**Estimation of neighborhood effect on mental health in the elderly using propensity score techniques**

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The goal of this work is to estimate the effect of living in different neighborhoods in Turin on mental health among elderly. The “neighborhood effect” is the independent causal effect of a neighborhood on any health or social outcome. The estimation of such effect is not trivial because we often have observational data, characterized by a non-random distribution of individuals in different neighborhoods. A valiant approach to estimate causal effect with observational data is the use of propensity score techniques, that allow the researcher to control the selection bias by closely mimic experimental study designs.

The source of data in our research is the Turin Longitudinal Study that allows to link together different health data flows relative to all resident people from 1971 to 2015, such as census, civil registry, drug prescriptions, hospital discharge registers and exemptions from pharmaceutical assistance. We focused our attention on mental health in older adults in the city of Turin, more specifically depression and dementia: the collaboration with the Epidemiological Service of Turin (ASL TO3) enabled us to operationally identify the outcome and the risk factors usually employed in prior researches. We considered ten districts of the city as different neighborhoods on which dichotomous and multi-treatment propensity scores are estimated.

In this work we evaluated and compared different methods to apply propensity scores in the estimation of neighborhood effect. As a first step, we performed some pairwise comparisons of different neighborhoods applying matching, stratification and inverse probability of treatment weighting. Then, we considered a multi-treatment propensity score, computed with boosted regression trees, in order to evaluate together all health differences among neighborhoods. The last step consisted in the interpretation and explanation of statistically significant neighborhood effects, using neighborhood characteristics, such as pollution, green areas and services distribution.