

HEALTHY CITIES

UCL-Lancet Commission

May 2011

Yvonne Rydin



Urban health: the challenge

2010

- half of the world's population lives in urban areas

2020

- over half will live in urban or peri-urban areas
- one in six people will live in an urban slum

Healthy cities are key to the health of humanity

Urban health: the opportunity

Cities are an opportunity for improving human health

- Substantial scope in the rapidly growing cities of low-middle income countries
- But also in “retrofitting for health” in the established cities of high income countries

The Commission's focus

To understand the dynamics involved in delivering better health outcomes through built environment interventions in cities across the world

- Looking at cities across the low-high income spectrum
- Focussing on how the physical fabric and infrastructure of urban areas can be shaped and reshaped for health

UCL-Lancet Commission on Healthy Cities

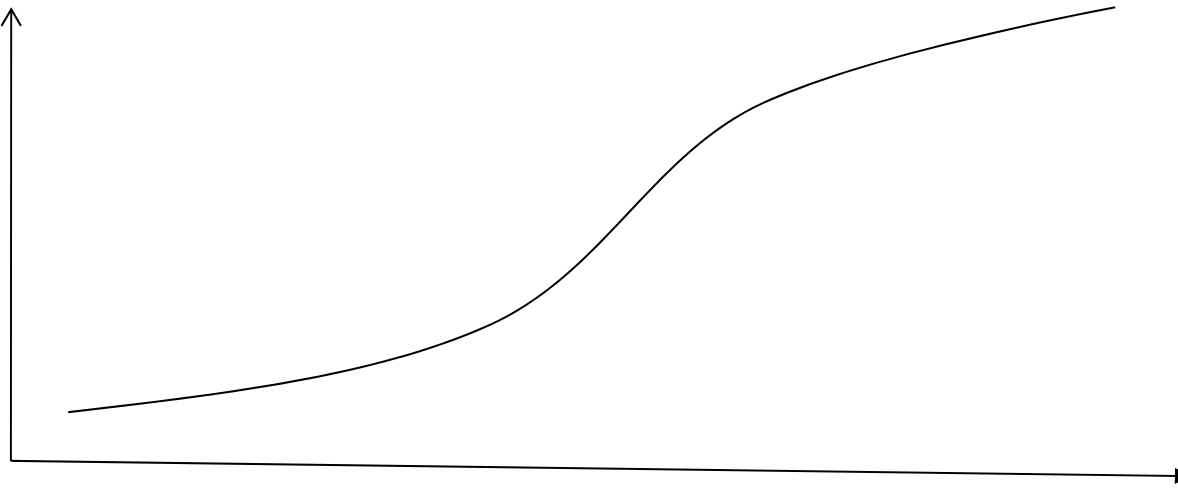
- Met monthly from November 2009
- Multi-disciplinary team:

Architecture	Engineering	Philosophy
Building Physics	Epidemiology	Public Health
Development Planning	Geography	Urban Planning

- Literature review; data review; city case studies

From Urban Penalty to Urban Advantage?

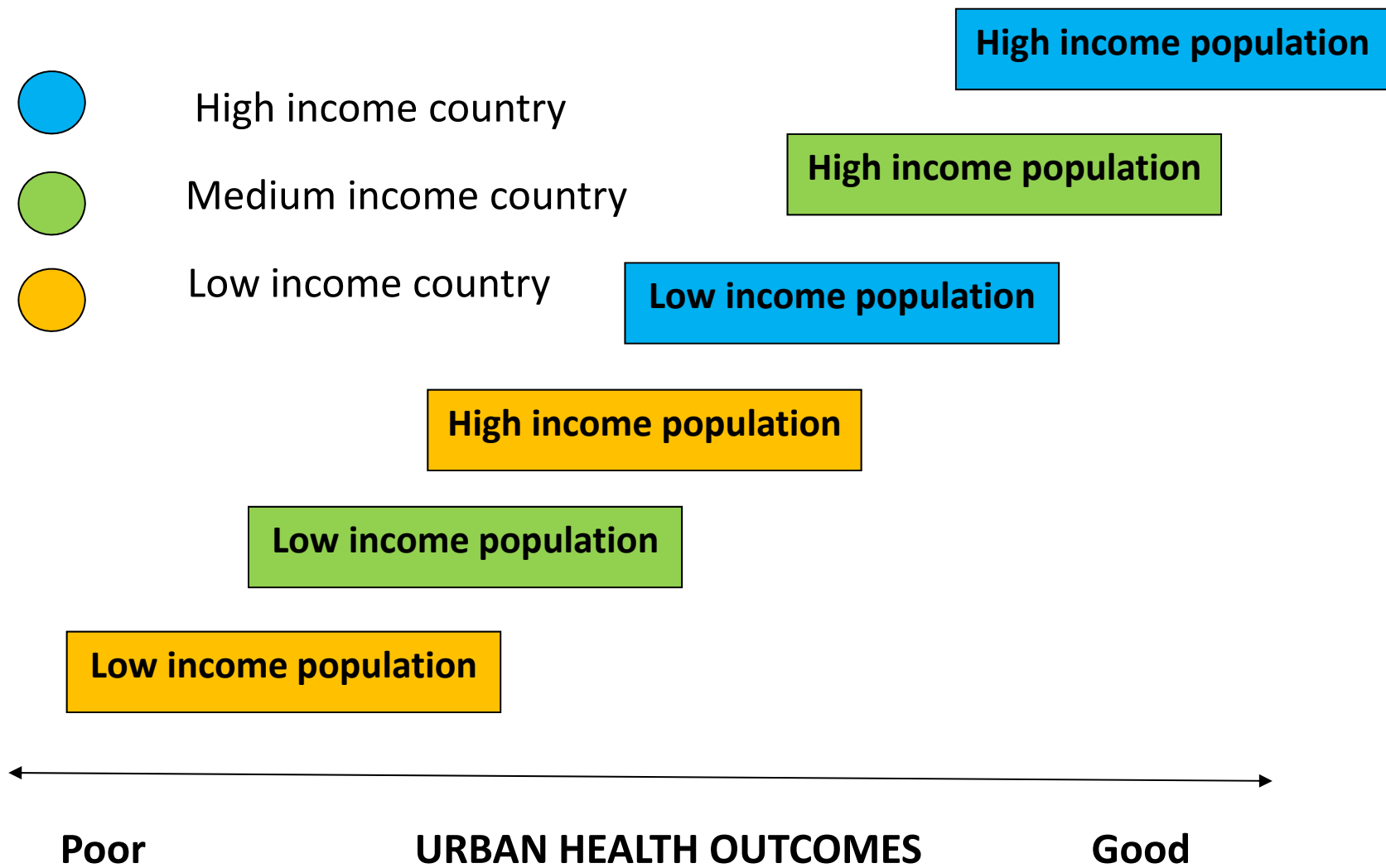
- Often assumed that income growth will bring health improvements:



- Based in a 'Transitions Model' of health, including urban health

Problems with the Transitions Model

1. Does not explain why shift has occurred more quickly in recent years than in past
2. Does not explain differences in speed of shift across countries; or across cities within one country
3. Ignores social inequalities within countries, i.e. urban health outcomes of different social groups in a city



Further problems with the Transitions Model

- Fails to recognise that the urban advantage actively needs to be created
- Also fails to recognise that it is potentially reversible, i.e. that it needs to be maintained

Three key tasks in understanding urban health

1. Understand what shapes urban health outcomes in cities and the role of built environment interventions
2. Recognise the importance of specific urban contexts
3. Learn how to deliver built environment interventions for urban health

Understanding urban health outcomes: Cities as Complex Systems

A complexity approach recognises:

- Inter-relationships leading to urban health outcomes are non-linear
- Causation is multi-directional
- Causes are also outcomes
- Feedback loops are widespread
- Links between cause and effect are often delayed

Determinants of urban health at different scales

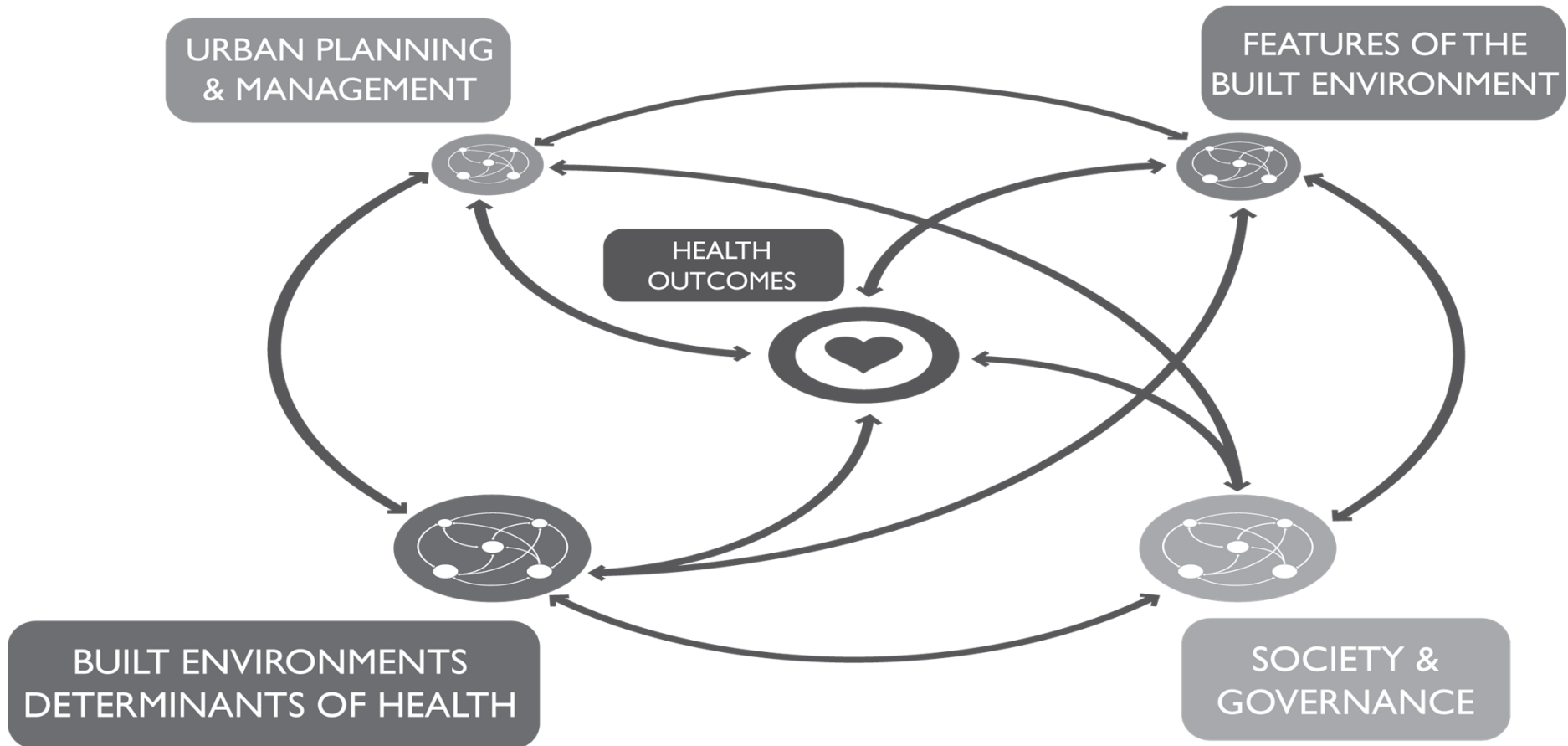
Level 1 - Society and Governance

Level 2 – Urban Planning, Policy and Management

Level 3 – Features of the Built Environment and the Social Fabric

Level 4 – Built Environment Determinants of Health

Level 5 – Health Outcomes of Urban Residents



The importance of context

	Low income countries	High income countries
Low income populations	Basic public health problems of informal settlements	Unequal distribution of benefits of growth
High income populations	Spillover effects from unregulated urban growth	Unintended consequences of wealthy lifestyles

How to deliver built environment interventions for urban healthy: five analyses

- Sanitation and wastewater management
- Building standards and quality
- Transportation, mobility and leisure
- Urban form and the Urban Heat Island
- Urban agriculture

Healthy Cities Symposium

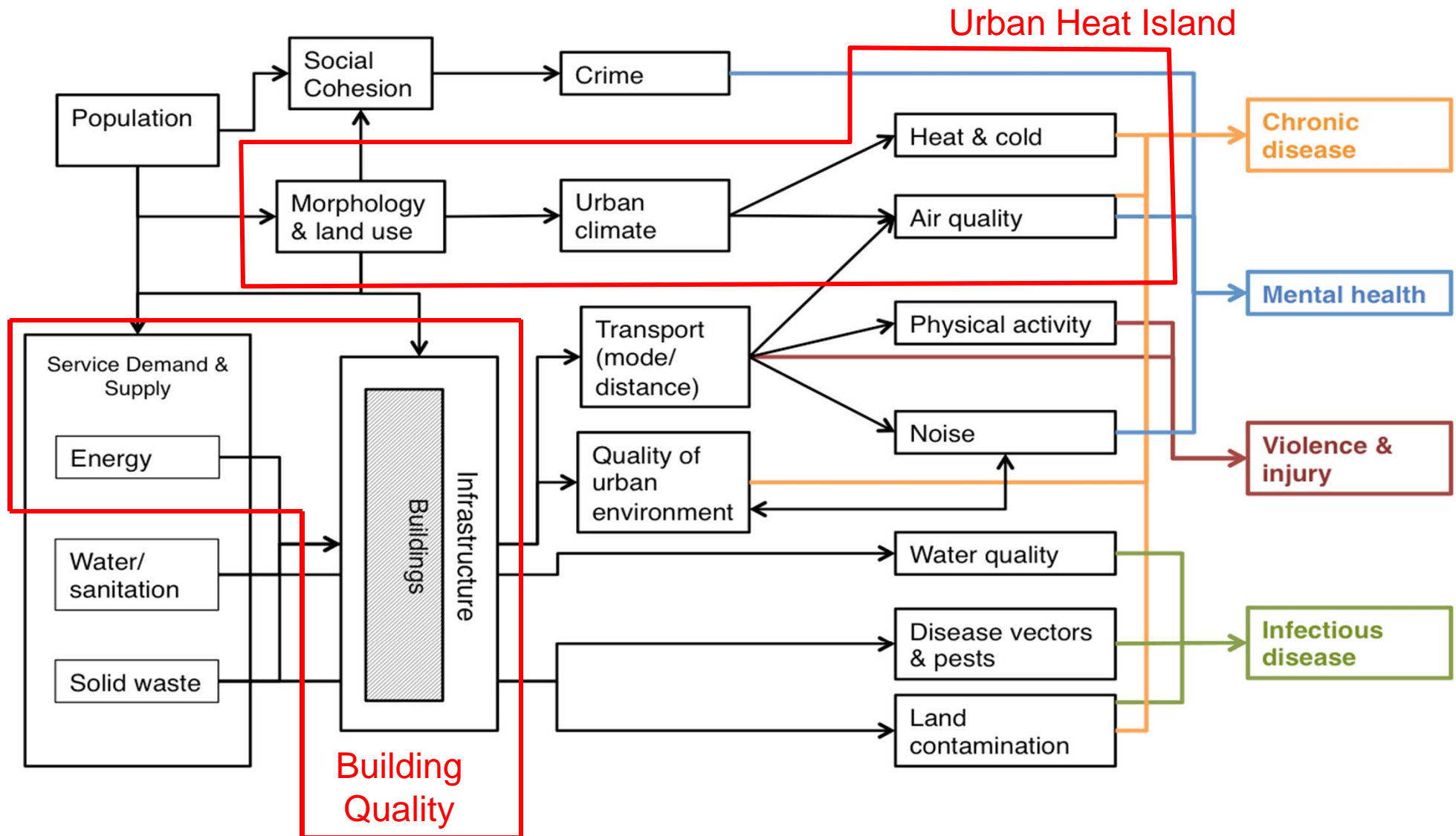
Building Quality
Urban Form

Ian Hamilton
Mike Davies
Ian Ridley
Paul Wilkinson

Healthy Cities: Built environment

- Building Quality
- Urban Structure & Form
- We aim to highlight:
 - Drivers for changes to building quality and urban form
 - Implications for high and low income urban development
 - The complexity of the interactions and relationships of these urban issues

Urban Form & Structure and Health



Building Quality & Energy

Connections between building quality, energy and health

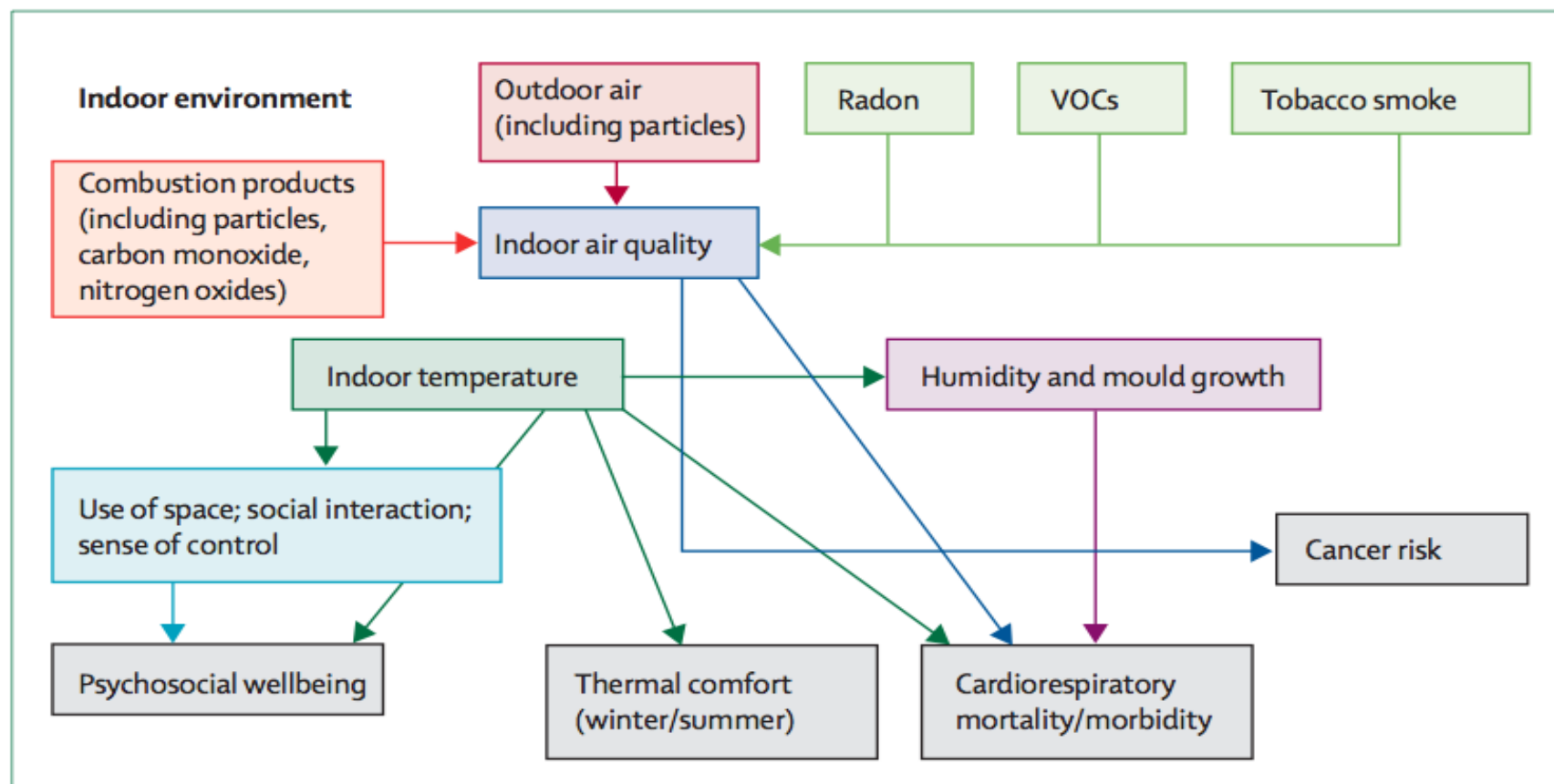


Figure 2: Connections between the built indoor environment and health

VOCs=volatile organic compounds.

Source: Wilkinson et al, 2009

Healthy Cities: Building Quality

Improving building quality

Example: UK & India

- UK Households: measures to improve building quality
 - ~ 850 DALYs/million pop. annual
 - ~ 0.6MtCO₂/million pop. annual
- India households: 150million low emission cookstoves
 - ~12,500 DALYs/million pop. annual
 - ~0.1-0.2 MtCO₂/million pop. annual



Healthy Cities: Building Quality

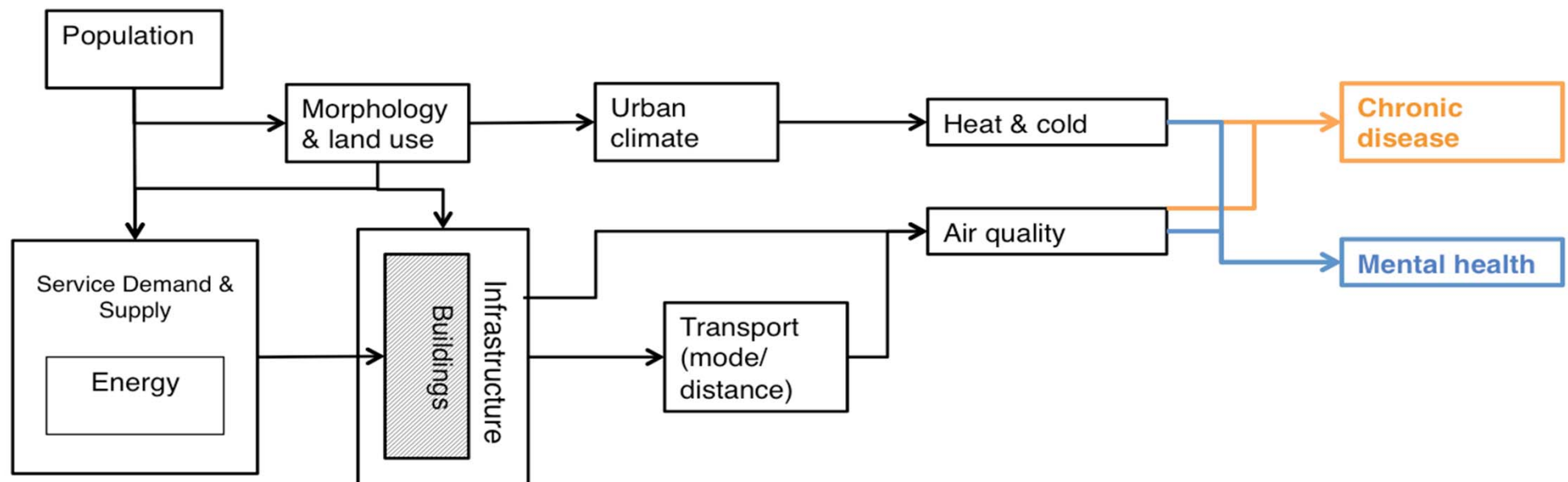
Contrast 'high' & 'low' income cities

- Not a rigid dichotomy; a spectrum even in one city
- High income:
 - Considerable time indoors (~80%)
 - Potential for greater CO₂e savings but lower health benefits
- Low income:
 - Higher indoor & outdoor pollutant concentrations
 - Potential for greater health benefits but lower CO₂e savings



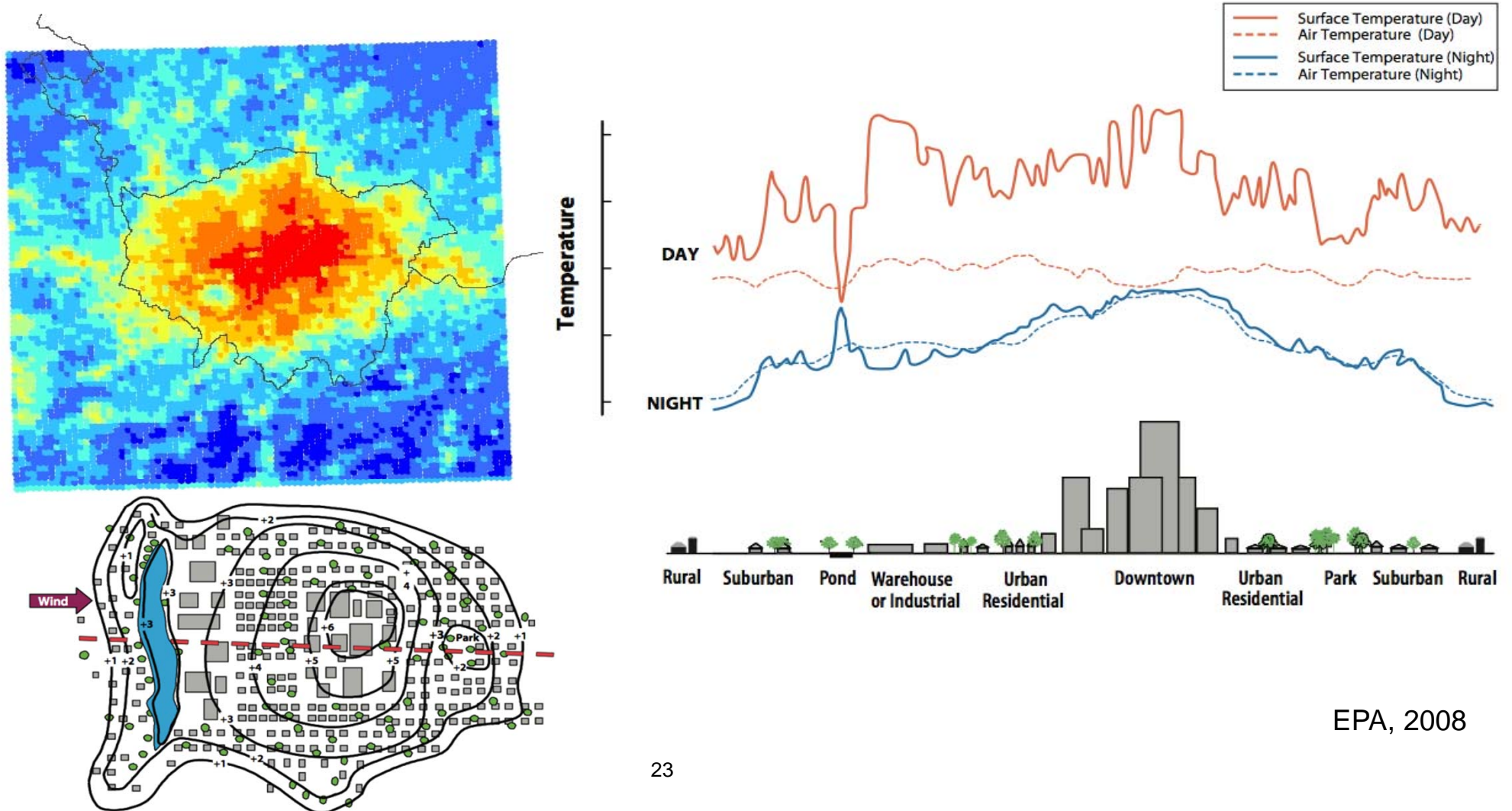
Urban Structure & Form and Health

Urban Heat Island & Health



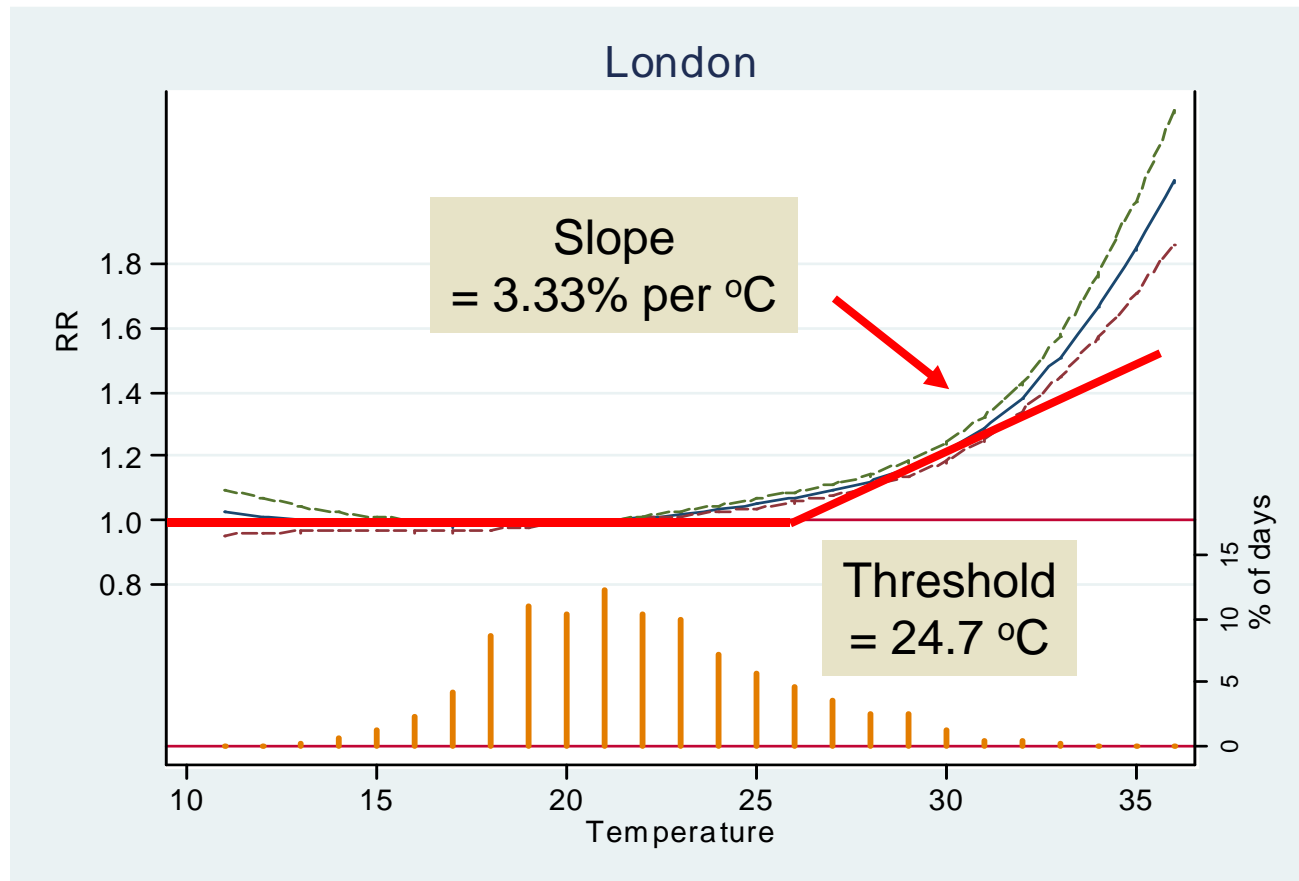
Urban Form & Health

Urban Heat Island



EPA, 2008

Temperature mortality association



Two-day mean of tmax, after adjusting for potential confounders
 A simpler linear-threshold (hockey stick) model (Armstrong et al. 2009)

Healthy Cities: Urban Form

Developing Appropriate Strategies

- **Scale**
 - Citywide
 - Neighbourhood
 - Building
- **Balance & Priorities**
 - Policies for changing the urban form may be due to:
 - Redevelopment or clearance
 - Growth management
 - Climate change adaptation

Summary

- The built environment has significant impact on health via, for example, indoor environment quality, comfort and heat.
- Appropriate interventions to improve health can coincide with responses to a range of issues (e.g. climate change, energy security)
- Cities must be viewed as a dynamic system. The complex nature, i.e. multiple interactions of the impact of such interventions means that the possibility of negative unintended consequences exists
- However, there is increasing acknowledgement and understanding of this complexity. The success of relevant policies is not dependant on an unpredictable reality – rather that the reality is amenable to study, of which we must do more.

Healthy Cities Symposium

Transportation mobility and leisure

Julio D Dávila

Physical activity and the built environment

- Links between physical activity and health are well established
- Two questions :
 - What effect does the built environment (streets, urban form, traffic) have on physical activity?
 - What can city governments do about this?

City governments and the built environment

- Much physical activity in cities takes place outside enclosed private spaces
- Relevance to transport planners and urban managers, and especially city governments
- City governments:
 - Generally responsible for planning and managing infrastructure and services that directly influence people's daily lives
 - Responsible for providing a sense of order and security

Walking and cycling in cities

- Difference between:
 - Utilitarian activities (e.g. walking to work)
 - Leisure activities (e.g. cycling for fun)
- In low- and middle-income countries:
 - The poor & the young tend to walk more for utilitarian reasons
 - Physical activity among wealthier groups more associated with leisure

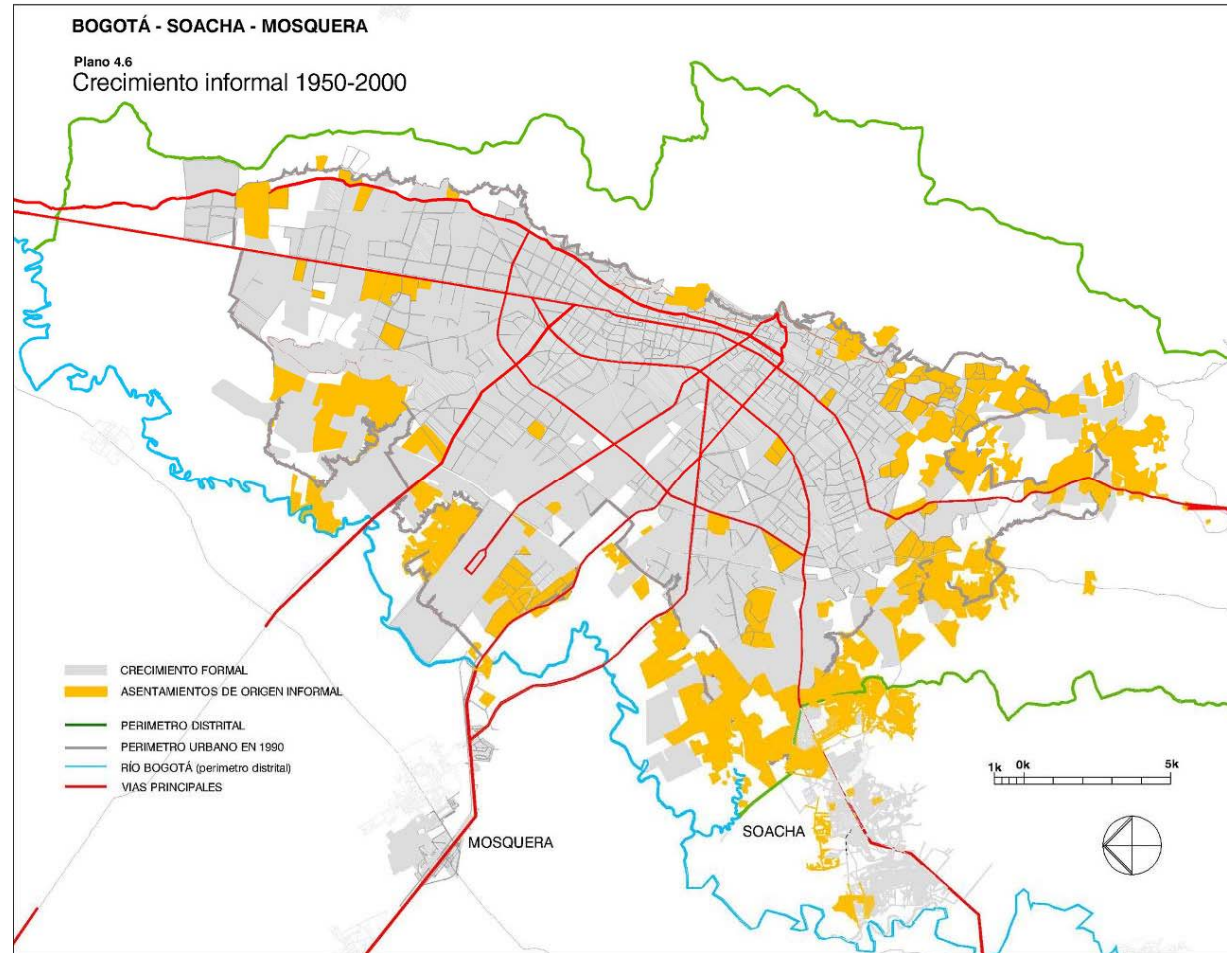
Built environment and physical activity: some evidence

- **In US & Australia, higher residential densities are associated with utilitarian walking but not necessarily with leisure walking**
- **Three factors measured in studies:**
 - **Population density (people per hectare)**
 - **Land-use mix (homes and shops)**
 - **Street connectivity (open streets vs. gated communities)**
- **In San Francisco, these have a moderate effect on walking & cycling**
- **In Bogota the evidence is weaker though**

What can planners and city managers do? Some evidence from Bogotá, Colombia

- Population 2010: ca. 8 million
- High altitude (2,600 m), temperate climate (mean temp. 14.4 °C), 188 days of rain/year, mostly flat terrain
- High levels of socio-spatial segregation and income inequality
- High levels of poverty and informality (both jobs and housing)
- High density and mixed land use

Over 25% of Bogotá's neighbourhoods are 'informal' in origin



Source: Dávila et al., 2006

Bogotá's remarkable transformation: mid-1990s-mid-2000s

- Urban/spatial interventions:
 - **Pavements** recovered for pedestrians
 - **Public space** upgraded at city and neighbourhood scales
 - **Green area** per inhabitant increased (to 4 m²)
 - Increased availability of key **city services** closer to large residential concentrations (reduced journeys)

- Transport/mobility:
 - Mass-transport system (Bus Rapid Transit system – ***Transmilenio***)
 - **Daily ban on circulation** for 40% of vehicle stock
 - ***Ciclorutas*** (bicycle paths)
 - ***Ciclovia recreativa*** (launched in 1974)

Bogotá by mid-2000s: An impressive transformation



***Transmilenio* Bus Rapid Transit (BRT) system and cultural heritage projects**

Other aspects of Bogotá's transformation



Metrovivienda low-income housing project



Extensive bicycle path (*Ciclorutas*) network

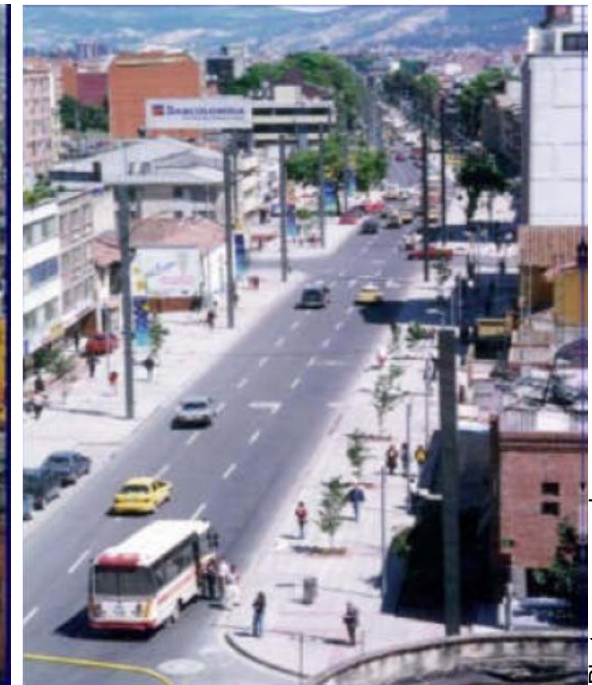


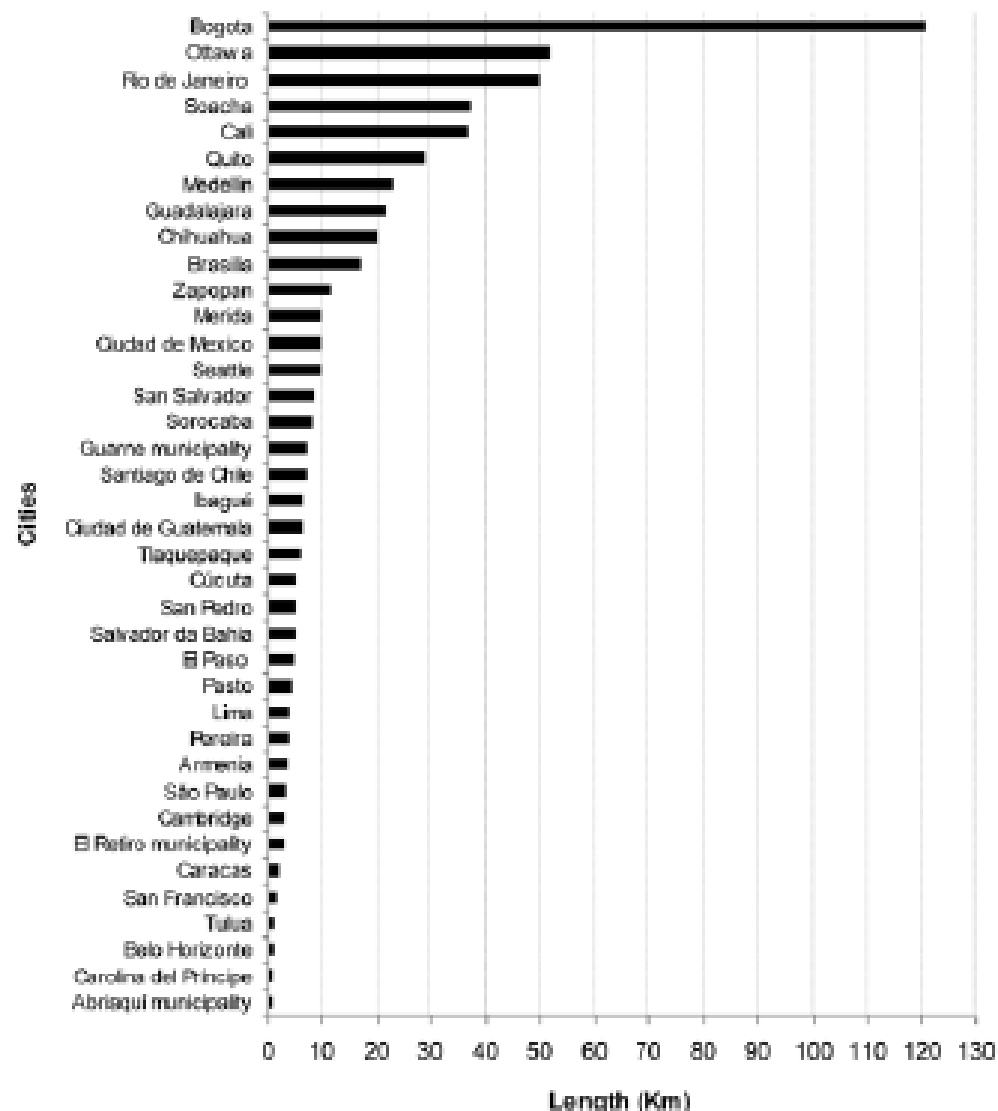
Photo source: unknown

Much improved public & pedestrian space:
Carrera 15 avenue in mid-1980s (left) and in mid-1990s

Ciclovia recreativa

- Launched in 1974
- 121 km of streets closed to motorised transport (longest *ciclovia* in the Americas)
- Weekly closure: Sundays/bank holidays 7:00-14:00 hrs
- Participants: 700,000-1.3 million per month
- Educational programmes & first aid
- Funded mainly by city government (US\$1.7 million p.a.)

Source: Sarmiento et al. (2010a)



Length of *Ciclovia* by city

Benefits of Bogotá's *ciclovia recreativa*

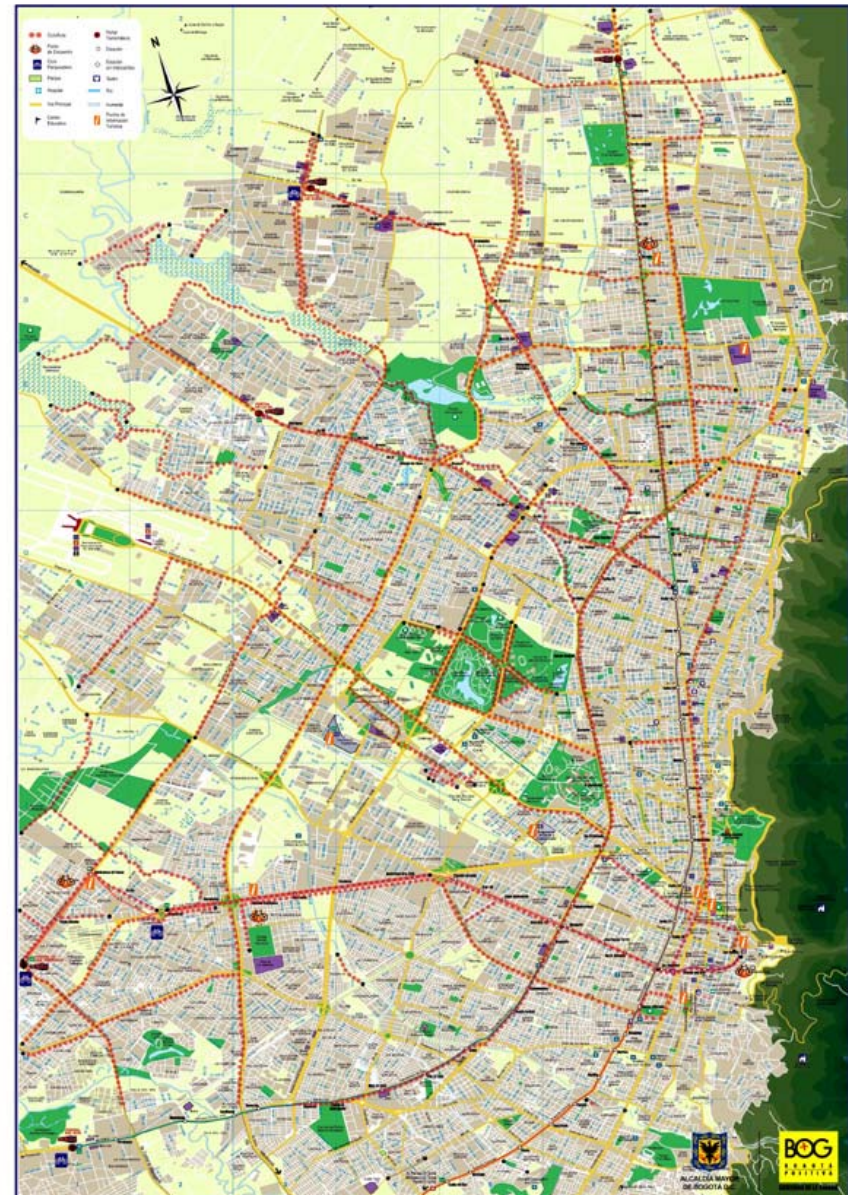
- *Ciclovia* associated with health-related quality of life indicators
- 41% of adults participate for over three hours per event
- Each **\$1** invested (publicly and individually) leads to net annual saving of **\$3.67-\$4.83** in direct health costs per person
- Jobs generated per event (2004):
 - Direct: 600 salaried + 1,900 volunteers
 - Indirect (e.g. street vendors, repairs): 2,033 (income: \$12 per vendor)
- Reduced pollutants

Sources: Sarmiento et al. (2010a&b); Montes et al. (2010); Wright & Montezuma (2004)

Ciclorutas: under-utilised?

- Permanent bicycle paths (334 km in 2010)
- Launched by city mayor in 1998
- Used daily by 285,000 people (<2% of trips)

Source: movilidadbogota.gov.co



What has changed in Bogotá?

- Improved physical environment
- Improved air quality
- And yet:
 - A majority of the adult population is still physically inactive
 - 12% of daily utilitarian trips made on foot (mostly by the poor)
 - Only 2% of daily trips made on bicycle

Healthy Cities Symposium

Urban Agriculture

CJ Lim







The global food system will experience an unprecedented confluence of pressures, as global population will increase to over nine billion by 2050. Two-thirds, or six billion will live in cities.

The implementation of urban agriculture - the cultivation, processing and distribution of food within the city could prove an important response to the anticipated food shortages, while providing a number of health, economic and social benefits.



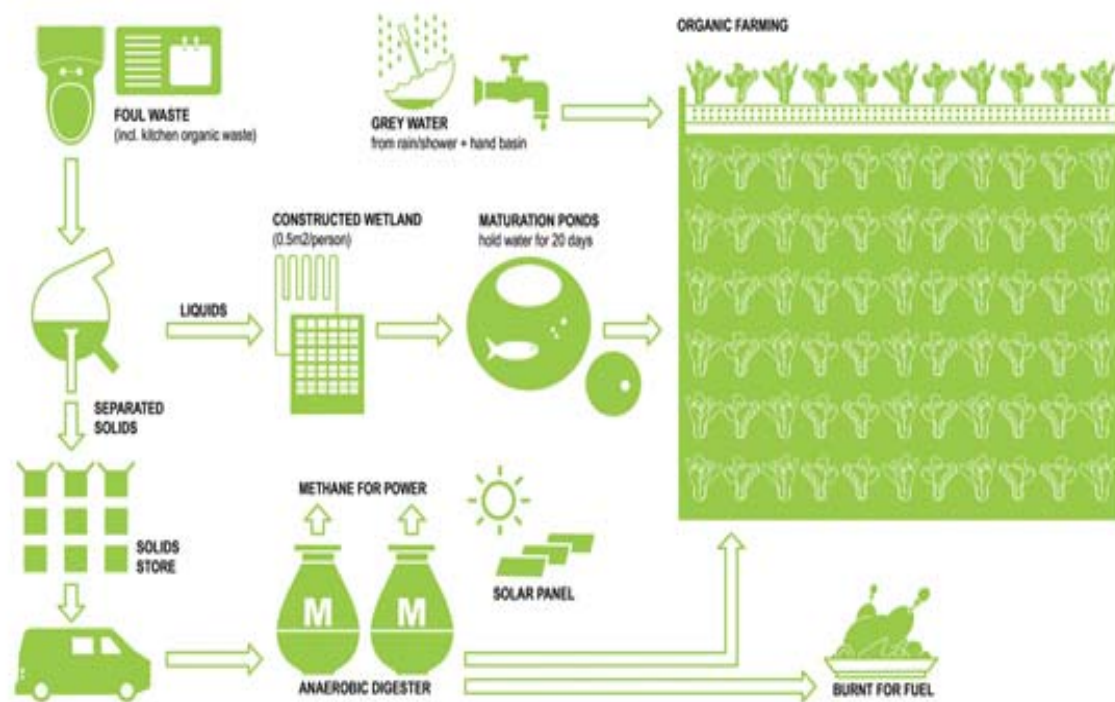
A 10x10 meter plot and a 130-day temperate growing season will sustain a family annually with fruit and vegetables and a nutritional intake of vitamins A, C, and B complex and iron.

The WHO Healthy Cities programme appeals to cities and their governments to incorporate food policies into their urban plan to establish healthy living, healthy design, and supportive and caring environments.



Victim to spiralling social and economic decline, Detroit's vast landscape of vacant land plots is being transform into a productive green patchwork of community allotments that yield health, nutrition, economic prosperity, new employment opportunities and new skilled industries.

OECD projected urban agriculture in Detroit in the future could generate \$200 million in sales and approximately five thousand jobs, with a \$1 investment returning approximately \$6 in fruit and vegetables.



Urban agriculture make possible a circular economy – the solid organic waste of the city can be chemically transformed via anaerobic digestion into gaseous energy and fertilizing digestate; grey and black-water from showers, sinks and gutters can be treated and re-channeled to irrigate crops provided they are in close enough proximity. With the added ingredient of sunlight, we have food from a living grocery store.



Skid Row, in Los Angeles, home to one of the largest homeless populations in the United States, installed a series of 30-foot long walls, each containing 4000 plants to provide food for the area's dispossessed. The programme has drawn together diverse disadvantaged members of the community of all ages and ethnicities as well as providing an opportunity to learn new skills.

In Ontario, community urban agriculture has helped reduce local crime by 56%.



The vertical farms championed by Professor Dickson Despommier, take the compact city argument for increasing plot ratio. One vertical farm with a footprint of one square city block rising thirty stories would provide enough nutrition (2000 calories / day / person) to accommodate the needs of 10 000 people employing technologies currently available.



Guangming Smartcity in China is arranged into clusters of housing and farming suburb-terraces at the scale of landscape. The stepped arrangement improves the solar angle for natural lighting within the apartment buildings; the terracing creates an arable land. Beneath the growing membrane, a gravel substrate is used to clean household water. The city consequently integrates the three functions of shelter, water purification, and food cultivation into the same space in addition to improving thermal insulation and surface water retention.



In Havana, the urban agricultural revolution was in response to severe food shortages after the collapse of the Soviet Bloc in 1989. Indefinite land-use rights of abandoned land granted to the population reconnected the city directly with the land and encouraged urban food production.

Today, Cuba proudly grows 90 percent of its fruits and vegetables, with 4 million tonnes of vegetables every year from urban allotments in Havana alone.



In Accra, it is common practice in the city for the urban poor and rural migrants to engage in open-space food cultivation without official access on undeveloped community land belonging to central and municipal governments including irrigation, railways and aviation authorities, parks and university campus.

For Ghanaian families, urban agriculture is a significant income-diversification strategy by supplying months of staple food for the family.



Urban agriculture is not a new phenomenon; victory gardens during the two World Wars successfully alleviate food shortages with rooftops, balconies, pontoons and public parks appropriated for food production.

In the United States, in a remarkably ambitious programme, gardening classes, literature, seeds, fertilizer and committees were organised, yielding over half a billion dollars worth of war-garden crops at the end of the First World War.

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Conclusions and recommendations

Yvonne Rydin

We know what a Healthy City looks like:

- Adequate water and sanitation infrastructure
- Housing of a safe standard, adequately heated so as to safeguard indoor air quality
- Good external air quality
- Provision for a decent standard of nutrition
- Effective public transport and provision for walking and cycling
- Green spaces

Many cities do not even meet the basics of this vision

How can this Healthy City be delivered?

- Political priorities are therefore important, but...
- Processes for delivering on priorities through planning also deserve attention
- Hence our recommendations are process-oriented
- They are also addressed to all cities, in all contexts

Every city can become a healthier place

Our Draft Recommendations

1. Understand the existing urban context and frame policy priorities accordingly
2. Identify 'low hanging fruit' in terms of maximum urban health benefits from an intervention in each city
3. Build dialogue between public health and urban planning/policy professionals
4. Identify the co-benefits for public health of urban planning and policy approaches; this improves the return on investment and builds political support

Our Draft Recommendations

5. Recognise the complexity of processes delivering urban health; acknowledge and monitor unintended consequences
6. Deliver data and tools to monitor urban health outcomes appropriate to the context
7. Enhance the capacity of local government; they are best placed to understand local complexities
8. Empower local communities to engage in the Healthy Cities agenda; to challenge local governments and to support their own health and well-being

Our Draft Recommendations

9. Fund inter-disciplinary research to develop the evidence base; involve public health and planning professionals in such research
10. Integrate Healthy Cities into education across disciplines and levels

The UCL-Lancet Commission members

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