Geo-spatial differences: the role of social and environmental variables

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Social determinant of health factors

- Socioeconomic status
- Transportation
- Housing
- Access to health care services
- Social grouping (e.g., ethnic, race, gender)
- Social or environmental stressors
Geospatial analysis & social determinant maps

**Socioenvironmental**
- Poverty
- Urban-rural
- Unemployment

**Sociodemographic**
- Children-Elderly
- Race and ethnic group

**Health Care Accessibility**
- Physical accessibility
- Financial accessibility
- Doctors/health professionals availability
Example of geospatial application in health sector

• Health mapping
  – Service availability mapping
  – Disease mapping

• Geographical correlation analysis

• Cluster analysis
Disparity in life expectancy at birth

Source: MOH & BPS
Disparity in Infant Mortality Rate (2007)
Doctors variation by province (per 100,000 population)

- National average: 15.5 doctors per 100,000 population.
- Provincial variation: 7.0 (Maluku) - 70.8 (DKI Jakarta).

2010 National Target

• Below National Average
• Above National Average

(Source: MOH Inventory, 2001)
Doctors distribution at Yogyakarta

2010 National Target

• National average: 15.5 doctors per 100,000 population.
• Provincial variation: 7.0 (Maluku) - 7.8 (DI Yogyakarta)

Data Source: Podes (2005)
~ 56% cases living 200 meters from the river

Chrysantina et al. (2004)
Chrysantina et al. (2004)
Delayed treatment of tuberculosis patients in rural areas of Yogyakarta province, Indonesia

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From data to policy

• Intersectoral collaboration
• Active case finding

Kedaulatan Rakyat, 16 April 2008
TB in Denpasar

- 67.33% cases located <500m from the road; while 32.66% > 500m

- Urban population living in poverty

- Kristina (2008)
Oktaviani (2013)
• 242 (98%) domestic water wells have nitrate concentration exceed the normal value

• Basuki (2011)
Challenges in providing healthcare
22 primary health centers at Wonosobo district
Construction expensiveness index
Koschinsky (2013): The case for spatial analysis in evaluation to reduce health inequities

Fig. 1. Spatial articles in health and evaluation journals, 1995–2009.
Data input for geospatial analysis

• Spatial data
  – Information about the locations and shapes of geographic features and the relationships between them, usually stored as coordinates and topology

• Attribute data
  – Data describing the geographic characteristics of features (e.g. population information, incidence, prevalence)
Freeware and open source tools

• HealthMapper
• Geoda
• SatScan
• Google Earth/Map
• OpenJump
What are the benefits of using geospatial application?
Thank you

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