ANIMAL CONFINEMENT BUILDINGS AS A SOURCE OF AMBIENT PM10 AND ENDOTOXIN PM10

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Background & Aims: While most PM10 exposure studies focus on traffic related sources, PM10 emitted by animal buildings has hardly been studied. It has been suggested that PM10 exposure from animal buildings, especially poultry houses, may impose respiratory health risks. In addition, PM10 dust composition i.e. microbial content may vary. We investigated ambient PM10, endotoxin, *Coxiella burnetii* and methicillin-resistant *Staphylococcus aureus* (MRSA) exposure levels in areas with varying animal farm densities.

Methods: Week-averaged PM10 dust was collected simultaneously at five sampling sites with various animal farm densities and at one urban background location. Density of animal buildings around a sampling point was calculated using a Geographic Information System. Endotoxin content was determined by LAL assay. DNA isolation and qPCR were performed to determine *C. burnetii* and MRSA DNA content. Association between exposure and number of surrounding animal farms was determined by regression analysis.

Results: The number of animal farms within a 1000 meter radius of the sampling location ranged from 3 to 23 (provence licence data) or 5 to 37 (animal registry data). Geometric mean concentration of PM10 and endotoxin ranged from 16.1–22.2 $\mu g.m^{-3}$ and 0.16–0.31 $EU.m^{-3}$, respectively. PM10 levels were increased compared to urban background at sampling points with highest animal densities only, whereas endotoxin levels were increased at all sampling points. Endotoxin levels and to a lesser extent PM10 levels increased with animal farm density (endotoxin Beta 0.017 per farm, standard error (0.009), PM10 Beta 0.007(0.005). The association was more clearly observed with pigs and poultry than cattle. Microbial DNA analysis is ongoing.

Conclusion: Levels of PM10 and endotoxin PM10 were positively associated with the number of surrounding animal farms. Since this was less clearly observed for PM10 dust, the microbial diversity might possess additional information Livestock farming should be considered when modeling PM10 exposures.