

CONCENTRATIONS OF OZONE AND MORTALITY IN TAIWAN: PRESENT AND FUTURE

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Background and Aims Global climate disruption has been implicated to influence air pollution profiles through altering atmospheric compositions and chemical processes, and result in deteriorating air quality. This study therefore aimed to examine the association between variations of temperature, ozone (O₃) concentrations and mortality in Taiwan aiming to facilitate the projection of elevated health risk in the future.

Methods Database was first set up to integrate daily temperature, humidity, O₃ concentrations and a daily registration of cause-of-death from 1994 to 2008 in six major cities (Keelung, Taipei, Taichung, Chiayi, Tainan and Kaohsiung) of Taiwan. The population from 2010 to 2060 was based on projection by Taiwan Council for Economic Planning and Development. Generalized additive models (GAMs) and meta-analysis of random effect measured the local and regional relative risks of mortality after applying the population projections of six cities to calculate the expected number of deaths above the baseline (1994–2008) for the projected period of 2035–2050.

Results A 10-ppb increase in 2-day-lag of O₃ concentrations was associated with an higher risk in non-accidental-all-causes mortality for all population (RR_{pooled}= 1.065, 1.049–1.081); yet, not for population over than 65 years (RR_{pooled}= 1.010, 0.961–1.062) in Taiwan. For projecting number of daily deaths attributable to O₃ concentrations, an average increase of 3 ppb of O₃ concentrations for all 6 cities was assumed, Having applied a steady exposure–response relationship though the period of 2035–2050, the projected increase of mortality appeared to range between 2.3% (Taichung), the lowest to 10.7% (Taipei), the highest.

Conclusions The estimated level of increased risk associating rising pollution level and mortality further justify the urgent need for both global and regional adaptation strategy.