
Learning about research in Africa



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Introduction

Whether it is working on reducing the impact of harvesting on the global carbon budget in Cameroon, improving public healthcare service delivery through a web-based overlay to existing healthcare system in Ethiopia, investigating the beliefs, perceptions and knowledge about the causes of FASD and the effects of alcohol consumption during pregnancy in Ghana or identifying the needs and barriers among medical and nursing personnel as it relates to postoperative pain management in Kenya, the most recent phase of the Canada – Africa Research Exchange Grants (CAREG) program awarded funding to international research projects in a wide range of disciplines and countries.

Since it was established in 2010 and until 2016 when it came to an end, the CAREG program worked to promote international partnerships among academic researchers from Canada and their counterparts in Africa as they attempt to solve some of the most pressing challenges facing the continent through:

- the development of new action-oriented research and training collaborations or the strengthening and broadening of existing ones; and
- the improvement of the knowledge and know-how of African and Canadian academics.

The program was funded by the International Development Research Centre (IDRC) and managed by Universities Canada. CAREG supported small collaborative research initiatives that create and disseminate knowledge in IDRC’s four priority research areas: agriculture and the

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environment; science, technology and innovation; social and economic policy; and global health policy. Through a competitive funding process, the program provided up to \$40,000 per project largely to cover travel expenses. Between 2010 and 2016, CAREG funded 30 research partnerships.

In Phase 2 of the program, which ran from March 2013 to August 2016 CAREG awarded over \$ 860,000 to 22 projects in 11 African countries. It helped forge new international collaborations that have facilitated knowledge-sharing and capacity-building including the exchange of new laboratory techniques and the training of graduate students. The partnerships also resulted in important findings that informed public health and other policy reforms. Findings have been published in peer-reviewed journals and presented at national and international conferences and workshops.

Phase 2 by the numbers:

Competitions: 2

Project applications received: 79

Grants awarded: 22

11 African countries

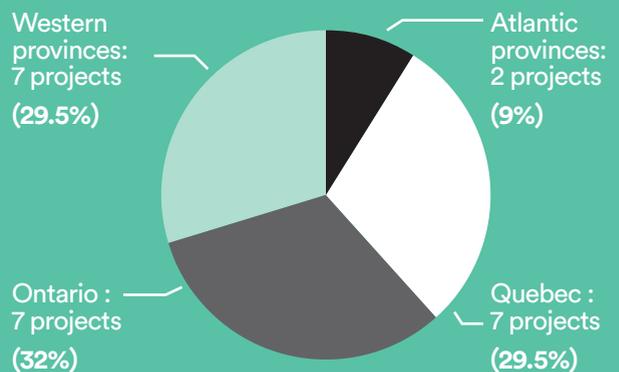
15 Canadian institutions involved in the projects

17 African institutions involved in the projects

Distribution of the 22 projects by African country (1 multi-country project) :

Algeria: 1	■	Rwanda: 1	■
Cameroon: 1	■	Senegal: 1	■
Cote d'Ivoire: 3	■	Sierra Leone: 1	■
Ethiopia: 1	■	South Africa: 4	■
Ghana: 5	■	Tanzania: 2	■
Kenya: 3	■		

Distribution of the 22 projects by province



Learning about research in Africa

Nathalie Kinnard

In spite of being from different sides of both the Atlantic Ocean and the Equator, Canadian and African researchers have a great deal to gain from working together. That is, provided they are aware of the different realities they will face on the two continents, particularly the perception of research and notions of time.

N’Doli Guillaume Assielou, from the Université Nangui Abrogoua in Abidjan, Ivory Coast, is convinced that science can help lift his country out of poverty. “But there is very little research being done in the Ivory Coast,” the researcher says. “There are very few grants, and it’s hard to get access to data.” Many African countries do not have the resources to make science a priority. Government authorities and businesses often see little interest in investing in scientific projects, particularly ones that are more theoretical than applied in nature.

When Dr. Assielou heard about the Canada-Africa-Research Exchange Grants (CAREG) program, financed by the International Development Research Centre (IDRC) and managed by Universities Canada, he jumped at the opportunity. “I contacted Mario Bourgault from Polytechnique Montréal, whom I had met in France, to propose a project on information and communication technology,” he says. The computer scientist was disturbed to see Ivory Coast ranking 122nd out of 144 countries for use of information and communication technology (ITC) by government and business. “Ivory Coast has no clear policy for developing and introducing new technologies and doesn’t offer training for entrepreneurs to use them,” he says. A specialist in implementing ITC, Mario Bourgault immediately signed on for the

adventure of a Canadian-African partnership, a first for him. The plan: to study the use of ITC in business, get the perceptions of entrepreneurs and public servants about new technologies and identify obstacles that slow their adoption in the country.



Isolating the fungi from plants on contaminated soil, Ghana

Slowly but surely

Although the two researchers were highly motivated by their partnership, there were many obstacles. “Contact on the ground and data collection were much tougher than I expected,” Mario Bourgault says. Challenges included the severe lack of official documentation on the topic, public servants who were hard to get hold of and endless red tape. “Even signatures from the university were hard to obtain, because the little research that is conducted is done individually, not as part of a collaborative effort,” adds N’Doli Guillaume Assielou.

The scientists nonetheless managed to meet with some 30 public servants and around 75 businesses to get a sense of the Ivory Coast’s ITC situation. “We hope our report will foster the implementation of ITC, which, ultimately, can help fight poverty and support economic growth,” Dr. Bourgault says. What did the Canadian researcher learn from this initial partnership with the Ivory Coast? “You need to step out of your comfort zone and account for the social, economic, cultural and scientific context of the other country. You also have to realize that the notion of time in Africa is very different from our own. You cannot underestimate this, and you need to allow more time than if you were doing a similar study on Canadian soil.”

Philip Matthews from the University of British Columbia’s Department of Zoology offers similar advice, having learned at the expense of his project that Africans and North Americans do not perceive time in the same way. Working with Dr. John Terblanche, from Stellenbosch University in South Africa, the researcher decided to study the nervous system of insects. The goal was to locate cells called chemoreceptors, which detect and

“You also have to realize that the notion of time in Africa is very different from our own. You cannot underestimate this, and you need to allow more time”

control oxygen and CO₂ levels, to better understand how insects breathe. This fundamental knowledge will help us understand insect sensitivity to climate changes. To accomplish this, the researchers had planned to submit the desert locust and the silkworm to different concentrations of gas in labs at Stellenbosch University. For safety reasons, the African university agreed to install an infrastructure of outdoor pipes to carry the gas to the lab. “When I arrived in South Africa, a number of months after the start of the project, the work still hadn’t been completed and was only finished after my departure,” Dr. Matthews says. Since the Canadian university didn’t have an appropriate lab to conduct this type of study, that part of the project had to be abandoned. “The next time, we will have official, written agreements in place between the two universities to avoid unpleasant surprises, and I will have a Plan B,” the Canadian researcher says, laughing.

Research also took longer than planned for Jack Saddler from UBC’s Department of Wood Science and Johann Görgens from the Department of Process Engineering at Stellenbosch University in South Africa. In fact, Dr. Saddler did not even get to Africa to work in his partner’s lab. “We needed more time and an additional grant to follow up with the companies involved in our project,” Dr. Saddler says. But he still qualifies their work as a success. Canadian and African scientists compared two

Slowly but surely

steam treatment facilities for forest biomass, one at UBC and the other at Stellenbosch University. “Using biomass makes it possible to reduce our dependence on oil and emit less CO₂,” Jack Saddler says. “But to convert biomass into fuel, pre-treatment is required to open the wood structures and allow the enzymes to decompose the carbohydrates into sugar, which can then be fermented into fuel.” The most commonly used pre-treatment is steam pulping, also called steam explosion. The unfortunate disadvantage is that this considerably reduces the amount of biomass available, plus it costs more. The project made it possible to establish guidelines to improve this step, which is often a hurdle to the use of biomass.

Time was also a factor for a project run by Patrick Drogui from the INRS Research Centre on Water, Earth and the Environment and Benjamin Yao, from the Institut National Polytechnique Houphouët-Boigny, in Ivory Coast. “We ran out of time to complete the data analysis and take our potable water treatment prototype to full commercial scale,” says the Canadian researcher, who wishes the grant could be extended. Dr. Drogui and Dr. Yao designed a process that uses bio-adsorbents from agricultural waste, like biomass, to eliminate pollutants from rivers and other sources of drinking water. “In Ivory Coast, access to clean water remains a problem, particularly in rural areas,” Benjamin Yao says. “So we developed a portable filtration unit, which is easy to use and not too cumbersome.” The project ended with the installation of a prototype near a potable water source in a village of 300 people. “The villagers were trained to prepare the activated charcoal from agricultural waste and sand, and use it as a filter for pollutants,” Patrick

Drogui says. “This step forced us to simplify things, because the majority of the population has very little education, and we had only one week to teach them how to maintain the filtration system.” The researchers are now trying to find additional financing to patent their approach and export their model more widely.



Preprocessing stage of activated charcoal, Ivory Coast

The springboard effect

Whether projects move slowly or not, scientists see the CAREG program as a catalyst. It is tremendous leverage for obtaining other grants and conducting other international projects, Patrick Drogui and Benjamin Yao report. They received funding from the *Agence Universitaire de la Francophonie* to develop advanced treatment technologies for water contaminated with persistent pollutants (e.g. hormones, pharmaceuticals) and are currently collaborating on a bioplastics project. “As an agricultural country, Ivory Coast produces a lot of organic waste that can be used in water treatment processes and to make bioplastics,” Dr. Drogui says. As for Johann Görgens and Jack Saddler, they report that their collaboration made it possible to develop other activities in their two countries. For example, the Dean of UBC’s Faculty of Forestry took part in a forestry conference in South Africa.

The project on rheumatological diseases, headed up by Carol Hitchon from the University of Manitoba’s Faculty of Medicine and her colleagues at McGill University, in partnership with Dr. Thomas Ngwiri and Dr. Eugene Were from Gertrude’s Children’s Hospital, in Nairobi, Kenya, enabled a Kenyan pediatrician to take courses in epidemiology and statistics at McGill. It was the practically non-existent research into rheumatology in Africa, and therefore a crucial lack of basic scientific data, that pushed Carol Hitchon and her partners to study inflammatory diseases such as rheumatoid arthritis and lupus. “We are not very familiar with the symptoms and even less so with the frequency of rheumatological complaints in Kenya. There was a glaring need to increase knowledge in rheumatology among physicians and clinicians but also to have data to develop public health programs and policies,” Dr. Hitchon says. Researchers therefore

“There was a glaring need to increase knowledge in rheumatology among physicians and clinicians but also to have data to develop public health programs and policies”

designed diagnostic aid tools for hospital clinicians. By analyzing tons of paper and electronic files, the team from Gertrude’s Children’s Hospital developed expertise in epidemiology which can be used to characterize other illnesses. Dr. Were is working on a research protocol to study the frequency and impact of musculoskeletal pain in school-aged children in Kenya, and a pediatric rheumatology clinic should one day be opening its doors at the hospital.

For Adrien Djomo, from the Department of Geography and Planning at Queen’s University, and Louis Zapfack, a specialist in botany at the University of Yaoundé 1 in Cameroon, the CAREG led to the creation of International Forest and Environment Development (IFED), an international organization based in Canada which specializes in forestry management and mitigating climate change. Louis Zapfack is the regional director for Central Africa. “We believe that the forest, specifically the tropical forest, must play a role in mitigating climate change,” Adrien Djomo says. So we developed tools to evaluate forestry management practices in Cameroon in relation to carbon storage, given that deforestation and the degradation of forests accounts for around 20% of greenhouse gas emissions.” The project developed forestry research capacities in Cameroon, thanks to conferences

The springboard effect

given by Dr. Djomo in universities across the country.

“The researcher and the lab receive international recognition,” says Issouf Fofana, from the Department of Applied Science at the Université du Québec à Chicoutimi. “We train graduate students and even professional researchers on issues that would never have been addressed without the CAREG program.” Dr. Fofana’s team acquired expertise on the technological use of natural substances extracted from exotic plants. Working with Sorho Siaka from the Institut National Polytechnique Félix Houphouët-Boigny, in Ivory Coast, the Canadian researcher used ancestral knowledge and local plants to solve an environmental and economic problem. The synthetic products used in the oils of power transformers, i.e. high-voltage electrical components, oxidize over

“We train graduate students and even professional researchers on issues that would never have been addressed without the CAREG program.”

time. This can cause disruptions in electricity transmission and distribution networks running into the thousands of dollars, in addition to posing pollution risks. Why not use biodegradable composites that respect the environment? So the scientists analyzed extracts from the *Mareya micrantha*, a local plant, and from the Canadian paper birch. In addition to proving that the extracts of these plants prevent the oxidation of oils, the researchers opened a new avenue for research into environmentally friendly antioxidants of inexpensive plant origin.



2016 workshop participants, Kenya

At the service of communities

The public also benefits from the CAREG program. Teachers now have access to an online guide for designing and making low-cost educational tools available in English and Swahili. A thousand people, if not more, have consulted this document, which was produced by Susan Crichton, from the Faculty of Education at the Okanagan campus of UBC, and Lilian Vikiru, at the time a professor at the Aga Khan University in Tanzania. Many researchers and teachers from around the world have contacted Dr. Crichton to discuss her approach, which involves using resources from the environment to energize student learning. “We proved that we don’t have to use technology to get teachers and students to think, experiment, design and innovate through creativity,” Dr. Crichton says. “You just have to get them out of the classroom and tap into local resources.” As part of the project, teachers from Turiani made a duck from old socks, bits of sponge, cardboard, buttons, paper, glue, paint and clay. The model can be used to talk about the animal, its environment, its eating habits and differences from other species found in Tanzania. “Now we are trying to encourage collaboration between schools and industry, to get access to equipment, objects and accessories to further promote active teaching with the spirit of design,” the Canadian researcher says. Through the project, a manufacturing and design centre for teachers was introduced at the Aga Khan University and in the village of Turiani. Recently, Lilian Vikiru, appointed registrar for academic affairs at a new university in Kenya, has been trying to secure financing to introduce the same concept there.

In Thika, Kenya, a project financed by the CAREG program has made the public aware of the existence of the *Toxoplasma gondii* parasite, which is responsible for

toxoplasmosis, an infection that can cause miscarriages or serious harm to fetuses, such as mental development delays and blindness. The parasite, which is passed on by animals living in close contact with humans, particularly affects people with AIDS or who have had transplants, because of their compromised immune systems. “The Thika region is known for having the highest number of cases of AIDS in Kenya and accordingly more people at greater risk of developing toxoplasmosis,” says Naomi Maina, from Jomo Kenyatta University of Agriculture and Technology, in Nairobi, Kenya. Since the prevalence of the parasite has not been documented in Kenya, Dr. Maina and Dr. Lucy Mutharia, from the Department of Molecular and Cellular Biology at Guelph University, decided to isolate the parasite at different stages in its development to establish a cryopreservation bank. “This confirmed the presence of the parasite in domestic cats, dogs and chickens, and we were able to create a bank of genetic material that can be used by other researchers,”



Using found materials, teachers create teaching resources, Tanzania

At the service of communities

Lucy Mutharia says. The two scientists also worked with Dr. Simon Muturi Karanja, from the School for Public Health, which is currently using data to educate populations at risk about the transmission of the parasite between animals and human beings. What was learned during the project was also sent to vets and medical personnel in the region. All animals belonging to families who participated in the project were immunized and treated for free.

In Senegal, another parasite is a major source of stomach problems. The larva of a trematode worm called schistosoma causes bilharziasis, an intestinal or urinary tract infection that has become the second most common reason for hospital visits in the country after malaria. Given the alarming situation, the Université Cheikh AntaDiop in Dakar and Université du Québec à Montréal (UQAM), under the aegis of Halima Elbiaze, decided to pool their expertise in information technology to institute an epidemiological monitoring system based on a network of sensors and cell phones. “The CAREG program allowed us to create a network of sensors that measure the ambient temperature and humidity, the level of solar irradiation, pH and the movement of the water,” says Bamba Gueye, from the Department of Mathematics and Computer Science at Université Cheikh Anta Diop. We achieved 75% of our goals, but we didn’t have enough time or money to develop sensors capable of detecting substances secreted by the parasite when it is in the water.” The sensors currently in place nonetheless show the environmental conditions conducive to the development of the parasite and send warning messages to the public via cell phone, in the form of a text or via a mobile app. Plus, the IDRC grant made it possible to raise public

“The IDRC grant made it possible to raise public awareness about the problem of the parasite”

awareness about the problem of the parasite: Dr. Gueye was invited to speak on Senegalese television and made educational videos about the topic available via social media.

Even though research takes more time to complete in Africa, it is worth doing—something all the scientists involved in Canadian-African partnerships believe. “The benefits of research projects, whether social, professional or personal, make the adventure so rewarding,” Mario Bourgault says. “I would do it again, no question, but I would prepare differently given the logistics and different cultural context.”



A relay antenna built on top of a building, Senegal

Before launching a Canadian-African partnership

- Prepare to step outside of your comfort zone
- Forget all your preconceived notions
- Take each country's individual context into account
- Be open to a different culture
- Find a partner with complementary expertise
- Divide tasks evenly between the two teams
- Set up a schedule that reflects the differing notions of time between the two countries
- Ensure you have written commitments from participating universities and institutions
- Plan trans-Atlantic travel well in advance
- Have a Plan B if travel plans fall through
- Stay in regular contact via Skype and email



E-health in Ethiopia

Shifting to digital health is no mean feat, especially for developing countries that may not have access to sophisticated tools for integrated hospital information management. Additionally, medical staff may not be trained to respect the electronic privacy of patients, many of whom worry that their records might be inappropriately disclosed. This could have serious repercussions for patients with HIV/AIDS, such as the abandonment of medical follow-up. The situation is undermining Ethiopia's efforts to encourage people to seek treatment and defeat the country's AIDS epidemic.

“As a result of the digital shift, health care facilities are facing tremendous challenges”

and must find a user-friendly system that puts the confidentiality of patient information first.

Researchers Mohammad Zulkernine, from Queen's University, and Dejene Ejigu Dedefa, from Addis Ababa University in Ethiopia, are proposing a solution to Black Lion Referral and Teaching Hospital and the Korean Memorial Hospital which allows patients to schedule doctor's appointments and gives them confidential online access to their test results and prescriptions. Their prototype uses OpenMRS, a collaboration tool for developing software solutions to support health care delivery in developing countries. Data encryption ensures information security and privacy. The flexible, open-source system can be adapted to new contexts with zero programming. Scientists hope to implement their solution elsewhere in

Ethiopia and Africa to better control AIDS and sexually transmitted infections. The system, which is designed for managers, administrators, clinicians and patients, is also available as an Android app.

Researchers: Mohammad Zulkernine, Queen's University, Canada; Dejene Ejigu Dedefa, Addis Ababa University, Ethiopia.

Freeing women from violence in Sierra Leone and Kenya

For many African women, subsistence often comes with a side order of violence. In countries such as Sierra Leone and Kenya, which are attempting to rebuild their economies in the aftermath of ethnic and political conflict, many women risk their health and safety to avoid living in poverty. Some agree to labour in artisanal mines, which are a major source of income in these countries. Others sell food, clothing or sexual services to the miners. Sexual violence is rampant in these small-scale and sometimes illegal mining operations; no official regulatory framework exists to safeguard health, improve safety or combat violence against women. Blair Rutherford, Director of the Institute of African Studies at Carleton University in Ottawa, conducted field research in partnership with the University of Sierra Leone and University of Nairobi and spoke with officials, members of various organizations and the women involved.

“The Canadian-African study confirmed that women in redeveloping countries are often forced to accept unsafe and insecure jobs in artisanal mines to survive.”

Moreover, policymakers are not sufficiently interested in the link between sexual violence and these workers’ livelihoods.

Professor Rutherford and his colleagues are currently setting up a network of African scientists who will continue working on the subject. By improving regulations and defining working conditions, they hope to influence policymakers to help women obtain secure and sustainable jobs. To learn more, visit the two Facebook groups the researchers created as part of the project: “Women and Conflict Economies” and “Gender and Mining in Africa.”

Researchers: Blair Rutherford and Doris Buss, Carleton University, Canada; Aisha Ibrahim, University of Sierra Leone, Sierra Leone; Sarah Kinyanjui, University of Nairobi, Kenya.

Groundwater management in Algeria

Ironically, the areas we have studied least are those hit hardest by droughts brought on by global warming. For this reason, Benoît Courcelles from Polytechnique Montréal and a number of Algerian colleagues decided to analyze the impacts of climate change and anthropogenic pressures on the Soummam watershed in northeastern Algeria. The researchers implemented a measurement network to collect geological, hydrological, meteorological and hydrographical data and build time series. They also researched historical climatic events such as floods, mudslides and droughts. Their goal was to profile the local groundwater resources, identify vulnerable areas and high-risk activities, and highlight the impacts of climate change on water resources.

However, the project was not without problems. The Algerian researchers were unable to come to Canada, and the Canadian government issued a terrorist attack warning that prevented Professor Courcelles from visiting Algeria. Nevertheless, the Canadian-Algerian team is confident that its research findings will help Algerian leaders better protect surface water resources and anticipate events related to climate change (high water, flooding, drought and erosion).

Researchers: Khodir Madani, University of Béjaïa, Algeria; Hocine Bendadouche, University of Béjaïa, Algeria; Benoît Courcelles, Polytechnique Montréal, Canada.

Using plants to clean up mines in Canada and Ghana

Canada and Ghana have a problem in common: countless mining sites are contaminated with heavy metals such as lead, zinc and cadmium, which are harmful to the environment and human health. Many techniques have been tested to clean up and restore polluted sites, without any real success. Researchers Ebenezer J.D. Belford, from Kwame Nkrumah University of Science and Technology in Ghana, and Sharon Regan, from Queen's University, are leveraging the power of phytodecontamination, which uses hyperaccumulating plants to rehabilitate contaminated soil. These plants, grown in contaminated soil, can absorb heavy metals and nutrients at the same rate. They then store the pollutants in their leaves, roots and stems. However, these super-plants struggle to grow in nutrient-poor polluted sites. One solution might be mycorrhizal fungi, which help the plants absorb nutrients and even enhance their powers of decontamination.

The researchers focused on an operational gold mine in Ghana and a former zinc and copper extraction site in Canada. They identified, collected and cultivated native mycorrhizal fungi. However, the fungi did not grow as quickly as expected, and Dr. Regan submitted a funding application to Genome Canada to pursue DNA sequencing. For his part, Dr. Belford plans to spend his year-long sabbatical at Queen's University in 2016-17 to pursue the project.

“Ultimately, the researchers would like to study ways to protect people from contaminated mining soil.”

Unlike in Canada, sites in Ghana remain open to the public. The scientists hope to collect conclusive scientific data to convince policymakers to develop appropriate regulations.

Researchers: Ebenezer J. D. Belford, Kwame Nkrumah University of Science and Technology, Ghana; Sharon Regan, Queen's University, Canada.

Safely returning to the road in South Africa

An illness, accident, trauma or natural aging impacts one's senses, perceptions, and cognitive and psychological functions. For many people, it also compromises their ability to drive. Before getting back in the driver's seat, these individuals are assessed by medical professionals specialized in driver screening. However, the problem with these assessments is that they are created in developed countries such as Canada and do not account for different realities in developing countries. In South Africa, road infrastructure is sometimes lacking, many drivers don't wear seatbelts and clinicians are not properly trained to evaluate a person's capacity to get back on the road.

Sherrilene Classen, from Western University, and Lana van Niekerk, from Stellenbosch University in South Africa, set out to adapt these tests to local cultural contexts and develop training programs for health professionals.

“The project will be critical in helping South Africa reduce its annual traffic accident death rate from the current 33.2 per 100,000 people, one of the world’s highest.”

The researchers are developing the first clinical guidelines to screen South African drivers. They are also creating tools to promote safe driving and support those who have to stop driving.

Researchers: Sherrilene Classen, Western University, Canada; Lana van Niekerk, Stellenbosch University, South Africa.

Managing postoperative pain in Rwanda

Numerous medical conditions come with their fair share of pain. At least relief can be found at a well-stocked pharmacy or a treatment centre; it’s just a matter of spending some money, right? Not so in many developing countries. For example, a Nigerian study found that only 50% of emergency room patients receive painkillers. Of those who receive treatment, 80% continue to experience moderate to severe pain. Furthermore, two-thirds of postoperative patients must cope with moderate to unbearable pain for 24 hours after leaving the operating room. Unmanaged pain can result in significant physical and psychological complications, such as chronic pain and extended hospitalizations.

Canadian researchers Joel Parlow and Ana Johnson, from Queen’s University, and their partners Gaston Nyirigira and Theogene Twagirumugabe, from the University of Rwanda, wanted to find out whether the same held true in Rwanda. They conducted surveys, personal interviews and discussion groups with nurses, physicians and managers at Kigali University Teaching Hospital (KUTH) and Butare University Teaching Hospital (BUTH). Their goal was to analyze the postoperative pain management models at Kigali and Butare and understand what compromises or facilitates pain management.

The preliminary findings showed that only 56% of respondents said they always or often used a protocol to relieve pain.

“Since Rwandan hospitals and clinics lack qualified staff, resources and services, pain management may not be a priority.”

Some facilities don't even have running water or electricity! Physicians and nurses are busy enough treating malaria, tuberculosis and AIDS without having to think about giving painkillers to postoperative patients. In addition, the fear of causing addiction and the unavailability of medication limit the use of painkillers. Via the project, Rwandan researchers created an interdisciplinary pain management team to promote good practices for managing acute postoperative pain.

Researchers: Joel Parlow and Ana Johnson, Queen's University, Canada; Gaston Nyirigira and Theogene Twagirumugabe, University of Rwanda, Rwanda.

Saving mothers and babies in Tanzania

According to the World Health Organization, some 75% of neonatal deaths occur within the first week of life. The vast majority of these deaths occur in developing countries, where nearly half of all mothers and their newborns do not receive skilled care during and immediately after birth. In Tanzania, there are 454 maternal deaths per 100,000 live births and 51 infant deaths per 1,000 live births. Surprisingly, only 31% of mothers come in for a check-up 48 hours after giving birth. Why?

Thecla Kohi, from Muhimbili University in Tanzania, and Megan Aston and Gail Tomblin, from Dalhousie University, met with midwives and obstetricians to find out how postpartum care is coordinated in Tanzania. The researchers also assessed the skills of medical staff to see how their interventions might affect a delivery. They found that access to health care and postpartum and breastfeeding information is critical for lowering the mortality rate in Tanzania. Mixed feeding—mother's milk and commercial infant formula—is prevalent in Tanzania.

“Better informing parents of the benefits of mother's milk for strengthening the immune system could decrease the infant mortality rate.”

Tanzanian and Canadian scientists are in the process of writing seven manuscripts to publish their research findings.

Researchers: Thecla Kohi, Muhimbili University, Tanzania; Megan Aston and Gail Tomblin, Dalhousie University, Canada.

Optimizing water use in South Africa

A forecasting model developed by Heinz Jacobs, from Stellenbosch University in South Africa, and Musandji Fuamba, from Polytechnique Montréal, showed that

“domestic water needs in South Africa will rise 400% by 2039.”

The chief factors to blame are population growth and decreased precipitation, both of which lead to increased use of irrigation. To make such estimates, the researchers developed a model that incorporated climate change parameters into an existing assessment model for residential water demand. They calculated the population’s daily water needs and focused on irrigation, which significantly increases the demand for water and is heavily influenced by climate change. The project is notable for its interest in urban agriculture. Water distributed through the aqueduct system is used by families to grow fruits and vegetables in their gardens. The model will help leaders plan ways to adapt. For example, one possible option is to irrigate the city using desalinated seawater and untreated water.

Researchers: Heinz Jacobs, Stellenbosch University, South Africa; Musandji Fuamba, Polytechnique Montréal, Canada.

Women’s views on health in Ghana

Different cultures view health in different ways. Similarly, people within the same country may not interpret public health advisories in the same way. Messages promoting public health, and the way they are brought across, must be adapted. Those were the findings of a study in Ghana led by Helen Vallianatos and Magdalena Sophia Richter, from the University of Alberta, and Kwasi Ansu- Kyeremeh, from the University of Ghana. To reach these conclusions, the researchers interviewed women in a small village in Ghana and others who had moved to Accra, the capital. Their questions centred on perceptions of health, child care and personal hygiene. The idea was to understand how surroundings and living environments influence views of health and healthy practices. For example, do views on health affect child care? Does a child’s sex influence the way the mother cares for it? How do women learn about health?

“The scientists’ findings showed that modern technologies and marketing methods were not sufficient for things like informing the public about a health crisis.”

While these methods widely disseminate health messages, they do not reach all members of a community. Mass distribution of posters or brochures is useless for women in rural areas, most of whom cannot read. More traditional means of communication, such as plays and

songs, remain essential for reaching all population strata. The project results will soon be available in scientific articles and via conferences.

Researchers: Helen Vallianatos and Magdalena Sophia Richter, University of Alberta, Canada;
Kwasi Ansu-Kyeremeh, University of Ghana, Ghana.

Alcohol and pregnancy in Ghana

Alcohol and pregnancy don't mix. Numerous studies show that alcohol can adversely affect a baby's mental and physical health. However, the message still hasn't gotten through to everyone. In Ghana, for example, pregnant women are consuming more alcohol than before, and we aren't sure why. Researchers Michael Baffoe and Don Fuchs, from the University of Manitoba, and Mavis Dako-Gyeke, from the University of Ghana, wanted to find out more. They met with pregnant women, young men and women of childbearing age in southern Ghana to learn about their beliefs, perceptions and knowledge concerning fetal alcohol syndrome. They also asked them what type and quantity of alcohol is consumed during pregnancy.

Some respondents said they were aware of the syndrome and knew that alcohol could cause mental and physical developmental delay in babies.

“However, many did not see a connection with alcohol, but rather with spiritual powers and witchcraft.”

The way a woman dresses and eats during pregnancy, whether she has sinned or if her family is cursed would determine whether an infant would have a disability. Many babies born with deformities are seen as products of black magic and are often abandoned or hidden away. The study also showed that pregnant women drink alcohol to increase their appetite, to relax during pregnancy and childbirth, or to terminate an unwanted pregnancy. The researchers hope that these findings will serve to develop prevention approaches and culturally adapted interventions for Ghanaian women and families.

Researchers: Michael Baffoe and Don Fuchs, University of Manitoba, Canada; Mavis Dako-Gyeke, University of Ghana, Ghana.

Wanted: housing for HIV-positive individuals in Ghana

Housing conditions can be detrimental to health. For example, a polluted living environment impacts the respiratory, nervous and cardiovascular systems. The World Health Organization considers housing to be a major determinant of an individual's health. How about for people with HIV? While some Canadian and U.S. studies are starting to focus on the housing needs of vulnerable populations, notably HIV-positive individuals, such studies are practically inexistent in sub-Saharan Africa.

Researchers Eric Y. Tenkorang, from Memorial University in Newfoundland, and Adobea Y. Owusu, from the University of Ghana, wanted to address this knowledge gap by conducting surveys and interviews among approximately 600 people with HIV/AIDS. One of their questions was about access to a safe and affordable living environment.

“Did their health, negatively perceived by the public, close doors on good housing?”

Or rather their wallets, drained by an illness that precludes them from working? The scientists also looked at ways substandard housing impacts the health of these vulnerable individuals. Lastly, they inquired about eviction. Are women more heavily affected? How does it impact medical treatment and follow-ups?

Due to lack of time, the researchers were unable to submit their project findings to Ghanaian policymakers. Professors Tenkorang and Owusu plan to do so shortly to show the government that housing conditions can form part of an integrated AIDS strategy. Recently, their joint efforts earned them a major grant to study domestic violence in Ghana, especially in areas affected by HIV/AIDS.

Researchers: Eric Y. Tenkorang, Memorial University of Newfoundland, Canada; Adobea Y. Owusu, University of Ghana, Ghana.

CAREG phase 2 projects

Project titles are presented in the language of the grant proposal

Algeria

Évolution de la ressource en eau du bassin versant de la Soummam: diagnostic et proposition d'outils de gestion des eaux superficielles et souterraines

Dr. Benoît Courcelles, Polytechnique de Montréal, Canada

Dr. Khodir Madani, Université de Béjaïa, Algérie

Hocine Bendadouche, Université de Béjaïa, Algérie

Cameroon

Quantifying the impact of forest management practices on carbon storage in forest ecosystems in Africa: Implications for the development of REDD+ initiatives in the Congo Basin

Dr. Neal Scott, Queen's University, Canada

Dr. Adrien Djomo, Queen's University, Canada

Dr. Louis Zapfack, the University of Yaounde 1, Cameroon

Côte d'Ivoire

Conception et vulgarisation d'un prototype portatif et mobile de traitement d'eau de consommation pour une utilisation en milieu rural

Dr. Patrick Drogui, Institut national de la recherche scientifique, Canada

Dr. Satinder Brar, Institut national de la recherche scientifique, Canada

Kouassi Benjamin Yao, Institut National Polytechnique Félix Houphouët-Boigny, Côte d'Ivoire

Kopoin Adouby Institut National Polytechnique Félix Houphouët-Boigny, Côte d'Ivoire

Le processus d'adoption et d'intégration des TIC dans les PME ivoiriennes : freins, facteurs d'adoption, sources d'influence, impacts

Mario Bourgault, Polytechnique de Montréal, Canada

N'Doli Guillaume Assiérou, Université Nangui Abrogoua, Côte d'Ivoire

Étude d'extraits végétaux pour application comme passivateurs naturels d'huile de transformateur de puissance

Issouf Fofana, Université du Québec à Chicoutimi, Canada

Betie Amidou, Université du Québec à Chicoutimi, Canada

Sorho Siaka, Institut National Polytechnique Felix Houphouet-Boigny, Côte D'Ivoire

Yaya Sorho, Institut National Polytechnique Felix Houphouet-Boigny, Côte D'Ivoire

Zié Yeo, Institut National Polytechnique Felix Houphouet-Boigny, Côte D'Ivoire

Koffi Golly, Institut National Polytechnique Felix Houphouet-Boigny, Côte D'Ivoire

Ethiopia

Secure and trustworthy reservation and medical records system (STRMRS)

Dr. Mohammad Zulkernine, Queen's University, Canada

Dr. Dejene Ejigu, Addis Ababa University, Ethiopia

Ghana

Diabetic foot project (DIFOPRO): A collaborative study on diabetic foot

Dr. Charles Quist-Adade, Kwantlen Polytechnic University, Canada

Dr. Samuel Debrah, University of Cape Coast, Ghana

Dr. De-Valera Botchway, University of Cape Coast, Ghana

Dr. Samuel Anane Essoun, Central/Regional Teaching Hospital, Ghana

Mr. Derek Anamaale Tuoyire, University of Cape Coast, Ghana

Dr. Sebastian Eliason, University of Cape Coast, Ghana

Ms. Stephanie Howes, Kwantlen Polytechnic University, Canada

Canadian–African academic partnership: Promoting applied knowledge and management of bio-phytoremediation as a new biotechnology tool to alleviate environmental stress of West African mine tailings

Dr. Sharon Regan, Queen's University, Canada

Dr. Ebenezer J. D. Belford, Kwame Nkrumah University of Science and Technology, Ghana

Saving the brains of unborn children: Understanding the prevalence of Fetal Alcohol Spectrum Disorder (FASD) in Ghana

Dr. Michael Baffoe, University of Manitoba, Canada

Dr. Don Fuchs, University of Manitoba, Canada

Dr. Mavis Dako-Gyeke, University of Ghana, Ghana

Gender, health and place: A multi-site ethnography of women's experience and perceptions of health

Dr. Helen Vallianatos, University of Alberta, Canada

Dr. Magdalena Sophia Richter, University of Alberta, Canada

Dr. Kwasi Ansu-Kyeremeh, University of Ghana, Ghana

Housing and health needs among HIV positive persons in Agomanya, Ghana

Dr. Eric Y. Tenkorang, Memorial University, Canada

Dr. Yaa A. Owusu, University of Ghana, Ghana

CAREG phase 2 projects

Kenya

The spectrum of pediatric rheumatic disease in East Africa

Dr. Carol Hitchon, University of Manitoba, Canada

Dr. Ines Colmegna, McGill University, Canada

Dr. Sasha Bernatsky, McGill University, Canada

Dr. Rosie Scuccimarrì, McGill University, Canada

Dr. Thomas Ngwiri, Gertrude's Children's Hospital, Kenya

Eugene Were, Gertrude's Children's Hospital, Kenya

John Wachira, Gertrude's Children's Hospital, Kenya

Omondi Oyoo, University of Nairobi, Kenya

Genetic diversity of *Toxoplasma gondii* isolates from chickens, feral and household cats in Thika District, Kenya

Dr. Lucy Matharia, University of Guelph, Canada

Dr. Naomi W N. Maina, Jomo Kenyatta University of Agriculture and Technology, Kenya

Dr. Simon M. Karanja, Jomo Kenyatta University of Agriculture and Technology, Kenya

Rwanda

Education and practice in perioperative pain management at two academic medical centres in Rwanda

Dr. Ana Johnson, Queen's University, Canada

Dr. Joel Parlow, Queen's University, Canada

Dr. Ryan Mahaffey, Queen's University, Canada

Dr. Theogene Twagirimugabe, University of Rwanda, Rwanda

Senegal

Mise en place d'un système de veille épidémiologique pour la bilharziose basé sur l'utilisation d'un réseau de capteurs auto-organisable

Dr. Halima Elbiaze, Université du Québec à Montréal (UQAM), Canada

Dr. Cheikh Ahmadou Bamba Gueye, Université Cheikh Anta Diop de Dakar, Sénégal

Dr. Ibrahima Niang, Université Cheikh Anta Diop de Dakar, Sénégal

Dr. Moussa Diallo, Université Cheikh Anta Diop de Dakar, Sénégal

Dr. Cheikh Elkabir Lo, Université Cheikh Anta Diop de Dakar, Sénégal

South Africa

Using biomass as way to evolve from a hydrocarbon based economy to a sustainable carbohydrate based society

Dr. Jack Saddler, Department of Wood Science, University of British Columbia, Canada

Dr. Johann F Görgens, Department of Process Engineering, Stellenbosch University, South Africa

International guidelines for fitness-to-drive assessment: A cooperative inquiry mixed methods approach

Dr. Sherrilene Classen, Western University, Canada

Dr. Lana Van Niekerk, Stellenbosch University, South Africa

Expected changes in domestic water use in the climate change (CC) context: Case of Southern Africa

Dr. Musandji Fuamba, Polytechnique de Montréal, Canada

Dr. Heinz Jacobs, Stellenbosch University, South Africa

The physiology of respiratory chemoreceptors in insects

Dr. Philip G. D. Matthews, University of British Columbia, Canada

Prof. John S. Terblanche, Stellenbosch University, South Africa

Tanzania

Leapfrogging pedagogical challenges: Using appropriate technology to foster innovations in literacy for the knowledge age

Dr. Susan Crichton, University of British Columbia Okanagan, Canada

Dr. Lillian Vikiru, Aga Khan University, Institute for Educational Development, Tanzania

Innovation exchange: Strengthening evidence based maternal child care in Nova Scotia and Tanzania

Dr. Megan Aston, Dalhousie University, Canada

Dr. Thecla W. Kohi, Muhimbili University of Health and Allied Sciences, Tanzania

Multi-country

Kenya and Sierra Leone

Women and post-conflict state-building in Sierra Leone and Kenya: Researching economies of gendered insecurity

Dr. Blair Rutherford, Carleton University, Canada

Dr. Doris Buss, Carleton University, Canada

Aisha Fofana Ibrahim, University of Sierra Leone, Sierra Leone

Sarah Muringa Kinyanjui, University of Nairobi, Kenya

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