

## Abstracts

DCM among proof-printing workers. All patients were pathologically diagnosed with cholangiocarcinoma. Age at diagnosis ranged from 25–45 years. Primary cancer sites included the intrahepatic bile duct (five patients) and the extrahepatic bile ducts (six patients). All patients were exposed to 1,2-DCP for 7–17 years and diagnosed with cholangiocarcinoma 7–20 years after the first exposure. Ten patients were also exposed to DCM for 1–13 years. Six of the patients had died by 2011 and the SMR for cholangiocarcinoma was 2,900 (expected deaths: 0.00204, 95% confidence interval: 1.100–6.400).

**Conclusion** These findings suggest that 1,2-DCP and/or DCM may cause cholangiocarcinoma in humans. New patients appeared among the company workers in 2012 and 2013, and the current number of patients has reached 17.

## Session: Plenary session RICOH: Introduction and work activities

### 212 WORK ACTIVITIES AND ADVERSE PREGNANCY OUTCOMES: A SYSTEMATIC REVIEW

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**Objectives** To assess the relation between five common occupational exposures (working hours, shift work, lifting, standing, workload) and five adverse outcomes of pregnancy (pre-term delivery (PTD), low birthweight, small for gestational age (SGA), pre-eclampsia, gestational hypertension).

**Methods** We conducted a search in MEDLINE and EMBASE (1966–2011) using combinations of keywords and MeSH terms. Reports were assessed for their reporting and potential for bias and confounding. Meta-estimates of relative risk (RR) were produced where possible. The material comprised 86 reports (57 reports with usable data on PTD, 54 on birthweight and 11 on pre-eclampsia/gestational hypertension).

**Results** For PTD, findings across a large evidence base were consistent in ruling out large effects (e.g.  $RR > 1.2$ ). Larger and better quality studies were even less positive ( $RR$  1.04 to 1.18). For SGA, the position was similar but meta-estimates were close to the null. For pre-eclampsia/gestational hypertension the evidence base was insufficient to draw strong conclusions.

**Conclusions** The balance of evidence is not compelling enough to justify mandatory restrictions on any of the activities considered in this review. Over time, estimates of risk for these activities and outcomes have become smaller.

### 213 RISK OF MISCARRIAGE IN RELATION TO WORK AT NIGHT, WORK HOURS, LIFTING AND STANDING: A META-ANALYSIS

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**Objectives** Miscarriage is a prevalent adverse pregnancy outcome that has been linked to ergonomic risk factors at work in numerous studies but no scientific consensus has emerged. In order to improve the impact of occupational health counselling of pregnant women the objective of this study was to quantify the risk of miscarriage according to prevalent work activities and to discuss causal inference based upon all available scientific data.

**Methods** A search in Medline and EMBASE 1966 - 2012 identified 29 primary papers reporting the relative risk (RR) of miscarriage according to work at night, long working hours, heavy lifting or prolonged standing. Following an assessment of completeness of reporting, confounding and bias, each risk estimate was characterised as more or less likely to be biased. Studies with equivalent measures of exposure were pooled to obtain a weighted common risk estimate. Sensitivity analyses excluded studies most likely to be biased.

**Results** Working fixed nights was associated with a moderately increased risk of miscarriage [pooled  $RR$  1.51 (95% CI 1.27–1.78,  $n = 5$ )], while working for more than 40–52 hours weekly, lifting >100 kg/day and standing > 6–8 hours/day were associated with small risk increments: the pooled  $RR$ s ranging from 1.16 (prolonged standing, number of risk estimates 6) to 1.33 (working hours, number of risk estimates 9). Most  $RR$ s tended to become smaller and statistically non-significant when analyses were restricted to higher quality studies.

**Conclusions** These largely reassuring findings do not provide a case for mandatory restrictions in relation to working fixed night shifts, long working hours, occupational lifting and prolonged standing. Considering the limited evidence base, however, it seems prudent to advise women against work entailing high levels of these exposures.

### 214 OCCUPATIONAL LIFTING AND FETAL DEATH: FINDINGS FROM THE DANISH NATIONAL BIRTH COHORT USING A INDUSTRY-JOB EXPOSURE MATRIX

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**Objective** We have in an earlier prospective cohort study observed a moderately increased risk of miscarriage based upon self-reported information on occupational lifting. In this paper we aim to corroborate or refute this observation by application of a industry-job exposure matrix for pregnant women.

**Methods** For 68,096 occupationally active women, who participated in the Danish National Birth Cohort, information on occupational lifting was collected by telephone interviews around gestational week 16. We established an industry-job exposure matrix (IJEM) by computing the industry and job specific mean values of the pregnant women's self-reported daily lifting activities while pregnant. Subsequently all women were assigned IJEM value for her industry and job. The associations between occupational lifting and early miscarriage (12 weeks or less), late miscarriage (13–21 weeks), and stillbirth (22 weeks or more) were analysed using Cox regression models with gestational age as the underlying time variable and adjustment for age, body mass index, parity, smoking and alcohol consumption.