

# SPATIAL EPIDEMIOLOGY OF MORTALITY DISPARITIES: A CROSS-SECTIONAL ANALYSIS OF LIFE EXPECTANCY DETERMINANTS ACROSS HONG KONG ADMINISTRATIVE DISTRICTS

## OBJECTIVES

1. Quantify and map life expectancy disparities across Hong Kong's 18 districts
2. Analyze the association between life expectancy disparities and key social determinants (age, sex, poverty rates, ethnic composition, and languages spoken)
3. Identify patterns in mortality causes that differ between socioeconomically advantaged and disadvantaged districts
4. Generate evidence to inform targeted public health interventions and policy decisions aligned with SDG health equity goals

## METHODOLOGY

This cross-sectional study examined health outcomes across Hong Kong's 18 districts in 2021 using quantitative descriptive analysis.

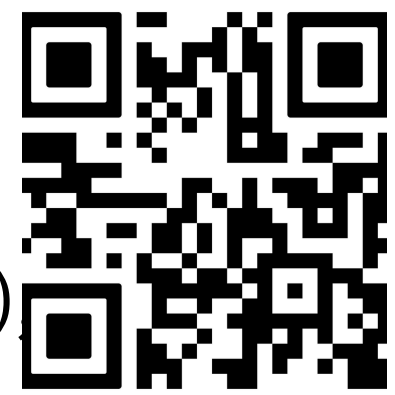
### Analytical Approach:

- Descriptive statistics for demographic and socioeconomic profiles
- Age-Standardized Mortality Rates using WHO standard population
- Herfindahl-Hirschman Index to quantify ethnic diversity
- Geospatial analysis using QGIS for visualization of health disparities

## PATTERNS OF SOCIAL DETERMINANTS OF HEALTH

### Age Dependency Patterns

- Highest dependency ratios: Eastern (48.50), Kwun Tong (47.07), Kowloon City (46.15)
- Lowest dependency ratios: Yuen Long (35.52), Sai Kung (37.15), Islands (37.59)

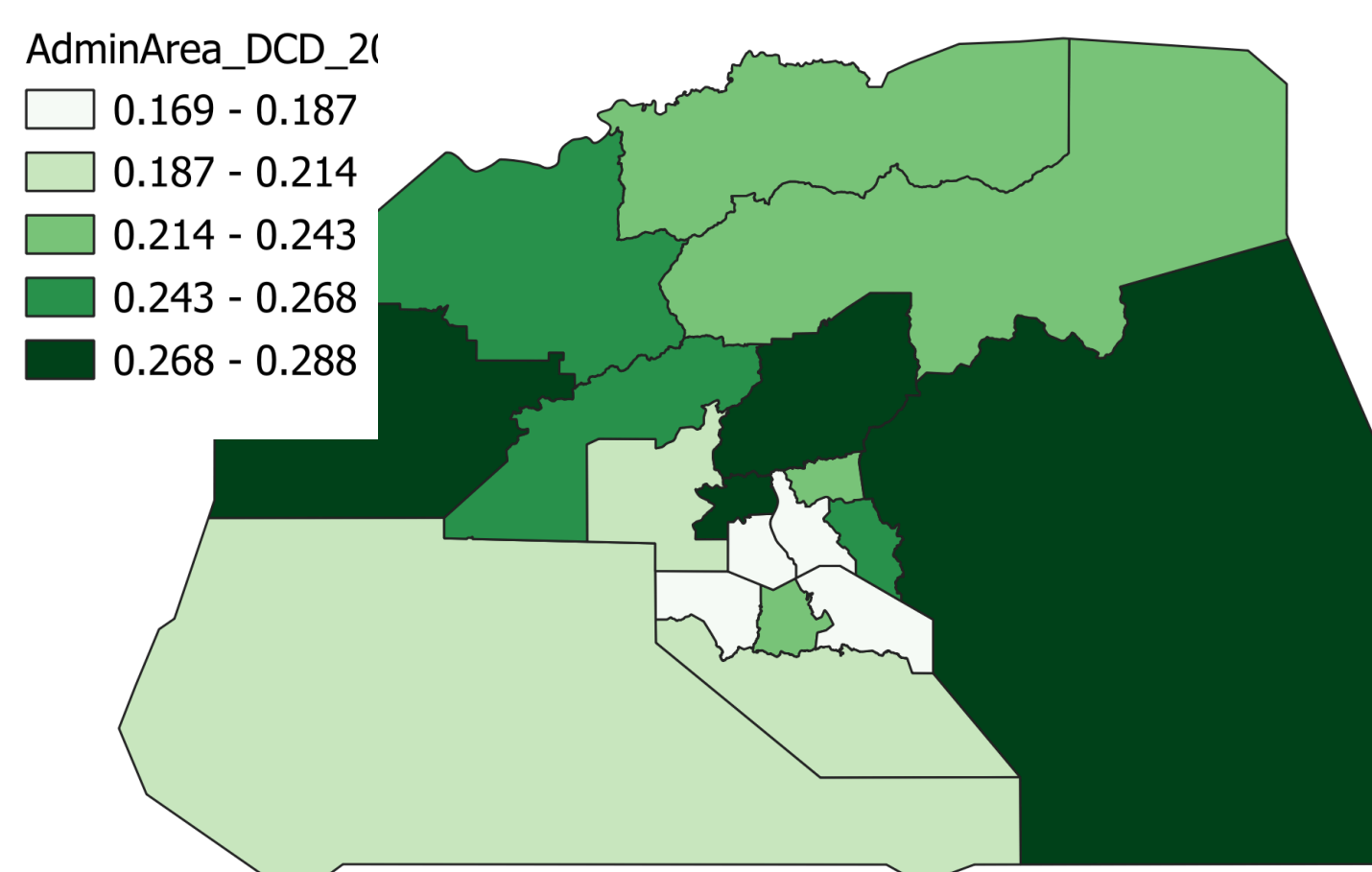
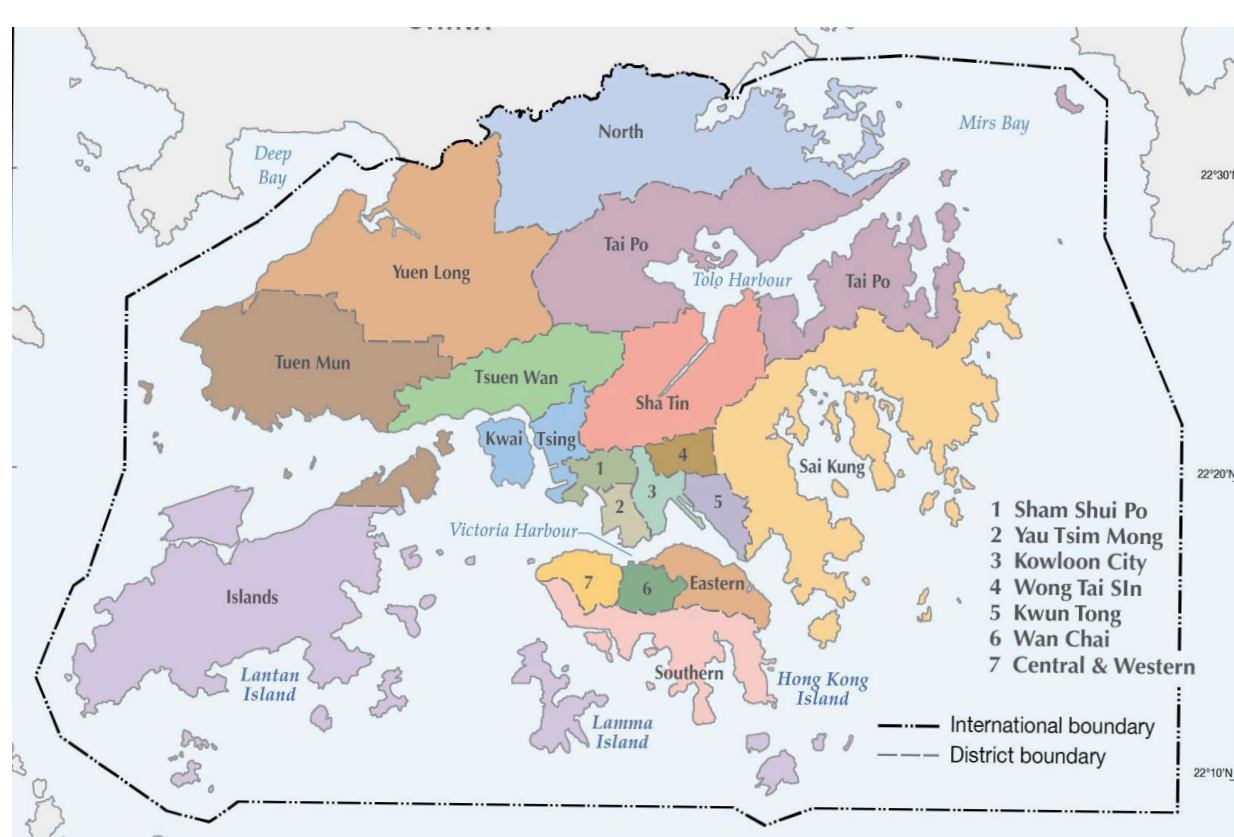


Scan here for district level population pyramid

### Sex Ratio Patterns

- Hong Kong Island: Central and Western (0.72) and Wan Chai (0.67) show extreme female predominance
- Kowloon districts: Moderate imbalances, sex ratios ranging from 0.78-0.87
- New Territories: Relatively balanced sex ratios (0.84-0.90)
- Tuen Mun has most balanced ratio (0.90)

Figure 1. Hong Kong Administrative Districts      Figure 3. Poverty Rates by District



### Poverty Rate Distribution

- Hong Kong's overall poverty rate: 23.6%
- Districts with poverty rates below average:**
  - Lowest rates on Hong Kong Island: Central and Western (16.9%), Wan Chai (17.0%)
  - Other low-poverty districts: Sai Kung (17.6%), Southern (18.2%), Eastern (19.4%)
  - Moderate rates: Yau Tsim Mong (20.8%), Tsuen Wan (21.2%), Kowloon City (21.5%)
- Districts with poverty rates above average:**
  - Highest rates in Kowloon: Kwun Tong (28.8%), Wong Tai Sin (27.1%)
  - Other high-poverty districts: Kwai Tsing (27.5%), North (27.0%), Sham Shui Po (26.5%)
  - Moderately high rates: Islands (25.7%), Yuen Long (25.6%)

## DISCUSSION

Our findings reveal how environmental conditions modify socioeconomic health gradients across Hong Kong's districts, particularly affecting ethnic minority communities in dense urban areas. The healthy immigrant effect appears vulnerable to environmental degradation and inadequate infrastructure, explaining poor outcomes in Yau Tsim Mong despite its demographic advantages. Conversely, Sham Shui Po's unexpected health resilience suggests community networks may buffer against socioeconomic disadvantages. These patterns underscore the importance of place-based interventions addressing environmental justice in diverse neighborhoods, while future research should examine immigrant health trajectories and community protective mechanisms longitudinally.

## INTRODUCTION

This study examines health inequalities across Hong Kong's 18 districts, addressing a research gap on spatial health disparities in high-density, high-income Asian metropolises. Despite Hong Kong's impressive life expectancy (82.8 years for males, 88.4 for females in 2024), significant socioeconomic inequalities persist, with a Gini coefficient of 0.397 and 20.2% of the population living in poverty (Census and Statistics Department, 2023a; The Centre for Health Protection, 2025; OXFAM Hong Kong, 2024). Building on established evidence that health outcomes follow socioeconomic gradients (Braveman, 2006; World Health Organization, 2025), **this research analyzes how life expectancy variations correlate with social determinants to inform targeted interventions aligned with SDG health equity goals** (Hosseinpoor et al., 2018).

## LIFE EXPECTANCY DISPARITIES AND MORTALITY RATES

### Life Expectancy at Birth (LEB)

#### Male LEB: Ranges from 79.63 to 82.30 years (2.67-year gap)

- Highest: Wan Chai (82.30), Sham Shui Po (82.27), Central and Western (82.09)
- Lowest: Yau Tsim Mong (79.63), Kwai Tsing (80.97), North (81.06)

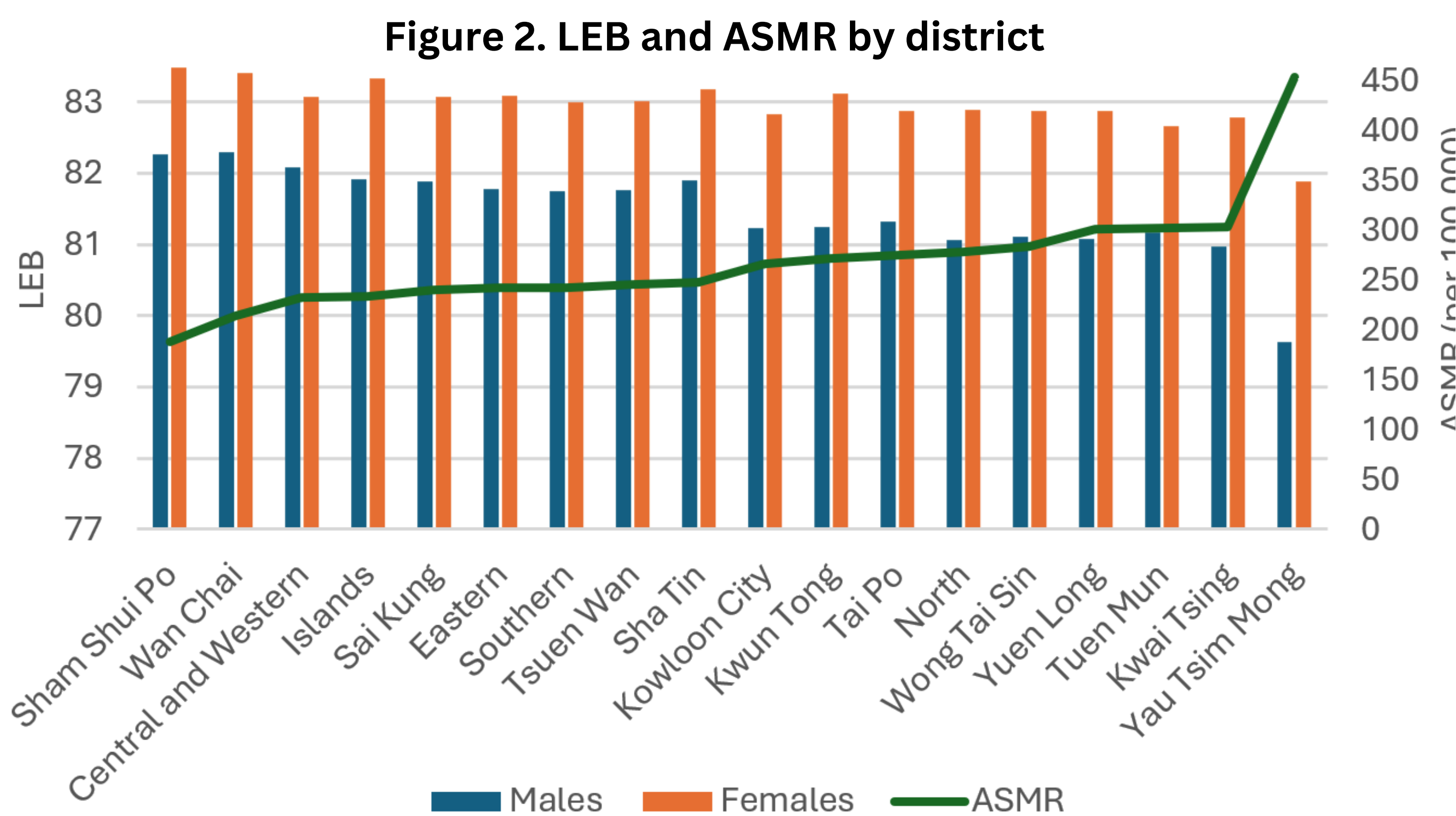
#### Female LEB: Ranges from 81.89 to 83.49 years (1.6-year gap)

- Highest: Sham Shui Po (83.49), Wan Chai (83.41), Islands (83.3)
- Lowest: Yau Tsim Mong (81.9), Kwai Tsing (82.6)

### Age-Standardized Mortality Rates (ASMR)

- Lowest: Sham Shui Po (188.18 per 100,000), Wan Chai (213.86), Central and Western (233.04)
- Highest: Yau Tsim Mong (453.12 per 100,000) - more than double the lowest rate
- Other high rates: Kwai Tsing (302.67), Tuen Mun (302.41)

### Consistent inverse relationship between ASMR and LEB across districts



## THE HEALTHY IMMIGRANT EFFECT

Immigrants initially demonstrate better health than native populations due to selection factors, but this advantage typically diminishes over time.

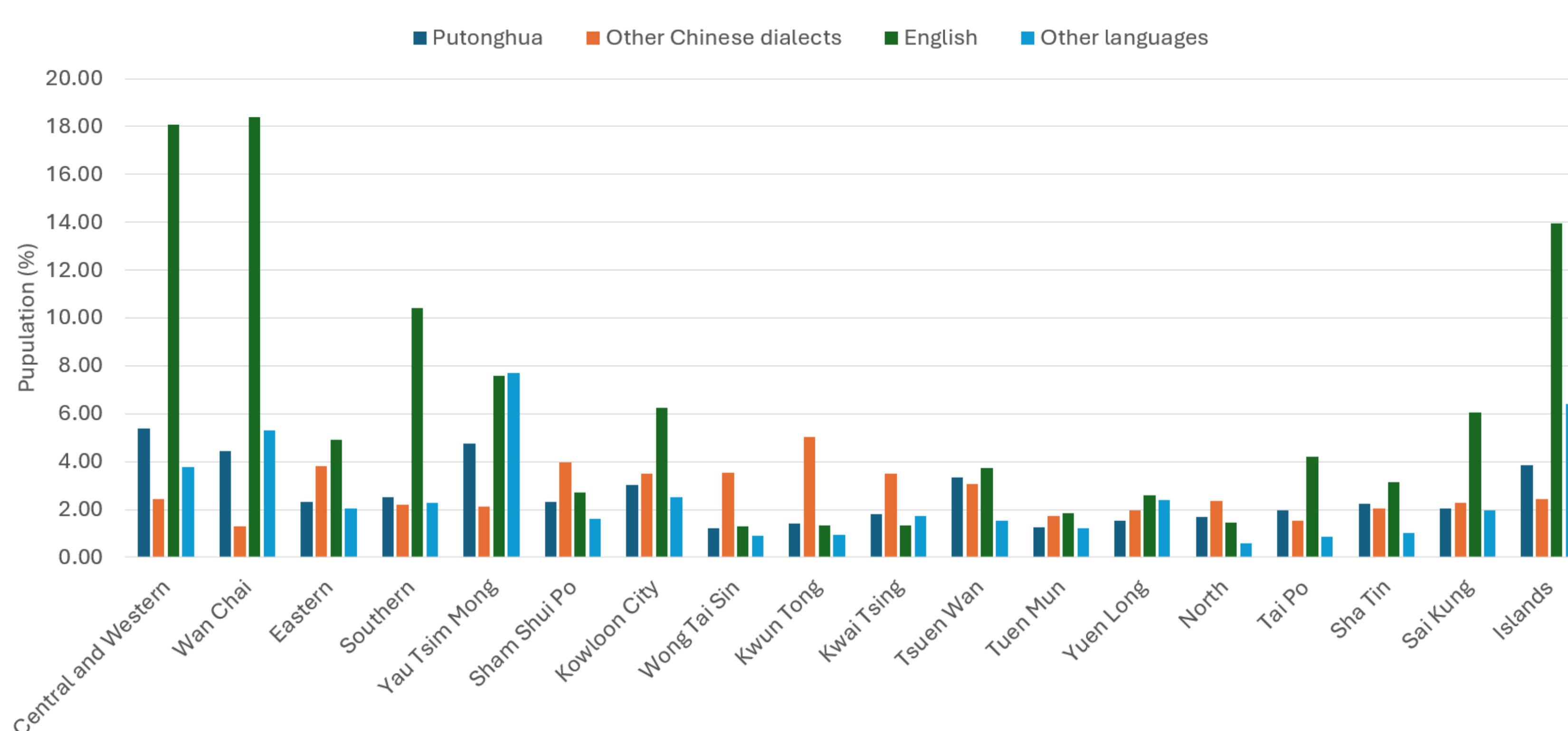
### Affluent Diverse Districts (Central & Western, Wan Chai)

- Maintain excellent health despite high ethnic diversity and low Cantonese use
- Strong infrastructure and socioeconomic resources protect health
- Western expatriates and Filipino communities benefit from quality housing and healthcare access

### Stressed Diversity (Yau Tsim Mong)

- High ethnic diversity correlates with poorest health outcomes citywide
- Nepalese, Indian, and Indonesian communities face environmental challenges
- Urban design creates concentrated pollution exposure
- Older building stock with poor ventilation accelerates health deterioration

Figure 4. Usual Languages Spoken



**Hong Kong's ethnic, socioeconomic, and demographic patterns interact in complex ways to shape health disparities, demonstrating that achieving health equity requires addressing multiple social determinants through community-centered approaches.**

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