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Lung cancer and silica exposure in the Netherlands - use of FINJEM for exposure assessment in the Netherlands Cohort study

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Introduction

Crystalline Silica may cause lung cancer and is classified as carcinogenic to humans (class 1). Epidemiological evidence for this classification is, however, restricted. Based on foreign studies, threshold values for cumulative exposure are derived of about $10 \text{ mg/m}^3 \cdot \text{yr}$. We investigated the application of an external JEM within the Netherlands Cohort Study (NLCS) for estimation of exposure response relationships, since in the NLCS no exposure data are available. We also evaluated whether a positive association can be shown in the absence of high exposures. By using different sets of potential confounders based on individual information, we wanted to assess their relevance for this association.

Methods

Associations were studied among the male population ($n=58,279$) of the prospective NLCS, which was initiated in 1986 with a self-administered questionnaire on risk factors for cancer among subjects aged 55-69 years. After 11.3 years of follow-up through the Cancer Registry, 1920 incident lung cancer cases were available. Exposure to silica was assessed by linking occupational history (job and duration), with

silica exposure probability and level assigned to occupational groups in FINJEM. FINJEM is based on measurements and expert judgment and has been developed for use in population based epidemiological studies. Based on a case-cohort design, and using Cox proportional hazards models, risks were estimated for different exposure metrics such as exposure duration, level, and cumulative exposure.

Results

Most exposed people have estimated cumulative exposure far below $3 \text{ mg/m}^3 \cdot \text{yr}$, which equals 40 years of exposure to the Dutch OEL of 0.075 mg/m^3 . Smoking acted as a strong confounder; adjustment decreased risk estimates with about 0.2 point. Positive associations were observed for most of the exposure metrics, such as duration of exposure: RR 1.60, 95% confidence interval 1.10-2.32 for exposure > 26 yrs, and an RR of 1.44 (95% CI 0.91-2.28) for cumulative exposure of $3 \text{ mg/m}^3 \cdot \text{yr}$ or more. Associations were stronger if potential misclassification of exposure was restricted by leaving out people with uncertain exposure.

Conclusion

Results suggest that exposure to silica dust is related to lung cancer risk in The Netherlands, and that an external JEM could be used to study the associations. Increased risks seem to exist already below 40 years of exposure to levels equal to the current OEL. It is shown that it is important to use good data on smoking habits to get unbiased exposure-response relationships. In addition, this study once again emphasizes the need for strategies to reduce exposure misclassification as much as possible in epidemiological exposure-response modelling.

Sessie 1G

REACH

Beoordeling van beroepsgebonden blootstelling binnen REACH: ervaringen uit voorbereidende projecten

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Inleiding

Binnen REACH moeten integrale "veilig gebruik scenario's" (voor mens en milieu) van stoffen worden opgesteld. De nadruk ligt op beheersing. Wij presenteren voor- en nadelen van methoden, gericht op werkerblootstelling, uit voorbereidende (internationale) projecten waarbij wij betrokken zijn. Ook bespreken we noodzakelijke verdere ontwikkelingen.

Communicatie is belangrijk

Producenten en importeurs moeten weten hoe hun stoffen gebruikt worden. De gebruikers moeten weten hoe ze dit veilig kunnen doen. Wij geven voorbeelden van verschillende aanpakken, vragenlijsten en formats die in ontwikkeling zijn.

Eenvoudige modellen

Bedrijven moeten veel stoffen in weinig tijd kunnen beoordelen. Daarom wordt een getrapte aanpak voorgesteld. Eenvoudige, conservatieve, methoden zijn geschikt voor eenvoudige en weinig riskante situaties. Wij geven voorbeelden uit de chemische industrie, de geur- en smaakstoffenindustrie, de verfindustrie en de lijmindustrie van het gebruik van (modificaties van) EASE, ECETOC TRA, COSHH Essentials en CONSEXPO en van ontwikkelingen in het model onder de Stoffenmanager.

Deze modellen zijn snel en met weinig informatie te gebruiken. Maar ze zijn conservatief, doorspekt met jargon, niet goed gevalideerd en bieden weinig keuzemogelijkheden voor beheersing. Sommige modellen hebben als extra voordeel dat