The built environment and health: *Systems approaches in research and innovation*

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International Institute for Global Health
Transport systems and health

Urban planning:
- values,
- preferences,
- theories

Transport system (inherited/evolved/planned)

History

Transport Modes
- public/private
- convenience
- costs

Associated infrastructure

Energy needs

Air pollution

GHG emissions

Global climate change

Respiratory disease
Asthma
Cardiovascular disease
Fetal/infant brain development

Noise

Easy personal mobility

Road safety

Urban/suburban landscape; local ‘walkability’
impacts on neighbourhood/community

Physical activity patterns

Weight; Endorphins (wellbeing); Social contact

Social contact patterns; reliance on supermarkets (food choices); etc.

Influences on green space
(heat island effect; visual calming; biodiversity)

Global climate change

Stress (hypertension)
Sleep disturbance
Impaired child learning

Influences on green space
(heat island effect; visual calming; biodiversity)
<table>
<thead>
<tr>
<th>Framework for urban sustainability and population health</th>
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<tr>
<td><strong>Ecological footprint</strong></td>
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<td>Economy and work</td>
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Checklist for healthy and sustainable communities

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Abstract: This paper describes a 10-point checklist for the planning and development of healthy and sustainable communities. The 10 domains in the checklist are essentially physical characteristics of places. Each domain has relevance to the health of people living in the place, and to the sustainability of the environment. The checklist is intended as a tool for those who plan, develop and manage urban environments. Such tools can be valuable for assessing the health and environmental impacts of decisions made by urban and transport planners, and businesses engaged in land development and infrastructure projects.

The urban environment is an important determinant of health. Obesity is a good example of how environmental factors can affect health. Obesity results from an energy imbalance: a person eats more energy than they burn off. The environment can influence this imbalance in several ways.

Ten-point checklist for healthy and sustainable communities

1. Outdoor air quality
Air pollution in Sydney is known to exacerbate asthma. The main source of outdoor air pollutants in Australian urban environments is motor vehicle emissions. Improved motor vehicle emission controls have reduced emissions for each kilometre travelled; however, the total number of kilometres travelled is increasing. Until there is a reduction in the total number of kilometres travelled, air pollution will remain a health issue in Australian cities.

Urban planning and public health interventions to reduce dependence on motor vehicles and improve air quality include:

- locating jobs, services, schools and shops close to where people live;
- promoting active modes of transport (walking and cycling); and
- implementing land use and transport policies to provide choice in transport modes.
Boyden’s biosensitivity triangle

Human activities

Health of people

Health of the planet
### Universal health needs of the human species

<table>
<thead>
<tr>
<th>Bio-physical</th>
<th>Psycho-social</th>
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<tbody>
<tr>
<td>Clean air</td>
<td>An emotional support network</td>
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<td>Clean water</td>
<td>The experience of conviviality</td>
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<td>A natural diet</td>
<td>Opportunities for co-operation</td>
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<tr>
<td>Absence of harmful levels of radiation</td>
<td>A natural level of sensory stimulation</td>
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<tr>
<td>Minimal contact with pathogens</td>
<td>An interesting environment</td>
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<td>Protection from extremes of climate</td>
<td>An aesthetically pleasing environment</td>
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<tr>
<td>A natural amount of physical activity</td>
<td>Opportunities for creative behaviour</td>
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<td>Sleep</td>
<td>Opportunities for learning</td>
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<td>Opportunities for recreation</td>
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<td>Opportunities for spontaneity</td>
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<td>Variety in daily experience</td>
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<td>Absence of alienation and deprivation</td>
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<td>A sense of belonging, purpose and love</td>
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Systems thinking

• Dynamic interactions
• Feedback
• Policy resistance
• Leverage points
• Unintended consequences
Collaborative conceptual modelling

(Newell and Proust)
Examples of ‘system’ problems

*Unintended consequences*

200 years ago, health problems in industrialising cities in England led to the ‘garden cities’ movement. In the 21st century, we face new health problems from urban sprawl.

*Feedback*

Climate change is increasing the intensity of heat waves which is leading to increased demand for air conditioning, thereby increasing energy use and greenhouse gas emissions from climate control in homes and workplaces.
Relationships between urban transport, land use and health and wellbeing

Transport policy

Land use policy

Promotion Incentives Subsidies

Infrastructure

Distances

Attitudes Values Preferences

Mix of fuels

Travel

Emissions

Travel-related injury

Physical activity

Climate change

Health and wellbeing
International Council for Science (ICSU)

Health and Wellbeing in the Changing Urban Environment using Systems Approaches


International programme office
Xiamen, China
Commission on Planetary Health
Commission on Planetary Health

- Chaired by Prof Sir Andy Haines, LSHTM
- Ecological determinants of health
- Addresses the Post-2015 Development Agenda
- Report *Safeguarding human health in the Anthropocene epoch* was released last month