

BAuA workshop on safe handling of nanomaterials at workplaces

27-28 November 2012

Chemical safety, occupational safety and health – the regulatory framework

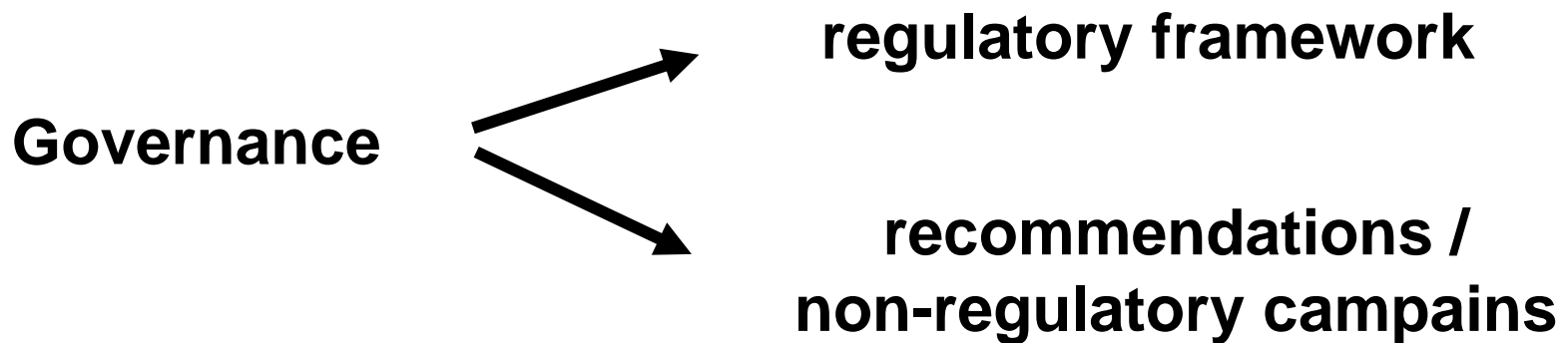
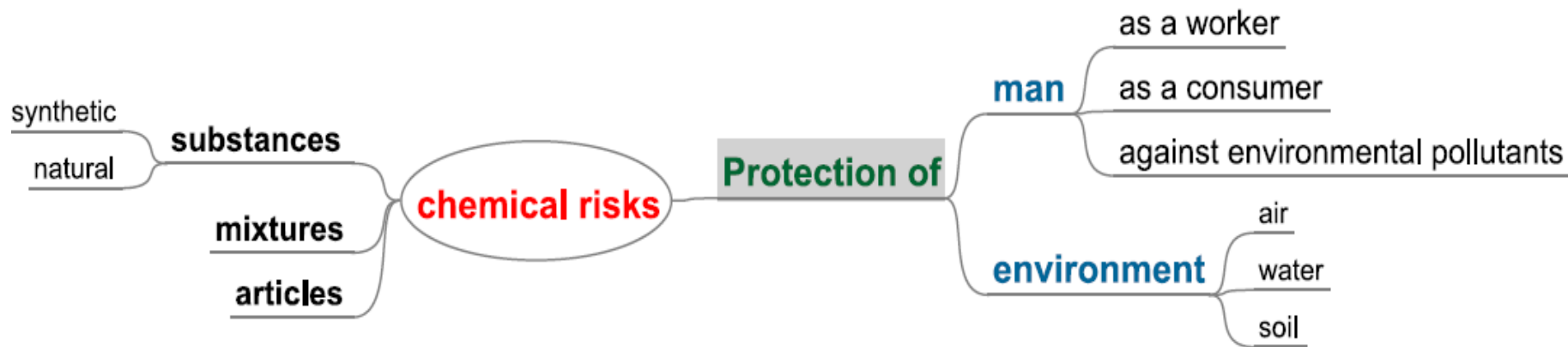


Dr. Rolf Packroff

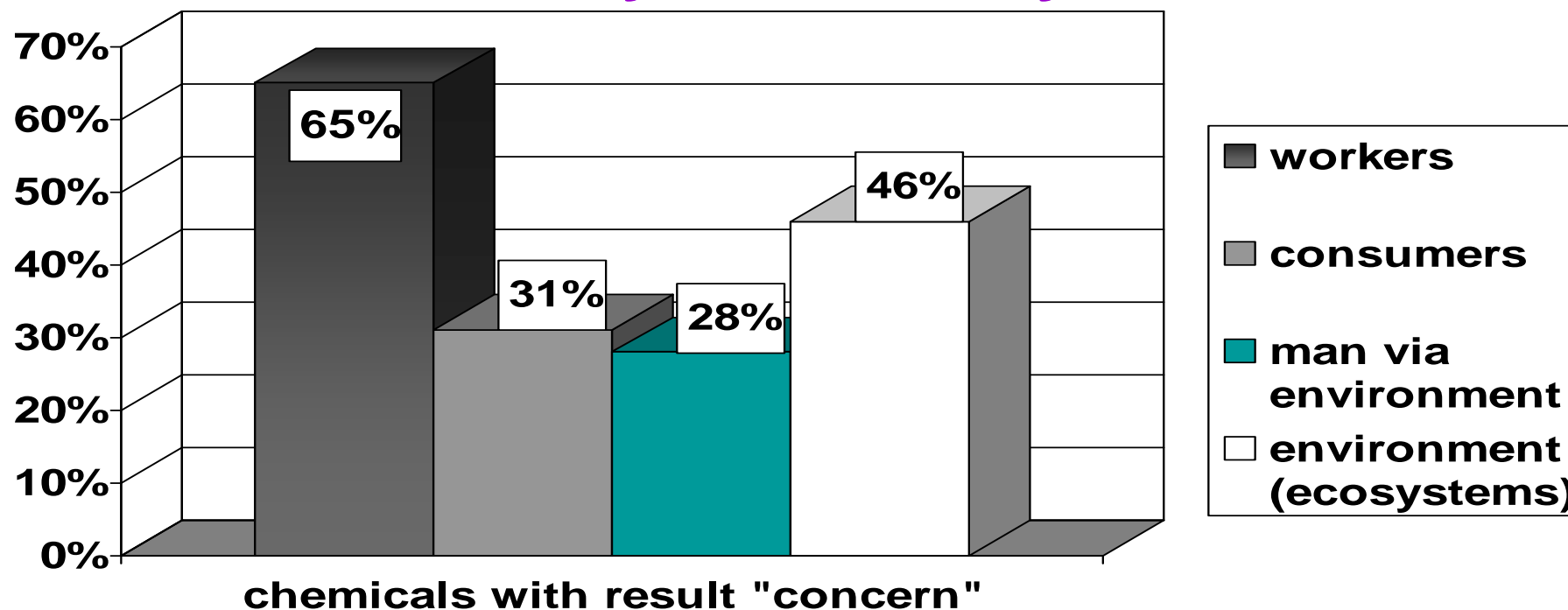
BAuA - Federal Institute for Occupational Safety and Health, Germany

baua:

Chemical risk prevention



Workers are mostly affected by chemical risks



Conclusions of risk assessment for
123 high production volume chemicals (1995 – 2008)
acc. to the EC existing chemicals regulation 793/93

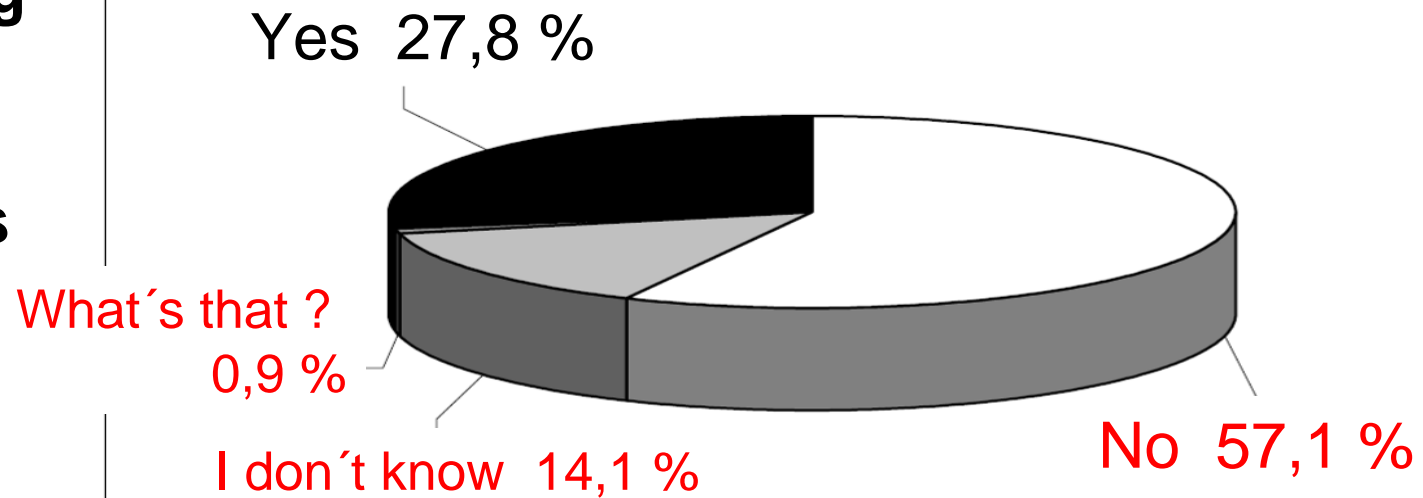
ECB, ORATS <http://ecb.jrc.ec.europa.eu/esis/index.php?PGM=ora>

Low compliance with OSH regulations

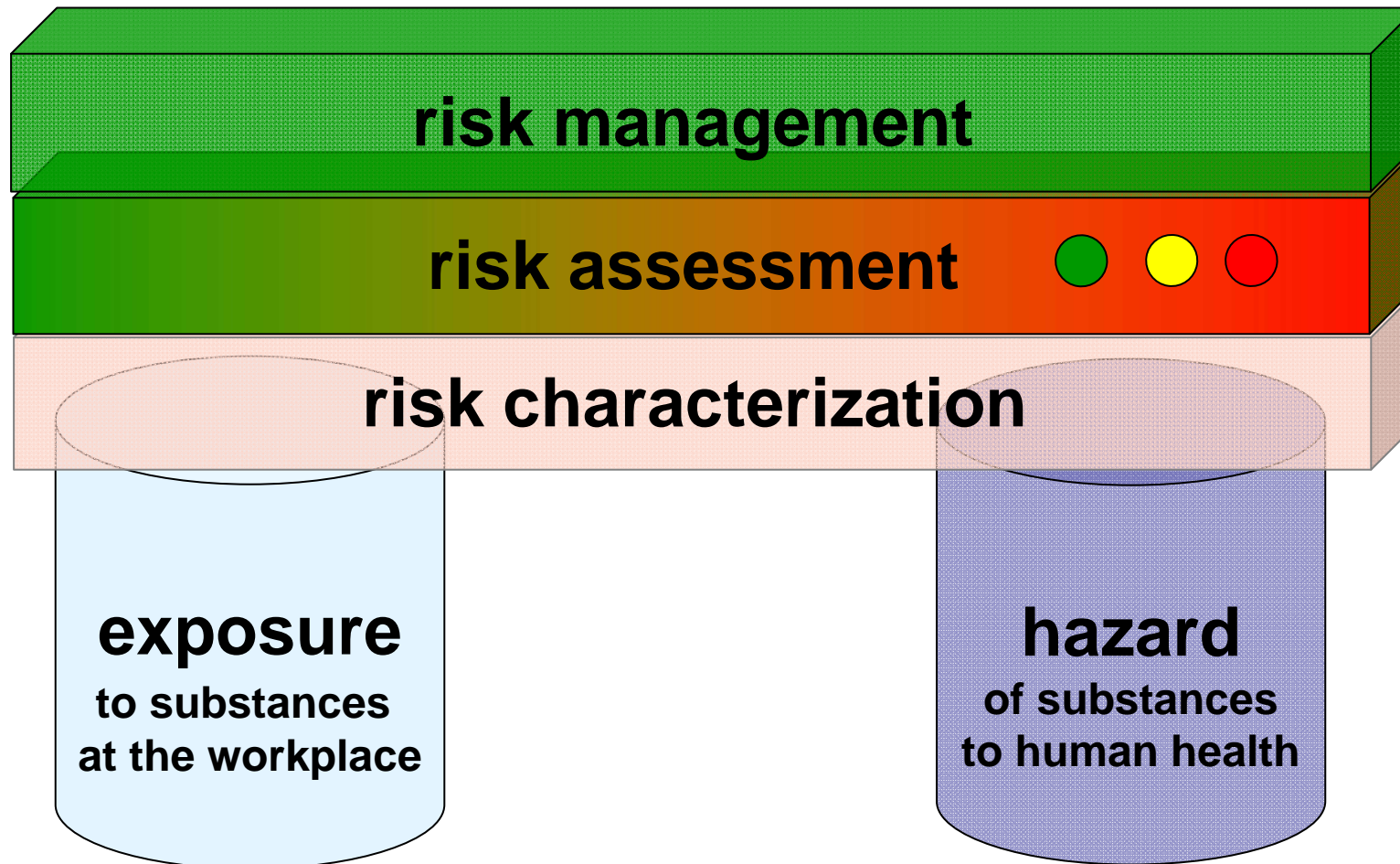
Results of questioning 20.000 German employees (2005)



Do you know of a risk assessment for your workplace ?



Federal Institute for Vocational Education (BIBB), Institute for Labour Market and Occupational Research (IAB)
Source: Annual report on OSH 2005 (BAuA)



EU protection pillars against chemical risks

**Placing
chemicals
on the market**

art. 114 AEUV* (binding)
REACH
CLP
special regulations for products

worker protection

consumer protection

environmental protection

art. 153 TFEU*

art. 169 TFEU*

art. 191 TFEU*

**EU minimum
standards**

* treaty on functioning of european union

Classification

Labelling

Packaging

based on GHS



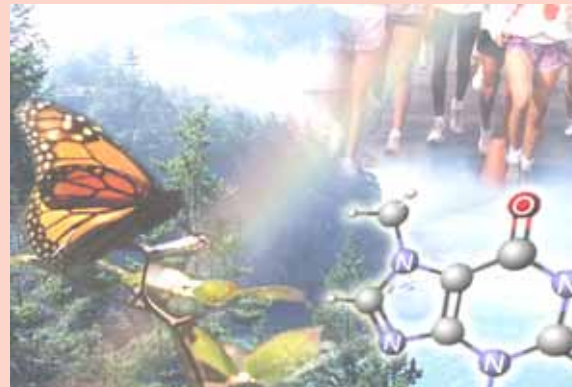
Hazard

Registration

Evaluation

Authorisation of

CHemicals



picture: ECHA

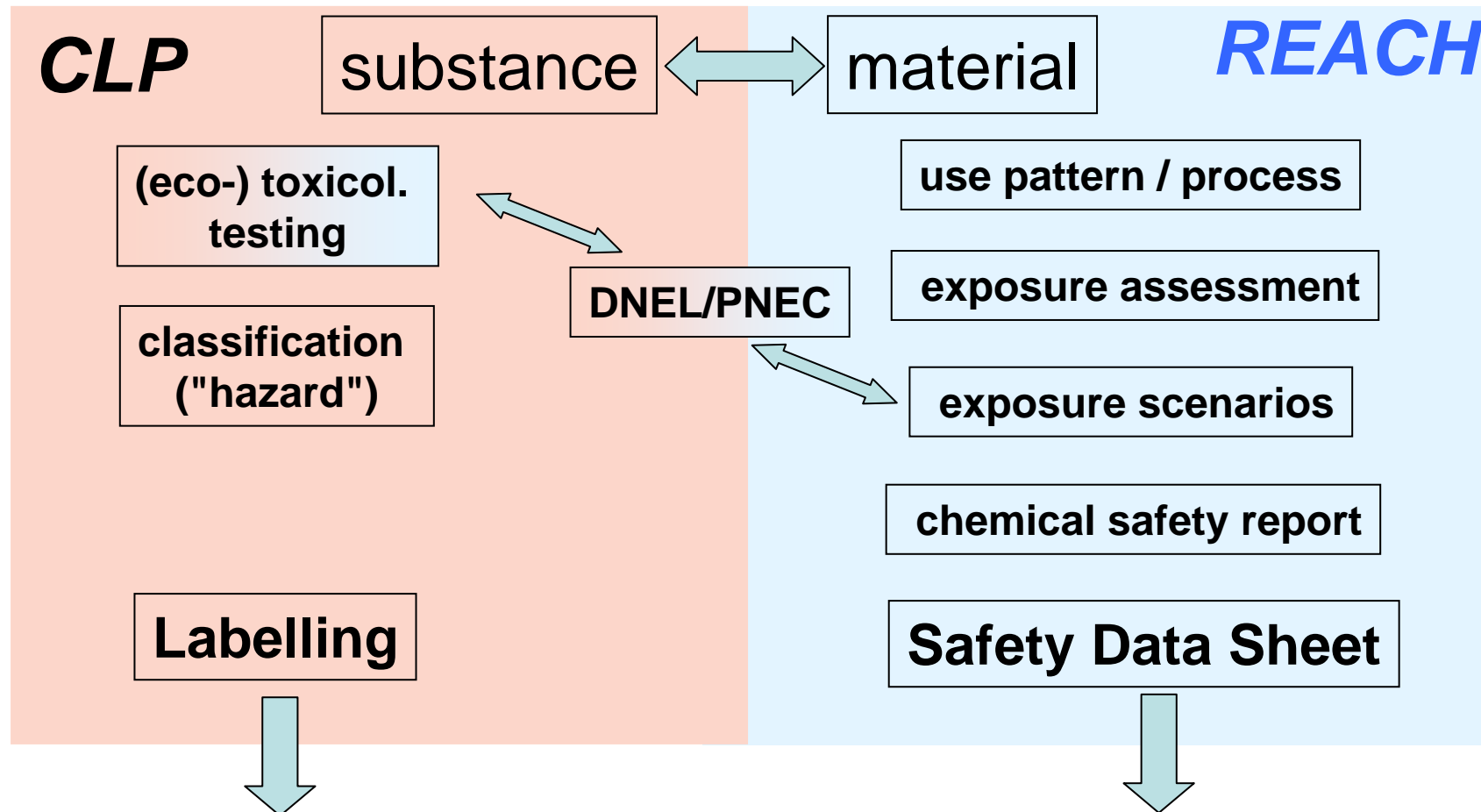
Risk

It's mandatory for a producer or supplier of a chemical substance or mixture to ...

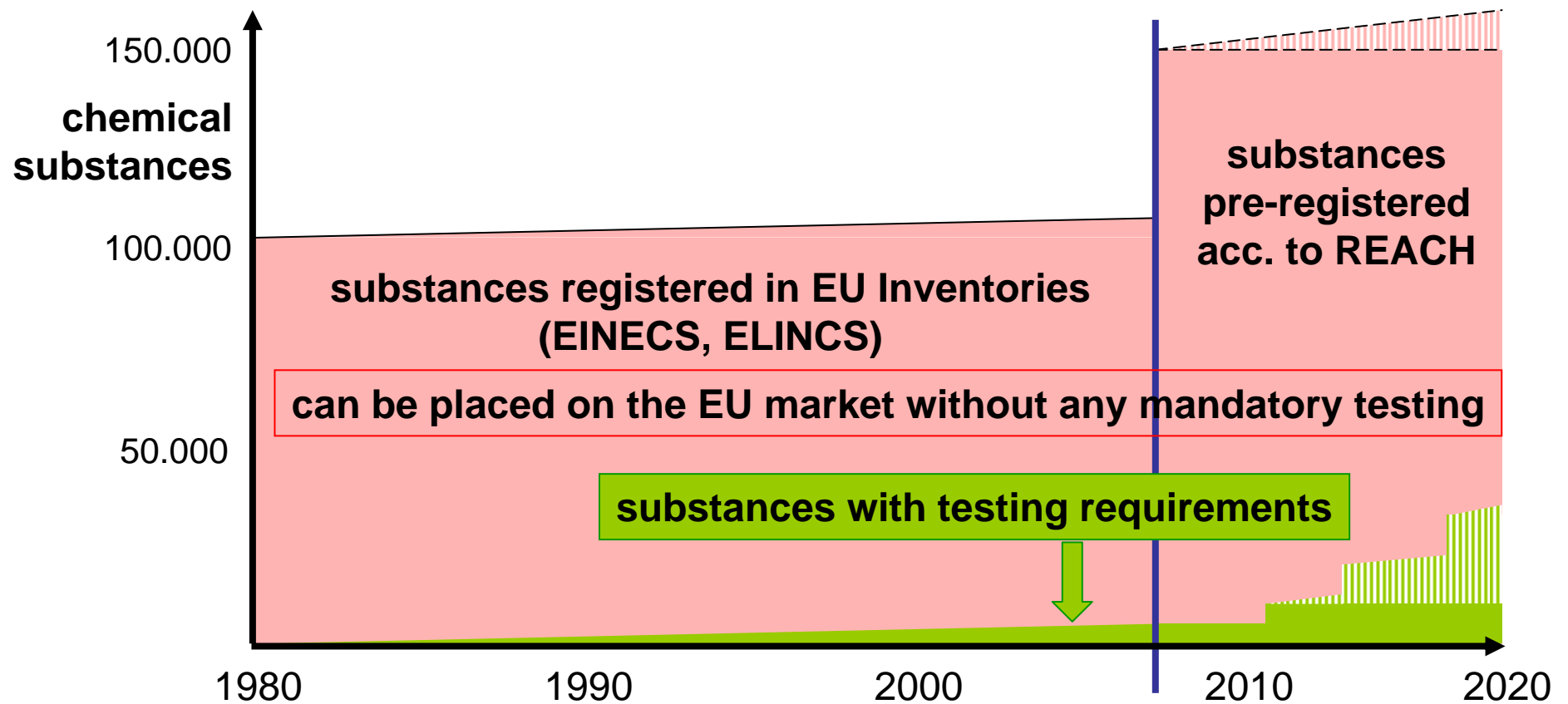
- identify hazardous properties of the chemical substance or mixture for **classification** and **labelling** (CLP)
- **register** a chemical substance with sufficient data (REACH)
- provide a **safety data sheet** for professional users with adequate information on safe handling (REACH)

Hazard

Risk



A safety program for generations ...



Special regulations for chemical products

risk for man or environment
assumed because of:

pesticides
biocides

food additives
feedingstuff additives

pharmaceuticals
cosmetics

**intended adverse effects
on organisms**

**not avoidable or intended
oral / dermal exposure with
wide dispersive use pattern**

Nanomaterials are chemicals ...

substance: means a chemical element and its compounds in the natural state or obtained by any manufacturing process, including any additive necessary to preserve its stability and any impurity deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition;

preparation: means a mixture or solution composed of two or more substances;

article: means an object which during production is given a special shape, surface or design which determines its function to a greater degree than does its chemical composition;

Art. 3 of the REACH regulation

... and they are covered by legislation for chemical safety

Occupational safety and health

Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the **safety and health of workers at work**

Directive 98/24/EC of 7 April 1998 on the protection of the health and safety of workers from the **risks related to chemical agents at work**

Directive 2006/15/EC of 7 February 2006 establishing a second list of **indicative occupational exposure limit values**

Directive 2004/37/EC of 29 April 2004 on the protection of workers from the risks related to **exposure to carcinogens or mutagens at work**

Directive 2000/39/EC of 8 June 2000 establishing a first list of **indicative occupational exposure limit values**

Directive 91/322/EEC of 29 May 1991 on establishing **indicative limit values**

Directive 83/477/EEC of 19 September 1983 on the protection of workers from the **risks related to exposure to asbestos at work**

98/24/EC - chemical agents (art. 2)

‘Chemical agent’ means:

any chemical element or compound, on its own or admixed, as it occurs in the natural state or as produced, used or released, including release as waste, by any work activity, whether or not produced intentionally and whether or not placed on the market.

‘Hazardous chemical agent’ means any chemical agent :

- which meets the criteria for **classification**
 - as a dangerous substance (...)
 - as a dangerous preparation / mixture (...)
- which may, **because of its physico-chemical, chemical or toxicological properties and the way it is used or is present in the workplace**, present a **risk to the safety and health of workers**, including any chemical agent assigned an occupational exposure limit value (..).

98/24/EC - activity (art. 2)

‘Activity involving chemical agents’ means any work in which chemical agents are used, or are intended to be used, in any process, including production, handling, storage, transport or disposal and treatment, or which result from such work;

98/24/EC - practical guidelines (art. 12)

The Commission shall draw up practical guidelines of a nonbinding nature. These guidelines shall address the topics referred to in Articles ...

3 - Occupational exposure **limit values** and biological limit values

4 - Determination and **assessment of risk** of hazardous chemical agents

5 - **General principles for prevention** of risks associated with hazardous chemical agents and application of this Directive in relation to assessment of risks, and

6 - **Specific protection and prevention measures**, and

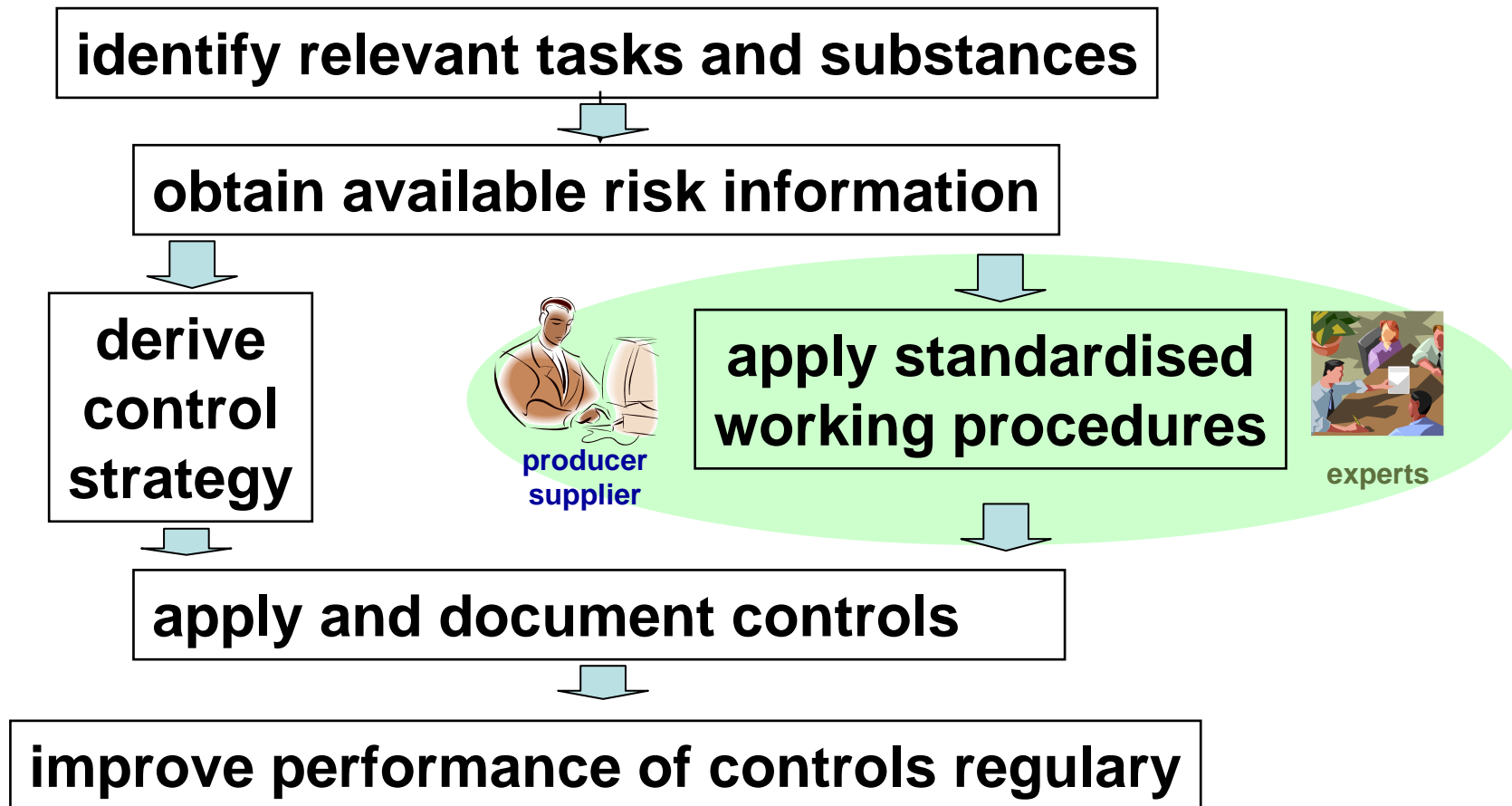
Annex II, section 1 - Binding biological limit values and health surveillance measures

98/24/EC - risk assessment (art. 4)

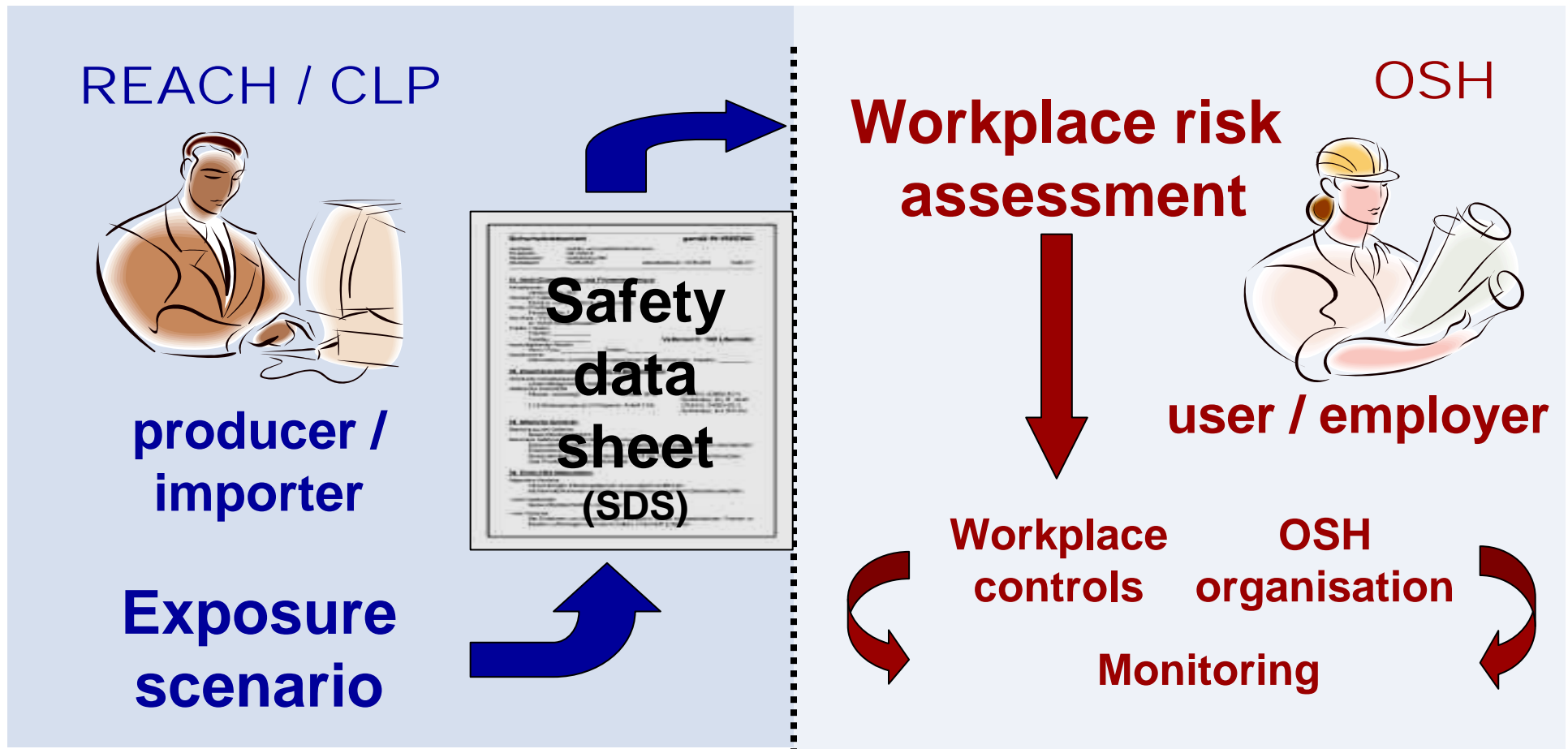
(...) The employer shall first determine whether any hazardous chemical agents are present at the workplace. If so, he shall then assess any risk to the safety and health of workers arising from the presence of those chemical agents, taking into consideration the following:

- their **hazardous properties**,
- information on safety and health that shall be provided by the supplier, (e.g. the relevant **safety data sheet** (...))
- the **level, type and duration of exposure**
- the **circumstances of work** involving such agents, including their amount,
- any **occupational exposure limit values** or biological limit values (...),
- the **effect of preventive measures** taken or to be taken
- where available, the conclusions to be drawn from any **health surveillance** already undertaken.

Scheme for workplace risk assessment



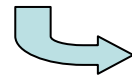
Risk assessment: information chain



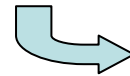
Control Strategies for OSH



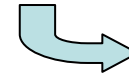
Substitution



Technical (closed system, LEV,)

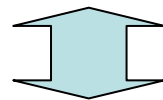


Organisation



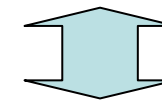
Personal (PPE)

Risk assessment for activity



Performance of Controls

Control Banding



Exposure limits

Control banding ...

... is a **qualitative** or **semi-quantitative** risk assessment and management approach to promoting occupational health and safety,

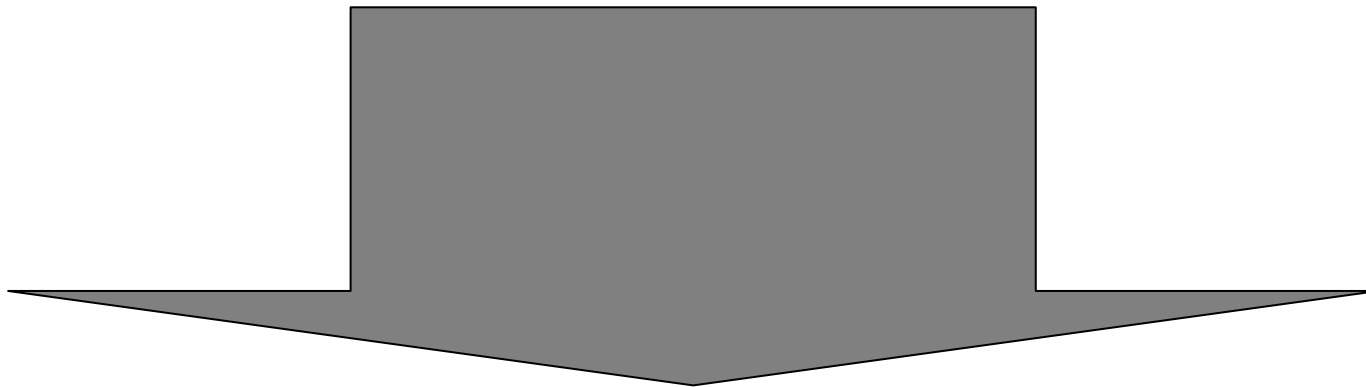
... is intended to **minimize worker exposures** to hazardous chemicals in the workplace,

... is intended to help **small businesses** by providing an **easy-to-understand**, practical approach to controlling hazardous exposures at work.

http://en.wikipedia.org/wiki/Control_banding

Features of Control banding

**easy-to-use tools
for risk assessment**



**control guidance sheets
for risk management**

1. Banding of hazard information



R - phrases
H - phrases
OEL

hazard bands

inhalation

skin

fire & explosion

2. Banding of exposure information

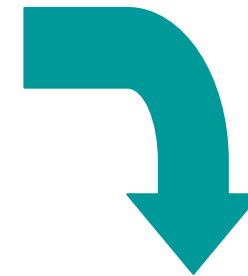
**exposure
potential of the
chemical**

temperature +
boiling point /
vapour pressure
dustiness

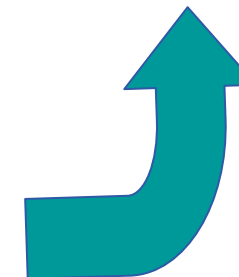
**task-related
exposure
potential**

quantity used
(t/m³, kg/l, g/ml)

skin contact
duration
contact area



exposure bands



3. Banding of control strategies

Control Guidance
Sheet Series



special expert advice **4xx**



closed system or process **3xx**



technical and other controls
minimising emissions at source **2xx**



www.health.nsw.gov.au

basic hygiene measures
(to be applied generally, acc. to art. 5 of 98/24/EC) **1xx**

4. Control guidance sheets (activities)

EMKG

1. Allgemeine Lüftung (General ventilation) - 100
 2. Befüllen von Säcken (Sack filling) - 206
 3. Geschlossenes System (Containment) - 300

General ventilation
 Sack filling
 Containment

COSHH ESSENTIALS

ILO Toolkit Control Sheet 100 - General Ventilation General Principles
 ILO TOOLKIT CONTROL SHEET 205 - SACK FILLING
 ILO Toolkit Control Sheet 300 - Containment

International Labour Organization

www.baua.de/emkg

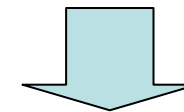
<http://www.coshh-essentials.org.uk/>

http://www.ilo.org/legacy/english/protection/safework/ctrl_banding/toolkit/icct/index.htm

An example



- new (nano)material
- unknown hazards
 - high dustiness



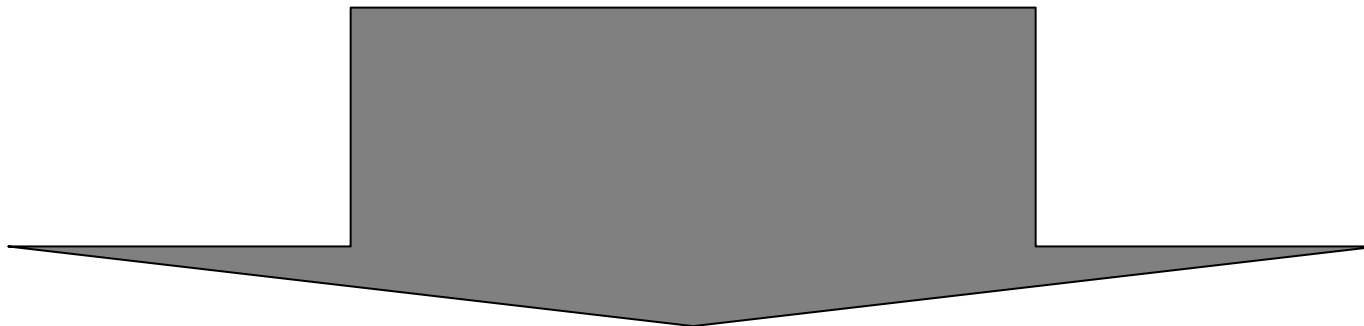
**Control strategy (CS) /
 Control guidance series
 dep. on task-related quantity**

grams >>> engineering control (CS 2)
 kilograms >>> containment (CS 3)
 tons >>> containment (CS 3)

www.baua.de/emkg

A special form of Control Banding

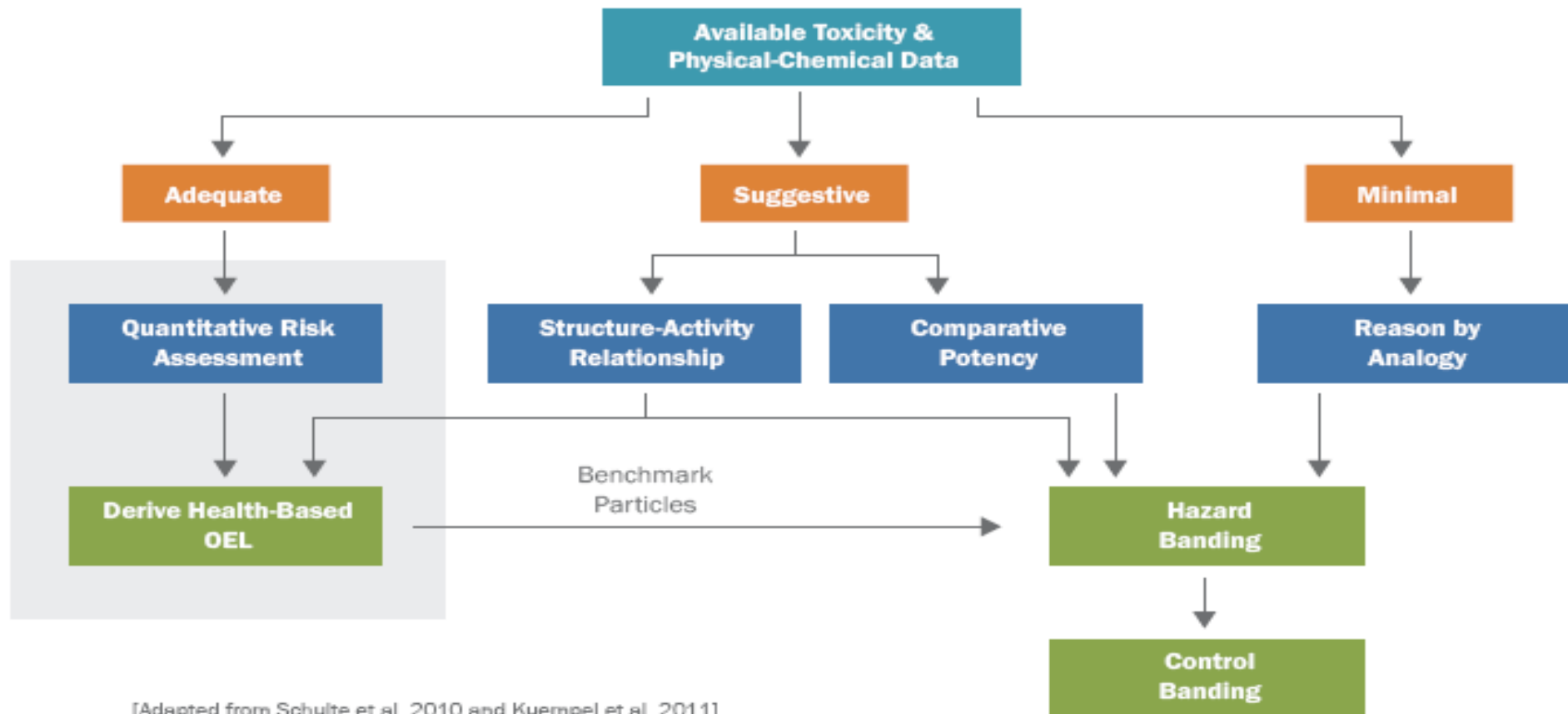
**Anticipated risk assessment
based on expert judgement**



**Standardized working procedures
(for specific tasks or branches)**

A new leading idea from US-NIOSH

Exposure limits vs. control banding



[Adapted from Schulte et al. 2010 and Kuempel et al. 2011]

Impact of a regulation / recommendation
for protection of workers from (chemical) risks

"guarantor position"

Are controls feasible and
manageable?
Can effectiveness be monitored?

"performance"

Can it be presumed,
that controls are used in reality?

"compliance"

Thanks a lot for your attention

Dr. Rolf Packroff

Federal Institute for Occupational
Safety and Health

Friedrich-Henkel-Weg 1-25
44149 Dortmund, Germany

Tel. +49 (0) 231/9071-2587
SekFb4@buaa.bund.de

www.buaa.de

