Results A 28-year-old female experimental animal trainer was referred for suspected occupational asthma. She worked with rhesus monkeys for about 6 years, as a lab technician in a university neurophysiology lab, performing mainly cognitive testing. She had daily contact with the test animals. The animals were living on sawdust.

The patient experienced respiratory symptoms 2 years after she started working on the experimental lab. She had progressive wheezing and non-productive cough. The respiratory symptoms were accompanied by irritation of eye and nose mucosa, itching papules on forearms with accidental blood splashes or scratch injuries by the monkeys, spontaneously disappearing after 10 min.

Specific IgE test to rhesus monkey was not available; screening to other possible (extra-) professional exposed allergens was negative. Her total serum IgE was not elevated (55 kU/L), blood eosinophil count was elevated (0.3 × 10^9; 6.9%). Spirometry showed supra-normal volumes and normal exhaled nitric oxide (FENO 16.40 ppb at flow of 50 ml/sec).

Histamine provocation test showed a mild bronchial hyper-reactivity (PC_{20}=1.47 mg/ml). Serial peak expiratory flow recordings performed were suggestive of occupational asthma (OASYS-score=3.67).

We did not perform skin prick testing with rhesus monkey saliva, blood, urine or hairs (epithelium) because of ethical reasons (possibility of infectious contaminated material). So we decided to perform ex vivo testing (basophil activation test).

Conclusion This is the first case demonstrating the possible role of rhesus monkey exposure in the development of occupational asthma.

**Abstracts**

**71 RESPIRATORY DISORDERS IN HOME DELIVERY SERVICE EMPLOYEES**

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Introduction Air pollution in developing countries is causing respiratory disorders and is especially affecting health of persons who are on the road for longer period due to their occupation. Objective of this study was to find the extent of air pollution on road leading to respiratory disorders in two wheeler riders employed in home delivery service.

Methods Permission from concerned authorities and consent from volunteers was taken. Automobile exhaust emission was tested in 100 vehicles, 25 in each group of (above 10 years old) cars, buses, trucks and auto rickshaws. Clinical findings were recorded for 100 two wheeler riders employed in home delivery service.

Results 28% vehicles had higher than standard emission readings. PFT reports of home delivery service employees showed 24 of them had mild/moderate obstructive pathology. 36 persons had symptoms of allergic bronchitis, 31 persons had irritation in nose and throat and 18 persons had irritation in eyes. Control group showed abnormal findings in 8 PFT reports.

Conclusion Creating awareness and educating public about air pollution on road due to automobiles exhaust is necessary.

Implementation of strict administrative engineering controls for regular maintenance of vehicles and enforcement of rules, regulations on vehicle emission standards and fuel quality standards will make a great difference in reducing air pollution. Encouraging mass transport, pooling of cars and electric vehicles will reduce air pollution in developing countries. These measures will change the scenario to a pollution free road to produce a positive effect on health of people who are on the road for a longer time due to their occupation and also on health of the general public.

**195 A BENCHMARK/SAFETY FACTOR APPROACH FOR SETTING OELS FOR NANOMATERIALS**

Tee Guidotti. Occupational + Environmental Health and Safety, Washington, DC, USA

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Uncertainty over the best way to evaluate the risks of engineered nanomaterials (ENMs) is causing delay in regulation despite their rapidly growing use by industry and in consumer products. Because of their enormous diversity in size, composition, configurations and properties, it seems clear that ENMs cannot be regulated as a single class. Occupational exposure levels (OELs) for engineered nanomaterials may however be usefully set using proposed benchmark/safety factor approach. In the proposed approach, a benchmark OEL would be used for ENMs considered to be ‘relatively inert’ (such as TiO_2).

As a precaution, the recognised benchmark OEL would be based on an existing standard for fine particulate air pollution, which is highly biologically active and includes modes of particles in relevant size ranges. For ENMs which cannot be presumed to be relatively inert, additional uncertainty factors (e.g., 0.1 or 0.3) would be applied for toxicologically significant properties, such as metal or semimetal content, fibrous shape, biological activity, structure-activity relationships suggesting greater potency, and resemblance to known hazards. OELs set in this manner could be used as provisional regulatory standards until data become available to support more definitive standards. An illustration of the approach is given based on the Canada-wide ambient air quality standard for fine particulate matter (PM_{2.5}). The Canadian standard and the proposed benchmark OEL are mass-based, of necessity. While mass may not be the most relevant dose metric for evaluating the biological effects of ENMs, mass-based measurement techniques are the only practical means for routine workplace exposure monitoring at the present time.

**1153 EFFECTS OF SULFUR DIOXIDE ON FRACTIONAL EXHALED NITRIC OXIDE CONCENTRATION IN THE CHILD RESIDENTS OF MIYAKEJIMA ISLAND**

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Introduction In 2000, all residents were forced to evacuate the island of Miyakejima in Japan, due to a volcanic eruption following massive amounts of volcanic gas emission including sulfur dioxide (SO_2). As a high concentration of SO_2...
BERYLLIUM IN GOLF CLUBS: CASE REPORT

A 53-year-old non-smoker male with medical history of diabetes mellitus type II and hyperlipidemia presented to his personal physician. He had the BeLPT performed with positive result, diagnosis him with BeS. CT scan showed residual of old granulomatous disease with multiple calcified small pulmonary nodules and calcified nodes. The patient is with no symptoms related to BeS.

Discussion
In this report, we describe two beryllium golf clubs manufacturing workers who developed BeS and CBD. Beryllium is a metal that is extremely light and strong with high melting point and a high thermal and electrical conductivity making it suitable for a wide range of industries, including defense, aerospace, nuclear, and electronics. Its lightweight makes it fitting for producing lightweight golf clubs. About 62,000 workers in the U.S. are exposed to beryllium in their workplaces and the risk of developing BeS and/or CBD from occupational beryllium exposure has been recognised for a long time. The risk factors include individual genetic susceptibility and the amount of beryllium exposure. The proportion of workers with BeS that progress to CBD varies widely, ranging from 9% to 100% with CBD developing approximately 10–20 years after first exposure. The importance of protecting workers from beryllium exposure is evident with OSHA’s recent lowering of the permissible exposure limit (PEL) for beryllium to 0.2 mcg/m³ air, averaged over 8 hours in hope of saving workers from BeS and CBD. With several case reports showing BeS development after a brief or opportunistic exposure to beryllium in administrative staff, it is important to minimise or eliminate beryllium exposure. Workers with beryllium exposure need ongoing medical screening and surveillance for BeS.

Conclusion These two cases underline the critical need to protect workers from harmful exposure to beryllium, using engineering and work practice controls along with personal protective equipment. For BeS and CBD, it is recommended to eliminate or minimise further exposure to beryllium.