Spatio-temporal dynamics of regional mortality in EU Member States between 2002 and 2016

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Background A mortality gap has been described between western and central and eastern European Union (CEE) Member States. The divide is considered to follow borders of the former iron curtain, where the west is characterised by low death rates and CEE by higher mortality in middle and older age. Our aim was to investigate whether the low mortality border has been pushed eastward since the EU expansion in 2004.

Methods Using Eurostat's regional life tables database, we constructed a panel of age- and sex-specific death rates in 1-year age groups for 276 European regions between 2002 and 2016. We classified the regions into clusters for each sex and year by applying the K-means clustering algorithm to the relevant cross-section of the panel. This approach allowed the computer to identify similar regions for each sex-year combination based on age-specific mortality patterns alone, without basing the comparisons on historical or political borders. The criterion used to determine the number of clusters was the model sum of squares. We repeated this procedure for a panel of annual age- and sex-specific changes in regional death rates.

Results Preliminary results support a two-cluster model of regional death rates. The two clusters only incompletely correspond to political western and CEE macro regions, as Slovenian and Croatian regions cluster together with western rather than CEE regions. The border between the clusters also changed in time, as Czech regions transitioned from clustering with eastern to clustering together with western regions. Analysing changes in regional death rates rather than their absolute levels produces a large number of clusters, with high and low mortality reductions present in both western and CEE regions.

Conclusions EU regional death rates data suggest a persistent east-west mortality gap, but its border does not follow expected political divides and has changed in the past 15 years.

Main messages

- We examined the borders of the east-west EU mortality gap using K-means clustering of regional data
- We found a persistent, yet changing low regional mortality border that does not precisely reflect political borders between western and CEE Member States