

# **Setting Global Health Priorities for Funding Canadian Researchers**

**A Discussion Paper Prepared for the Institute on Population and Public Health**

**By**

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**The views expressed herein are those of the authors and have not been formally adopted as policy or statements of the Institute of Population and Public Health.**

## Introduction

The Global Forum for Health Research (GFHR, 2000) notes that less than 10% of all health research conducted globally is devoted to diseases or conditions that account for 90% of the global disease burden. For example, it is estimated that pneumonia, diarrhea, tuberculosis and malaria, which together account for more than 20% of the disease burden in the world, receive less than 1% of the total public and private funds devoted to health research. The human and economic costs of such misallocation of resources are enormous.

There are clear reasons for this imbalance in research funding: Over 90% of research funds are in the hands of a small number of countries which give priority to their own health research needs. Decision-makers are unaware of the magnitude of the problems outside their own national borders and, in particular, of the impact on their own country of the health situation in the rest of the world, both directly (e.g. through increasing travel, re-emerging diseases, development of anti-microbial resistance due to the misuse of antimicrobial drugs) and indirectly (e.g. through lower economic growth, migration, etc.). The decision-making process is influenced by the personal preferences of influential scientists, competition between institutions, donor preferences, tradition and local circumstances. In Canada, there have been virtually no incentives for researchers to address global health issues – indeed the former Medical Research Council largely considered international health issues as outside their terms of reference – making it difficult for serious researchers to obtain operating grants or career awards if they choose to focus on global health concerns.

Over the last decade, the strengthening of “Essential National Health Research Capacity” [ENHR] within developing countries, and recognition of the value of partnerships, have been prominent parts of the effort to address global health challenges. Nonetheless, there has been limited progress made on how researchers in a developed country such as Canada could indeed most effectively contribute to addressing these issues. With the advent of an entirely new approach to funding health research in Canada, through the creation of the Canadian Institutes of Health Research [CIHR], an opportunity has arisen to take up this challenge.

This challenge calls for a well-coordinated effort based on a clear understanding of appropriate roles and responsibilities of agencies with a stake in this issue, including the CIHR, but also the International Development Research Centre [IDRC], the Canadian International Development Agency [CIDA], Health Canada, non-governmental organizations [NGOs] and private sector interests. It also demands clarity in terms of the issues that should constitute priorities. The purpose of this paper is specifically to assist in identifying *global health* research topics and approaches for future funding priority for Canadian health researchers.

In addressing this challenge, a number of different organizing schemes have been used. Aside from the approach used by the ENHR, a Five-Step Process has been developed by the Ad Hoc Committee on Health Research (1996), and a “Visual Health

Information Profile” was created by the Advisory Committee on Health Research (1997) to systematize the approach to priority setting in health research.

These organizing systems represent one approach to global health research. This approach emphasizes research on health problems that are more characteristic of and are growing significantly in poor countries, including infectious disease such as TB, malaria, other vaccine-preventable diseases, HIV; as well as injuries, non-communicable diseases and their risk factors such as tobacco use; as well as maternal and reproductive health, and so on. However, a different way of addressing the challenge facing the CIHR is also presented here, one that combines, in a matrix fashion, an assessment of “inherently global issues,” (IGIs), and the more traditional approach of focusing on diseases or vulnerable groups themselves. The IGIs are those health determining phenomena that transcend national borders and political jurisdictions and, as such, may be the focus of institutes such as the *Institute of Population and Public Health [IPPH]*, or the *Institute of Health Services and Policy Research [IHSPR]*. The complementary approach that begins with the diseases, risk factors or vulnerable populations, in turn, may be the focus of institutes such as, for example, the *Institute of Immunology and Infectious Diseases [IIID]*, or the *Institute of Gender and Health [IGH]*, respectively.

These global phenomena, which can have health implications for all peoples, including Canadians, include such current problems as climate change, ozone depletion, water shortages, global spread of new diseases or recurrences of older ones, deforestation and so on. The analytical pathways between these global “drivers” may be more difficult to trace or, in some cases, still somewhat speculative. Their potential health effects, however, could overwhelm the best efforts of disease-based intervention. In this second approach, global economic, political and environmental drivers that condition or constrain health must be thoroughly examined.

Broadly speaking, IGIs will be associated with differences in the prevalence and population distribution of numerous diseases. The linkages between global phenomena and individual diseases may vary, as will the pattern within and between nations. Understanding these differences is likely key to understanding better the policy levers and program interventions that will improve global health.

We presume that the pathways between the list of IGIs we discuss, and the burden of disease that is their partial expression, include personal practices (such as tobacco use, sexual behaviour, dietary customs) and related health knowledge (or its absence). Much health program intervention in poorer nations has followed that in richer ones, orienting more to individual-level change than to changes in social and environmental conditions. There is a case for extending these programs, and any research questions that might be associated with these programs, in both directions: Downwards to their actual impacts on disease, and upwards to more systemic conditions or contexts, including global drivers.

In summary, then, we undertake our analysis with the following four assumptions.

1. Global health research priorities need to give attention to inherently global issues. These issues are broader contexts rather than specific diseases. As such, they fit well within a population health approach. Health research into such contexts nonetheless will invariably involve analyzing their impacts on disease, as well as on other measures of health status.
2. This contextual prioritization should not be at the exclusion of more traditional global health research that focuses on diseases (e.g. HIV), vulnerable groups (e.g. women) or nations (e.g. Africa). Such research, however, should be required to incorporate analyses of global-level phenomena within their research design.
3. Global health research needs to maintain a balance between descriptive studies and intervention studies. For example, we know that some developing countries are doing better than others (Asia vs. Africa); we know some but not all of the reasons why; and we have a poor grasp on what policy and program interventions might improve the situation in countries falling behind or failing to catch up.
4. Global health research should seek policy and civil society partners. The need for research studies to include policy analyses and research findings to interpolate to policy options is gaining increasing ground in health research, generally. As for civil society partnerships, most global health research questions – whether on inherently global issues or more disease specific topics – are of considerable interest to many NGOs. Furthermore, the pursuit of public-private partnerships provides a means for leveraging additional funds.

### **Organization of the Paper**

Our paper is structured as follows:

- A. A brief discussion of the global burden of disease.
- B. An introduction to Inherently Global Issues.
- C. A longer discussion of each of these issues and their links to health, with examples of potential research directions/questions, and comments on potential research funders.
- D. A brief discussion of a resulting matrix (IGIs x burden of disease), and the importance of national case-studies and intervention-oriented research.
- E. A brief conclusion considering relations to roles and responsibilities of potentially involved stakeholders.

## A. Burden of Disease-Focused Research

Various approaches to identifying priorities for global health research have been developed since the 1990 Report of the Commission on Health Research for Development (CHRD 1990) highlighted the need for global prioritization. A central concept in these approaches has been a focus on “disease burden”. In fact, the analysis of disease burden, supported by consistent methodological approaches, has become a vehicle for exposing the stark imbalance between investment in health research (an increasingly global enterprise) and actual disease burden.

The 1996 Ad Hoc Committee on Health Research made a significant contribution in this regard by preparing a framework for identifying research opportunities for developing new interventions, improving the cost-effectiveness of existing interventions, and improving ways to more efficiently address health needs as well as a 5-step process for systematically conducting the analysis (Ad Hoc Committee, 1996) (Table 1).

**Table 1: Steps in Priority Setting for health research**

<b>Five Steps in Priority Setting</b>	<b>Data and Analytic Requirements</b>
<b>I. What is the burden of the disease/risk factor?</b>	Health status Assessment of the burden of disease (DALYs, QALYs, etc.)
<b>II. Why does the burden of disease (BoD) persist? What are the determinants?</b>	Acquisition of knowledge about disease determinants
<b>III. What is the present level of knowledge?</b>	What is known today about existing interventions? How cost-effective are they?
<b>IV. How cost-effective could future interventions be?</b>	Is research likely to produce more cost-effective interventions than present ones?
<b>V. What are the resource flows for that disease/risk factor?</b>	Assessment of the public and private resource flows

Source: Ad Hoc Committee (1996) as cited in GFHR (2000)

A consensus around disease group was pursued so that priority approaches could be identified and then compared, resulting in the concept of “global burden of disease.”

While the burden of disease approach has been developed as an evidence-based starting point for priority-setting process on a national basis, it has been applied to yield estimates globally. This global analysis has then been the basis for summaries to consider the disease burdens associated with different causes in different populations globally, with sharply different distributions in the wealthiest versus the poorest countries (Table 2).

**Table 2: Distribution of Disability-Adjusted Life Year (DALY) Loss  
By Disease Group and Country Income Level Grouping**

Cause	Percentage of DALY Loss		
	Entire Global Population	Poorest 20% of the Global Population	Richest 20% of the Global Population
Communicable, Maternal, Perinatal, Nutritional (Group I)	43.9%	63.6%	10.9%
Noncommunicable (Group II)	41.0%	23.3%	75.8%
Injuries (Group III)	15.1%	13.1%	13.3%
TOTAL	100.0%	100.0%	100.0%

Source: WHO (1999) as cited in GFHR (2000)

This analysis has been broken down further to estimate the burden associated with specific disease subgroups and risk groups (Table 3). These have been applied in analyses as an evidence base for then considering determinants and opportunities for interventions, and hence research priorities.

**Table 3: Global Burden of Disease Distribution Attributed to Diseases and Risk Factors among Low-Income and High-Income Countries**

Cause (as % of total burden of disease)	Burden of disease			
	1998 Low-income countries	1998 High-income countries	1998 World	2020* World
Lower respiratory infections	6.4	1.3	6.0	3.1
Perinatal conditions	6.2	1.9	5.8	2.5
Diarrheal diseases	5.7	0.3	5.3	2.7
HIV / AIDS	5.5	0.9	5.1	2.6
Unipolar major depression	4.0	6.5	4.2	5.7
Ischaemic heart disease	3.3	8.8	3.8	5.9
Cerebrovascular disease	2.9	4.8	3.0	4.4
Malaria	3.1	0.0	2.8	1.1
Motor vehicle accidents	2.7	4.2	2.8	5.1
Tuberculosis	2.2	0.1	2.0	3.1
Chronic obstructive pulmonary disease	2.1	2.3	2.1	4.1
War	1.7	0.1	1.5	3.0

Source: Frenk and Murray (1999) and WHO (1999)

\* Estimates for 2020 based on authors' assessment of trends and anticipated changes in pressures

Building on its analysis of the global burden of disease, the 1996 Ad Hoc Committee on Research identified four critical health problems globally:

1. The unfinished agenda (unnecessary deaths, sickness and disability, in light of existing knowledge).
2. New and emerging microbes (drug resistance leading to concerns for diseases thought to be in control).
3. Increase in non-communicable diseases, injuries and violence.
4. Inequity and inefficiency in delivery of health services.

The Global Forum for Health Research continues to refine the methods to estimate the burden of disease so that the estimates can be used in priority-setting. There is a need, however, for development of matrices based on steps 2 to 5 (which identify disease determinants) to determine opportunities for interventions and new research priorities.

## **B. Inherently Global Issues: an Overview**

A potential limitation of the burden of disease approach is that its focus on disease (even if taking into account determinants of the disease) may lead to insufficient attention to the social, economic and environmental drivers. Table 4 below, for example, estimates determinants for burden of disease as “risk factors.” These determinants, however, are proximate and are conditioned by broader (deeper) and increasingly global “drivers” that underpin a multiplicity of diseases. For example, the leading dozen causes of disease in low-income countries in Table 3 above still account for just over 45% of the total disease burden in 1998.

**Table 4: Disease Burden Due to Selected Risk Factors**

<b>Risk Factor</b>	<b>% of Disability-Adjusted Life Years</b>
Malnutrition	15.8
Water/sanitation	6.7
Unsafe sex	3.7
Alcohol	3.3
Indoor air pollution	3.3
Tobacco	3.1
Occupational hazards	2.6
Hypertension	1.5
Physical inactivity	1.0
Illicit drugs	0.5
Outdoor air pollution	0.4

Source: Global Forum on Health Research, 2001

Jean-Francois Rischard, Vice-President of the World Bank, European Region, presented a list of what he defined as “inherently global issues” (IGIs) during the pre-Genoa G-8 consultation with NGOs held in Florence, April 2, 2001 (<http://www.gnginitiative.net>). His list is not perfect (no particular model of IGIs, or how they potentially path to health, is) but it provides a starting point. It includes:

- Greenhouse gas emissions (climate change)
- Biodiversity loss
- Water shortage
- Decline in fisheries
- Deforestation
- Increase in poverty
- Financial instability (capital markets)
- Digital divide
- Taxation (tax havens, transfer pricing)

The first five represent environmental global degradation. The latter four describe social or economic trends. The two sets are inter-related, and at least issues 1 through 6 on the list are sensitive to population growth pressures.<sup>1</sup> Each of these IGIs has strong links to health and to the equity dimension of health, i.e. the social distribution of health status and health determining conditions.

*An important element in all global health research should be the “equity” dimension. Averages can mask inequalities between groups. The recent UK Report on Health Inequalities (Acheson, 1998) urged that “health impact assessments” of policies on health determining conditions (e.g. income, employment, education, access to health services, housing) should be amended to become “health inequality assessments.” Not only should research study how health is improved in the aggregate, but also how health is distributed across groups or nations. In developed countries, at least, public and political support for policies that reduce economic and other forms of social inequalities (“social justice” oriented policies) is higher when the link between these and health inequalities is made clear.*

We would add to this list four others: food insecurity, health damaging products, governance and war and conflict. Usually considered a national concern, food insecurity links global environmental issues (1 through 5) with global socio-economic issues (6 through 9). The major concern with health damaging products is increased global trade in, for example, tobacco, arms and toxic waste. Governance, in turn, is singled out for particular discussion, not because it is absent from any of the other issues, but because there are aspects of governance, particularly increasing trade

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<sup>1</sup> Latest UN population projections are less Malthusian than apocalyptic demographers have sometimes argued, predicting a peak and then slow decline in global population over the next century, as the growth rate continues to decline more rapidly. Developing countries experiencing population growth, moreover, are still very low *per capita* consumers of ecological capital and/or producers of environmental waste.

agreements' "trade creep" into areas of previous domestic authority. These include global competition for lower tax regimes (though evidence on this is presently mixed) and access to health-determining infrastructures (primarily services) such as health care, therapeutics, education, housing, social safety nets and so on, that may require particular research focus. War and conflict, in many respects an effect of both failures and regional disparities in the "burden of IGIs," remains a part of the landscape, particularly among vulnerable populations adapting to pressures in the contemporary era of globalization. These additional IGIs all relate to threats to "human security", a concept receiving increased attention as a basis for how foreign policy interests should be evaluated.

Thus, we arrive at a list of 13 IGIs:

1. Greenhouse gas emissions (climate change)
2. Biodiversity loss
3. Water shortage
4. Decline in fisheries
5. Deforestation
6. Food (In)security
7. Increasing poverty
8. Financial instability (capital markets)
9. Digital divide
10. Taxation (tax havens, transfer pricing)
11. Trade in health-damaging products
12. Governance
13. War and conflict

Each of these is reviewed below, in order. There is no prioritization in the order of their presentation. Indeed, "governance" could be considered an overarching issue. Moreover, each of these issues is affected by two other inter-related global phenomena:

1. Increased global economic integration via the new regime of trade and investment liberalization agreements, primarily at the level of the World Trade Organization (WTO), but also including the proliferation of regional and bilateral agreements. The question here becomes:

*How does (or might) this new regime of trade and trade-related agreements affect other inherently global issues, particularly in terms of potential or real impacts on health status?<sup>2</sup>*

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<sup>2</sup> Increasing attention is being paid to the effects of economic globalization, generally, and trade agreements, specifically, by the WHO, among other multilateral agencies. A growing number of Canadian researchers are also giving this area some attention, as are independent policy research organizations (e.g. the Canadian Centre for Policy Alternatives). In the past, much of this Canadian research, when tri-laterally funded, has been through SSHRC.

2. The shift in capital flows from rich to poor nations from Official/Overseas Development Assistance (ODA), which has declined in real terms in the past decade, to Foreign Direct Investment (FDI), which has more than tripled in the past decade and now completely overshadows ODA (UNEP, 1999). Notwithstanding the importance of FDI to economic growth (and its potential health benefits) the question here becomes:

*How has increasing reliance on FDI shifted economic policies and practices in poorer nations away from development that improves the social and economic circumstances of its own citizens, particularly in ways that reduce intra-national inequalities, to development that principally benefits foreign investors and companies? Stated somewhat differently, how is this shift affecting the ability of national governments to provide “public goods” such as health care, education and environmental protection (UNEP, 1999)?<sup>3</sup>*

In other words, not only are the issues identified above inherently global because of the spread of their effects; there are also global economic forces that contribute to their existence.

Finally, one of the significant pathways linking these IGIs and the burden of disease is that of the quality, organization and financing of, and access to, different programs or services within nations. In poorer countries, health systems, education and environmental protection (including water and sanitation) are amongst the most important health-promoting programs or services. Some of these are discussed briefly in the section on “Governance” below, however, we want to underscore the importance of research in the equity, effectiveness and efficiency dimensions of these programs and services at the outset. Health and education systems, for example, are particularly important predictors of population health for people living in countries at the \$1/day poverty level; while education systems remain important predictors of population health for people living in countries at the \$2/day poverty level. Canadian-initiated global health research into these systems might best be supported through the *Institute for Health Services and Policy Research [IHSPR]*.

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<sup>3</sup> This shift is most acute for the African continent. While FDI flows to Africa continue to increase (a point often argued by those arguing that global trade and investment liberalization is a “tide lifting all boats”), Africa’s share of total FDI to all developing countries has dropped from over 11% in the early 1980s to just 1.9% in 1997 (Abdou, 2001). This points to the continued “market” marginalization of Africa. Ironically, despite the decline in total share, FDI now comprises a much larger share of African investment (i.e., domestic investment has declined, partly the result of structural adjustment programs), indicating the fragility of domestic businesses or economic development and increasing the dependence of Africa on the economic interests of non-resident investors or transnational companies.

## C. Examination of Inherently Global Issues

### 1. Greenhouse gas emissions (climate change)

While carbon emissions globally continue to decline (partly due to the collapse of Eastern bloc economies, and to a decline in the carbon intensity of the gross world economy), levels far exceed those considered sustainable in terms of slowing climate change (Worldwatch Institute, 2001). Despite some disagreement in the scientific community, there is widespread consensus over the existence of climate change and the contribution of fossil fuel use and emissions to that change. Within the health community, there is also consensus over the potential (in some cases already real) health effects of climate change via desertification, food loss, heat stress, increased urbanization, spread of tropical diseases and weather-related disasters. The human cost of weather-related disasters is now outstripping the capacity of relief agencies to respond (World Disasters Report, 2001); and the economic cost has led many large insurance companies to weigh in alongside environmental and health groups urging rapid action to reduce emissions. Ecological degradation, generally, increasingly underpins population movements (environmental refugees) – and health concerns associated with refugee camps or other temporary settlement, the global spread of disease<sup>4</sup> – and potential conflict (resource-based wars, tensions arising from mass migrations). The potential for conflict may be higher where societies are still strongly kin- or tribally-based, and/or where gender inequalities (Sen’s concept of “missing women”, see Sen, 1999) have resulted in a high portion of unattached younger males.

The health effects of climate change would encompass *direct and indirect, immediate and delayed effects*. While some health outcomes in some populations would be beneficial – some tropical regions may become too hot for mosquitoes, for example, and winter cold-snaps would become milder in temperate-zones where death rates typically peak in winter time – most of the anticipated health effects would be adverse (IPCC, 1996a, 1996b).

A great deal of Canadian research on climate change already exists, much of it funded through the Climate Change Action Fund and directed at modelling or monitoring climate change effects, particularly on flora and fauna. Some studies are estimating community-level effects of climate change for different regions of the country. Much of this research starts from the assumption that climate change will have damaging environmental (and economic and human health) consequences. An important research question still exists:

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<sup>4</sup> The global movement of populations, within and across borders, has reached unprecedented scale, with estimates of “people on the move” approaching 1 billion. Poverty, environmental disaster, persecution and war all number as causes for this movement, although beneath all of these may be the “gap” between the quality of life where one resides, and what one thinks it could be elsewhere (Worldwatch Institute, 2001). As real or perceived inequalities within and between nations increases, aided partly by more widespread entertainment images of (usually exaggerated) Western consumerism, the “gap” may grow and, with it, the movement of peoples. This underscores the importance of ensuring that equity (reductions in inequalities) remains a consideration in all global health research or policy.

*Can we measure the extent to which climate change impacts human health? If so, do we have a system in place to monitor the effects?*

Assuming climate change will yield generally negative health consequences, and that human activities (particularly economic activities associated with fossil fuel consumption) are important contributors to climate change, several other research questions arise:

*In relation to ODA or FDI: How much of these capital transfers from richer to poorer nations is going into sustainable, renewable energy projects, in contrast to fossil-fuel dependent projects? What are the effects of these transfers on climate change indicators in poorer nations? How do these changes associate with disease prevalence rates?<sup>5</sup>*

Regarding the impact of global trade and trade agreements, research questions include:

*How is increased trade affecting the use of fossil-fuel transportation systems? What impact is this having on ground-level ozone or particulate levels and associated respiratory illness?<sup>6</sup> How is the development of massive trade transport “truck corridors” affecting communities, i.e. are lower socioeconomic groups tending to be relocated by market prices to areas of high trade-related transport?*

*How are trade-related agreements (such as TRIPS [Trade Related Intellectual Property Rights], the Agreement on Subsidies and Countervailing Measures, and the Agreement on General Procurement) affecting subsidies for developing “clean” technologies, or their transfer to poorer nations, as agreed under the Rio Accord and Kyoto Protocol?<sup>7</sup>*

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<sup>5</sup> This in no way is meant to detract from the present global inequity in *per capita* greenhouse gas emissions, particularly with respect to North American emissions. US emissions, for example, have grown 13% above 1990 levels. While emissions in developing countries have risen 22.8% over the same time period, the major industrializing countries in this group – China, India and Brazil – all have lower carbon/GDP indicators (Worldwatch, 2001). Policy research questions pertinent to health here extend beyond emission trading systems to proposals for a carbon tax that could be collected and administered globally, thus representing a possible wealth redistribution mechanism.

<sup>6</sup> There is Canadian and North American evidence that truck transport has risen sharply with NAFTA, and that transportation-related greenhouse gas emissions had the second highest sector-specific increase after electricity generation (see Reinert and Roland-Holst, 2000; Sierra Club et al, 2000; ENS September 6, 2000). Vehicle production and use continues to grow globally, roughly doubling since 1980 and estimated to almost double again by 2020 (Worldwatch Institute, 2001). Transport currently accounts for 25% of total energy consumption and 50% of oil production, with corresponding contributions to greenhouse gas emissions (UNEP, 1999).

<sup>7</sup> Certain provisions of these WTO agreements directly conflict with several multilateral environmental agreements – MEAs – and that such conflict needs to be removed so that MEAs are given clear superordinance in trade disputes (see Cosbey, 1999).

In addition to concerns over health impacts associated with climate change, there is now a growing recognition of a need to consider adaptation strategies, both to mitigate the effects of changes as well as to provide appropriate surveillance.

## 2. Biodiversity loss

Ecologists have long argued that a healthy ecosystem is one with rich biodiversity. Health researchers also find such biodiversity essential in the discovery of new therapeutics. Growth in agriculture and resource-extraction industries, and related increases in population and wealth-based consumption, continues to erode biodiversity. To date, biodiversity loss is probably associated more with improved than worsened human health, due to the increased food production and economic growth derived from its loss, and to the various social and cultural infrastructures (health care, education, sanitation and the like) accompanying increased wealth generation. There have been intermittent food shortage crises arising from monocrop production (e.g. the 1996 corn shortage in Mexico, see Wallach and Sforza, 1999) but the trade-off between biodiversity loss and health gain remains difficult to assess. Several multilateral accords on protecting and preserving biodiversity exist, such as the Convention on Biodiversity. The most recent agreement, the Cartagena Protocol on Biosafety, deals specifically with genetically modified organisms (GMOs) and potential threats to biodiversity.<sup>8</sup>

GMOs (or transgenics) are highly controversial with scientific disagreement over their potential benefit or harm. There is increasing momentum to promote GMOs as solutions to food shortages in poorer nations, even from previously sceptical sources (for example, the Director-General of UNDP). Counterarguments point to increased corporate patent rights and control over the food chain (who benefits?); potential ecological disruptions akin to those experienced by the increased movement of flora, fauna and insects from one ecosystem to another; unknown effects on soil and wildlife; exaggerated claims of benefit; and a deflection of policy attention away from systemic problems of poverty, food maldistribution and lack of land or resources. There is currently insufficient evidence of either environmental harm or benefit. Research on the direct human health implications of GMOs might best be undertaken by genetics and nutrition researchers (e.g. via the *Institute for Genetics [IG]* and the *Institute for Nutrition, Metabolism and Diabetes [INMD]*).

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<sup>8</sup> There is concern, for example, that certain agreements (such as the risk assessment requirement of the Sanitary and Phytosanitary Standards Agreement [SPS]) conflicts with the “precautionary principle” enshrined in many MEAs, most recently the Cartagena Protocol on Biosafety. The SPS puts the burden of proof on the importer, while Cartagena, more in keeping with the precautionary principle, puts the burden of proof on the exporter. The SPS is WTO-sanctionable, the Cartagena Protocol is not. The SPS risk assessment requirement is also an example of so-called “trade creep” into domestic legislation. Even if a regulation treats imported products exactly the same as domestically produced products (i.e. there is no trade bias in the regulation), the exporting country can still require the regulation to “pass” the SPS risk assessment criteria.

Research issues more generally associated with GMOs and global health include:

*How does the use of GMOs influence the economic conditions and food security (including land tenure) of producers, especially in poorer agricultural-dependent countries? How will GMOs affect ownership of agricultural land and products (there are concerns it will increase corporate ownership due to higher investment costs); and the agricultural labour markets in developing countries (again, there are concerns that many labourers currently employed in weeding or tending fields will be displaced)? What mediating or buffering government policies are required (appear to work) to mitigate labour market transition and potential poverty increases?*

These concerns have been expressed with particular reference to indigenous peoples, globally, who are at greatest potential risk from dislocations in crop production or economic re-organization of agriculture (UNEP, 1999). This applies to most, if not all, of the environmentally-based IGIs under discussion:

*How are environmentally-induced changes in food availability/security (partly through biodiversity loss) affecting traditional forms of self-reliance or health-enhancing cultural practices or solidarity amongst indigenous populations?*

This area of global health research might best be initiated by the *Institute of Aboriginal Peoples' Health [IAPH]*, although this would require the IAPH adopting a global, and not only national, approach to defining aboriginal peoples.

There are also questions about the TRIPS agreement, particularly with respect to granting patent rights on indigenous therapeutics or other life-forms. The World Bank estimated 1990 world sales of medicines derived from traditional knowledge of indigenous plants at \$43 billion, little of which went to the people or countries who originally created that knowledge. The WTO and developed world thrust is to better prepare many poorer countries to “compete” in and comply with such patent legislation. Developing countries are somewhat divided on whether TRIPS should be amended to better protect indigenous knowledge, or whether all life-forms, including micro-organisms and microbiological processes, should be banned from patent protection on the argument that such processes are a discovery, not an invention. Nonetheless, with respect to biodiversity, we are left with a somewhat paradoxical question:

*Will extending patent rights to life-forms increase biodiversity protection and, hence, though indirectly, longer-term human health gains? Where is the trade-off between the health losses of economic inequalities this might create globally, with the health benefits such protection might afford?*

### 3. Water shortage

Water shortage and quality have obvious and immediate health impacts and both, globally, are in decline (World Resources 2000-2001). Provision of potable water has improved, particularly for rural families (UNDP, 2001), though sanitation lags behind (up from 2.6 to 3.3 billion people from 1990 to 2000, UNEP, 1999) and there are increasingly basic questions about the sustainability (safety, sufficiency) of the future supply of water. Problems are most severe in Africa and Asia, but are growing worldwide. Fully 2/3rds of the global population are projected to experience moderate to high water stress by 2025 (UNEP, 1999); over 2 billion people are projected to be living under conditions of extreme water scarcity (Worldwatch Institute, 2001).

The inter-relatedness of IGIs begins to show as we proceed down the list. With respect to GMOs, for example, several water-related questions arise:

*How might the new generation of GMOs (sidestepping the question of their human safety) affect longer term food sustainability by, amongst other considerations, their potentially greater drain on water/irrigation, or increased uptake of food nutrients? How might these problems be balanced by a decreased need for herbicides and pesticides, and decreased contamination of drinking water sources?<sup>9</sup>*

More generally:

*How will the trajectories of the future economic growth of poorer nations affect the safety and sustainable supply of water?*

Cost and other fiscal pressures on public governments are increasing discussion of, in some cases multilateral agency support for, increased privatization of water supplies or, in the case of public supply, changes in pricing to more accurately reflect its market costs. The latter is in keeping with the long-argued (and Rio committed) principle of internalizing into commodity costs their environmental externalities. Both trends, however, could place poor populations at greatest risk of water shortage, especially as water scarcity increases.

*How will water supply and pricing policies reflecting market-based costs affect water access, and the burden of disease associated with “hydrological poverty” (Worldwatch Institute, 2001), for poorer groups, particularly within poorer nations?*

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<sup>9</sup> Though noting *in passim* that some of the most widely used GMOs are those developed for herbicide resistance so as to *increase* agri-chem use, and that Monsanto/Pharmacia, the dominant company in GMO research, markets seeds and herbicides as a single package. Presently, 75% of the crop area seeded with transgenics are devoted to herbicide-resistant strains (Worldwatch Institute, 2001).

There is also a significant global equity issue here. Tourism is the world's fastest growing industry, with much of the traffic flowing from rich to poor countries. It is often seen as an important source of foreign currency exchange and economic growth for poorer nations. Apart from harmful environmental effects of continually increasing rates of air travel (and these are considerable), or tourism as a vector for the spread of newly-resistant diseases, tourism also drains aquifers and other water sources in poorer countries in gross disproportion to local use (Addley, 2001).

Finally, there is concern over the long-term environmental, and hence human, health effects of what is anticipated to become a huge global market in water. Analysis of existing trade agreements, and those in negotiation, figures prominently in this concern.<sup>10</sup>

#### **4. Decline in fisheries**

Around 1 billion people, most in developing countries, depend upon fish as their primary form of protein (UNEP, 1999). The global marine fish catch almost doubled between 1975 and 1995, due to industrialization of fish fleets, but at the cost of serious depletion of fish stocks. Some 60% of global fisheries are estimated to be in, or near, depletion crisis (UNEP, 1999), a factor in the slower rate of growth in fish catch over the past few years.

There are several environmentally mediated health issues associated with the decline of fisheries, and with associated compensatory measures such as fish farms, shrimp farms and the industrial organization of what had once been a "hunter-gatherer" activity. Some of these pertain to habitat and biodiversity loss (e.g. destruction of mangrove swamps by shrimp farming), others to the use of antibiotics (farm fish are more prone to disease) and related concerns for human bioaccumulation, and others to the proposed introduction of genetically-modified (faster, larger growing) fish species.<sup>11</sup> There are also concerns that fishery declines (and other environmentally induced changes in food availability/security) lead to the loss of traditional forms of self-reliance and the erosion of health-enhancing cultural practices or solidarity amongst indigenous populations. As with biodiversity loss, specific questions associated with genetic modification or nutrients, and bioaccumulation effects of antibiotics, might best be handled by *the Institutes of Genetics*, and of *Nutrition, Metabolism and Diabetes*, and of *Infection and Immunity*.

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<sup>10</sup> This concern is particularly acute for Canadians. Water supplies in many major southwest US cities will be depleted within a decade; expansive development of these cities continues; and there seems to be an assumption that transport or diversion of mass amounts of water from other sources, including Canada, will resolve their looming shortage.

<sup>11</sup> Assuming human safety and minimal environmental impact, genetically modified fish with shorter growth cycles and higher protein output/nutrient input ratios may be important in food security, especially in poorer fish-dependent nations. Much will depend on how, and who, will control or regulate such use.

Research issues more generally associated with global health might include:

*What are the long-term environmental (and hence human) health effects of increased industrialization of fish farming? In the short-term, how are the benefits of economic growth associated with fish farming and export from poorer to wealthier nations distributed amongst the population?*

The effects of increased global trade in fish products on fish stocks and the environment are mixed. NAFTA studies on the effects of free trade on fish stocks remain equivocal; there is insufficient evidence to pass judgement in any direction (North American Commission on Environmental Cooperation, 1999). Other studies from developing countries (e.g. Uganda, Argentina) are less sanguine, finding a strong association between liberalization, increased trade, fisheries depletion and environmental degradation (UNEP, March 2001).

*How has increased global trade in environment-based resources, such as fish, affected environmental (and thus human) health; and the longer-term sustainability of food, in this instance fish, sources?*

*What is, or should be, the trade-off between short-term poverty-reducing economic growth and longer-term food sustainability, i.e. fish stocks, particularly for poorer populations in poorer countries?*

At the same time, WTO agreements require the removal of trade-distorting subsidies except for situations covered by GATT Article XX(b), permitting WTO members to violate GATT rules in cases where a law, regulation or other measure is “necessary to protect human, animal or plant life or health.”<sup>12</sup> Declines in fish stocks are strongly related to the presence of fishery subsidies, yet an estimated 90% of such subsidies have not yet been reported to the WTO (despite requirements for such reporting), much less removed (Sustainable Developments, 2001).

*How can trade-distorting and environmentally-damaging fish subsidies be removed without harming the incomes or food security of poorer populations in poorer countries?*

## **5. Deforestation**

As with many of the measures of environmental degradation, one might expect deforestation to be associated with health gains in the short-term (through increased agricultural land and food production, and/or forestry-related economic benefits) but with a declining health utility as longer-term environmentally induced health problems eclipse

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<sup>12</sup> Trade dispute panels, however, have interpreted this exception so narrowly that most attempts to shield a government measure on environmental or public health grounds have so far been unsuccessful. Part of the problem with this Article is that it was drafted decades ago, when there was greater confidence in the ability of scientific proof of causal relations in environmental and human health relationships and “uncertainty” was not well understood as an important scientific principle.

the short-term gain. (This would also include increased hazards associated both with forestry and agriculture such as accidents and chemical exposure, water contamination and so on.) There are clear occupational and labour market pathways between deforestation and health (associated with forestry and agricultural employment changes) which, in turn, relate to income (poverty reduction, distribution) pathways. We are unaware of any studies that have attempted to calculate the short and long-term health gains or losses, i.e., when deforestation becomes more human unhealthy, even in the short-term; and particularly when the distributive impact of health gains/losses within and between nations is taken into account. This may not be a particularly easy or productive line of inquiry for global health research – it can quickly dissipate into multiple sector specific studies – but it is worth noting that, at least in developed countries, environmental issues expressed in human health terms tend to receive more policy attention.

A general issue applying here (and to all other inherently global environmental issues) pertains to the links between short-term health gains and long-term health costs.

*When is the pivot point reached (as it may already have been in many ecologically stressed regions or nations) between short-term health gains and long-term health costs? To what extent does poverty drive environmental degradation or environmental degradation drive poverty? More specifically, at what point does economic growth associated with environmental degradation increase, rather than decrease, poverty, or increase environment-related poor health to a greater extent than decrease poverty-related poor health?*

Several agencies are already undertaking routine monitoring of forest stocks, and of the systemic environmental changes associated with forestry loss (desertification, changes in water cycles and so on).<sup>13</sup> Such monitoring might be value-added by incorporating estimates of human health risks associated with such changes. Health effects of deforestation range from short-term and wide-spread respiratory disorders associated with extensive burning to long term ecosystem disturbances and potential climatic change, with estimated negative health outcomes. Such value-added research would essentially seek to address:

*How is deforestation affecting human health in the short-term (setting aside longer-term issues of environmental degradation) via changes in disease vectors (pooling water, malaria), burning (respiratory infections), accidents (logging/agriculture) and so on? To the extent it is possible to assess, how are*

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<sup>13</sup> Global trade affects deforestation rates, as it affects other environmental IGIs. The combined effects of deregulation, privatization, and weak governmental controls on the Indonesian logging industry, for example, implemented to increase economic growth through increased trade, have led to the loss of more than 1 million hectares of forest per year through logging in Indonesia (Walt, 2000). Similarly, the “pull” of open markets in the US has led to an increase in illegal logging in Mexico; this not a direct problem of free trade *per se*, but of the indirect problems it places on countries with weak public regulatory and/or enforcement structures (Guerrero et al., 2000).

*these risks offset by any short-term health benefits via employment, income, increased food production (assuming it is retained for local consumption)?*

These questions are more acute for developing countries. While North America and the EU are currently increasing forest cover, forests are declining rapidly in Latin America, Asia and Africa (UNEP, 1999).

## 6. Food security

Food security is a bridge between global environmental and global socio-economic/political issues. All of the environmental issues above underpin food security/insecurity: population pressures, climate change, water loss, fisheries decline, deforestation, biodiversity loss, GMOs. A strong argument from the South is that, while ODA and FDI remain important, opening northern markets to the products of the South (primarily agricultural and textile) is the most important lever for economic growth and development, at least in the short term.<sup>14</sup> But there are several contentious (and researchable) issues pertinent to increased agricultural trade, food security, environmental degradation, economic growth, and their interrelationship to human health:

*Will increased food or non-food (cash crop) exports to developed countries create sufficient income for developing countries to pay for the increased food imports they will need to offset the decline in domestic food production? This is the classic liberalization argument, but there is little empirical evidence to support this theoretical claim (see Murphy, 1999). More generally, what effects will agriculture export-led development have on poverty and income distribution profiles in poorer nations, public tax regimes and associated social development programs (such as health care, education and so on)?<sup>15</sup>*

There is also a fundamental environmental question:

*How will increased agricultural trade affect greenhouse gas emissions, water shortage and contamination, or other global environmental issues; and how, over time, might this affect domestic food security?<sup>16</sup>*

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<sup>14</sup> Tariffs on manufactured goods (primarily from the North) have dropped from over 40% to around 5% in the past half century, while tariffs on agriculture (primarily from the South) remain between 40% and 50%. Some analysts believe this inequity is the principle reason for the collapse of the Seattle WTO Round (Denny, 2001).

<sup>15</sup> Several developing countries, even as they argue for a radical drop in agricultural subsidies and tariffs in developed countries, are urging exemptions for themselves. This apparent double standard may be warranted on health, development and ecological grounds. The internal economies of food production differ radically between rich and poor nations, in terms of the number of citizens employed in food production, the technological scale of such production, the size of the production surplus or deficit for domestic consumption, and so on.

<sup>16</sup> There is growing evidence, for example, that increased and intensified agricultural production is dramatically altering global nitrogen cycles (due to fertilization) with serious water contamination effects (UNEP, 1999). The relationship between economic growth and environmental sustainability, important *within* nations, is one of the most important global health issues *between* nations. Environmental impacts of poverty-reducing economic growth are

This question is most pressing for Africa, which has experienced serious soil erosion in the past decade, with declining food security, and which is the only continent where poverty rates are expected to rise over the next decade. The “environmental debts” of ongoing ecological degradation (which could be enhanced by increased agricultural-led export growth) will soon outstrip the costs of many African countries’ already heavy financial debts (UNEP, 1999).

The environmental argument against increased global trade is generally based upon reducing the non-renewable energy impacts of moving goods large distances. There is an equity overlay to this argument. Much of the economic wealth of today’s richer countries relied upon global trade in earlier eras, albeit with less polluting (sail, animal pack, rail) transport technologies; and the greatest growth in trade-related transport is still within and between the Quad (the EU, US, Canada, Japan). This underscores the importance of policy-oriented research in areas related to global tax options, such as a carbon tax, that might work to reduce developed nations’ “ecological footprint” while functioning as a vehicle for global income redistribution.

## **7. Increasing poverty**

Poverty is both a cause of many of the IGIs discussed so far, and an outcome. Its cause and resolution lies, in part, in global economic policies and practices. Its deepening globally has implications for all nations as the number of economic and environmental refugees/migrations increase.

The recent era of increased free trade and investment flows has seen a decrease in poverty at the <\$1/day level, hence the claim by many that global poverty is declining. But it has also seen an increase in poverty at the <\$2/day level, hence the counterclaim by many that poverty is increasing (Ben-David, Nordstrom and Winters, 1999).<sup>17</sup> Only a handful of countries (i.e. east Asia) have “grown” economically out of poverty. Many analysts believe this is due more to their inward initial development and protracted protectionism than to liberalization *per se*, i.e. economies that do well with liberalization are those already internally developed, rich and saturated.<sup>18</sup>

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rarely considered in studies finding positive effects for developing countries due to liberalization and increased global trade, except the (largely unsupported claim) that only when poorer nations become wealthier will environmental protection become a possible policy choice.

<sup>17</sup> The desultory implication one may draw from these data is that the world’s absolutely poor gained a little at the expense of those not quite so poor, an income distribute from have very littles to the have even lesses.

<sup>18</sup> While there are some examples where liberalization has benefited developing countries, there are also many examples where it hasn’t. Much depends on the pace of liberalization, the nature of compensatory public policies or programs and the structure of national welfare systems. In general, countries with weak domestic economies are often overwhelmed by surging, cheap imports, often from wealthier countries still subsidizing their domestic producers or their exports, though this is coming under closer WTO scrutiny. This, in turn, suppresses their domestic economic activity, depresses wages and tax revenues, and worsens balance of payments (Sustainable Developments, 2001).

There remains considerable disagreement on this point amongst economists. Some argue that trade openness leads to growth leads to poverty reduction (and hence, presumably, to improved health) (e.g. Dollar, 2001; Dollar and Kray, 2000), while others challenge every link in the chain (e.g. Rodriguez and Rodrik, 2000; Rodrik, 1999; Sen, 1999)<sup>19</sup>. One of the draft background papers for the WHO Commission on Macroeconomics and Health even suggests that technical diffusion may be more important than poverty reduction in accounting for historical declines in IMRs in developing countries.<sup>20</sup> Whether this holds for other health outcomes, is sustained over the lifespan or is distributed equitably within a nation remains unknown. As well, there is only speculation (some positive, some negative) on how such diffusion might be affected by a potential slow-down in technology transfers associated with strengthened intellectual property rights agreements, such as TRIPS.<sup>21</sup>

Somewhat less disputed is the increase in income inequality within most nations, and between developed and developing nations, that occurred in the past two decades (Cornia, 2001, UNDP, 1999). What is sharply contentious is where (or if) a trade-off should be made between poverty reduction that also increases income inequality. That is, economic growth may generally decrease poverty, but it also increases inequality. The former should lead to short-term health gains.

*What are the longer-term risks of increased health inequalities associated with longer-term income inequalities?<sup>22</sup> What is (or should be) the normative trade-off between increasing the base-line of wealth and health while also increasing the “gap” between top and bottom within and between nations? Given the growing literature on social capital/cohesion, and its pathways to health, what are effects of increasing income inequalities on social capital/cohesion?<sup>23</sup>*

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<sup>19</sup> Much of this disagreement hinges on differences in measurement, time-period, country and analytical techniques used. Background papers to the WHO Commission on Macroeconomics and Health, so far, do not appear to offer a consensus view on the debate.

<sup>20</sup> While available in draft on the web, the paper is not yet available for citation.

<sup>21</sup> The authors do note the importance of other public policies on health care, education and poverty reduction as creating a more favourable climate for technology uptake. This is similar to the conclusion reached by Ben-David et al (1999), that even if economic growth decreased poverty (regardless of how dependent on trade openness such growth might be), specific “pro-poor” or anti-poverty policies would still be required.

<sup>22</sup> Not all researchers are convinced that income inequalities are the greatest “driver” of health inequalities, even in developed, post-transition countries (see Deaton, 2001). . Poverty, which is higher in high income inequality countries, may be more important. Much of the interpretation problem rests on the poor quality of most of the income data sets used for cross-national comparisons. Hierarchies (social stratification systems), and their role in increasing or decreasing a sense of individual or community/group control, do appear to be important health predictors within developed countries. This may open up a different line of inquiry for developing countries, especially where ethnic or other forms of status hierarchies may be entrenched or growing,. Hierarchies and status systems are associated with income distribution and inequalities, but whether the latter is the primary driver or merely a marker remains moot.

<sup>23</sup> The one mortality cause significantly associated with income inequality is homicide (Deaton, 2001), which

The naive, but fundamentally sound, question about increasing global poverty is simply this:

*Why are some countries still poor and unhealthy?*

There are, of course, numerous and persisting sub-questions, for example:

*How is trade liberalization affecting economic growth, poverty, disparity (convergence, divergence in incomes)? What a priori conditions allow trade liberalization to promote economic growth in poverty-reducing, disparity-reducing ways? What specific and general compensatory public policies (ranging from re-training, to improved social safety nets, to longer phased in tariff removals) for “liberalization shocks” would best maintain health-enhancing social and environmental conditions, particularly though not exclusively associated with poverty and income distribution? Since some research suggests that economic growth increases inequalities, while public programs reduce inequalities but at the cost of dampening economic growth, what is an optimum balance with respect to net health gains, and more equitable health distribution?<sup>24</sup> What are the longer term implications of increasing inequalities on, for example, ethnic conflict or regional warfare, and how is this abetted or constrained by trade liberalization or other macroeconomic interventions?<sup>25</sup>*

## **8. Financial instability**

The scale and volatility of global financial markets – the confluence of digital technology, new investment instruments and de-regulation – is widely regarded as one of the most pressing global economic issues. Opinions still vary over whether the over \$1.5 trillion a day exchanged between currencies is a force for “healthy” macroeconomic discipline or a massive global casino fed by greed and rumour, increasingly disconnected from economic fundamentals in the production of goods or supply of services. There is less dispute that massive and short-term inflows and outflows of capital seriously erode the ability of national governments to intervene in foreign exchange markets to stabilize their currencies, manage their economies and maintain fiscal autonomy (Rao, 1999).

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would fit with the “story” (as economists like to express their hypotheses) that such inequalities heighten ethnic, class-based, religious or other forms of potential social conflict.

<sup>24</sup> Research to date has been primarily on developed country economies, although Ben-David et al (1999) claim it is a pattern generalizable to all economies, thus begging the question: At what point do we sacrifice growing inequalities for diminishing poverty, or *vice versa*.

<sup>25</sup> A recent study argues that one of the underpinnings of the Kosovo conflict was the macroeconomic structural adjustment policies imposed on Yugoslavia. These policies led to economic collapse, increased unemployment, reduced transfers to have-not regions, and re-created inequalities between ethnic groups that had, for half a century or longer, been absent (Allen, 1999). Similar arguments have been made for many regions where ethnic conflicts exist.

The domestic “shocks” of this volatility, together with the usual requirements for bail-out packages (increased liberalization, decreased public spending, increased privatization), often increases poverty and/or income inequality (Mexico, Asia, Russia, Brazil, now Argentina).

There are also indirect climate change effects due to de-regulation of foreign investment. The 1998 Brazilian currency crisis, for example, was precipitated by the greatest inflow and outflow of speculative capital ever experienced by a developing country (UNDP, 1999). The government lacked sufficient foreign reserves to stabilize its currency and was forced to borrow from the IMF. The rescue package included the requirement for drastic public spending cuts, including a two-thirds reduction in Brazil’s environmental protection spending. This led to the collapse of a multi-nation funded project that would have begun satellite mapping of the Amazonian rainforest as a first step in stemming its destruction. This destruction, in turn, may have a profound on climate change, with long-term and potentially severe health implications for much of the world’s population.

Several countries now support the creation of a financial transaction (or so-called Tobin) tax. Such a tax would penalize and so reduce the current high level of foreign portfolio capital in domestic markets, without deterring long-term foreign direct investment. The 2000 United Nations World Summit for Social Development saw unanimous Agreement from 160 nations calling on the UN to host a study on such a tax, partly as a means to develop new sources of funding for global social development and poverty eradication initiatives. (Based on 1995 data, such a tax would raise about \$150 billion US annually.) Yet there appears to be little political will to enact such a tax.<sup>26</sup>

Other efforts to increase financial stability include the “dollarization” of weaker economies, as undertaken by Ecuador. Economists differ on the wisdom of such a policy, and there is an urgent need to analyze its impact on poverty, income inequality and access to health care and other health-promoting public services or programs.

## 9. Digital divide

The digital divide refers to the rapid growth of communications technology and the internet, and the impact of such technologies (including who controls them and the

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<sup>26</sup> Chile’s requirement for 30% of FDI to be deposited in the government’s central bank as a “speed bump” against speculative capital flight was regarded as another potential policy model. Under investment liberalization, however, neighbouring countries without this requirement were able to attract higher rates of FDI, and Chile abandoned this policy in 1998. This speaks to the need for *global* rules in this area. Without them, countries enacting what might be more sustainable or “healthier” economic and financial policies (to the extent permitted under WTO agreements) could be penalized in trade and investment opportunities. This case was argued strongly in a national study of workplace health in the US, which included dimensions of worker democracy, income-sharing/distribution, affirmative action and other policies that would enhance workers’ health in indirect but positive ways (Levine, 1995). The study found that companies that *had* progressive internal corporate policies suffered financially against those that did not, and slowly began eliminating them. The study concluded that, without legislation requiring these commitments on the part of all companies (not the “voluntary” approach increasingly favoured in global policy discussions), market competition would inevitably erode them.

messages that flow through them) on social cultures. Setting aside the complex issue of the slow global domination of Western values and language,<sup>27</sup> such technologies can increase access to health information, and are already playing a major role in strengthening civil society participation in an emerging network of “global governance” (UNDP, 1999). But there is concern over the extent to which such technologies, or access to the knowledge (information) economy, are available to all persons or nations on an equitable basis. They currently are not, with a 500:1 ratio in the prevalence of Internet users between the richest and poorest population quintiles (UNDP, 1999).

There is a spirited debate in development circles over whether poorer nations need computers and computer literacy (high technology skills) more than they need such basics as food, shelter, health care, education, potable water and the like. There are examples, such as India, where technology-driven economic growth considerably outperforms agricultural-driven economic growth, though with the usual problems of increased inequalities. But many countries, particularly in sub-Saharan Africa, face such acute health, poverty, environmental and war/conflict problems that a development initiative based principally on reducing the digital divide seems improbably grand. It is difficult to formulate any specific research questions relating health to the digital divide. But it is important to note that economic development based on technological innovation and manufacturing is generally greater and more sustainable than agricultural-led growth. To the extent this growth is basic to reducing poverty (though not necessarily inequalities), it has obvious health benefits. There are many aspects to this question, some related to the existing degree of equity in access to education or health services in poorer countries, and how this access is influenced by increasing digital technologies in both of these sectors.<sup>28</sup>

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<sup>27</sup> The largest single export industry for the US is entertainment. The language of the internet is English. Researchers and analysts differ sharply on whether cultural globalization will improve or worsen ethnic relations. There is less difference on the positive effect of a globalization of gender rights and empowerment, though with the *caveat* that these rights are not simply an invention of the West but exist (often more strongly in pre-Western colonization times) in many presumably less emancipated countries today. An important debate here is over the impact of the globalization of Western consumerism through advertising and “name branding.” Many of the low GDP/high health countries (such as China, Costa Rica, Sri Lanka and the “exemplar” Indian state of Kerala) have, or had, relatively equitable income distribution, as well as policies supporting social transfers to meet basic needs, universal education, equitable access to public health and primary health care, and adequate caloric intake (Werner and Sanders, 1997). These pro-poor policies are now being eroded by trade liberalization. In Kerala, a media-developed Western consumerist culture, alongside tariff reductions, is rejecting locally produced goods for imported luxuries, weakening the local entrepreneurial base. In China, it is producing a dramatic growth in income inequalities.

<sup>28</sup> A first-world anecdote (risky to insert in a paper on global health research for its obvious bias and limitations) nonetheless comes to mind. Liberalization and taxation policies in the Australian state of Victoria led to chronically underfunded public schools. A parallel network of private schools has emerged. Apart from fees, entry to these schools requires even elementary students to possess a \$3,000+ personal notebook, since all lessons and assignments are mediated through the computer. Public schools are falling far behind in the digital divide. Private students, already economically more privileged, will become more so if the digital economy re-assumes a driving role in economic growth. Such students, meanwhile, *must* be driven to and from school everyday, as the notebook is too expensive and too heavy to walk with. The environmental effects are obvious, as are the decreased options for “active living.” Psychological effects associated with an increasing disconnect from land or place are more subtle, but probably real.

There are also questions of the new trade and investment regime in reducing or increasing existing inequalities in such access, e.g., through strengthened intellectual property rights which slow technology transfers, or a downward pressure on taxation and provision of public programs (such as health, education and technical upskilling) that improve the chances for regions, population groups or whole nations to compete more equally in the new economy.

## 10. Taxation

A major concern with increasing global trade and investment liberalization is its weakening effect on the abilities of national and sub-national governments to regulate domestically social and environmental conditions for human health and environmental protection. Countries can adopt human investment and social transfer policies to cushion peoples' living standards against economic declines consequent to economic globalization. When they do, they slow the rise in income and other forms of social inequality (Rodas-Martini, 1999), holding out the possibility of reversing the trend in the future. But global integration so far has "run ahead of global governance to share the benefits." With capital tending to prefer low-tax situations, liberalization is creating tax competition amongst countries.<sup>29</sup> This is resulting in declines in tax revenues in rich and poor countries alike (Rodas-Martini, 1999, Rao, 1999), with a subsequent erosion of public services. This is not a universal phenomenon. Some countries are managing to maintain high levels of taxation, with varying degrees of progressivity; others are not. Nation-specific factors appear to be the political orientation of national governments (social-democratic states do better), the extent of labour force organization (countries with higher unionization rates do better), the level of economic wealth (high and middle-income countries, with the exception of the US and the UK, tend to stronger and more progressive "universalist" welfare policies) and the internal capacity to collect and administer tax revenues (GSP Forum, 2001; Gough, 2001).<sup>30</sup>

Declining tax capacities have been most dramatic for transition economies (Eastern Europe, CIS), but liberalization-related currency crises in Asia led to reductions of 10% or more in public spending for health, education and social/community services in Thailand, the Philippines, Korea and, for a time, Malaysia. (UNDP, 1999). The net effect is what the 1999 UNDP Report described as "double jeopardy," that while "all the structural changes of globalization increase the demand for public resources...in the face of reduced revenues, governments are pulling back" (p. 93). Tariff removal *per se*

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<sup>29</sup> Some analysts cite convincing research that low tax structures and regulatory regimes are only a few of many conditions that determine investment decisions. More powerful determinants of where non-speculative investment might locate are the supply of human capital (skilled labour and labour productivity), materials and market access, i.e. the conditions for profit. But they also acknowledge that investors will use the threat of more liberalized mobility to continually nudge such regimes lower.

<sup>30</sup> As poorer countries continue to cope with compliance with an increasing number of WTO agreements, their ability to develop the national capacities for effective and transparent tax collection and administration will be further strained.

may not decrease such revenues, but only to the extent that alternative, progressive forms of taxation are substituted. However, economic pressures from trade liberalization are applying downward pressures on all forms of taxation.

Capital mobility and transfer pricing methods used to minimize corporate taxation are also hampering the ability of national governments to generate tax revenues. OXFAM estimates that over US \$100 billion in potential tax revenue leaves developing countries for off-shore tax havens each year, more than the total amount of aid (see Action Aid et al, 2001).<sup>31</sup> Transfer pricing, in which companies engage in “intra-firm” global trade with their own subsidiaries, allows them to earn the highest profits in countries with low tax regimes, and the lowest profits (or even losses) in countries with high tax regimes (Reinicke, 1998). The Organization for Economic Cooperation and Development (OECD) is leading negotiations to regulate such tax havens, although it is meeting some resistance from the US. This is an area where investment regulations under the WTO, particularly with respect to transparency in the movement of capital, could help to stem the theft of national wealth from developing countries by corrupt leaders.<sup>32</sup>

Issues of taxation, while central to those of governance, income equality and access to health-enhancing conditions, are complex. Research on how tax regimes are shifting, how these shifts are related to other IGIs and to global trade and investment liberalization, and how these shifts are affecting health determining conditions within different countries, might best be initiated by the *Social Science and Humanities Research Council [SSHRC]*, with its less health-specific mandate. As with other IGIs so far discussed, there may be potential for “value-adding” health-specific analyses accompanying such research.

## 11. Health-Damaging Products

Most research in this area has gone towards examining the effects of trade liberalization on tobacco use. A recent study demonstrated that there was a significant rise in the market share of US cigarettes in those countries affected by particular sections of bilateral trade agreements which resulted in the removal of excise taxes and what were perceived to be discriminatory distribution practices (Chaplupka and Laixuthai, 1996). The study concluded that the agreements resulted in an overall increase in cigarette demand. A joint World Bank/WHO study demonstrated the same results more broadly, showing that the largest impact of reduced trade barriers with respect to tobacco consumption occurred in low income countries (Taylor et al, 2000). The inclusion of tobacco marketers in Canada’s most recent (February 2001) trade delegation to China

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<sup>31</sup> This estimate is based on calculating, for each nation the value of export-oriented economic production, applying average corporate tax rates to the residual profit and comparing the potential to the real amounts of corporate tax revenue.

<sup>32</sup> There have also been calls from NGO and independent policy institutes for the WTO to change its enforcement measures. Currently, countries found in violation of WTO agreements can be fined or subject to trade sanctions. The argument here is that trade sanctions as a penalty for failing to liberalize trade is contradictory. It also hurts poor nations disproportionately. A fine-based system, perhaps tied to “ability to pay” (based on some GDP percentage), would be more equitable and could also function as another form of global taxation.

raised numerous complaints from health officials in government, and from health practitioners and researchers. It remains to be seen if the WHO Framework Convention on Tobacco is able to stem this trend.

There is a need for ongoing research on the effects of trade liberalization (and specific agreements, such as TRIPS, which may delimit government tobacco-control strategies) on tobacco use, especially in developing countries and amongst women who tend to have low smoking rates in these countries. As tobacco use is highly addictive, and is often cited as the leading preventable cause of cancer and heart disease, it may be appropriate for the *Institutes of Cancer Research [ICR]*, *Circulatory and Respiratory Health [ICRH]* and *Neurosciences, Mental Health and Addiction* to consider competitions in this area. Similarly, given that youth and women constitute the largest group of potential new tobacco users in developing countries, the *IGH* and the *Institute of Human Development, Child and Youth Health [IHDCYH]* might also partner in funding such studies.

There is also concern over the growth in trade in hazardous waste, much of it illegal. Most of the world's toxic waste is generated in OECD countries. Stricter environmental regulations and higher costs for disposal in these countries are leading to a growing export market. Officially, only a small amount of toxic waste is exported to developing countries, but there is evidence of widespread unofficial movement. Trade in European waste to India, for example, is particularly brisk, due to disposal costs in the latter being \$2500 US/tonne cheaper. India, however, presently lacks the environmental standards and/or inspection capacities over its hazardous waste sites to ensure reasonably safe disposal (Shiva, 2000).

There is a paucity of data tracking production and transport of hazardous waste. Some initial attempts to map changes in the flow of hazardous waste following NAFTA have been made (Jaycott, Reed and Winfield, 2000), particularly to determine if nominal or regulatory commitments between trading nations for "cradle to grave" management have been compromised. The study concluded that, at present, it is difficult to ascertain potential environmental (much less human health) impacts since data on waste generation (particularly in Canada and Mexico) is limited, and for transboundary shipments is almost non-existent. Assessing any changes in the global trade in hazardous waste, and the effect of trade liberalization on such movement, will require detailed, localized case studies.

While important, it is difficult to determine if this specialized area of trade in health-damaging products warrants health research priority, especially given the current lack of data. Given the technical and environmental components of toxic waste transport and disposal, this may be an area of study fundable through the *National Sciences and Engineering Research Council of Canada [NSERC]*.

## 12. Governance

Much of the preceding discussion relates to governance, both in terms of the capacities of nations to regulate domestically for their own development or environmental protection, and in their ability to provide the programs or services that enhance the health of their population. Recent studies have examined the contribution of health (or education and other “pro-poor” capacity-building) public investments on longer term economic growth (e.g. Savedoff and Schultz, 2000) indicating some modest positive relationship.<sup>33</sup> Multilateral agencies, including the World Bank, now also claim the importance of pro-poor economic development strategies. Such policies, however, often require forms of economic intervention (tariffs, performance requirements and other policy instruments) to direct internal economic development in ways that meet human development (including health development) goals. Yet the new regime of trade agreements works precisely to remove these capacities from national governments.<sup>34</sup> Unsurprisingly, many developing countries argue for continued “special and differential” exemptions to WTO provisions that limit their capacity to develop their domestic economies. Many development NGOs and independent policy research centres are now arguing that such exemptions should not be based on extending the “grace period,” but on indicators of a domestic economy sufficiently well-developed to better cope with the “shocks” of liberalization and global competition (see Labonte, 2001). The argument against such discriminatory measures is that the greater growth liberalization (should) bring will ultimately be of greater benefit to all citizens in all countries, although this remains a claim open to greater empirical investigation.

Broad, descriptive patterns do not support the liberalization claim. A recently released “scorecard” on the past 20 years of globalization compares numerous indicators for the “pre-globalization” period (1960-1980) and the rapidly globalizing period (1980-2000) (Weisbrot et al, 2001). During the more recent, rapidly globalizing period, GDP growth declined in all countries, but was most pronounced for the poorest 20% of nations. The rate of improvement in life expectancy declined for all but the wealthiest 20% of nations, indicating increasing global disparity. Infant and child mortality improvements slowed, particularly for the poorest 40% of nations. The rate of growth of public spending on education (as a share of GDP) also slowed for all countries, and the rate of growth for school enrolment, literacy rates and other educational attainment measures slowed for most of the poorest 40% of nations, with the sharpest drop in the poorest 20%.<sup>35</sup> The

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<sup>33</sup> Recall that the relationship of such investments to short-term economic growth may be more emphatically in the reverse direction.

<sup>34</sup> The WTO Agreement on Trade-Related Investment Measures (TRIMS) similarly prevents countries from placing “performance requirements” on foreign investment. Such requirements have been used to benefit government officials or their families (“cronyism”), one of the arguments made in favour of their removal. But such requirements have also proven useful in the development of a viable national economy, and their removal benefits more investors from developed countries than people living within developing countries. A WTO dispute panel recently concluded that “development [or pro-poor] policy,” is not the same as “macro-economic policy.” Where there is a WTO dispute, the latter shall prevail (Raghaven, 1999).

<sup>35</sup> The decline in the rate of growth in education spending by poorer countries will also affect their capacities to utilize new technologies (see discussion of “the digital divide” above), even if these technologies become more

authors caution that this does not prove a link between globalization, or liberalization, and a slowdown in development progress. As most researchers now accept, only detailed, multi-level national studies will begin to tease apart causal patterns or relationships (Haddad and Mohindra, 2001).

Developed countries generally do better than developing countries in ensuring their poorer obtain access to health care. At the same time, the health gains from such care in developed countries is much more marginal than it is for the poor in poorer nations (Wagstaff, 2001). Health care in poorer countries still tends to favour the wealthy over the poor and hospital care over primary care. Even in the case of programs intended for the poor (such as oral rehydration therapy) many initiatives fail to reach the poor and so widen health inequalities within the country (Wagstaff, 2001). Nonetheless, public health spending in poorer countries (at the \$1/day or \$2/day poverty levels), regardless of the inequality of its distribution, is associated with improved health outcomes. Interestingly, education spending, particularly for women, is only associated with improved health outcomes at the \$2/day poverty level – the very level where poverty rates, globally, are increasing (Wagstaff, 2001; Ben-David et al., 1999).

Access to health care, however, is not the major driver of health status in developing countries. The greatest predictors continue to be income and education levels, and gender equity (Wagstaff, 2001). Health service access, while still important, may be a driver more for what it represents in forgone income (particularly under conditions of increased privatization or user fees) than in services *per se*.

The potential list of research questions here would be extensive. In more general terms, the larger questions are:

*How are liberalization and macroeconomic adjustment programs (i.e. privatization, de-regulation, decreased public spending) affecting governments' abilities to provide health, educational and welfare services or programs to the poorer members of their citizenry? What impact is this having on measures on health status (both absolute and distributional), and the rates of change in these measures?*<sup>36</sup>

As technological innovation proceeds, and assuming it diffuses to poorer nations, another question arises:

*How will technological innovation bias health care provision towards hospital-based or "high-end" interventions in poorer nations, with what opportunity costs to primary care services of greatest benefit to the poor within those nations?*

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diffused within them. That this decline in growth rate is steeper in poorer, than richer, nations will only further this divide.

<sup>36</sup> Existing studies of SAPs produce mixed findings (see Breman and Shelton, 2001), although effects on Africa have generally been more singularly negative.

*(This may be an area of research supported by the IHSPR, as it applies to Canada as well as to developing countries.)*

There are also several important issues raised by the new WTO trade regime, including the General Agreement on Trade in Services (GATS), still in negotiation. Disputes over the interpretation of GATS' implications with respect to privatization of health or other health-promoting services are particularly rancorous. Key concerns appear to be:

- GATS requires progressive liberalization, i.e. a country can only liberalize more services in the future, and not withdraw those to which it presently commits liberalization.
- Interpretation of preamble and textual clauses (does it protect domestic policy-making in service areas where there is already a mixture of public/private provision, which is the case with almost all "public" services?).
- The role of powerful economic forces behind the GATS negotiations (major private service providers in the US and the EU, with open acknowledgements that the intent of GATS is to increase the private provision of health, education and other services globally).
- The potential bias towards technologically-driven, hospital-based Western-style health care systems in developing countries if, and as, exports of Western health care management styles increase under GATS.
- More narrowly, mode 4 provisions that govern the movement of persons providing services (how this will effect the already increasing migration of health and other professionals from poorer to richer countries? see Drager, 1999).

Finally, the TRIPS agreement has been the source of tremendous concern with respect to the availability and affordability of anti-retrovirals (or any other new therapeutic inventions) in poorer countries.

*A basic question here is how TRIPS in its current, or potentially amended, form, will affect access to new therapeutics? More systemically, and perhaps more subtly, is research into how TRIPS may increase resource and knowledge control (and hence economic benefit, with all of its associated health gains) by developed nations, at the expense of developing nations.<sup>37</sup>*

### **13. War and conflict**

While the end of the Cold War was greeted as the beginning of an era of peace and prosperity, the reality of the past decade has been more sobering, however. While the

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<sup>37</sup> The point here being that price differentials, special funds and other measures intended to make developed world drugs more affordable or accessible in poorer nations does not address the important role of generic pharmaceutical companies in poorer countries in developing or enhancing local knowledge, increasing domestic economic development and capacity, and improving the nation's competitive ability in global medical research.

security of the world's states may have improved, the security of its peoples has declined.

Armed conflict in particular has become more brutal and deadly. The number of armed conflicts between states has declined over the last 25 years, but the number of intra-state conflicts has increased. Of the 108 armed conflicts since the end of the Cold War, 101 have been fought within rather than between states, such evident in the Great Lakes region of Africa, in Bosnia and Kosovo, in East Timor, in Angola and in Sierra Leone (DFAIT, 2000). Civilians are increasingly the principal targets and instruments of these modern wars. Casualties from armed conflict have doubled in just the last decade, with approximately one million people losing their lives each year. Whereas during the First World War only 10 percent of casualties were civilians, today that figure is closer to 80 percent. In this context, the impact of war, conflict and threats to exerts pressures on health from different perspectives (Levy and Sidel, 2000). Direct impacts are profound from conflict itself and its residual trauma, such as the amputation epidemics caused by landmines. Scars are also inflicted upon the psychological well-being of populations, particularly younger generations. In the environment of conflict, populations are forced into makeshift transient communities and camps where they are cut off from basic supports and infrastructure and subject to yet further health risks.

In addition to direct impacts described above, profound ecological damage and economic damage and disruption resulting from conflict exert strong indirect pressures. The diversion of resources undercuts the capacity for more beneficial alternatives.

Health personnel are increasingly recognizing the desirability of addressing this obvious major determinant of health (MacQueen and Santa Barbara, 2001; Yassi et al, 2001). Research, however, is lacking as to how best this might be achieved, or what types of primary or secondary prevention interventions are worthwhile. Canada, with its history of "peacemaking," could play a leadership role in addressing both the health impacts of world conflict, as well as how health professionals can best intervene. As is the case with other IGIs, investigation of these factors can effectively involve collaboration with civil society stakeholders.

## D. Setting Global Health Research Priorities

In setting global health research priorities based on both burden of disease (BoD) and IGIs, there are five useful considerations.

1. A matrix that allows an examination of BoDs against IGIs
2. The role of strategic partnerships
3. The value of synthesis research
4. The importance of nation-based case studies
5. Integration with intervention (evaluation) research.

### 1. A simple matrix

The two approaches to identifying global health research priorities (i.e. the BoD approach, and the IGIs approach) can be viewed together as a matrix where the rows are the diseases while the columns can be considered as the set of drivers or pressures at a global level (Table 5).

**Table 5: Design for a Matrix Integrating the Two Approaches to Scoping Global Health Research Priorities**

<b>Diseases</b>	<b>Drivers</b>	Ecological degradation	Poverty	Financial instability	Digital divide	War and conflict	Etc.
Infectious Disease							
Non-communicable Disease							
Injuries							
Cancer							
HIV/AIDS							
Etc.							

Some CIHR Institutes would already line up with certain diseases, e.g.

Institute of Cancer Research  
 Institute of Circulatory and Respiratory Health  
 Institute of Infection and Immunity  
 Institute of Musculoskeletal Health and Arthritis  
 Institute of Neurosciences, Mental Health and Addiction  
 Institute of Nutrition, Metabolism and Diabetes

At a more underlying level, one might also include the Institute of Genetics.

An additional column can be added to the left of the rows, identifying those groups or states most vulnerable to these diseases, for example, heavily indebted or least

developed countries, women, children, indigenous people. Again, some CIHR Institutes would already line up with certain of these vulnerable groups, e.g.

Institute of Aboriginal Peoples' Health  
Institute of Gender and Health  
Institute of Healthy Aging  
Institute of Human Development, Child and Youth Health

In both instances, these Institutes could support global health research through the entry points of vulnerable groups and/or specific diseases. The extent to which this research should include the requisite to incorporate some analyses to IGIs is open to discussion. What also remains at issue is which, if any Institute, would direct research backwards, from the IGIs to specific diseases, although the Institute of Population and Public Health seems a logical first choice. The Institute of Health Services and Policy Research can play a role here, especially relative to national governments' capacities to provide the health systems and other social or environmental programs that regulate IGIs, or prevent or mitigate their disease effects on vulnerable populations.

An overlay of questions in all of the research would include some analysis of the impact of trade agreements and liberalization (more generally) and, as indicated in the introduction, the effect of a shift in capital transfers from rich to poor from ODA to FDI.

## **2. Strategic partnerships**

Much of the research on the impacts of global forces on health or health-determining conditions is presently undertaken by multilateral agencies, such as the World Health Organization, the World Bank, and numerous UN agencies (e.g. UNDP, UNEP, UNCTAD). Much of the commissioned research is undertaken by scholars in developed countries, which raises an interesting issue of global equity. While perhaps minor in direct economic transfer terms, this first-world reliance does little or nothing to enhance the knowledge/research capacity in developing nations. These points raise two questions:

*To what extent should Canadian-funded global health research be strategic and primarily supplement or "add on" to other multilaterally funded global health research initiatives? This would require a careful scanning of such research to ensure that it adequately addresses the global "drivers" of health status/health inequalities.*

*To what extent should Canadian-funded global health research require partnerships with researchers in developing countries (such as with the IDRC's current "Partnerships for Global Health Equity"), or otherwise seek to enhance the research capacity in poorer countries?*

### 3. Synthesis research

As we noted in our introduction, several models attempting to describe how global forces might influence health are now being developed. All of these posit several pathways that are associated with known health-determining social, economic and environmental conditions (e.g. poverty, income distribution, physical environment quality, and public services such as health care, education and social services, labour market/employment). The importance of these conditions on health will vary by the level of development of different countries. The effects of economic globalization (using different methods and methodologies) on many of these pathways (for example, transportation-related greenhouse gas emissions, poverty rates) have been studied, but syntheses of these disparate studies into some larger framework for policy purposes is still nascent. The “ecosystem health” approach endorsed by IDRC has stimulated consideration of transdisciplinary approaches that provide methodologies and frameworks to support collaboration and interaction with communities and may be of special interest in this regard (Forget and Lebel, 2000; Spiegel et al. 2001).

*To what degree should synthesis research, akin to that requested by the NHRDP and now, occasionally, by Health Canada, but specific to inherently global health issues, be a priority, and for which funder?*

### 4. National-Level Research

A key problem facing research on IGIs is determining how much of the trends is merely an extension of pre-existing national trajectories and how much is a result of qualitatively new global changes in economic and political structures/practices. This can only be done through carefully constructed comparative national studies, such as the IDRC-funded, multi-nation MAPHealth (Macroeconomic Health Policies) research program (Haddad and Mohindra, 2001). Many of the health-related research questions can only be answered in any detail by closer intra-national study and then cross-national comparison. This applies particularly to questions surrounding the health effects of global economic and political changes.

With research partners in different countries, the intent here would be to look more closely at countries where economic globalization appears to be yielding net health benefits and those where it may be yielding net health losses. If we take Mexico, for example, the *maquiladoras* or free-trade zones are the only place where employment has risen – and risen quite dramatically – and where new FDI is locating. These zones are not well integrated into the overall Mexican economy or society which, post-NAFTA, has experienced dramatic decreases in income for salaried and self-employed workers though, interestingly, not for workers in cooperatives (Economic Policy Institute, 2001). Are there countries where the benefits of liberalization have been more equally distributed by geography or population groups?

In examining such countries, particularly for global comparative purposes, it is important to assess not only shifts in health status (for example, <5 mortality rates) and health determining conditions, but also the degree of equity in such status and access to such conditions across the population. Just as we know there are high income, high inequality, poor health countries/states, and low income, high equality, high health countries/states, there are some countries where health status is more equitably distributed, and some where it is not. Vietnam, for example, has low income, high equality and both a low <5 mortality rate and a low gap in this rate between top and bottom quintiles. Brazil has higher income, higher inequality, and both a higher <5 mortality rate and a higher gap in this rate between top and bottom quintiles. Overall, patterns regarding inequalities in access to health services, maternal/child health services (e.g. ORT), education and more underlying health determinants (income, employment) aren't straightforward in explaining inequalities in, for example, <5 mortality rates and other health measures within and between countries. If the ability to influence policy change is at least part of the intended research outcome, considerably more research untangling domestic pathways, in light of global pressures, is required (Wagstaff, 2001). Studies selecting low and middle-income countries where the *concentration index* of health inequality is either low (more equitable) or high (more inequitable) might usefully examine differences in contexts, policies, known health determinants (conditions, food security, ecosystems), cultural beliefs.

## 5. Intervention Studies

A great deal of ODA and health NGO work is for programmatic interventions in the medical manifestation of disease and its treatment, its behavioural risk factors and/or its underlying determinants. Evaluation research on these interventions is often minimal. This is not a problem confined to interventions in poorer countries, but concerns funders in most developed countries as well.

There is a need for more rigorous evaluation research. Using HIV/AIDS as an example, we might ask: What is the equity in access to medical services, for HIV/AIDS specifically, or in more general terms, across infected populations? How has behaviour (not simply knowledge) changed, and again, how is this change distributed by socioeconomic status or by gender/culture within populations or countries? How have government, health or local-level policies altered that might redress persistent inequalities in access to services and change opportunities? How have capacities in communities most at-risk increased, both specific to HIV/AIDS and more generally with respect to health? (This is an important, generalized outcome of much health promotion community-level work that can be undertaken and evaluated in more deliberate fashion; see, for example, Labonte and Laverack, 2001a/b.)

There are larger research questions which can also be attached to such evaluation research, increasing the knowledge gains with respect to program or policy interventions. Carrying on with the HIV/AIDS example: How do gender roles and role

change influence behaviour, disease, policy uptake? How do national macroeconomic changes influence behaviour, policy uptake? How do specific trade policy commitments influence services, therapeutics, costs, governance, public revenues associated with change in behaviour? What are the economic and development impacts of the disease, and of program interventions into the disease (including even the employment or knowledge gains created by programs, their effects on social cohesion/cooperation at local levels, and so on)? Are there differences with how some communities/nations dealing with the disease from others, i.e. they are more effective or, in UNICEF's interesting new jargon, they are "positively deviant?"<sup>36</sup> How do cultural understandings influence action on HIV/AIDS? What are the environmental, social, cultural commonalities or differences "driving" greater risk for HIV/AIDS and other diseases, between populations or communities, different nations at similar development levels, and so on?

Thus, we might consider two ways to enrich knowledge by linking program interventions to research questions:

1. More specific research questions associated with HIV/AIDS could be linked to interventions, when appropriate, as a matter of funding requirement.
2. Funding bodies primarily interested in interventions (what *does* work?) could partner with research funders primarily interested in research questions (what *should* work?) to create value-added research questions in intervention programs/studies; and/or value-added intervention programs/studies to research questions.

While the example given applies to HIV/AIDS, there is no reason it should not also apply to other diseases.

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<sup>36</sup> "Positive deviance" was coined by UNICEF field representatives to describe those families or communities whose health is substantially better than other families or communities facing similar economic, environmental or general developmental contexts. By studying "positive" families or communities that "deviate" from the norm, one can learn more about local- level (or presumably even national level) differences that might explain the better health outcomes and so give greater direction to future program and policy interventions.

## E. Conclusion

Canadian health researchers have distinguished themselves in many areas and have an important role in contributing to global health research efforts. Given the scope and complexity of the global health challenge, however, it is imperative that efforts be as well-organized as possible to have an optimal effect and impact, building on established strengths while pursuing effective partnerships, particularly with Southern researchers and institutions.

As we orient ourselves to the issues that stand out as priorities, we must ensure that the institutional context is as supportive as possible. The tasks at hand were eloquently summarized by Neufeld et al. (2001) in a commentary piece in the *Canadian Medical Association Journal* where the prescription presented was to increase awareness, involvement and funding. The mosaic of institutions that can contribute to the global health research effort have different roles and stakes in pursuing this matter. The basis for collaboration must be structured as appropriately as possible, so that those organizations such as IDRC whose primary mandate is with Southern researchers can effectively work with those such as CIHR, with its direct connection to Canadian researchers. Agencies such as CIDA, with a broad concern for development, can in turn incorporate the benefits that can accrue, as can Health Canada with its health-oriented mandate. Furthermore, there are limitless opportunities for engaging NGOs and private sector partners.

This calls above all for strategic positioning regarding roles and responsibilities, and communication regarding the initiatives that can emerge. Initiatives such as the Partnership for Global Health Equality request for proposal prepared by IDRC in collaboration with several partners provides an example of how such an approach can be applied.

With specific reference to the Canadian Institutes for Health Research, Neufeld et al. drew attention to the following recommendations as applicable for industrialized countries such as Canada:

- "provide career opportunities for young [Canadian] scientists to become engaged in research on health problems of developing countries;
- promote the strengthening of ... medical schools [and other health-related institutions] and development studies groups ... to pursue advanced research, conduct training of industrialized-country and developing-country scientists, and participate in international networks;
- commit a larger share of the budgets of [Canadian] health research funding agencies to support research focused on health problems of developing countries."

This, then, brings us to the specific question of how to set the agenda for research in Canada.

First, it may be useful to conceive of the challenge in three phases:

*Short-term (i.e. 12 months):* Where organizations with their existing mandates and budgets can set priorities and initiate activities that will not only not only result in increased knowledge and strengthened capacity, but can contribute to longer terms activities. The watchword at this phase is modest, but strategic, initiatives. Pilot studies, rather than major undertakings, should be encouraged. Constructing partnerships can have special importance. Trainee and Career Awards are particularly important to be offered at this early stage to stop the brain drain of researchers interested in global health issues and develop Canada's capacity to play a leading role in this area.

*Medium-term (2-3 years):* Will allow for reallocations of priorities and development of inter-agency partnerships to create greater critical mass and more elaborate undertakings.

*Long-term (beyond 3 years):* Will allow for the development of qualitative breakthroughs and consideration of whether more dramatic and ambitious goals and approaches should be pursued.

What does this say for global health research priorities?

At CIHR, there is an opportunity for pursuing a "horizontal" cross-institute initiative, which would require an articulation of a strategic thrust. This could then imply different roles for different institutes. The two approaches laid out in this discussion paper are perhaps suggestive of how CIHR can orient itself, ensuring that consideration is given to both consideration of dynamic driving forces and the burden of disease evidence-base from which opportunities can be assessed.

For example, the Institute of Population and Public Health can place its emphasis on exploring the driving force impacts, perhaps as a core theme for an RFP that will call for a consideration of how these pathways relate to health impacts and the possibilities for effective interventions.

On the other hand, Institutes such as the Institute of Infection and Immunity can proceed from an orientation directly grounded in the disease burden evidence to call for research projects in appropriate targeted areas, and call explicitly for consideration and exploration of driving force interactions. Similarly, the Institute of Gender and Health, or the Institute of Human Development, Child and Youth Health, and the Institute of Healthy Aging, can consider relevant IGIs and their impacts in their own right, as well as in relation to identified disease burdens.

The matrix framework suggested as a means for synthesizing the two conceptual approaches for Global Health Research can be employed to provide an overall orientation, with separate Institutes proceeding from one side or the other to articulate

their priorities. The research program that emerges should result from exchanges that optimize the complementarity and creation of strengthened critical mass. Establishing broader partnerships should be encouraged as a way to leverage additional resources and collaboration.

We have avoided, in this paper, defining what *should* be the specific research priorities. Rather, we conclude with a set of sequential principles that could potentially guide funding selection of appropriate research proposals, without *a priori* confining the content area:

- Give priority to research on inherently global issues that will reduce the burden of disease.
- Give priority to research on the burden of disease that includes study of inherently global determinants.
- Within either, give priority to research that represents Southern-defined concerns or questions.
- Within such research, give priority to proposals that will increase equity in health outcomes between groups within nations.
- Within such research, give priority to proposals that have solid civil society engagement.
- Within such research, give priority to proposals that will increase equity in knowledge capacities between the North and South.

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