Health and Wellbeing in the Urban Environment: A Systems Analysis Approach

an ICSU interdisciplinary science program

report by Suzanne Bennett Johnson for the ICSU Planning Group
ISCU’s Strategic Plan

- Human health was identified as a new research priority in ICSU’s Strategic Plan 2006-2011
- A Scoping Group was established in 2006 to more clearly define how ICSU might contribute to the science of human health
- The Scoping Group selected the following topic for further development: A systems analysis approach to health and wellbeing in the changing urban environment
- A new Planning Group was established in 2008 to develop the science plan
Why urban health? percent of population living in urban environments

Figure 1 Trends and projections in urban population as a percentage of total population by world region

Urbanization presents both opportunities and risks:

- Urbanization can improve health by providing sanitation, clean water, access to health care, education, employment to large numbers of people.
- While reducing deaths from infectious disease, urbanization is associated with increasing numbers of people suffering from chronic disease.
- When urban areas are overwhelmed by rapid population growth, slums develop which are associated with high mortality rates from infectious disease – essentially eliminating the health advantage normally seen in urban environments.

Fig. 3. Mortality rates of children under 5 years are lower in countries that are more urbanized, but mainly through differences between rather than within regions. Data are for 2005 (15, 16).

Worldwide, Urbanization is Associated with an Increased Prevalence of Overweight

If Urbanization is Too Rapid, Cities Can Become Overwhelmed: Slum and Non-Slum Urban Dwellers by Region (2001)

UNHABITAT, 2003
Percent of Urban Dwellers Living in Slums by Region (2001)

UNHABITAT, 2003
Urban Slum Dwelling is Associated with High Mortality Rates from Communicable Disease

Table 2: Top ten causes of premature mortality among children under the age of five years ranked by percentage contribution to the total YLL in the Nairobi DSS 2003–2005

<table>
<thead>
<tr>
<th>Causes</th>
<th>YLL</th>
<th>% YLL</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumonia</td>
<td>3463</td>
<td>22.8</td>
<td>1</td>
</tr>
<tr>
<td>Diarrhoeal Diseases</td>
<td>2969</td>
<td>19.5</td>
<td>2</td>
</tr>
<tr>
<td>Stillbirths</td>
<td>2480</td>
<td>16.3</td>
<td>3</td>
</tr>
<tr>
<td>Malnutrition and Anaemia</td>
<td>1275</td>
<td>8.4</td>
<td>4</td>
</tr>
<tr>
<td>Birth Injury and/or Asphyxia</td>
<td>661</td>
<td>4.3</td>
<td>5</td>
</tr>
<tr>
<td>AIDS and TB</td>
<td>609</td>
<td>4.0</td>
<td>6</td>
</tr>
<tr>
<td>Malaria</td>
<td>537</td>
<td>3.5</td>
<td>7</td>
</tr>
<tr>
<td>Prematurity and or Low Birth Weight</td>
<td>529</td>
<td>3.5</td>
<td>8</td>
</tr>
<tr>
<td>Acute Febrile Illness</td>
<td>434</td>
<td>2.9</td>
<td>9</td>
</tr>
<tr>
<td>Measles</td>
<td>304</td>
<td>2.0</td>
<td>10</td>
</tr>
</tbody>
</table>

Causes of Death Among Nairobi Slum Dwellers 5 Years or Older

Table 3: Top ten causes of premature mortality among the population aged five years and above ranked by percentage contribution to total YLL in the Nairobi DSS, 2003 – 2005

<table>
<thead>
<tr>
<th>Causes</th>
<th>YLL</th>
<th>% YLL</th>
<th>YLL Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIDS and Tuberculosis</td>
<td>11252</td>
<td>49.9</td>
<td>1</td>
</tr>
<tr>
<td>Interpersonal Violence Injuries</td>
<td>2719</td>
<td>12.1</td>
<td>2</td>
</tr>
<tr>
<td>Road Traffic Accidents</td>
<td>1302</td>
<td>5.8</td>
<td>3</td>
</tr>
<tr>
<td>Meningitis</td>
<td>781</td>
<td>3.5</td>
<td>4</td>
</tr>
<tr>
<td>Direct Maternal Causes</td>
<td>755</td>
<td>3.3</td>
<td>5</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>524</td>
<td>2.3</td>
<td>6</td>
</tr>
<tr>
<td>Malaria</td>
<td>418</td>
<td>1.9</td>
<td>7</td>
</tr>
<tr>
<td>Cancer of the Gastrointestinal Tract</td>
<td>374</td>
<td>1.7</td>
<td>8</td>
</tr>
<tr>
<td>Renal Disorders</td>
<td>362</td>
<td>1.6</td>
<td>9</td>
</tr>
<tr>
<td>Malnutrition and Anaemia</td>
<td>305</td>
<td>1.4</td>
<td>10</td>
</tr>
</tbody>
</table>

Kyobutungi et al. The burden of disease profile of residents of Nairobi’s slums
Population Health Metrics, 2008
ICSU’s Health and Wellbeing Science Plan: Why Systems Analysis?

- Permits mathematical modeling of a complex system
- Maps processes and relationships and their effect on measurable end points
- Can integrate existing (and new) data and information, leading to new insights as well as the identification of gaps in current knowledge
- Enables analysis & allows predictions when data are sparse
- Enables predictions that can be tested and refined experimentally
Science Program Criteria

- Inter-disciplinary approach,
- Collaborative with key stakeholders
- Systems analysis methodology
- Multiple determinants of health and wellbeing
- Needed data are obtainable
- Projects should actively involve decision or policy-makers

**Products/outcomes:**
- Useful narratives for decision or policy-makers
- Sustainable partnerships between scientists and stakeholders
- New shared data bases.
Science Program Vision

To generate policy-relevant knowledge that will improve health, reduce health inequalities, and enhance the wellbeing of urban populations
Science Program Objectives

- Promoting and coordinating research projects
- Developing methodologies and identifying data needs
- Building and strengthening capacity
- Communicating new knowledge: promotion and outreach
Science Program’s Research Objectives

- To generate high-impact scholarly outputs
- To enable better-informed decision-making, re urban health and wellbeing
- To establish this approach as a thriving and relevant area of interdisciplinary research
Science Program’s Methodology and Data Objectives

- To develop innovative systems analysis methodologies and approaches
- To identify data needs and inform observation and monitoring initiatives
- To reveal and/or generate new data that will be made fully and openly available
Science Program’s Capacity Enhancement Objectives

- Build capacity and interdisciplinary platforms for urban health research using systems analysis
- Enhance capacity of policy-makers and practitioners, re-use of systems analysis information
- Expand the number of young scientists in this area
Science Program’s Communication Objectives

- Create a virtual forum as a point of reference for scientists and other stakeholders
- Promote trans-disciplinary exchange and collaboration via conferences and workshops
- Make results available to multiple stakeholders in relevant formats
Science Program’s Current Status

- Approved by ICSU’s Committee on Scientific Planning and Review
- Approved by the ICSU Executive Board
- ICSU General Assembly will be asked to approved in late September
- Report is being prepared for publication
  - if you would like a draft pdf, email me at suzanne.johnson@med.fsu.edu
- ICSU seeks nominees for scientific committee to oversee program’s implementation