

Conclusion: Comparing with the results from the study conducted in Zagreb in the same age group in 2002, our results showed statistically significant increasing in the prevalence of the diagnosis of asthma (χ^2 6.7182, P -value 0.009544; $P < 0.05$), but no statistically significant increase in the prevalence of wheezing in the 12-months period (χ^2 0.0038, P -value 0.950619, $P < 0.05$).

TP1140 | Are new types of smoking alternatives better than conventional tobacco for the prevention of asthma in adolescence?

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Background: The health effect of electronic cigarette (e-cigarette) versus conventional tobacco is still under investigation. We evaluated the effect of smoking in the development of asthma according to many aspects of smoking including e-cigarette smoking.

Method: This study was conducted using the 14th Korea Youth Risk Behavior Web-based Survey (KYRBWS), 2018 which represented 2 850 118 Korean middle and high school students (12-18 years old). The development of asthma was assessed by the question "Were you diagnosed as asthma by physician within past 12 months?" Conventional and e-cigarette smoking status was assessed by corresponding questionnaires. Covariates were age, sex, body-mass index, physical activity, socioeconomic status, presence of rhinitis and secondhand smoking.

Results: There were 190 313 (6.7%) current smoker and 76 715 (2.7%) current e-cigarette users. Current smoking was significantly associated with the development of asthma (odds ratio [OR] = 1.53, 95% confidence interval [95% CI] 1.23-1.91) whereas current e-cigarette use was not (OR = 1.17, 95% CI, 0.83-1.63). However, when e-cigarette were divided into liquid and heating type e-cigarette, consumption of heating type e-cigarette was significantly associated with the development of asthma (OR = 1.55, 95% CI, 1.02-2.36). Using only e-cigarette and not conventional cigarette was not a risk factor for the development of asthma compared to never smokers. Switching to e-cigarette smoking from conventional smoking significantly reduced the risk of the development of asthma than maintaining conventional smoking (OR = 0.14, 95% CI, 0.2-0.96).

Conclusion: E-cigarette seemed less associated with the development of asthma than conventional smoking. However, the type of e-cigarette must be taken into consideration.

TP1141 | Progress in automated airborne pollen monitoring with the BAA500

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Background: In the last few years, an increasing percentage of the population suffers from pollen allergies. As yet, established pollen counting techniques rely on manual evaluations with light microscopes. Therefore, they cannot supply short-term information on ambient pollen concentrations which would be extremely helpful for allergic persons to plan their daily activities and medications. Since 2010, Hund has been active in the development and installation of the first fully automated pollen monitoring system, the BAA500. It is based on optical microscopy in combination with digital image acquisition and recognition.

Method: The implemented algorithm discriminates the pollen taxa contained in the machine database with high accuracy. As the images of the pollen are permanently stored in the system and because the evaluation of the taxa is based on a feature set, hitherto unknown species can easily be included into the database, and re-evaluation of images of older samples is always possible. The results are available on short-term basis and can easily be accessed via Internet.

Results: For many years now, the BAA500 has successfully been tested in several locations in Germany and Europe. Its results are continuously validated and improved. In 2018, the first pollen monitoring network has been established based on the BAA500. It has already been proven as a quantum leap for automated pollen monitoring. It will therefore be a key component for future pollen forecasting models. The BAA500 has shown high reliability and accuracy when compared with the result of Hirst-type traps. Thus, it helps affected persons with more precise pollen counts.

Conclusion: The presentation shows how the accuracy of the system can continuously be improved by adding more pollen data to the reference database. This is supported by pollen experts using our system. Moreover, the classification algorithm is open in the sense that also objects other than pollen can be detected and added to the database. We present first results for germs or fungal spores.

TP1142 | Automated dander dispersion in a naturalistic exposure chamber

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Background: A naturalistic exposure chamber with two neutered male cats has been developed (Red Maple Trials, Ottawa) to test allergic responses of subjects during controlled exposures to Fel d 1. To improve upon traditional methods of dander aerosolization,

in which bedding is shaken, resulting in transient levels of allergen, we have developed an automated delivery system using a modified robotic vacuum cleaner. The prototype model has been shown to deliver steady particle levels and Fel d 1 levels consistent with those found in homes with cats. In the present work, we validate our working aerosolization system for two dispersion rates, and document the spatial and temporal distribution of aerosolised particles and Fel d 1 within the chamber.

Method: The robotic vacuum has been modified to vent aspirated dander into the air via a custom fit exhaust tube. Controlled remotely, it will move throughout the chamber (floor area = 15.1 m²) for up to one hour, aerosolizing the dander that has naturally collected on the floor. Air samples will be obtained at various locations across the chamber using portable air sampling pumps (Gilliam 5000) with glass fiber filters (Millipore). Fel d 1 deposited on the filters will be quantified using ELISA (Indoor Biotechnologies). Counts and sizes of dander particles will be measured using a time-of-flight particle size distribution analyser (PSD 3603, TSI Incorporated). Results will be evaluated for spatial distribution and temporal stability of Fel d 1 level, for two dispersion rates.

Results: A flow visualisation test, in which the robot aspirated and vented flour dust, revealed a turbulent round jet exiting the vacuum, having a strong core as high as 2 feet above the floor, and high concentrations of diffused particulate as high as 4 feet above floor level. Preliminary testing of the working model at the highest flow setting showed a higher number of large particles (>1 µm) being aerosolized compared to a prototype model, with the average particle size approximately 2 µm, compared to 0.8 µm for the prototype model.

Conclusion: The validation of a novel automated system for aerosolizing dander is expected to provide a means of better controlling subject exposure to animal dander for cat allergy studies, while maintaining a naturalistic environment.

TP1143 | Comparison of Methods for cat dander aerosolization

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Background: Historically, aerosolization of cat dander in natural exposure rooms is done by intermittently shaking bedding. However, this has resulted in widely variable Fel d 1 exposure. For the RMT Natural Exposure Chamber, we developed an automated aerosolization technique, using a filterless robotic vacuum cleaner that generates more stable particle levels. In this study we compare cumulative airborne Fel d 1 levels and aerosolized particle counts from this automated method, with and without the use of additional fans, to the blanket-shaking method.

Method: Dander aerosolization was performed for 30 minutes for each method; the vacuum was run continuously, while bedding was shaken vigorously for two minutes at 15-minute intervals. During the 30 minutes of aerosolization (or two 15-minute periods following blanket shaking) dander samples were collected using portable air sampling pumps (Gilliam 5000) at 4 L/min with 2 µm glass fiber filters (Millipore). Fel d 1 was quantified using ELISA (Indoor Biotechnologies). Counts and size distributions of airborne particles were measured every three minutes during and for 15 minutes following aerosolization with a time-of-flight particle size distribution analyser (PSD 3603, TSI Incorporated). Measurements were repeated on four separate days for each method.

Results: Despite having the lowest total particle (>2 µm) count (3.04 × 10⁶ particles/m³), blanket shaking resulted in the highest Fel d 1 levels of the three methods (76 ng/m³). It also had the highest standard deviation (30 ng/m³), indicating comparatively low repeatability. The vacuum method with fans produced comparable Fel d 1 levels (65 ng/m³) as well as the lowest standard deviation (8 ng/m³) with a particle count of 4.58 × 10⁶ particles/m³. Vacuuming alone had the highest particle count (8.06 × 10⁶ particles/m³), but also the lowest Fel d 1 levels (43 ng/m³), showing that the Fel d 1 level did not correlate to aerosolised particle count.

Conclusion: All methods produced Fel d 1 levels in the range of those in homes with cats. Particle counts surprisingly did not correlate to Fel d 1 level, suggesting the aerosolization of non-dander particles. Blanket shaking generated the highest average Fel d 1 level, but showed low repeatability. The vacuum method with fans showed the best stability and repeatability and met target Fel d 1 levels for matching "in-home" conditions.