EVALUATION OF THE SPATIAL ACCESSIBILITY TO INPATIENT SERVICES IN BEIJING,CHINA

Zhang JW[1] , Han PE[1] , Yang L[1*]
1.School of Public Health,Peking University,Beijing
*Contact details for the corresponding author： lyang@bjmu.edu.cn
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Objective:

The study aimed to quantify spatial accessibility to inpatient services in Beijing and to assess accessibility improvements following the completion of the medical institution reconstruction and expansion in 2025.

Data:

※Health statistics of medical institution from Beijing Municipal Health Commission (2019)

※Community based population data in 2020 and predicted population data in 2025 from Beijing Municipal Health Commission

※The road network and administrative boundary data from China's National Basic Geographic Information System(2019)

Analytic Methods：

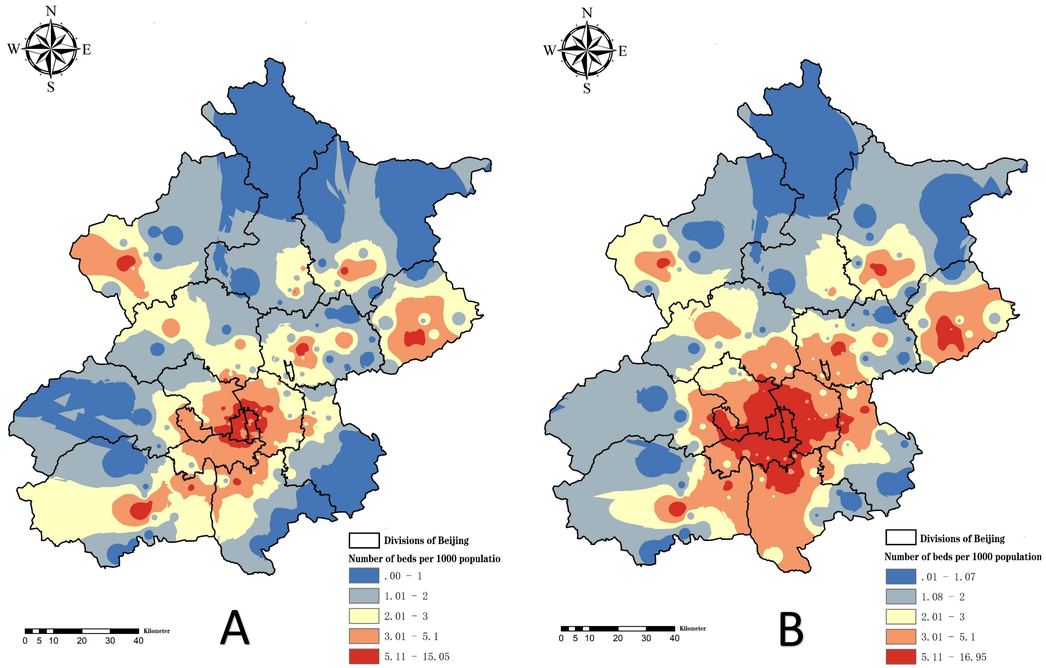
※ the two-step floating catchment area method（2SFCA）

$$A_i = \sum_{j=1}^{n} \frac{S_j f(d_{ij})}{\sum_{k=1}^{m} D_k f(d_{kj})}, f(d_{ij}) = \begin{cases} d_{ij}^{-\beta}, d_{ij} \le d_0 \\ 0, d_{ij} > d_0 \end{cases}$$

Parameters	Meaning	Practical implications
A_i	Spatial accessibility of population location i to accessible medical institutions	Number of beds per 1000 population
S_j	Service capacity of medical institutions	Number of beds in each medical institution
D_k	Number of habitations at population location k(population location within a threshold travel time subzone from healthcare institutions)	Number of habitations at population location k
d_{ij}	The travel distance between i and j	Actual travel time
d_0	Maximum threshold travel distance	120 minutes
n	Number of target points	Number of medical institutions
m	Number of searching points	Number of population location
β	Travel friction factor	1.5

Results：

The average number of beds available per 1,000 people was 3.03, while the median was 2.90.Accessibility was recalculated using population estimates in 2025, which included reconstruction and expansion of medical facilities. Inpatient service accessibility grew in 289 communities (82.34%), with 98 communities experiencing an increase of more than 50%. 32 communities maintained roughly similar accessibility (change of less than 0.005), whereas 29 communities' accessibility decreased.



Spatial accessibility of inpatient services in 2020(A)and 2035(B) in Beijing

The accessibility of inpatient services exhibited significant variation across districts, with higher levels of accessibility observed in the central and southern districts.

Conclusions:

The community-level spatial accessibility to inpatient services shows a significant disparity, and the uneven distribution of general hospitals is the main cause. Accessibility to inpatient services has improved in Beijing with the reconstruction and extension of medical institutions, with the majority of improvements occurring in the southern and eastern suburbs.

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