**EFFECTS OF LONG-TERM AMBIENT HYDROGEN SULFIDE EXPOSURE ON ASTHMA AND LUNG FUNCTION**

Michael N Bates, School of Public Health, University of California, Berkeley, CA, USA  
Nick Garrett, Faculty of Health, Auckland University of Technology, Auckland 1142, New Zealand  
Julian Crane, School of Medicine and Health Sciences, University of Otago, Wellington, New Zealand.  
John Balmes, School of Public Health, University of California, Berkeley, USA.  
John McKeogh, School of Medicine and Health Sciences, University of Otago, Wellington, New Zealand.

**Background and Aims:** The health effects of long-term, low-level H\textsubscript{2}S exposures are unknown. This study took place in Rotorua, New Zealand, the world’s largest city built on a geothermal field (population >55,000). Geothermal gas, including H\textsubscript{2}S, emission sources are distributed throughout the city.

**Methods:** Participants were adult Rotorua residents, each of whom performed spirometry. H\textsubscript{2}S exposure was estimated from networks of passive samplers distributed throughout the city in the summer and winter. The monitoring results were used to generate concentration surfaces across the city, from which H\textsubscript{2}S concentrations at participants’ current residential addresses were estimated.

**Results:** A total of 739 participants was used in this analysis, of whom 169 (23%) reported a doctor’s diagnosis of asthma. H\textsubscript{2}S exposure was divided into quartiles based on estimated residential concentrations averaged over winter and summer. The asthma diagnosis rate was lower in the highest exposure group (16.6%) than in the other three groups combined (24.8%) (p=0.07). Logistic regression analysis for asthma, adjusted for smoking, age, BMI and ethnicity showed the 3 highest H\textsubscript{2}S exposure quartiles to have odds ratios of 1.21 (95% CI:0.75-1.95), 0.94 (0.58-1.53), and 0.70 (0.41-1.88), in order of increasing residential H\textsubscript{2}S exposure. Participants with asthma had higher adjusted FEV\textsubscript{1} measures associated with higher residential H\textsubscript{2}S exposures on a continuous scale (p=0.02), whereas there was no association with H\textsubscript{2}S for those without an asthma diagnosis (p=0.79).

**Conclusions:** This study presents evidence of reduced asthma risk and higher FEV\textsubscript{1} in asthmatics living in higher H\textsubscript{2}S exposure areas. This might be a direct effect on the airways of asthmatic subjects, as recent animal studies have shown inhaled H\textsubscript{2}S can reduce inflammation (Faller et al 2010), or it could be a healthy survivor bias.

**References:**