



賽馬會長者計劃新里程  
*A Jockey Club Initiative for Seniors*

# Age-friendly Cities with Cooperation & Participation - The Asian Pacific Perspective Regional Conference

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# A Neighbourhood Environment Index for Hong Kong

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# Recall

- ❖ A paper on “Neighbourhood and health outcomes” was presented at *CADENZA Symposium 2010: Age-Friendly World Cities and Environment* on 8 October 2010
- ❖ It was shown that based on a neighbourhood environment index for Hong Kong, better neighbourhood environment was associated with better health outcomes
- ❖ Details of the neighbourhood environment index will be presented here

# Background

- ❖ The characteristics of neighbourhood play an important role in influencing health and social outcomes (Ellen *et al.*, 2001)
- ❖ A composite score summarising different neighbourhood environment features has been proposed to study their associations with health outcomes



# Example 1

- ❖ The scores of six domains of perceived neighbourhood (namely local amenities, local problems, area reputation, neighbourliness, fear of crime and satisfaction with area) were summed to obtain an overall assessment score
- ❖ Such score was shown to be associated with self-rated health, anxiety and depression

(Sooman and Macintyre, 1995)

# Example 2

- ◆ The scores of 13 types of socio-environmental problems (such as smells and fumes, litter and rubbish, burglaries, lack of safe places for children to play and lack of recreational facilities) were aggregated to construct an overall score of respondents' perceptions of local problems in their neighbourhood
- ◆ Such score was shown to be associated with self-rated health, mental health and recent symptoms

(Ellaway *et al.*, 2001)

# Example 3

- ❖ The scores of five neighbourhood characteristics (namely houses condition, noise, air quality, street condition, and yards and sidewalks condition) were summed to obtain a summary score of worsening neighbourhood conditions
- ❖ Such score was shown to be associated with increased incident of functional limitations

(Schootman *et al.*, 2006)

# The Hong Kong Situation

- Some studies examined the geographical variations in health outcomes (e.g. self-rated health, quality of life, frailty, morbidity and mortality) at district level  
(Wong *et al.*, 2009; Wong *et al.*, 2010; Yu and Wong, 2004; Lloyd *et al.*, 1996; Woo *et al.*, 2010)
- Some of these attempted to explain geographical variations of health outcomes in terms of the socio-economic characteristics of the neighbourhood, but few examined the neighbourhood environment characteristics which vary within district
- Those researchers who quantified neighbourhood environment, had slightly different study objectives  
(Philips *et al.*, 2004 & 2005)



# Objectives

- ◆ Develop a neighbourhood environment index to quantify the environmental characteristics of neighbourhoods in Hong Kong
- ◆ Examine the relationship between this index and health and social outcomes



# Methods

❖ Making reference to overseas and local studies on neighbourhood and health, we designed questions related to neighbourhood environment in six domains:

- 1) General impression
- 2) Accessibility
- 3) Safety
- 4) Pollution-free
- 5) Amenities and recreation facilities
- 6) Medical and social facilities

(Sooman and Macintyre, 1995; Phillips, 1999; Phillips *et al.*, 2004; Bowling and Stafford, 2007; Weden *et al.*, 2008)

❖ Responses were collected on a five-point Likert scale

# General Impression

- ◆ Whether the neighbourhood is a good place for respondents to live  
(“very bad”=1, “bad”=2, “fair”=3, “good”=4, “very good”=5)
- ◆ This score  
= the score of the general impression domain

# Accessibility

- Walking around the respondents' current accommodation  
("very difficult"=1, "difficult"=2, "average"=3, "not difficult"=4, "not difficult at all"=5)
- Accessibility of public transport  
("very difficult"=1, "difficult"=2, "average"=3, "easy"=4, "very easy"=5)
- The average of the two scores  
= the score of the accessibility domain



# Safety

- Walking around the respondents' current accommodation on their own at night  
(“extremely unsafe”=1, “unsafe”=2, “average”=3, “safe”=4, “extremely safe”=5)
- Coming across people engaged in illegal activities around the respondents' current accommodation  
(“all the time”=1, “most of the time”=2, “sometimes”=3, “occasionally”=4, “never”=5)
- The average of the two scores  
= the score of the safety domain

# Pollution-free

- Occurrence of pollution around the respondents' current accommodation
  - Noise pollution
  - Air pollution
  - Accumulated garbage

(“all the time”=1, “most of the time”=2, “sometimes”=3, “a little of the time”=4, “never”=5)
- The average of the three scores  
= the score of the pollution-free domain

# Amenities and Recreation Facilities

## ◆ Accessibility to various amenities and recreation facilities

- ◆ Wet market
- ◆ Supermarket
- ◆ Shopping mall
- ◆ Cantonese restaurants
- ◆ Restaurants other than Cantonese restaurants
- ◆ Bank
- ◆ Post office
- ◆ Public library
- ◆ Public swimming pool or beach
- ◆ Indoor sports centre
- ◆ Outdoor sports ground
- ◆ Recreation and open space

(“very difficult”=1, “difficult”=2, “average”=3, “easy”=4, “very easy”=5)

## ◆ The average of the twelve scores = the score of the amenities and recreation facilities domain

# Medical and Social Facilities

## ◆ Accessibility to various medical and social facilities

- ◆ Public hospital
- ◆ Accident and emergency departments
- ◆ Day hospital
- ◆ Private hospital
- ◆ Private clinic
- ◆ Community centre
- ◆ Elderly centre

(“very difficult”=1, “difficult”=2, “average”=3, “easy”=4, “very easy”=5)

## ◆ The average of the seven scores = the score of the medical and social facilities domain



# Neighbourhood Environment Index

- ◆ The self-perceived neighbourhood environment index  
= sum of the scores of the six domains
- ◆ Range: 6 to 30
- ◆ Higher score → Better neighbourhood environment

# Psychometric Property

- ◆ 77 subjects were interviewed twice to establish inter-rater reliability and test-retest reliability
  - ◆ Inter-rater reliability = 0.8
  - ◆ Test-retest reliability = 0.8

# Application

- ❖ To illustrate the use of the index, a telephone survey with random sampling was conducted in two districts in Hong Kong
- ❖ Sham Shui Po and Sai Kung, which have contrasting neighbourhood characteristics, were selected
- ❖ 814 subjects aged 25 and above, living in the current accommodation for one year or more were successfully interviewed
- ❖ Neighbourhood environment index had high internal consistency (Cronbach's Alpha = 0.9)



# Table 1 Neighbourhood Environment Index by District of Residence

	Sham Shui Po Mean (s.d)	Sai Kung Mean (s.d.)
General impression*** (range:1-5)	3.5 (0.9)	3.9 (0.7)
Accessibility** (range:1-5)	4.2 (0.6)	4.1 (0.6)
Safety*** (range:1-5)	4.2 (0.7)	4.4 (0.5)
Pollution-free*** (range:1-5)	3.6 (1.0)	4.0 (0.8)
Amenities & recreation facilities* (range:1-5)	3.6 (0.7)	3.5 (0.7)
Medical & social facilities** (range:1-5)	3.3 (0.7)	3.1 (0.7)
<b>Overall*** (range:6-30)</b>	<b>22.4 (2.9)</b>	<b>23.0 (2.4)</b>

\* p-value of independent samples t-test < 0.05

\*\* p-value of independent samples t-test < 0.01

\*\*\* p-value of independent samples t-test < 0.001



# Table 2 Correlations of the Neighbourhood Environment Index and the Health Outcomes

	Neighbourhood Environment Index
Physical components of SF-12 (PCS) ***	0.18
Mental components of SF-12 (MCS)***	0.15
Medical Outcomes Study-Social Support Survey (MOS-SSS)***	0.23

\*\*\* p-value of independent samples t-test < 0.001

# Neighbourhood Environment

- After controlling for the socio-demographic characteristics\* of individuals, an unit increase in Neighbourhood Environment Index was associated with
  - An increase of 0.37 in PCS score (p-value<0.001)
  - An increase of 0.32 in MCS score (p-value<0.001)
  - An increase of 1.22 in MOS-SSS score (p-value<0.001)

\*Socio-demographic characteristics include age, sex, education, ownership of accommodation & household income

# Future Direction

- ◆ To modify the index to include more features such as social cohesion
  - ◆ But the current index may have to be trimmed so as to minimize respondent burden
- ◆ To take into account unequal weightings of the domains in constructing the index

# Conclusions

- ❖ The neighbourhood environment index developed in this study helps to quantify environmental characteristics of a neighbourhood and examine the inter-relationship between neighbourhood and health and social outcomes
- ❖ Based on the sub-scores, policy makers can identify the worst features in the neighbourhood that may be amenable to improvements



# For More Details

◆ Please visit our website

[www.cadenza.hk](http://www.cadenza.hk)



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# Q & A

