Weiran Yuchi. **Neighborhood environmental exposures and incidence of attention deficit/hyperactivity disorder: a population-based cohort study.**

Background. Emerging studies have associated lower green space and higher air pollution exposure with increased risk of child attention deficit/hyperactivity disorder (ADHD). However, population-based studies are limited, and joint effects have rarely been evaluated. We investigated associations of ADHD incidence with green space, air pollution and transportation noise in single- and multi-exposure models within a population-based birth cohort.

Methods. We assembled a cohort from an administrative health database of births from 2000 to 2001 (N ~ 37,000) in Metro Vancouver, Canada. ADHD was identified by hospital records, physician visits and prescriptions. Cox proportional hazards models were applied to assess associations between environmental exposures and ADHD incidence. with adjustment for parental behavioral factors, birth information, and socio-economic status. Green space exposure from birth to age 3 was estimated using the vegetation percentage within 100- and 250-meter buffers of residential postal codes, derived from linear spectral unmixing of Landsat satellite data. Exposures to fine particulate matter (PM(2.5)) and nitrogen dioxide (NO(2)) were estimated using land use regression models; noise exposure was estimated using a deterministic model. Joint effects of green space and air pollution were further analysed by categorizing the co-exposures into quintiles.

Results. Over 7 years of follow-up, 1217 ADHD cases were diagnosed (4.2% prevalence). In single exposure models, green space was associated with lower incidence of ADHD (within 250-meter buffer size, hazard ratio: 0.90 [0.81-0.99] per interquartile range exposure increment), while PM(2.5) was associated with increased incidence (1.11 [1.06-1.17] per interquartile range increment). NO(2) and noise were not associated with ADHD. In multi-exposure models with impacts from air pollution (PM(2.5) and NO(2)) and vegetation, the effect of vegetation percentage was attenuated towards null. Effects of vegetation percentage and PM(2.5) on ADHD were larger among males. There was a 50% decrease in the hazard ratio for ADHD in locations with the lowest PM(2.5) levels and the highest vegetation exposure, compared to a 62% increase in hazard ratio in locations with the highest PM(2.5) and lowest vegetation levels.

Conclusions. We found evidence suggesting the existence of environmental inequalities in which children living in greener neighborhoods with low air pollution had much lower risk of developing ADHD compared to those with higher air pollution and/or lower vegetation levels. The results suggest that green space initiatives in urban design may reduce negative effects of harmful exposures on ADHD incidence.