USE OF FACTOR ANALYSIS TO OBTAIN INDEPENDENT HEALTH PERFORMANCE INDICATORS

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OBJECTIVE
Health performance indicators (HPIs) provide a quantitative tool to assess the performance of health care policies. Available HPIs may be strongly correlated, limiting further inferential use.

In this study we converted published HPIs into a set of independent HPIs (iHPIs) using factor analysis and we subsequently used these iHPIs to perform regional health care performance comparisons.

METHODS
The set of 27 HPIs on 43 European countries from 7 geographical regions¹ was used. We extracted only indicators related to direct health care policy having limited missing data (< 20%) and applied factor analysis to obtain iHPIs.

The performance of the 7 regions was analysed using iHPIs in cluster analysis and non-parametric ANOVA.

RESULTS
8 correlated indicators met our analysis criteria: teenage pregnancy rate, neonatal mortality, mother mortality, measles immunization rate, post-neonatal mortality, AIDS incidence, male systolic blood pressure and cervical cancer mortality. The factor analysis reduced this set to 3 components or iHPIs, which could be grouped in ‘mother & child mortality’, ‘prevention’ and ‘AIDS incidence’. These 3 components explained 77% of the variance.

The 7 European regions differed significantly for 7 of the 8 initial HPIs and for each of the 3 iHPIs (p always <= 0.02). As shown in figure 1 the health performance of Nordic countries, UK and Ireland, Continental and Mediterranean Europe are similar, except for the higher AIDS incidence in Mediterranean Europe. In the former Soviet Union area, mother & child mortality and AIDS incidence are worse than in other regions even if strong differences exist between countries of that area.

Cluster analysis based on the 3 iHPIs, avoiding multicollinearity, generated regions with different country composition. Both Malta and Georgia became isolated, Finland and Portugal shifted from their geographical region.

As compared to the average result of the respective region, Malta has increased neonatal and mother mortality, Portugal has increased mother mortality and AIDS incidence, Finland has lower AIDS incidence and Georgia has increased mortality and AIDS incidence.

CONCLUSIONS
HPIs are important to assess and compare the impact of health care policies across regions and countries. After extracting 8 correlated HPIs linked to direct health care policies from a published set of HPIs, factor analysis allowed to convert these into 3 independent components, which were subject to further multivariate analyses offering additional and different insights.

References:

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