SHORT TERM IMPACT OF PM10 EXPOSURE ON MORTALITY: A PROPENSITY SCORE APPROACH

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Exposure to air pollution is associated with short-term increase in mortality and the interest in this field has recently moved to health impact assessment. Impact is usually evaluated in terms of deaths attributable to air pollution levels exceeding pre-specified thresholds corresponding to different counterfactual scenarios. To this end, a two-step approach is typically implemented: first the exposure-response function is estimated through specification of a regression model on the daily number of events, which accounts for possible confounders, including seasonality, meteorological conditions and influenza epidemics; second the estimated exposure-response curve is combined with the observed number of events and the observed air pollution levels in order to evaluate the absolute excess of deaths under each specific scenario. In this work, we propose a new statistical causal approach based on propensity score matching methods (Rosenbaum & Rubin, 1983). “Exposed” days (i.e., days with air pollution levels exceeding pre-specified thresholds) are matched with “unexposed” days having similar values of all observed confounders. Then the number of deaths attributable to air pollution is obtained comparing the number of deaths between matched days. We apply our approach to evaluate the short term impact of fine air-born particles (PM10) on mortality in the Italian city of Milan during the period 2003-2006. The results are compared to those obtained using the traditional approach (see Baccini et al. 2011), and advantages and disadvantages of the two methods are discussed.

References

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