Cognitive development and neurologic disorders

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Clean Air in Europe for All
Brussels, May 24, 2023

CLEAN AIR IN EUROPE FOR ALL
Air pollution and brain function

Hypotheses

- Childhood
  - High exposure leads to impaired growth
  - Low exposure

- Advanced Age
  - High exposure leads to accelerated decline
  - Low air pollution exposure
  - Cognitive Impairment
  - Dementia
  - Cognitive impairment and dementia occur earlier in life
Cognitive development and brain structure in children
Barcelona and Rotterdam

Lower cognitive growth among highly exposed

- Decrease in gray matter / cortical thickness
- Changes in white matter structure (wiring)

Sunyer et al. Plos Med 2015
Guxens et al. BPS 2018
Impact on the aging brain

Meta-analyses

Air pollution is related to accelerated cognitive decline

Wilkerson et al, BMJ, 2022

Air pollution is related to incidence of dementia

Thompson et al, 2023
Conclusions

• Air pollution impairs cognitive growth in babies and children

• Air pollution accelerates cognitive decline and development of dementia in the aging brain