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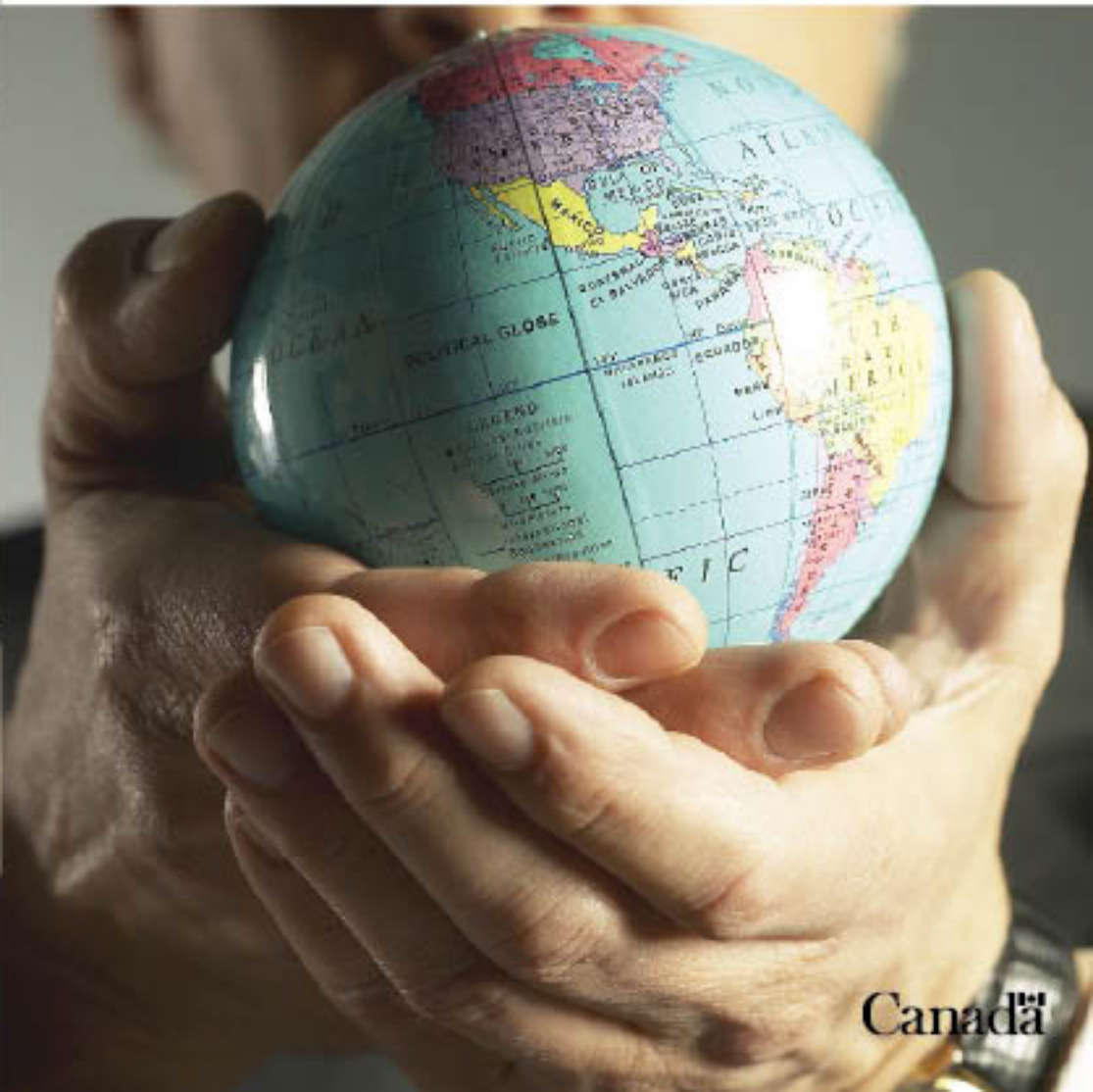
Global Health

Healthy Canadians in a Healthy World



Global Health

Healthy Canadians in a Healthy World

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Global Health

Healthy Canadians in a Healthy World

Introduction

The boundaries of the world are contracting – and Canada is not insulated from the health problems that affect the lives of people around the world. Canadians can't be healthy in an unhealthy world.

Low- and middle-income countries (LMICs) face particular health challenges, including epidemic-level HIV/AIDS, infectious diseases, lack of adequate health services and insufficient health professionals to deliver those services – as do some populations in developed countries, such as indigenous peoples. Yet, despite the great need, fully 90% of the world's investment in health research goes toward those diseases that are responsible for just 10% of the global disease burden.

To address this 10/90 gap, as it is commonly known, and in keeping with the United Nations' Millennium Development Goals, CIHR has identified global health research as a priority and is undertaking a wide range of activities, such as the Global Health Research Initiative, intended to support health research that responds to the health challenges and needs of LMICs around the globe. As well as funding research, CIHR is creating partnerships to help build research and institutional capacity in these countries and better enable them to respond to their own health challenges.

In a global world, Canada cannot sit apart. The global health research initiatives highlighted in the following pages are CIHR's expression of its commitment to healthy Canadians in a healthy world.

CIHR at a Glance

Founded in 2000, the Canadian Institutes of Health Research (CIHR) is Canada's response to the global revolution in health research. CIHR's mandate is to create new knowledge – and translate that knowledge into improved health, a strengthened health-care system and new health products and services for Canadians.

CIHR takes a problem-based, multidisciplinary approach to the health challenges facing Canadians. Its inclusive approach brings together researchers from all disciplines, from the social sciences to biomedical sciences, informatics and engineering.

By building partnerships, national and international, CIHR brings new perspectives to health and ensures that research findings are applied where they are needed.

The majority of CIHR funding goes toward supporting investigator-initiated research. A proportion, however, is set aside for strategic initiatives intended to pursue areas of research where the need is great.

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The Need

Low- and middle-income countries (LMICs) face significant health challenges, many of which are distinct from those faced by high-income nations. Infant mortality is high, life expectancy is low and the risk of infectious disease acute.

Millions of people in LMICs die each year of diseases that are both preventable and treatable. Every year, more than 500 million people become severely ill from malaria and more than one million of them die, mostly infants, young children and pregnant women and most of them in Africa.[1] The greatest number of deaths in the world from tuberculosis and the highest mortality per capita are in Africa.[2] Malaria and tuberculosis are among the greatest killers in these countries. HIV/AIDS is at epidemic levels, with 24.7 million adults and children in sub-Saharan Africa living with HIV infection in 2006.[3] Non-communicable diseases such as cancer and cardiovascular disease are making up an increasing proportion of the burden of disease in many LMICs.

Health systems in these countries do not have the physical infrastructure or human resources to deal with these challenges. The result is poor health and premature death and disability in many countries. Poor health is a problem in and of itself. It is also a serious impediment to economic progress, enhanced productivity, an improved standard of living and human fulfillment.

Of the approximately US$73.5 billion invested in 1998 in health research and development worldwide, only 10% was allocated to 90% of the world's health problems, most of which are concentrated in poor countries. Since then, organizations around the world have worked to reduce this 10/90 gap. CIHR is playing its role by making global health research a priority.

1 World Health Organization, fact sheet on malaria, http://www.who.int/mediacentre/factsheets/fs094/en/
2 World Health Organization, fact sheet on tuberculosis, http://www.who.int/mediacentre/factsheets/fs104/en/
3 Joint United Nations Programme on HIV/AIDS, http://www.unaids.org/en/HIV_data/epi2006/default.asp

The Response

Since its inception, CIHR has been active on the global front, establishing more than 150 collaborations with organizations outside Canada. The goal of these collaborations is to align our research priorities with those of our international partners and develop health research capacity both in Canada and in partner countries.

CIHR expresses its international involvement in many different ways, including those described below.

The Global Health Research Initiative

Established in 2001, the Global Health Research Initiative (GHRI) is a partnership among CIHR, the Canadian International Development Agency (CIDA), the International Development Research Centre (IDRC) and Health Canada. The partnership is a first for Canada, bringing together the expertise of all four partners to bear on health problems in LMICs and on global health priorities. Health Canada has a substantial knowledge base and recognized leadership in the area of health. IDRC has extensive experience with research in developing country settings. CIDA has considerable development experience and an emphasis on evidence-based health development. And CIHR stands for excellence in research, the foundation of which is peer review.

Through the GHRI, four federal agencies with complementary mandates and expertise are enabling Canada to work with LMICs to address

the health and health systems priorities of these countries through research and capacity-building programs and strategic collaborations and by influencing global health policy and research agendas. This is being achieved by all partners sharing their knowledge, experience and resources to strengthen and build the capacity for global health research in Canada and in developing countries alike. Some of the key ingredients in the GHRI's success have been: promoting and strengthening knowledge exchange and transfer, including links to policy-makers and other research users; supporting research addressing health challenges that are a priority to vulnerable populations in LMICs; and supporting Canada-LMIC teams to jointly address health issues.

Since its inception, the GHRI has funded nearly 70 research development and pilot projects. In addition, the GHRI has fostered and promoted the evolution of the Canadian Coalition for Global Health Research, a not-for-profit organization coordinating global health research in Canada and abroad to address global health problems in LMICs.

- Communities and policy-makers can't plan for ways to improve health without first understanding the extent and nature of health problems. **Dr. Theresa Gyorkos** of McGill University and **Dr. Martin Casapia** of the Asociación Civil Selva Amazónica and Universidad Nacional de la Amazona led a team that completed the first comprehensive health survey of a community in Peru's Amazon basin. They documented alarming statistics, including that more than 80% of schoolchildren had worm infections and 33% were stunted due to malnutrition. The project is a first step toward future health improvement efforts and helped to build capacity for continued research efforts.

- A Canadian-Cuban team led by **Dr. Jerry Spiegel** of the University of British Columbia and **Dr. Mariano Bonet** of the National Institute of Hygiene, Epidemiology and Microbiology (INHEM) in Cuba has designed, established and refined a system to prevent and control dengue (a mosquito-borne viral disease) in an inner-city community of Central Havana. Population density is high in this neighbourhood, housing conditions poor and water supply irregular – resulting in a high-risk environment for mosquito transmission. The system relies on extensive community involvement for continuous monitoring. Building local capacity was a core part of the project and the team has worked together to train front-line workers, community members and researchers in Cuba. The project also included a Mexican colleague, laying the groundwork for further collaboration on dengue in Latin America and the Caribbean.

- The shortage of health-care personnel in Nigeria is an important component in its health-care crisis, one that is exacerbated by a continuing exodus of workers (there are 28 doctors for every 100,000 Nigerians, compared to 214 doctors for every 100,000 Canadians). A Nigerian-Canadian study led by **Dr. Bernadette Stringer** of the University of Western Ontario is addressing the problematic health and safety conditions that may be contributing to this exodus, in particular the transmission of blood-borne pathogens. The team found that, of three hospitals surveyed, only one had an infection control committee and hospital-acquired infection surveillance program, but that even in that one hospital, personnel were not well-informed about infection control policies and practices.

Dr. Abimbola Oluwatosin, a Nigerian researcher on the team, is now leading an important occupational health and safety training program for nurses in Nigeria, a result of an educational opportunity that arose from participating in the project. The partnership has also expanded into other regions of Nigeria and has led to new international collaborations in similar research areas.

Excellence in Research

Dr. Ana Sanchez: Giving back to her homeland

When you think of infectious diseases and the developing world, it's the big killers, like HIV/AIDS, tuberculosis or malaria, that come to mind. Dr. Ana Sanchez thinks a little smaller. She focuses on a disease that, although less lethal, still causes immense suffering and lifelong ill health, affects economic and food security and, overall, contributes to the vicious cycle of poverty in her home country, Honduras. The disease, called taeniasis or cysticercosis, is caused by a tapeworm prevalent in regions where people live in close proximity to pigs. Because of the poverty in these communities, there are no simple solutions to reduce the disease's toll. It's easy to get discouraged, says Dr. Sanchez, an associate professor in the Department of Community Health Sciences at Brock University, in St. Catherines, Ontario. Instead, she has worked with her Honduran colleagues to make small changes in local communities – changes like encouraging families not to let pigs roam freely, which increases the chances of the pigs being infected with the tapeworm and transmitting it to humans.

Dr. Sanchez believes that if pigs are healthier, food security and safety increase. When children are better fed, they will do better in school. With more education, their economic prospects are better. It's a cascading effect that can start with small actions. But, Dr. Sanchez warns, the actions can't be imposed from above; her project has involved local community members at all stages. Dr. Sanchez's Canadian students have taken part in the project. But the benefits are definitely greater for Honduras – for the communities who know more about how to enhance their health and their economic stability and for the Honduran undergraduate students who have enhanced their capabilities by taking part in a research project. Often, professionals leaving their countries of origin is seen as a brain drain. For Dr. Ana Sanchez, it's been a way to contribute to the health of her homeland.

The Teasdale-Corti Global Health Research Partnership Program

The Teasdale-Corti Global Health Research Partnership Program is intended to provide long-term investment that supports teams of researchers and research users as they develop, test and implement innovative approaches to strengthening institutional capacity, especially in LMICs. The program, which is sponsored by the GHRI, applies the knowledge it creates to improve the health of some of the most vulnerable populations in the world and strengthens health systems in their countries.

The program is inspired by the legacy of internationally renowned Dr. Lucille Teasdale, one of the first female surgeons in Canada, and her husband, Italian medical missionary Dr. Piero Corti, who devoted their lives to their Ugandan patients and to mentoring nurses and health educators. It grounds its work where it is needed most: in countries affected by global health challenges, particularly poorer countries. Research teams funded through the first phase of the program, pair at least one Canadian institution with at least one LMIC institution.

These are just three of the 13 projects funded to date:

- Preventing and treating most types of pain in children is relatively easy and inexpensive. But it requires overcoming barriers of attitude and lack of information. **Drs. G. Allen Finley** of Dalhousie University and **Somboon Thienthong** of Thailand's Khon Kaen University are developing a community of practice among 19 provincial and regional hospitals in northeastern Thailand with standardized approaches to ensure the best possible pain prevention and treatment for children. At the same time, their team will study the process of disseminating information and changes in practice, which will help develop approaches to controlling other diseases and conditions in Thailand and in other countries.

- Childhood obesity is emerging as a public health crisis in many countries. In LMICs, simultaneous undernutrition and obesity are placing a double burden on public health as the population undergoes rapid economic and social changes, leading to a nutritional transition. **Drs. Peter Katzmarzyk** of Queen's University and **Juan Ricardo López y Taylor** of the University of Guadalajara in Mexico are working to reduce childhood obesity in Mexico while building research capacity there, through the development of an international, multidisciplinary team of researchers and government representatives from both countries. The project will focus on four activities: development and delivery of an annual obesity short course; development of a collaborative program of research; student and faculty exchanges; and building partnerships and networking. The research will inform the design of intervention programs and healthy public policies.

- Health systems in sub-Saharan Africa and the Caribbean, the two areas of the world hardest hit by HIV/AIDS, are having difficulties meeting the needs posed by the epidemic. A team of researchers led by **Drs. Nancy Edwards** of the University of Ottawa, **Eulalia Kahwa** of the University of the West Indies in Jamaica, and **Dan Kaseje** of the Great Lakes University of Kisumu in Kenya want to improve HIV and AIDS policies and practices in these parts of the world. Their goal is to strengthen health systems' ability to cope with HIV and AIDS by improving the quality of HIV and AIDS nursing care, supporting the scaling up of innovative HIV/AIDS programs and practices and fostering dynamic and sustained engagement of researchers and research users in the policy development process.

The team's work will provide a critical platform for developing research and leadership capacity among nurses and midwives.

Dr. Ana Sanchez, profiled in the GHRI section, has also received funding under the Teasdale-Corti program to continue her work on infectious diseases.

The Canada-HOPE Scholarship Program

Personal encounters can change lives. The Canada-HOPE Scholarship Program brings promising scientists and clinicians from LMICs face to face with prominent Canadian scientists for mentoring and to expose them to some of the best science, laboratories and training opportunities in Canada. This joint program, which was developed by CIHR, is supported by the CIHR/Rx&D Collaborative Research Program in partnership with sanofi-aventis Canada Inc. and is currently supporting researchers from India studying areas including healthy aging, organ damage as a result of hypertension and diabetes, and stroke. The researchers will spend the first two years of the program in Canada; their research projects will then be transferred to their home institution when they return to India for the remaining two years of the program. As part of the program, all participants and their mentors will meet to share and compare experiences, adding to the value of the program. As a result of receiving these scholarships, the funded researchers will be in a position to establish productive research programs in their home country. The long-term relationships that are established will benefit both Canada and India. To date, six researchers have been funded:

- **Dr. Biju George**, from Health Action by People in India, is following a cohort of 1,500 people from the Indian province of Kerala who have hypertension and/or diabetes to identify risk factors for early development of organ damage as a result of these conditions. He is working with Dr. Subrata Chakrabarti of the University of Western Ontario.

- **Mr. Reddy Kommaddi** of the National Brain Research Centre in India is studying the role of neurotrophins in neuron growth and survival as a first step toward developing new drugs to treat brain disorders such as Alzheimer's disease and Parkinson's disease. He is working with Dr. Philip Barker of the Montreal Neurological Institute.

Excellence in Research

Dr. Denis Xavier: Getting to the roots of stroke

No matter where in the world you live, 90% of heart attacks are caused by some combination of the same nine risk factors, according to INTERHEART, a study that looked at 29,000 people in 52 countries. The risk factors for stroke, however, are a little more difficult to tease out and can vary according to the kind of stroke – ischemic, which makes up about 80% of strokes and is caused when a blood clot interferes with blood flow to the brain, and hemorrhagic, which accounts for the other 20% of strokes and is caused by uncontrolled bleeding in the brain.

Dr. Denis Xavier, along with colleagues at McMaster University, is examining people in eight countries – Argentina, Canada, China, Denmark, Germany, India, Nigeria and South Africa – and five different ethnic groups to find out if there are regional or ethnic differences in the impact of different risk factors for stroke. The results of the INTERSTROKE study will mean that we will know as much about the risk factors for stroke as we do about those for heart attacks.

Dr. Xavier is undertaking the work at McMaster University while on a two-year sabbatical from St. John's Medical College in Bangalore, India, taking advantage of the opportunity to work with Dr. Salim Yusuf, the lead investigator on the INTERHEART study. He is one of the three inaugural recipients of the Canada-HOPE Scholarship Program. While in Canada, he is also completing a master's degree in clinical epidemiology and biostatistics, to supplement his extensive practical experience in the area. Upon his return to Bangalore, he hopes to design and run clinical research projects relevant to India and other developing countries. He also hopes to collaborate with his colleagues at McMaster and other universities to set up some informal training opportunities in clinical epidemiology for residents and young faculty at St. John's Medical College, the precursor, he hopes, to a more formal training program down the road.

The Global Indigenous Health Research Initiative

Aboriginal people, wherever they live, face many of the same health challenges – primarily a profound health disparity between them and the general population of their country. Throughout the world, they experience higher incidences of cancer, diabetes, arthritis, heart disease, suicide, mental illness and addiction, and HIV/AIDS, among others.

Excellence in Research

Dr. Neil Andersson: Resilience is more than just bouncing back

Dr. Neil Andersson of CIETcanada (the Canadian arm of Community Information and Epidemiological Technologies, a non-profit NGO based in New York) believes that the way young people use their own and their communities' strengths, including their history, culture, traditions and Elders, can reduce their risk of infections. His team works with Aboriginal youth across Canada to understand how existing risk-education programs build on or ignore this resilience, and how this affects the risk of sexually transmitted infections, including HIV, and related blood-borne viruses (for example, in intravenous drug users). He believes that risk education that recognizes and builds on the resilience of Aboriginal youth wherever they live – in cities, on reserves, in the north – will be much more effective at preventing infection than current materials, which tend to be written for a non-Aboriginal, urban audience.

While the mechanisms that support resilience differ from community to community, Dr. Andersson believes that Aboriginal youth in Canada, Australia and New Zealand will benefit from sharing experiences of how they study and understand their resilience and what this means in today's world. He works with researchers in all three countries through an International Collaborative Indigenous Health Research Partnership grant, to increase the ability of Aboriginal youth to protect themselves from infection.

The Canadian team is a partnership of CIETcanada with the Canadian Aboriginal AIDS Network (CAAN) and the Public Health Agency of Canada (PHAC). In the research approach developed by Dr. Andersson, young people themselves will analyze the data and, guided by their Elders, will make recommendations to risk-education institutions, so that these can better reinforce and build on individual and community strengths.

In 2002, CIHR's Institute of Aboriginal Peoples' Health (CIHR-IAPH) signed an agreement with the Health Research Council of New Zealand and the National Health and Medical Research Council of Australia to work together to address these challenges. The goal of the Global Indigenous Health Research initiative is to improve the health of indigenous communities in all three countries through multidisciplinary, multi-institutional and multi-sectoral collaboration. Projects funded to date include an assessment of how Indigenous people can protect themselves against HIV/AIDS; factors that promote resilience in mental health among Indigenous people across their lifespan; and development of an international framework for resilient Indigenous health workforce networks.

CIHR, through CIHR-IAPH has also entered into a similar partnership with a North American focus. One agreement, with the National Institutes of Health in the United States, focuses on health issues of priority to Indigenous peoples in the two countries. Another agreement with Mexico focuses on providing and enhancing health promotion and disease prevention services to Aboriginal populations in the two countries through research.

Researchers focusing on resilience include:

- **Dr. Judith Bartlett** of the University of Manitoba, who is examining Indigenous health workforce networks as a key strategy to address health disparities among Aboriginal communities and advance opportunities for these communities. These networks, which exist in Australia, Canada, and New Zealand, provide valuable support and protection, but have often struggled due to small numbers of Indigenous health workers and lack of support within dominant health systems. Dr. Bartlett will describe the structures and roles of Indigenous health networks, identify Indigenous constructs of

resiliency and document key work-life transitions, in order to develop a framework outlining an optimum intersect between the Indigenous health workforce and networks during key work-life transitions.

- **Dr. Laurence Kirmayer** of Montreal's Sir Mortimer B. Davis Jewish General Hospital, who is leading a team that is studying the factors that promote resilience in mental health among Indigenous peoples across the lifespan. The team is focusing particularly on the response to risk factors in early childhood, school-aged children, adolescence and young adulthood. A series of linked projects are identifying the distinctive characteristics of individual and collective resilience among Indigenous peoples in Australia, New Zealand and Canada. The focus on the distinctive aspects of resilience among Indigenous peoples will result in targeted interventions to improve mental health among these populations.

Canada and the Gates Foundation: Grand Challenges in Global Health and HIV/AIDS vaccines

The Grand Challenges in Global Health initiative is a major effort to achieve scientific breakthroughs against the diseases that kill millions of people every year in some of the world's poorest countries. The ultimate goal of the initiative, which was created by the Bill & Melinda Gates Foundation, is to develop innovative health tools that are effective, inexpensive, easy to distribute and simple to use. CIHR inaugural President Dr. Alan Bernstein is a member of the Scientific Board of the Grand Challenges initiative.

Canada, through CIHR, is the only country that is a funding partner in the Gates Grand Challenges initiative. Four of 43 teams funded are from Canada; part of the funding for three of these teams comes from CIHR.

These teams are focusing on vaccines, HIV resistance and fighting infectious diseases common in developing countries, such as malaria and tuberculosis.

The three teams are being led by outstanding Canadian researchers:

- **Dr. Lorne Babiuk**, who is working on a single-shot vaccine that can reduce the need for multiple immunizations;
- **Dr. Frank Plummer**, who is studying factors associated with HIV resistance among women and their families; and
- **Dr. Brett Finlay**, who is exploring new ways to combat drug resistance by developing new medicines that can boost the body's own ability to fight infectious diseases, such as malaria, typhoid fever, *E. coli* infection and tuberculosis, that are found in developing countries.

Canada has also entered into a partnership with the Gates Foundation to accelerate the development of HIV/AIDS vaccines. Canada has committed $111 million to the Canadian HIV Vaccine Initiative (CHVI), while the Gates Foundation will provide up to $28 million. The investment will support Canadian researchers and institutions to work with collaborators around the world, including in developing countries, on a range of HIV vaccine activities, like discovering new vaccine candidates; strengthening clinical trials capacity; manufacturing promising candidates for trials; and addressing policy, regulatory and social issues related to HIV vaccine development and delivery. CIHR is one of five government agencies and departments involved in CHVI,

together with the Public Health Agency of Canada, CIDA, Industry Canada and Health Canada. The initiative represents a coordinated and strategic Canadian contribution to the Global HIV Vaccine Enterprise.

Gender and Health

Gender has a significant impact on health throughout the world, a reality poignantly illustrated by the fact that fully three-quarters of people between the ages of 15 and 24 infected with HIV in Africa are women, according to former United Nations AIDS envoy Stephen Lewis.

Through its Institute of Gender and Health (CIHR-IGH), CIHR is focusing on the confluence between gender and health. It is extending this approach beyond Canada's borders through partnerships that share the results and impacts of research with international partners, build capacity in the global community and create and strengthen international networks dedicated to advancing gender and health research.

Gender in relation to globalization and health has been a major focus of activities. Widespread consultations across North America, Latin America and South Africa resulted in the identification of key issues, including food security, tobacco, occupational health and safety, mental health, infectious diseases (including HIV/AIDS), violence and reproductive health. Research projects are focusing on these priorities, while building capacity in low- and middle-income countries.

Among the investigators conducting research in this area are:

- **Dr. Donna Stewart** of the University Health Network in Toronto, who is assessing the feasibility of measuring and comparing gender-sensitive indicators related to mental health in Peru, Colombia and Canada. Her research will be important for other researcher as well as

health professionals and policy-makers and could ultimately lead to improved mental health for women worldwide.

- **Drs. Kenneth Bassett** and **Arminée Kazanjian** of the University of British Columbia, who are testing gender-specific community interventions in Egypt that can restore vision. Egypt has approximately 800,000 blind people, two-thirds of whom are women and almost all of whom live in poverty. Rural populations rarely take advantage of urban and suburban vision restoration services, even if they are free, so Drs. Bassett and Kazanjian are studying a community strategy that packages eye health with acknowledged women's health needs. Their work will form the basis for a larger integrated community eye and population health program in Egypt.

- **Dr. Lynn McIntyre** of the University of Calgary is undertaking a gender-based analysis of hunger and food provisioning. Hunger, she says, is not gender neutral, but is a burden borne by poor women as a consequence of low status and systemic inequities, as well as the voluntary sacrifice of poor motherhood. Dr. McIntyre is learning first-hand from impoverished single mothers in Canada and other countries about their experiences of hunger and food insecurity. Her work will help lead to better strategies to support the United Nation's Millennium Development Goal to eradicate extreme poverty and hunger by 2015.

Excellence in Research

Jennifer Levy: Making HIV programs more effective

Pregnant women in Lilongwe, Malawi, who are HIV positive (and their infant children, once born) can receive nevirapine, a drug that helps to reduce transmission between mothers and children, through the Prevention of Mother to Child Transmission (PMTCT) program. But, as Jennifer Levy discovered when she spent a year at a Malawian health centre talking to the women, following up their diagnosis with treatment is often very difficult for them.

Part of the problem lies with the counselling they receive after a positive HIV test – a session only ten minutes long that comes just after receiving their diagnosis. Between the short time frame and assimilating the shock of diagnosis, women may not understand the medical information they receive or what they are supposed to do.

Another problem is the location of the PMTCT program, separate from the rest of the clinic. To be seen going to the program is confirmation of a positive diagnosis, with all its attendant stigma. As well, PMTCT services, including treatment with nevirapine, are not simply part of standard prenatal care for HIV-positive pregnant women, as they could be, but are delivered separately. Ms. Levy, who is completing her doctorate in medical anthropology at McMaster University, believes the program could be improved by better integrating it into the health system and by using peer educators, other HIV-positive women, to provide counselling and education.

With this project complete, Ms. Levy now wants to look more deeply at the impact of food insecurity on women with HIV. This can include both their inability to wean their children at six months, as is recommended to reduce transmission of HIV, because they don't have any other food to give their children, and their own ability to follow positive living advice and eat a balanced diet to keep their immune systems functioning well.

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