

IOM's work as part of the HBM4EU Chromates study has revealed that hexavalent chromium [Cr(VI)] is a cause for concern for workers and companies alike. The carcinogen is present in activities such as stainless-steel welding, Cr(VI) electroplating and other surface treatment processes, thus placing workers involved in these activities at risk.

This work provided the EU with relevant harmonised data on occupational Cr(VI) exposure, which will better inform regulatory decision making on this carcinogen. For industry, this provides insight on the applicability of different biomonitoring methods to determine Cr(VI) exposure and insight on potential policy changes.

THE RESEARCH IN SUMMARY

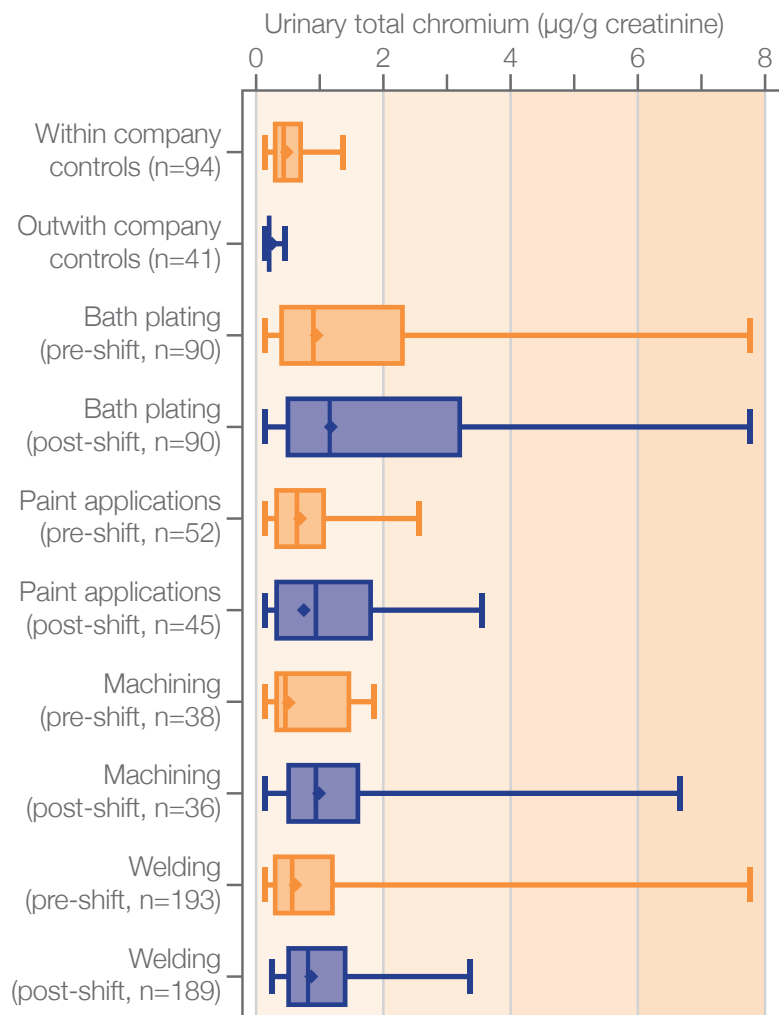
The HBM4EU Chromates study, explored the applicability of different biomonitoring methods in the assessment of occupational exposure to Cr(VI) in welding, electroplating and other surface treatment activities. In addition dermal (hand wipes) and air samples (inhalable and respirable fractions) were collected.

The study, involving ~600 participants across 9 European countries, observed higher urinary chromium exposure in bath plating than in welding or other activities monitored (Fig. 1).

The study also observed a high association between urinary chromium levels and air Cr(VI) and dermal total chromium exposure. Urinary chromium showed its value as a first approach for the assessment of total, internal exposure. Associations between urinary chromium and Cr(VI) in exhaled breath condensate and chromium in red blood cells were low.

Air sample results suggest a need for more effective risk management measures to achieve low levels. In addition to those workers directly exposed to Cr(VI) through their work, the study observed that some office workers could also be at risk through indirect exposure.

Fig 1: Distribution of U-Cr in controls and in exposed workers (pre-shift, post-shift). (Edited from Ref: Santonen et al, 2021).



Note: Bottom and top of the box are, respectively, the 25th and 75th percentiles, horizontal line inside the box is the median. The lower and upper ends of the whiskers are the 5th and 95th percentiles, respectively. The solid diamond is the geometric mean.

UNDERSTANDING YOUR WORKING ENVIRONMENT:

The IOM's analytical laboratories are able to offer fast and reliable analysis to determine Cr(VI) levels in workplace air and dermal exposure samples to ensure compliance with industry standards. The analysis is carried out following published methods within agreed timescales by our team of trained analysts. Our experienced team are also at hand to provide you with

technical advice to help with your sampling strategy and supply the required sampling media for you to undertake the monitoring. Alternatively, we can collaborate with our Workplace Protection Team to provide you with a comprehensive monitoring and analytical package to support you in ensuring your workers are protected.



IOM RESEARCH

This study is one of many that IOM are involved in, improving working environments and making society a better place. Our research team is trusted by the EU, UK government and other notable institutions who value an independent and impartial view.

HELPING YOU TO QUANTIFY AND CONTROL CR(VI):

Our Workplace Protection Occupational Hygiene experts can evaluate and quantify current exposure levels to ensure compliance with regulations. Working with you to assess existing control measures that are in place, making any necessary recommendations for improvement so that you are

protecting your staff as effectively as possible. They are also on hand to provide advice on ventilation systems, working techniques, or other engineering controls, as well as ensuring that the correct RPE and PPE are being used. They can provide comprehensive analysis, interpretation, and best practice recommendations.

Our research expertise includes:

- Environmental and Occupational exposure science
- Chemical Exposure & Risk Assessment
- Work related Health & Wellbeing
- Nanosafety
- Air Pollution (Indoor and Outdoor) Research
- Data Science
- Toxicology
- Human factors, Psychology & Ergonomics

CONTACT OUR EXPERTS - TRUST IOM TO SUPPORT YOU IN PROTECTING YOUR STAFF



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More information on the wider HBM4EU project can be found at:
www.hbm4eu.eu

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Santonen T, Porras SP, Bocca B, Bousoumah R, Duca RC, Galea KS, et al (2021) HBM4EU chromates study - overall results and recommendations for the biomonitoring of occupational exposure to hexavalent chromium. Environmental Research. 2021,111984, <https://doi.org/10.1016/j.envres.2021.111984>.