

#OA0066 - Evaluating the real exposure of allergics to airborne pollen: Too high, too early, too long or too complex?

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Background

To date, high-risk pollen exposure alerts have been provided only via forecasting models and laborious monitoring methods. The aim of this study was to evaluate the ‘real pollen exposure’ to airborne pollen, using automatic, real-time pollen monitoring devices, as well as conventional ones and comparing against symptoms from dedicated cohorts of allergic individuals. The research question was whether it is possible and to what extent to assess the personalised pollen exposure that accurately reflects in the everyday symptom score of an allergic individual.

Method

Airborne pollen have been monitored in Augsburg, Germany, since 2015, using a novel automatic Bio-Aerosol Analyser (BAA 500, Hund GmbH), along with a conventional 7-day recording Hirst-type volumetric trap. In parallel, ocular, nasal and pulmonary symptoms of birch and grass pollen-allergic human volunteers have been registered daily. We investigated for the ‘genuine’ pollen exposure, comparing symptoms against the 3 pollen datasets, A) from conventional device, B) from automatic device with the original pollen classification, C) from automatic device with the manual pollen classification. To achieve the above, different definitions of pollen season start, peak, end and duration were checked.

Results

Only the automatic pollen sampler (but after manually classifying pollen and improving existing algorithms) was more accurately able to predict the onset of symptoms, even in earlier or isolated incidents in November and December. On average, all three pollen monitoring means yielded comparable pollen season peaks for birch and grass airborne pollen seasons. During the main pollen season, pollen coincided and correlated positively with symptoms scores of allergic subjects, irrespective of type of the measurement device used. However, the Hirst-type pollen sampler by rule underestimated the amount of pollen in the air, at least 2-fold.

Conclusion

The actual pollen exposure of allergic individuals can be defined more efficiently by automatic, real-time pollen information, after pollen manual classification. This monitoring system identifies out-of-the-season, early pollen occurrence, which closely reflects in early-season symptoms, whose onset cannot be warned upon with existing conventional techniques. An urgent switch to operational automatic pollen monitoring techniques needs to be made, towards the implementation of timely, personalised management of allergies in the future.