



# **Environmental health (in)equity: From the molecular to the global**

**NCC Environmental Health  
Webinar**

**30 October 2014**

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University of Victoria**

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# Outline

1. Health (in)equity
2. The environmental determinants of health
  - a) Ecotoxicity – the “enormity of tinyness”
3. Environmental health inequity
  - a) Ecotoxicity and the health of children
  - b) Aboriginal people
  - c) Urban health inequity
    - i. A little history – Manchester
    - ii. The GRNUHE
    - iii. Nature
    - iv. Is beauty a determinant of health?
    - v. Cities and natural hazards
  - d) Ecosystem inequity
4. Actions for environmental justice



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**There are many hidden slides with more details,  
and I will skip through many slides**

# I. Health inequity

**“Differences in health which are not only unnecessary and avoidable, but, in addition, are considered unfair and unjust.”**

Margaret Whitehead, 1992

*“The Concepts and Principles of Equity in Health”*

Int J Health Serv 22:429 - 445



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# WHO - Commission on the Social Determinants of Health

**“Where systematic differences in health are judged to be avoidable by reasonable action they are, quite simply, unfair. It is this that we label health inequity. Putting right these inequities - the huge and remediable differences in health between and within countries - is a matter of social justice.”**

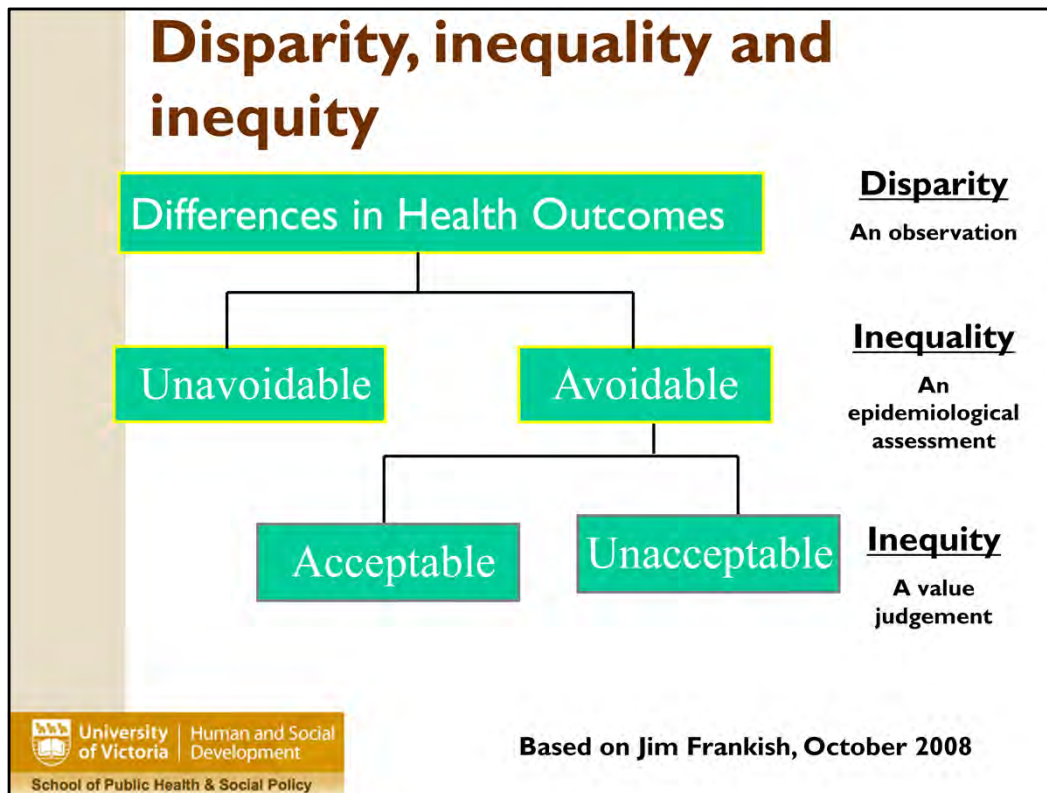
WHO Commission on the Social Determinants of Health (2008) *Closing the Gap in a Generation* (Final Report – Executive Summary) Geneva: WHO

Available at

[http://www.who.int/social\\_determinants/thecommission/finalreport/en/index.html](http://www.who.int/social_determinants/thecommission/finalreport/en/index.html)



**“These inequities in health, avoidable health inequalities, arise because of the circumstances in which people grow, live, work, and age, and the systems put in place to deal with illness. The conditions in which people live and die are, in turn, shaped by political, social, and economic forces.”**



Today, I am going to focus a lot on what I term the nonmedical determinants of health & the role of health regions in improving population health. These include factors like housing, education, social support & income.

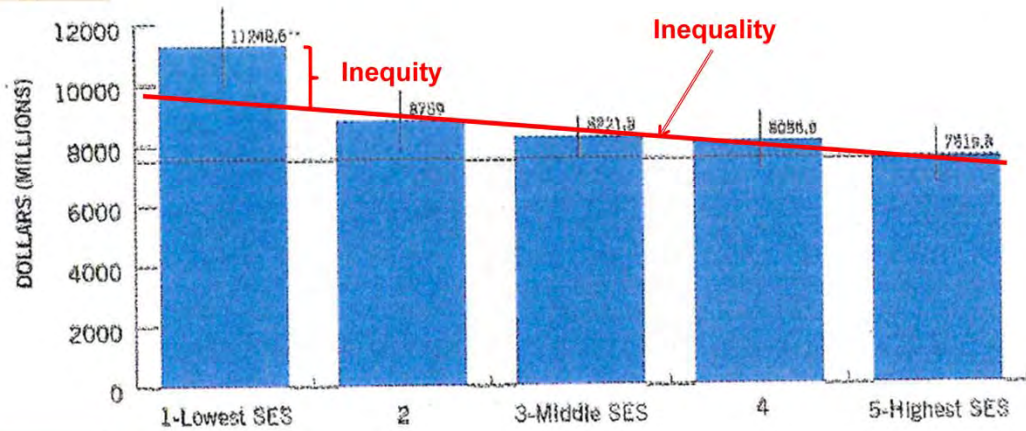
I am not suggesting that we should simply ignore medical services & health sector reform.

I only wish to ask you to consider which negative health outcomes are avoidable & which one are made more or less acceptable by societal action or inaction.

Margaret Whitehead has said that inequalities count as inequities when they are avoidable, unnecessary & unfair.



# Inequality, inequity and the gradient



# EQUALITY

to a conservative

to a liberal



Equality of  
input

Equality of outcome



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## 2. The environmental determinants of health

- **We have spent so much time focused on the social determinants of health that we have neglected the environmental determinants**
- **It is not 'either/or', it is 'both/and'**
- **We need to re-establish the balance**



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# Our physical environment – the 80/90/100 rule

- **80**

- We are 80% urbanised

- **90**

- We spend 90% of our time indoors
- And 5% in vehicles
- = 1 hour (5%) outdoors (and mostly urban)

- **100**

- We live 100% of the time within natural ecosystems
- *We also all carry a body burden of POPs and heavy metals throughout our lives*



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## 2 b) Ecotoxicity – the “enormity of tinyness”\*

### Very low levels

Oestrogen is active at levels as low as a few parts per trillion, while many of these synthetic compounds are present in human tissues at levels that may be thousands or even millions of times higher (PSR, 2001)

### Bioconcentration

POPs such as PCBs, may reach concentrations in bald eagle eggs that are 25 million to 100 million times greater than the levels in the water (Gilbertson, 1998)

**Overall source:** Hancock, Trevor (2001) *Health, Environment and Sustainable Development: The Child Health Perspective* A background paper for Canada's National Assessment Report to the World Summit on Sustainable Development (Unpublished manuscript)

Hall, Ross and Chant, Donald (1979) *Ecotoxicity: Responsibilities and Opportunities* Ottawa: Canadian Environmental Advisory Council

Gilbertson, Michael (1998) "Linking Water Quality to Wildlife and Human Health" *Focus* 23(3): 18\_19

Physicians for Social Responsibility (2001) *Environmental Endocrine Disrupters: What Health Care Providers Should Know* Washington, DC: PSR

## **Multiple chemicals**

**It has been reported that 196 different organochlorines have been identified in the tissues of North Americans, with several hundred others detected but not chemically characterized (Thornton, 2001)**

## **Food chain contamination**

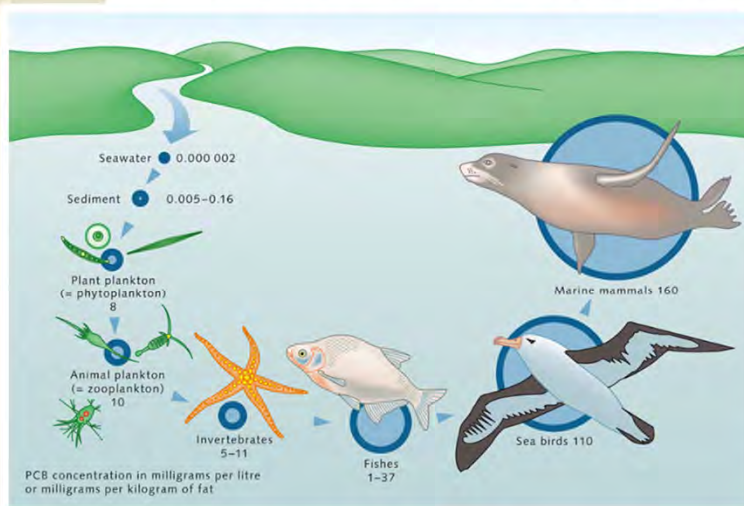
**For selected organochlorines and PCBs, Ontario adults eating Ontario grown food receive 88 percent (range = 68 - 100%) of their exposure from food (Davies, 1990)**

**Overall source:** Hancock, Trevor (2001) *Health, Environment and Sustainable Development: The Child Health Perspective* A background paper for Canada's National Assessment Report to the World Summit on Sustainable Development (Unpublished manuscript)

Thornton, Joe (2000) *Pandora's Poison: Chlorine, Health and a New Environmental Strategy* Cambridge MA: MIT Press

Davies, K (1990) Human exposure pathways to selected organochlorines and PCBs in Toronto and southern Ontario *Adv Environ Sci Technol* 23: 525 - 540

# Pollution and ecotoxicity



Increase in PCB concentration from water to fish is 0.5 – 18 million times, and to seal fat is 80 million times the levels in sea water  
And then we eat them!

4.7 > Bioaccumulation of toxins in the marine food chain has long been recognized as a problem. The process illustrated here relates to polychlorinated biphenyls (PCBs), a typical environmental toxin. © maribus (after Böhmman, 1991)



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# Health impacts of ecotoxicity

**What are the health impacts of hundreds of POPs and other chemicals present in the body from before birth at levels below individual effect levels?**

**WE DON'T KNOW!**

**And we should probably add nanoparticles to the concept, perhaps also GMOs**



## **An unauthorised experiment**

- **The entire population of the Earth – all species, not just humans – are being subjected to an experiment to which we have not consented – population-wide, lifetime exposure to persistent toxic chemicals**
- **This is an inequitable and unethical use of power by the corporations who are producing and using these chemicals**



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### **3. Environmental health inequity**

**“Environmental health inequity can be defined as the inadequate, unresponsive, and/or discriminatory policies that result in multiple environmental risks and inadequate access to environmental benefits among disadvantaged Canadian communities.”**

**Centre for Environmental  
Health Equity, Queen’s U**

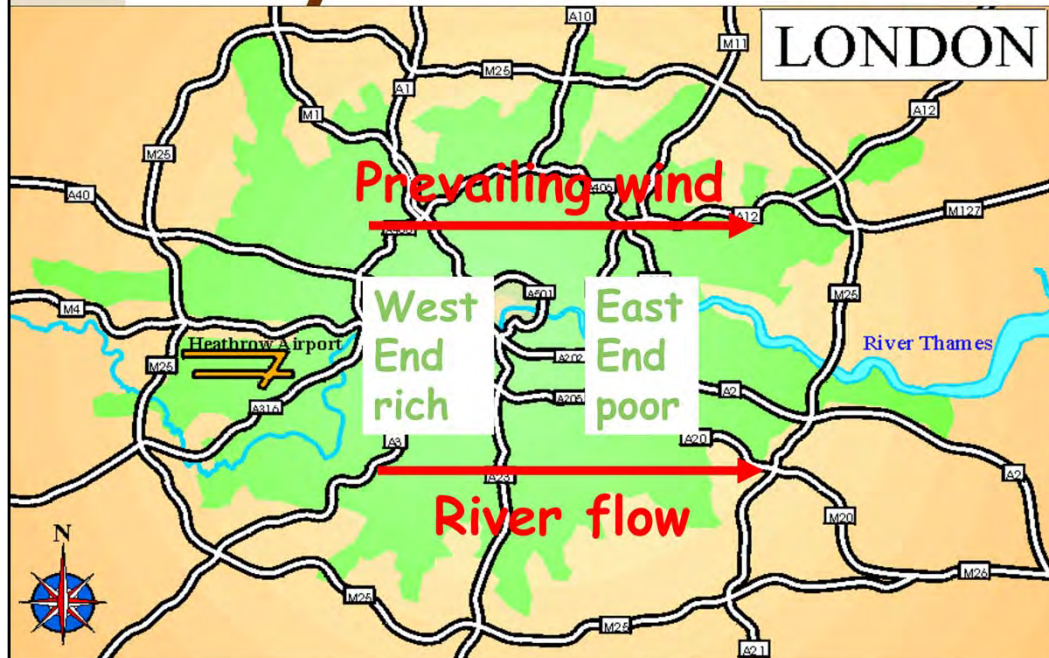
# **Who suffers from environmental health inequity? CEHE**

- **Children**
- **Aboriginal people**
- **Cities – The urban poor**

## **Also**

- **Rural/remote populations**
- **Ethno-racial minorities**
- **Seniors**
- **People with disabilities etc.**

# Why is London's ...



# The poor live ...

- **Downwind**
- **Downstream**
- **Downhill**
  - **But uphill if the slopes are dangerous**
- **On floodplains and other marginal lands**



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- **Near landfills, industrial plants and hazardous sites**
- **In damp, unsafe, unhealthy housing**
- **In dangerous neighbourhoods**
- **And they work in unsafe, unhealthy workplaces**

\*\*\*\*\*

**This is environmental injustice**

- **It results in environmental health inequity**




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### **3 a) Ecotoxicity and the health of children: A case of intergenerational inequity**

## Children are particularly vulnerable to toxic chemicals


- **Proportionately higher exposure than adults** because, kg per kg of body weight, they eat more food, drink more water, and breathe more air.
- **Differ behaviourally**; they crawl on the floor and breathe at tailpipe level; they consume significant amounts of soil when young; they indulge in riskier behaviour as they explore their environment



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- 
- **Their metabolic systems are immature** at birth and for some months, even years afterwards, so they do not detoxify and excrete pollutants as well as adults do.
  - From conception through to adolescence, **the child is growing and developing rapidly** and its organ systems - brain, endocrine, immune, reproductive, respiratory and other - are differentiating and maturing. **These processes are sensitive to disruption, and such disruptions can have life-long effects.**
  - Infants and children **have many more years of life ahead of them** than adults, giving time for long-term effects to be felt.

Landrigan, Philip (2001) "Children's Environmental Health" on the Population Reference Bureau website ([www.prb.org](http://www.prb.org))

## **Children are exposed from before birth**

- **Children today are exposed to thousands of synthetic chemicals.**
- **Most have not been tested for toxicity, and especially for children**
  - **Information on developmental toxicity is available for less than 20% of the 3000 high production volume (HPV) chemicals**
- **Yet many HPV chemicals are detectable in adult blood, breast milk and infant cord blood**

From a presentation to the New Brunswick Children's Environmental Health Workshop, Fredericton NB, March 27<sup>th</sup> 2013

# **Children and toxic chemicals**

**“The central question in pediatric environmental health research: what is the evidence that toxic chemicals in the environment contribute to chronic disease in children?”**

**Dr. Philip J. Landrigan, Professor of Pediatrics  
Director, Children’s Environmental Health Center,  
Mount Sinai School of Medicine**

**New Brunswick Children’s Environmental Health  
Workshop, Fredericton NB, March 27<sup>th</sup> 2013**

**From a presentation to the New Brunswick Children’s Environmental  
Health Workshop, Fredericton NB, March 27<sup>th</sup> 2013**

# **Toxic chemicals are causing chronic disease in children**

- **“Evidence is increasing that toxic chemicals in the environment contribute to chronic disease in children”**
  - **Asthma**
  - **Childhood cancer**
  - **Male reproductive disorders**
  - **Neuro-developmental disorders**

**Landrigan, 2013**

**From a presentation to the New Brunswick Children's Environmental Health Workshop, Fredericton NB, March 27<sup>th</sup> 2013**



## 3 b) Aboriginal People in Canada

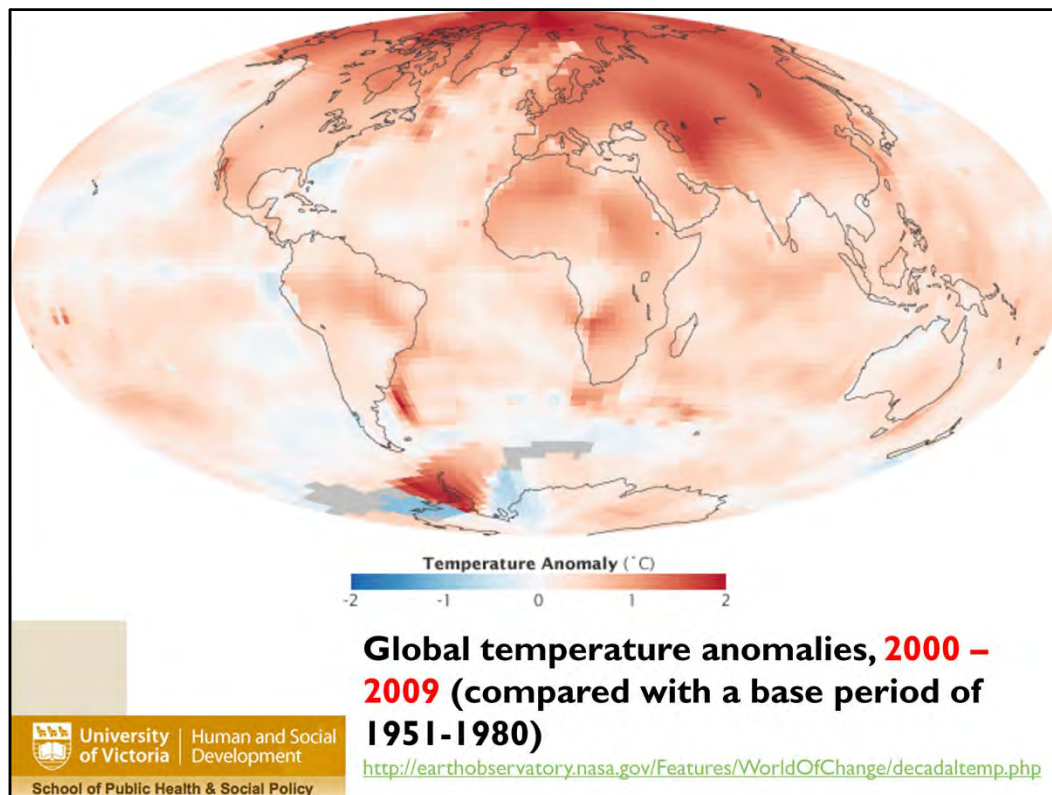
- **Aboriginal people suffer the greatest inequity**
- **This is our version of environmental racism**
  - **Loss of traditional lands and resources**
  - **Climate change, esp in the Arctic**
  - **Ecosystem contamination**
  - **Poor quality locations**
  - **Poor housing conditions**



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According to an ongoing temperature analysis conducted by scientists at NASA's Goddard Institute for Space Studies (GISS) and shown in this series of maps, the average global temperature on Earth has increased by about 0.8°Celsius (1.4°Fahrenheit) since 1880. Two-thirds of the warming has occurred since 1975, at a rate of roughly 0.15-0.20°C per decade.

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# The Inuit and POPs

- **“As the Inuit diet is comprised of large amounts of tissues from marine mammals, fish and terrestrial wild game, the Inuits are more exposed to food chain contaminants than human populations living in temperate regions.”**
- **“... their infants are exposed through transplacental and breast milk transmission from the Inuit mother.”**

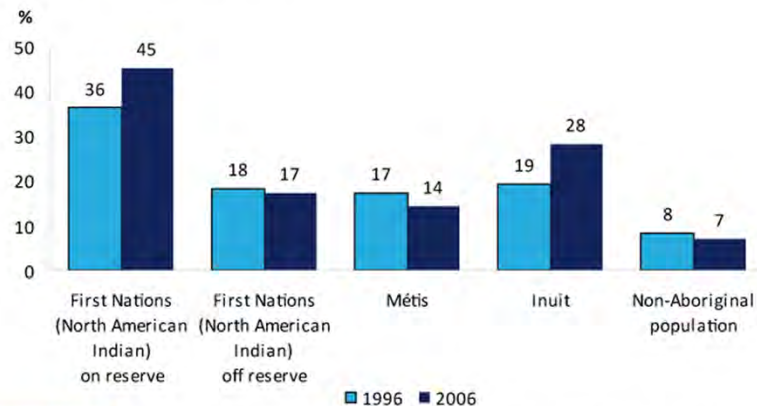
**Dewailly, 2006**

Dewailly, Éric (2006) Canadian Inuit and the Arctic Dilemma *Oceanography* 19 (2): 88 - 9

# Canada's worst housing

The worst housing conditions in Canada are found among Aboriginal people – and it is getting worse!

Proportion of dwellings in need of major repairs by Aboriginal identity, population aged 15 and over



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Source: Statistics Canada (2010) *Aboriginal Statistics at a Glance*

<http://www150.statcan.gc.ca/pub/89-645-x/2010001/housing-logement-eng.htm>

Dwellings in need of major repairs: those that, in the judgment of the respondent, require major repairs to such things as defective plumbing or electrical wiring, and/or structural repairs to walls, floors or ceilings, etc.

Source: Statistics Canada (2010) *Aboriginal Statistics at a Glance*

<http://www.statcan.gc.ca/pub/89-645-x/2010001/housing-logement-eng.htm>



## **3 c) Urban health inequity**



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### **3 c) I - A little history - Manchester**



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# Manchester was the first industrial city

## Massive problems

- Rapid population growth
- Appalling slums
- Appalling environments
- Appalling health status

The description is not that different from the slums of many cities around the world today

**See 5 hidden slides**



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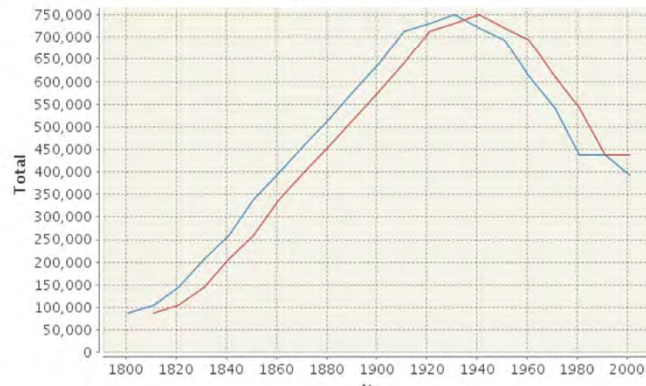
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Source: Douglas, Hodgson and Lawson, 2002

Douglas, Ian; Hodgson, Rob and Lawson, Nigel (2002) Industry, environment and health through 200 years in Manchester *Ecological Economics* 41: 235–255

# Rapid population growth

**1801**      nearly 77,000 people  
**1851**      over 316,000 (> 4 x)  
**1901**      2,149,000 (6.8 x)



Source: Douglas, Hodgson and Lawson, 2002

Text from

Douglas, Ian; Hodgson, Rob and Lawson, Nigel (2002) Industry, environment and health through 200 years in Manchester *Ecological Economics* 41: 235–255

Image from

A Vision of Britain Through Time

[http://www.visionofbritain.org.uk/unit/10033007/cube/TOT\\_POP](http://www.visionofbritain.org.uk/unit/10033007/cube/TOT_POP)

## Appalling slums

**“a sizeable proportion of the ... workforce ... lived in overcrowded, damp, poorly lit and inadequately ventilated accommodation ... with little sanitation (privies often shared by 20– 30 families, sometimes many more), an inadequate water supply, and high rates of disease and mortality.”**

Text from

Douglas, Ian; Hodgson, Rob and Lawson, Nigel (2002) Industry, environment and health through 200 years in Manchester *Ecological Economics* 41: 235–255

- **“Nearly a third of the houses in the city lacked sanitation in 1868 ... Only after 1890 did a waterborne system of sewage disposal and treatment come into operation in Manchester and start to reduce the incidence of typhoid.”**
- **“... distribution of pure water remained very uneven throughout the 19th century. . most central-city courts and terraces did not have their own in-house water supply but relied on standpipe in yard or end street for most of the 19<sup>th</sup> century.”**

Douglas, Ian; Hodgson, Rob and Lawson, Nigel (2002) Industry, environment and health through 200 years in Manchester *Ecological Economics* 41: 235–255

# Appalling environment

**“For 200 years the rivers of Greater Manchester presented a sorry record of deterioration in quality.” (Douglas, Hodgson and Lawson, 2002)**

**Frederick Engels described Manchester's River Irk in 1845 as:**

- **"...a narrow, coal-black, foul-smelling stream . . .in dry weather, a long string of the most disgusting, blackish-green slime pools are left standing...from the depths of which bubbles of miasmatic gas constantly arise and give forth a stench unendurable even on the bridge forty or fifty feet above the surface of the stream."**

Douglas, Ian; Hodgson, Rob and Lawson, Nigel (2002) Industry, environment and health through 200 years in Manchester *Ecological Economics* 41: 235–255

Engels quote is from Chapter 12, "Manchester and the Industrial City" in Mark Giroud's book Cities and People



## Manchester 1859

- "Earth and air seem impregnated with fog and soot. The factories extend their flanks of fouler brick one after another, bare, with shutterless windows, like economical and colossal prisons...Through half-open windows we could see wretched rooms at ground level, or often below the damp earth's surface. Masses of livid children, dirty and flabby of flesh, crowd each threshold and breathe the vile air of the street, less vile than that within..."

Hippolyte Taine

Quotation from Chapter 12, "Manchester and the Industrial City" in Mark Girouard's book Cities and People.

Hippolyte Adolphe Taine was a French critic and historian. He was the chief theoretical influence of French naturalism, a major proponent of sociological positivism, and one of the first practitioners of historicist criticism. [Wikipedia](#)

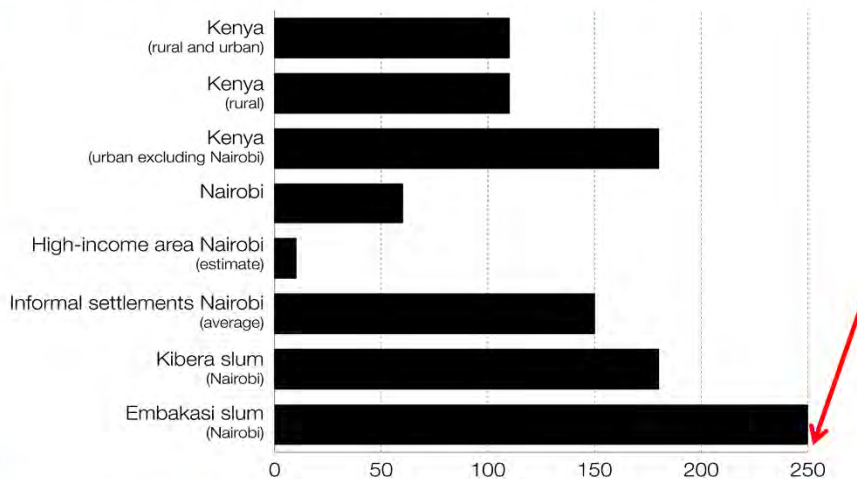


## Appalling health status

- “Infant mortality in Manchester in 1798 may have been as high as **300 per 1000 live births.**”
- “In 1890, the infantile death rate for the offspring of cotton workers and labourers in Blackburn was **252 per 1000** births compared with 160 for the offspring of all other parents.”

Douglas, Ian; Hodgson, Rob and Lawson, Nigel (2002) Industry, environment and health through 200 years in Manchester *Ecological Economics* 41: 235–255

## Urban rural differences in under-five mortality, Kenya



# The health impact

- **Life expectancy for mechanics and labourers in Manchester in 1842 was 17 years**

**Edwin Chadwick**

**The Report from the Poor Law Commissioners on an Inquiry into the Sanitary Conditions of the Laboring Population of Great Britain**

Life expectancy of a working man in Salford in the 1870s could be as little as 17 years.

<http://www.manchester2002-uk.com/history/victorian/Victorian1.html>

\*\*\*\*\*

In 1842 the reformer Chadwick reported that a Manchester worker's average life expectancy was 17 years, whereas that of an agricultural worker was 38.

<http://homepage.ntlworld.com/d.a.ratcliffe/lhg/vol3/develmcr.htm>

\*\*\*\*\*

### **3 c) ii The Global Research Network on Urban Health Equity**

- **Funded by the Rockefeller Foundation**
- **Grew out of the WHO Commission on Social Determinants of Health**
  - **Knowledge Network on Urban Settlements**

**GRNUHE reports are available at**

**<http://www.ucl.ac.uk/gheg/GRNUHE/GRNUHEPublication>**



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The line between rich and poor - Morumbi and the Paraisópolis favela, São Paulo, Brasil





## Four key research questions

1. How to ensure urban social conditions promote health equity
2. The added pressure of climate change on urban health inequities
3. **How to put health equity at the heart of urban planning/design**
4. **How to put health equity at the heart of urban governance**

Friel, Sharon (2010) *Preventing and reducing urban health inequity through action on the social and environmental determinants of health: Final Report of the GRNUHE*  
London: Global Research Network on Urban Health Equity/UCL  
Available at <http://www.ucl.ac.uk/gheg/GRNUHE/GRNUHEPublication>



## Urban health inequity

- **“The systematic social patterning in health outcomes within and between cities suggests that there is something about urban living - urban physical and social environments and living conditions, and the ways of life they encourage - that cause these differences in health. These differences are by and large not explained by biological variation, which means that they can be avoided by reasonable societal-level action.”**

Friel, Sharon (2010) *Preventing and reducing urban health inequity through action on the social and environmental determinants of health: Final Report of the GRNUHE*  
London: Global Research Network on Urban Health Equity/UCL  
Available at <http://www.ucl.ac.uk/gheg/GRNUHE/GRNUHEPublication>

- **“Urban health inequities flow from the systematically unequal distribution in power, prestige and resources associated with relative position in the social hierarchy, whether at the individual, group, city or indeed country level, manifesting in inequities in both material and psychosocial conditions.”**

Friel, Sharon (2010) *Preventing and reducing urban health inequity through action on the social and environmental determinants of health: Final Report of the GRNUHE*  
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Available at <http://www.ucl.ac.uk/gheg/GRNUHE/GRNUHEPublication>

- **A wide variety of structural factors influence political empowerment and importantly the actualization of urban health equity. These include**
  - **rapid globalization and economic liberalization**
  - **the push away from viable rural livelihoods and**
  - **the pull towards urban opportunities**

Friel, Sharon (2010) *Preventing and reducing urban health inequity through action on the social and environmental determinants of health: Final Report of the GRNUHE*  
London: Global Research Network on Urban Health Equity/UCL  
Available at <http://www.ucl.ac.uk/gheg/GRNUHE/GRNUHEPublication>

- **Health equity depends vitally on the political empowerment of individuals and groups to represent their needs and interests strongly and effectively and, in so doing, to challenge and change the unfair distribution of material and psychosocial resources.**

Friel, Sharon (2010) *Preventing and reducing urban health inequity through action on the social and environmental determinants of health: Final Report of the GRNUHE*  
London: Global Research Network on Urban Health Equity/UCL  
Available at <http://www.ucl.ac.uk/gheg/GRNUHE/GRNUHEPublication>

- **Most of the world's population now lives its life within the built environment - the social, economic and physical make-up of the built environment, therefore, poses a major opportunity by which to improve urban health and health equity.**

Friel, Sharon (2010) *Preventing and reducing urban health inequity through action on the social and environmental determinants of health: Final Report of the GRNUHE*  
London: Global Research Network on Urban Health Equity/UCL  
Available at <http://www.ucl.ac.uk/gheg/GRNUHE/GRNUHEPublication>

- **...improving living conditions in areas such as income, housing, transport, employment, education, social support, and health services is central to improving the health of urban populations.**

Friel, Sharon (2010) *Preventing and reducing urban health inequity through action on the social and environmental determinants of health: Final Report of the GRNUHE*  
London: Global Research Network on Urban Health Equity/UCL  
Available at <http://www.ucl.ac.uk/gheg/GRNUHE/GRNUHEPublication>



## **Key issues and roles for urban planning and governance in ensuring health equity**

**Urban planning can help ensure**

- **Equitable access to the benefits of urban life**
- **Access to adequate housing**
- **Safe living environments**
- **Food and nutrition security\***
- **Physical activity\***

## a) Equitable access to the benefits of urban life

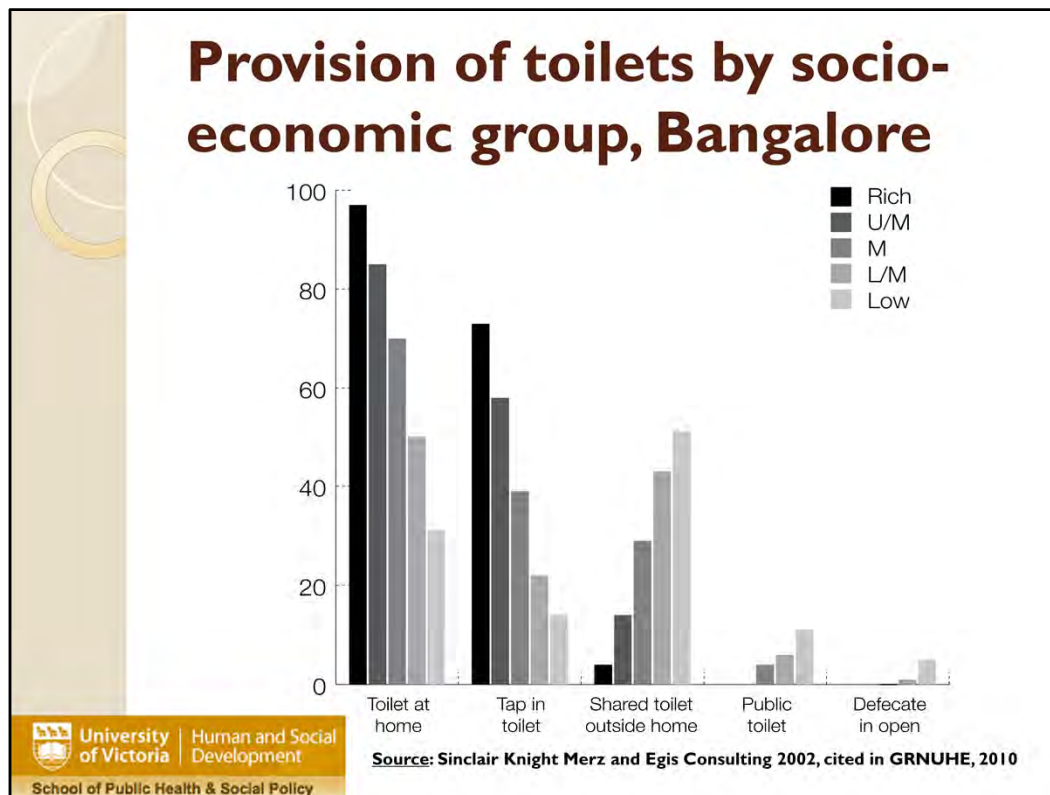
- Livelihood opportunities are important determinants of inequities. **The time and effort required to get to work**, which depends upon the nature of the physical urban environment, is an important issue.
- **Long commutes** represent a form of family and community time-deprivation; a two hour commute each way is 20 hours per week, or the equivalent of two 40 hour work weeks every month.

- **Access to shops, facilities and community spaces (both outdoor and indoor).**
  - “Shops, services and other destinations can encourage physical activity, social interaction and conviviality...
  - Quite apart from what is learnt in schools, including life skills and health literacy, there are health benefits associated with the physical presence of schools within communities” (Capon and Blakely 2007).
- **Access to health care facilities**

## b) Access to adequate housing

In terms of health inequities the key housing issues are:

- **Location** (presence or absence of hazards, e.g. pollution or risk of flooding);
- **Access to basic services** such as water, sanitation and refuse removal, and access to an energy source;
- **The quality of the shelter itself** – protection from the elements, and sufficient living space.



Friel, Sharon (2010) *Preventing and reducing urban health inequity through action on the social and environmental determinants of health: Final Report of the GRNUHE*  
 London: Global Research Network on Urban Health Equity/UCL  
 Available at <http://www.ucl.ac.uk/gheg/GRNUHE/GRNUHEPublication>

## **c) Safe living environments**

### **Key issues:**

- **transport safety**
- **home and leisure safety**
- **children's safety**
- **safety of the elderly**
- **occupational safety**
- **crime and violence prevention**
- **suicide prevention; and**
- **disaster preparedness and response.**



# Inequitable risk of injury

The poor are often at a high risk of injury, because they are faced with hazardous situations on a daily basis ...

- **their means of transport** are overcrowded and poorly maintained
- as **pedestrians on unsafe roads**, they are vulnerable to being crushed by cars and buses
- their **homes, often poorly constructed**, are vulnerable to fire.
- In general, the poor have **less chance of survival when injured** because they have less access to health services.



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GRNUHE Final Report, 2010

Friel, Sharon (2010) *Preventing and reducing urban health inequity through action on the social and environmental determinants of health: Final Report of the GRNUHE*  
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Available at <http://www.ucl.ac.uk/gheg/GRNUHE/GRNUHEPublication>

- **A study of injuries in Uganda highlighted that injury rates in Uganda are much higher than those in most Western countries, and that the urban population is at a higher risk than the rural population (Kobusingye et al. 2001).**
- **Based on 1998 data,**
  - **88% of traffic-related deaths**
  - **86% of suicides and**
  - **95% of homicides occurred in LMICs.**
- **For most types of injuries, people die at a higher rate in LMICs than in high-income countries. Road traffic injuries have one of the steepest socio- economic gradients, with many of the impacts falling disproportionately on poorer populations (SDC 2010).**

## **d) Food and nutrition security**

- **Fresh fruit, vegetables, meat, eggs and so on can become more expensive and less available in urban areas than rural areas, especially in poor urban areas, as has been the case in Mexico, due to differential distribution systems (Peña et al. 2007).**
- **The relative ease of access, especially in urban areas, to caloric energy is a major contributor to the two billion adults estimated to be overweight and obese.**
- **The net result of these changes in diet has been a double burden of malnutrition and obesity for the urban poor (Doak et al. 2004)**

**Six major determinants of urban nutritional inequalities in industrializing and industrialized cities have been identified (Dixon et al. 2007):**

- **decline in national food self-sufficiency due to withdrawal of government support for agricultural sectors;**
- **displacement of local food retailers by supermarket and convenience store chains;**
- **global food safety policies that impact negatively on small food producers, retailers, and poorer consumers;**
- **producer subsidies, consumer demand for cheap food, and high levels of foreign direct investment in food processing firms and convenience food chains that encourages the production of high energy foods;**
- **loss of livelihood options in local food systems, and**
- **urban planning that contributes to diet-related disease and to health inequities through its support for “automobility”.**

## e) Physical inactivity and urban health inequities

The escalation in NCDs in rapidly urbanizing and industrializing countries can be attributed to changes in the economy and consequently in society that have led to profound changes in individuals' lifestyles, including the adoption of unhealthy food consumption patterns, prevalent tobacco use, alcohol abuse and physical inactivity

- A survey of 30 Indian cities shows that urban travel in Indian cities predominantly happens through walking, cycling and public transport. In cities with more than 8 million population 22% always walked, 8% used cycles and 44% used public transport. While this encourages active travel and physical activity, there are equity implications - the minimum cost of public transport use accounts for 20 to 30 per cent of the family income for nearly 50 per cent of the city population living in slums (Urban-Age 2007).



### **3 c) iv Engaging with nature**

**There are health benefits from**

#### **1. Viewing nature**

- **As through a window, or in a painting**

#### **2. Being in (the presence of nearby) nature**

- **May be incidental to some other activity**

#### **3. Active participation and involvement with nature**

**Countryside Recreation Network (UK)**



# The health impacts of 'less green' environments

## Social breakdown

- Less strength of community, courtesy, mutual support, supervision of children outdoors
- More loneliness, graffiti, noise, litter, loitering, illegal activity, property crime, aggression, violence, violent crime

## Psychological breakdown

- Less attention, learning, management of major life issues, impulse control, delay of gratification
  - Greener schools related to better scores, greening schools leads to improved scores
- More ADHD symptoms, clinical depression, anxiety attacks



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### **Physical breakdown**

- **Poorer recovery from surgery, self-reported physical health, immune functioning**
- **More obesity in children, physician-diagnosed diseases, mortality**

### **Strength of evidence**

- **Based on hundreds of studies involving millions of people**
- **Multiple methodologies, multiple outcomes**
- **Many diverse populations**

Based on Ming Kuo's presentation  
**Healthy by Nature, 22 Sept 2011** and on  
Kuo, (2010) Parks and Other Green Environments:  
Essential Components of a Healthy Human Habitat  
(National Recreation and Park Association)

Kuo, Frances E. (Ming) (2010) Parks and Other Green Environments: Essential Components of a Healthy Human Habitat Ashburn, VA: National Recreation and Park Association

# **‘Vitamin G’**

**If this was a drug, we would  
call it a miracle drug!**



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# Health benefits of urban parks

- **Physical (exercise)**
- **Social (being with others)**
- **Mental/emotional (relaxation, etc)**
- **Spiritual (connecting with nature)**
- **Ecological (air quality, temperature regulation etc)**



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# Parks for all

- **Given the inequalities in health we face, how do we ensure the most disadvantaged get the benefits that 'Vitamin G' offers?**
- **How do parks meet the needs of ethno-racially diverse communities?**
- **Age-friendly parks?**
- **How do we bring nature indoors?**



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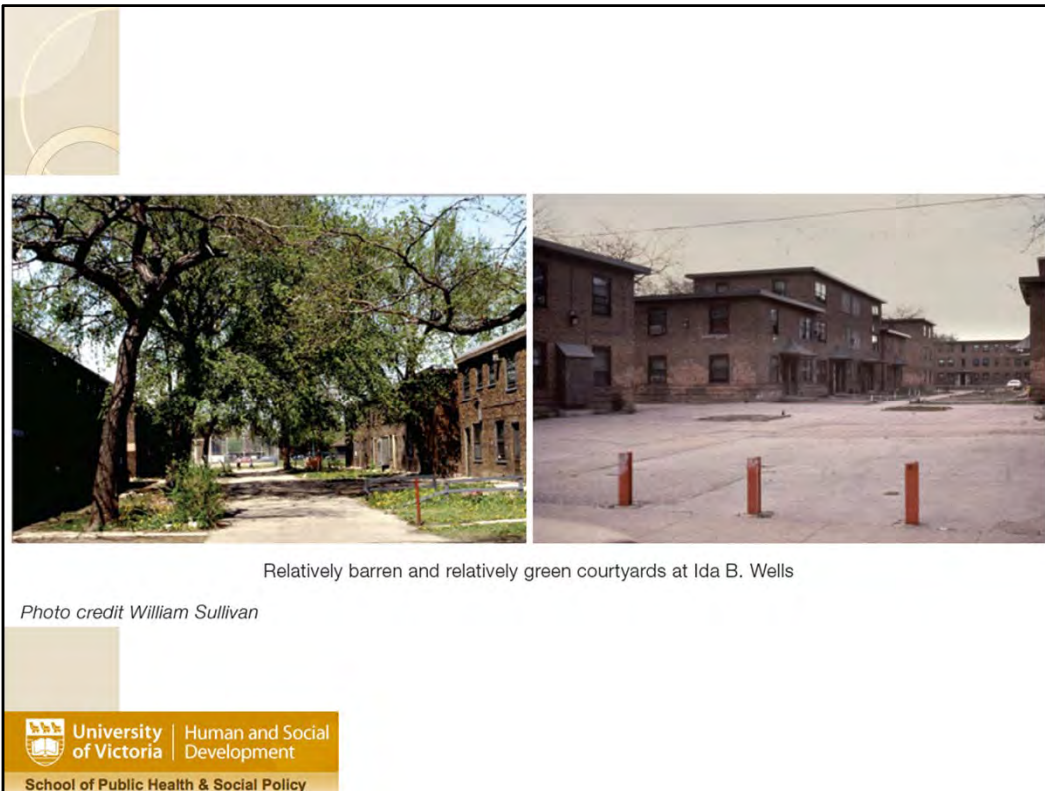


Relatively barren and relatively green courtyards at Ida B. Wells (aerial photo)

Photo credit William C. Sullivan  
School of Public Health & Social Policy

Source: Kuo, Ming (2010) **Parks and Other Green Environments: Essential Components of a Healthy Human Habitat (Executive Summary)** Ashburn, VA: Natioanl Recreation Association





Source: Kuo, Ming (2010) **Parks and Other Green Environments: Essential Components of a Healthy Human Habitat (Executive Summary)** Ashburn, VA: Natioanl Recreation Association

## Ming Kuo's research

- **The greater the amount of greenery in common spaces, the higher the levels of mutual caring and support among neighbours**
- **The higher the amount of vegetation, the lower the crime rate**
- **Higher levels of residential greenery are associated with lower levels of aggression against domestic partners**

<http://lhlh.illinois.edu/communities.htm>

<http://lhlh.illinois.edu/crime.htm>

<http://lhlh.illinois.edu/violence.htm>

## Ming Kuo's research/2

- **The more natural the view from home, the better girls scored on tests of concentration and self-discipline**
- **The more greenery, the higher levels of optimism and sense of effectiveness**
- **The greener the setting in which children with **ADD** spend time, the more their symptoms are relieved**

[http://lhlh.illinois.edu/girls\\_self-discipline.htm](http://lhlh.illinois.edu/girls_self-discipline.htm)

<http://lhlh.illinois.edu/coping.htm>

<http://lhlh.illinois.edu/adhd.htm>

### **3 c) iv Is beauty a determinant of health?**

- **Every culture has decorative art, music, dance, jewelry**
- **Every culture has ideas of beauty and seeks to create beauty**
- **So it seems beauty is fundamental to human societies and culture**
- **That suggests to me that beauty is likely to be good for health and social wellbeing**
- **Presumably, ugliness is bad for health**

# **Presumably the opposite is true ...**

**Ugly is defined as**

- 1. very unattractive or unpleasant to look at; offensive to the sense of beauty; displeasing in appearance.**
- 2. disagreeable; unpleasant; objectionable:**
- 3. morally revolting:**
- 4. threatening trouble or danger:**
- 5. mean; hostile; quarrelsome**

**Dictionary.com**

## **So ...**

- **Is beauty good for health?**
- **Is ugliness bad for health?**

**Note that I am not talking here about whether people feel they are beautiful, attractive or ugly. So this is NOT about**

- **The body beautiful and body image**
- **Cosmetic surgery or dentistry**
- **The beauty industry, tanning beds etc.**



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## **If so ...**

- **Do disadvantaged groups experience a lack of beauty or an excess of ugliness?**
- **Does this contribute to inequalities in health?**
- **If so, should we not preferentially create beauty and ensure access to nature, art and beauty in disadvantaged communities?**



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### 3 c) v Cities and natural hazards

**Natural hazards include**

- **Cyclones**
- **Droughts**
- **Earthquakes**
- **Floods**
- **Landslides, and**
- **Volcano eruptions**

**Remember ...**



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*World Urbanization Prospects: The 2011 Revision*

76

Department of Economic and Social Affairs, Population Division (2012) *World Urbanization Prospects: The 2011 Revision – Highlights* New York: The United Nations

# The poor live ...

- **Downwind**
- **Downstream**
- **Downhill**
  - **But uphill if the slopes are dangerous**
- **On floodplains and other marginal lands**



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## **For the 63 most populated urban areas (>5 million inhabitants in 2011)**

- **39** are located in regions that are exposed to a high risk of at least one natural hazard
  - **Flooding** – 30 cities
  - **Cyclones** - 10 cities,
  - **Droughts** - 9 cities, and
  - **Earthquakes** - 6 cities

## Latin & North American cities at multiple risk

- **Ciudad de México** has a high risk of floods, medium risk of landslides and low risk of droughts;
- **New York-Newark**, is at high risk of floods and medium risk of cyclones
- **Santiago and Valparaíso (Chile), Quito (Ecuador) ... and Managua (Nicaragua)** - all located in areas at high risks of droughts, earthquakes and floods (as well as landslides and volcano in Quito)



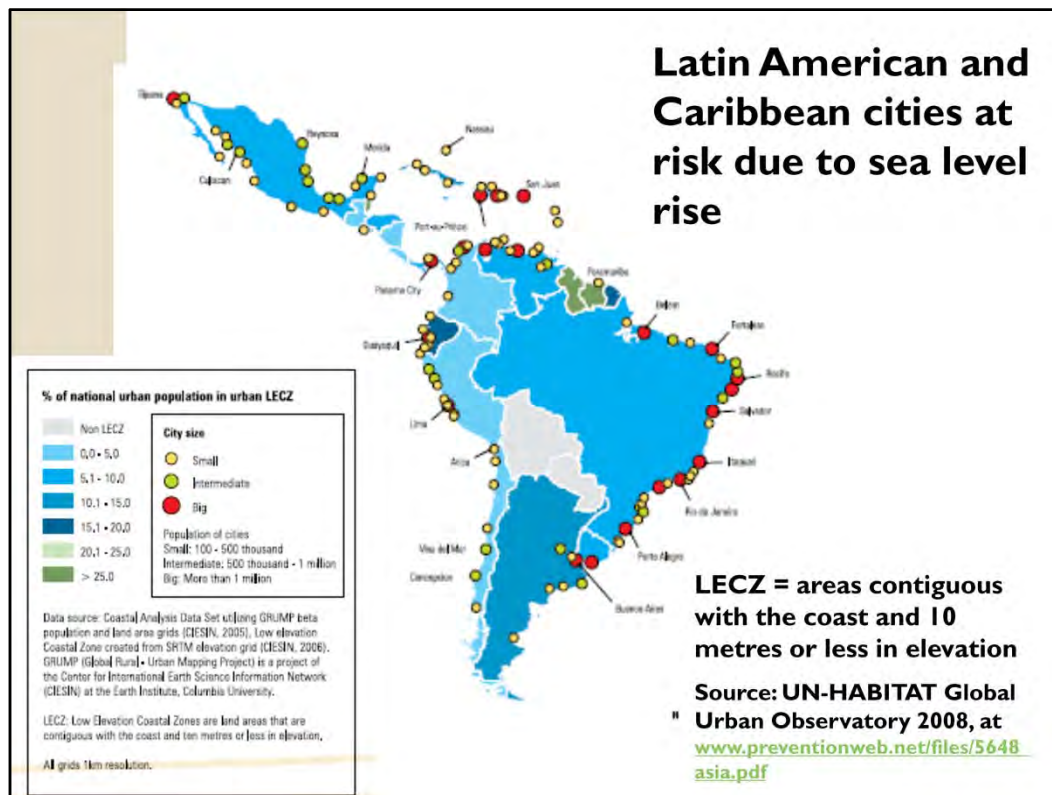
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*World Urbanization Prospects: The 2011 Revision*

79



[http://www.preventionweb.net/files/5648\\_asia.pdf](http://www.preventionweb.net/files/5648_asia.pdf)



### **3 d) Ecosystem inequity**

**An appropriation of 'natural capital' that exploits and destroys the environment of others**

- **Social inequity**

**This will deprive future generations of the resources they need to meet their needs**

- **Intergenerational inequity**

**Also deprives other species of what they need to survive**

- **Interspecies inequity**



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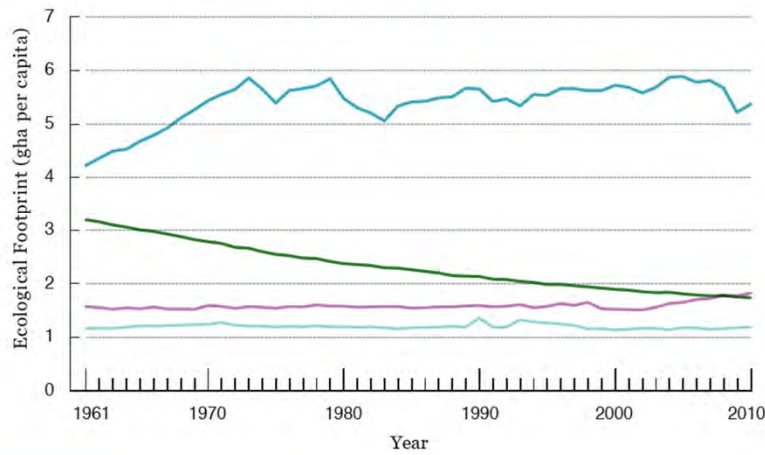
## **Climate change and health inequity**

**Changes in climatic conditions will increasingly exacerbate existing social and health inequities, with those most at health risk being**

- **in low-income countries**
- **poor people living in urban areas**
- **elderly people**
- **children**
- **traditional societies,**
- **subsistence farmers, and**
- **coastal populations**

• **Friel et al. 2008**

# Inequity in the Ecological Footprint



**Figure 6: Ecological Footprint per capita (gha) in high-, middle- and low-income countries (World Bank classification and data) between 1961 and 2010**  
The green line represents world average biocapacity per capita. (Global Footprint Network, 2014).

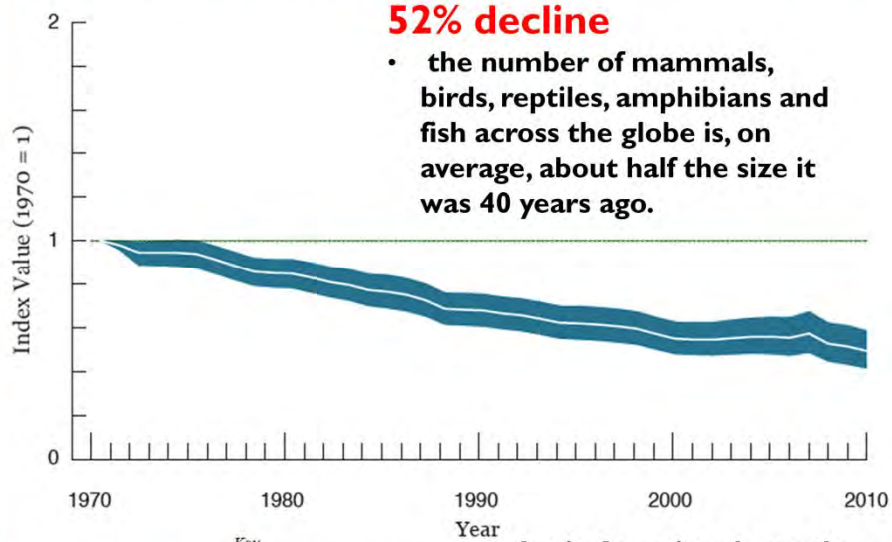
## Key

- High income
- Middle income
- Low income
- World biocapacity



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# Living Planet Index 1970 - 2010



**52% decline**

- the number of mammals, birds, reptiles, amphibians and fish across the globe is, on average, about half the size it was 40 years ago.

**Latin America shows the most dramatic decline – a fall of 83 per cent.**



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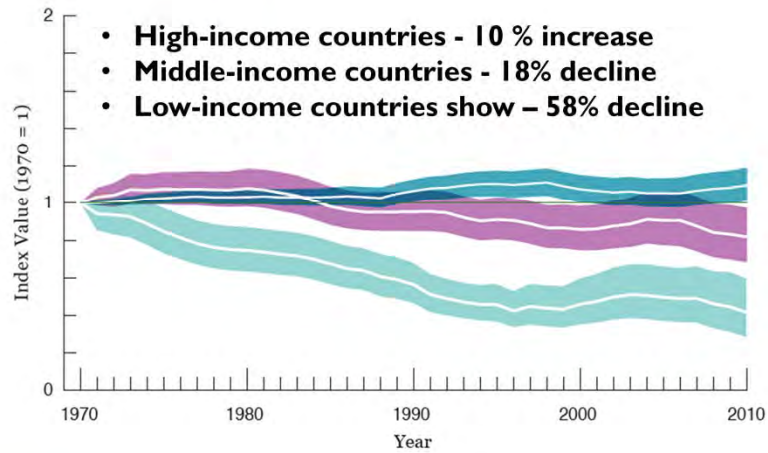
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# Inequity in the Living Planet Index

**Figure 7: LPI and country income groups**  
(World Bank classification),  
1970-2010. (ZSL, WWF, 2014).

**Key**

- High income
- Middle income
- Low income



## **4.Actions for environmental justice**

- a) Health equity impact assessment**
- b) Proportionate universalism**
- c) Environmental justice for Aboriginal people**
- d) Children's environmental rights**
  - a) Intergenerational equity**
  - b) Child-friendly communities**
- e) Urban planning guidelines**



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# Environmental justice

1. **A social movement** in the United States whose focus is on the fair distribution of environmental benefits and burdens.
2. **An interdisciplinary body of social science literature** that includes (but is not limited to) theories of the environment, theories of justice, environmental law and governance, environmental policy and planning, development, sustainability, and political ecology.

[http://en.wikipedia.org/wiki/Environmental\\_justice](http://en.wikipedia.org/wiki/Environmental_justice)



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## US EPA definition

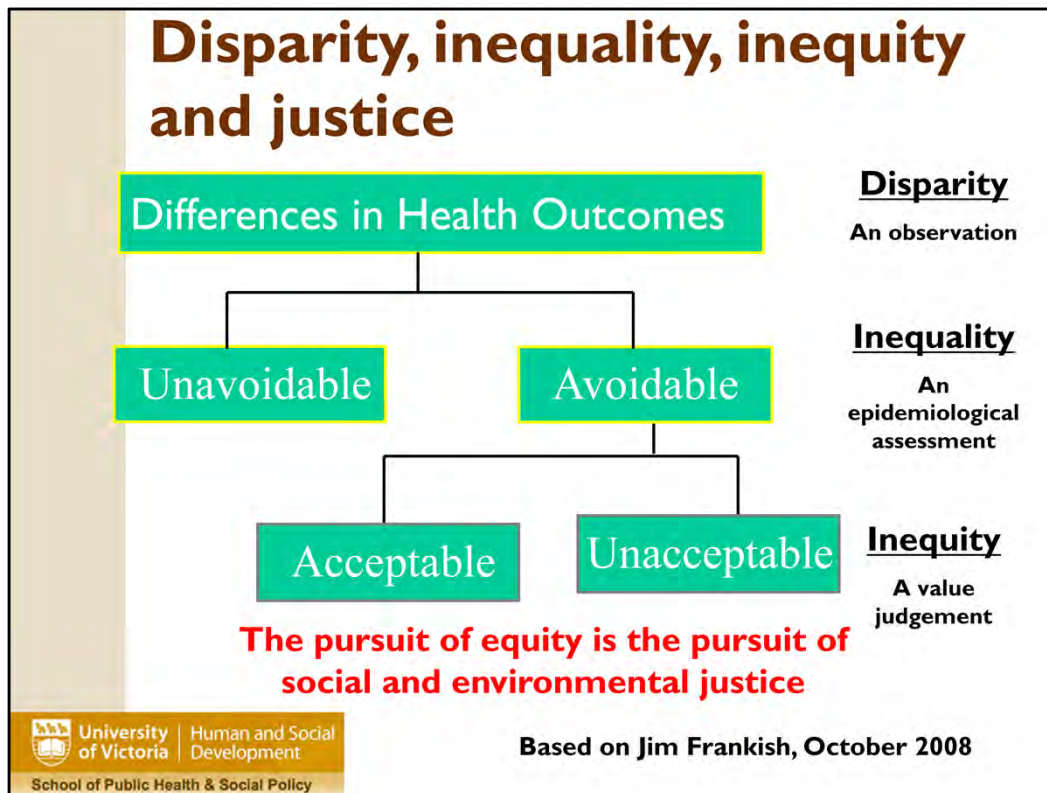
- **Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.**



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Today, I am going to focus a lot on what I term the nonmedical determinants of health & the role of health regions in improving population health. These include factors like housing, education, social support & income.

I am not suggesting that we should simply ignore medical services & health sector reform.

I only wish to ask you to consider which negative health outcomes are avoidable & which one are made more or less acceptable by societal action or inaction.

Margaret Whitehead has said that inequalities count as inequities when they are avoidable, unnecessary & unfair.

## 4 a) Health equity impact assessment (HEIA)

- The 'equity lens' in BC's Core Public Health Programs
- Formal HEIA processes
  - See ELPH report on Health Equity Tools
    - <http://www.uvic.ca/research/projects/elph/assets/docs/Health%20Equity%20Tools%20Inventory.pdf>
  - See MoHLTC in Ontario – HEIA Toolkit
    - <http://www.health.gov.on.ca/en/pro/programs/heia/>
  - See Wellesley Institute resource page
    - <http://www.wellesleyinstitute.com/topics/health-equity/heath-equity-impact-assessment/>



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# Ontario's HEIA Toolkit

The HEIA tool that has been developed by MOHLTC has four key objectives :

- Help identify unintended potential health equity impacts of decision-making (positive and negative) on specific population groups
- Support equity-based improvements in policy, planning, program or service design
- Embed equity in an organization's decision-making processes
- Build capacity and raise awareness about health equity throughout the organization

<http://www.health.gov.on.ca/en/pro/programs/heia/>



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# Proportionate universalism

- **Focusing solely on the most disadvantaged will not reduce health inequalities sufficiently. To reduce the steepness of the social gradient in health, actions must be universal, but with a scale and intensity that is proportionate to the level of disadvantage. We call this proportionate universalism.**

*Fair Society, Healthy Lives*

**The UK Marmot Review, 2010**



# **The urban poor suffer environmental injustice**

## **Not just basic needs**

- **Poor water supply, worse housing, less access to healthy food, worse air pollution, poor public transport, etc but also broader human needs**
- **Less access to nature, art, beauty, libraries, museums etc**



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93

## **We should preferentially create healthier environments for disadvantaged groups**

**They need MORE**

- **Public transport**
- **Libraries**
- **Recreational and cultural facilities**
- **Parks and access to nature**
- **Art**
- **Beauty**
- **etc.**

**Has to be done WITH, not for or to communities – see this as an opportunity**

## **Environmental justice for Aboriginal people**

- **‘Land’ is a fundamental issue for  
Aboriginal people**
- **Control over their traditional lands**
  - The Tsil’cotin decision
- **Climate change and the Inuit**
- **Improved housing**



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# Environmental justice for children

- “Given our rapidly advancing knowledge of
  - early brain development,
  - the differential effects of the physical environment on the developing child,
  - epigenetics,
  - the prevalence of environmental injustice, and
  - the potential effects of climate change on children
- **it is incumbent on society to consider the environment and environmental justice in the context of child health equity.”**



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**American Academy of Pediatrics 2010**

## Health Equity and Children's Rights

Council on Community Pediatrics and Committee on Native American Child Health,  
American Academy of Pediatrics

Pediatrics 2010;125;838

<http://pediatrics.aappublications.org/content/125/4/838.full.html>

# Creating better environments for ALL children – What can we do?

**Remember – get it right for kids and you protect all of us – and future generations (intergenerational equity)**

- Pay as much attention to the environmental determinants of health as the social determinants
- Recognise that ecosystem health is the ultimate determinant of the health of this and future generations
- Pay attention to and point to environmental health inequity wherever you see it
- Pay far more attention to
  - the built environment



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the importance of access to play and to nature

• POPs and other eco-toxic chemicals

# An Environmental Bill of Rights (for children)

- **Children should have the RIGHT to a toxin-free consumer environment**
  - **Children's rights trump corporate rights**
  - **Chemicals are not people – they are not innocent until proven guilty**
- **And a healthy built environment**
- **And a healthy ecosystem**
- **Based on the Convention on the Rights of the Child - which Canada has signed**
- **New Brunswick has recently introduced a Bill (before the election)**



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# Child Friendly Communities

**A child friendly city is the embodiment of the Convention on the Rights of the Child at the local level, which in practice means that children's rights are reflected in policies, laws, programmes and budgets. In a child friendly city, children are active agents; their voices and opinions are taken into consideration and influence decision making processes.**

**Unicef**

<http://www.childfriendlycities.org/>



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<http://www.childfriendlycities.org/>

**It is “a system of local governance,  
committed to fulfilling children's rights,  
including their right to”**

**(among other things)**

- **Drink safe water and have access to proper sanitation**
- **Walk safely in the streets on their own**
- **Meet friends and play**
- **Have green spaces for plants and animals**
- **Live in an unpolluted environment**

**Unicef**



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<http://www.childfriendlycities.org/>

<http://www.childfriendlycities.org/en/overview/what-is-a-child-friendly-city>

## National and local government action for health equity (WHO CSDH, 2008)

- Progressive building of universal health-care services;
- establish a central gender unit to promote gender equity across government policy-making;
- improve rural livelihoods, infrastructure investment, and services;
- **upgrade slums and strengthen locally participatory healthy urban planning;**
- invest in full employment and decent labour policy and programmes;
- invest in ECD;
- build towards universal provision in vital social determinants of health services and programmes regardless of ability to pay, supported by a universal programme of social protection; and
- establish a national framework for regulatory control over health-damaging commodities.

## **Put health equity at the heart of urban planning/ design**

**Through impacting on the physical urban environment, urban planning/ design can impact on health and health equity in various ways, by facilitating:**

- **access to shelter and basic services**
- **access to work and amenities**
- **physical activity**
- **food security**
- **safe living environments (i.e. with low risk of injuries)**
- **a healthy natural environment**
- **good mental health**
- **mobility for people with disabilities, children and seniors**
- **effective health care**

## **Social Urbanism: Medellín's City Plan Guidelines**

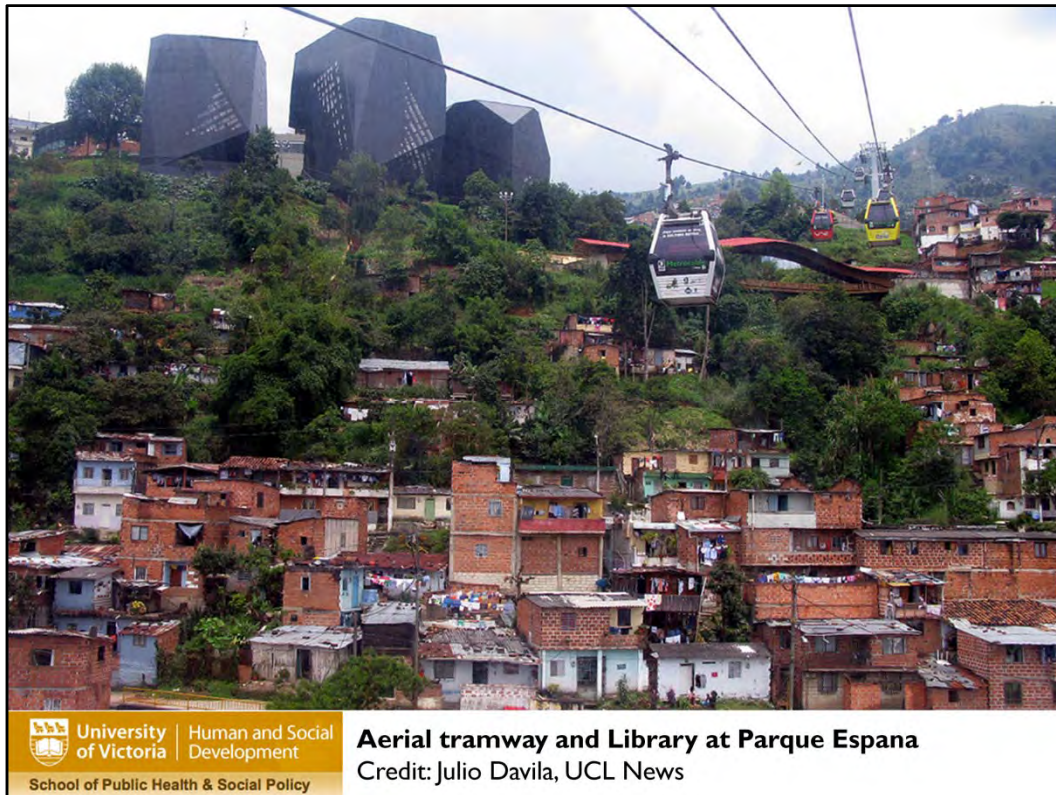
- **The indicators of human development and quality of life will guide the public investment, focusing on first serving the ones in the biggest need.**
- **Public space and infrastructure must become the framework where education and culture are cultivated in places of encounter and coexistence.**

Alcaldía de Medellín (2004). *Plan de Desarrollo 2004-2007: Medellín, Compromiso de Toda la Ciudadanía*. Medellín: Alcaldía de Medellín.



- **Urban projects must simultaneously integrate physical, cultural and social components; improving not only places but also the life and interactions of people in the communities.**
- **The Integrated Metropolitan Transport System must be used as the organizing axis of mobility and projects in the city. All projects have to be directly linked to the main transport system.**
- **The decision to make Medellín an educated city. Education and culture as priorities that guide programs and projects.**





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**Aerial tramway and Library at Parque Espana**

Credit: Julio Davila, UCL News

Available at: <http://www.flickr.com/photos/uclnews/7256239732/>

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