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# Exposure of the Flemish population to PFOS and PFOA

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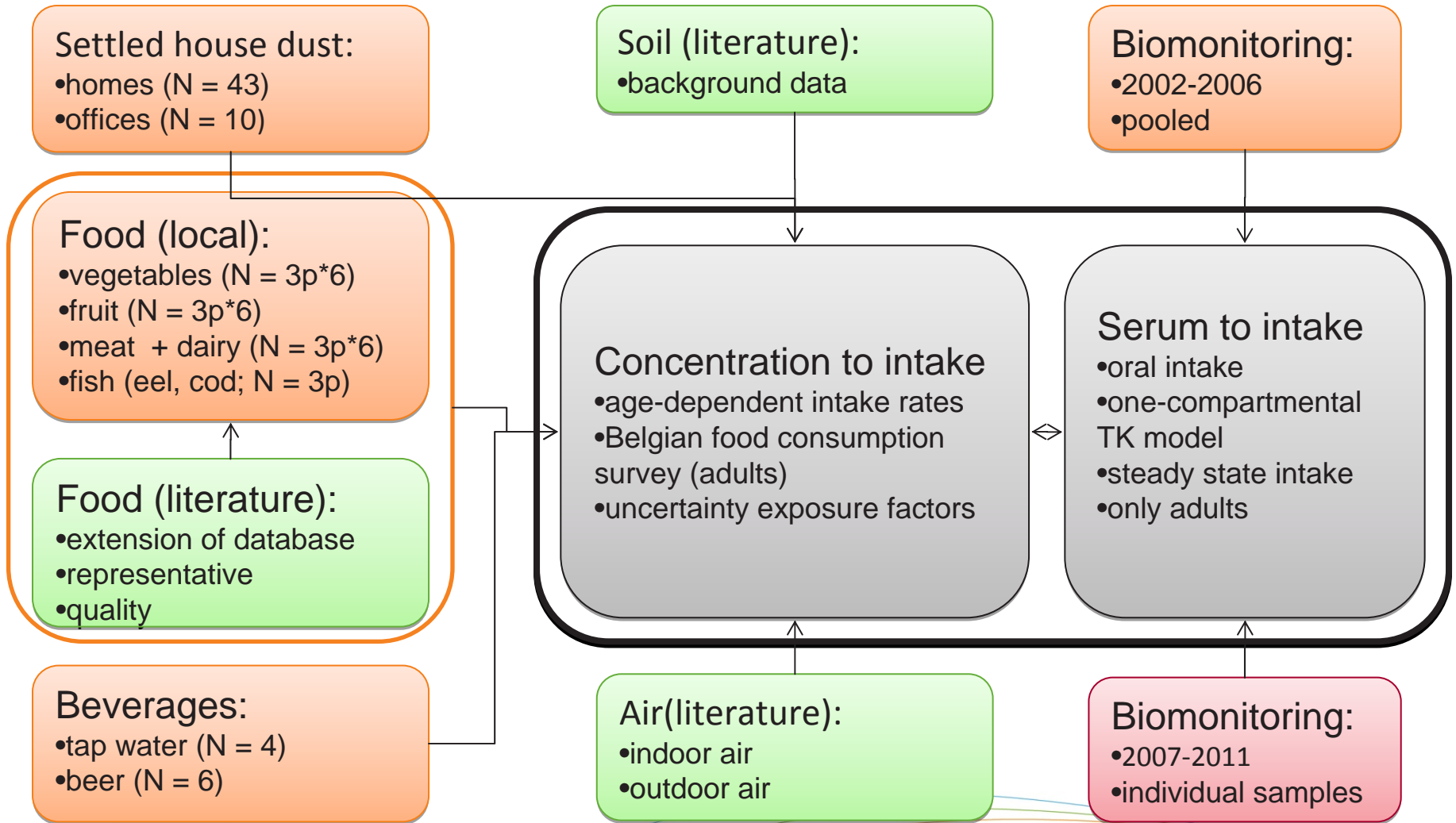
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# Objectives of the study

- » First assessment of population exposure in Flanders (Belgium) to perfluorinated compounds
  - » Measurements
  - » Exposure modelling
- » Elements presented:
  - » Exposure of adults
  - » PFOS and PFOA
  - » Comparison with biomonitoring data

# Design of the exposure assessment



# Input concentrations (1)

	PFOS			PFOA		
	P50	P95	N	P50	P95	N
indoor dust (ng/g)						
homes	0.73	21.7	40	0.72	11.4	43
offices	1.83	6.88	9	2.88	56.9	10
soil (ng/g)	5 (med. bound)		1	7.5		1
air (pg/m <sup>3</sup> )						
indoor air	1.6 (upper level)		3	4.4 (mean)		4
outdoor air	1.6	46	38	8.9	552	34

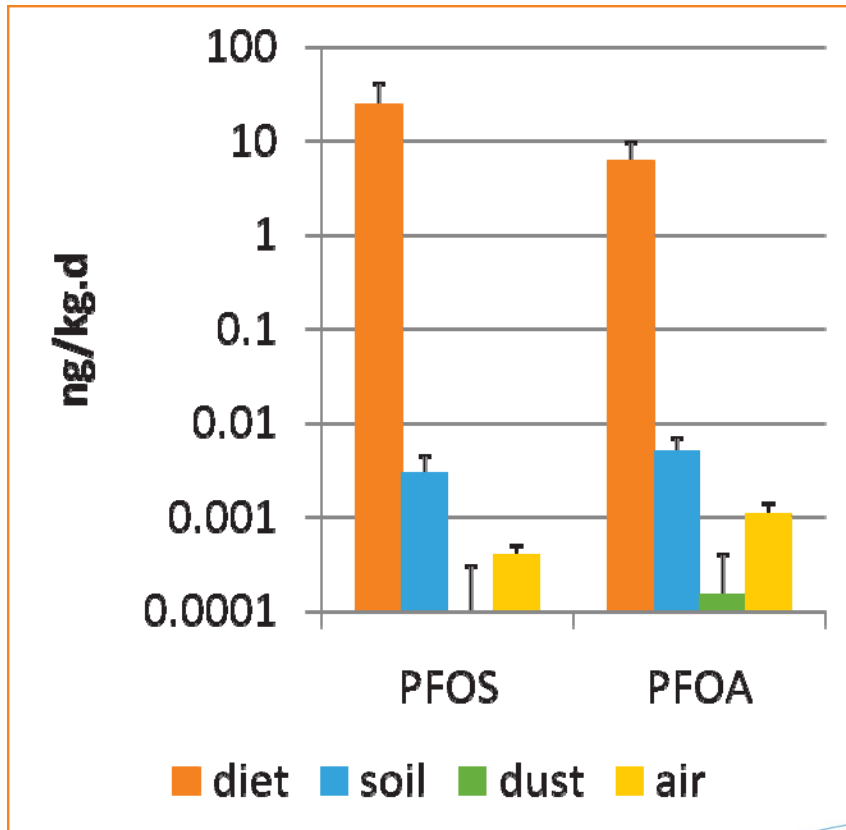
# Input concentrations (2)

(ng/g)	PFOS		PFOA	
*	Mean (range)	N	Mean (range)	N
potatoes ↓	6.18 (<0.021-19)	6	0.67 (<0.57-2.0)	6
vegetables =	0.60 (<0.0057-10)	36	0.65 (<0.027-4.1)	36
fruits ↑	0.35 (<0.017-0.7)	11	0.43 (<0.037-1.6)	11
eggs ↑	6.86 (<0.12-22)	8	0.86 (<0.055-5.0)	8
milk and dairy products ↓	0.25 (<0.014-0.64)	9	0.12 (<0.028-0.34)	9
cereals and rice ↓	0.052 (<0.069-<0.12)	3	0.055 (<0.08-<0.12)	3
pork meat ↓	0.17 (0.045-0.47)	7	0.055 (<0.053-<0.12)	7
poultry meat ↓	0.63 (0.02-2.1)	5	0.055 (<0.067-0.06)	5
other meat ↓	0.055 (0.03-0.06)	7	0.52 (<0.034-3.3)	7
seafish =	12.0 (<0.12-62)	28	0.59 (<0.065-5.4)	27
freshwater fish ↑↑	174 (1.3-551)	26	0.78 (<0.6-9.13)	26
crustaceans / molluscs ↓	9.86 (0.148-80)	745	3.34 (<0.029-<15)	652
vegetable oil ↓	0.033 (<0.034-<0.099)	2	0.091 (<0.115-<0.25)	2
drinking-water, coffee, tea ↑	0.005 (0.004-0.01)	4	0.002 (0.001-0.005)	4
beer ↓	0.013 (<0.0013-0.04)	5	0.006 (<0.0008-0.02)	5

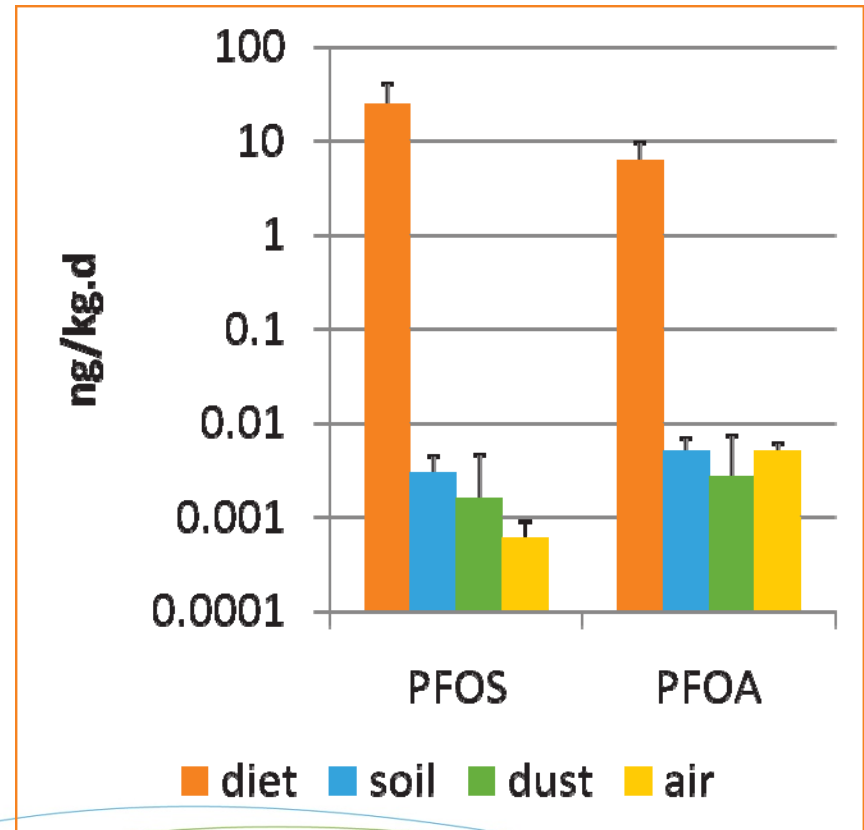
\*: PFOS compared with Brambilla et al. (2010). *Organohalogen Compounds*, 72, 1644-1647.

# Exposure results (adults)

## P50 levels in environment

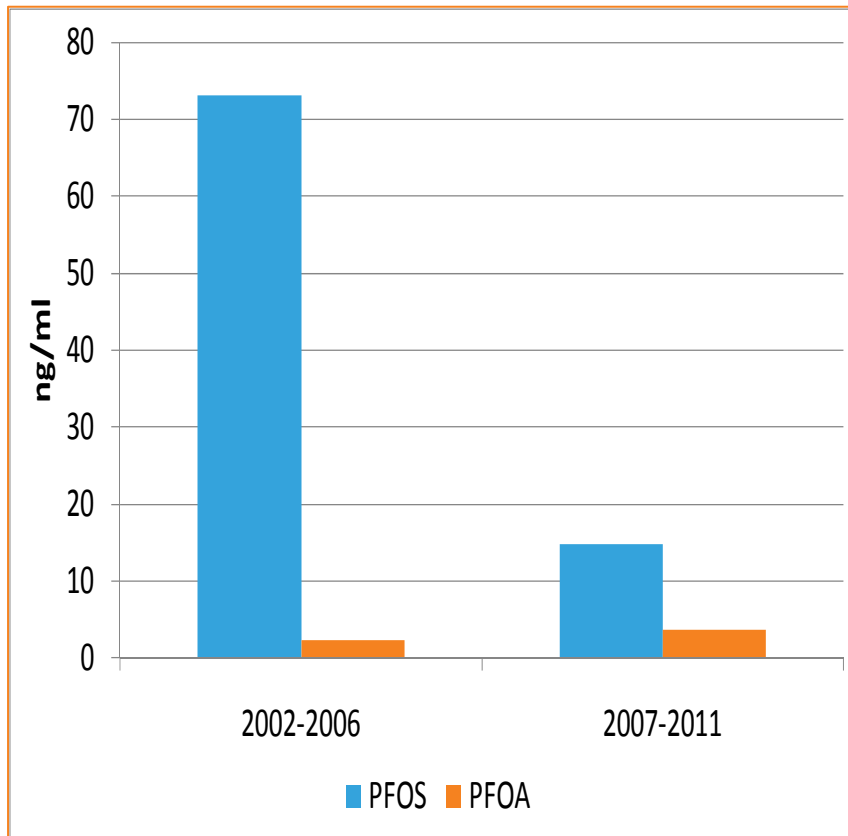


## P95 levels dust and outdoor air



# Comparison with serum levels (1)

## PFOS serum levels

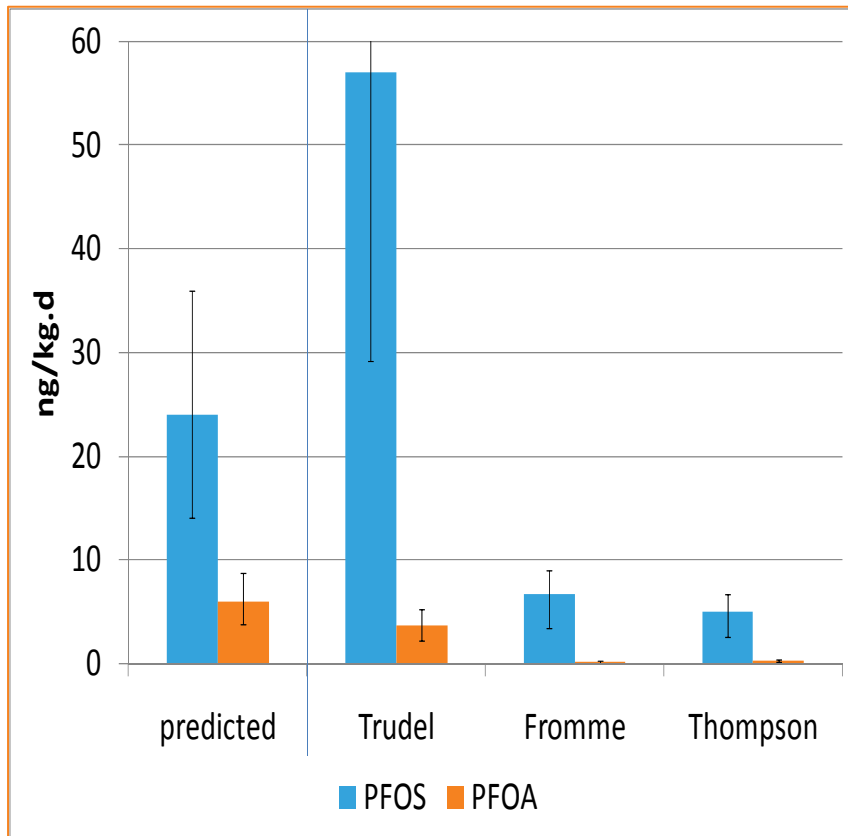


$$Intake = serum * k * Vd / ABS$$

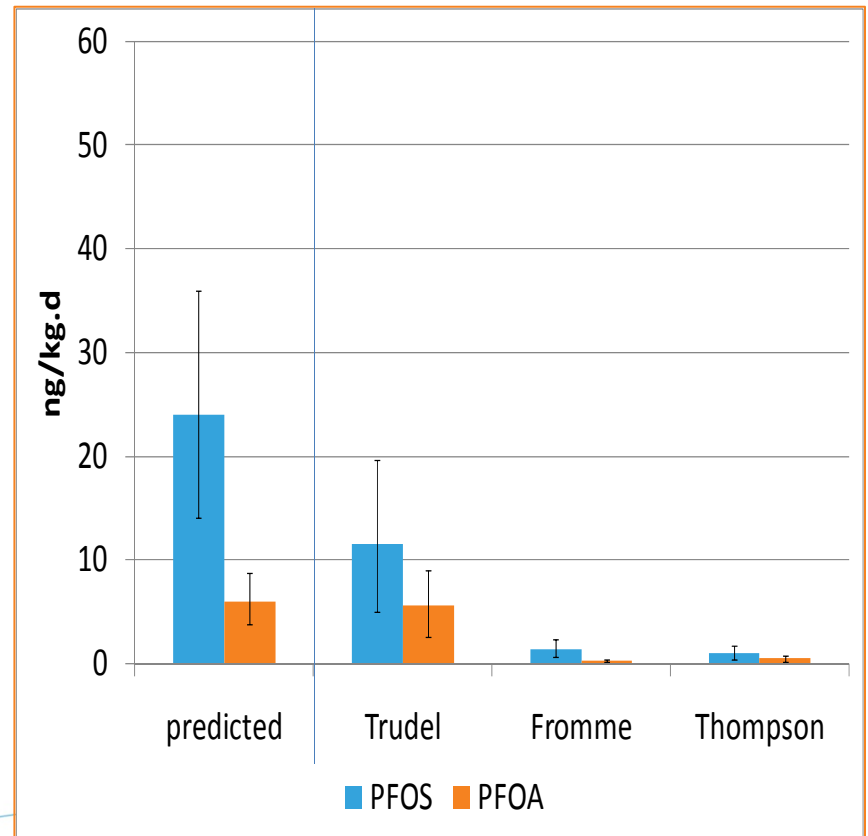
	k (1/d)	Vd (ml/kg)
PFOS		
Fromme (2007)	4.2 <sup>E-4</sup>	220
Trudel (2008)	2.2 <sup>E-4</sup>	3600
Thompson (2010)	3.0 <sup>E-4</sup>	230
PFOA		
Fromme (2007)	5.5 <sup>E-4</sup>	140
Trudel (2008)	4.3 <sup>E-4</sup>	3600
Thompson (2010)	8.0 <sup>E-4</sup>	170

# Comparison with serum levels (2)

## 2002-2006 biomonitoring



## 2007-2011 biomonitoring





# Conclusion

- » First attempt to quantify exposure to PFOS and PFOA in the Flemish population:
  - » Limited data
  - » Evolving analytical methods
- » Exposure from food probably overestimated:
  - » Mainly for PFOS
  - » Comparison with other data (e.g. Germany, Spain; NOT EFSA)
  - » Comparison with serum levels (although uncertainty in toxicokinetic parameters)
- » Food seems to be the dominant exposure pathway (also in children)
- » Important to compare various approaches
- » Interested to see impact of Perfood results on exposure estimate