Appendix S1

MATERIALS AND METHODS

Population

Data were provided by the nationwide Survey of Living Conditions – Work Environment, which was conducted by Statistics Norway (SSB). Data were collected by personal telephone interviews (0.5% of the completed interviews were face-to-face interviews) during 2 periods: from September 2006 to February 2007 (baseline 2006) and from June 2009 to January 2010 (follow-up 2009). Prior to the telephone contact, potential respondents were informed by email about the topic of the study and privacy protection.

The eligible respondents were Norwegian residents aged 18–66 years. In 2006, this population consisted of 2,941,281 persons (source population). A gross sample of 18,679 individuals was randomly drawn from this population, and a total of 12,550 (67%) persons were then interviewed. Among those interviewed (Fig. 1), 9,961 were enrolled in paid work in 2006. The baseline cross-sectional sample was compared with the gross sample according to the benchmarks of age, sex and region; no major differences were detected (25). The panel data comprising the respondents to the survey in 2006 and 2009 consisted of 9,375 persons (response frequency: 50.2% of the gross sample; 74.4% of the baseline cross-sectional sample).

Respondents in the panel dataset who were enrolled in paid work both at baseline and follow-up ($n = 6,745$) constituted the population of the present study.

Work-related exposure measurement

Perceived exposure to work-environment factors was measured based on 9 items (Table I) that were developed by an expert group from a Nordic co-operation project (S1). The questions have been applied in regular surveys of living conditions since 1989.

The response categories were "Yes" and "No". "Yes" respondents were asked to estimate the proportion of the working day during which they were exposed (response categories: "almost all the time", "three-quarters of the working day", "half of the working day", "a quarter of the working day" and "very little of the working day"). Scores were then categorized into 4 categories, "none or very little of the working day", "a quarter of the working day", "half of the working day" and "three-quarters of the working day or more", that were analysed linearly. Score changes from baseline to follow-up were based on the re-coding of the dichotomized scores ("none or very little of the working day" and "a quarter of the working day or more") at baseline and at follow-up into 4 categories: "not exposed", "exposed only at baseline", "exposed only at follow-up" and "exposed at both baseline and follow-up".

Other variables: the assessment of occupation was based on an open questionnaire, coded by SSB into a professional title in accordance with the International Standard Classification of Occupations (ISCO 1988) and re-coded into 10 major occupational groups.

Outcome

At follow-up, the outcome was measured using the following question: "Have you over the past month been afflicted by eczema, itchy skin or rash?" Participants who gave an affirmative answer where further asked: Have you been severely afflicted, somewhat afflicted or little afflicted? Cases were defined as respondents who reported being afflicted a little or more at follow-up.

Statistics

Exposure to chemical and physical hazards at work was regressed on skin problems at follow-up (2009) using the following designs: (*i*) prospective analyses with exposure measured at baseline (2006) and; (*ii*) prospective analyses with exposure measured at both baseline (2006) and follow-up (2009).

The associations were calculated as odds ratios (ORs) with 95% confidence intervals (95% CIs). Adjustments for potential confounders were made by logistic regression analyses in separate models, each model n+1 including the variables adjusted for in the previous model. Model #1 was the crude analysis. In model #2, we made adjustments for skin problems reported at baseline. In model #3, further adjustments were made for sex, age and occupation. To limit the potential of over-adjustment, in model #4, each work-related predictor was adjusted only for other work-related predictors that were first estimated to exert an influence above a certain threshold. This estimation was made *a priori* based on the following procedure suggested by Rothman (S2). In the first step, crude ORs were estimated separately for each work-related factor. In the second step, each of the other work-related variables was entered one at a time. If the inclusion of a potential confounder resulted in a change in the OR of 10% or more, that variable was treated as a real confounder in the multiple regression models.

All statistical analyses were performed using PASW Statistics (formerly SPSS), V.19.0 (IBM, Armonk, New York, USA).

For the statistically significant work-related factors in the adjusted regression analyses (Table SII, model #4), we calculated the PAR with 95% CIs based on the method described by Natarajan et al. (S3, S4).

Ethical considerations

Statistics Norway carried out the survey according to statutory rules. Statistics Norway has appointed its own privacy ombudsman, approved by the Norwegian Data Inspectorate. All persons gave their informed consent prior to their inclusion in the study.

SUPPLEMENTARY REFERENCES

S1. Ørhede E. Nordic cooperation in research on the work environment. Scand J Work Environ Health 1994; 20: 65–66.

S2. Rothman KJ. Using regression models in epidemiologic analysis. In. Epidemiology: an Introduction. New York: Oxford University Press, Inc., 2002: p. 181–197.

S3. Natarajan S, Lipsitz SR, Rimm EA. Simple method of determining confidence intervals for population attributable risk from complex surveys. Stat Med 2007; 26: 3229–3339.

S4. Bruzzi P, Green SB, Byar DP, Brinton LA, Schairer C. Estimating the population attributable risk for multiple risk factors using case-control data. Am J Epidemiol 1985; 122: 904–914.