ALZHEIMER'S ASSOCIATION INTERNATIONAL CONFERENCE WEDNESDAY, JULY 25, 2018 SYPMPOSIA: S4-01 ENVIRONMENTAL RISK FACTORS FOR ALZHEIMER'S DISEASE

S4-01-01 THE RELATION BETWEEN AIR POLLUTION EXPOSURE AND DEMENTIA

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Abstract not available.

S4-01-02 INTERACTION BETWEEN POLLUTANT EXPOSURES AND GENETICS IN AGING POPULATIONS AT RISK FOR COGNITIVE DECLINE

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Abstract not available.

S4-01-03 LIFE COURSE AIR POLLUTION EXPOSURE AND COGNITIVE DECLINE IN SCOTLAND: MODELLED HISTORICAL AIR POLLUTION DATA AND THE LOTHIAN BIRTH COHORT 1936

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Background: Exposure to air pollution has been consistently linked with dementia in observational studies and basic research. Both dementia and air pollution are truly global problems affecting high- and low-to-middle-income countries alike. However, in the context of life course epidemiology, it is unclear whether risk is accumulated through long-term exposure or whether there are sensitive/critical periods. One major barrier to clarifying this is the dearth of historical air pollution data. **Methods:** Using the EMEP4UK chemical transport model[1] we modelled historical particulate matter ($PM_{2.5}$) for the years 1935, 1950, 1970, 1980, and 1990 and combined these with contemporary modelled data from 2000 onwards to estimate life course exposure in 467 participants in the Lothian Birth Cohort 1936[2] who have provided lifetime residential history[3]. Linear regression models using two outcomes (cognitive change from [1] age 11 to age 70 years and [2] age 70 to 76 years) and dementia occurrence were constructed adjusting for the rich lifestyle, medical, and socioeconomic data collected in the LBC1936. Thus, we were able to explore when exposure to air pollution was most important in relation to brain health. **Results:** Concentrations of $PM_{2.5}$ in Scotland are estimated to have peaked at approximately 110ug/m^3 in 1935, roughly ten times the maximum concentration seen in contemporary results. Preliminary models suggest that early life air pollution is particularly important in cognitive ageing: $PM_{2.5}$ concentrations in 1935 and 1950 were associated with cognitive change from 11-70 years ($P<0.01$) but levels in later years were not; $PM_{2.5}$ concentrations in 1980 were associated with cognitive change from 70-76 years ($P=0.013$) but levels in other years were not. Final results will be available for presentation at AAIC2018. **Conclusions:** The life course paradigm is essential in understanding the development of dementia and this study is the first to examine life course air pollution exposure in relation to brain health. References: 1. https://doi.org/10.5194/acp-14-8435-2014 2. https://doi.org/10.1093/ije/dyr197 3. https://doi.org/10.1016/j.socscimed.2017.10.038.

S4-01-04 TRAFFIC NOISE EXPOSURE AND MILD COGNITIVE IMPAIRMENT

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Background: Age-related cognitive decline and dementia are important topics due to aging populations in developed countries. According to the Global degeneration scale for assessment of primary degenerative dementia, there are seven stages of cognitive decline, and a Mild cognitive impairment (MCI) is the third (early) stage. Recently, adverse effects of environmental exposures on the central nervous system have been proposed. One of the potential environmental risk factors could be ambient noise. Studies on the effect of noise on cognitive function of children suggest worse cognitive function in those exposed to higher noise levels. Studies investigating such an association in adults are scarce and their results are partially inconsistent. **Methods:** We analyzed the current evidence on noise effects on cognitive function in adults. We included studies in adult populations ($\geq$18 years old) published in English language in peer-reviewed journals. We used two major search engines: PubMed and Google scholar. Long-term exposure was defined as the average exposure during at least one year. We paid specific attention to studies analyzing the association between road traffic noise and MCI. As such studies are scarce, we included into analysis studies on the different noise exposures and any stage of cognitive function/decline. **Results:** Studies on the association between ambient noise and cognitive function are scarce and their results are inconsistent, starting from absence of any association, and till the rather strong association. One of the possible reasons of such inconsistency might be a misclassification of the exposure and/or the outcome. Only few studies investigate to the association between ambient noise and MCI. Most of such studies investigate additionally the second exposure – air pollution. As air pollution and road traffic noise share the same source – traffic, it is difficult to disentangle the effects of these two exposures, thus such approach seems to be justified. On the other hand, the proper definition of cognitive decline is not always provided but is necessary, especially considering different stages and types of dementia. **Conclusions:** Proper definition of both exposure and outcome may help in future studies of the association between traffic noise and cognitive function.