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Lead guideline values

Åsa Valley (SEPA), Yvonne Ohlsson (SGI)



Background

- EFSA published a toxicological reference value of 0.5 $\mu\text{g}/\text{kg}/\text{day}$ (2011)
(compared with WHO value 3.5 $\mu\text{g}/\text{kg}/\text{day}$)

- Toxicological endpoint: effects on childrens' central nervous system (IQ loss)



Common Forum survey 2018

Yes, we adapted our screening values

Germany, Wallonia

Discussions in lead working group

Joint expert workshop with SoilVer

No, we didn't adapt screening values

Italy, France (uses the EFSA value for screening), The Netherlands, Slovakia

We're evaluating

Flanders



Swedish soil screening values

Indata för beräkning av riktvärden Naturvårdsverket, version 2

Beskrivning av scenariot

Scenariots namn: --- namnlöst ---

Beskrivning: Standardscenario för känslig markanvändning, enligt Naturvårdsverkets generella riktvärden för förorenad mark.

Val av generellt scenario (gulbruna celler)

Hämta generellt scenario: KM

Val av eget scenario (data till vita inmatningsceller)

Hämta eget scenario: KM

Val av ämnen

Ämne 1: Ämne 9: Ämne 17:
Ämne 2: Ämne 10: Ämne 18:
Ämne 3: Ämne 11: Ämne 19:
Ämne 4: Ämne 12: Ämne 20:
Ämne 5: Ämne 13: Ämne 21:
Ämne 6: Ämne 14: Ämne 22:
Ämne 7: Ämne 15: Ämne 23:
Ämne 8: Ämne 16: Ämne 24:

Beaktade exponeringsvägar

Intag av jord
 Hudkontakt med jord/damm
 Inandning av damm
 Inandning av ånga
 Intag av dricksvatten
 Intag av växter
 Uppskattning av halt i fisk

KM

Exponeringsparametrar

	KM	
Intag av förorenad jord		
Exponeringstid barn	365	365 dag/år
Exponeringstid vuxna	365	365 dag/år
Hudkontakt med jord/damm		
Exponeringstid barn	120	120 dag/år
Exponeringstid vuxna	120	120 dag/år
Inandning av damm		
Exponeringstid barn	365	365 dag/år
Exponeringstid vuxna	365	365 dag/år
Andel inomhusvistelse	1	1
Inandning av ånga		

Generic guideline values

Two generic scenarios:
sensitive and less sensitive land use

Site specific screening values

Excel based tool

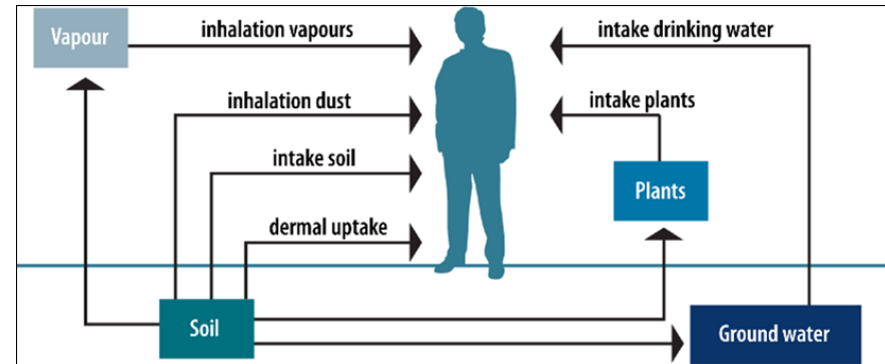
Guideline values are not legally binding

Relatively low – signify a "safe" level
and a screening step

Often (erroneously) applied as remedial
targets

Particular functions in the Swedish model

- Considers exposure from "other sources"
 - Integrates individual exposure routes
 - Not "added risk"
- Can result in screening values below background concentration



Exponeringsväg	KM	MKM
Soil Intake	21	190
Dermal contact	460	2 300
Inhalation of dust	5 300	29 000
Inhalation of vapor	NR	NR
Drinking water	39	Not included
Vegetable intake	39	Not included
Health based guideline value	10	170
Adjustment – short term exposure	600	600
Adjustment – Acute toxicity	No data	No data
Health based guideline value	10	170

$$\frac{1}{RV} = \frac{1}{EK_1} + \frac{1}{EK_2} + \frac{1}{EK_3}$$

Effect on Swedish lead screening values

Effects on screening values (SE):

Sensitive land use: from 50 mg/kg DS to 20 mg/kg
(adjusted to background)

Less sensitive land use: from 400 to 180 mg/kg

Problems with low screening values

- Wrongly classifying soil as contaminated (by a point source)
- Increased excavation and handling of excavated soil
- Generally high urban background values
- Where to find "clean" refill material
- Increased transports and costs
- Landfilling of very lightly contaminated soil
- GHG emissions (excavation, transports)

Cost benefit analysis

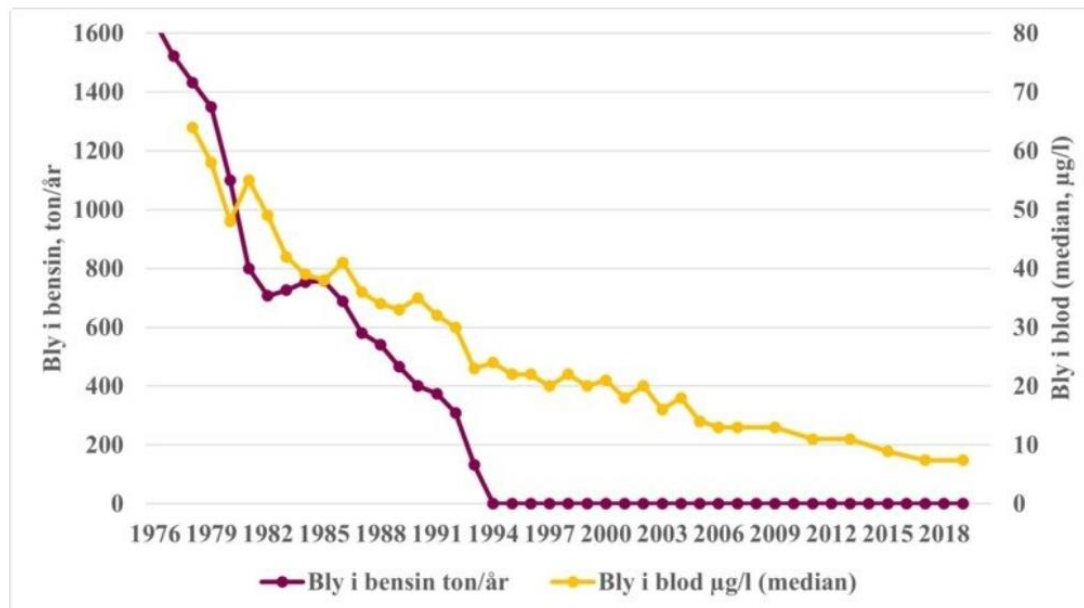
- Costs are difficult to assess but tend to get quite high (billions of SEK)
- Benefits of reducing lead levels in blood are well established

...but....

- Connection between low levels of lead in soil and exposure (blood lead levels) is less well understood
- Lead exposure should be minimised – where is the effect highest?

Time series – lead in children 1976-2019

- Long time series for blood levels in children
- Level out from around 2015 at 7.5 $\mu\text{g/l}$
- Contribution from food around 2.5 $\mu\text{g/l}$ (Swedish food safety authority)



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SE lead screening values (from Nov 2022)

- Sensitive land use: remains at 50 mg/kg (policy decision)

Site specific values for this land use risk based (typically lower than the screening value).

- Less sensitive land use changed from 400 mg/kg to 180 mg/kg
- Possible to calculate site specific values

TDI (mg/kg.day)	Guideline values Pb in soil (mg/kg DS)	
	Sensitive land use	Less sensitive land use
3,5E-03	50 mg/kg	400 mg/kg
5,0E-04	10 mg/kg	180 mg/kg
	Background: 20 mg/kg	

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Further work

- Promoting research on exposure from low levels in soil
- Supporting local/regional efforts in establishing region specific risk assessment methodology in mining areas – Falu copper mine

Lead in other applications

Agri soil	Compost	Compost	Fertiliser	Biochar			Other
SE eco label	SE eco label	SPCR152	SPCR120	EBC-AgroBio	EBC-Agro	EBC-Urban	EU Ecolabel
30	45	100	100	45	100	100	100

Drinking water criteria

- New drinking water directive – lowered criteria from 10 $\mu\text{g/l}$ to 5 $\mu\text{g/l}$ no later than 2036
- Swedish drinking water criteria lowered from 1 January 2023

Thank you for your attention!

