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Long-term exposure to road traffic noise and incidence of acute lower respiratory infection: evidence from the Danish Nurse Cohort

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ABSTRACT

Background: Road traffic noise is linked to cardiovascular disease, but evidence on respiratory disease is limited. We examined the association between long-term exposure to road traffic noise and the incident acute lower respiratory infections (ALRIs).

Methods: We followed 23,141 women (> 44 years) from the Danish Nurse Cohort from baseline (1993 or 1999) to their first hospital contact for ALRI or the end of 2015. The residential annual mean levels of road traffic noise (L_{den}) were estimated by the Nord2000 model. We applied time-varying Cox models to estimate the association of 3-year mean exposure to L_{den} with ALRI incidence and piece-wise analysis to estimate the threshold of L_{den} related to ALRI incidence. We examined the robustness by adjusting residential particulate matter with diameters ≤ 2.5 μm ($PM_{2.5}$), and the effect modification by age, socioeconomic status (SES), comorbidity, and lifestyle.

Results: During 18 years of follow-up, 2,004 nurses developed ALRIs. In a linear model, we detected a statistically significant positive association between the L_{den} and ALRI, with hazard ratio (HR) of 1.11 [95% confidence interval (CI): 1.04-1.17] per 9.2 dB (interquartile range, IQR). We observed non-linear association with a threshold at 57 dB, above which HR was 1.25 (95% CI: 1.09-1.43) per IQR. Further adjustment for $PM_{2.5}$ reduced HRs slightly to 1.21 (95% CI: 1.04-1.40). The associations were stronger for nurses with underlying asthma, chronic obstructive pulmonary disease, and in those with lower SES.

Conclusion: Our novel finding suggests that long-term exposure to road traffic noise may increase risk of ALRIs.

Keywords (3-6): Noise, Traffic-Related Pollution, Survival analysis, Cohort study, Pneumonia, Threshold limit values