



**Performance Evaluation of Health Spending Models Based
on Infant Mortality and Life Expectancy During the 1980-
2022 Period: Multidimensional Scaling and Cluster Analyses
for Türkiye and OECD Countries**



Taking action to
improve health for all



**Prof. Dr. Yusuf Celik, Acibadem Mehmet Ali Aydınlar
University**



**Assoc. Prof. Dr. Salim Yilmaz, Acibadem Mehmet Ali Aydınlar
University**

Health Spending Models Matter

Understanding the Stakes Behind Health Financing Systems



Impact on Population Health

Health financing models directly affect life expectancy and infant mortality, influencing millions of lives.



Spending Structure Determines Access

Public vs. private dominance in health systems defines the equity and reach of healthcare services.



Policy Relevance

Understanding model effectiveness helps government design policies that optimize health outcomes efficiently.

The Turkish Health System: Evolution and Challenges

From Public Dominance to Hybrid Complexity



Hybrid System Development

Türkiye shifted from a predominantly public model to a hybrid one integrating private sector involvement.



Health Transformation Program

Launched in 2003, it expanded access and strengthened healthcare infrastructure nationwide.



Sustainability Concerns

Hybridization raises concerns about equity, regulatory oversight and fiscal sustainability.

Study Purpose and Research Questions

Analyzing Health Spending and Its Impact on Outcomes



Performance Evaluation

To assess the effectiveness of various health financing models across Türkiye and OECD countries between 1980 and 2022.



Focus on Outcomes

To investigate correlations between spending types and two critical health metrics: infant mortality and life expectancy.



Cluster and Scaling Analysis

To identify patterns using multidimensional scaling and clustering to interpret country-level typologies and proximities.

Methodology: From Data to Insight

Analytical Framework and Data Sources



Robust Data Sources

Utilized longitudinal data from WHO, OECD, and World Bank for 38 countries (1980–2022).



Dimensional Reduction

Applied PCA to reduce multicollinearity and synthesize complex spending variables into three principal components.



Focus on Recent Trends

Data weighted towards recent years to emphasize current relevance while retaining historical context.

Health Spending Categories Explained

Out-of-Pocket, Voluntary, and Government-Mandated Models



Out-of-Pocket (OoP)

Direct payments by individuals at the point of service; high burden on patients.



Voluntary Health Spending (VHS)

Discretionary spending such as private insurance premiums and donations.



Government Mandatory Health Spending (GMHS)

Compulsory public financing via taxes or social security contributions.

Multidimensional Scaling (MDS) Analysis

Visualizing Global Health Financing Proximity



Geometric Representation

MDS transformed PCA components into a 3D spatial layout to depict country similarities.



Türkiye's Positioning

Mapped Türkiye's relative distance to other countries based on spending profiles.



Euclidean Distance Metrics

Used to quantify positional differences and interpret health financing similarities.

Health Spending Typologies via Clustering

K-Means Analysis of Spending Models



Three-Cluster Model

Identified optimal typology clusters: Government-Mandated, Out-of-Pocket & Voluntary Dominance, Balanced.



Typology Definitions

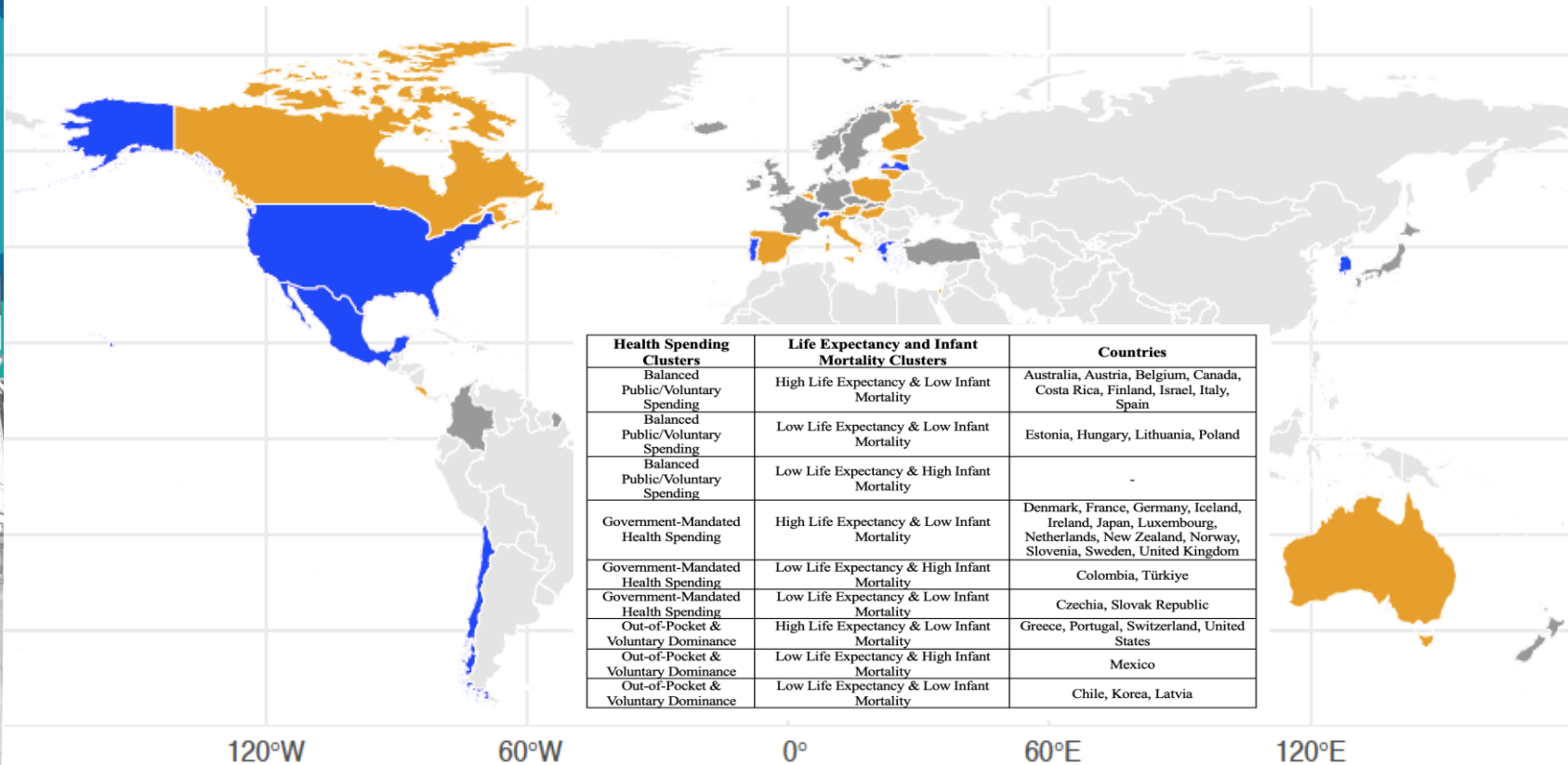
Clusters reflect systemic differences in health financing structures across countries.



Türkiye's Cluster

Classified in the Government-Mandated group, sharing structural traits with Poland and Estonia.

Health System Financing by Countries



Financing



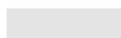
BP & VS (13)



OOP & VD (8)

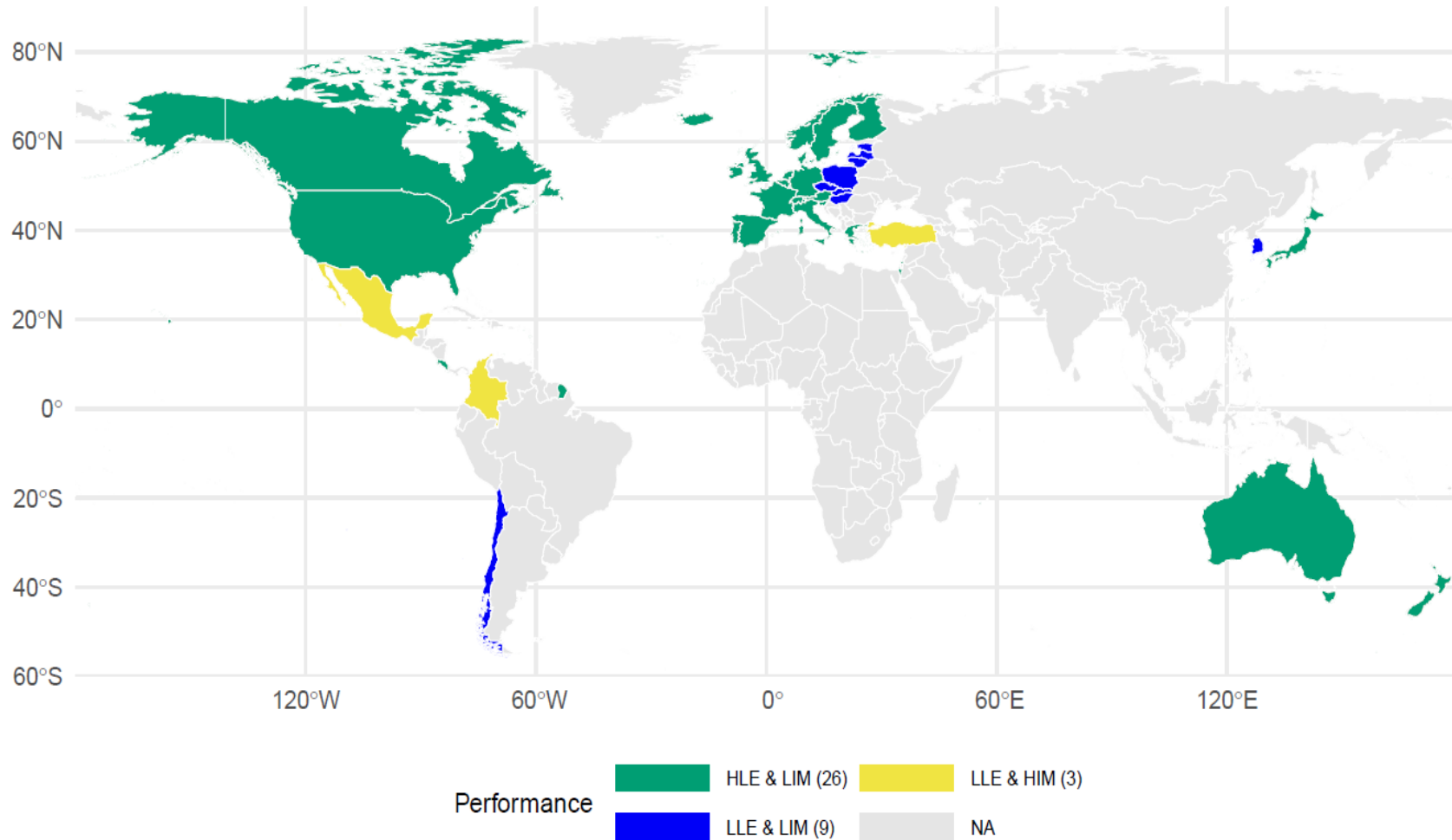


GMHS (17)



NA

Health System Performance by Countries



Clustering Health Outcomes

Life Expectancy and Infant Mortality Patterns



Three Outcome Clusters

High, medium, and low-performing health systems based on scaled life expectancy and infant mortality.



Türkiye's Grouping

Grouped with Colombia and Mexico in the low-performance cluster—low life expectancy, high infant mortality.



Cross-Comparison

Mapped performance clusters against spending typologies to evaluate effectiveness.

Türkiye's Performance in Context

Health Outcomes Lag Despite Public Spending



Underperforming Public System

Despite public-dominant spending, Türkiye shows lower health outcomes than its peer cluster.



Peer Comparison

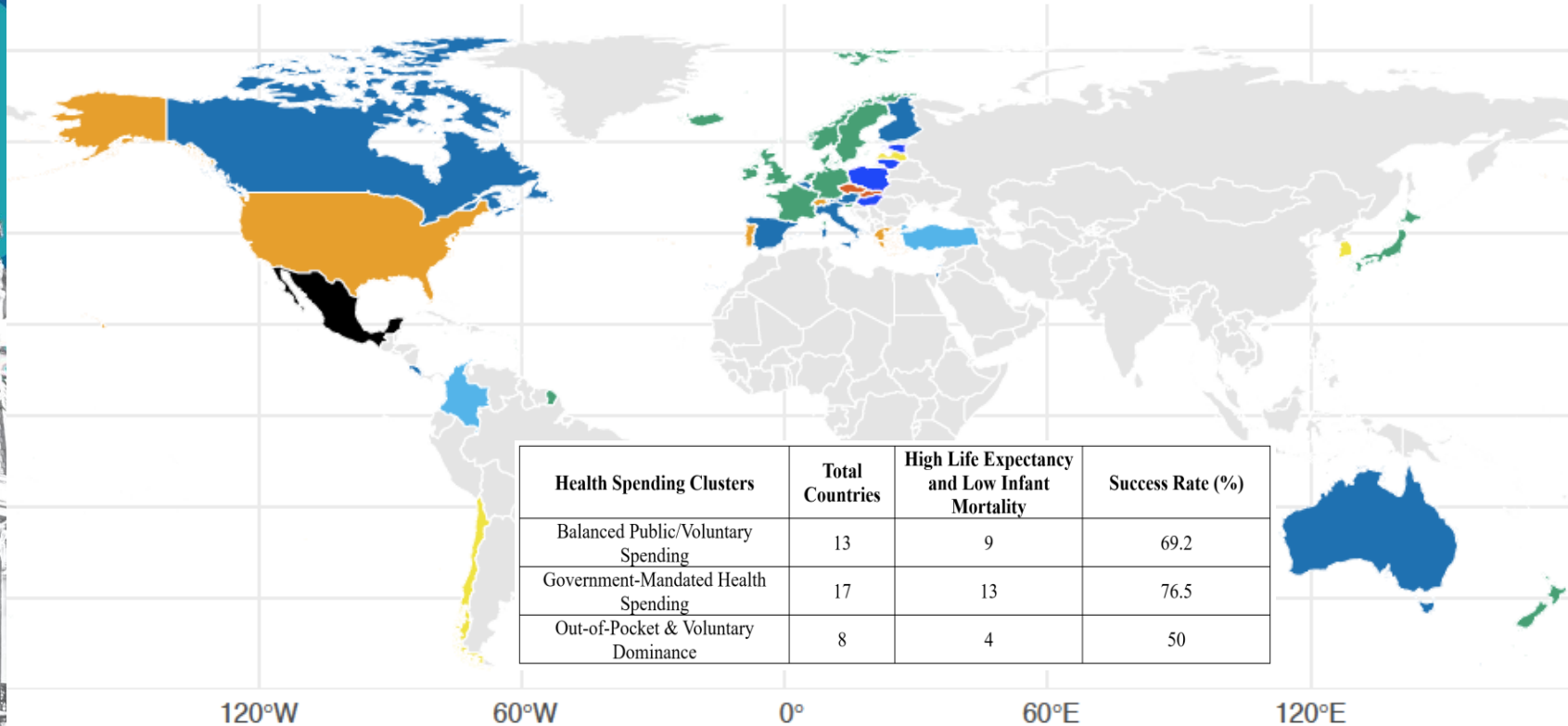
Grouped with Estonia and Poland —countries with mixed but generally higher health results.



Efficiency Questions

Points to systemic inefficiency in translating funding into effective services.

Health System Performance and Financing by Countries



Performance & Financing



Top Performers in Health Outcomes

Insights from Countries with Superior Systems



Cluster 3 Leaders

Japan, Switzerland, Sweden,
and Iceland exhibit highest
life
expectancy and lowest
infant mortality.



Balanced Financing Models

Blend of public and
voluntary spending
characterizes many top-
performing systems.



Holistic Policy Execution

Strong governance,
preventive care, and
equitable access bolster
performance.

Policy Recommendations

Strategic Actions for Better Health System Performance



Strengthen Public Health Investment

Expand efficient, publicly-funded health services to boost equity and access.



Lower Financial Barriers

Reduce out-of-pocket expenses through subsidies or insurance expansions.



Focus on Quality and Efficiency

Enhance service delivery, governance, and outcome monitoring mechanisms.

Conclusions

What Healthcare Spending Models Teach Us



Public Spending Performs Best

Government-mandated systems are generally linked to superior health outcomes.



Efficiency Over Volume

Effective use of resources matters as much as total expenditure levels.



Model Alone Isn't Enough

Governance, equity, and access mechanisms significantly shape success.

Study Limitations

Critical Considerations and Caveats



Data Uniformity

Differences in data quality and reporting standards across countries may affect comparability.



Methodological Constraints

PCA and MDS techniques simplify real-world complexities and may miss nuanced dynamics.



Temporal Generalization

Weighting recent years skews interpretation of long-term structural changes.

Future Research Directions

Advancing Global Health Financing Understanding



Dynamic Temporal Analysis

Segmenting the timeline could uncover regime-specific impacts across decades.



Equity and Access Studies

Deeper exploration of how financing models affect marginalized populations.



Policy Implementation Mapping

Connecting legislation to spending outcomes would enrich causal interpretation.

Final Thoughts

Strategic Health Financing is the Key to Population Wellbeing



Financing Shapes Outcomes

Model structure must align with access, efficiency, and equity principles.



Global Lessons for Local Reform

Cross-national insights offer a roadmap for country-specific improvements.



Evidence-Based Policymaking

Data-driven strategies empower health systems to adapt and thrive.



THANK YOU

WWW.EHMA.ORG
WWW.EHMACONFERENCE.ORG