# The Social Distribution of Quality Adjusted Life Expectancy (QALE) among Social Deprivation Subgroups in China

HPR97

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## Background

- ✓ Monitoring socioeconomic health disparities requires granular metrics like Quality-Adjusted Life Expectancy (QALE), which integrates mortality and morbidity data.

## Objective

- ✓ This study aims to estimate QALE differences among various social deprivation subgroups in China.

## Methods

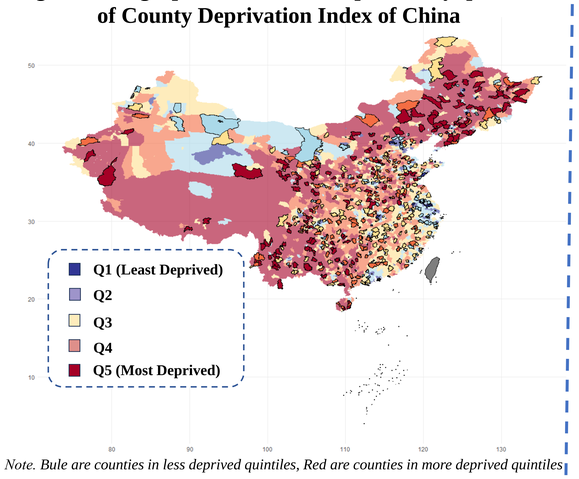
- **Lifetable**
  - ✓ The 2021 Chinese Death Surveillance System (CDSS) was integrated with County-level Social Deprivation Index (CSDI 2020) to develop lifetables for five deprivation quintiles.[1]
  - ✓ The under-5 mortality gaps were imputed by referring to the China Maternal and Child Health Surveillance[2], while elderly mortality (≥60 years) was adjusted via Coale-Demeny West model.[3] lifetables.
- **Utility norm**
  - ✓ Health utilities (EQ-5D scores) obtained from the Psychology and Behavior Investigation of Chinese Residents 2021 (PBICR 2021) were modeled through OLS regression.[4]
  - ✓ The model incorporated variables such as age, sex, and CSDI indicators including income, employment sector, education levels, tap water access, and urban/rural residence.
  - ✓ Interaction terms were added to quantify the interaction effects.
- **QALE distribution**
  - ✓ The Lifetables of the deprivation subgroups were assembled by Chiang's method using the adjusted mortality data.[5]
  - ✓ The QALE was computed using the Sullivan method.[6]

## Results

- **531 Death Surveillance counties** (highlighted in **Figure 1**) were matched with **Social deprivation quintiles in CSDI 2020.**
- After Mortality adjustment, the average LE of the lifetables were decreased from 79.63 years **(Figure 2 left)** to 78.40 years **(Figure 2 right)**, which is more similar to the Chinese LE at 2021 (78.2 years).

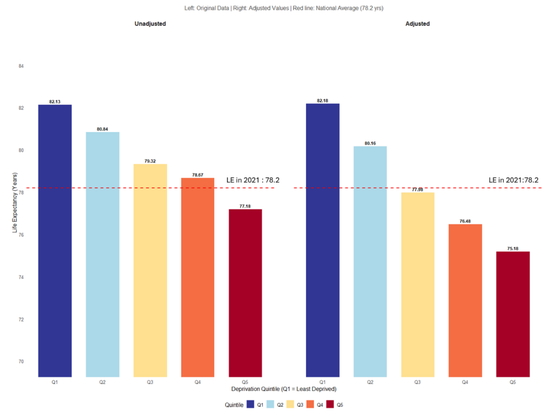
## Results

**Figure 1 Geographical distribution pattern by quintiles of County Deprivation Index of China**




*Note. Bule are counties in less deprived quintiles, Red are counties in more deprived quintiles*

**Figure 2 Impact of mortality adjustment on estimation of disparities in life expectancy at birth.**




- The life expectancy at birth ranged from **82.12** years in **the least deprived quintile** to **75.12** years in **the most deprived quintile**, with a gap of **7.00** years. **(Figure 2)**
- Health utility were lower for individuals with **higher deprivation indicators** (e.g. lower income or education level).
  - ✓ An 1% increase in income was associated with a 0.004 gain in utility (β=0.004, p<0.1).
  - ✓ Individuals with a high school degree had a disutility of 0.011 compared to those with a university degree (Highschool: β=−0.011, p<0.05).
  - ✓ Tap water access independently predicted 0.031 higher utility (p<0.001)
- The interactions between age and deprivation revealed **compounding disparities**.
  - ✓ males exhibited protective interaction effects at 60-70 years compared to female (β=0.051, p<0.001).
  - ✓ In the age group of ≥71 years, individuals experienced an additional 0.033 gain in health utility for every 1% increase in income (income × age≥71: β=0.033, p<0.001).
- The age-sex-specific utility norm were predicted by the regression model by **the socio-demographic patterns** of the deprivation subgroups. **(Figure 3 & Figure 4)**

**Figure 3. The age-specific utility norm of female among social deprivation subgroups.**

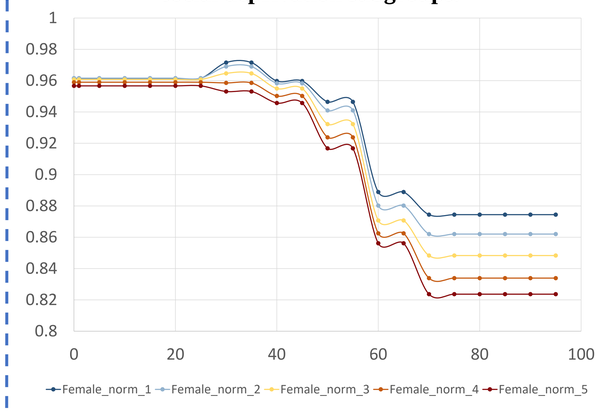
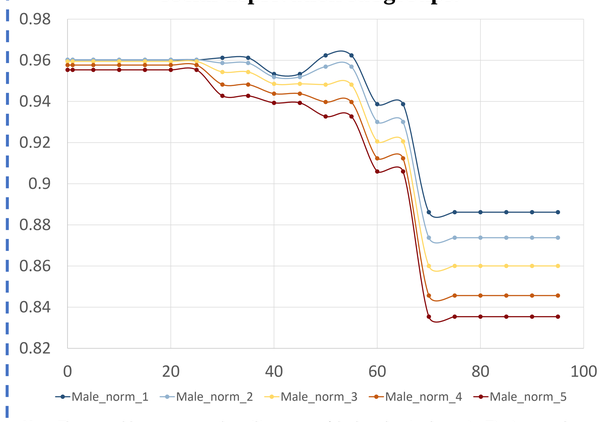



**Figure 4. The age-sex-specific utility norm of male among social deprivation subgroups.**




*Note. The upper blue curves are the utility norms of the less deprived people .The lower red curves are the utility norms of the more deprived people.*

## Results

- ✓ The QALE at birth ranged from **77.35** years in the least deprived quintile to **69.61** years in the most deprived quintile, resulting in a **7.74-QALE** gap. **(Figure 5 A)**
- ✓ Gender disparities were presenting that deprived men had a **7.97-year deficit** (74.92 vs. 66.95, **Figure 5 C**), which was greater than the **7.31-year gap** for women (80.21 vs. 72.90 , **Figure 5 B**).

**Figure 5 The distribution of Chinese QALE from birth among social deprivation subgroups.**


*Note. QALE : Quality Adjusted Life Expectancy, QAYLL: Quality Adjusted Years of Life Lost.*

## Conclusion

This research underscores the importance and urgency of estimation of equity effects in healthcare decision making, such as Distributional Cost-Effectiveness Analysis (DCEA).

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