

# COSANTA BV

## Inleiding op blootstellingmodellen

NVvA Symposium 2015

Koen Verbist

19-03-2015

**TNO** company

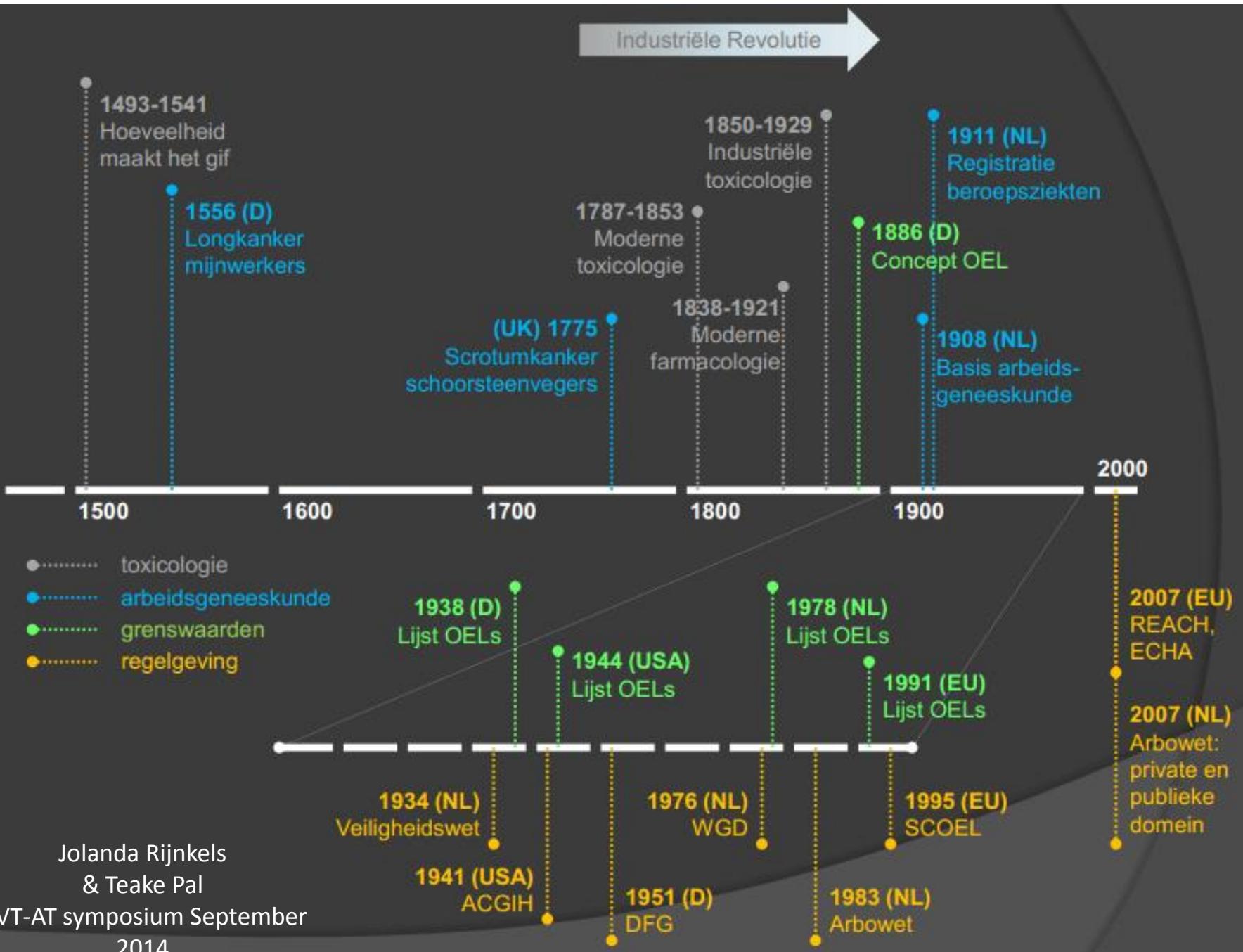
**COSANTA BV**

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# In het begin

- Waren er geen grenswaarden voor stoffen
  - Vanaf eind 19e eeuw
  - 1944 eerste lijst grenswaarden ACGIH
- Waren er geen meetmethoden
- Waren er geen modellen



# Eerste stapjes

- >1970 eerste ontwikkelingen
  - Kwalitatief
  - Semi-kwantitatief
- COSHH (late 1980s)
  - ‘Simplified strategy to assess health risks in the workplace’
  - Combinatie van gevaar (R-zinnen) en blootstelling

# Eerste ‘control banding’ tools

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Exposure management system (CEFIC)

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Targeted Risk Assessment (ECETOC)

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COSHH Essentials (UK)

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Risk Potential Hierarchy (Fr)

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Chemical Management Guide (Du)

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EMKG (Du)

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Stoffenmanager® (NL)

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KjemiRisk (No)

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Regetox & Sobane (Be)

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Semi-quantitative Risk Assessment (Singapore)

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Korean Control Toolkit (Korea)

**Qualitative Risk Characterization and  
Management of Occupational Hazards:  
Control Banding (CB)**

A Literature Review and Critical Analysis

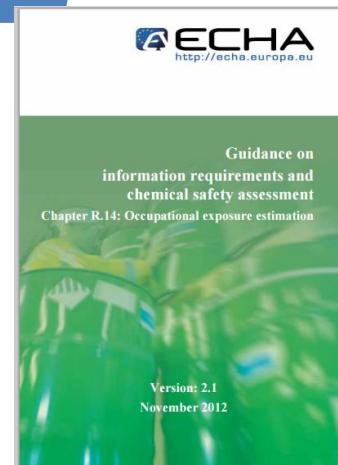
NIOSH, 2009

# Kwantitatief (inhalatie – werker)

EASE (begin jaren 90)

'REACH-tools' (R.14) - Werker

- ECETOC TRA
- EMKG
- Stoffenmanager®
- ART
- MEASE



**Easy-to-use workplace control scheme for hazardous substances**



# Kwantitatief (inhalatie - werker)

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Lasrookassistent

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Concentratie-Bron model

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IH Mod

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Abschätzung der Dieselmotoremissionen (DME)

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ChemSTEER (US EPA)

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Industry Specific Generic Scenarios (US EPA)

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Wall Paint Exposure Assessment Model (WPEM)

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EUROPOEM

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SprayExpo (BAuA)

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TEXAS (Tool for EXposure ASsessment, INRS)

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# OECD – overzicht van tools

- <http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=env/jm/mono%282012%2937&doclanguage=en>

**DESCRIPTIONS OF EXISTING MODELS AND TOOLS USED FOR EXPOSURE ASSESSMENT  
Results of OECD Survey**

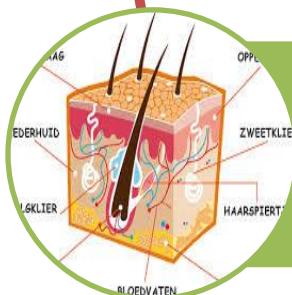
**Series on Testing and Assessment  
No. 182**

# Domein



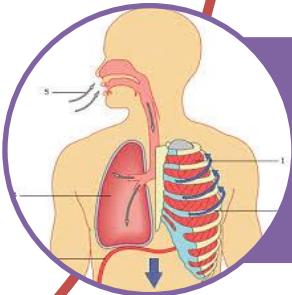
## Populatie

- Werknemer
- Milieu
- Consument



## Route

- Inhalatie
- Dermaal
- Oraal



## Beschikbaarheid

- Externe dosis
- Interne dosis

# Belangrijke vragen

Hoe is een model tot stand gekomen?

Hoe is een model gekwantificeerd?

Is het model (extern) gevalideerd?

Heeft het wettelijke status / acceptatie?

- Conservatief?

Wat is het benodigde kennisniveau?

- Training noodzakelijk? ‘Seductively simple’?

Wat is de verdere ontwikkeling?

- Eenmalig project?
- Continue aanpassing?

# Evaluation of Tier 1 Exposure Assessment Models under REACH

## the eteam project

• Home

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• ETEAM Conference

• Work Packages

• Partners

• Model user survey

• Between-user reliability

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### Welcome to the eteam project

The REACH (Registration, Evaluation, Authorisation and restriction of Chemicals) legislation was introduced on 1st June 2007 and aims to control human and environmental risk from exposure to chemicals across the European Union. The first phase of registration of chemical agents was completed in December 2010.

Due to the paucity of exposure data, a tiered approach is used to determine the risk of exposure to chemicals, with a great reliance on conservative screening models for exposure assessment. Several 1st tier exposure models are recommended by the European Chemicals Agency (ECHA) for estimating occupational exposure; however, to date none of these models have been extensively evaluated and compared.

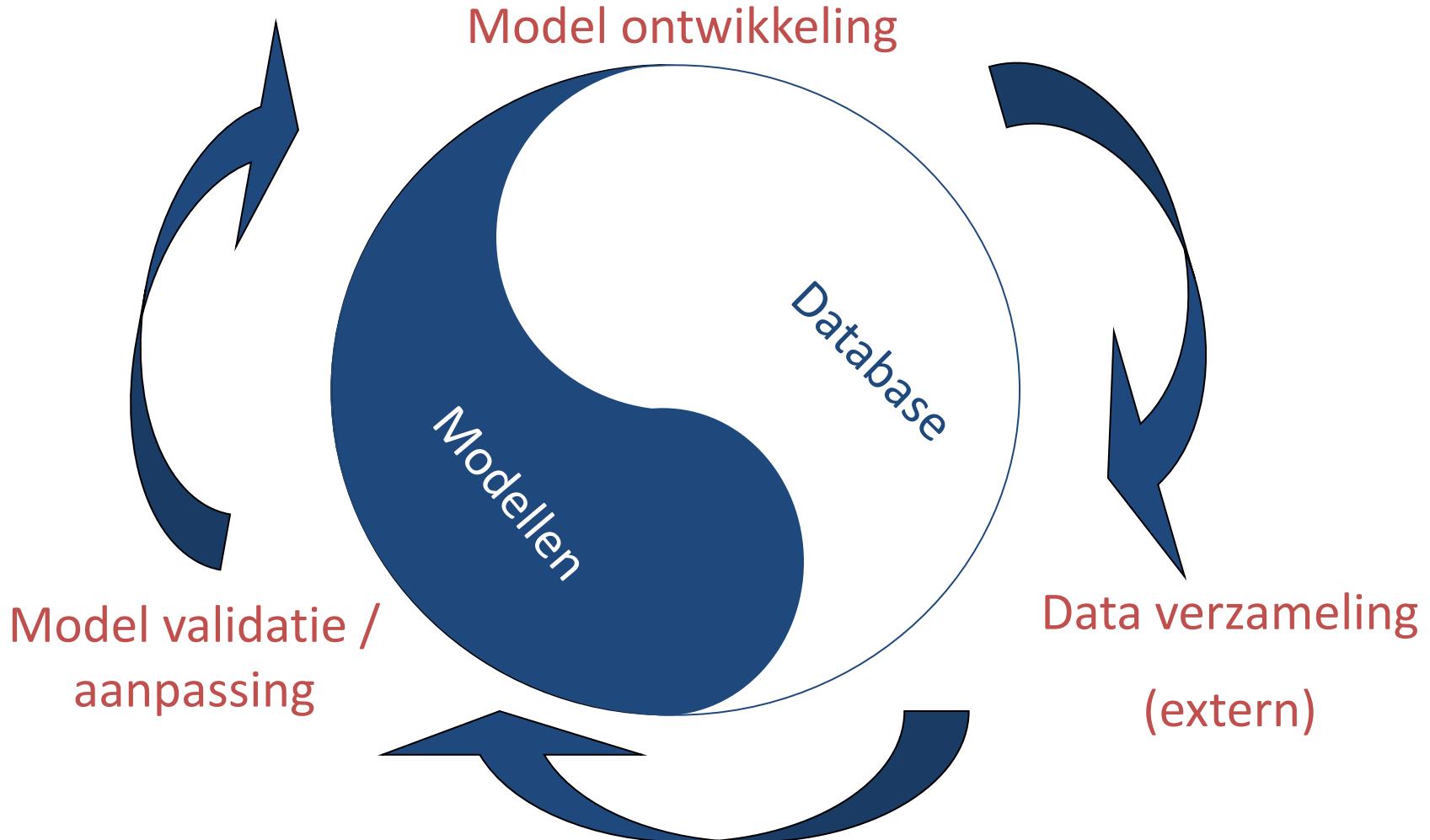
The Evaluation of Tier 1 Exposure Assessment Models under Reach ("eteam") project, sponsored by the German Federal Institute for Occupational Safety and Health (BAuA), aims to compare and contrast the different REACH Tier 1 exposure assessment models in terms of their determinants, scope of application, functionality and user-friendliness.

The models to be evaluated are:

- ▶ ECETOC TRA
- ▶ Stoffenmanager
- ▶ RISKOFDERM
- ▶ MEASE
- ▶ EMKG-Expo-Tool

<http://www.eteam-project.eu/Home.aspx>

# (Blijvende) ontwikkeling

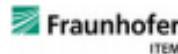


# Geldigheidsdomein

Printscreen E-TEAM conference  
 Dortmund, 25-03-2014  
<http://tinyurl.com/ogsallu>

Applicability	EMKG-EXPO-TOOL	Stoffen-manager v.4.5	ECETOC TRA v2	ECETOC TRA v3	MEASE	RISKOFDERM
Route	Inh.	Inh.	Inh.+derm.	Inh.+derm.	Inh.+derm.	Derm.
Covered physical state	solid liquid	solid liquid	solid liquid = volatile	solid liquid = volatile	solid liquid gaseous	solid liquid
Beyond Scope	Dusts by abrasive techniques, open spray, gases, pesticides, fumes, wood dusts, CMR substances	Fibres, gases or hot working techniques (welding, soldering); abrasion and impact of solid objects not recommended	Fibres, liquid aerosols or emissions from hot processes (e.g. fumes). Solids in liquids. Caution recommended for CMRs	Fibres, liquid aerosols or emissions from hot processes (e.g. fumes). Solids in liquids. Caution recommended for CMRs	Organic substances & some restrictions concerning special combinations of PROC/physical properties	Sometimes restrictions due to original data set (e.g. "only on manual tasks for powders") fumes not covered

© Fraunhofer



## Applicability matrix

2/2

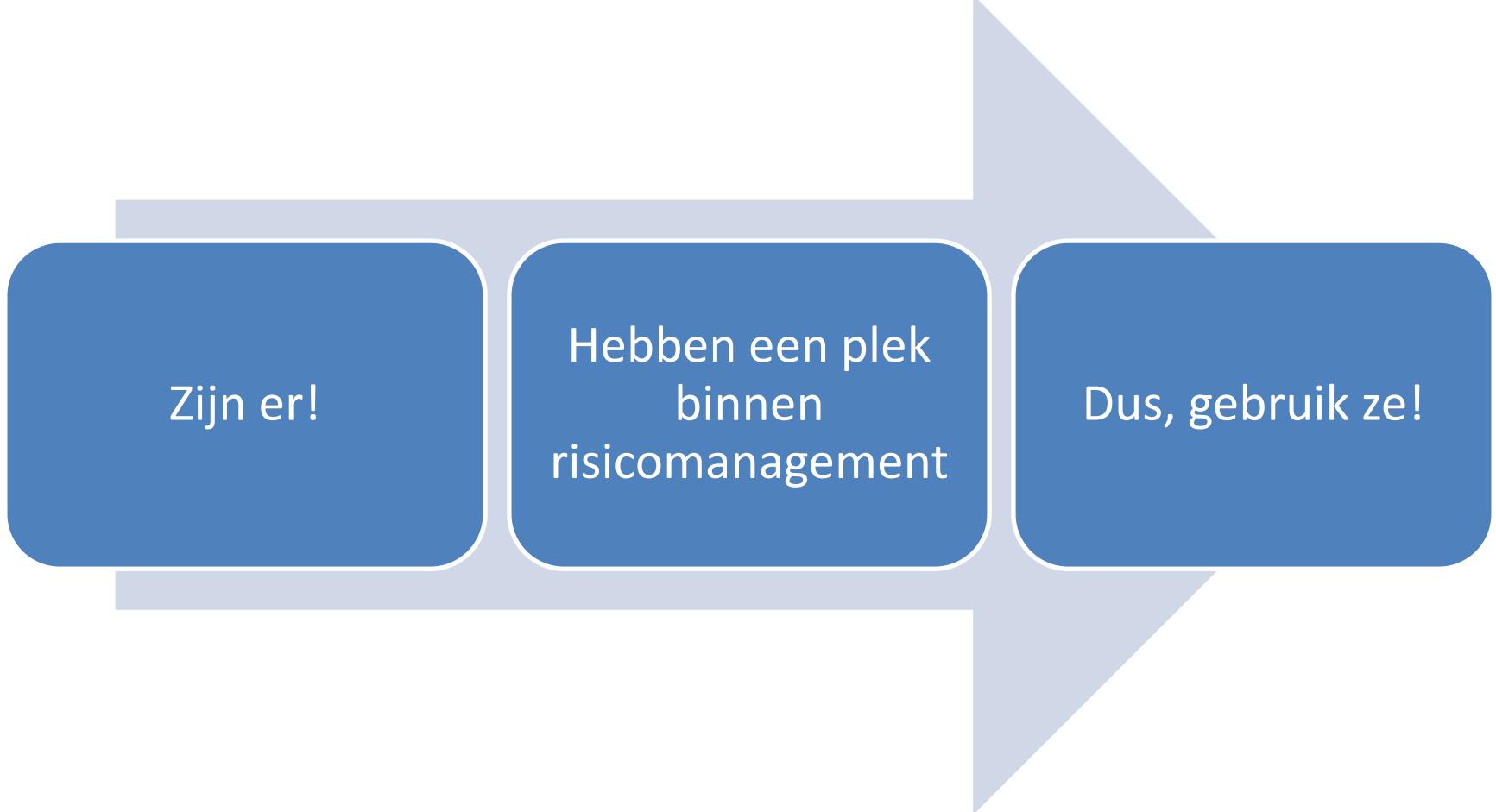
Applicability	EMKG-EXPO-TOOL	Stoffen-manager v.4.5	ECETOC TRA v.2	ECETOC TRA v.3	MEASE	RISKOFDERM
Type of enterprises	SME	industrial & professional	industrial & professional	industrial & professional	industrial & professional	industrial & professional
Use categories process or task based	task	task	process	process (+ „peak exposure“)	process	task
Farfield factors	partly included via cgs	same task by other workers	Not included	Not included	Not included	Not included
Other information		only model which covers stone / wood dust				only model which covers body exposure



Not all situations are applicable for all models!

# Kortom

# 1. Modellen

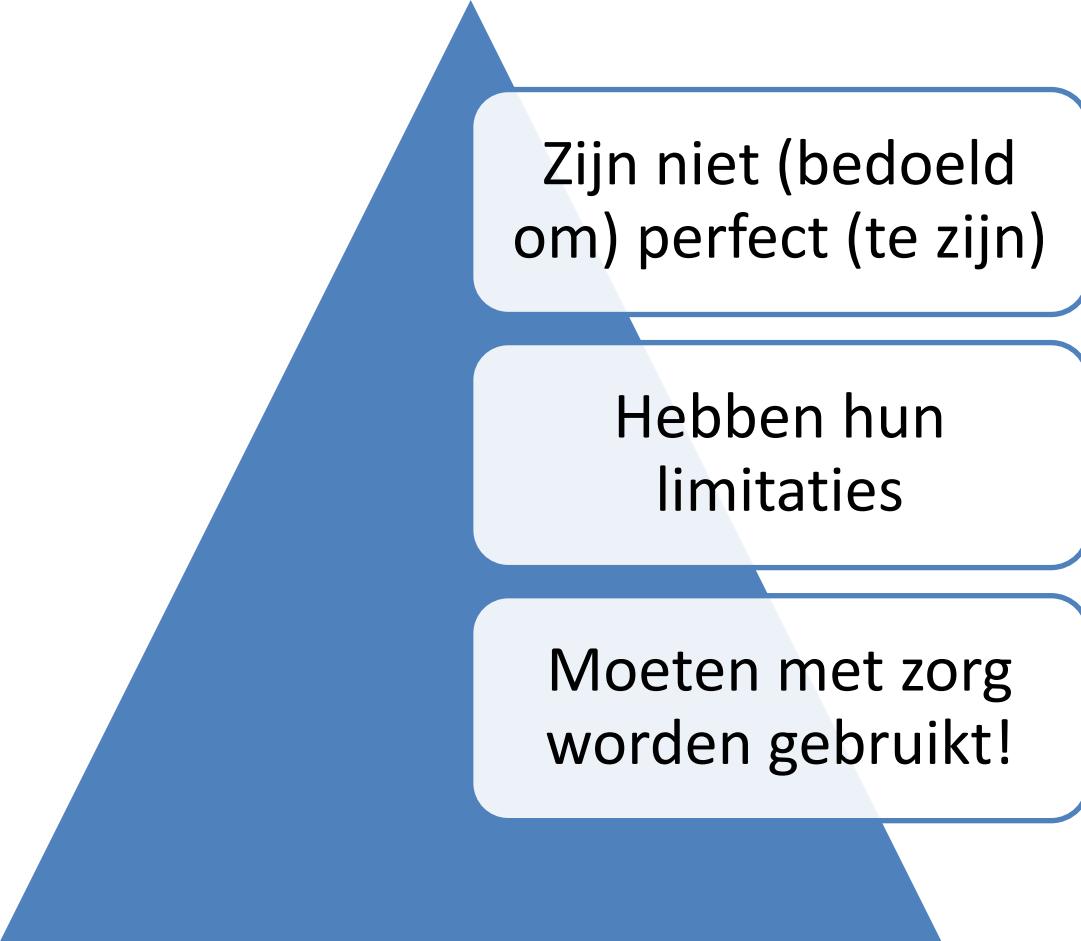


Zijn er!

Hebben een plek  
binnen  
risicomanagement

Dus, gebruik ze!

## 2. Modellen



Zijn niet (bedoeld  
om) perfect (te zijn)

Hebben hun  
limitaties

Moeten met zorg  
worden gebruikt!

# 3. Modellen input



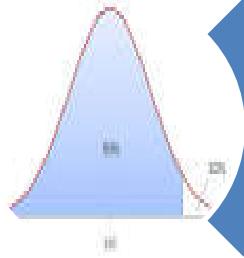
Ken de  
parameters



Ken de  
werkplek



# 4. Modellen output



Is conservatief!?



Vereist interpretatie



Is niet het einde van de  
risicobeoordeling

# 5. Are we there yet?



*Essentially, all models are wrong, but some are useful*

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*Remember that all models are wrong; the practical question  
is how wrong do they have to be to not be useful*

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George E. P. Box (1919 – 2013)

# MEASE & BioNormtox PBPK

