What Drives Regional Disparities in Healthcare Spending? A Decomposition Analysis in Eastern China

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BACKGROUND

- Significant geographic variation in healthcare spending persists across China.
- This study decomposes the sources of regional differences in inpatient expenditure in eastern China to identify actionable policy levers.
- We focus on distinguishing between factors related to patient characteristics and those shaped by the delivery system.

OBJECTIVE

- This study quantifies the contributions of key factors to geographic variation in inpatient spending across insurance enrollment areas within an eastern Chinese province, with a focus on policy-actionable drivers.

METHODS

Data Source: Using comprehensive claims data from 2024, we analyzed 3.63 million hospitalizations across 11 cities, representing a population of over 80 million and total spending of ¥35.5 billion.

Analysis Methods: To disentangle the sources of geographic variation, we combined three complementary approaches:

- Shapley Decomposition: Allocates model explanatory power across five factors: age-sex composition, disease mix, insurance-type composition, patient flow composition, and service intensity.
- Das Gupta Decomposition: Decomposes regional deviations from the provincial mean into structural components.
- K-means Clustering: Classifies diseases according to their dominant Shapley decomposition drivers.

RESULTS

- **Overview**
  - Average expenditure per inpatient visit: RMB 9,784.
  - Substantial municipal variation: RMB 7,959–12,251 per admission.
- **Structural Patterns**
  - **Flow:** Cross-regional inpatient visits were associated with higher expenditures but lower reimbursement rates.
  - **Insurance Type:** Expenditure per admission was higher for UEBMI than for URRBMI.
  - **Demographics:** An inverted-pyramid age structure, with admissions concentrated among adults aged 65+ and women aged 85+**(Fig. 1).**
- **Overall Drivers**
  - While demographic factors (age–sex composition, 14%) are largely fixed, more than 50% of variation stems from potentially modifiable factors, notably service intensity (31%) and patient mobility (20%) **(Tab. 1).**

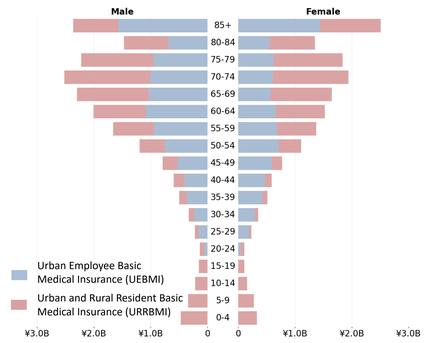

Figure 1. Average Inpatient Medical Expenditure per Admission by Insurance Type, Sex, and Age, 2024

Table 1. Shapley Decomposition of Intercity Variation in Inpatient Medical Expenditure within the Province

Factor	Percent
Age-Sex Composition	14%
Disease Mix	20%
Insurance-Type Composition	15%
Patient Flow Composition	20%
Service Intensity	31%
TOTAL	100%

- **Disease-Level Heterogeneity (Fig. 2)**
  - **Emergency Conditions:** Dominated by service intensity (51.6%).
  - **Cancer & Chronic Diseases:** Primarily driven by patient mobility, reflecting uneven access to specialized care.
  - **Aging & Common Conditions:** Shaped mainly by demographics and disease prevalence.
  - **Critical & Complex Conditions:** Driven by disease complexity and service intensity.

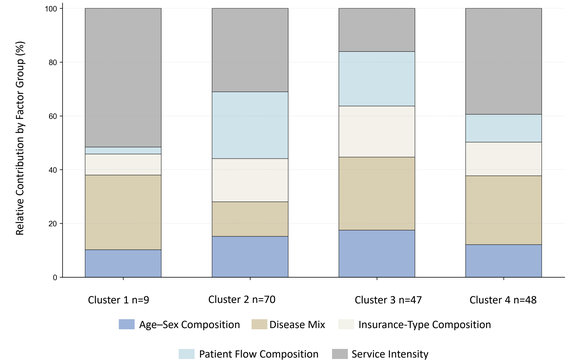

Figure 2. Disease-Level Heterogeneity (4 clusters)

- **Regional Deviations**
  - Most municipal deviations were driven by age-sex composition, whereas the provincial capital's higher expenditure per admission (+18%) was mainly attributable to service intensity.

CONCLUSIONS

- Geographic variation in inpatient spending is driven predominantly by supply-side factors (service intensity) and spatial dynamics (patient mobility), rather than by patient case-mix.
- Policies should therefore prioritize: 1. Aligning provider incentives to curb excessive service intensity; 2. Guiding patient mobility toward more rational care-seeking patterns to reduce unnecessary cross-regional travel.

CONTACT INFORMATION

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