chromium (CrR, CrU), and chromium in whole blood and in erythrocytes (CrBl, CrEry) in welders.  

**Methods** Respirable welding fume was collected in 241 welders during a working shift. Blood samples and spot urine samples were collected after the working shift. The content of CrR in the welding fume was determined using inductively coupled plasma mass spectrometry. CrU, CrBl and CrEry were measured by means of graphite furnace atom absorption spectrometry. Linear regression models were applied to model exposure to chromium. A multiple imputation approach was chosen to account for values below the limit of quantitation (LOQ).

**Results** Median concentrations of CrR were <3.80 μg/m³, with about 23% below LOQ. Major determinants of the CrR were the chromium content in the electrodes or base material in addition to the type of welding. Airborne exposure was higher when welding was performed under inefficient ventilation. CrR correlated strongly with CrU (Pearson’s correlation r = 0.61). Median concentrations of CrU were <1.20 μg/m³, and 44% of CrU measurements were below LOQ. CrU exposure decreased by a factor of 0.66 when a respiratory mask was used. Most measurements of CrBl and CrEry were below LOQ. All 15 welders with a measurable concentration of CrEry had high chromium contents in the materials (above 5%).

**Conclusions** CrR was mainly influenced by the chromium content in the materials and the welding process. Welding in confined space increased exposure to CrR. Efficient local exhaust ventilation and the use of respirators decreased exposure. Airborne Cr concentration was a good predictor of urinary Cr exposure.

**Objective** Description of current exposure levels of benzene and other organic compounds among workers in the petroleum industry.

**Materials** A total of 2578 air measurements taken by 12 oil- and service companies were evaluated and summarised in a database. The data includes personal full-shift samples and measurements on specific tasks.

**Results** Most samples were from offshore installations (70%). 93 chemical agents were detected in the samples. Of these, 11 agents were measured in 100 or more samples including aromatic hydrocarbons (benzene n = 853, toluene n = 1014, xylene isomers n = 987, and ethylbenzene n = 939) and alkanes (n-hexane n = 856, oil vapour n = 130, oil mist n = 132). 66% of the chemical agents were measured in less than 11 samples. In total, 299 work tasks were described in the reports.

Generally, personal exposure levels of full-shift samples of benzene (median = 0.005 ppm), toluene (median = 0.005 ppm), ethylbenzene (median = 0.001 ppm), xylene (all isomers) (median = 0.005), and n-hexane (median = 0.003) were low compared to Norwegian 12-hour time-weighted average occupational exposure limits of 0.6 ppm, 15 ppm, 3 ppm, 15 ppm, and 12 ppm, respectively.

The highest personal air levels were reported when performing tasks such as cleaning of tanks, opening of processing units, changing of filters, and sampling from the petroleum stream.

**Conclusion** Although much of the monitoring data has been conducted for control evaluation and compliance, they provide a basis for industrial hygienists and exposure assessors to identify work tasks and jobs where exposures are likely, and provide an overview of current exposure levels. This work also shows that for most agents the exposure data is extremely sparse and therefore there is a need to measure chemical exposures in this industry.