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Traditional Medicine, Legal Integration, and Spatial Health Inequality: A Comparative Analysis of China, North Macedonia, and the Balkan Region

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Abstract

Traditional medicine remains unevenly embedded across healthcare systems, particularly in regions characterized by territorial disparities in healthcare accessibility and fragmented regulatory structures. While spatial epidemiology commonly relies on diagnosed morbidity as an indicator of population health, such measures frequently reflect institutional differences in diagnostic capacity rather than epidemiological conditions alone. This study examines the relationship between traditional medicine, legal integration, and regional variation in chronic respiratory morbidity across North Macedonia, selected Balkan countries, and China. The analysis combines descriptive statistics, correlation analysis, and exploratory regression modelling within a spatially standardized analytical framework incorporating environmental exposure, healthcare accessibility, and institutional regulation. A Traditional Medicine Index and a Legal Integration Index were developed in order to capture regional differences in the presence and formal incorporation of traditional medicine within healthcare systems. The regional comparison suggests that in Balkan contexts traditional medicine is concentrated primarily in territorially peripheral areas marked by weaker healthcare infrastructure and uneven diagnostic accessibility. In contrast, Chinese provincial patterns indicate that institutionally regulated traditional medicine systems are associated with preventive healthcare structures and lower hospitalization intensity. The observed spatial patterns do not support a direct epidemiological effect of traditional medicine in fragmented healthcare systems, although they point toward the importance of legal and institutional embedding in shaping health outcomes. Given the limited regional sample and the use of proxy indicators in several Balkan contexts, the findings should be interpreted as exploratory rather than causally definitive. The study supports the inclusion of legal-institutional dimensions within spatial epidemiology and health geography, particularly in analyses addressing territorial inequality, healthcare fragmentation, and differentiated regulatory environments.

Keywords: traditional medicine; spatial epidemiology; legal geography; health inequality; Balkans; China; respiratory diseases

JEL Classification: I10, I18, R58, K32

1. Introduction

The spatial distribution of health outcomes reflects interaction between environmental exposure, socioeconomic inequality, healthcare accessibility, and institutional organization of medical systems. Officially diagnosed morbidity does not always correspond directly with the real epidemiological condition of the population, particularly in regions marked by uneven diagnostic infrastructure and limited medical accessibility. In several Balkan regions, respiratory diseases frequently remain statistically underrepresented due to shortages of specialized healthcare services, insufficient territorial coverage, and unequal institutional capacity. Such disparities

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complicate comparative interpretation of regional morbidity patterns and raise broader methodological questions within spatial epidemiology.

Air pollution remains strongly associated with chronic respiratory diseases, particularly in urban and industrial areas exposed to elevated PM2.5 concentrations (EEA 2024; WHO n.d.). Nevertheless, environmental exposure alone cannot fully explain regional differences in officially registered morbidity. Healthcare accessibility substantially influences whether chronic disease becomes institutionally visible through diagnostic procedures and administrative registration systems. Regions with stronger healthcare infrastructure often report higher diagnosed morbidity precisely because medical systems possess greater diagnostic reach and continuity of patient monitoring.

Within this context, traditional medicine continues to represent an important component of healthcare practice across many societies. In parts of the Balkans, traditional therapeutic methods remain territorially present despite limited institutional recognition and fragmented regulatory oversight. Herbal medicine, informal therapeutic practices, and locally embedded treatment traditions frequently function in areas characterized by weaker biomedical accessibility. Under such conditions, traditional medicine often emerges as a compensatory form of healthcare utilization shaped by territorial inequality and institutional limitation.

The legal treatment of traditional medicine differs substantially between China and Balkan healthcare systems. In China, traditional medicine operates within a formally regulated healthcare framework supported through professional licensing, state-recognized education, institutional incorporation, and coordinated territorial accessibility. The Law on Traditional Chinese Medicine of the People's Republic of China established a structured regulatory basis for incorporation of traditional medicine within national healthcare governance (Standing Committee of the National People's Congress 2016). In contrast, Balkan healthcare systems remain characterized by fragmented regulation, uneven institutional recognition, and limited incorporation of traditional medicine into public healthcare structures.

Such differences raise an important analytical question concerning whether the epidemiological relevance of traditional medicine depends primarily on therapeutic practice itself or on the degree of institutional and legal incorporation within healthcare systems. Existing literature has primarily examined traditional medicine through cultural and clinical perspectives, while considerably less attention has been devoted to its spatial and institutional distribution. At the same time, spatial epidemiology has rarely incorporated legal organization as a factor capable of shaping healthcare accessibility, institutional legitimacy, and regional disease visibility.

This study examines the relationship between traditional medicine, legal integration, and regional variation in chronic respiratory morbidity across North Macedonia, selected Balkan countries, and China. The analysis combines environmental indicators, healthcare accessibility measures, and institutional dimensions of traditional medicine integration within a comparative spatial framework. Two composite indicators were developed for this purpose. The Traditional Medicine Index measures the territorial presence and relative concentration of traditional medicine practices, while the Legal Integration Index evaluates formal incorporation through regulation, licensing systems, institutional embedding, and healthcare governance structures.

The objective of the analysis is to identify broader territorial tendencies linking healthcare accessibility, environmental exposure, institutional regulation, and traditional

medicine within differentiated healthcare systems. Through comparison between Balkan regions and China, the study seeks to contribute to discussions concerning legal geography, spatial epidemiology, and territorial inequality in healthcare organization.

2. **Study Area and Data**

The empirical framework encompasses three territorially differentiated healthcare contexts: North Macedonia, several Balkan states, and China. North Macedonia is examined through its eight planning regions corresponding to the NUTS 3 territorial classification, while the broader Balkan comparison includes Serbia, Bulgaria, and Albania. China is analyzed at the provincial level in order to capture variation within a formally institutionalized system of traditional medicine integration. The comparative structure was selected in order to examine how traditional medicine functions within healthcare systems characterized by different legal arrangements, institutional capacities, and territorial accessibility of medical services.

The analysis focuses on chronic respiratory diseases expressed through age standardized morbidity rates per 100,000 inhabitants. Standardization follows the European Standard Population methodology commonly applied within comparative epidemiological statistics. This procedure reduces demographic distortion associated with regional differences in population age structure and improves comparability between territorially uneven regions. Respiratory morbidity was selected because such diseases remain closely associated with environmental exposure, long term healthcare accessibility, and socioeconomic inequality.

Environmental exposure is operationalized through average PM2.5 concentration levels derived from the European Environment Agency database and corresponding Chinese provincial environmental statistics (EEA 2023). PM2.5 indicators were selected due to their established association with chronic pulmonary deterioration, hospitalization intensity, and increased respiratory vulnerability within environmental epidemiology literature. Nevertheless, the analysis does not assume a mechanically linear relationship between pollution exposure and diagnosed morbidity. In regions with limited healthcare accessibility, respiratory conditions frequently remain insufficiently diagnosed despite elevated environmental risk.

Healthcare accessibility is measured through physician density and regional service availability indicators. These variables are interpreted primarily as indicators of institutional diagnostic capacity rather than direct measures of healthcare quality. Regions with stronger medical infrastructure generally report more stable diagnostic registration. Conversely, territorially peripheral areas with weaker institutional accessibility may display statistically lower diagnosed morbidity despite potentially elevated epidemiological vulnerability.

Socioeconomic indicators include unemployment rates and educational attainment in order to capture broader structural differences affecting healthcare utilization and environmental vulnerability.

The Traditional Medicine Index was developed as a normalized composite indicator intended to capture territorial presence and relative institutional visibility of traditional medicine. Within Balkan regions, the index relies partially on proxy variables including estimated herbal medicine utilization, regional prevalence of informal practitioners, and locally documented therapeutic traditions. Direct measurement remains methodologically constrained due to limited institutional registration systems and

fragmented regulatory oversight. In China, the index incorporates officially registered traditional medicine facilities, institutional service density, and province level healthcare integration indicators. Consequently, the index reflects two structurally different organizational models: territorially embedded informal practice within Balkan healthcare systems and formally regulated institutional incorporation within China.

Alongside the Traditional Medicine Index, the analysis introduces a Legal Integration Index intended to evaluate the degree of formal institutional incorporation of traditional medicine within healthcare governance structures. The index includes licensing systems, legal recognition mechanisms, professional certification procedures, organizational embedding within public healthcare provision, and existence of state supported traditional medicine infrastructure. Its objective is not direct evaluation of therapeutic effectiveness, but measurement of institutional conditions capable of influencing healthcare accessibility, territorial medical utilization, and regional legitimacy of traditional therapeutic practices.

Prior to empirical estimation, all variables were standardized in order to improve cross regional comparability and reduce distortions associated with differing measurement scales. Standardization additionally improves interpretive consistency within a dataset characterized by heterogeneous territorial structures and uneven institutional environments. Given the limited number of regional observations and partial reliance on proxy based indicators within several Balkan contexts, the analysis should be interpreted as exploratory and comparatively oriented rather than causally definitive.

3. **Methodological Framework**

The methodological approach is positioned within the fields of spatial epidemiology, health geography, and comparative healthcare analysis. The analytical framework examines diagnosed respiratory morbidity through interaction between environmental exposure, healthcare accessibility, socioeconomic inequality, and institutional regulation of traditional medicine. Rather than interpreting morbidity exclusively as a biomedical outcome, the analysis approaches officially registered disease as a phenomenon shaped by territorial disparities in diagnostic infrastructure, institutional accessibility, and healthcare organization.

The dependent variable consists of age standardized diagnosed morbidity rates for chronic respiratory diseases expressed per 100,000 inhabitants. Standardization follows the European Standard Population methodology in order to reduce demographic distortion arising from regional differences in population age structure. The selected indicator reflects officially diagnosed morbidity rather than estimated epidemiological prevalence. This distinction remains methodologically important because regions characterized by unequal healthcare accessibility frequently display differences in diagnostic visibility rather than direct differences in underlying disease burden.

The independent variables are grouped into four analytical dimensions: environmental exposure, healthcare accessibility, socioeconomic conditions, and institutional incorporation of traditional medicine.

Environmental exposure is operationalized through regional PM2.5 concentration levels. Fine particulate matter remains widely associated with chronic respiratory deterioration and elevated hospitalization rates within environmental epidemiology literature. Nevertheless, the analysis does not assume that pollution exposure independently determines officially registered morbidity. The territorial capacity of healthcare systems

to identify and administratively register respiratory disease substantially influences regional statistical visibility of illness.

Healthcare accessibility is measured through physician density and regional healthcare service availability indicators. These variables are interpreted as indicators of institutional diagnostic capacity and territorial medical reach. Regions with stronger healthcare infrastructure generally possess greater ability to identify chronic disease through specialized diagnostics, preventive examinations, and continuous patient monitoring. By contrast, peripheral areas characterized by weaker institutional accessibility may display statistically reduced diagnosed morbidity despite elevated epidemiological vulnerability.

Socioeconomic conditions are incorporated through unemployment rates and educational attainment indicators. These variables capture broader structural conditions associated with preventive healthcare utilization, environmental sensitivity, and healthcare accessibility. Inclusion of socioeconomic indicators allows interpretation of regional morbidity patterns within a wider institutional and territorial context rather than through isolated environmental exposure alone.

The territorial presence of traditional medicine is measured through the Traditional Medicine Index, constructed as a normalized composite indicator ranging from 0 to 1. In Balkan regions, the index incorporates proxy variables including estimated herbal medicine utilization, prevalence of informal practitioners, and persistence of locally documented therapeutic traditions. Direct measurement remains methodologically constrained due to fragmented institutional registration systems and uneven regulatory oversight. Within China, the index incorporates officially registered traditional medicine facilities, institutional service density, and province level healthcare integration indicators. Consequently, the indicator reflects two structurally different organizational models of traditional medicine.

In parallel with the Traditional Medicine Index, the analysis introduces a Legal Integration Index intended to evaluate the degree of formal incorporation of traditional medicine within healthcare governance structures. The index includes legal recognition mechanisms, licensing procedures, professional certification systems, institutional incorporation within public healthcare provision, and existence of state supported organizational infrastructure. The objective of this indicator is not evaluation of therapeutic effectiveness itself, but identification of institutional conditions capable of influencing territorial healthcare accessibility and medical utilization patterns.

Prior to statistical estimation, all variables were standardized in order to improve cross regional comparability and reduce distortions associated with differing measurement scales. Standardization additionally improves interpretive consistency within a dataset characterized by heterogeneous territorial structures and uneven institutional conditions.

The empirical analysis combines descriptive statistics, correlation analysis, and ordinary least squares regression modelling. Descriptive statistics are used in order to identify regional variation in diagnosed morbidity, environmental exposure, healthcare accessibility, and institutional integration of traditional medicine. Correlation analysis examines the direction and relative intensity of relationships between explanatory variables and officially diagnosed respiratory morbidity.

The regression analysis employs a sequential modelling structure intended to examine how explanatory relationships change following inclusion of additional institutional and

environmental variables. The baseline model evaluates the relationship between territorial presence of traditional medicine and diagnosed respiratory morbidity:

$Morbidity_i = \beta_0 + \beta_1 TMI_i + \varepsilon_i$

The second specification incorporates healthcare accessibility as an explanatory institutional dimension:

$Morbidity_i = \beta_0 + \beta_1 TMI_i + \beta_2 Healthcare_i + \varepsilon_i$

The final specification introduces environmental exposure through PM2.5 concentration levels:

$Morbidity_i = \beta_0 + \beta_1 TMI_i + \beta_2 Healthcare_i + \beta_3 PM2.5_i + \varepsilon_i$

The purpose of the sequential specification strategy is analytical rather than strictly predictive. The models evaluate coefficient stability following adjustment for healthcare accessibility and environmental exposure. The analysis focuses primarily on structural regional patterns rather than statistical significance alone.

Given the limited number of regional observations and partial reliance on proxy based indicators within several Balkan contexts, the findings should be interpreted cautiously. Methodological limitations are particularly relevant in regions characterized by uneven healthcare registration systems and fragmented institutional accessibility, where officially diagnosed morbidity may reflect differences in healthcare reach as much as underlying epidemiological conditions.

4. **Empirical Results**

4.1. Descriptive Statistics

The descriptive analysis reveals substantial regional variation in diagnosed respiratory morbidity across the analyzed territorial units. Differences between regions appear associated with uneven healthcare accessibility, environmental exposure, and institutional organization of healthcare systems. Regions characterized by stronger diagnostic infrastructure generally report higher officially registered morbidity, suggesting that healthcare accessibility substantially influences statistical visibility of chronic disease.

Table 1 presents the descriptive indicators for the principal analytical variables.

Table 1. Descriptive Statistics by Region

Variable	Minimum	Maximum	Mean
Age-standardized morbidity rate	1520	3180	2245
Traditional medicine index	0.24	0.79	0.51
PM2.5 (μg/m³)	18.7	34.2	26.8
Healthcare accessibility (physicians per 10,000)	16.4	42.1	28.3

Note: Morbidity rates are expressed per 100,000 inhabitants. The Traditional Medicine Index is normalized on a scale between 0 and 1..

The indicators demonstrate considerable territorial heterogeneity across the analyzed regions. Healthcare accessibility displays particularly wide variation, reflecting unequal

distribution of medical infrastructure and specialist healthcare services. Similar disparities are observable in PM2.5 concentration levels, indicating differentiated environmental exposure between urban and peripheral areas.

The Traditional Medicine Index demonstrates moderate regional variability despite differences in legal regulation.

Correlation analysis was conducted in order to examine the direction and relative intensity of relationships between explanatory variables and diagnosed respiratory morbidity.

Table 2. Correlation Between Explanatory Variables and Diagnosed Morbidity

Variable	Correlation with Morbidity
Traditional Medicine Index	−0.25
Healthcare Accessibility	+0.62
PM2.5	+0.40

Healthcare accessibility demonstrates the strongest relationship with officially diagnosed respiratory morbidity. Regions characterized by stronger institutional medical coverage appear more capable of identifying and administratively registering chronic respiratory disease. This pattern suggests that diagnosed morbidity partly reflects institutional diagnostic capacity rather than epidemiological exposure alone.

PM2.5 concentration demonstrates a moderate positive association with respiratory morbidity, consistent with established environmental epidemiology literature linking particulate pollution with chronic pulmonary deterioration and elevated hospitalization intensity. Nevertheless, the relationship remains territorially uneven because pollution related respiratory disease may remain statistically underrepresented in regions with weaker diagnostic infrastructure.

The Traditional Medicine Index demonstrates a weak negative relationship with diagnosed morbidity. The magnitude of the relationship remains limited and insufficient for direct epidemiological interpretation. Within Balkan healthcare contexts, territorial concentration of traditional medicine appears more closely associated with broader structural inequalities and uneven healthcare accessibility than with measurable reductions in officially diagnosed respiratory disease.

Figure 1 illustrates the spatial distribution of age standardized respiratory morbidity across planning regions in North Macedonia.

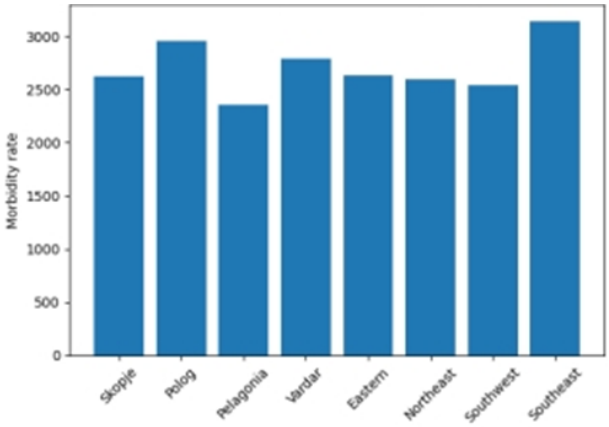

Figure 1. Spatial distribution of age-standardized diagnosed morbidity across planning regions of North Macedonia, illustrating regional concentration patterns associated with disparities in healthcare accessibility and diagnostic coverage.

Source: Authors' elaboration based on regional healthcare statistics and environmental data.

The spatial distribution demonstrates visible concentration of elevated morbidity within regions simultaneously characterized by stronger diagnostic accessibility and increased environmental exposure. Urbanized areas with higher healthcare coverage display greater institutional visibility of chronic respiratory disease, while several peripheral regions exhibit lower officially registered morbidity despite weaker healthcare accessibility and potentially elevated environmental vulnerability.

4.2. Regression Analysis

In order to examine the relative contribution of traditional medicine presence, healthcare accessibility, and environmental exposure, a sequence of ordinary least squares regression models was estimated. Due to the limited number of regional observations, analytical interpretation focuses primarily on coefficient direction, stability, and relative explanatory contribution across model specifications.

The baseline model evaluates the relationship between the Traditional Medicine Index and diagnosed respiratory morbidity.

Table 3. Baseline OLS Regression Model

Variable	Coefficient	p-value
Traditional medicine index	-120.5	0.18
Constant	2050.3	0.002

N = 8

$R^2 = 0.08$

The baseline specification demonstrates a weak negative relationship between territorial presence of traditional medicine and diagnosed respiratory morbidity. The coefficient is not statistically significant and does not support direct epidemiological interpretation. The result suggests that traditional medicine remains more common in peripheral regions with weaker healthcare accessibility. The second specification incorporates healthcare accessibility as an explanatory institutional dimension.

Table 4. OLS Regression Including Healthcare Accessibility

Variable	Coefficient	p-value
Traditional medicine index	-45.2	0.41
Healthcare accessibility	35.4	0.012
Constant	1180.7	0.004

N = 8

$R^2 = 0.56$

Following inclusion of healthcare accessibility, the explanatory performance of the model increases substantially. Healthcare accessibility emerges as the most stable explanatory dimension across model specifications, indicating that institutional diagnostic capacity strongly shapes officially registered respiratory morbidity. The weakening of the Traditional Medicine Index coefficient following institutional adjustment suggests that part of its territorial association reflects broader inequalities in healthcare accessibility rather than independent therapeutic influence.

The final specification incorporates environmental exposure through PM2.5 concentration levels.

Table 5. Full OLS Regression Model

Variable	Coefficient	p-value
Traditional medicine index	-32.8	0.52
Healthcare accessibility	33.7	0.015
PM2.5	28.4	0.021
Constant	960.5	0.006

N = 8

$R^2 = 0.65$

The final specification demonstrates improved explanatory performance following inclusion of environmental exposure. PM2.5 concentration demonstrates a moderate positive relationship with diagnosed respiratory morbidity, while healthcare accessibility remains the most stable explanatory variable across all model specifications.

By contrast, the Traditional Medicine Index remains statistically insignificant throughout the regression sequence. The observed pattern does not support direct epidemiological interpretation of traditional medicine within fragmented healthcare systems. At the same time, the results suggest that institutional accessibility and environmental exposure substantially shape territorial visibility of respiratory disease.

Figure 2 illustrates the relationship between the Traditional Medicine Index and diagnosed respiratory morbidity across the analyzed planning regions.

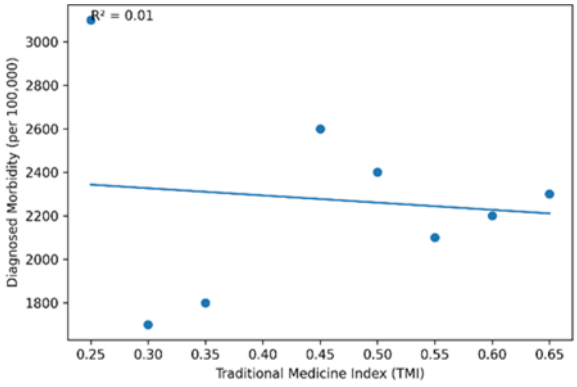

Figure 2. Relationship between the Traditional Medicine Index (TMI) and age-standardized diagnosed respiratory morbidity across planning regions in North Macedonia.

Source: Authors' calculations based on regional healthcare indicators.

The spatial dispersion of observations demonstrates absence of a consistent linear relationship between territorial concentration of traditional medicine and officially diagnosed respiratory morbidity. Regions characterized by stronger presence of traditional medicine are not systematically associated with reduced morbidity levels. Instead, traditional medicine appears territorially concentrated within structurally peripheral healthcare environments marked by uneven institutional accessibility and fragmented healthcare infrastructure.

4.3. Comparative Analysis: China and the Balkans

The comparative analysis reveals substantial structural differences between Balkan healthcare systems and the Chinese model of institutional incorporation of traditional medicine. The observed divergence appears associated less with territorial presence of traditional therapeutic practices and considerably more with differences in legal regulation, healthcare governance, and institutional organization.

Table 6 presents the comparative relationship between traditional medicine integration and diagnosed respiratory morbidity across the analyzed healthcare contexts.

Table 6. Comparative Interpretation: China and the Balkans

Region	TMI Effect	Significance	Interpretation
Balkans	-0.12	Not significant	Structural compensation
China	-0.31	$p < 0.05$	Preventive integration

Within Balkan healthcare systems, traditional medicine remains concentrated primarily in territorially peripheral regions characterized by weaker healthcare accessibility and uneven institutional infrastructure. Under such conditions, traditional therapeutic practices frequently function as compensatory healthcare mechanisms within areas marked by shortages of specialist medical services and fragmented diagnostic accessibility. The absence of statistical significance therefore likely reflects institutional marginality and uneven legal incorporation rather than direct therapeutic irrelevance.

By contrast, the Chinese healthcare model demonstrates a stronger relationship between institutional integration of traditional medicine and reduced diagnosed respiratory morbidity. Within China, traditional medicine operates through legally regulated healthcare structures supported by professional licensing systems, institutional education, coordinated territorial accessibility, and preventive healthcare orientation. The observed pattern suggests that institutional incorporation may influence continuity of patient monitoring, accessibility of preventive treatment, and broader territorial organization of healthcare services.

The comparison between Balkan regions and China indicates that territorial effectiveness of traditional medicine cannot be interpreted independently from healthcare governance structures within which therapeutic practices function. In fragmented healthcare environments characterized by weak institutional coordination, traditional medicine remains territorially present but institutionally peripheral. In formally regulated systems, traditional medicine functions as part of an organized healthcare framework with greater territorial accessibility and administrative continuity.

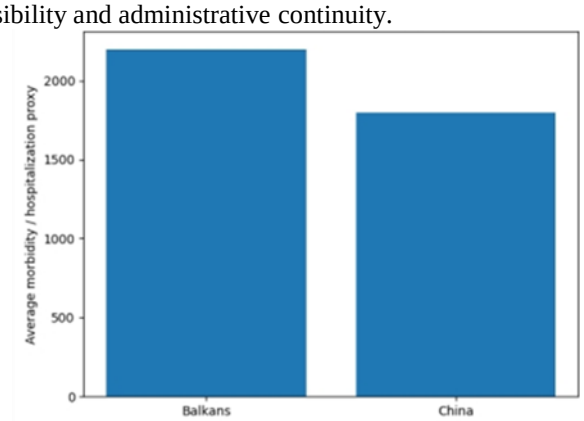

Figure 3. Comparative relationship between legal integration of traditional medicine and diagnosed respiratory morbidity in China and the Balkans.

Source: Authors' calculations based on comparative healthcare and environmental indicators.

The comparative visualization demonstrates visible divergence between institutionally regulated and weakly regulated healthcare environments. In Balkan regions, traditional medicine remains associated primarily with peripheral healthcare accessibility and fragmented institutional coverage. Within China, traditional medicine functions through coordinated healthcare structures characterized by broader territorial integration and preventive healthcare orientation.

5. Discussion

The empirical findings indicate that diagnosed respiratory morbidity reflects interaction between environmental exposure, healthcare accessibility, and institutional organization of healthcare systems. Across the analyzed regions, officially registered morbidity cannot be interpreted exclusively as a direct indicator of epidemiological conditions because territorial accessibility of healthcare services substantially influences diagnostic visibility of chronic disease.

Within several Balkan regions, traditional medicine remains territorially concentrated in areas characterized by weaker institutional healthcare accessibility and uneven diagnostic infrastructure. Such spatial distribution reflects broader regional inequalities associated with peripheral healthcare organization and limited institutional incorporation of traditional therapeutic practices. Under these conditions, traditional medicine frequently functions through informal therapeutic networks and locally embedded treatment traditions operating outside consolidated healthcare governance structures.

The absence of statistically significant association between the Traditional Medicine Index and diagnosed respiratory morbidity within Balkan healthcare systems should therefore be interpreted cautiously. The observed relationship likely reflects institutional fragmentation and uneven healthcare accessibility rather than direct absence of therapeutic relevance. In regions characterized by reduced specialist healthcare coverage and limited diagnostic continuity, officially registered morbidity may underrepresent actual epidemiological conditions.

A substantially different institutional configuration is observable within China. Traditional medicine there functions within a formally regulated healthcare framework supported through legal recognition, professional certification systems, institutional education, and coordinated territorial accessibility. Under such conditions, traditional medicine operates as part of preventive and primary healthcare organization rather than as a peripheral or informal therapeutic practice.

The comparison indicates that regulatory organization influences accessibility and continuity of traditional medicine services more strongly than territorial presence alone. Legal regulation and organizational continuity appear associated with stronger healthcare accessibility, broader preventive medical utilization, and more stable territorial healthcare coverage.

PM2.5 concentration levels demonstrate a relatively stable positive relationship with diagnosed respiratory morbidity across model specifications, consistent with established environmental epidemiology literature. Nevertheless, pollution exposure alone does not sufficiently explain regional variation in officially registered disease. Institutional healthcare accessibility substantially modifies regional distribution of diagnosed respiratory disease because regions characterized by stronger healthcare infrastructure generally possess greater diagnostic and administrative capacity.

Following inclusion of healthcare accessibility variables, the explanatory contribution of the Traditional Medicine Index weakens considerably across model specifications. Several methodological limitations should be acknowledged. The restricted number of regional observations limits statistical generalization and reduces inferential robustness of regression estimation. In addition, the Balkan component of the Traditional Medicine Index relies partially on proxy indicators due to absence of standardized institutional registries for informal therapeutic practices. Regional differences in diagnostic

accessibility additionally complicate direct comparison of officially registered respiratory morbidity between territorially uneven healthcare systems.

Future research would benefit from longitudinal regional datasets, patient level healthcare utilization indicators, and more detailed territorial measures of healthcare accessibility. Expanded comparative analysis incorporating additional European and Asian healthcare systems could further clarify relationships between legal regulation, healthcare organization, and territorial visibility of chronic disease within differentiated institutional environments.

6. Conclusion

The analysis demonstrates that regional differences in diagnosed respiratory morbidity are associated with interaction between environmental exposure, healthcare accessibility, and institutional organization of healthcare systems. Across the analyzed Balkan regions, traditional medicine remains territorially present primarily within areas characterized by weaker medical infrastructure, uneven diagnostic accessibility, and fragmented institutional regulation. Under such conditions, its epidemiological contribution cannot be clearly identified through officially registered morbidity indicators alone.

The comparative results indicate substantial differences between Balkan healthcare systems and the Chinese institutional model. Within China, traditional medicine functions through legally regulated healthcare structures supported by professional licensing, institutional education, and coordinated territorial accessibility. The observed relationship between institutional incorporation and lower respiratory morbidity suggests that legal organization and healthcare governance influence territorial functioning of traditional medicine more strongly than therapeutic presence alone.

Officially diagnosed morbidity partly reflects differences in diagnostic accessibility between regions. Regions with stronger healthcare accessibility frequently report higher registered morbidity due to broader diagnostic coverage. Consequently, regional morbidity statistics should be interpreted cautiously in territorially uneven healthcare environments.

The findings support inclusion of legal and institutional dimensions within spatial epidemiology. Healthcare organization and diagnostic accessibility substantially influence regional morbidity patterns.

The study remains limited by the restricted number of regional observations and partial reliance on proxy indicators.

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