



**Tradition och trender inom
exponeringsbedömning**



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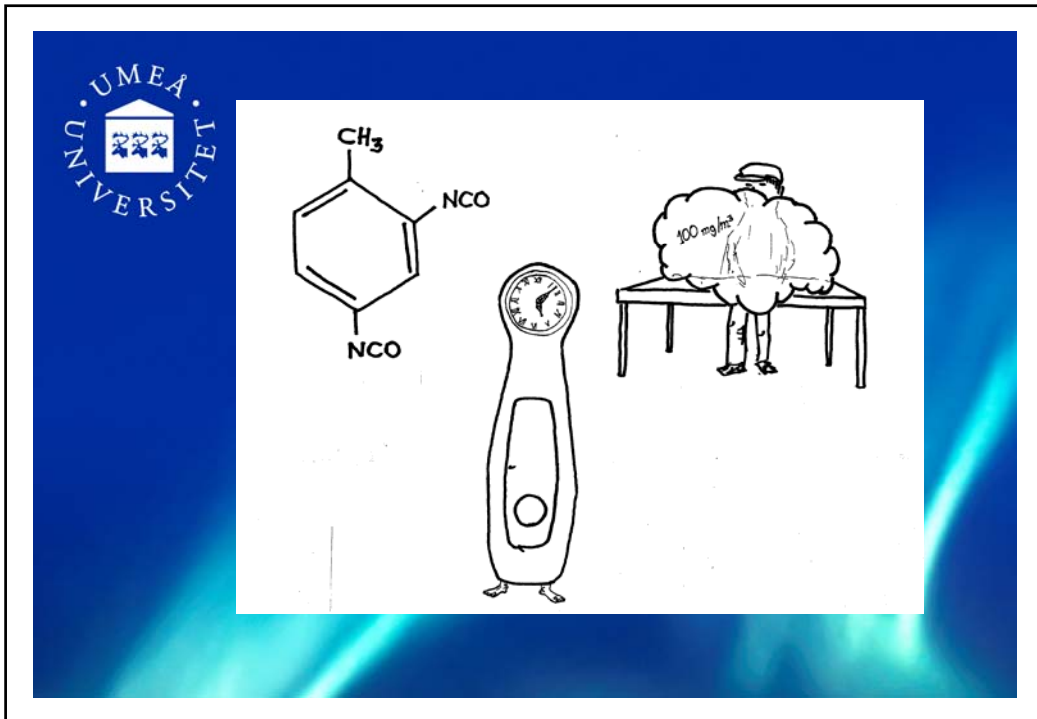
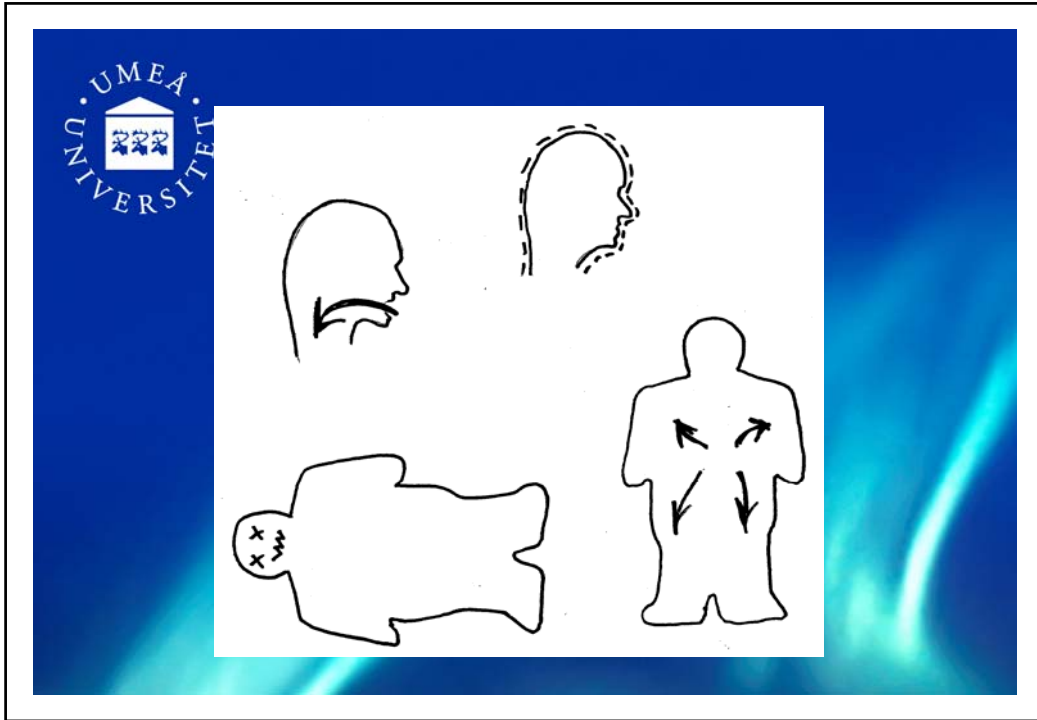
- Public health impact of long-term, low-level mixed element exposure in susceptible population strata

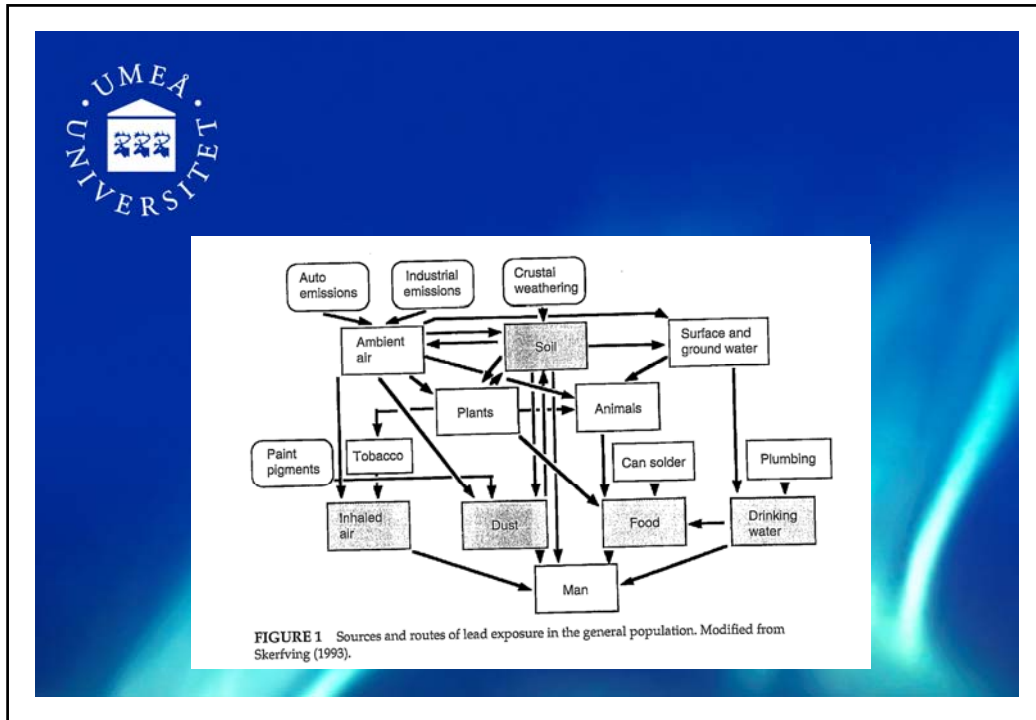


Exponeringsbedömning är olika saker!

- Verktyg i yrkesmedicinsk utredning och vård
- X-axeln i epidemiologisk studie
- Regulatoriskt krav i REACH
- Prognostiskt verktyg

The slide has a blue background with a white and green abstract pattern on the right side. The Umeå University logo is in the top left corner.





Traditionella angreppssätt

- Summera utifrån arbetsuppgifter
- Jobb-exponeringsmatris
- Identifiera determinanter



Summera utifrån arbetsuppgifter

- Lösningsmedel hos målare
- Medelvärde för 8-timmarsdag
- Parallell: olika exponeringsvägar




FIGURE 1 Sources and routes of lead exposure in the general population. Modified from Savelbergh (2005).



Jobb-exponeringsmatris

	20 Lösningsmed. Dieselavg (med 1/2)	24 Rök o damm	25 Asfalttrök	28 a asbest kvartsbedömning
Avtäkningsarbeten (inkl. röjning)	0	1	0	0
Förstärkningsarbeten (borrning, injektering, stämpning m m)	0	2	0	2
Rensningsarbeten	0	0.5	0	1
Skrotningsarbeten	0	0.5	0	2
Sprängningsarbeten (inkl. borrning)	0	0.5	0	4


Table 3. Associations between metal concentrations in blood in city children from European countries and potential determinants



Identifiera determinanter

Hrubá et al., manuscript

Metal	Model including country R ² (%)	Variable	Model including country and other determinants			
			Relative change (point estimate)	95% CI	p-value	R ² (%)
Cadmium		Traffic density				
		≤1 car/min				
Lead		>1				
		Sex				
		Girls				
		Boys				
Mercury		Shellfish intake				
		<1 meals/month				
		>1				
		Amalgam fillings				
		0-1				
		>1				
		Fish intake				
		<1 meals/month				
		1-3				
		>3				



Identifiera determinanter

Bustyn et al Am J Ind Med 2003;43:3

TABLE II. Predictive Models ($\log_e(\text{Exposure}) = \sum_{all j} (\beta_j \times \text{Determinant of Exposure } j) + \text{Intercept}$) of Bitumen Fume, Organic Vapor, and Benzo(a)pyrene Exposures, Adjusted for Sampling Strategy and Analytical Methods (Adapted From Bustyn et al. [2000a] with permission)


Determinant of exposure	Estimates of models' parameters					
	Bitumen fume (mg/m ³)		Organic vapor (mg/m ³)		Total benzo(a)pyrene (ng/m ³)	
	β^e	M^f	β^e	M^f	β^f	M^f
Mastic laying	0.88	2.4	0.78	2.2	1.27	3.6
Mastic laying × worst case ^a	1.71	13	1.70	12	3.07	80
Recycling	0.89	2.4	NS ^c		1.51	4.5
Recycling × worst case ^a	1.67	12	NP ^d		NP	
Surface dressing	NS		1.88	6.6	0.38	1.5
Oil gravel	-1.51	0.2	0.48	1.6	-0.65	0.5
Tar use ^b	NS		NS		1.68	5.4
Years before 1997	0.062	1.06	0.135	1.14	0.107	1.11
Application temperature in non-mastic paving (°C)	NS		0.009	1.009	NS	
Intercept (associated exposure)	-2.10	(0.12 mg/m ³) ^j	-1.19	(0.30 mg/m ³) ^j	0.91	(2.5 ng/m ³) ^k
% variance explained	41		36		43	
ww S ²⁰	0.99		1.16		0.43	
ww S ^{2h}	1.08		1.26		1.71	

^aSymbol "×" denotes multiplicative interaction terms in a model.
^bTar use variable was not initially offered into bitumen fume and vapor models, however, when added to the final form of the models it was not statistically significant.
^cVariable is not statistically significant and therefore, is not included in the model or did not improve model fit upon inclusion in the model (assume regression coefficient of zero).
^dNot possible to estimate.


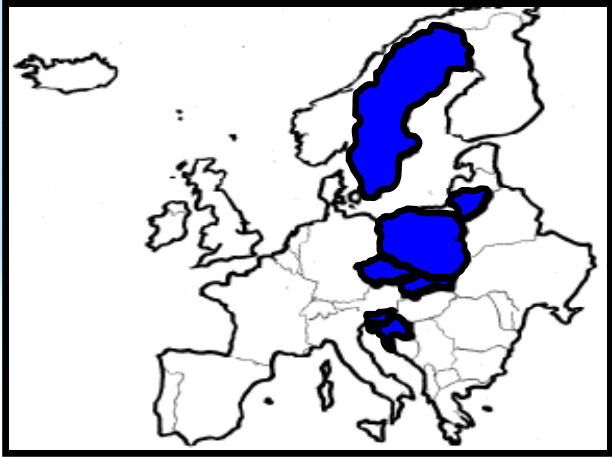


Trend: Variation i exponering

- Varians är vägen till determinanterna
- Korrekt skattning kräver upprepade provtagning
- Mätstrategi kräver kunskap om varians (t.ex. Dag-till-dag vs. Mellan individer)
- Tillsyn och gränsvärden



Beskrivande studie Cd, Pb, Hg





- Eftersom data är preliminära och opublicerade finns de inte med på den version som läggs ut på nätet.

- Hrubá et al., manuscript



Trend: Populationens exponering

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• Hrubá et al., manuscript



Trend: Populationens exponering (EU)

- The main goal of COPHES is to develop a coherent approach to human biomonitoring (HBM) in Europe as requested by ACTION 3 of the "European Environment and Health Action Plan 2004-2010" through coordination of ongoing and planned HBM activities across Europe.



UMEÅ UNIVERSITET

Nieuwenhuijsen (antologi, allmän)
Rappaport och Kupper (statistik, variation)

The slide displays two book covers. The left cover is for "exposure assessment in occupational and environmental epidemiology" edited by Mark J. Nieuwenhuijsen, published by Elsevier. The right cover is for "Quantitative Exposure Assessment" by Stephen M. Rappaport and Lawrence L. Kupper, published by Wiley. The right cover features a graph showing a bell-shaped curve with a peak labeled "Peak" and a horizontal line labeled "OEL". A table on the graph lists parameters: $\mu = 0.01$, $\sigma = 0.01$, $\sigma_{\text{range}} = 0.01$, $\sigma_{\text{OEL}} = 0.01$, and $\sigma_{\text{OEL}} = 0.01$.



 **Tack!** 

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