BDE209 was associated with a significant increase of 2.48 nmol/L in total T4 in men ($p=0.011$), and with a close to significant increase in the free/total testosterone ratio of 6% in men ($p=0.053$). BDE47 and BDE153 were not associated with hormone levels.

Conclusions The clinical significance of high exposure to BDE209 in working adults is yet to be established, but endocrine effects were observed in this population. E-recycling workers are highly exposed to PBDEs among other substances, which may make them more vulnerable to hormonal disruption.

Mini-Symposium 4: Advances in Neurodegenerative Disease Epidemiology

O6E.1 SELF-REPORT OCCUPATIONAL EXPOSURES AND MND IN NEW ZEALAND

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Background We have reported previously the results on a New Zealand population based case-control study evaluating occupations as risk factors for MND. The aim of this study was to investigate the associations between 11 different occupational exposure groups and the risk of MND by using self-reported job-related exposures.

Methods We recruited 321 cases through the New Zealand Motor Neurone Disease Association and hospital discharges records, and 605 population controls from the Electoral Roll between 2013 and 2016. A standardized questionnaire was used to obtain information on personal and demographic details, lifestyle factors and a full occupational history with detailed workplaces exposures. Unconditional logistic regression was used to estimate odds ratios (ORs) and 95% confidence intervals for MND. Analyses were adjusted for age, gender, ethnicity, socioeconomic status, education and smoking.

Results Significantly elevated risks for MND were observed for self-reported job related exposures to Fibres (OR=1.39, 95% CI 1.00–1.93); Fumigants (OR=2.44, 95% CI 1.35–4.23); Animal and Animal Products (OR=1.41, 95% CI 1.03–1.92); Other Chemicals (OR=1.53, 95% CI 1.14–2.05) and Fungicides/Insecticides/Herbicides/Timber Preservatives (OR=1.44, 95% CI 1.05–1.99)

Conclusions Our study shows various occupational related exposures with increased odds of MND. While study results need to be interpreted cautiously given the lack of direct exposure measures, these results, in particular exposure to Fumigants, Fungicides/Insecticides/Herbicides/Timber Preservatives which were consistent with our previous results on agriculture occupations and MND risk. Future studies will have a particular focus on exposures specific for certain job tasks and dose-response relationships.

O6E.2 EXPOSURE ASSESSMENT FOR A STUDY OF COGNITIVE IMPAIRMENT IN FORMER PROFESSIONAL FOOTBALLERS IN ENGLAND

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Evidence is accumulating on the possible increased risks of neurodegenerative disease in former (professional) sports persons. This study will assess the associations between a history of repetitive low-level head trauma and general and neurological health in retired professional footballers aged 50+ in England. The main exposure measures are concussions and cumulative lifetime repeated sub-concussive head impacts (RSHIs), either from heading footballs or other forces applied to the head. Information on factors associated with concussions and RSHIs will be collected via a structured questionnaire during face-to-face interviews.

Our approach will include:

- Literature search to identify potentially important proxy measures of RSHI during training and matches;
- Developing a model of cumulative RSHIs, based on the more strongly predictive variables, which may include playing position, the frequency of heading, the number of games played and training sessions attended, decade of play and the type of ball used.
- The model will be developed from analyses of head contacts from video footage of matches and training, at the individual level and in general, and from statistics on playing career. We will also consult a panel of former professional footballers on the exposure assessment.

The exposure data will be crucial to assess whether those with higher exposure within the study cohort are at increased risk compared to those with lower exposure.

O6E.3 CAN THE MULTISTAGE MODEL BE APPLIED TO AMYOTROPHIC LATERAL SCLEROSIS (ALS)?

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Background There are several intriguing features of amyotrophic lateral sclerosis (ALS). Some people with genetic susceptibility never develop ALS; ALS develops in late life and progresses rapidly; the same mutation can predispose to ALS or other diseases; ALS starts in one region and spreads; degeneration is specific to a subgroup of neurons; and ALS shows complex inheritance. Cancer shares many of these characteristics, and these have been incorporated into the Armitage-Doll multistage model. We therefore used this model to investigate the hypothesis that ALS is a multistage process.

Methods Incidence data by age and sex were generated from five ALS population registers, in Ireland, the Netherlands, Italy, Scotland and England; age and sex adjusted incidences were calculated for each register.