments were to expose the trainees to the front



Kawango Agot presenting during the 2012 Kenya Course



Course Instructors: Joseph Kaufert, Ross Upshur, Jeremy Sugarman, and Eric Meslin



Trainees: Julie Ambia and Suresh Sanjeeva at the Kenya AIDS Control Program during the major course



Trainees at the Majengo Sex Worker Clinic in Pumwani, Nairobi



A round table discussion during the major course

lines of a clinical trial site and allow them to have the opportunity to meet those operating the trials, meet the study participants, and come to appreciate some of the challenges, opportunities and ethical issues that surround a clinical trial. The assignment challenged the trainees to understand their assigned existing trial and design a new hypothetical trial to use on site. Following the field site visits, the trainees returned to Nairobi to present their assignments in front of the class and a panel of judges, with ample time for discussion.



Trainees outside the residence in Nairobi, Kenya

While completion of the course did not necessarily make trainees an ‘ethicist’ or a ‘clinical trialist’, it stimulated interest and understanding of these important topics so they can be applied to future research.

KENYA LEARNING VISITS FROM A TRAINEE’S PERSPECTIVE

Team Bondo by Were Omange



Team Bondo: Front L-R: Were Omange, Melissa Herman, Kaveri Gurav, Zhujun Ao; Back L-R: Stella Njagi, Onyango Obila

On February 5, 2012, six trainees travelled 400km from Nairobi to Bondo which is located in the Nyanza province of Kenya. Upon arrival we were welcomed by the principal investigator of the trial, Prof. Kawango Agot and visited the recently concluded FEM-PrEP trial. The trial tested the efficacy of taking Truvada (a single pill of Tenofovir and Emtricitabine) daily in the prevention of HIV infection in women at a high risk of being exposed to HIV. The members of team Bondo were Kaveri Gurav (India), Melissa Herman (Canada), Zhujun Ao (China/Canada) Were Omange (Kenya/Canada), Stella Njagi (Partners PrEP in Thika-Kenya) and Onyango Obila (U of Nairobi KAVI-Kenya).



Team Bondo: Zhujun Ao, Melissa Herman, Were Omange, Kaveri Gurav, Onyango Obila and Stella Njagi

During the first part of our visit we met with the trial managers and learned the different aspects of the clinical trial such as the ethical issues around recruitment and retention of study participants, follow-up, monitoring and evaluation, and the overall administration of the project. As well, we had the opportunity to visit the recruitment sites, like the hotspots in Usenge and Bunyala beaches where the

study participants were mostly drawn.

The second part of our assignment was to write a review of the FEM-PrEP trial and design a cluster randomized clinical trial to improve adherence to once a day Truvada use to prevent HIV in women from Bondo who are at the greatest risk of being infected. After completion of the proposal we returned to Nairobi to present our proposed study to the rest of the trainees who had visited other sites and a panel of judges. Unfortunately, our proposal was not the best, but we did enjoy the learning experience and the scenic journey to Bondo.

Team Migori by Winnie Apidi

I was among the trainees of Team Migori who visited the Migori Clinical Trial Site. Migori is a rural county in Southern Nyanza and a clinical trial called Cluster-randomized trial of integrating HIV care with Antenatal care. The first site we visited was called Karungu Sub District Hospital, which was right on the edge of Lake Victoria. Here we observed the control arm of the trial.

Later we travelled to Macalder District Hospital where the integrated program took place. Team Migori had the opportunity of acting as external reviewers of the project which was an excellent hands-on learning experience. It showed us what was required to set up a clinical trial and to get it running. The main thing we took home from the experience was that community engagement is key especially in rural areas.

At a personal level, I felt the impact of these sites exposed the trainees to the reality that good research can also be performed in small resource-poor settings, such as these hospitals which only have the most basic of resources. These small resource-poor settings are able to strive to provide adequate health care as well as conduct clinical trials amidst the various challenges they face daily. I would like to especially thank our mentor, Dr. Maricianah Onono for making our site visit enjoyable and a great learning experience.



Team Bondo: L-R: Stella Njagi, Were Omange, Onyango Obila, Kaveri Gurav, and Zhujun Ao



Team Bondo: Onyango Obila, Melissa Smith, Stella Njagi, Were Omange, Kaveri Gurav and Zhujun Ao



Team Migori: Ifeoma Okwor, Salome, Satyanarayana, Joy, Winnie Apidi, Aida Sivo and Shamshad Khan at Rift Valley View Point at Mai Mahiu



Team Migori: Aida Sivo, Winnie Apidi, Shamshad Khan, Ifeoma Okwor, Satyanarayana, Salome (KACP) receiving a gift for their presentation

SCIENTIFIC DISCUSSIONS



Above: PhD trainee Were Omange presenting during the December 2012 Infectious Minds

The purchase of video conference equipment for each international site enabled important scientific discussions to take place in real time and allowed smaller sites the benefit of “critical mass”. These sessions are called Infectious Minds and over the years numerous sessions have taken place allowing trainees and mentors from all four of CIHR’s research pillars and the four international training sites to work cooperatively to explore issues of international infectious diseases and global health.

Each month a trainee-selected topic is presented by a team of trainees from different pillars and training sites. The trainees also invite a guest speaker, who is an expert in the field, to present on the topic and participate in the discussion. Below are a list of topics covered in 2012.



Split screen view of the Infectious Minds meeting from the four international sites: Canada, Kenya, India and Colombia

2012 Infectious Minds Sessions

January 19

Guest Speaker: Dr. Malcolm Xing, PhD

Presenters: Zhujun Ao, Melissa Herman, and Jennifer Juno

Topic: Nanoparticles

March 15

Guest Speaker: Alberto Severini

Presenting: Jayanna Krishnamurthy, Ifeoma Okwor, and Robert Were Omange

Topic: The Impact of Stem Cell Research in Everyday Life

April 12

Guest Speaker: Dr. Renee Douville, PhD

Presenting: Michael Babu Raj, Cisily Meeme, and Meika Richmond

Topic: Human Endogenous Retroviruses



Left: Trainees and mentors taking in the Infectious Minds meeting from the Colombia site

SCIENTIFIC DISCUSSIONS

2012 Infectious Minds Sessions

May 17

Presenting: Zulma Rueda, Suresh Sanjeeva, and Souradet Shaw
Topics: Multi-Level Modeling

September 27

Guest Speaker: Dr. Songok; PhD
Presenters: Alex Silaghi, Aida Sivro, and Derek Stein
Topic: International Infectious Diseases and Bio-terrorism

October 18

Guest Speaker: Dr. Maria Christina Navas
Presenters: Shamshad Khan, Yingfeng Zheng, and Natalia Taborda
Topic: Hepatitis C Virus

November 15

Guest Speaker: Amanda Sansregret
Presenters: James Sainsbury and Elizabeth Cooper
Topic: HIV and the Law

December 13

Guest Speaker: Dr. Robert Chernomas
Presenters: Melissa Herman, Robert Were Omange, and Dhanunjaya Rao Chintada
Topic: Health Economics



Yoav Keynan, a PhD trainee in the IID&GH Training Program during the question & answer session of the Infectious Minds meeting



Guest Speaker Dr. Robert Chernomas speaking about Health Economics at the December 2012 Infectious Minds meeting



James Sainsbury presents from Winnipeg to the Infectious Minds group

PRACTICA: 2012 REPORT

The intention of the practicum portion of the CIHR IID&GH Training Program, coordinated by Dr. John Wylie, is to expose trainees to a completely different type of learning experience apart from their main research area and to foster interdisciplinary research. The practica are intended to last from four to twelve weeks and to be tailored to the specific goals, objectives and time lines of each trainee. The Program encourages every trainee to seek out their own practica site in order to reach their practicum goal. However, if this is not possible the Program will provide the trainee with a list of possible practica sites to choose from. Upon completion of the practicum the trainee will write a report, and complete an evaluation form to provide feedback to the training program on their completed practicum experience.

In 2012, two trainees completed their practicum. A brief description of each practicum is provided below:

Jennifer Juno completed her practicum in The Office of Research Services at the University of Manitoba under the supervision of Dr. Gary Glavin. Jennifer is a PhD trainee with a basic science background who used her practicum to gain experience working with central administration on institutional level research priorities.

Lyle McKinnon, a PhD trainee with a background in basic science (Immunology), pursued his practicum with Professor Nico Nagelkerke. During his practicum he gained experience in advanced bio-statistical analysis of longitudinal data related to HIV risk and disease progression. The skills Lyle gained from his practicum were used to analyze epidemiological data gathered in various sex worker cohorts in Nairobi which have since resulted in multiple publications.



One of the lectures during the 2012 Kenya Course

PROGRAM ADVISORY COMMITTEE

The Program Advisory Committee (PAC) is composed of key stakeholders such as government, industry, community members, non-profit sector, academia, international partners and two of our trainees. This committee was struck in March 2010 and Dr. Gary Glavin, Associate Vice-President (Research) accepted the invitation to serve as the PAC Chair. The responsibilities of the PAC are to advise the Principal Investigator (Dr. Fowke), Core Committee (Drs. Wylie, Mignone, and Moses) and Program Coordinator (Ms. Natasha Hollett) of the program; provide recommendations; and give feedback with regard to the program goals, vision and responsibility. The first meeting of the PAC took place on May 12, 2010 and a second meeting was held on October 14, 2011. The next PAC meeting is scheduled for January 29, 2013.



A sculpture by artist Fernando Botero in Medellin, Colombia



A winter day in Winnipeg, Canada

PLANS FOR 2013

The trainees will be in Winnipeg to attend the “Ecology of Infectious Diseases (Eco ID)” course which will be held from May 6 - 17, 2013 hosted by the Canadian site leader Dr. Keith Fowke. As well the trainees will visit Medellin and Riohacha, Colombia to attend the “Practical Epidemiology and Indigenous Health” course which will be held from August 8 - 23, 2013, hosted by the Colombian Site leader Dr. Carlos Rojas.



The Metrocable. A form of public transportation in Medellin, Colombia linking the city center to the undeveloped suburban areas of the city

FUNDING & ACADEMIC PARTNERS

Funding Partners

- Canadian Institutes of Health Research (CIHR)
- Manitoba Health Research Council (MHRC)
- National Collaborating Centre for Infectious Diseases (NCCID)
- National Microbiology Laboratory (NML)
- Natural Sciences and Engineering Research Council (NSERC)
- Province of Manitoba –Innovation, Energy and Mines
- University of Manitoba
- Kenya AIDS Vaccine Initiative (KAVI)
- Colciencias

Academic Partners

- University of Manitoba
- University of Toronto Joint Centre for Bioethics
- University of Indiana Centre for Bioethics
- St. John’s Medical College
- University of Nairobi
- University of Manitoba Centre for Global Public Health
- Universidad de Antioquia



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des maladies infectieuses



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Canadian Institutes of Health Research (CIHR)
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