

Spatial and Temporal Patterns in Type 2 Diabetes Dynamics in Romania – A 10-year Time Series Study

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Abstract

Background: The study analyzes the temporal and spatial evolution of type 2 diabetes prevalence in Romanian counties over a 10-year period (2012-2021), based on the time series autocorrelation and cross-correlation coefficients. **Methods:** The database used in our analysis was extracted from a report achieved by the National Institute of Public Health in 2022, regarding the Type 2 Diabetes Evolution Evidence in Romania, between 2012-2021 (insp.gov.ro). The autocorrelation coefficients were calculated within each county's data series, in order to identify the internal temporal dependencies, and the cross-correlation coefficients were calculated on administrative regions, in order to identify epidemiological patterns. The calculations were made in SPSS 29.0 and Microsoft Excel. **Results:** The type 2 diabetes prevalences in most counties follow autoregressive series, with significant positive correlations at lag 1, indicating cyclical fluctuations. Cross-correlation analysis revealed 3 regional patterns: North-East and West regions showed a highly synchronized dynamics with cross-correlations exceeding 0.9; South-East and South regions showed mixed synchronization, with temporal lags of 1–2 years between counties, while the other regions (Center, South-West and North-West) revealed a synchronized core and an isolated county, with atypical dynamics (e.g., Cluj, Alba, Mehedinți, Ialomița). These findings highlight the utility of time series analysis in understanding the specificity of such data and their practical applicability in customizing the required public health interventions.

Keywords: Time series analysis; Autocorrelation; Cross-correlation; Type 2 diabetes; Epidemiology; Romania.

