

Submission No.: AKC1-9043

Session Title: APSN-KSN CME Course 1

Date & Time, Place: April 29 (Sat), 08:30 - 10:30, Room 1

## **Greenness and Kidney? - Epidemiological Studies on the Relationship Between Green Space and Kidney Diseases**

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**Background:** Recent studies have identified the association of environmental stressors with reduced kidney function and the development of kidney disease. While residential greenness has been linked to many health benefits, the association between residential greenness and the development of kidney disease is not clear. We aimed to investigate the association between residential greenness and the development of kidney disease.

**Methods:** We performed a longitudinal population-based cohort study including all fee-for-service Medicare Part A beneficiaries (aged 65 years or older) in Massachusetts (2000-2016). We assessed greenness with the annual average Enhanced Vegetation Index (EVI) based on residential ZIP codes of beneficiaries. We applied Cox-equivalent Poisson models to estimate the association between EVI and first hospital admission for total kidney disease, chronic kidney disease (CKD), and acute kidney injury (AKI), separately.

**Results:** Data for 1,462,949 beneficiaries who resided in a total of 644 ZIP codes were analyzed. The total person-years of follow-up for total kidney disease, CKD, and AKI were 9.8, 10.9, and 10.8 million person-years, respectively. For a 0.1 increase in annual EVI, the hazard ratios (HRs) were 0.95 (95% CI: 0.93 to 0.97) for the first hospital admission for total kidney disease, and the association was more prominent for AKI (HR: 0.94 with 95% CI: 0.92 to 0.97) than CKD (HR: 0.98 with 95% CI: 0.95-1.01]. The estimated effects of EVI on kidney disease were generally more evident in White beneficiaries and those residing in metropolitan areas compared to the overall population.

**Conclusions:** This study found that higher levels of annual residential greenness were associated with a lower risk of the first hospital admission for kidney diseases. Results are consistent with the hypothesis that higher residential greenness benefits kidney patients.