Bundesanstalt für Arbeitsschutz
und Arbeitsmedizin

Federal Institute for Occupational Safety and Health

Risk management measures & their impact on occupational exposure levels to hazardous substances

- A review -

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Unit 4.1 – Exposure scenarios
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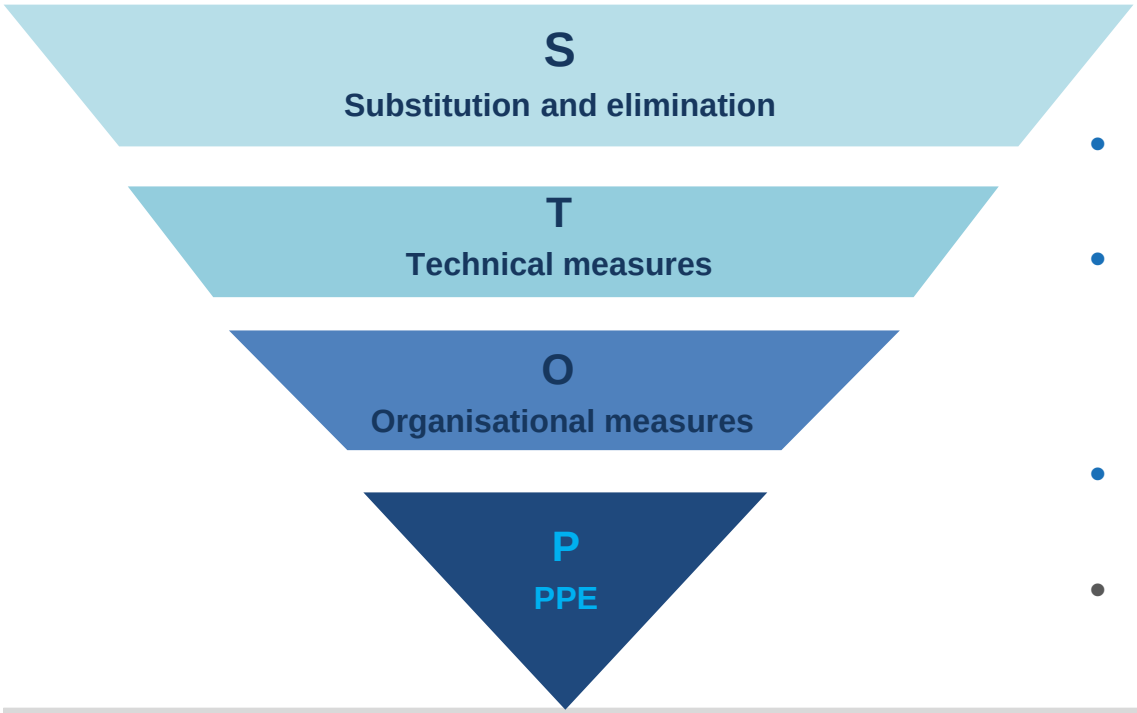
Structure of this talk

- **Background**
  - Workplace exposure & risk management measures (RMMs)
  - Challenges of workplace risk assessments
    - Reduction factors
  - Why are workplace intervention studies important?

- **The literature review**
  - Aims & scope
  - Methods
  - Preliminary results & discussion
  - Conclusions

Workplace risk assessment

- Controlling exposure to hazardous substances & protecting health and wellbeing of workers
- Selection and implementation of appropriate RMMs aimed to reduce/controll exposure



- **OSH:** Employers → staff
- **REACH:** Manufacturers/Importers of chemical substances → safe use throughout supply chain
- **Biocidal Product Regulation**
- ....

Sound risk assessment to meet legal obligations can be complicated issue!

Especially for small and medium sized enterprises …

- **Needs: Resources (knowledge, time, personnel, costs)**
  - Expert advice
  - Sources of information and good practice
  - **Risk assessment tools** (e.g. COSHH Essentials, EMKG, Stoffenmanager etc.)
    - In most cases: Tools direct to potential RMMs

    → facilitate the assessment of **effect of potential RMMs**

How do we know the effect of potential RMMs?

- **Model assumes reduction factors**
  - **=** predicted or anticipated exposure change following implementation of specific RMMs / control approach
  - Based on data, expert judgement
  - **Associated with uncertainties**
  - **Conservative?**

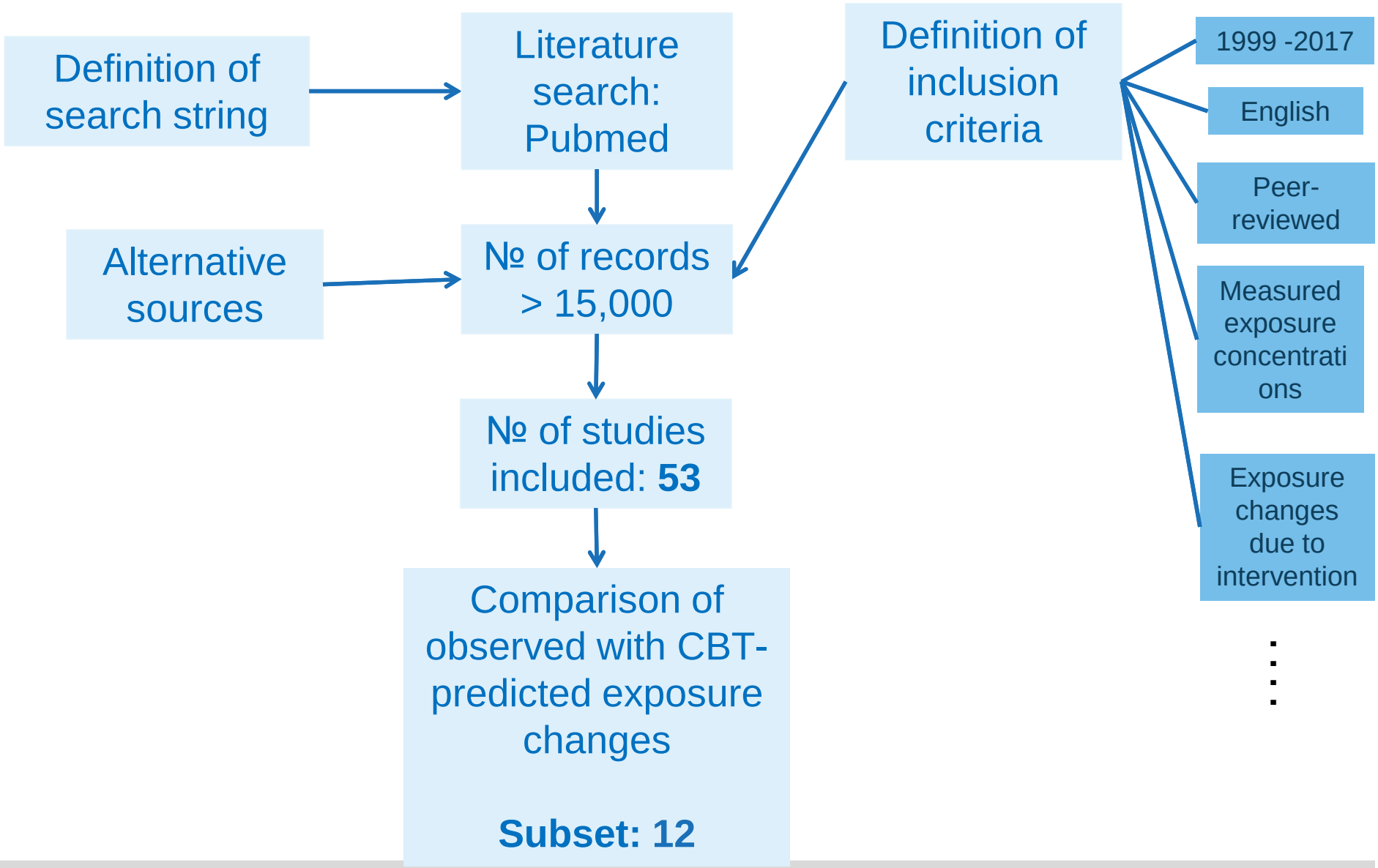
- **Definition:**
  - Events
    i. aimed at reducing occupational exposure to hazardous substances at workplace or
    ii. where reductions occurred as side effect, e.g. due to changes in production process

- **Supporting and complementing scientific validation of non-intervention assessments**

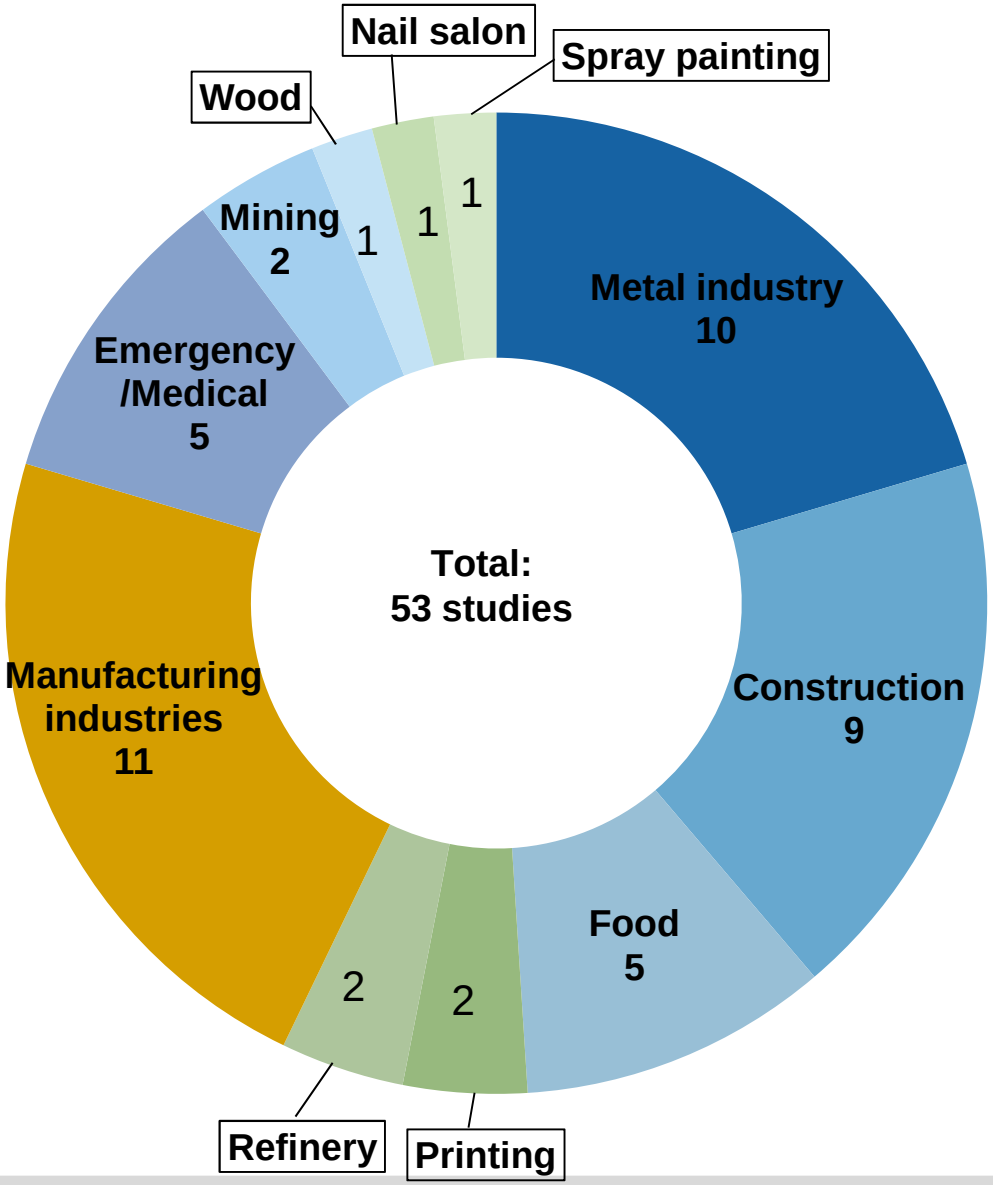
- **Monitoring effectiveness of specific RMMs**

➢ **Allow comparison: How does expected potential to reduce exposure compare to real-life observations?**

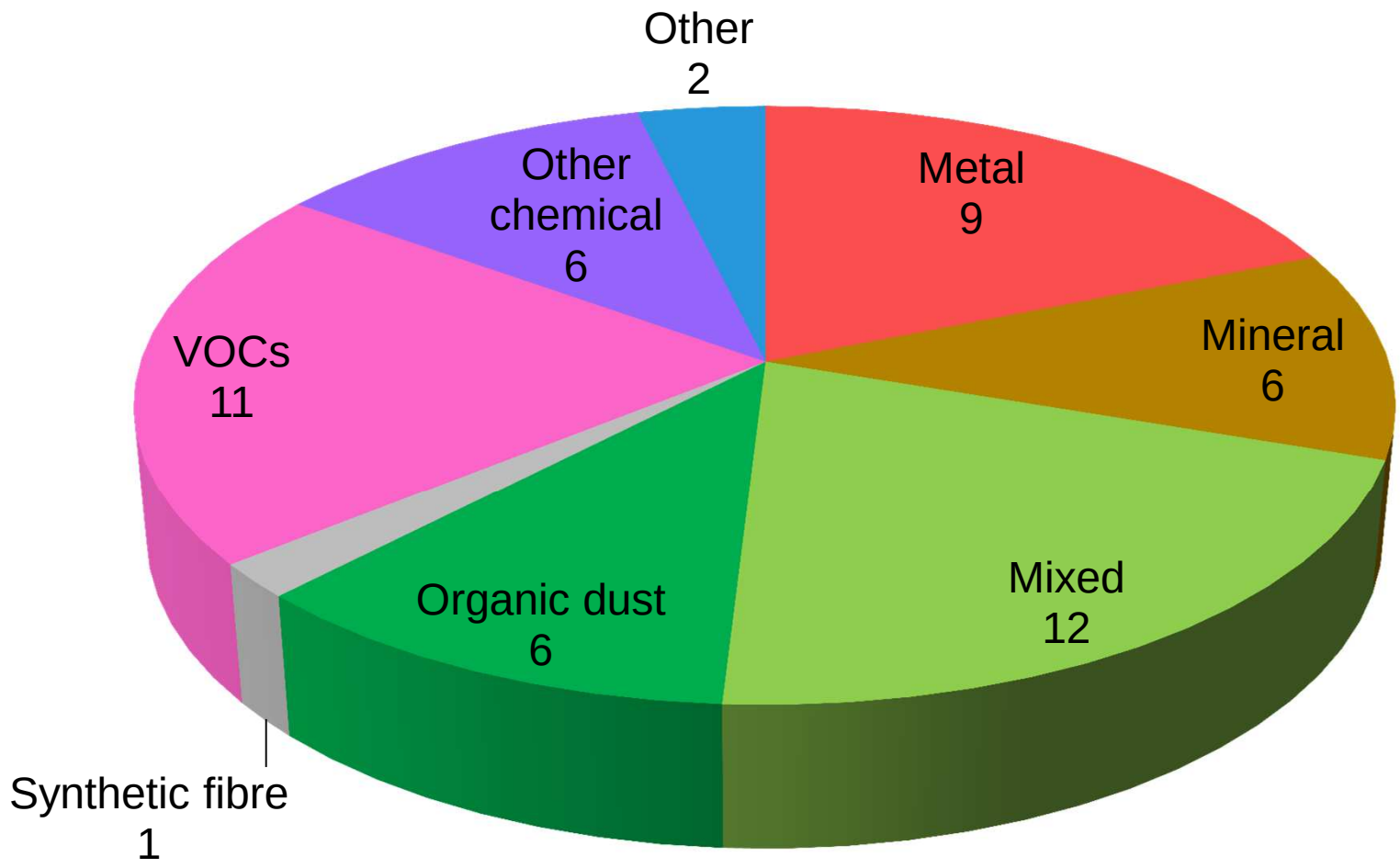
- **Control banding tools (CBT): Easy approach to evaluate worker exposure and to identify RMMs**
- **Knowledge of how expected reduction factors assumed by CBT compare to effectiveness of specific, implemented RMMs observed in field studies essential to ensure appropriate RMM recommendation by CBT → protection of workers**
- **We review a collection of published intervention studies**
- **For a subset: Comparison of observed with CBT-predicted exposure changes**

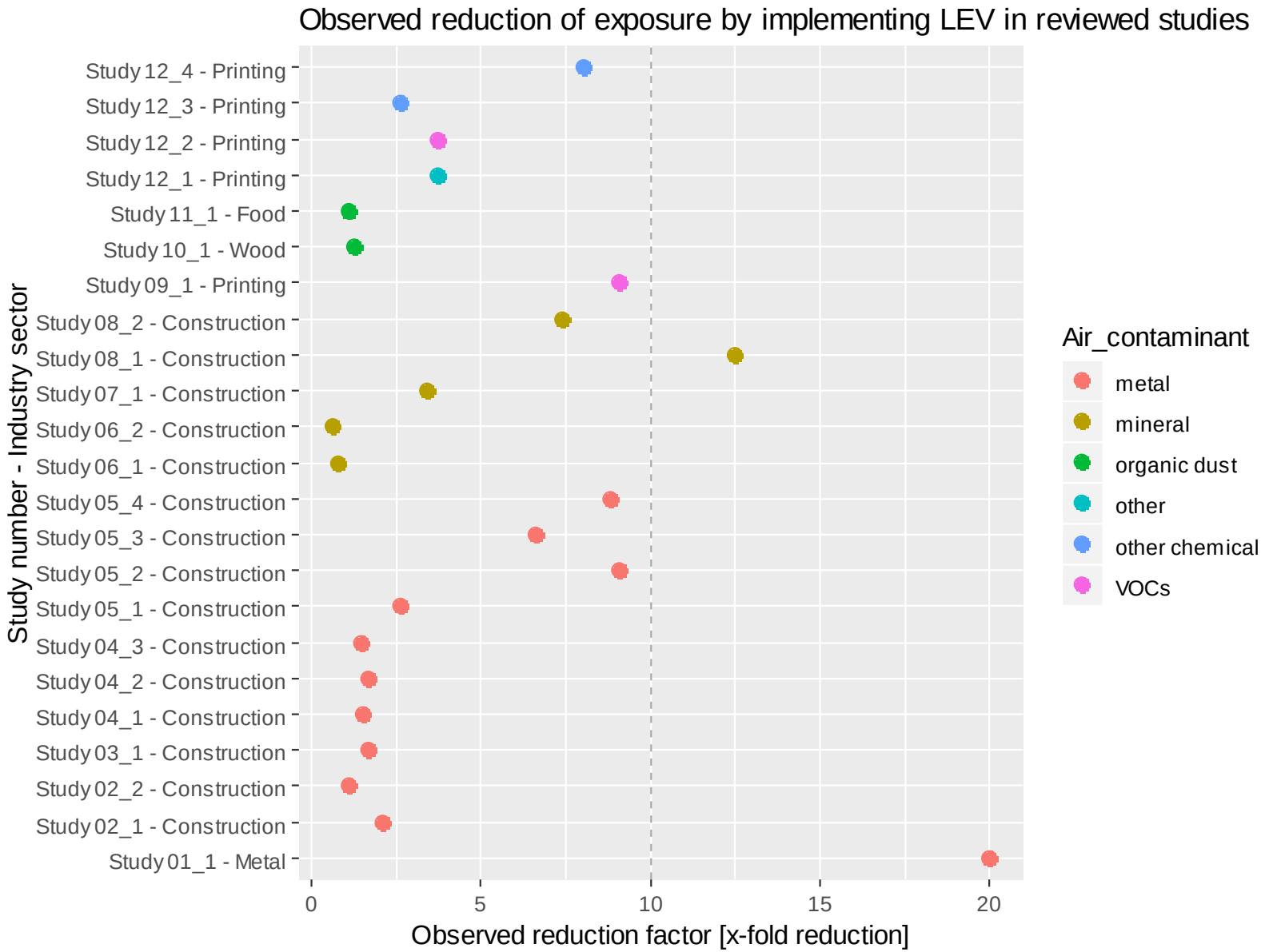

Definition of search string
Literature search: Pubmed
Alternative sources
№ of records > 15,000
№ of studies included: 53
Comparison of observed with CBT-predicted exposure changes
Subset: 12
Definition of inclusion criteria
1999 -2017
English
Peer-reviewed
Measured exposure concentrations
Exposure changes due to intervention
...

Overview of studies by industry sector



Overview of studies by airbourne contaminat(s) assessed




Observed reduction of exposure by implementing LEV in reviewed studies
Study 12_4 - Printing
Study 12_3 - Printing
Study 12_2 - Printing
Study 12_1 - Printing
Study 11_1 - Food
Study 10_1 - Wood
Study 09_1 - Printing
Study 08_2 - Construction
Study 08_1 - Construction
Study 07_1 - Construction
Study 06_2 - Construction
Study 06_1 - Construction
Study 05_4 - Construction
Study 05_3 - Construction
Study 05_2 - Construction
Study 05_1 - Construction
Study 04_3 - Construction
Study 04_2 - Construction
Study 04_1 - Construction
Study 03_1 - Construction
Study 02_2 - Construction
Study 02_1 - Construction
Study 01_1 - Metal
Study number - Industry sector
0
5
10
15
20
Observed reduction factor [x-fold reduction]
Air_contaminant
metal
mineral
organic dust
other
other chemical
VOCs

Overall:

- **Majority of interventions successful at reducing exposure levels**

- **Methods and findings varied considerably**

  → **limit scope to directly compare:**

  i. results from different studies and

  ii. effectiveness of different interventions

Comparison observed vs. CBT-predicted exposure changes - LEV

- **Majority: Assumed CBT reduction factor overestimated efficacy of LEV**

- **Decrease in workplace exposure levels followed variety of interventions in variety of industries → benefits of implementing RMMs**

- **BUT at this point:**

  i. no clear tendency regarding best choice of (classes of) RMMs

  ii. no specific recommendations for workplace risk assessment possible

- **Preliminary results indicate: Efficacy of classes of RMMs called into question**

Thank you!

Questions?

For additional information please check out our 2 Posters on the BAuA webpage:

Get a PDF copy of the poster here:

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https://www.baua.de/DE/Angebote/Publikationen/Aufsaetze/artikel1205.pdf?__blob=publicationFile

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