Biometeorological Conditions and Respiratory Admissions in Crete Island, Greece

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The goal of this study is to assess and quantify the possible relationship between biometeorological conditions and daily counts of respiratory admissions in Heraklion city, Crete Island, Greece, during a five-year period 2008-2012. The thermal environment was analyzed by means of the Physiologically Equivalent Temperature (PET) and Universal Thermal Climate Index (UTCI), which are two of the most popular human thermal indices based on the human energy balance.

Generalized Linear Models (GLMs) with Poisson distribution were applied to time series of daily counts of outpatients with respiratory diseases against bioclimatic conditions, after controlling for possible confounders and adjustment for season and trends. The medical data sets, considered in three groups (total, male and female admissions), stand for the dependent variable while air temperature, relative humidity, wind speed, cloudiness, mean radiant temperature, PET and UTCI are the independent variables in the GLMs.

The interpretation of the extracted results suggests significant association between increased respiratory imports and cold weather. Specifically, a 50% increase of cloudiness causes a 5.4% and 5.2% increase in total and males' respiratory admissions, respectively. On the other hand, a 1.5% increase in females' admissions is observed due to 1^oC decrease of temperature. The impact of air temperature, wind speed and mean radiant temperature (Tmrt) on admissions on the same day is weaker than that of 3-days lag. The lag effect suggests that the air temperature can affect significantly after three days by increasing 2.8%, 2.2% and 4% the total, males' and females' admissions, respectively. Further, multivariate analysis (Generalized Additive Models) on respiratory admissions explains largest percentage of variance, after considering the lag effect to each variable. The percentage ranges from 13.8% for females' respiratory admissions, to 21.5% for total admissions.