


**We help to Environment and Health using best available technologies**

## Selected results fom bioexposure studies



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## INCIDENCE OF BRAIN TUMORS 1997-2007

Data [www.SVOD.cz](http://www.SVOD.cz)



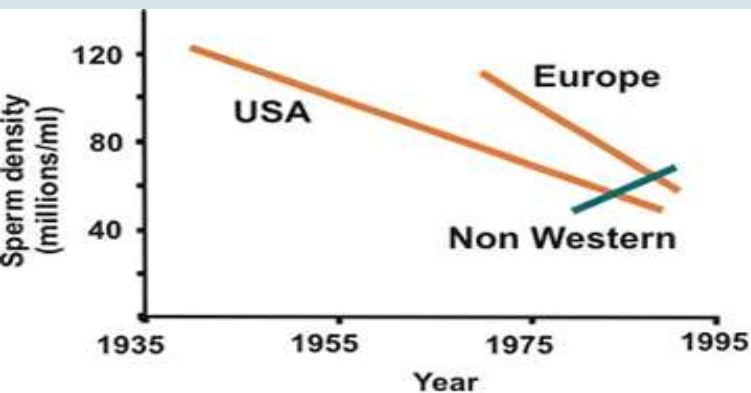
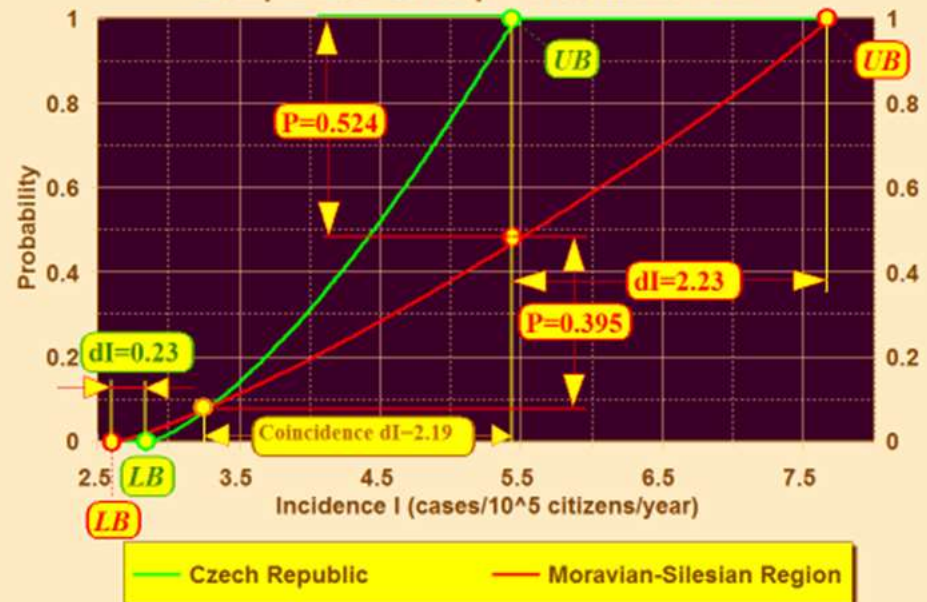
## GLIOMAS: INCIDENCE AND MORTALITY

- The mortality related to gliomas is also available on [www.SVOD.cz](http://www.SVOD.cz) for the whole Czech Republic
- Mortality:  $m = \text{deads}/10^5 \text{ citizens/year}$
- These data enabled the robust equation of the dependence of mortality on the incidence to be derived:  

$$\text{Mortality} = -0.0123 + 0.755 \times \text{Incidence}$$
- The gliomas incidence in Moravian-Silesian Region is known, the mortality can be estimated by this equation

## INCIDENCE OF BRAIN TUMORS 1997-2007

Compar. Czech Rep. v. North Moravia





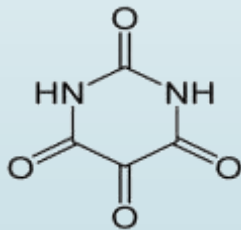
# POPs

- ▶ Polychlorinated biphenyls (PCBs), polychlorinated, dibenzodioxines/furanes (PCDD/Fs), polyaromatic hydrocarbons (PAHs), organochlorinated pesticides (OCPs)
- ▶ Adverse effects to human health and the environment
- ▶ Resistant to environmental degradation through chemical , biological and photolytic processes
- ▶ Bioaccumulated in human and animal tissue through food or inhalation of contaminated air (limited from particulates!)
- ▶ Endocrine disruptors(EDCs) - exogenous substances or mixtures that alter function(s) of the endocrine system and consequently cause adverse health effects in an intact organism, or its progeny, or in populations.
- ▶ Stockholm Convention (2001) – elimination of POPs from the environment

# New challenges

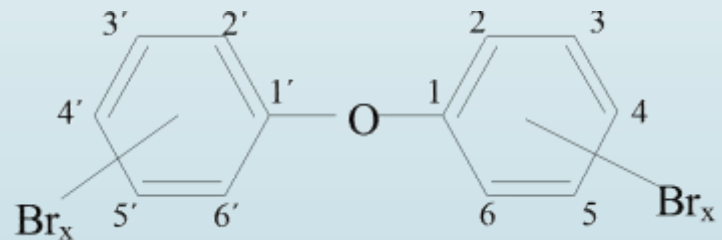
## ALLOXAN

- 2, 4, 5, 6-tetraoxypyrimidine
- Diabetogenic agent
- Chemical instability in physiological solutions intra and extracellular reactive oxygen species which are responsible for its toxic effect
- Occurrence in wheat flour

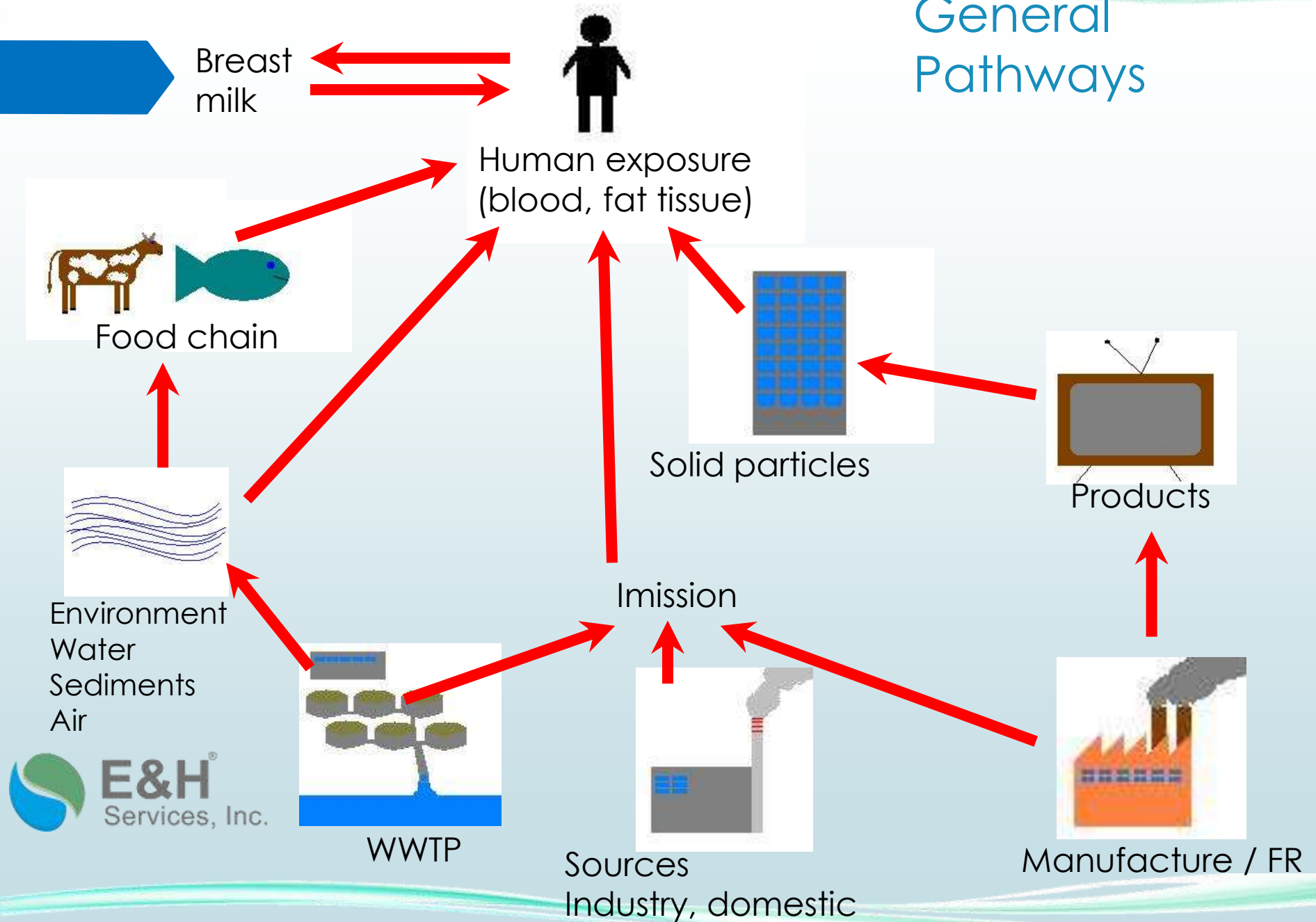


## FLAME RETARDANTS

- Brominated (PBDE)
- Phosphorous
  - increasing accumulation
  - broad spectrum o materials
  - human exposure



# General Pathways



Breast milk

Human exposure  
(blood, fat tissue)

Food chain

Solid particles

Products

Environment  
Water  
Sediments  
Air

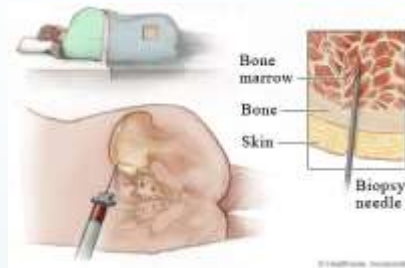
Imission

WWTP

Sources  
Industry, domestic

Manufacture / FR

# Complex of samples



## ► Biological samples

- human blood,
- plasma,
- bone marrow,
- adipose tissue



## ► Ambient Air

- active sampling (HiVol 3000 high volume air sampler)
- passive sampling (PUF filters)
- emission?? (long-term/grab)

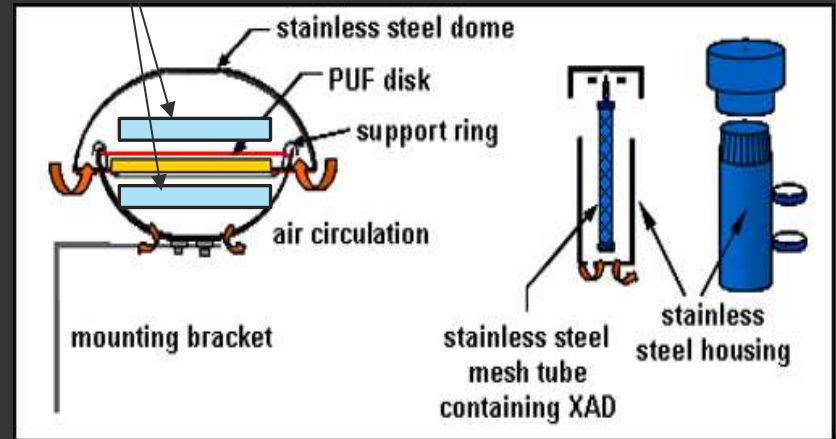
## ► Food chain

- Total diet study



# Ambient Air

## SPMD (the modification)





# Chemical assessment

- ▶ Polyurethane foams and filters / pre-cleaning
- ▶ Exposure 3-4 weeks
- ▶ Immunoassay (15-F2t-isoprostane immunoassay)
- ▶ Extraction PUFs / SPMDs in laboratory
- ▶ Cleaning on silica and active carbons columns
- ▶ GC-MS/MS, GC-ECD, LC-MS/MS, GC-HRMS analysis
- ▶ Nano-phases / Evaluation of biological available fractions

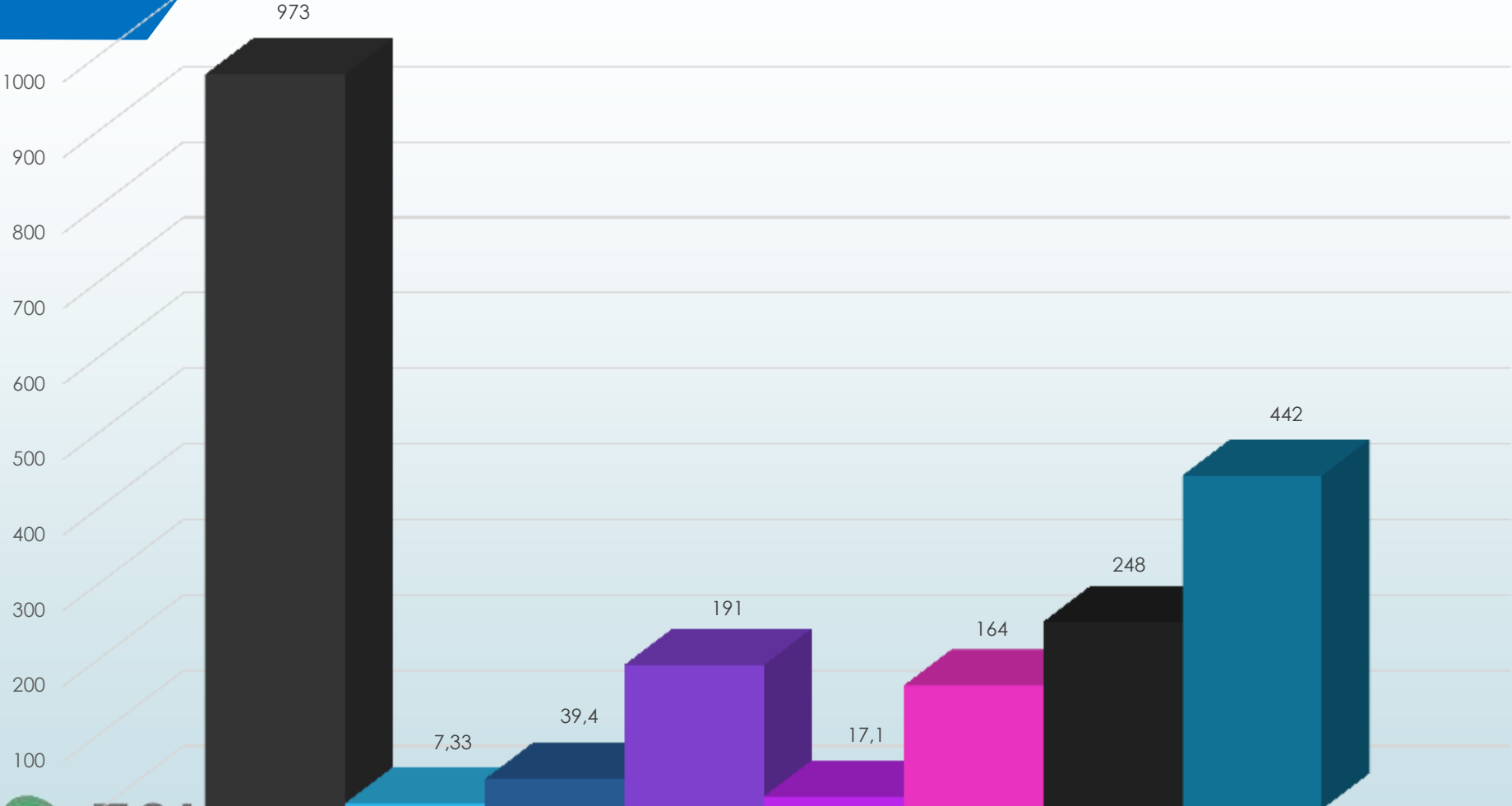


# Dioxin Lab (and POPs) + specific laboratory for Cannabis diagnostic

- ▶ EN ISO/IEC 17 025
- ▶ Recognition ILAC, EA, IAF
- ▶ Sampling, analysis
- ▶ Intercalibration
  - ▶ CR, international
- ▶ Recent Certification
  - ▶ Ministry of Health
  - ▶ Ministry of Agriculture
  - ▶ *Community Reference Laboratory for Dioxins and PCBs in Feed and Food* in Freiburg
  - ▶ Slovakia
- ▶ Technological laboratory
  - ▶ Designed for optimisation of destruction process
  - ▶ Development of new products with CBs

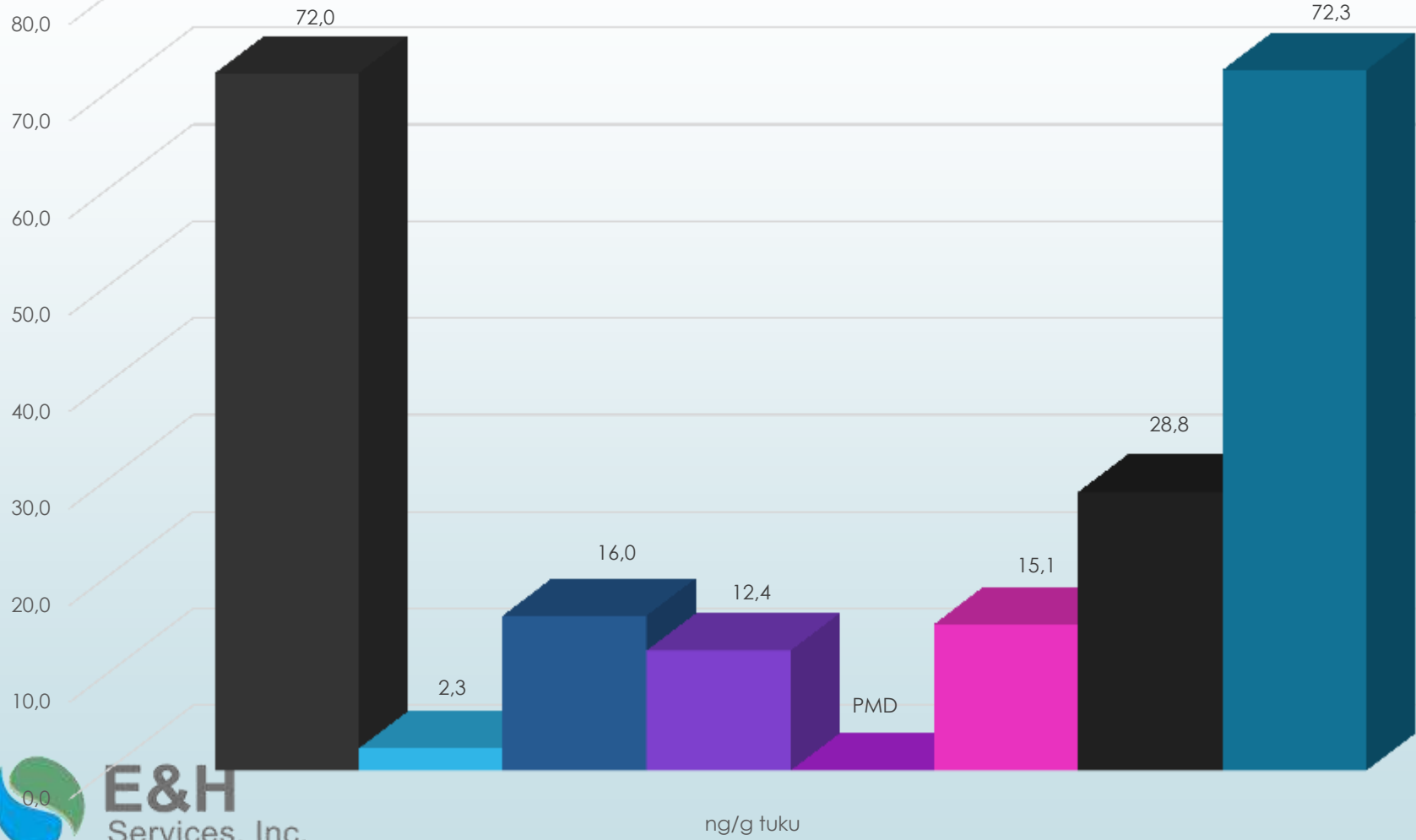


Blood: testing group

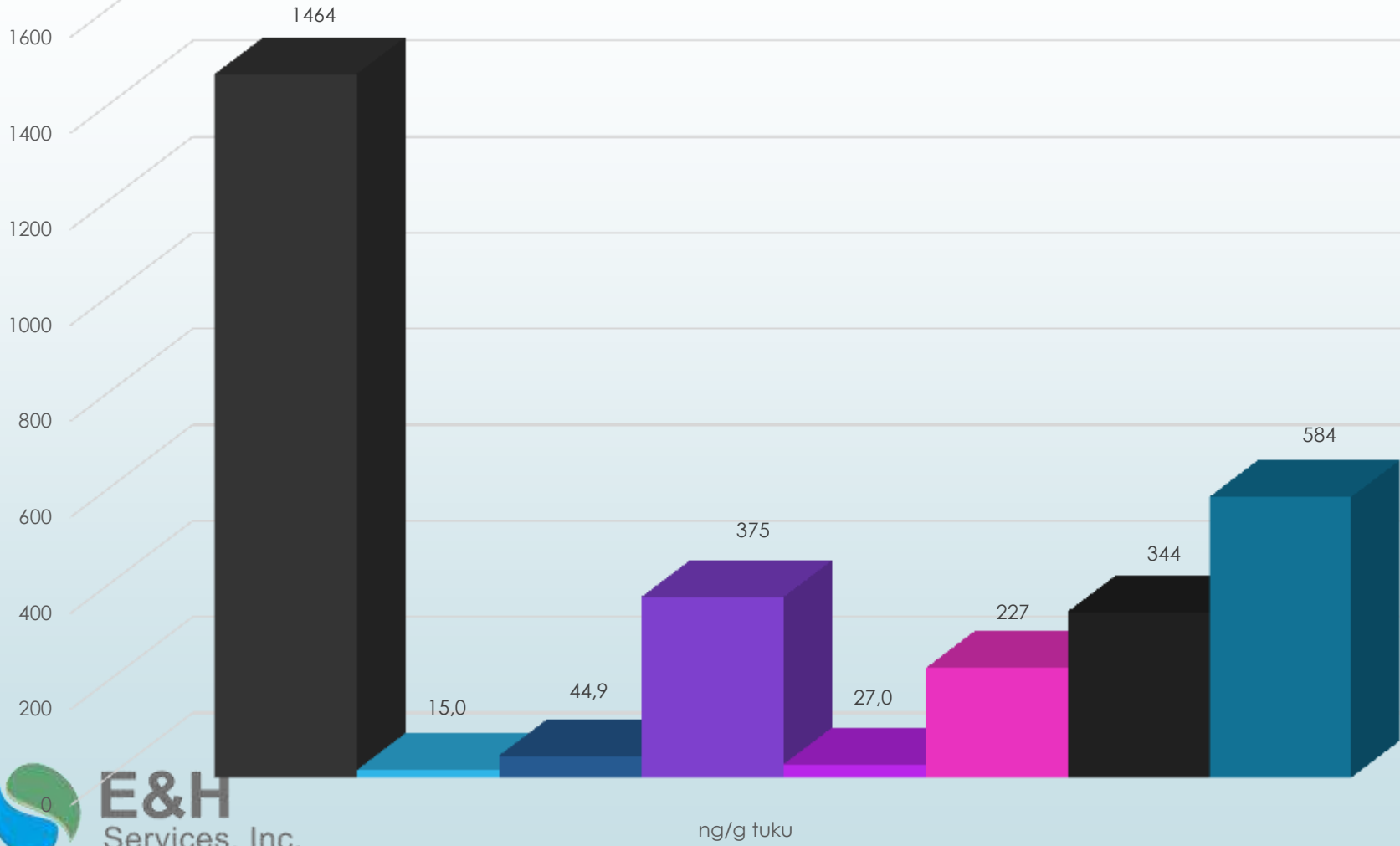


■ pp-DDE ■ pp-DDT ■ HCH-beta ■ HCB ■ PCB 118 ■ PCB 138 ■ PCB 153 ■ PCB 180

# Blood: healthy group

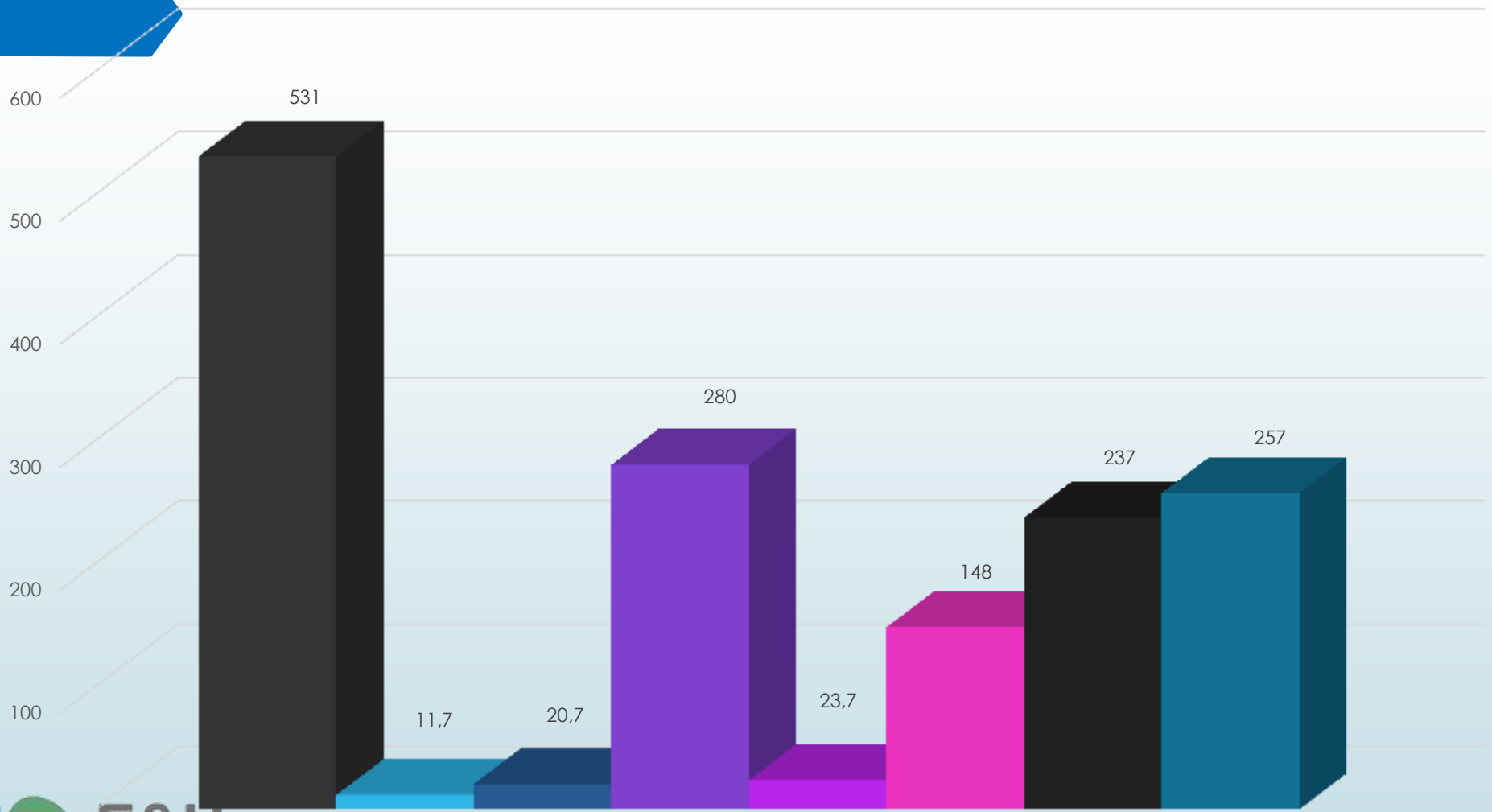


# Bone marrow



■ pp-DDE ■ pp-DDT ■ HCH-beta ■ HCB ■ PCB 118 ■ PCB 138 ■ PCB 153 ■ PCB 180

# Fat tissue

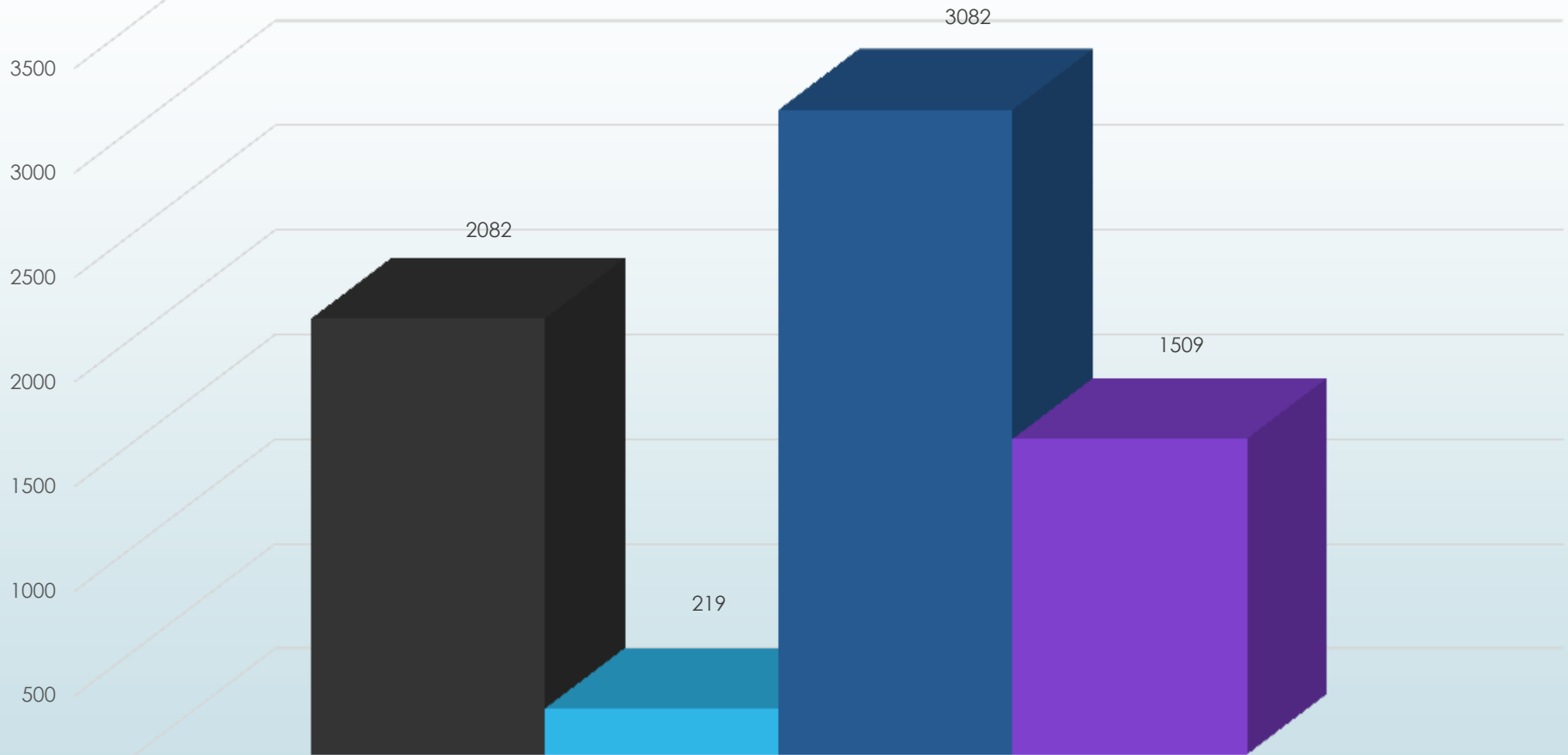


ng/g tuku

■ pp-DDE ■ pp-DDT ■ HCH-beta ■ HCB ■ PCB 118 ■ PCB 138 ■ PCB 153 ■ PCB 180



## Overall sums / matrix



# Eg: butter – TEQ distribution

PCDD/Fs+PCBs (PMS = LOQ)

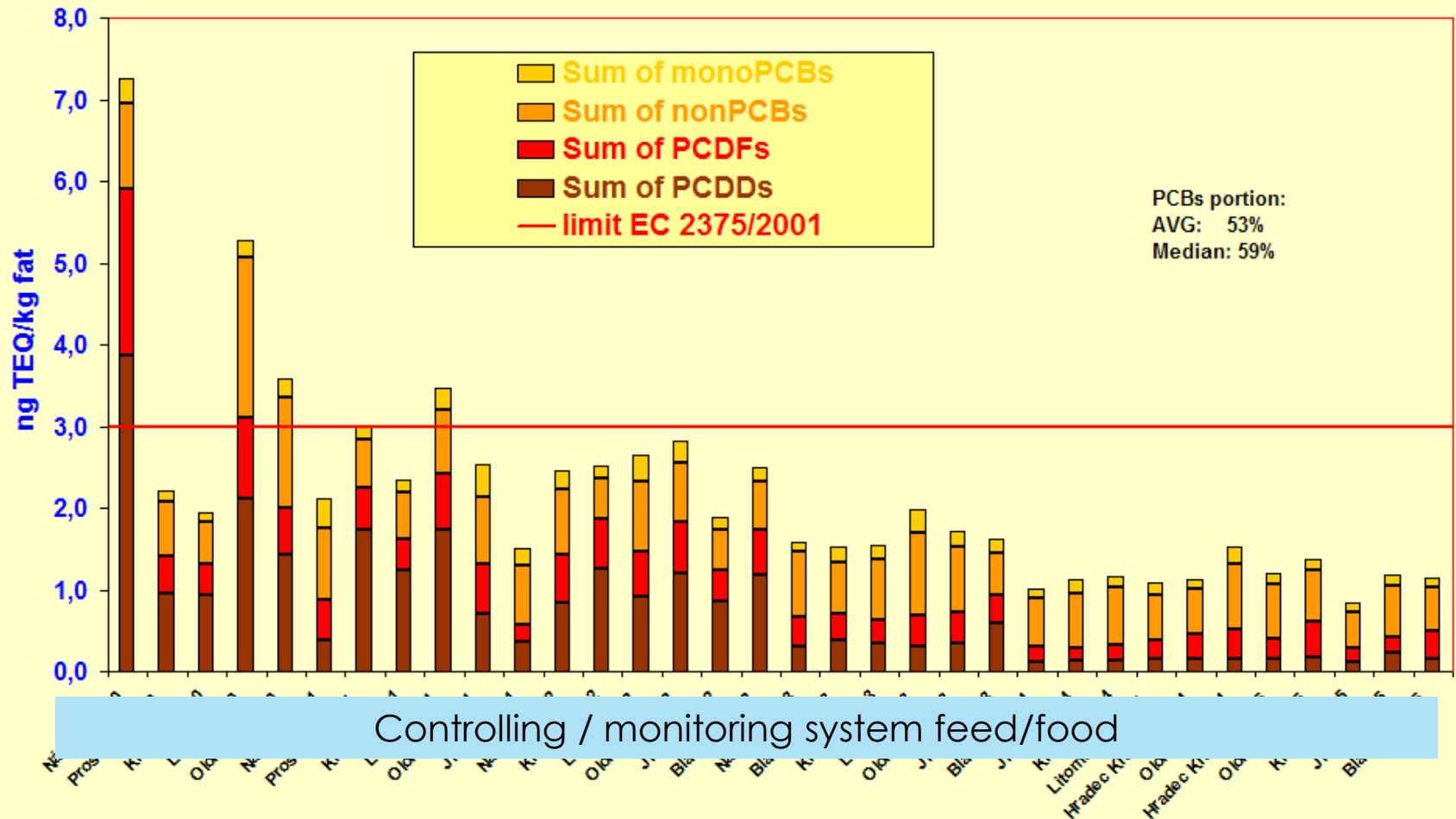
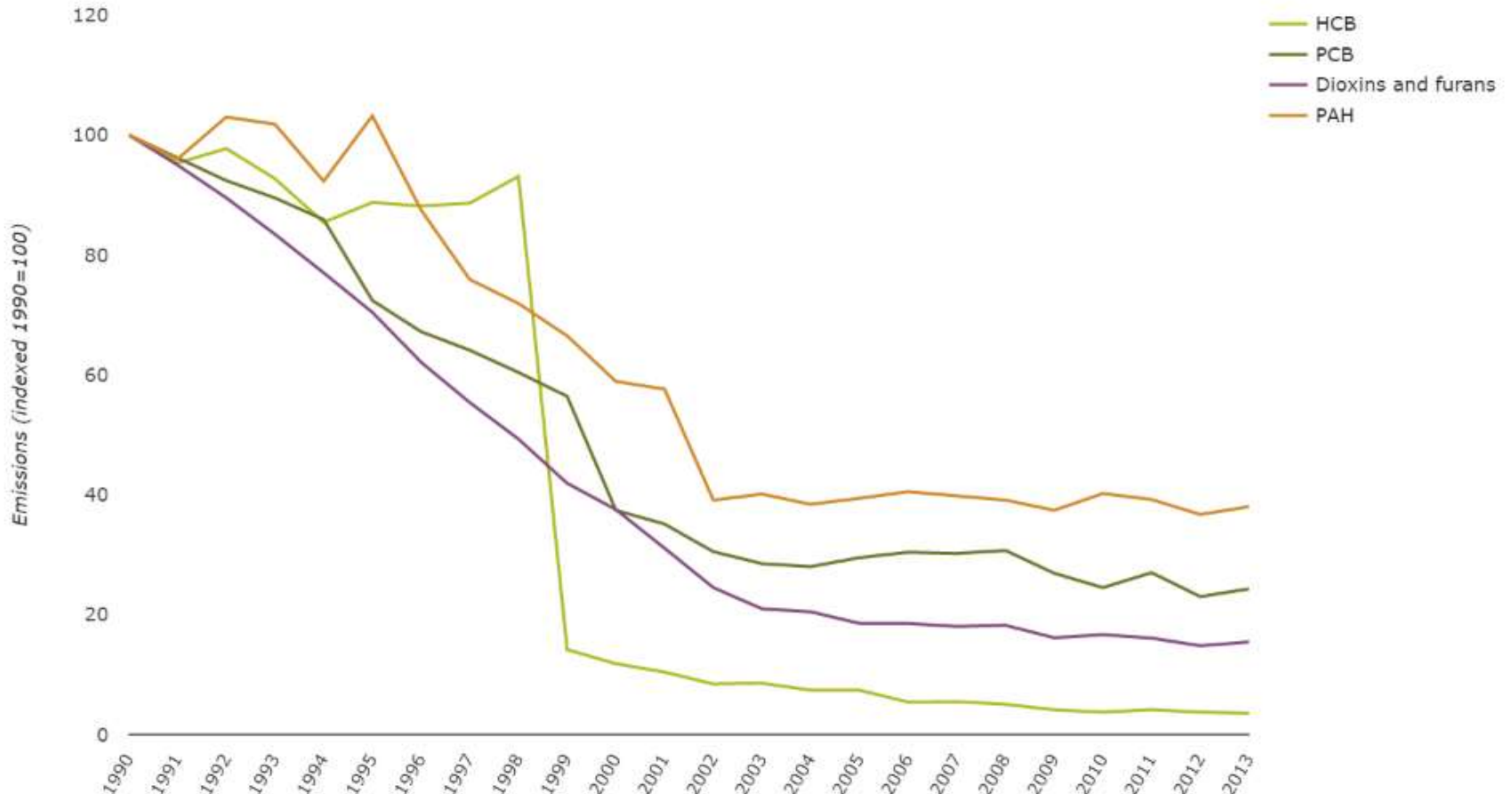
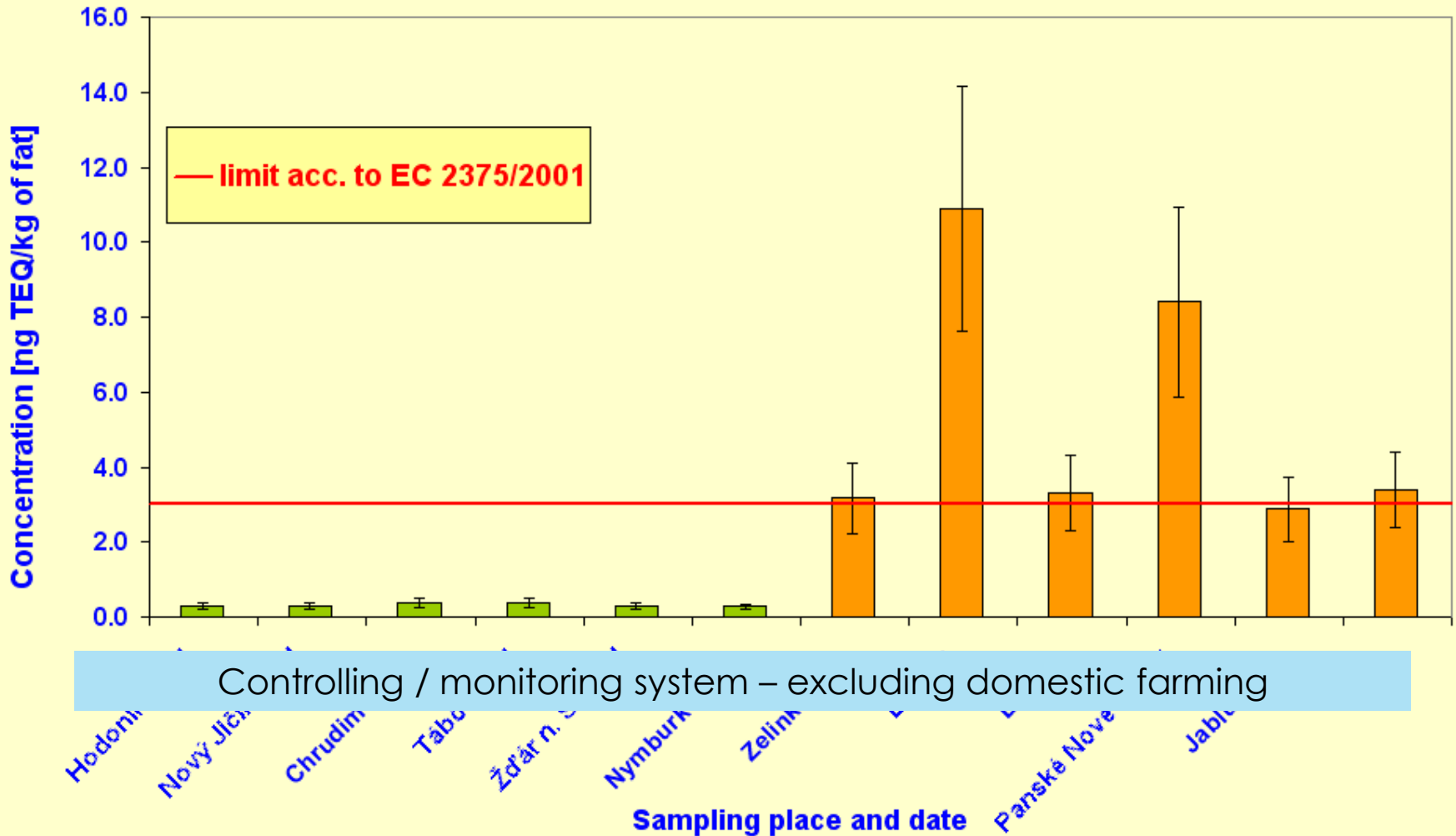


Chart – Emission trends of persistent organic pollutants



Controlling / monitoring system – variable along countries

## EGGS - concentration of PCDD/F (BLOD=LOQ)





# Conclusion

- ▶ Complex approach needed
  - ▶ Environmental and human samples
  - ▶ **Cross border problem (Poland)**
- ▶ Strong national and international expert background
- ▶ Willingness to solve the issue despite non-popular conclusions
- ▶ Cooperation to Industry / Governmental hearing
- ▶ **Sufficient funding needed**
- ▶ Risk evaluation => **solution to weak socio-economic areas (MSK)**
- ▶ Acknowledgement: to Dioxin Lab team & partners (FNO / ARR / MSK)