

LETTER TO THE EDITOR

The effects of Air Pollution on asthma Hospital admissions in Adelaide, South Australia, 2003–2013: time series and case-crossover analysis

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We read with great interest the recent study by Chen and colleagues [1] which showed an increased risk of asthma hospital admissions in all age groups with total pollen. However, there are numerous issues that have been overlooked in the analysis of the pollen variable. If these issues were considered, the authors may have observed stronger species-specific effects, thereby contributing to the evidence base on which pollen species is the major trigger of asthma exacerbations requiring hospitalization.

Pollens are specific to the local environment, and Australia is geographically and climatically diverse; our recent work suggests significant variations in the distribution of airborne pollen across urban regions in Australia [2, 3]. The study by Chen and colleagues contributes to the evidence base by showing significant effects of pollen on respiratory disease in Adelaide, which is a region with different exposure and climatic distributions compared to Melbourne, where most of the Australian pollen studies arise from [4–6].

It is important to know whether grass pollen is the prime trigger in Adelaide too. Our current work analysing data from Sydney using a similar analytical approach confirms our earlier findings on pollen in that instantaneous effects are stronger by different species compared to cumulative effects. For example, an increase from the 75th to 90th percentile in same-day grass pollen was associated with childhood asthma hospitalizations in Sydney (2008–2013), adjusted odds ratio = 1.033 (95% CI: 1.0044–1.0621), $P = 0.023$ (unpublished data). If we are observing strong grass pollen effects in most regions in Australia, we can therefore focus on interventions that minimize exposure to high grass pollen days, thereby reducing the likelihood of an asthma exacerbation. It is difficult to assess this in this study from Adelaide when different pollens are collapsed into a total pollen count variable.

The authors observed effects of pollen in cool seasons but not in warm seasons in multi-pollutant models. While they hypothesize that pollen types in Adelaide in the cool season may be more allergenic than those in warm seasons, they do not provide data on pollen species by season in Adelaide. In fact, personal communication with the Adelaide Aerobiology Laboratory [Thomson K 2016, Adelaide Aerobiology Laboratory, oral communication, 19th August] suggests that grass is the prominent pollen during the August to March peak period and other pollens that are less allergenic occur during the cooler season. This chance finding should be interpreted with caution because all pollens are modelled together by season and absence of respiratory viral data during the cooler months would also confound these associations. The authors also do not report the P value from the interaction term in models with the exposure-by-season interactions. Including readmissions within 28 days is also a potential problem. Our previous work on admissions in children over the 1997–2009 period suggests that readmissions within 28 days peak in winter and can be as high as 21% on a weekly basis in children and adolescents [7]. It is difficult to diagnose asthma in the 0- to 2-year age group as the majority of children present with symptoms, such as wheezy bronchitis, and recurrent upper respiratory tract infections and should be excluded from the analysis.

Identifying high-risk groups is important, and by extending the analysis to assess sex differentials may provide further insights. Childhood asthma is more prevalent among boys, and evidence suggests differences in pollen exposure effects between boys and girls [5, 8]. Although this study provides an important contribution, a detailed description of the instruments used to collect the pollen in the study including the location, height and counting protocol are important factors that need to be considered when assessing these associations [9]. Further studies with uniform measures of pollen and similar analytical methods are necessary to fully understand the impact of different pollen species on allergic respiratory disease in the Australasian region.

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