

## Mapping global health inequalities: challenges and opportunities

Peter Tugwell, Vivian Robinson, Erin Morris

### Introduction

Health inequalities both between and within countries persist, for almost all diseases and health problems. Between countries, both average life expectancy and child mortality have improved more in the richest countries than the poorest (Marmot 2007). Within countries, progress on redressing health inequalities is uneven, and data are not always available over time. Analysis of 22 countries with available data found that only five of 22 countries reduced health inequalities in childhood mortality across income from 1995 to 2000 (Moser 2005).

Health inequalities are differences in health across population groups defined by socioeconomic, demographic, or geographic factors. These factors can be summarized using the acronym PROGRESS: Place of residence (urban/rural), Race/ethnicity, Occupation, Gender, Religion, Education, Socioeconomic status, and Social capital/resources (Evans and Brown 2003). Examples of health inequalities across these factors in North America are shown in Table 1.

Differences in health are not produced solely by health care systems; while quality, accessibility, and affordability of care are important, it is the complex interaction of health determinants that leads to health inequalities. Health determinants include the social and physical environment, individual behaviours, genetics, and the health care system. Individual behaviours are estimated to account for only 25% of health inequalities (Frank 1995, Marmot 2006). Determinants of health inequalities are different from determinants of health (Graham 2004), leading to interest in the “causes of the causes”; that is, “the fundamental structures of social hierarchy and the socially determined conditions these create in which people grow, live, work, and age” (Marmot 2007).

Measurement of health inequalities and changes over time can be assessed with both relative and absolute differences. An absolute difference is that between a specified group rate and a chosen reference point, whereas a relative difference is the difference in rates expressed as a percentage of the chosen reference points (Keppel 2005). Because relative differences depend on the chosen reference group as well as the baseline difference, there is a need to present absolute differences to interpret changes in health inequalities between groups over time.

While high quality health care is essential to reduce health inequalities across PROGRESS factors, its influence is undermined by social determinants which affect peoples' health and opportunity for good health (Labonte 2007, part 1).

Where inequalities in health are deemed avoidable, remediable, and unfair, they are considered health inequities (Whitehead 1990). The definition and measurement of health inequity require a normative decision about social justice and fairness, which is a dynamic concept that also changes depending on context (Daniels 2006). Hence, this paper focuses on health inequalities that can be measured.

## Empirical data

*What has been happening to health inequalities between and within countries? What sources of data track these changes?*

Between countries, health inequalities in life expectancy have been worsening, particularly between industrialized countries and sub-Saharan Africa; six years of this difference in life expectancy is attributed to HIV/AIDS (Dorling 2006) (Figure 1). Furthermore, the effects of climate change are expected to have even worse consequences on health in low- and middle-income countries, particularly sub-Saharan Africa, than in industrialized countries, due to potential increases in malaria from increases in mosquito breeding grounds due to longer and more intense rainy seasons. Effects of climate change and environmental risk are expected to be worse for the poorest in low- and middle-income countries (Smith 2005). However, none of the existing models predicting these changes in malaria transmission have been adequately validated using empiric data ([http://grida.no/climate/ipcc\\_tar/wg2/360.htm](http://grida.no/climate/ipcc_tar/wg2/360.htm)).

Within countries, the differences in health between rich and poor have increased in some countries such as the United States (Table 2), but improved in others, where progressive social policies have increased tax transfers to the poor (e.g. Sweden). Even in countries where health inequalities have improved, there is no reason for complacency since the differences in health across population groups remain substantial (e.g. Colombia child mortality).

Empirical data on both within and between country health inequalities are available from many international household surveys (Table 3) as well as specific surveys such as the World Bank 56 country survey of within country health inequalities between 1995-2000 (Gwatkin 2007). Longitudinal data on health across geographic and socioeconomic indicators is needed to assess progress towards reducing between and within country inequalities in health and assessing whether programs and policies are indeed benefiting the poorest.

For child mortality, data by geographic region shows that Africa continues to have unacceptably high child mortality rates compared to industrialized countries (Figure 2). However, longitudinal data shows that there has been progress on the average, even in sub-Saharan Africa (Figure 3). Yet, these averages hide the wide range of between country inequities- even within Sub-Saharan Africa (Figure 4), as well as obscuring the fact that within county

inequalities may be worsening over time, or that enhanced equity may be achieved at the expense of the least poor populations. For example, data from the World Bank health inequality surveys in six African countries shows that while some countries have reduced inequalities between richest and poorest, the poorest continue to have unacceptably high infant mortality, and some countries, there has been worsening in infant mortality rate for the least poor (e.g. Chad, Ghana and Kenya) (Figure 5). Furthermore, there are several initiatives at local and regional levels which measure health inequalities over time and develop appropriate public policies and programs to redress these health inequalities. For example, the Global Equity Gauge Alliance (GEGA), developed in 2001, set up equity gauges to monitor within-country inequalities in health in 12 regions at different levels ranging from city to national level (Ntuli 2007). Some countries have set up special observatories for health inequalities and health inequities, and have data available on local, regional, or national levels (e.g. Bogota observatory on health equity, Chilean observatory on health equity, London Health Observatory [<http://www.lho.org.uk>]).

These equity gauges have the potential to monitor the differences in health across socioeconomic factors. For example, the Bangladesh Equity Gauge, led by the Bangladesh Rural Advancement Committee (BRAC) and International Centre for Diarrhoeal Disease (ICDDR,B), has monitored inequities in childhood mortality between 1977 and 1996, using a demographic surveillance system (Bhuiya 2001). They found a large reduction in the socioeconomic differential in child mortality between 1982 and 1996, which could be attributed to the extension of maternal child health and family planning services (MCH-FP) (Figure 6). These MCH-FP services included family planning counseling, provision of contraceptives, safe-delivery services and illness treatment and referral. Comparison to areas without this extended service package suggested that this MCH-FP service was responsible for much of the decline in shortfall in child mortality rate. Prospective monitoring of socioeconomic differential in health inequalities from equity gauges can be used to assess the impact of programs on health inequalities as well as to design and advocate for improvements in services.

Despite these numerous data sources, there is a scarcity of comparative data over time on average health indicators across countries (Attaran 2005). For example, only two indicators have data over time for 98% of countries (Attaran 2005B). This lack of time trend data limits the ability to measure progress towards the Millennium Development Goals (MDGs), shown in Table 4 (United Nations 2006). The health-related MDGs aim to reduce child mortality, reduce maternal mortality and combat HIV/AIDS, malaria and other major diseases. Data on inequalities between population groups across time are even more scarce. Local and regional observatories are a promising development for correcting this lack of equity data over time. For example, the Chile Equity Gauge has developed an observatory which collects data on a number of health

indicators across socioeconomic status, and allows assessment the effects of health reforms and other non-health policies on the distribution of health in the population (Vega 2003).

Several methods have been developed to visualize different dimensions of health inequalities, such as the UK's Health Poverty Index (Figure 7), the genuine progress indicator (Canada), and the inequity in health index (Eslava-Schmalbach 2007). Between country inequalities on a macro level across 366 indicators related to health and social determinants of health can be visualized using the worldmapper software (<http://www.worldmapper.org/>). These methods are powerful tools to advocate for action and to monitor progress towards reducing health inequalities.

## 2. Processes and opportunities

*What processes of change influence inequalities on this dimension? What opportunities are being opened for reducing inequalities?*

Health inequalities are affected by both global and local processes of change, shown in Figures 8 and 9: 1) health system characteristics; 2) social and political context; and 3) globalization (Diderichsen 2001).

Health system characteristics influence the quality, accessibility, availability, and affordability of health care. Some methods of improving affordability of health care, such as the PROGRESA conditional cash transfer program which pays poor people to attend health visits, have been shown to have beneficial effects on health, nutrition, and education (Rivera 2004). However, other methods of health insurance, such as community-based health insurance, may increase health inequalities by requiring the poor to pay, either through insurance premiums or through user fees (Palmer 2004, Lagarde 2007). The health system reform in Latin America has been criticized for providing sub-standard packages of services to poor people, and for providing no coverage for secondary care (Homedes 2005, De Vos 2006). An increasing evidence-base on the effects of health system characteristics on health inequalities is being developed by the Alliance for Health Policy and Systems Research. For example, causal mechanisms in reducing inequalities in child health include training of health workers, using lay health workers, health system improvements, improved quality of care, and improved family and community interventions (Bryce 2005), Figure 6.

Social and political processes are dynamic and are influenced by local and national governance and the degree of citizen participation as well as other factors. Internal displacement and migration, produced by conflict or by underemployment in rural areas, have grave consequences on health inequalities, by affecting urbanization and increasing the number of people living in urban slums. International commitment to the rights of children, human rights, the right to health, the MDGs, and environmental protection also

shape the political and social context, but their translation into policies to reduce health inequalities is unsatisfactory. Not only do countries fail to implement policies to support their international commitments (e.g. lack of progress on meeting target of 0.7% GDP for overseas development aid), but commitment to these international treaties does not necessarily translate into policies that aim to reduce health inequalities. For example, all but one of the MDG targets (gender equality in education) can be met by improving average health, with no improvement, or even worsening of health inequalities (Moser 2005). For example, of 13 countries with improvements in under five child mortality between 1996 and 2001, only four showed progress in reducing inequalities in child mortality across income level and five countries had increased inequalities in child mortality (Moser 2005).

Increased involvement of the state in legislating healthy physical and social environments, such as improved water quality and seatbelt legislation, may have potential to reduce health inequalities by reducing differential exposures and vulnerability, but requires a consideration of the balance between individual rights and protection of public health (Gostin 2006). The state can act to protect public health through seven powers: 1) power to tax and spend; 2) power to alter the informational environment; 3) power to alter the built environment; 4) power to alter the socioeconomic environment; 5) direct regulation; 6) indirect regulation; and 7) deregulation (Table 5). The effects of the “nanny state”, defined as heavy involvement of the state in regulating healthy environments, on health inequalities may vary according to setting and context. For example, partial smoking bans may increase inequalities in health (Woodall 2005), but seatbelt legislation may reduce health inequalities in traffic injuries (Briggs 2006).

Because the social and political context requires consideration of individual and collective values and rights, increased social participation and civil society movements are needed to debate the proposed policy changes. The Global Equity Gauge Alliance is an example of a social movement to link data from monitoring health inequalities to both top-down policies and grass-roots advocacy movements (McCoy 2003). Equity gauges include dynamic engagement of academics, policy-makers, and community-based organizations in developing monitoring methods as well as policy approaches. The People’s Health Movement is another example of an international civil society movement to increase consideration of social determinants of health on health inequalities.

Increasing social participation in the democratic process and in policy development can have positive effects on social inclusion, which may improve health status through mechanisms of increased empowerment, social capital, and resources. The WHO Commission on Social Determinants of Health Social Exclusion Knowledge Network is assembling evidence on the processes of social exclusion. Their investigative work will focus on three themes: 1) the

pathways to social/economic/health disadvantage; 2) active and passive exclusion; and 3) processes and interactions at different levels (Popay 2006a). The increased availability of electronic communication can facilitate these processes, but lack of electronic communication in many rural and poor areas is a barrier to participation in an era of increasing reliance on information communication technology.

Globalization has been defined as “*a process of greater integration within the world economy through movements of goods and services, capital, technology and (to a lesser extent) labour, which lead increasingly to economic decisions being influenced by global conditions*” (Jenkins 2004). Globalization affects health inequalities through seven mechanisms: 1) trade liberalization and poverty reduction; 2) labour markets and global reorganization of production; 3) debt crisis and marketization under pressure; 4) financial liberalization and financial crises; 5) cities restructured by the global marketplace; 6) natural resources and environmental exposures; and 7) marketization of health systems (Labonte 2007, part 2). For example, the structural adjustment programs of the International Monetary Fund developed in response to the debt crisis required countries to privatize in order to receive debt relief. These policies of forced privatization and marketization have been criticized for causing income and food insecurity. For example, the Malawi famine in 2002 was attributed to structural adjustment policies that reduced subsidies for agriculture that resulted in increased prices, reduced income for farmers and reduced crop production (Devereux 2002). Marketization of health systems is one of the drivers of the “brain drain” from Africa to industrialized countries. Industrialized countries are able to offer higher salaries, job security and career paths for physicians, pharmacists and nurses from Africa (Labonte 2007, part 2; Attaran 2007). This brain drain from Africa is contributing to the increasing health worker crisis in Africa (Figure 7), and the ability of African health systems to deliver even primary health care is being compromised (Chen 2004).

### ***Opportunities being opened for reducing health inequalities***

Commitment to knowledge translation represents a major opportunity for reduction of health inequalities. Knowledge translation is defined as: “*the synthesis, exchange and application of knowledge by relevant stakeholders to accelerate the benefits of global and local innovation in strengthening health systems and improving people’s health*” (World Health Organization 2005). This definition implies that knowledge translation is a complicated process involving multiple stakeholders in generating, adapting, and applying knowledge.

There is increasing support for knowledge translation at international and national levels. At the international level, following the Mexico Ministerial

Summit in 2004, the World Health Assembly adopted a resolution which clearly supported a mandate for knowledge translation (Pablos-Mendez 2006). There is a major commitment from the WHO and PAHO to support knowledge translation, through the Evidence into Policy Networks (EVIPNET) being developed in Asia, Africa and the Americas (Hamid 2005). The WHO Collaborating Centre on Health Technology Assessment and Knowledge Translation for Health Equity, based at the University of Ottawa, has developed a toolkit of quality-appraised methods for considering equity in knowledge translation ([www.cgh.uottawa.ca](http://www.cgh.uottawa.ca)).

Knowledge translation and exchange can influence health inequalities through one or more policy entry points shown in Figures 4 and 5, as defined by Diderichsen, Dahlgren, and Whitehead (Diderichsen 2001): 1) reducing social stratification; 2) reducing differential exposure; 3) reducing differential susceptibility; and 4) reducing differential consequences by enhancing quality, accessibility, affordability, and availability of health care.

Social stratification can be mediated by policies that aim to improve employment possibilities such as enhanced completion of primary education and by strategies to reduce poverty such as income tax transfers. For example, tax transfers in Canada have reduced poverty in seniors by 90% from 1981 to 1997 (Ross 2001). Sweden is widely acknowledged as spending a high proportion of its GDP on social assistance, and having consequently low after-tax poverty rates for children, seniors and the general population (Ross 2001).

Differential exposure refers to the evidence that disadvantaged populations are exposed to greater health risks. In high-income countries, these health risks could include less freedom at their workplace, less ability to choose healthy lifestyles and poor housing conditions such as exposure to lead and asbestos. In low- and middle-income countries, differential exposure to air and water-borne disease are more important due to poor sanitation, water quality and air quality (Bhuiya 2001). Interventions to reduce differential exposure include policies that improve the living and working conditions such as improvements to housing quality (Thomson 2001). Subsidized daycare for preschool children of disadvantaged mothers exposes children to early childhood education and has benefits on long-term employment of both mothers and their children (Zoritch 2000). School feeding for disadvantaged children can mitigate food insecurity, and has beneficial effects on growth and cognition (Kristjansson 2007).

Differential vulnerability implies that exposure to the same health risks may result in greater health damage in disadvantaged populations due to interacting factors. For example, lower education may result in less resilient psychosocial status which could increase vulnerability to health risks such as smoking and commercial sex work. Programs to reduce vulnerability could focus on

improving psychosocial strategies during pregnancy (Hodnett 2003) or providing home-based social support for disadvantaged parents (Bennett 2007).

Differential consequences of ill health on social and economic circumstances can be mitigated by policies to reduce the out-of-pocket expenses required for health care, such as conditional cash transfer and health insurance mechanisms (Xu 2007). Improvements to health systems to increase access such as outreach for specialist services also reduce the economic consequences of ill health (Gruen 2003).

Multiple models and frameworks for knowledge translation have been proposed depending on the type of evidence, type of stakeholders, and stage of knowledge exchange (Ramalingam 2005, Graham 2004, Santesso 2006, Lavis 2003a, Tugwell 2007). Once effective interventions have been identified from systematic reviews (or primary research where systematic reviews are lacking), five steps can be used to design and monitor knowledge translation strategies: 1) Assessing barriers and facilitators to implementing the intervention; 2) Prioritizing barriers across appropriate audiences, described by the six “P”s (policy-maker, public, patient, provider, press, private sector) (Tugwell 2006); 3) Choosing knowledge translation interventions to address key barriers; 4) Evaluation of process and health outcomes; and 5) Knowledge mobilization with the six “P”s (Tugwell 2006). Knowledge mobilization strategies can be classified as “producer-push”, “user-pull”, or linkage and exchange (Lavis 2003b).

In choosing knowledge translation interventions for policy-makers, there is an increasing, though still scarce, evidence base on how to translate evidence into policy and practice (World Health Organization 2007). Strategies for improving capacity for the translation of evidence into policy are conceptualized into four categories of: 1) setting research priorities; 2) generating relevant knowledge; 3) Evidence filtering and amplification; and 4) improving policy-making strategies to consider evidence (Figure 11). Evidence-based actionable messages from the relevant evidence-base need to be framed as policy strategies or options (Lavis 2003). One example of enhancing capacity for evidence-informed policy is the Canadian Health Services and Research Foundation (CHSRF) Executive Training for Research Application (EXTRA) program to train middle-level managers from government, public, and private institutions involved in health policies and programs in how to appraise, adapt, and apply evidence ([http://www.chsrf.ca/extra/overview\\_e.php](http://www.chsrf.ca/extra/overview_e.php)).

Effectiveness of strategies to change behaviour of practitioners depends on the context and setting (Grimshaw 2006, Siddiqi 2005). The evidence of professional, consumer, organizational, financial and regulatory interventions is summarized on a website hosted by the Canadian Agency for Drugs and Technology in Health (CADTH) at [www.rxforchange.ca](http://www.rxforchange.ca). Overall, this evidence base suggests that knowledge translation strategies need to be selected with

consideration for the context and setting, need to be monitored for effectiveness, and that there is no one-size fits all strategy.

For the general public, increased commitment active involvement of civil society is likely to enhance relevance of knowledge for public decision-making. For example, the Academic NGO initiative has developed an intervention to reduce stigma around HIV/AIDS with collaboration from adolescent girls and two non-governmental organizations; the intervention is a collection of stories as told by adolescent girls (Robinson 2006). Community engagement in evidence-based planning using the CIET methods is another example of a strategy to include the general public in problem solving and knowledge mobilization (Andersson 1989).

For patients, decision aids, written in lay language or using videos and other media, have been shown to improve adherence to health decisions and reduce health care costs (O'Connor 2003). The Cochrane Collaboration is developing evidence-based actionable messages in lay language for all systematic reviews as part of the Plain Language Summaries initiative (Santesso 2007).

### **Wider understanding of poverty and inequality**

*How do changes in health inequality influence three aspects of poverty: material poverty, vulnerability, and exclusion?*

Poor health can lead to a “medical poverty trap”, in which rising personal health care costs create poverty and worsen the situation of those already poor (Whitehead 2001). This occurs when poor health affects ability to work (either physically or mentally) or results in catastrophic health care costs which lead to reduced material wealth and increased vulnerability. These effects interact and reinforce each other through feedback loops of social stratification and exclusion (e.g. due to leaving the work force), differential exposure and vulnerability (e.g. due to reduced material wealth and its effects on living conditions, food security, water quality, etc), and inability to access or afford high quality health care. A study of American bankruptcies found that illness or injury were cited by 28.3% of debtors as the primary reason for bankruptcy. Moreover, almost half of debtors (46%) reported that some form of catastrophic medical expense had caused their bankruptcy: 1) illness or injury as main reason for bankruptcy; 2) uncovered medical bills of over \$1,000; 3) had to mortgage a home because of medical expenses; and/or 4) lost two weeks or more of employment income due to illness/injury (Himmelstein 2005). In low- and middle-income countries, costs of care for tuberculosis are estimated to cost over 500% of personal income for the poor compared to only 174% of personal income for the least poor populations in Malawi (Kemp 2003), as in Table 6.

Furthermore, poor health can affect employability through processes of social exclusion and stratification, thus reducing material wealth and increasing

vulnerability. For example, stigma associated with HIV/AIDS disclosure may affect employment and family relations. However, lack of disclosure may result in delay of effective treatment as well as increased risk of transmission to others. Depression and mental health are also associated with stigma, but lack of treatment can lead to social withdrawal which affects employment, household wealth, and vulnerability. Poor dental health is associated with discrimination and exclusion from employment, and can lead to long-term poor health outcomes such as chronic infections which may affect employment and wealth. Adolescent pregnancy is associated with a two- to three-year lag in educational attainment and employment.

## **Conclusions**

In conclusion, the world has achieved impressive improvements in health, but we still have a long way to go to correct both between and within country health inequalities. Involvement of multiple sectors is needed to reduce health inequalities since health, social, financial, economic, and transportation policies are all needed to improve the social determinants of health. Multiple social and political processes from the local to the international level are involved in generating health inequalities and these interact with each other, as shown in Figures 8 and 9. Knowledge translation represents a major opportunity to improve health inequalities by dynamic engagement of multiple stakeholders in developing, adapting, and applying the evidence-base on not only what works, but also how to reduce health inequalities. The main policy entry points for reducing health inequalities are reducing social stratification, reducing differential exposure, reducing differential vulnerability, reducing differential consequences of ill health and improving the quality of health care services. Continued emphasis on monitoring health inequalities over time is needed to evaluate the impact of programs and policies. Visual representation and mapping of health inequalities can provide a tool for both monitoring inequalities over time, as well as for planning and advocacy purposes.

Table 1: Examples across PROGRESS from Canada and the United States

P	Place of residence	Rural youth are more likely than their urban counterparts to commit suicide; the risk is four times higher for rural boys, and six times higher for rural girls [CIHI 2006]
R	Race/ethnicity/culture	Annual incidence of tuberculosis in aboriginals (indigenous people) is 36/100,000 versus 6.5/100,000 for the general Canadian population [Medical services branch 1999]
O	Occupation	People exposed to asphalt for their occupation have an odds ratio for brain cancer of 1.29 [Pan 2005]
G	Gender	After coronary artery bypass grafting, women are more likely than men to have a cardiac readmission (hazard ratio 1.5)[Guru 2006]
R	Religion	American counties with higher concentrations of Mormon communicants have lower rates of cancer mortality than counties with higher concentrations of Jewish communicants [Dwyer 1990]
E	Education	Women with lower educational attainment are more likely to be hospitalized for asthma complications [Chen 2001]
S	Social status	Children in high-income neighbourhoods are half as likely to be obese as those in low-income neighbourhoods [Veugelers 2005]
S	Social capital	Individuals who both provided and received assistance from members of their social network were 1.32 times more likely to report being in good health than individuals who reported no reciprocal assistance relationships [Bouchard 2005]

Table 2: Annual percentage change in number of mentally unhealthy days by annual household income, Behavioral Risk Factor Surveillance System, United States, 1993-2001 (Zack 2004)

<u>Mentally unhealthy days</u>		
Annual household income	% change	95% CI
<\$15,000	4.9	4.2, 5.7
\$15,000 - \$24,999	4.4	3.7, 5.2
\$25,000 - \$49,999	3.5	3.0, 4.1
≥ \$50,000	2.2	1.5, 2.8
Unknown or refused to answer	3.2	2.2, 4.1

\*The annual percentage change equals the slope from a linear regression model of annual household income on year, adjusted for age and divided by the mean of annual household income in the reference year, 1993

\*\*Two-sided  $p < 0.05$

\*\*\*CI = confidence interval

Table 3: Sources for empiric data on within and between country inequalities in health

Survey	Stratifiers for assessing inequalities in health
Demographic and Health Survey (DHS)	Age Sex Education School attendance Residence Employment Religion Ethnicity Basic material needs
Living Standards Measurement Study (LSMS)	Income Education Gender Ethnicity Age Employment Housing Migration
Multiple Indicator Cluster Survey (MICS)	Sex Age Education Ethnicity Language
Demographic surveillance system (DSS)	Sex Ethnicity Education What is house made of Material possessions
World Health Survey (WHS)	Age Sex Education Income Household expenditure Language Marital status Employment Occupation

Table 4: Millenium Development Goals (MDGs) (United Nations 2006)

**Goal 1: Eradicate extreme poverty and hunger**

- Reduce by half the proportion of people living on less than a dollar a day
- Reduce by half the proportion of people who suffer from hunger

**Goal 2: Achieve universal primary education**

- Ensure that all boys and girls complete a full course of primary education

**Goal 3: Promote gender equality and empower women**

- Eliminate gender disparity in primary and secondary education preferably by 2005, and at all levels by 2015

**Goal 4: Reduce child mortality**

- Reduce by two-thirds the mortality rate among children under five

**Goal 5: Improve maternal health**

- Reduce by three-quarters the maternal mortality ratio

**Goal 6: Combat HIV/AIDS, malaria and other diseases**

- Halt and begin to reverse the spread of HIV/AIDS
- Halt and begin to reverse the incidence of malaria and other major diseases

**Goal 7: Ensure environmental sustainability**

- Integrate the principles of sustainable development into country policies and programmes; reverse loss of environmental resources
- Reduce by half the proportion of people without sustainable access to safe drinking water
- Achieve significant improvement in lives of at least 100 million slum dwellers, by 2020

**Goal 8: Develop a global partnership for development**

- Develop further an open trading and financial system that is rule-based, predictable and non-discriminatory, includes a commitment to good governance, development and poverty reduction - nationally and internationally
- Address the least developed countries' special needs. This includes tariff- and quota-free access for their exports; enhanced debt relief for heavily indebted poor countries; cancellation of official bilateral debt; and more generous official development assistance for countries committed to poverty reduction
- Address the special needs of landlocked and small island developing States

- Deal comprehensively with developing countries' debt problems through national and international measures to make debt sustainable in the long term
- In cooperation with the developing countries, develop decent and productive work for youth
- In cooperation with pharmaceutical companies, provide access to affordable essential drugs in developing countries
- In cooperation with the private sector, make available the benefits of new technologies - especially information and communications technologies

Table 5: Seven powers of the state regarding public health law (adapted from Gostin 2006)

<b>Legal intervention</b>	<b>Example</b>	<b>Evidence of impact</b>
Power to tax and spend	Tax on tobacco	Tobacco taxes are effective at reducing smoking, but increased prices are disproportionately borne by low-income groups
Power to alter the informational environment	Limits on tobacco advertising	Tobacco advertising is known to increase likelihood of adolescent smoking (Lovato 2003). Advertising bans reduce public awareness of messages about tobacco (Harris 2006)
Power to alter the built environment	Smoke-free workplaces, shopping centres, restaurants	May increase health inequalities if partial bans are used [Woodall 2005]
Power to alter the socioeconomic environment	Financial incentives for healthy behaviour, including smoking cessation	Financial tax benefits or incentives have been considered as a policy option to reduce smoking (Legrand)
Direct regulation of persons, professionals and businesses	Banning smoking in public places (e.g. Canada, Scotland, UK)	May increase health inequalities if partial bans are used [Woodall 2005]
Indirect regulation through the tort system	Litigation against tobacco companies	Public health success, mostly for class action law suits, and also useful for gaining public support for other policies (Gostin 2007)
Deregulation	Legalization of alcohol post-prohibition (e.g. BC government Liquor Act 1921 establishing Liquor Control Board and 1951 Indian Act allowing Indians to drink in public places, if mandated by the province)	Reduced the Black Market on alcohol, which consisted of potentially more dangerous, unregulated alcohol

Table 6: Costs for tuberculosis care contribute to the medical poverty trap

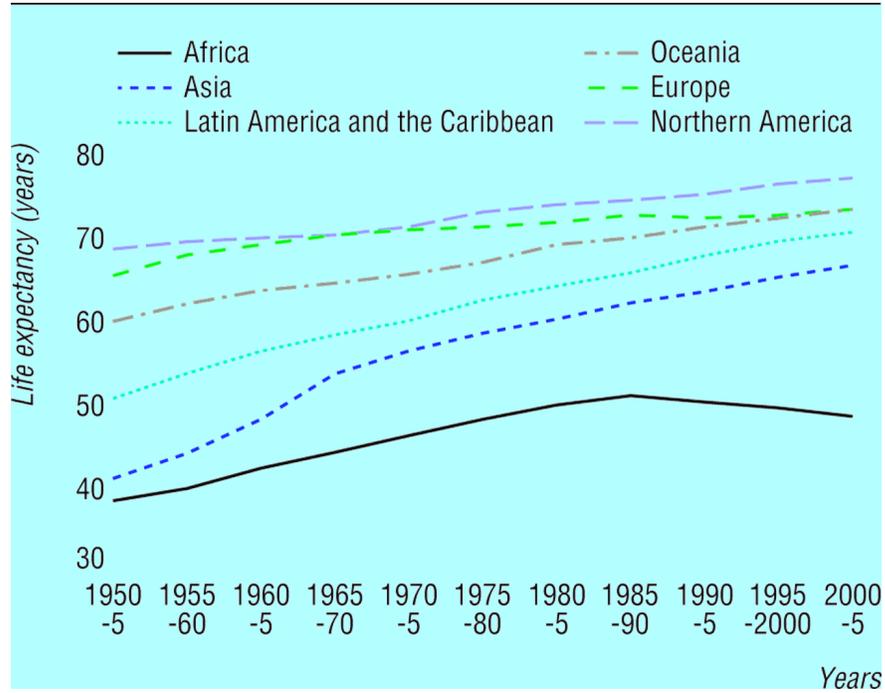
	All Patients	All poor	All non-poor
<b>Direct Costs of Pathway to Care</b>			
Fees and Drugs	7.6	6.6	9.8
Transport	3.4	2.6	5.6
Food	2.0	1.8	2.3
<b>Total Direct Costs</b>	<b>13.0</b>	<b>11.0</b>	<b>17.7</b>
<b>Opportunity Costs</b>			
<i>Days Lost (days)</i>	22.1	21.9	23.2
Mean income (IHS)	\$0.71	\$0.21	\$1.23
<b>Income lost during care seeking</b>	<b>\$16</b>	<b>\$5</b>	<b>\$29</b>
<b>Total Costs</b>	<b>\$29</b>	<b>\$16</b>	<b>\$46</b>
Total costs as % of monthly income	134%	248%	124%
% income not spent on food	65%	42%	70%
Total costs as % of monthly income after food expenditure	206%	584%	176%

Source: Kemp 2003, Available at:

<http://info.worldbank.org/etools/docs/library/114527/RTPmaterials/Reaching%20the%20Poor/Session%20B-Pres/Mann.ppt>

Figure 1: Declining life expectancy in Africa

Fig 2 Life expectancy (in years)



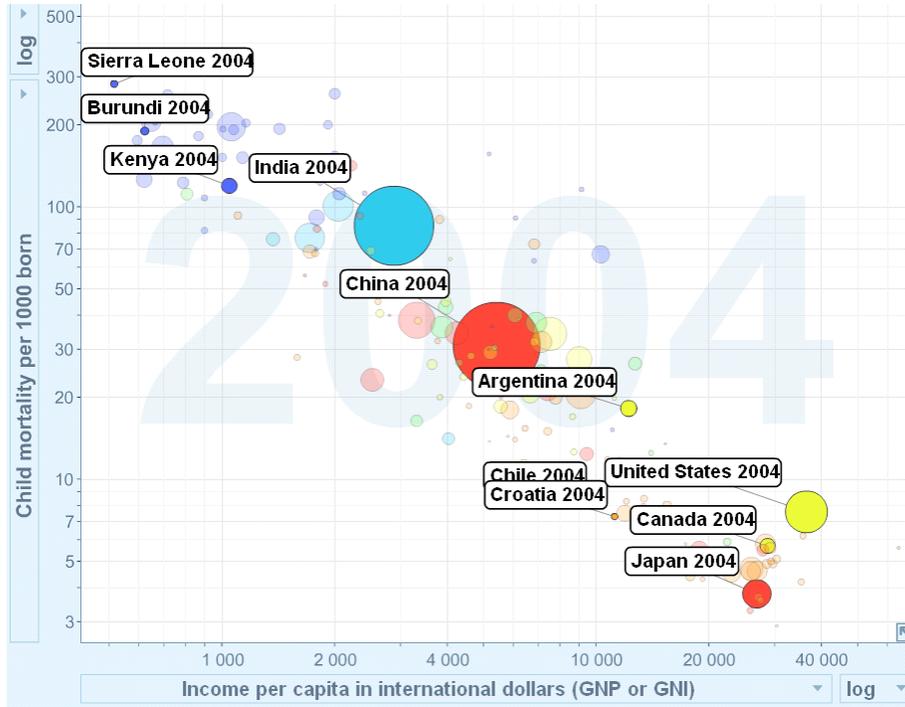
Dorling, D. et al. BMJ 2006;332:662 -664



Copyright © 2006 BMJ Publishing Group Ltd.

**Note:** Difference in life expectancy between Africa and other countries accounted for by HIV/AIDS is estimated as 6 years

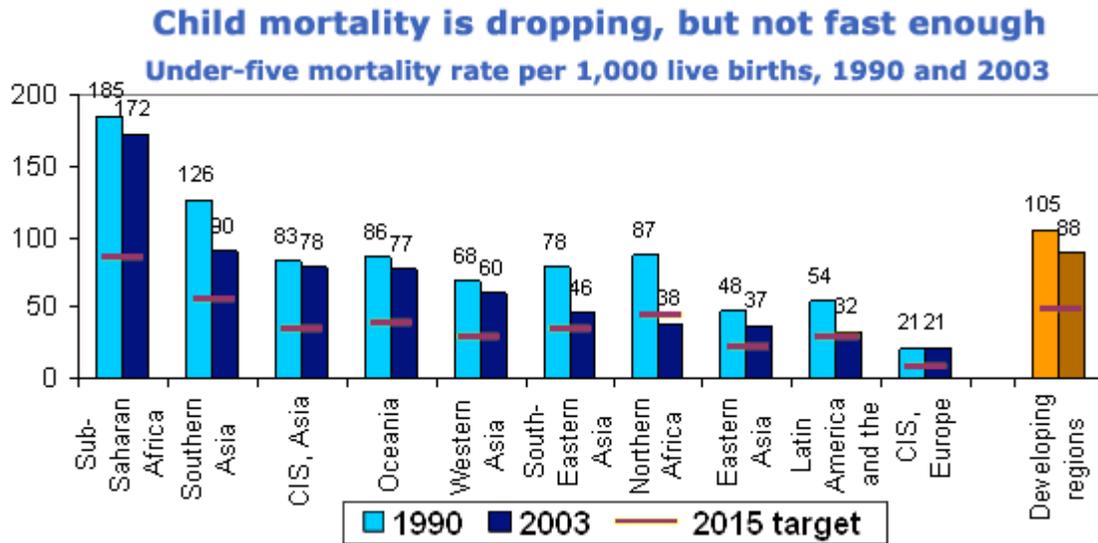
Figure 2: Child mortality per 1000 born worldwide against income per capita in 2005



Note: Size of bubbles represents size of population. Colours represent continents.

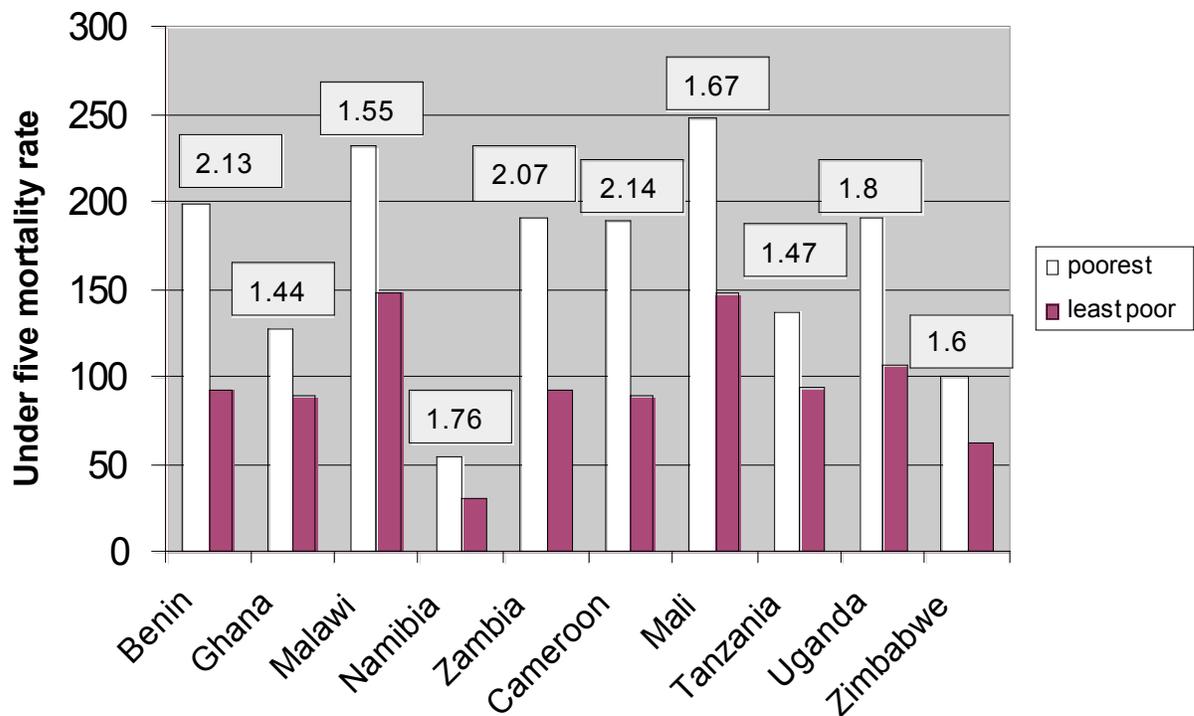
Source: Gapminder, [www.gapminder.org](http://www.gapminder.org)

Figure 3: Progress towards meeting child mortality MDG to reduce by two-thirds the under-five mortality rate from 1990 to 2015



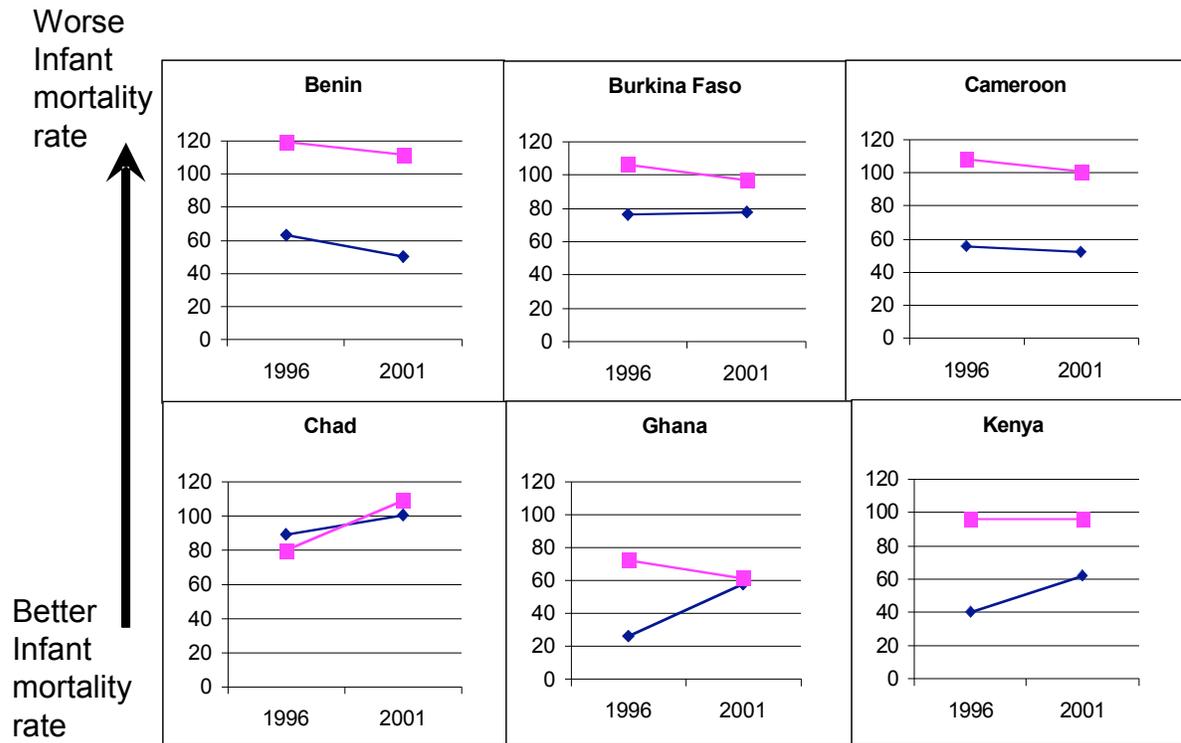
Source: <http://childinfo.org/areas/childmortality/>, Accessed Dec 7, 2007

Figure 4: Average progress in child mortality hides within country inequalities in health



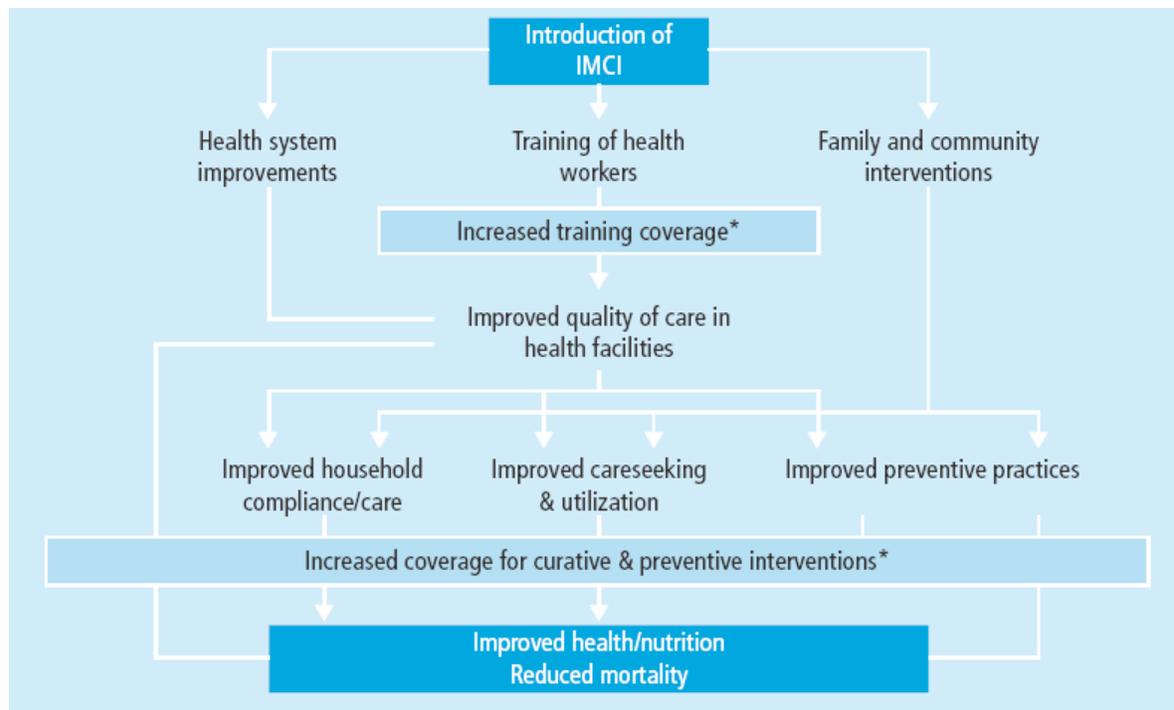
Note: label above each bar indicates ratio between least poor and poorest

Figure 5: Infant mortality rate in six African Countries showing uneven progress on reducing health inequalities (Gwatkin 2007)



- Lowest wealth quintile (poorest)
- ◆ Highest wealth quintile (least poor)

Figure 6: Impact mapping of causal pathways from integrated mother child interventions to improved health outcomes



Source: Bryce J, Victora CG, Habicht JP, Black RE, Scherpbier RW; MCE-IMCI Technical Advisors. Programmatic pathways to child survival: results of a multi-country evaluation of Integrated Management of Childhood Illness. Health Policy Plan. 2005 Dec;20 Suppl 1:i5-i17. [http://heapol.oxfordjournals.org/cgi/content/abstract/20/suppl\\_1/i5](http://heapol.oxfordjournals.org/cgi/content/abstract/20/suppl_1/i5)

Figure 7: Health Poverty Index (Dibben 2004)

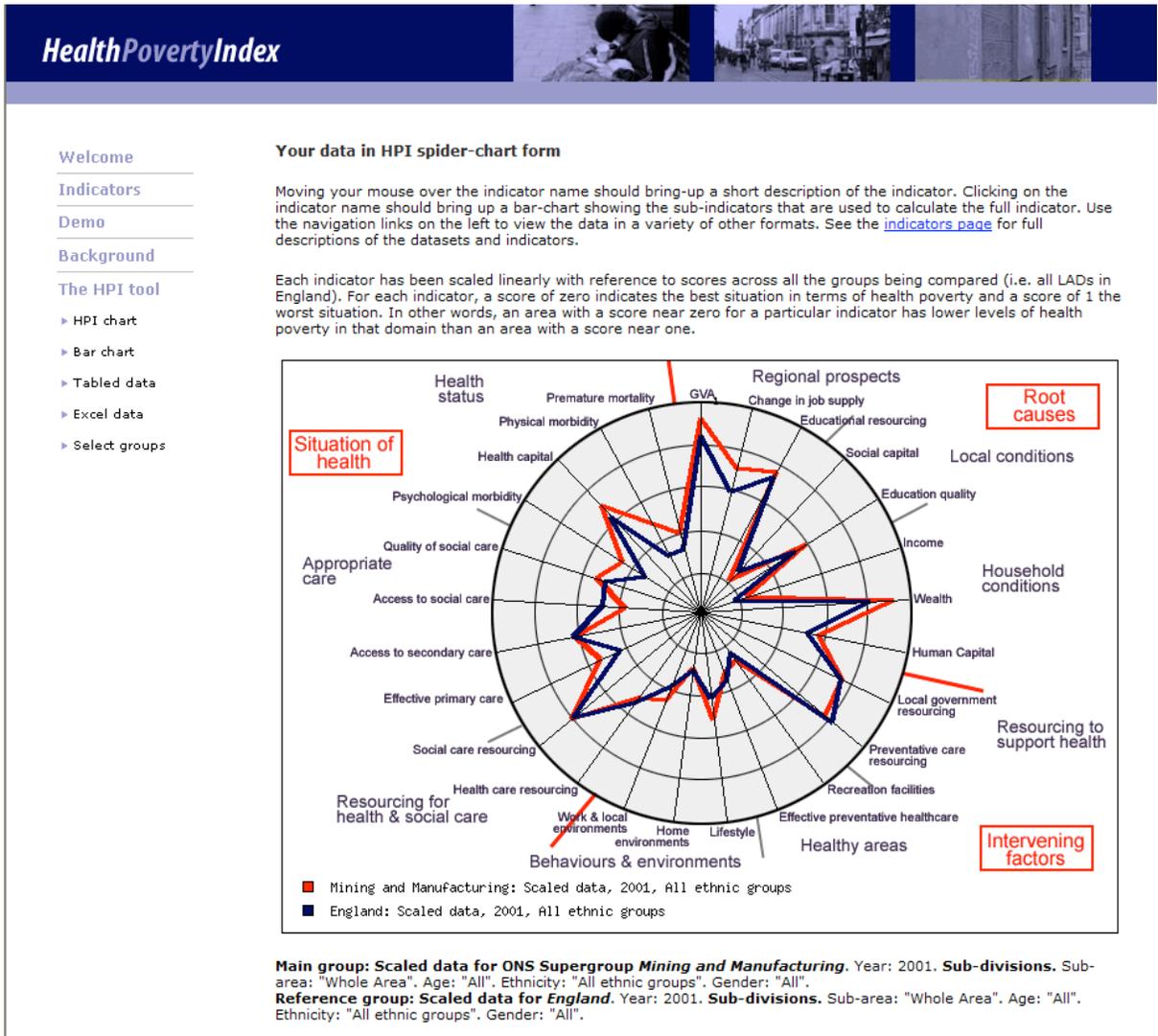


Figure 8: Processes which influence health inequalities (Diderichsen 2001)

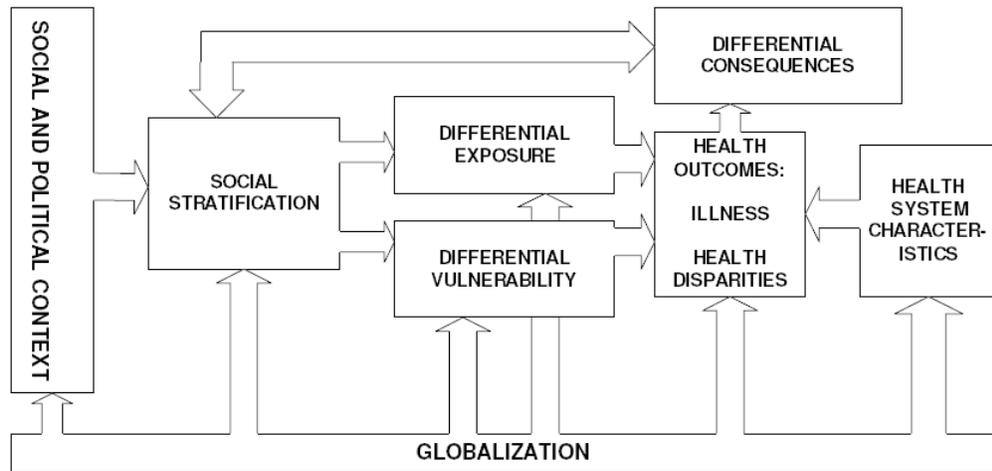
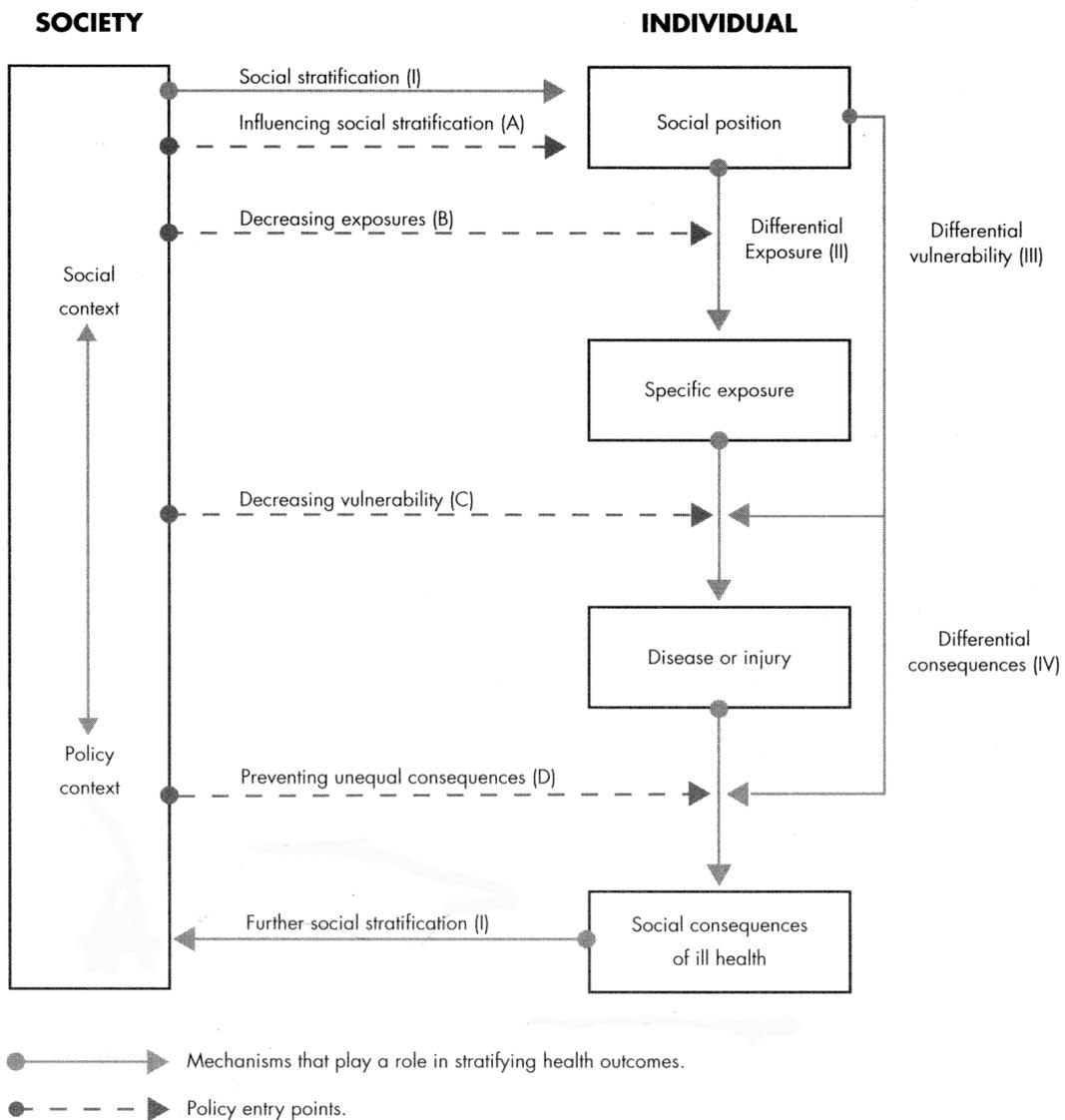
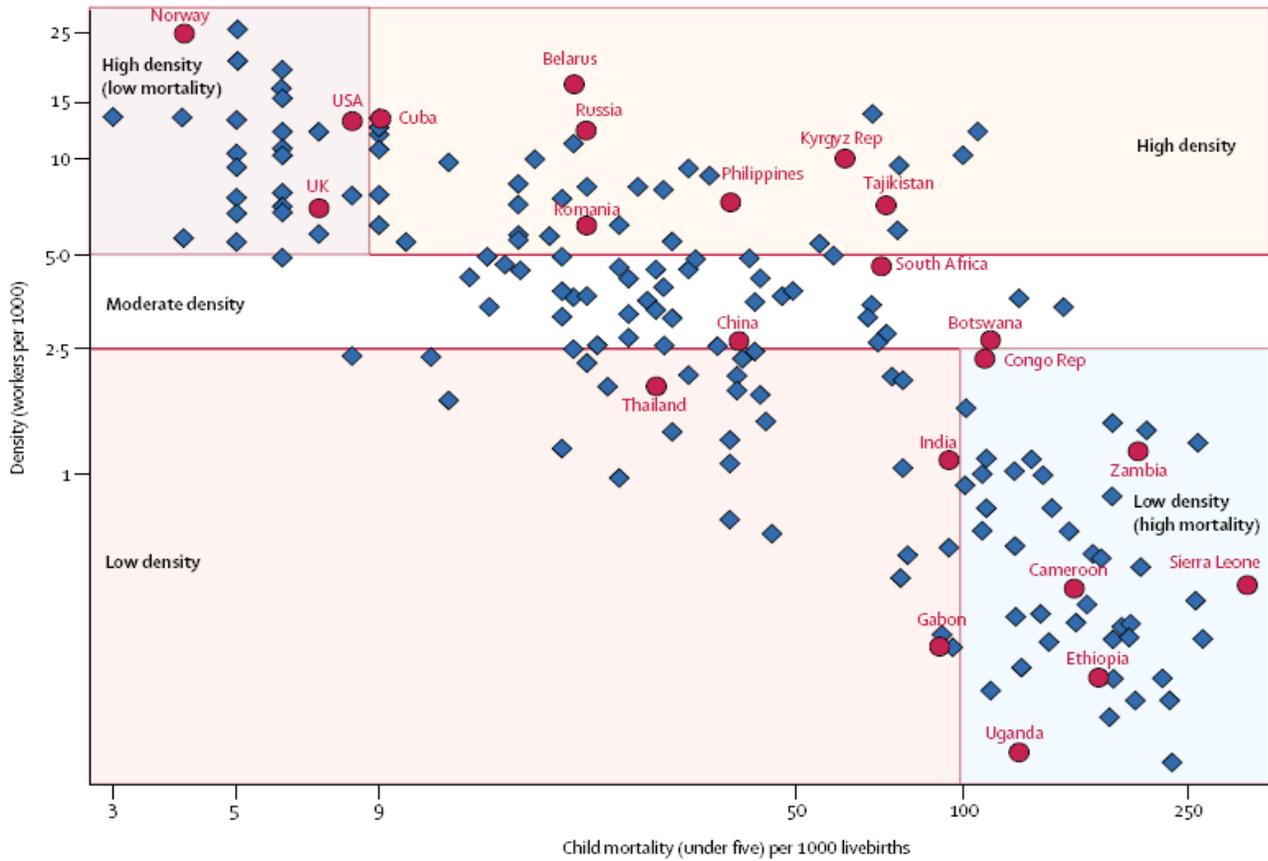


Figure 9: A framework for elucidating the pathways from the social context to health outcomes and for introducing policy interventions (Diderichsen 2001)



Source: Adapted from Diderichsen and Hallqvist 1998

Figure 10: Health workers save lives, data from the Joint Learning Initiative 2004



Source: Chen et al, 2004

Figure 11: Mapping capacity development strategies for knowledge translation in low- and middle-income countries

Initiative	Strategies targeted at Individuals					Strategies targeted at organizations					Environment level	
	Individual support	Learning by doing	Curriculum Development	Conducting training courses	Mentoring	Group support	Institutional Development	Project management training	Networks/networking	Formal Institutional twinning		Partnerships
Alliance HPSR			■	■			■		■		■	
CGHRI	■					■					■	
COHRED		■							■		■	■
EU INCODEV	■						■		■		■	
GDN									■		■	
GFHR				■			■		■		■	
HSR Project				■			■		■		■	
IDRC							■		■		■	■
INDEPTH	■			■		■	■		■		■	
IHPP	■	■			■	■			■		■	
INCLEN	■		■	■	■		■		■			
SIDA/SAREC	■			■			■	■	■	■	■	
TDR	■			■		■	■	■	■	■	■	■

■ A square indicates that the initiative is active in capacity development for this function.

**Acronyms:**

Alliance HPSR	Alliance for Health Policy and Systems Research	INDEPTH	International Network of Demographic Surveillance Sites
CGHRI	Canadian Global Health Research Initiative	IHPP	International Health Policy Programme
COHRED	Council on Health Research for Development	INCLEN	International Clinical Epidemiology Network
EU-INCODEV	European Union Programme for International Cooperation in Development	SIDA/SAREC	Department for Research Cooperation, with the Swedish International Development Agency
GDN	Global Development Network	TDR	Special Programme for Research and Training in Tropical Diseases.
GFHR	Global Forum for Health Research		
HSR Project	Joint WHO/DGIS/KIT Health Systems Research Project		
IDRC	International Development Research Centre		

Source: Sound Choices. WHO Alliance for Health Policy and Systems Research. Geneva 2007. Available at: [http://www.who.int/entity/alliance-hpsr/resources/Alliance\\_BR.pdf](http://www.who.int/entity/alliance-hpsr/resources/Alliance_BR.pdf), Accessed Dec 11, 2007.

## References

- Andersson N, Martinez E, Cerrato F, Morales E, Ledogar RJ. The use of community-based data in health planning in Mexico and Central America. *Health Policy and Planning* 1989;4(3):197-206.
- Ashton D. Food advertising and childhood obesity. *Journal of the Royal Society of Medicine* 2004 February;97(2):51-2.
- Attaran A. An immeasurable crisis? A criticism of the Millenium Development Goals and why they cannot be measured. *PLoS Medicine* 2005 October;2(10):e318.
- Attaran A: Author's Reply. *PLoS Med* 2005; 2(11): e405, [doi:10.1371/journal.pmed.0020405](https://doi.org/10.1371/journal.pmed.0020405)
- Attaran A, Walker RB. Shoppers Drug Mart or Poachers Drug Mart? *CMAJ*. 2007 Nov 26; epub ahead of print
- Bambas L, Brown H. Global Equity Gauge Alliance, Sub-national Health Systems Performance Assessment. April 24-26, 2002. Available at: [http://www.gega.org.za/download/gega\\_ass.ppt](http://www.gega.org.za/download/gega_ass.ppt), Accessed Dec 11, 2007.
- Bennett C, Macdonald GM, Dennis J, Coren E, Patterson J, Astin M, Abbott J. Home-based support for disadvantaged adult mothers. *Cochrane Database of Systematic Reviews* 2007, Issue 3. Art. No.: CD003759. DOI: 10.1002/14651858.CD003759.pub2.
- Bhuiya A, Chowdhury M, Ahmed F, Adams AM. Bangladesh: An intervention study of factors underlying increasing equity in child survival. IN *Challenging Inequities in Health: frm ethics to action*. Ed. Evans T, Whitehead M, Diderichsen F, Bhuiya A, Wirth M. Oxford University Press 2001.
- Briggs NC, Schlundt DG, Levine RS, Goldzweig IA, Stinson N Jr, Warren RC. Seat belt law enforcement and racial disparities in seat belt use. *Am J Prev Med*. 2006;31(2):135-41.
- Bryce J, Victora CG, Habicht JP, Black RE, Scherpbier RW; MCE-IMCI Technical Advisors. Programmatic pathways to child survival: results of a multi-country evaluation of Integrated Management of Childhood Illness. *Health Policy Plan*. 2005 Dec;20 Suppl 1:i5-i17.
- Canadian Institute for Health Information (CIHI). Summary Report. How healthy are rural Canadians? An assessment of their health status and

- health determinants. Ottawa: Canadian Institute for Health Information, 2006. Available from: [http://secure.cihi.ca/cihiweb/products/summary\\_rural\\_canadians\\_2006\\_e.pdf](http://secure.cihi.ca/cihiweb/products/summary_rural_canadians_2006_e.pdf). Accessed November 23, 2007.
- Chen L, Evans T, Anand S, Boufford JI, Brown H, Chowdhury M, Cueto M, Dare L, Dussault G, Elzinga G, Fee E, Habte D, Hanvoravongchai P, Jacobs M, Kurowski C, Michael S, Pablos-Mendez A, Sewankambo N, Solimano G, Stilwell B, de Waal A, Wibulpolprasert S. Human resources for health: overcoming the crisis. *Lancet* 2004;364(9449):1984-90.
- Chen Y, Dales R, Krewski D. Asthma and the risk of hospitalization in Canada\*. The role of socioeconomic and demographic factors. *Chest* 2001;119:708-13.
- Daniels N. Equity and population health: toward a broader bioethics agenda. *Hastings Cent Rep* 2006;36(4):22-35.
- De Vos P, De Ceukelaire W, Van der Stuyft P. Colombia and Cuba, contrasting models in Latin America's health sector reform. *Trop Med Int Health*. 2006;11(10):1604-12.
- Devereux S. The Malawi Famine of 2002. *IDS Bulletin* (Institute for Development Studies), 33 (4)70-79.
- Dibben C, Sims A, Watson J, Barnes H, Smith T, Sigala M, Hill A, Manley D. (2004) The Health Poverty Index. South East Public Health Observatory, Oxford.
- Diderichsen F, Evans T, Whitehead M: The Social Basis of Disparities in Health. In *Challenging Inequities in Health: From Ethics to Action*, ed. Whitehead M, Evans T, Diderichsen F, Bhuiya A, Wirth M. New York: Oxford University Press; 2001:13-23.
- Dwyer JW, Clarke LL, Miller MK. The effect of religious concentration and affiliation on county cancer mortality rates. *Journal of Health and Social Behavior* 1990;31:185-202.
- Eslava-Schmalbach J, Alfonso H, Oliveros H, Gaitán H, Agudelo C. A new Inequity-in-Health Index based on Millenium Development Goals: methodology and validation. *Journal of Clinical Epidemiology*. In press: doi:10.1016/j.jclinepi.2007.05.001.
- Evans RG, Stoddart GL. 1994. Producing Health, Consuming Health Care. In *Why Are Some People Healthy and Others Not? The Determinants of*

- Health of Populations. R.G. Evans, M.L. Barer, and T.R. Marmor, eds.  
New York: Aldine De Gruyter.
- Evans T, Brown H. Road traffic crashes: operationalizing equity in the context of health sector reform. *International Journal of Injury Control and Safety Promotion* 2003;10(1):11-2.
- Frank JW. Why "population health"? *Can J Public Health*. 1995;86(3):162-4.
- Gostin L. Legal foundations of public health law and its role in meeting future challenges. *Public Health* 2006;120(Suppl 1):8-14.
- Gostin LO. The "tobacco wars"--global litigation strategies. *JAMA* 2007;298(21):2537-9.
- Graham, H. & Kelly, M.P. (2004). *Health Inequalities: Concepts, Frameworks and Policy*. London: Health Development Agency.
- Graham ID, Logan J. Innovations in knowledge transfer and continuity of care. *Can J Nurs Res*. 2004;36(2):89-103.
- Greenhalgh T, Kristjansson E, Robinson V. Realist review to understand the efficacy of school feeding programmes. *BMJ*, Oct 2007; 335: 858 - 861.
- Grimshaw J, Eccles M, Thomas R, MacLennan G, Ramsay C, Fraser C, Vale L. Toward evidence-based quality improvement. Evidence (and its limitations) of the effectiveness of guideline dissemination and implementation strategies 1966-1998. *J Gen Intern Med*. 2006 Feb;21 Suppl 2:S14-20.
- Gruen RL, Weeramanthri TS, Knight SE, Bailie RS. Specialist outreach clinics in primary care and rural hospital settings. *Cochrane Database of Systematic Reviews* 2003, Issue 4.
- Guru V, Fremes SE, Austin PC, Blackstone EH, Tu JV. Gender differences in outcomes after hospital discharge from coronary artery bypass grafting. *Circulation* 2006;113:507-16.
- Gwatkin DR, Rutstein S, Johnson K, Suliman E, Wagstaff A, and Amouzou A. *Socio-Economic Differences in Health, Nutrition, and Population* (Washington, D.C.: The World Bank, 2007). Available at: <http://go.worldbank.org/AXUIIHT490>. Accessed Oct 5, 2007.
- Hamid M, Bustamante-Manaog T, Truong VD, Akkhavong K, Fu H, Ma Y, Zhong X, Salmela R, Panisset U, Pang T. EVIPNet: translating the spirit of Mexico. *Lancet*. 2005 ;366(9499):1758-60.

- Harris F, MacKintosh AM, Anderson S, Hastings G, Borland R, Fong GT, Hammond D, Cummings KM; ITC Collaboration. Effects of the 2003 advertising/promotion ban in the United Kingdom on awareness of tobacco marketing: findings from the International Tobacco Control (ITC) Four Country Survey. *Tob Control* 2006;15 Suppl 3:iii26-33.
- Himmelstein DU, Warren E, Thorne D, Woolhandler S. Illness and injury as contributors to bankruptcy. *Health Affairs* 2005;W5:63-73.
- Hodnett ED, Fredericks S. Support during pregnancy for women at increased risk of low birthweight babies. *Cochrane Database of Systematic Reviews* 2003, Issue 3. Art. No.: CD000198. DOI: 10.1002/14651858.CD000198.
- Homedes N, Ugalde A. Why neoliberal health reforms have failed in Latin America. *Health Policy*. 2005 Jan;71(1):83-96.
- Jenkins R. Globalization, production, employment and poverty: debates and evidence. *Journal of International Development*. 2004;16:1-12. DOI: 10.1002/jid.1059
- Keppel K, Pamuk E, Lynch J, et al. Methodological issues in measuring health disparities. National Center for Health Statistics. *Vital Health Stat* 2(141). 2005.
- Kristjansson EA, Robinson V, Petticrew M, MacDonald B, Krasevec J, Janzen L, Greenhalgh T, Wells G, MacGowan J, Farmer A, Shea BJ, Mayhew A, Tugwell P. School feeding for improving the physical and psychosocial health of disadvantaged elementary school children. *Cochrane Database of Systematic Reviews* 2007, Issue 1.
- Labonte R, Schrecker T. Globalization and social determinants of health: introduction and methodological background (part 1 of 3). *Globalization and Health* 2007;3(5): doi:10.1186/1744-8603-3-5
- Labonte R, Schrecker T. Globalization and social determinants of health: the role of the global marketplace (part 2 of 3). *Globalization and Health* 2007;3(6): doi:10.1186/1744-8603-3-6
- Lagarde M, Haines A, Palmer N. Conditional cash transfers for improving uptake of health interventions in low- and middle-income countries: a systematic review. *JAMA* 2007;298(16):1900-10.
- Lalonde, Marc (1974). A New Perspective on the Health of Canadians. Ottawa: Minister of Supply and Services Canada. [www.hc-sc.gc.ca/hcs-sss/alt\\_formats/hpb-dgps/pdf/pubs/1974-lalonde/lalonde\\_e.pdf](http://www.hc-sc.gc.ca/hcs-sss/alt_formats/hpb-dgps/pdf/pubs/1974-lalonde/lalonde_e.pdf)

- Lavis 2003a. Lavis JN, Robertson D, Woodside JM, McLeod CB, Abelson J; Knowledge Transfer Study Group. How can research organizations more effectively transfer research knowledge to decision makers? *Milbank Q.* 2003;81(2):221-48.
- Lavis 2003b. Lavis J, Ross S, McLeod C, Gildiner A. Measuring the impact of health research. *J Health Serv Res Policy.* 2003;8(3):165-70.
- Lovato C, Linn G, Stead LF, Best A. Impact of tobacco advertising and promotion on increasing adolescent smoking behaviours. *Cochrane Database of Systematic Reviews* 2003, Issue 3. Art. No.: CD003439. DOI: 10.1002/14651858.CD003439.
- Marmot M. Health in an unequal world: social circumstances, biology and disease. *Clin Med.* 2006;6(6):559-72.
- Marmot M for the Commission on Social Determinants of Health. Achieving health equity: from root causes to fair outcomes. *Lancet* 2007 Oct 5;370(9593):1153-63.
- McCoy D, Bambas L, Acurio D, Baya B, Bhuiya A, Chowdhury AM, Grisurapong S, Liu Y, Ngom P, Ngulube TJ, Ntuli A, Sanders D, Vega J, Shukla A, Braveman PA. Global Equity Gauge Alliance: reflections on early experiences. *J Health Popul Nutr.* 2003 Sep;21(3):273-87.
- Medical Services Branch. Tuberculosis Program and Epidemiologic Review. Ottawa: Minister of Public Works and Government Services; 1999. Cat no H34-96/1999E.
- Moser KA, Leon DA, Gwatkin DR. How does progress towards the child mortality millennium development goal affect inequalities between the poorest and least poor? Analysis of Demographic and Health Survey data. *BMJ* 2005;331(7526):1180-2.
- Ntuli A. Global Equity Gauge Alliance. *Promot Educ.* 2007;14(2):107-8.
- O'Connor AM, Stacey D, Entwistle V, Llewellyn-Thomas H, Rovner D, Holmes-Rovner M, Tait V, Tetroe J, Fiset V, Barry M, Jones J. Decision aids for people facing health treatment or screening decisions. *Cochrane Database of Systematic Reviews* 2003, Issue 1. Art. No.: CD001431. DOI: 10.1002/14651858.CD001431.
- Pablos-Mendez A, Shademani R. Knowledge translation in global health. *Journal of Continuing Education in the Health Professions* 2006 Winter;26(1):81-6.

- Palmer N, Mueller DH, Gilson L, Mills A, Haines A. Health financing to promote access in low income settings—how much do we know? *Lancet* 2004;364:1365-70.
- Pan SY, Ugnat A, Mao Y, the Canadian Cancer Registries Epidemiology Research Group. Occupational risk factors for brain cancer in Canada. *Journal of Occupational & Environmental Medicine* 2005 Jul;47(7):704-17.
- Pawson R, Greenhalgh T, Harvey G, Walshe K. Realist review - a new method of systematic review designed for complex policy interventions. *Journal of Health Services Research and Policy* 2005 July;10(Suppl 1):21-34.
- Popay 2006a. Popay J, Enoch E, Johnston H, Rispel L. Social Exclusion Knowledge Network (SEKN). Scoping of SEKN and proposed approach. 2006. Available from: [http://www.who.int/social\\_determinants/resources/sekn\\_scoping.pdf](http://www.who.int/social_determinants/resources/sekn_scoping.pdf). Accessed December 11, 2007.
- Popay 2006b. Popay J, Roberts H, Sowden A, Petticrew M, Arai L, Rodgers M, Britten N, Roen K, Duffy S. Guidance on the conduct of narrative synthesis in systematic reviews: a product from the ESRC Methods Programme. 2006. Available from: [http://cpd.conted.ox.ac.uk/healthsciences/courses/short\\_courses/qsr/NSguidanceV1-JNoyes.pdf](http://cpd.conted.ox.ac.uk/healthsciences/courses/short_courses/qsr/NSguidanceV1-JNoyes.pdf). Accessed November 23, 2007.
- Ramalingam B. Implementing Knowledge Strategies: Lessons from international development agencies. Overseas Development Institute, London: 2005. Available at: <http://www.odi.org.uk/RAPID/Publications/Documents/WP244.pdf>, Accessed Dec 11, 2007.
- Rivera JA, Sotres-Alvarez D, Habicht J, Shamah T, Villalpando S. Impact of the Mexican Program for Education, Health, and Nutrition (Progresa) on rates of growth and anemia in infants and young children. *JAMA* 2004;291:2563-70.
- Robinson V, Tugwell P, Walker P, et al. Creating and Testing the Concept of an Academic NGO for Enhancing Health Equity: A New Mode of Knowledge Production? *Educ Health (Abingdon)*. 2007;20(2):53.
- Ross DP. Policy Approaches to Address the Impact of Poverty on Health. Canadian Population Health Initiative. Canadian Institute for Health Information. 2001. Available at: [http://secure.cihi.ca/cihiweb/products/CPHIPolicyApproaches\\_e.pdf](http://secure.cihi.ca/cihiweb/products/CPHIPolicyApproaches_e.pdf), Accessed Dec 11, 2007.

- Santesso N, Tugwell P. Knowledge translation in developing countries. *Journal of Continuing Education in the Health Professions* 2006;26(1):87-96.
- Siddiqi K, Newell J, Robinson M. Getting evidence into practice: what works in developing countries? *Int J Qual Health Care*. 2005;17(5):447-54.
- Smith KR, Ezzati M. How environmental health risks change with development: The epidemiologic and environmental risk transitions revisited. *Annu Rev Environ Resour* 2005; 30: 291-333.
- Sound Choices. WHO Alliance for Health Policy and Systems Research. Geneva 2007. Available at: [http://www.who.int/entity/alliance-hpsr/resources/Alliance\\_BR.pdf](http://www.who.int/entity/alliance-hpsr/resources/Alliance_BR.pdf), Accessed Dec 11, 2007.
- Thomson H, Petticrew M, Morrison D. Health effects of housing improvement: systematic review of intervention studies. *BMJ* 2001;323:187-90.
- Tugwell P, Robinson V, Grimshaw J, Santesso N. Systematic reviews and knowledge translation. *Bull World Health Organ* 2006;84(8):643-51.
- Tugwell P, Santesso N, O'Connor AM, Wilson AJ, Effective Consumer Investigative Group. Knowledge translation for effective consumers. *Physical Therapy* 2007;87(12): in press.
- United Nations. The Millennium Development Goals Report. United Nations. New York, 2006. Available at: <http://mdgs.un.org/unsd/mdg/Resources/Static/Products/Progress2006/MDGReport2006.pdf>. Accessed November 12, 2007.
- Vega J, Bedregal P, Jadue L, Delgado I. Gender inequity in the access to health care in Chile. *Rev Med Chil* 2003;131(6):669-78.
- Veugelers PJ, Fitzgerald AL. Prevalence of and risk factors for childhood overweight and obesity. *CMAJ* 2005 Sep 13;173(6):607-13.
- Whitehead M. The concepts and principles of equity in health. Copenhagen: WHO 1990, Reg Off. Eur (EUR/ICP/RPD 414 7734r), 29 pp.
- Whitehead M, Dahlgren G, Evans T. Equity and health sector reforms: can low-income countries escape the medical poverty trap? *Lancet* 2001, 358(9284):833-836.
- Woodall AA, Sandbach EJ, Woodward CM, Aveyard P, Merrington G. The partial smoking ban in licensed establishments and health inequalities in England: modeling study. *BMJ* 2005;331:488-9;

World Health Organization. *Bridging the “Know-Do” gap meeting on knowledge translation in global health. 10-12 October 2005*. Geneva: World Health Organization; 2005. Available from: [http://www.who.int/kms/WHO\\_EIP\\_KMS\\_2006\\_2.pdf](http://www.who.int/kms/WHO_EIP_KMS_2006_2.pdf), accessed 5 June 2006.

World Health Organization. *Sound choices: enhancing capacity for evidence-informed health policy*. Edited by Andrew Green and Sara Bennett. Geneva; 2007. Available at: [http://www.who.int/entity/alliance-hpsr/resources/Alliance\\_BR.pdf](http://www.who.int/entity/alliance-hpsr/resources/Alliance_BR.pdf); Accessed Dec 11, 2007.

Xu K, Evans DB, Carrin G, Aguilar-Rivera AM, Musgrove P, Evans T. Protecting households from catastrophic health spending. *Health Aff (Millwood)*. 2007;26(4):972-83.

Zack MM, Moriarty DG, Stroup DF, Ford ES, Mokdad AH. Worsening trends in adult health-related quality of life and self-rated health - United States, 1993-2001. *Public Health Reports* 2004;199:493-505.

Zoritch B, Roberts I, Oakley A. Day care for pre-school children. *Cochrane Database of Systematic Reviews* 2000, Issue 3. Art. No.: CD000564. DOI: