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Exposure to molds in the indoor environment and respiratory health in older residents living in Lausanne

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Indoor air pollution has been associated to adverse respiratory health effects in children, adults and in older persons. However, although a large number of studies explore the impact of airborne fungal particle content on the respiratory health of children or adults, only scarce information exists on older persons' exposure to airborne fungal particles in the indoor environment and on the consequences of such an exposure on their respiratory health. The specific objective of the present study was to contribute to filling the gaps in the knowledge on the airborne mold profiles that affect the respiratory health in the older population. To reach this objective, the mold species profile was determined in the indoor air of 270 residences of 289 Lausanne inhabitants older than 65 years that are a part of the Lc65+ cohort. Electrostatic dust collector (EDC) sampling devices have been used to sample the microbiome during summer, autumn and winter periods between June and February 2014. The diversity of viable fungal species have been determined from samples cultured on DG18 media, although that of fungal species represented by the overall fungal particles - viable and dead - have been characterized directly from the EDC samples by high throughput sequencing of the ITS1 region. The respiratory health data as well as characteristics of the buildings were extracted from Lc65+ database. The season effect on fungal species diversity has been tested. Association of viable and overall mold community profiles with the respiratory symptoms of the inhabitants was determined by unconditional logistic regressions. In order to propose preventive solutions, the building characteristics that can favor the development of fungal communities harmful for respiratory health have been explored.

Keywords: indoor fungal community, Illumina sequencing, culturable fraction.