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# InterWeld - an interventional study on reduction of exposure from welding

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Symposium of ISSA Chemistry Section

Hazardous Substances in Maintenance Works: Risks and Prevention

June 11–12, 2024, Frankfurt



## Welding - important joining technique in metal construction

- ~ 200,000 welders in Germany (~ 500,000 employees exposed)
- Construction of buildings, ships, plants, vehicles, vessels, containers....
- ..... also in repair and maintenance departments
- Application of wear-resistant and non-corrosive metal alloys to highly loaded surfaces (build-up welding)



# Health hazards from metal welding

## *chemical:*

- Inhalative exposure
- .....

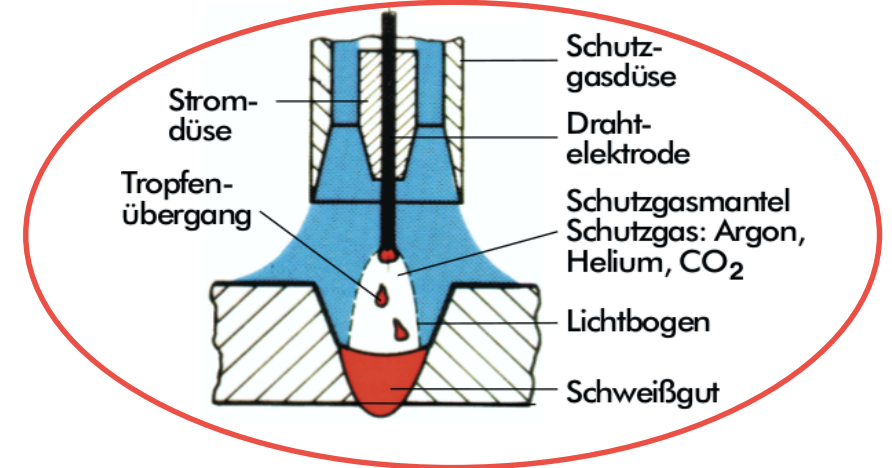
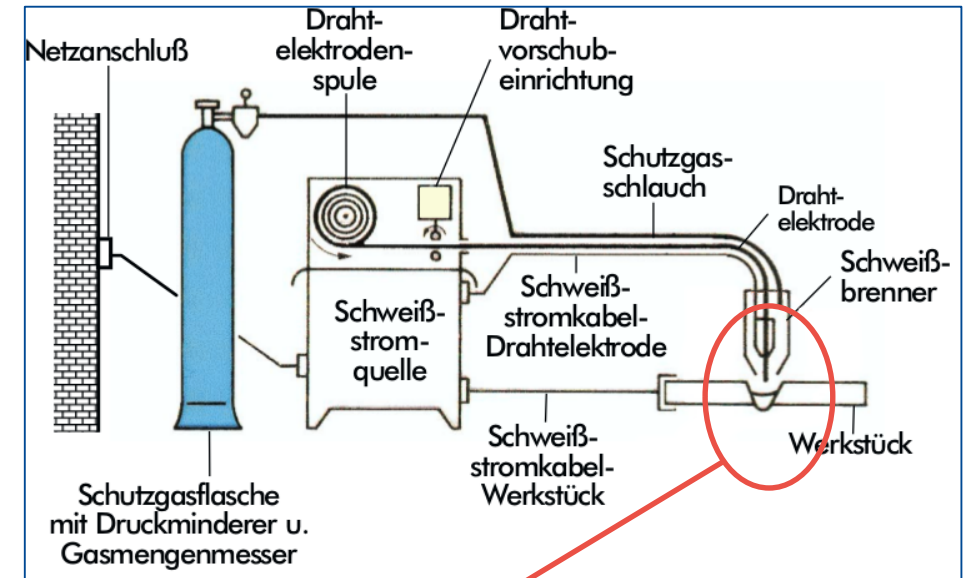
## *physical:*

- UV radiation
- Noise
- Heat / cold
- Postural constraints (ergonomics)
- EM radiation (cave: active implants, e.g. pace makers)

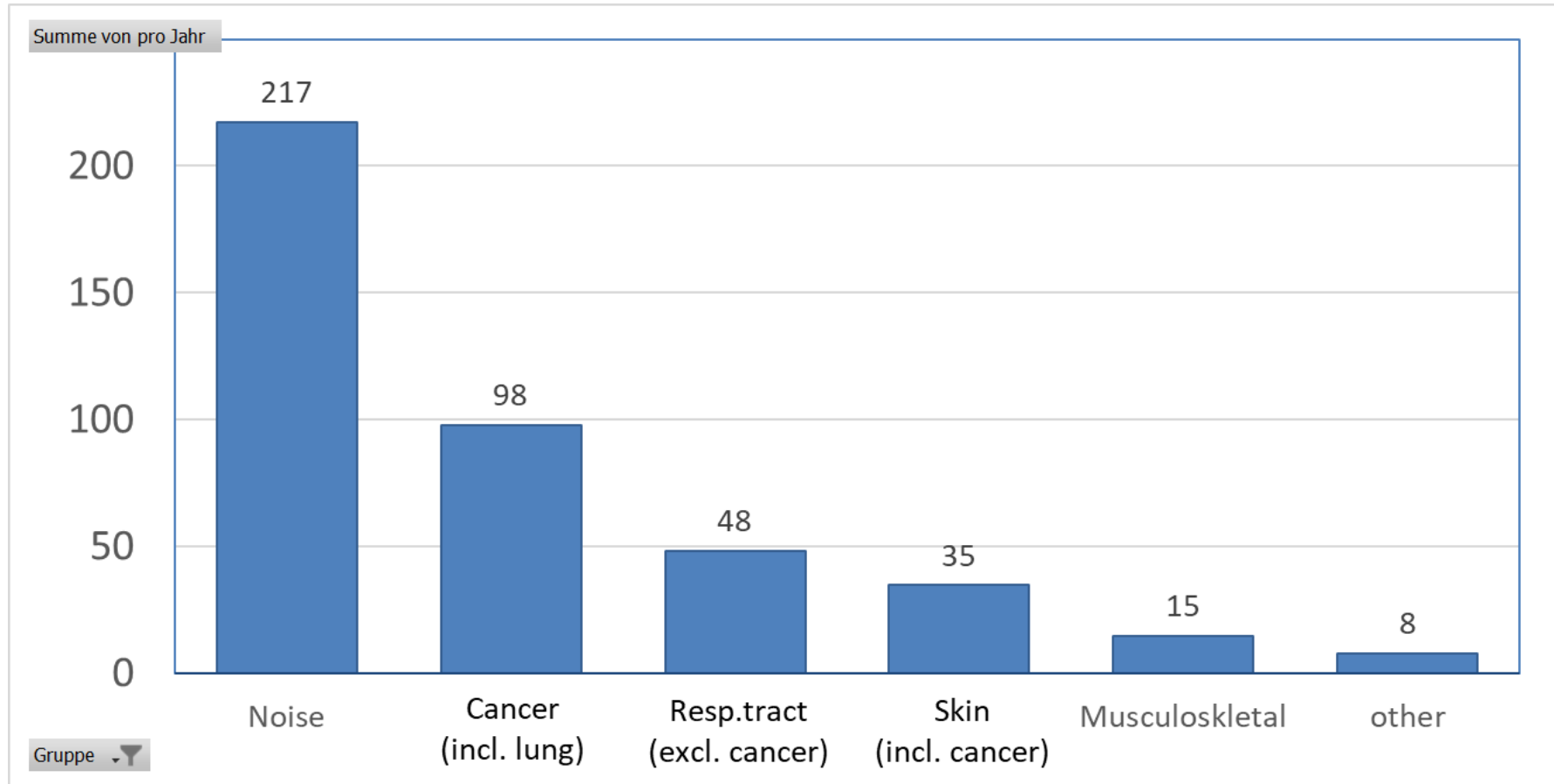


## Inhalative exposure

- Particles, inhalable (E) and respirable (A)
- Metals (Fe, Mn, Cr, Ni, ...) and metal oxides
- Gases (NO<sub>x</sub>, ozone, CO, ...)
- Diseases of respiratory tract (COPD, siderofibrosis, cancer, ...)
- Diseases of the CNS (neurotoxic effect of Mn)

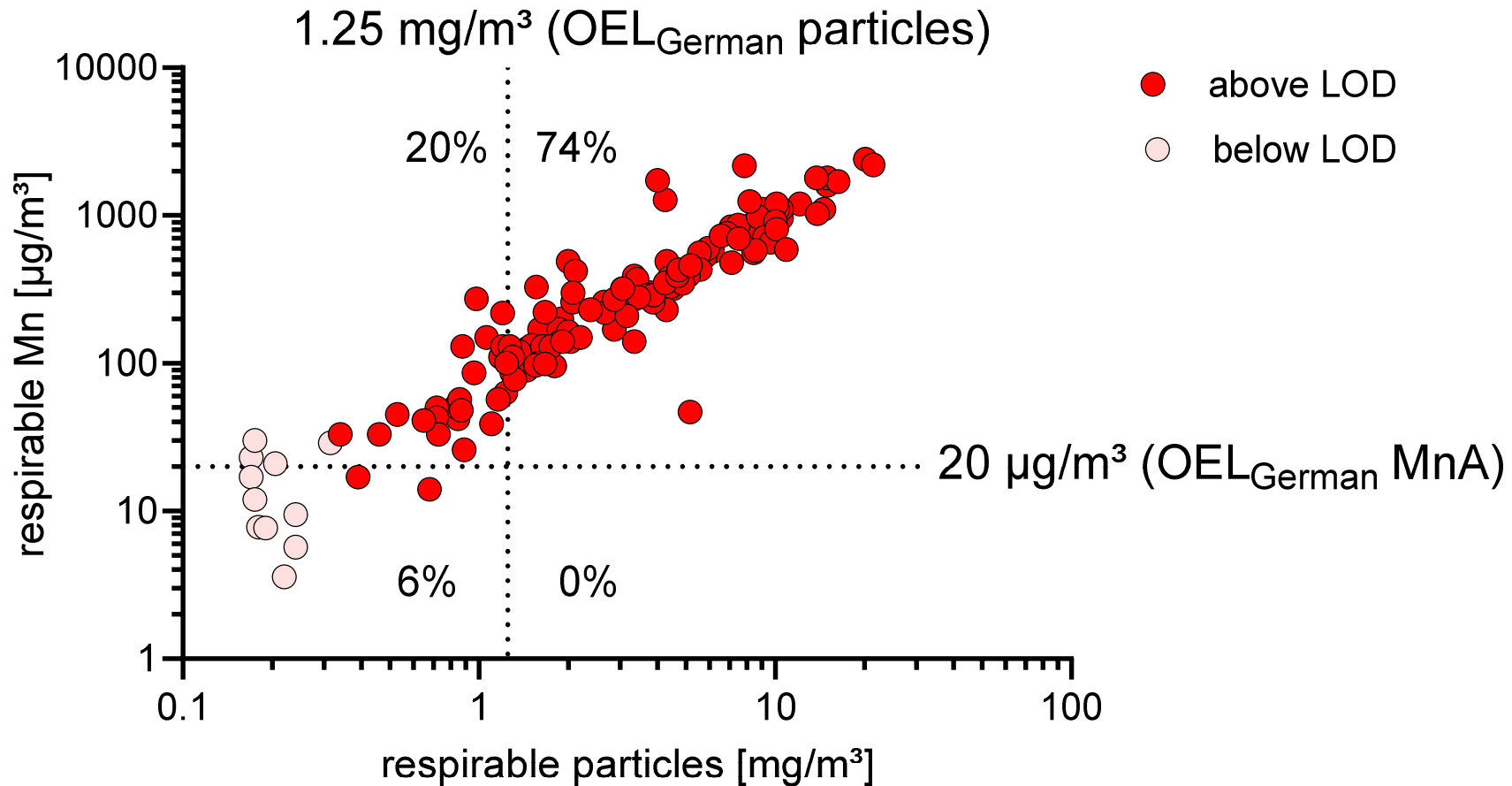


# Occupational diseases recognized among German welders 2018 – 2022 per year (N=420 on average)



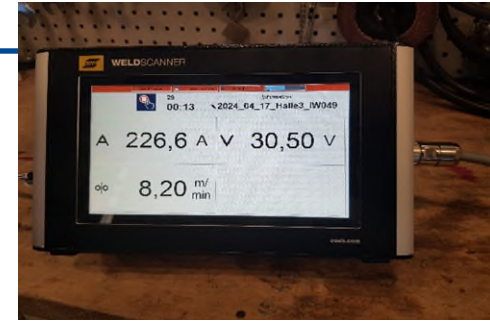
# Exceedance of German occupational exposure limits (OEL)

Gas Metal Arc Welding (GMAW) only (N=144, Weldox I & II)



# InterWeld study

- What measures can be taken to reduce exposure to welding fumes during gas metal arc welding (GMAW)?
- How effective are individual measures in everyday industrial practice?
- Targets for interventions:
  - ✓ Local exhaust ventilation
  - ✓ Alloy composition of the consumables
  - ✓ Mix of the shielding gas components
  - ✓ Process variants resulting in lower emissions
  - ✓ Ergonomics of the welding station



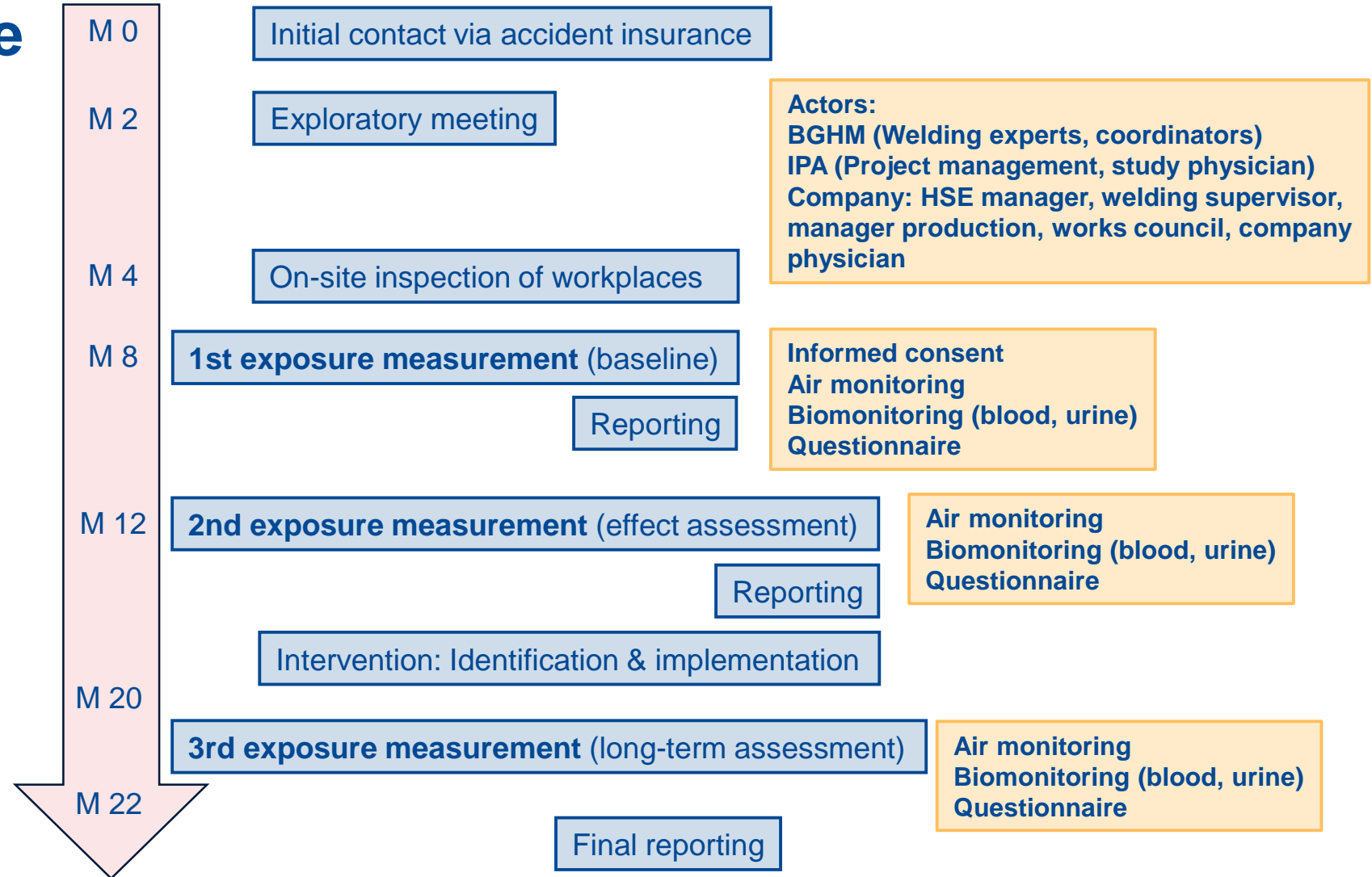
## Objectives & Benefits

- Evaluation of the effectiveness of measures to reduce exposure to welding fumes during manual MAG/MIG welding
- Assessment of the current protection concept (Compliance with OEL)
- Innovations in measurement and analysis
- Best practice examples of welding workstations - future-proof and regulation-compliant
- Good practice examples for joint prevention approaches



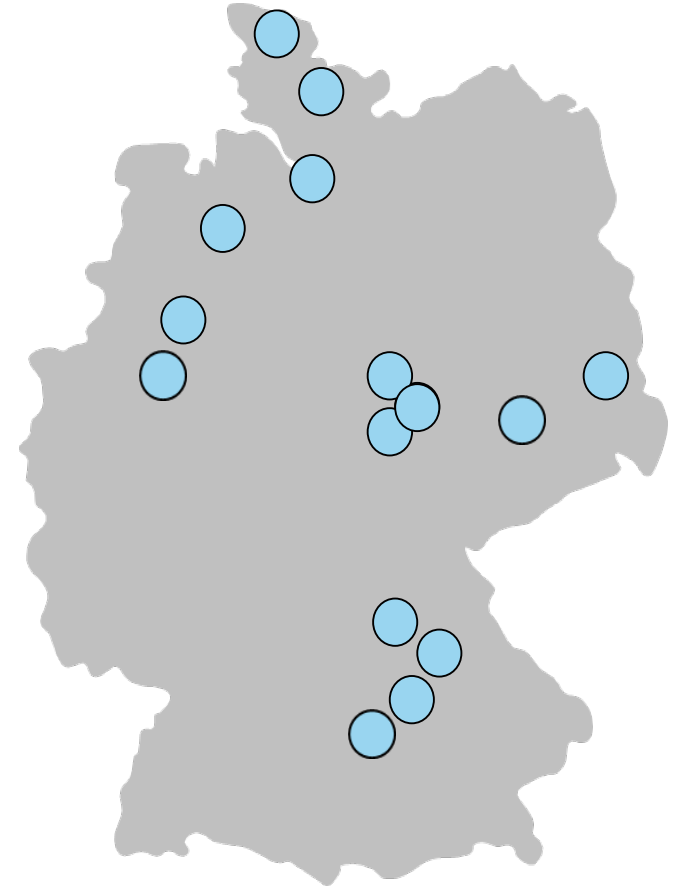


# Procedure & schedule



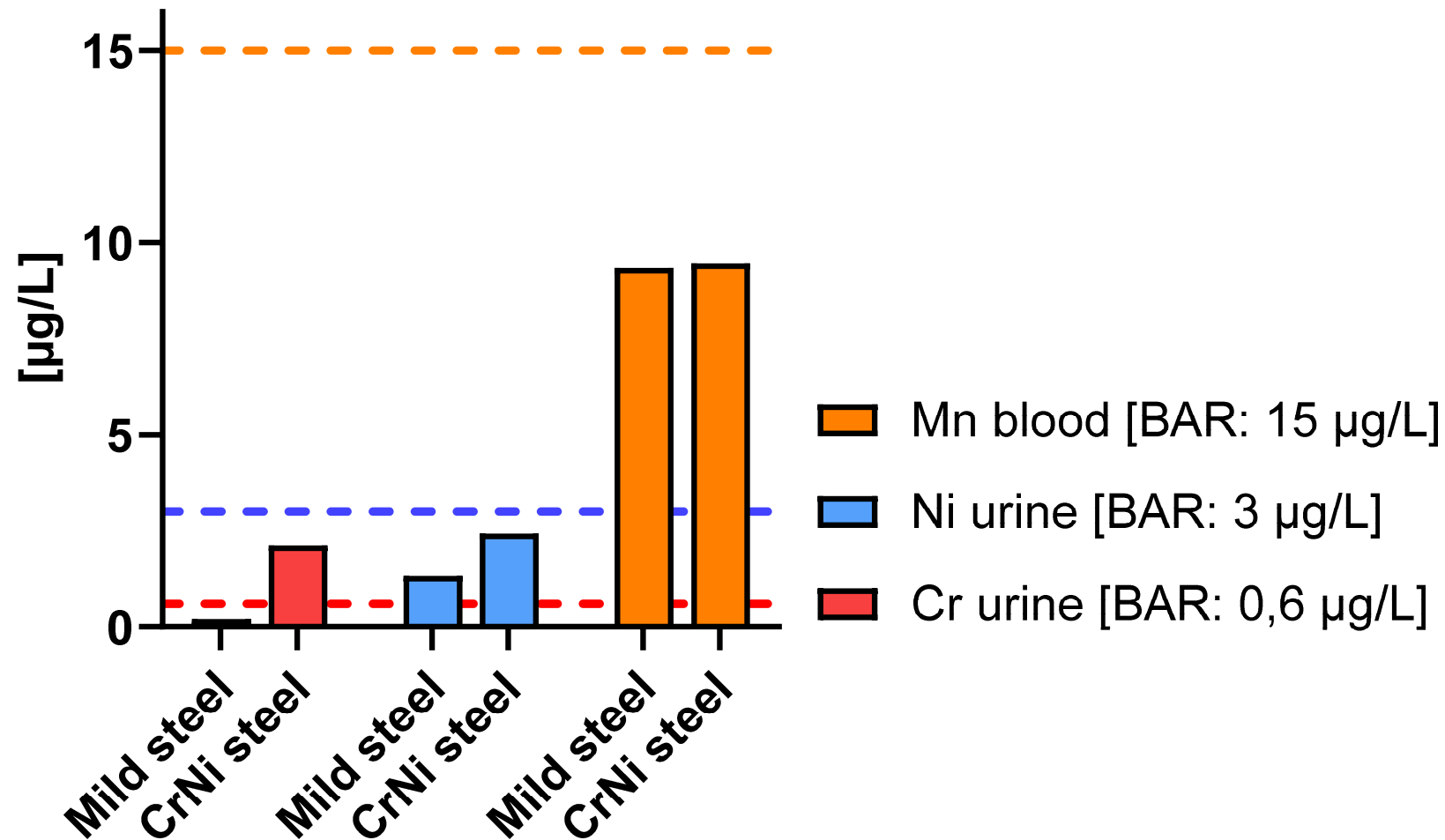
## Project status in May 2024

- Exploratory talks with 15 interested companies
- On-site assessment of the welding stations at 15 companies
- Baseline measurements carried out in 12 companies (+ 2 in coordination)
- Measurement reports presented (8)
- Effectiveness checks scheduled (3)



# Human biomonitoring at baseline

- Preliminary median values
- 45 welders  
(27 mild steel vs.  
18 stainless steel)
- ICP-mass spectrometry  
(IPA-Lab)
- Population reference values  
95th Percentile (BAR)



## Further information

- <https://www.sicherschweissen.de/home>



209-096

DGUV Information 209-096

### Schweißbrauchminderung im Betrieb

Schweißbrauchminderungsprogramm

**Thank you for your attention!**