EHMA 2025

Taking action to improve health for all

Future projections of cancer burden in Europe: Insights from the Box-Jenkins Approach

EHMA 2025

Taking action to improve health for all

Prof. Dr. Yusuf Celik Acibadem Mehmet Ali Aydinlar University

Prof. Dr. Ozgur Ugurluoglu Hacettepe University

Dr. Birol Yetim Mus Alparslan University

EHMA 2025

Future Projections of Cancer Burden in Europe

Insights from the Box-Jenkins Approach

Authors

Yusuf Çelik
Özgür Uğurluoğlu
Birol Yetim

Main Objective

To forecast the future cancer burden in Europe using ARIMA models and inform public healthplanning

Key Insight

Study highlights regional disparities and supports targeted cancer control strategies across European countries

Introduction

Rising Cancer Burden and Policy Imperatives

Global Threat

Cancer remains a top cause of death and illness globally, exerting intense pressure on healthcare systems

Key Drivers

Aging populations, lifestyle changes, and health disparities contribute to the escalating cancer burden

Need for Projections

Understanding future cancer trends is essential for resource allocation and policy development

Methods: Data Collection

IHME Dataset and DALY Metrics

Data Source

Used IHME's Global Burden of Disease (GBD) database for cancer-related DALYs across Europe (1990–2021)

Data Type

Disability-Adjusted Life Years (DALYs) combine premature mortality and years lived with disability

Data Integrity

All data were cleaned and formatted to ensure consistency and reproducibility

EHMA 2025

Methods: Modeling Approach

Box-Jenkins ARIMA Forecasting

Model Used

Applied ARIMA model for time series forecasting of cancerrelated DALYs by country

Stationarity Testing

Disability-Adjusted Life Years (DALYs) combine premature mortality and years lived with disability

Model Selection

Optimal parameters (p,d,q) chosen via AIC and autocorrelation analyses

Methods: Data Analysis & Forecasting

ARIMA Projections to 2050

Model Validation

Residual diagnostics ensured
models resembled white noise, confirming good fit

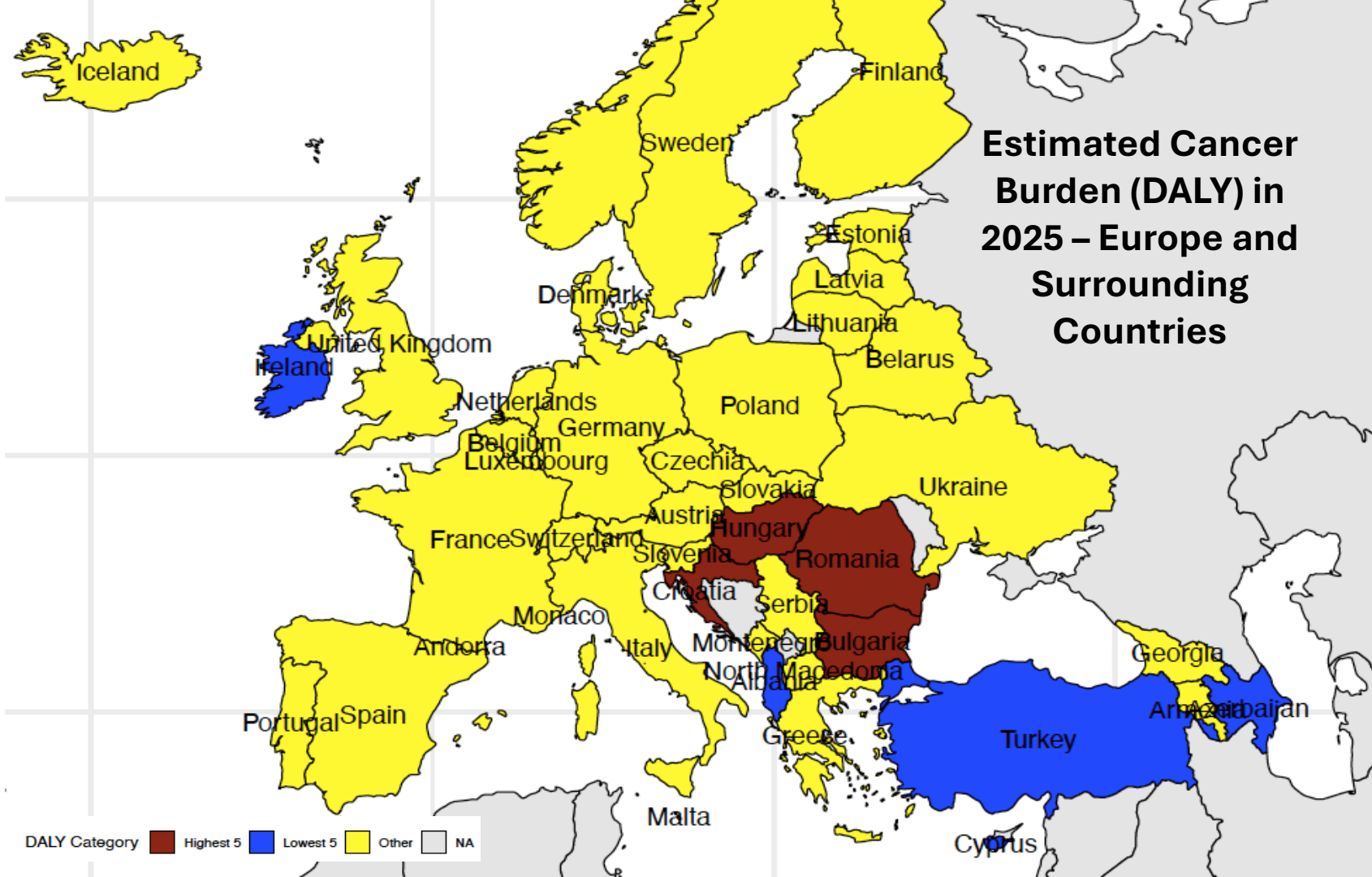
Forecasting Horizon

Projected cancer-related DALY
values for each country up to
2050

Software Used

Analysis conducted in RStudio
using 'forecast' and 'tseries' packages

Estimated Cancer Burden (DALY) in 2025 – Europe and Surrounding Countries



Findings: Projected Cancer Burden 2025

Estimated DALYs Across Europe

High-Burden Nations

Countries like Bulgaria, Romania, and Hungary have higher burden of cancer DALY estimates in 2025

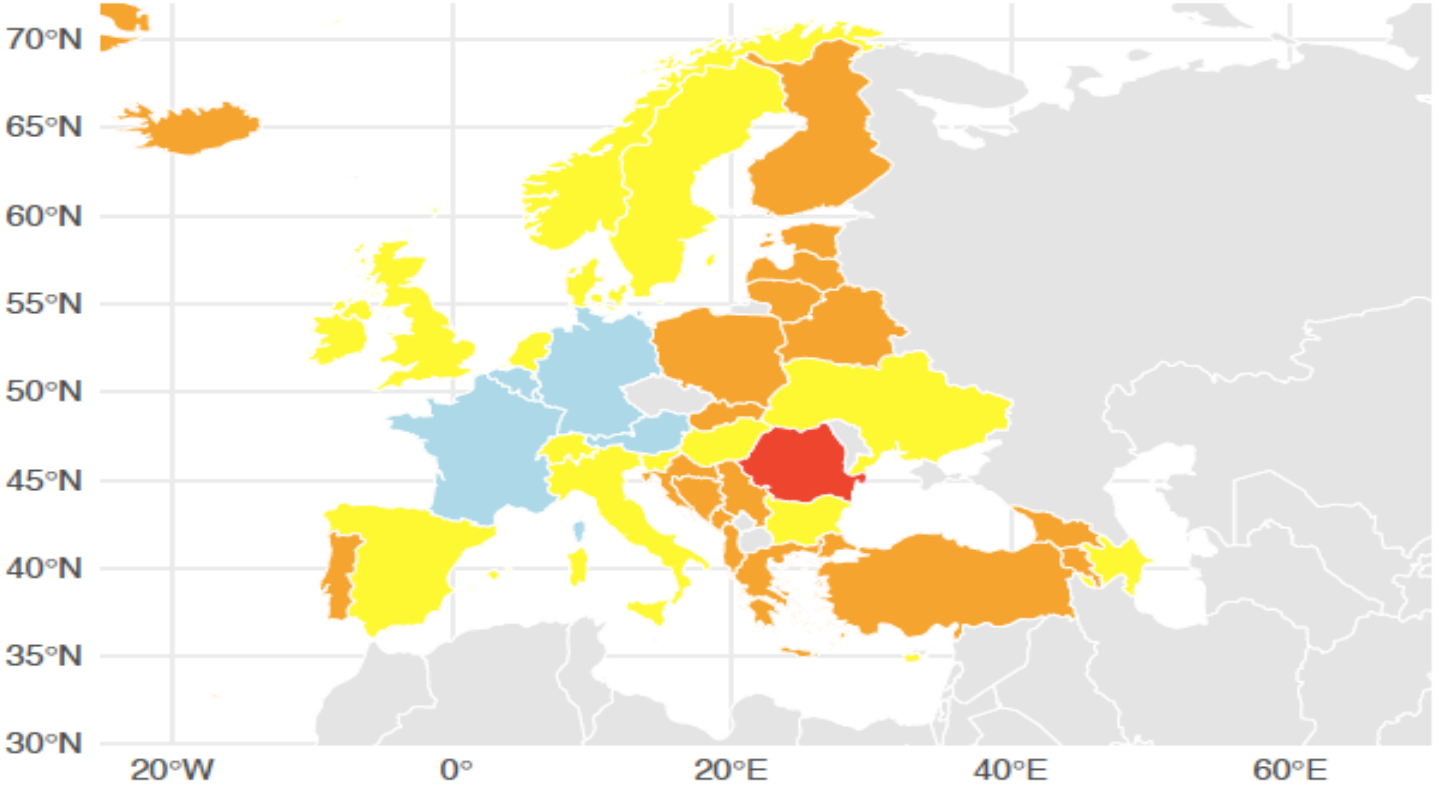
Western Europe Trends

Nations such as France, UK, and Sweden exhibit moderate to declining DALY rates

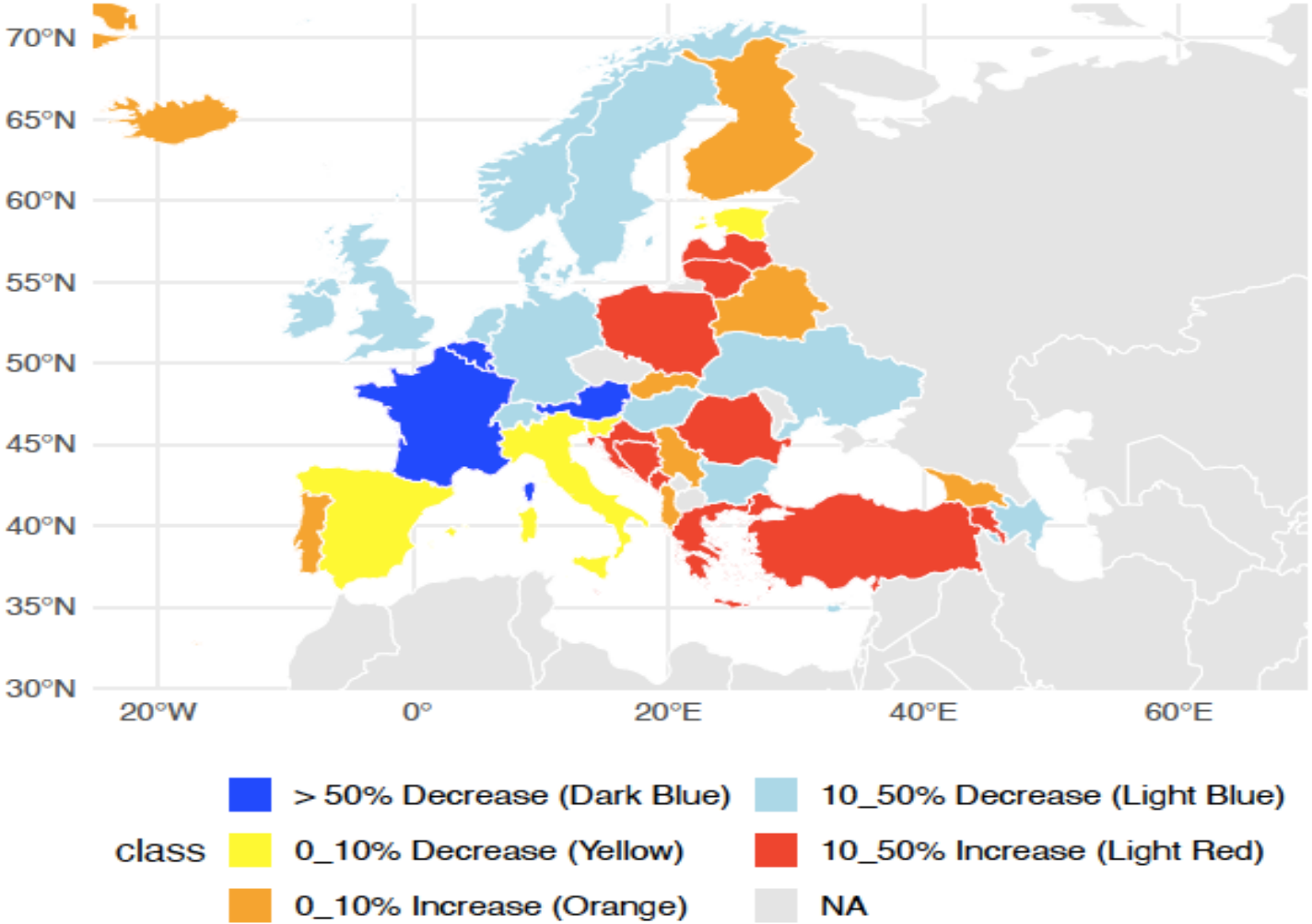
Continental Snapshot

Countries like Turkiye, Ireland, and Albania have lower burden of cancer DALY estimates in 2025

Disease Burden by 2030 Europe and Surrounding Region



Disease Burden by 2050 Europe and Surrounding Region



Findings: Projected Cancer Burden 2050

DALY Forecast Across Europe

Rising Trends

Romania, Poland, and Turkiye expected to face significant increases in DALYs by 2050

Declining Regions

Western European nations like
France, Belgium and Austria
Show marked improvements

Policy Signal

Forecasts highlight need for differentiated regional strategies in cancer care

EHMA 2025

Discussion: Regional Disparities

Diverging Cancer Trends in Europe

Eastern Burden

Rising DALYs in Romania, Poland, Lithuania, and Hungary highlight systemic health challenges

Western Decline

Belgium, Austria, Ireland, and Switzerland show improving cancer trends

Health System Contrast

Outcomes reflect disparities in prevention, screening, and treatment access

Discussion: Policy Implications

Toward Equitable Cancer Control

Urgent Investment

Eastern and Southeastern countries must prioritize oncology capacity and screening expansion

Collaborative Strategy

Cross-national knowledge sharing can help transfer successful cancer control policies

Forecasting Utility

ARIMA projections support proactive, data-driven resource allocation

EHMA 2025

Conclusion

Insights for Future Healthcare Strategy

Analytical Power

ARIMA modeling provides valuable foresight for healthcare policy and resource planning

Regional Priorities

Forecasts identify urgent needs in Eastern and Southeastern Europe

Equity Goal

Targeted interventions can reduce disparities and improve cancer outcomes across Europe

EHMA 2025

Final Reflections

Toward a Data-Driven Future for Cancer Control

Predictive Policy

Forecasting empowers proactive planning and investment in healthcare

Equity Lens

Models highlight disparities, guiding equitable cancer control strategies

Global Model

This European study can inform cancer policy globally through methodology and insights

Closing Thought

A Humanistic Perspective on Cancer

Beyond Biology

Cancer reflects humanity's battle not just with disease but with inequalities, access, and resilience

Vision for Future

Understanding cancer's trajectory helps pave paths of hope, care, and scientific breakthroughs

Call to Action

We must align policy, research, and compassion to create a future of equity in cancer care

EHMA 2025

THANK YOU

WWW.EHMA.ORG
WWW.EHMACONFERENCE.ORG

#EHMA2025