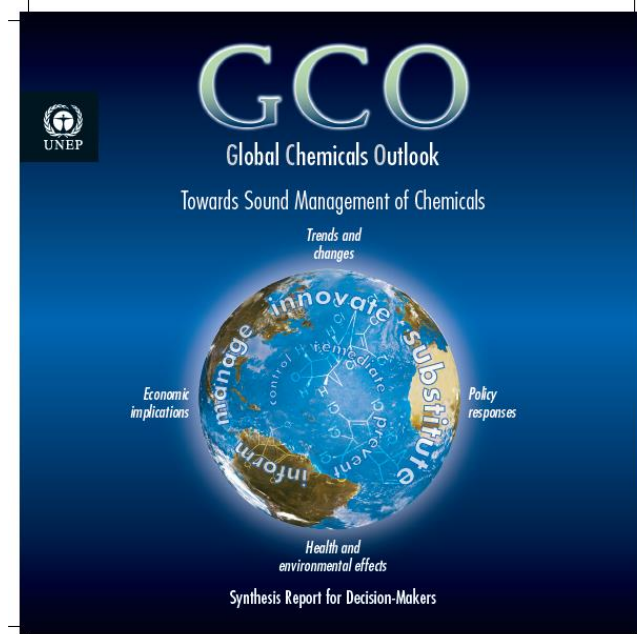




# Indoor air and dust as exposure pathways of contaminants to humans

# Background

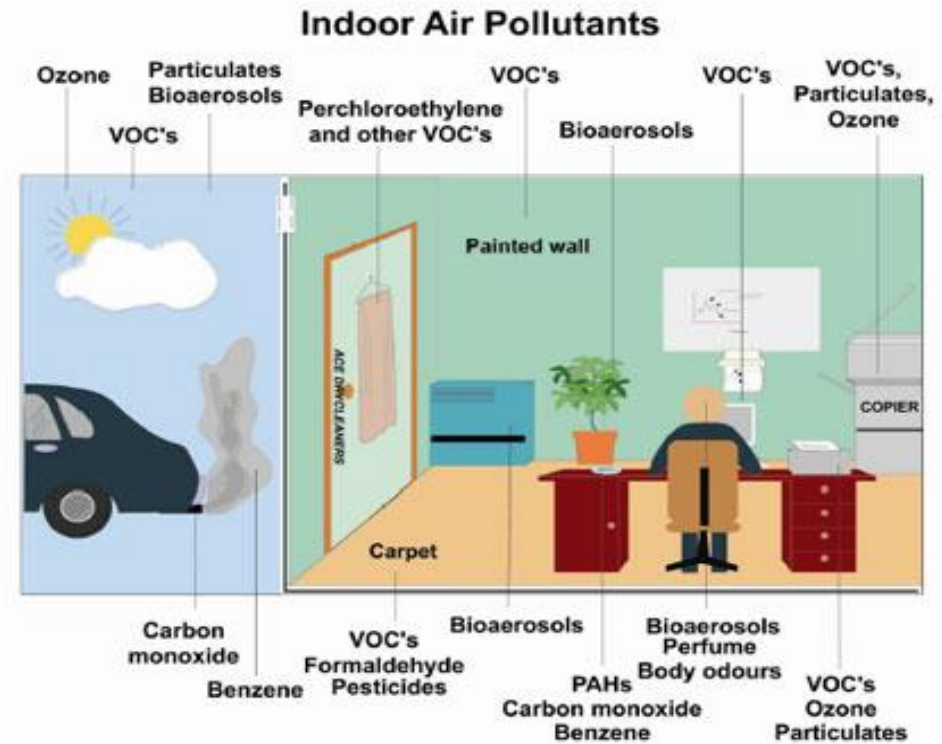
- UNEP Global Chemical Outlook (GCO), 2012
  - Exact number of chemicals on the global market is not known
  - Pre-registration chemicals **REACH 143,835 chemical substances**. Approximate number of chemicals in commercial use
- Other sources **7 million** recognized chemicals are in existence
- EPA and FDA have no idea:
  - How many chemicals are used in consumer products
  - In which products they are used





# Indoor air pollution

- People are exposed to contaminants via various exposure pathways indoors and outdoors
- Increased evidence that articles and consumer products used indoors, containing a variety of chemicals, can emit chemicals
- Indoor air and dust are important pathways of chemical exposure
- Sources:
  - e.g. furniture, electronics, household, products, plastics, carpets, ventilation systems, print shops, offices



# EU Marie Curie projects focus on dust and air pollution

## INFLAME

- Indoor Contamination with Flame Retardant Chemicals: Causes and Impacts
- How and to what extent flame retardants used in every-day consumer goods and construction materials enter humans and identify the health



## A-TEAM

- External and internal human exposure to selected chemicals
  - Plasticizers, new brominated flame retardants, perfluorinated compounds
- Exposure assessment only

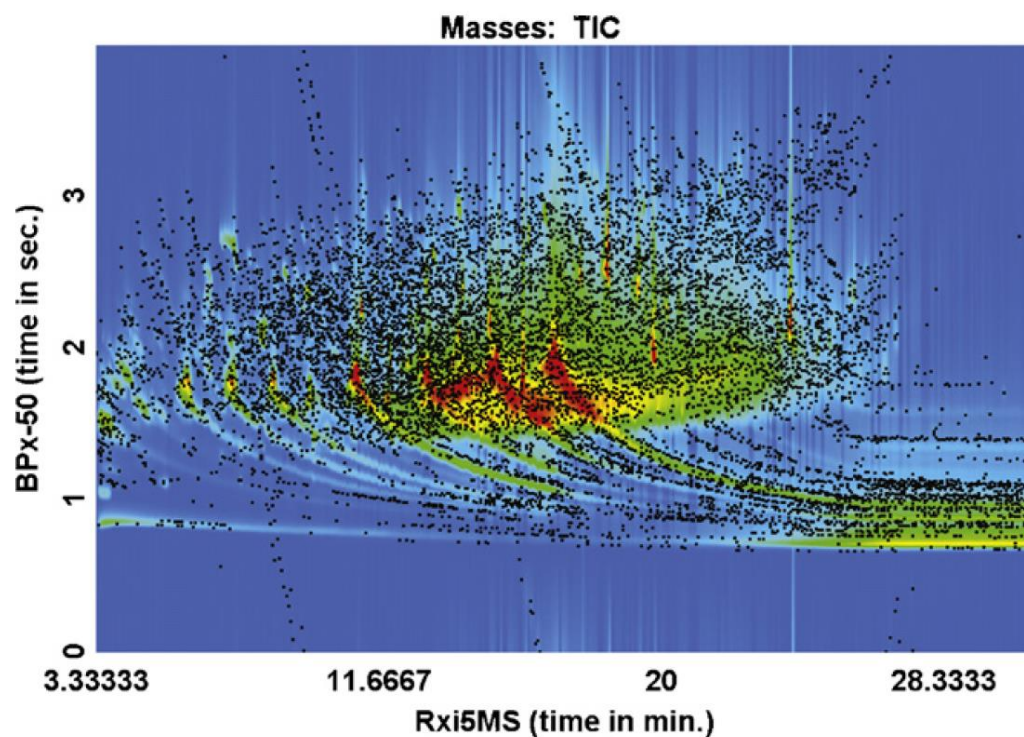


# Project idea: Indoor exposure of chemicals, sources and diseases

- Aim: To relate exposure of indoor environment chemicals to sources of pollution and diseases
- Data gaps:
  - Type of chemicals emitted
  - What are the sources
  - Levels and patterns
  - What are the exposure pathways
  - Potential health risk in different indoor environments (e.g. houses, offices, schools, shops, cars)

# Dust as exposure pathway

More than 10,000 chemicals found in house dust



Hilton et al., 2010. J. Chrom A, 1217 (2010) 6851–6856





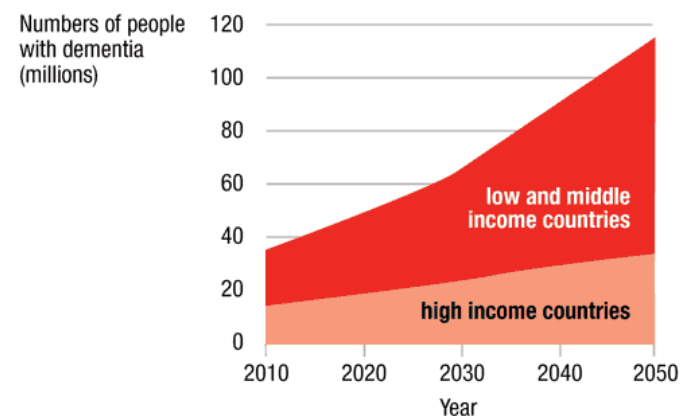
# Relationship of environmental pollution and human health at low doses

# Background

- Worldwide, serious concern has arisen about the increased incidence of neurodevelopmental diseases such as Parkinson disease or Alzheimer disease
- Scientific evidence suggests a **higher risk of Parkinson and Alzheimer disease is associated with pesticide exposure**
  - Pesticide exposure is association to other diseases as well
- Low doses of environmental biologically active contaminants can cause adverse effects on learning and development

## Increase Alzheimer disease

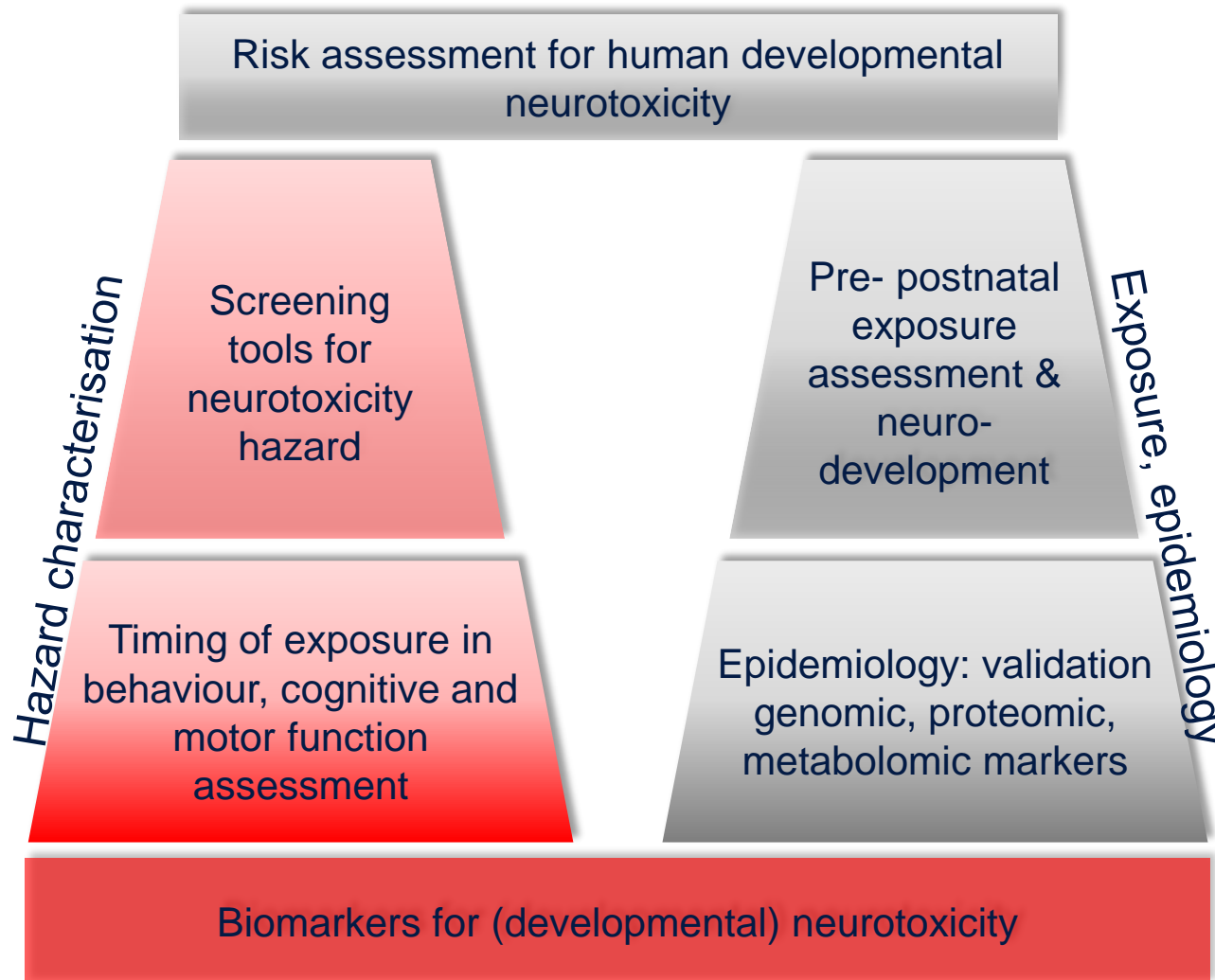
The growth in numbers of people with dementia in high income countries and low and middle income countries



[www.alz.co.uk/research/statistics](http://www.alz.co.uk/research/statistics)



- Developmental Neurotoxicity Assessment of Contaminant Mixtures in **Children**
- Investigates neurotoxic effects of **low-concentration mixtures** of pesticides and a number of common environmental pollutants in children
- Focus on (subclinical) effects on
  - **learning** (cognitive skills)
  - **developmental disorders in children** (e.g. ADHD, autism spectrum disorders and anxiety disorders)
- Develop **tools** and **methods** for **screening** of neurotoxic effects and determine **neurotoxic chemicals** in cohorts



# Project idea: Neurodegenerative diseases and exposure to environmental contaminants

- Aim: to further strengthen the relationship between **environmental exposure** (which compounds are causing the effects) and **neurodevelopmental diseases at adult age**
  - focus on Parkinson and Alzheimer disease
- Focus on **low dose** exposure of environmental biologically active contaminants

