Key words: *occupational chemicals; exposure; cancer epidemiology*
Ключевые слова: *химические вещества на производстве; воздействие; эпидемиология рака*

Retrospective exposure assessment for both community-based (case-control) and industry-based (cohort or nested case-control) epidemiological studies can be quite challenging especially when more than one centre/country is involved. When pooling data across community based case-control studies (like for instance in the case-control studies of the SYNERGY project) the exposure assessment has to be redone in order to overcome the issue of the lowest common denominator. Also when exposure assessment is based on expert judgement in individual studies, no straightforward approaches exist for calibration and pooling of these exposure estimates. Often though, complete and detailed occupational histories of the study participants will be available which can be used as the basis for a standardized approach across centres/studies. For instance in the SYNERGY project we successfully managed to collect actual exposure measurements across Europa and Canada covering almost 4 decades (1970-2010). Based on this wealth of exposure data a job-exposure matrix (JEM) was elaborated with quantitative estimates of the level of exposure by job, year, and region. Combining the JEM with occupational histories of cases and controls resulted in quantitative exposure histories which allowed for derivation of quantitative exposure response relationship for amongst others silica and asbestos. A feature not previously seen within community-based studies. In industry-based cohort studies exposure assessment can often be performed at a much more detailed level by ascertaining detailed occupational histories and collecting production characteristics in multiple companies enrolled in a cohort study. For instance by collecting (a considerable amount of) industry specific measurements with detailed auxiliary information very specific exposure models can be derived. Consequently these models will allow for quantitative exposure estimates at the detailed level of exposure scenario (rather than just at the level of a job). For instance by doing so in the European Asphalt Workers study we were able to estimate quantitatively workers exposure to bitumen fume, organic vapour, and benzo(a)pyrene. Standardization of exposure assessment tools, approaches and empirical modelling are clearly needed in this day and age where big data will be the norm and will be needed to discern the so far undetected (smaller) cancer risks. However, availability of actual measurements of workers' exposure will stay a prerequisite in order to calibrate and validate our exposure assessment methods employed in large-scale epidemiological studies on occupational cancers.

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SICKNESS ABSENCE AND PRESENTEEISM RATE IN SOCIO-DEMOGRAPHIFC GROUPS IN LATVIAN WORK POPULATION

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ЧАСТОТА ПРЕЗЕНТЕИЗМА И ОТСУТСТВИЯ ЗАБОЛЕВАНИЯ В СОЦИАЛЬНО-ДЕМОГРАФИЧЕСКИХ ГРУППАХ ЛАТВИЙСКОГО РАБОТАЮЩЕГО НАСЕЛЕНИЯ**. Лакиса С., Гобина И., Ванадзинс И.** Рижский университет им. Страдыня, Институт охраны труда, ул. Дзирциема, 16, Рига, Латвия, LV-1007

Key words: *presenteeism; sickness; Latvian work population*
Ключевые слова: *презентеизм; заболевание; латвийское работающее население*

Introduction. Presenteeism it's a complex phenomenon which is investigated by health care and occupational health specialists, economists and work psychologists. There have been significant economic changes in Latvia during the last decade, including economic crisisand changes in legislation, which may affect the sickness absence and presenteeism rates among employees. Since 2014 increases public expenditure on benefits, sick – benefit receiver count and the number of cases per beneficiary. Official lost working days in 2016 accounted 7.5 million and this is only long term absence days (more than 10 days).**The aim** of this study was to investigate sickness absence and presenteeism rate differences in socio – demographic groups during period 2006–2016.**Methods.** Self-reported data on sickness during the last year among representative sample of employees were analysed. The total number of respondents was 2357 in 2006, 2103 in 2010 and 2260 in 2013. Three groupswere analysed: formal sickness absence group (took sick leave while was sick), informal sickness absence group (was absent from work while was sick, without sick leave) and presenteeism group (was at work while was sick). **Results.** Every year in average 40% report that they were sick during last year. Statisticaly significant structural differences in 2010, were observed less formal sickness absenceand more informal sickness absence and presenteeismthan in 2006 and 2013. Sickness absence rate was similar in both gender — 25.3% men and 28.3% women (p=0.006).For both gender formal absence rate is significant lower and presenteeism rate increase in 2010. Formal sickness absence rate was highest in age group 35 – 44 age, 31.3% comparing to 23.6% — 27.9% in other age groups (p<0.001). Informal absence rate was higher in group 18–24 age and 25–34 age, 8.0% and 7.0% respectively comparing to 4.4% — 6.3% in other age groups. The lowest presenteeism rate was in 18–24 age group (5.9%) compared to 24 – 34 age and 35–44 age presenteeism rate 10.7% (p<0.001). No significant differences in formal sickness absence and presenteeism rate were found among educational groups during the studied time period. Informal sickness absence rate was significantly higher for higher education group 8.4% comparing to 3.4% — 5.9% in other educational groups (p<0.001). In 2010 formal absence rate was in average 7% lower than other years in elementary, secondary and vocational education group. In elementary education groups presenteeism is significantly increasing from 5.1% to 14.2% (p=0.009) in 2006–2016 period.Highest formal absence rate is for senior specialists 29.5%, skilled workers 28.6%, specialist/practitioner 28.3%, lower rate

is for service and sales workers 25.6%, head of the department/managers 25.2% and the lowest rate for chief executive officer (CEO) is 20.4%, and 22.1% for unskilled workers (p=0.006). Informal sickness absence highest rate of 8.4% is for senior specialists compared to lowest 4.6% and 4.9% in unskilled and skilled workers group (p=0.013). The higher salary group (more than 570 euro), the higher formal absence rate — 32.8% compared to 23.0% in lowest salary group below 215 euro (p<0.001).

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OCCUPATIONAL HEALTH AND SAFETY IN TUNNELING

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ГИГИЕНА ТРУДА И ПРОИЗВОДСТВЕННАЯ БЕЗОПАСНОСТЬ ПРИ ПРОКЛАДКЕ ТУННЕЛЕЙ. **Нийязи Билим, Атийе Билим.** Университет Сельчук, ул. Анкары, 6, Конья, Турция, 42030

Key words: *occupational health and safety; work in tunnels; work accidence*
Ключевые слова: *гигиена труда и производственная безопасность; работа в туннелях; несчастные случаи на производстве*

Tunneling activities are rapidly growing in parallel with the increase in urbanization, industry, trade and transportation needs in the world. Tunneling in developed and developing countries is now becoming indispensable. Because in many areas of life the tunnel is now confronted as a structure used by human beings. Today, tunnels can be used for many purposes such as subway, highway, railway, water, sewerage, derivation (in hydroelectric power plants), under the river, immersed tunnel and nuclear waste repository. Nowadays, two methods are usually used in tunneling called drilling-blasting and mechanized excavation. However, there are many risks and dangers faced by the workers in the tunneling. Because the nature of work, the work conditions are very difficult. Hazardous gases in underground, fire, explosion, roof fall, mudflow, explosive material accidents transport hoisting accident (loading, hauling or hoisting) and machine accidents are the most common work accidents. Besides, it is unfortunately possible to encounter very tragic work accidents that are concluded with mass deaths. In this study, the procedures to be observed in tunneling and the safety precautions that are essential in terms of work safety are generally explained. The work safety procedures can be changed according to the factors such as the type of tunnel, the opening method, the geology, the equipment used, etc. For this reason, in this study general safety precautions in tunnels are explained. As a result, a summary safety procedure and flow chart for the tunnel has been developed by presenting the procedures that should be paid attention to firms and employees working in tunnels.

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ASBESTOS AND LUNG CANCER IN A MULTINATIONAL CONSORTIUM OF CASE-CONTROL STUDIES (THE SYNERGY PROJECT)

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АСБЕСТ И РАК ЛЕГКИХ В МНОГОНАЦИОНАЛЬНОМ ОБЪЕДИНЕННОМ ИССЛЕДОВАНИИ ПО МЕТОДУ «СЛУЧАЙ-КОНТРОЛЬ» (ПРОЕКТ SYNERGY). **Олссон А.[1], Кромхут Х.[2], Брюнинг Т.[3]** [1]Международное агентство по исследованиям рака, ул. Кур Альбер Тома, 150, Лион СЕДЕКС 08, Франция, 69372; [2]Институт исследований по оценке риска, Утрехт, Нидерланды; [3]Институт профилактической и производственной медицины немецкого страхования от несчастных случаев, Бохум, Германия

Key words: *asbestos; smoking; cancer; epidemiology*
Ключевые слова: *асбест; курение; рак; эпидемиология*

Introduction. Asbestos fibers have been attractive for a wide range of industrial applications for over a century. Consequently, large groups of workers have been (and still are, in a shrinking number of countries) exposed to asbestos, for example in the insulation, textile, cement, roofing, and refractory industries. Lung cancer is the most common cancer globally, and tobacco smoking is well established as the main cause. Asbestos is the most important occupational carcinogen, and lung cancer is the most common asbestos-related cancer. Asbestos was the first occupational exposure to be suggested to have a joint effect with smoking. Several studies and reviews have supported this hypothesis, but the type of interaction (additive or multiplicative) has been debated. The evidence is limited regarding risk and the shape of the exposure-response curve at low levels of asbestos exposure. We estimated the exposure-response for occupational exposure to asbestos and assessed the joint effect of asbestos exposure and smoking by sex, and lung cancer subtypes (adenocarcinoma, squamous cell lung carcinoma, small cell lung carcinoma) in general population studies. **Research methods:** Fourteen case-control studies conducted between 1985 and 2010 from Canada and Europe were pooled, including 16,901 lung cancer cases (13,605 men, 3296 women) and 20,965 controls (16451 men, 4514 women) with detailed information on tobacco habits and lifetime occupations. The database comprises around 14% never smokers, whereof 822 cases. A quantitative job exposure matrix (SYN-JEM) was created based on exposure measurements from multiple countries together with auxiliary data, covering a time period of more than 50 years. SYN-JEM