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### Wastewater-based Epidemiology

#### Wastewater as a mirror of the society

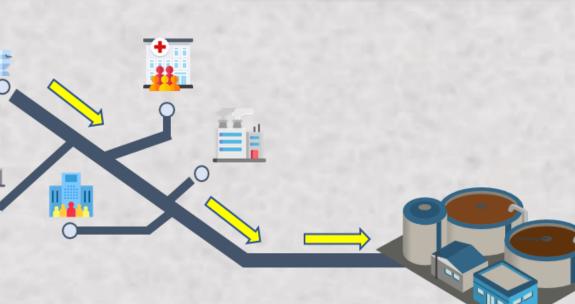
#### What?

- Analysis of spatio-temporal trends of use of drugs and pharmaceuticals
- Investigating lifestyle (e.g. tobacco & alcohol use) and health aspects (e.g. exposure to toxicants) of communities
- Screening for new psychoactive substances (NPS)

#### How?

- Wastewater = "pooled urine sample" of a large population
- Reflects disease, lifestyle and exposure
- European network of wastewater analysis





### Environmental Contaminants

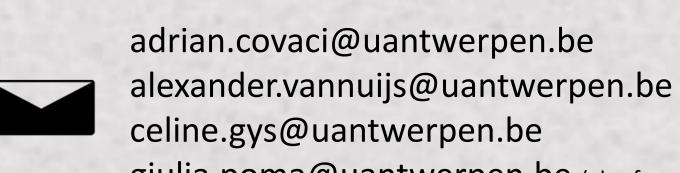
Human exposure and health impact for POPs, flame retardants, plasticizers, pesticides, PFAS, and other emerging contaminants

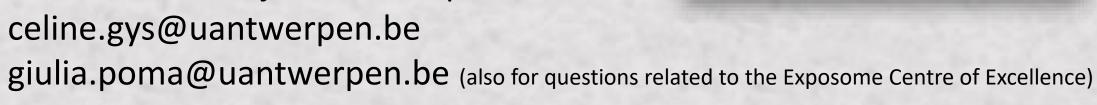
#### What?

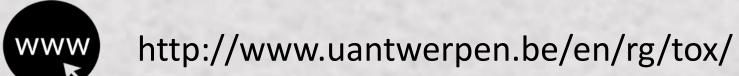
- Chemicals with endocrine disruptive properties and widespread exposure
- Presence in building materials, furniture, personal care products, food contact materials, ...
- Via food, dust ingestion, air, dermal contact, ...
- Chemical safety of edible insects & other novel foods

#### How?

- Characterization of human exposure pathways
- Characterization of pharmacokinetics
- Human biomonitoring studies
- Identification and evaluation of emerging contaminants
- Risk evaluation & assessment







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# Forensic & Clinical Toxicology

Forensic analysis as a toxicological tool for justice, patients & physicians

#### What?

- Alcohol & drugs of abuse in traffic (oral fluid and blood)
- Post-mortem toxicological screening
- Therapeutic drug monitoring
- Monitoring adherence, abstinence & chronic abuse via hair and/or nail analysis
- Drug analysis in seizures

#### How?

- Biological samples: blood, urine, oral fluid, organs, vitreous humour, ...
- Hair & nails
- Seized chemicals, powders, tablets, plant materials, ...





## In vitro metabolism & Metabolomics

Studying human metabolism using in silico, in vitro and in vivo methods

#### What?

- Prediction and elucidation of Phase I & II metabolites & metabolic pathways
- Characterization of alterations in endogenous metabolites (e.g. lipids, amino acids)

#### How?

- Elucidation of metabolism of chemicals using human liver microsomes (HLM)
- Comparison of in vitro results with in vivo samples
- Biomarker discovery using metabolomics and lipidomics
- Bioinformatic and statistical tools
- Characterization of affected biochemical pathways for different matrices (cells, blood, vitreous humour, hair)

### Techniques

#### Sample preparation

- Solid-phase extraction (SPE & μSPE)
- Liquid-liquid extraction (LLE)
- Soxhlet extraction

#### Analysis

- LCxLC-IM-QTOF-MS
- LC-QTOF-MS
- LC-MS/MS
- LC-DAD/FLU
- GC-MS and GC-MS/MS
- GCxGC-QTOF-MS

Headspace-GC-FID

