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## ***A statistical method to create a neighborhood deprivation index for health inequalities analysis***

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**Background:** To study social health inequalities, contextual data may constitute an appropriate alternative to individual socioeconomic characteristics. Indices can be used to summarize the multiple dimensions of the neighborhood socioeconomic status. This work aims to develop a statistical procedure to create a neighborhood socioeconomic index and to investigate the influence of the clustering method on the measure of health inequalities.

**Methods:** The study setting is three French urban areas. Socioeconomic data at the census block scale come from the 1999 national census. Successive principal components analyses are used to select variables and create the index. Deprivation categories are drawn with hierarchical clustering. This procedure is illustrated by exploring the relationship between infant mortality (2000-2009) and neighborhood deprivation in the Lyon urban area.

**Results:** Among the twenty variables selected in the index, 15 are common to the three areas. Clustering shows that in order to create 5 classes more than one principal component should be used, 3 classes appeared more relevant when using only the first. Application to infant mortality risk revealed a socioeconomic gradient.

**Conclusion:** The proposed methodology is statistically justified. It can be applied to multiple areas or socioeconomic variables. We highlight the importance of the clustering method when investigating social health inequalities.

**Keywords :** *Socioeconomic Status, Multidimensional index, Principal component analysis, Hierarchical classification, Small-Area Analysis*