

Pregnancy and childhood

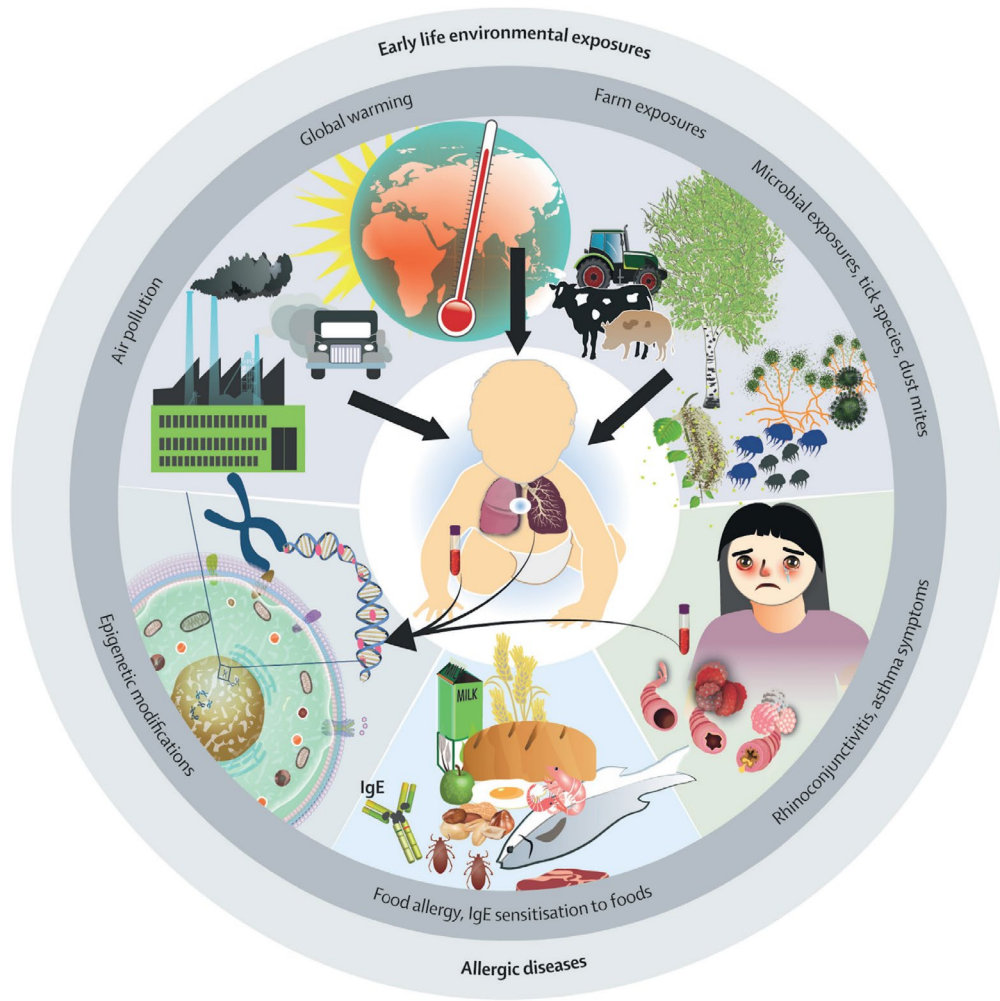
ERS- ISEE- HEI workshop, May 24th 2023

Erik Melén, MD, PhD

Professor, senior consultant pediatric allergy

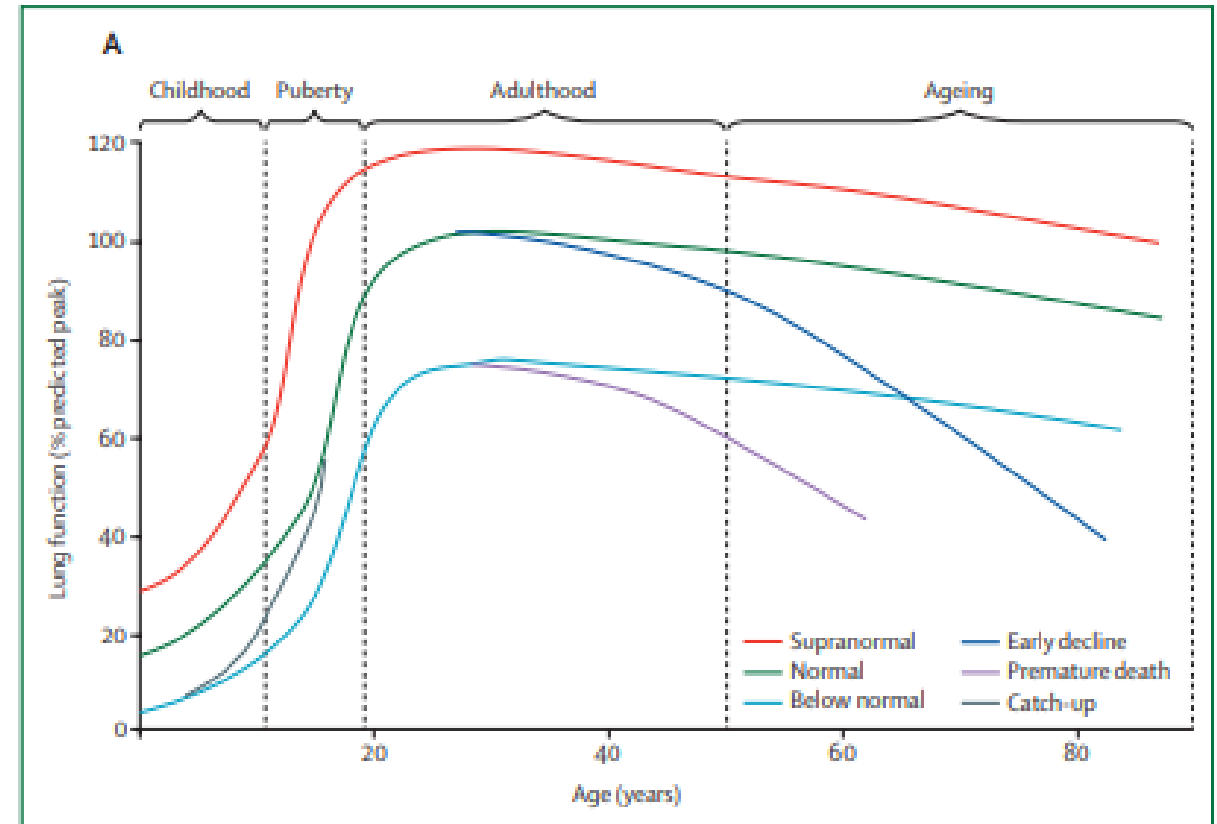
ERS Environmental Health Committee

A life-course perspective



Melén, Koppelman et al. *Lancet Child & Adolescent Health* 2022

The example of lung function trajectories



Agusti, Melén et al. *Lancet Resp Med* 2022



Children are particularly vulnerable to environmental hazards:

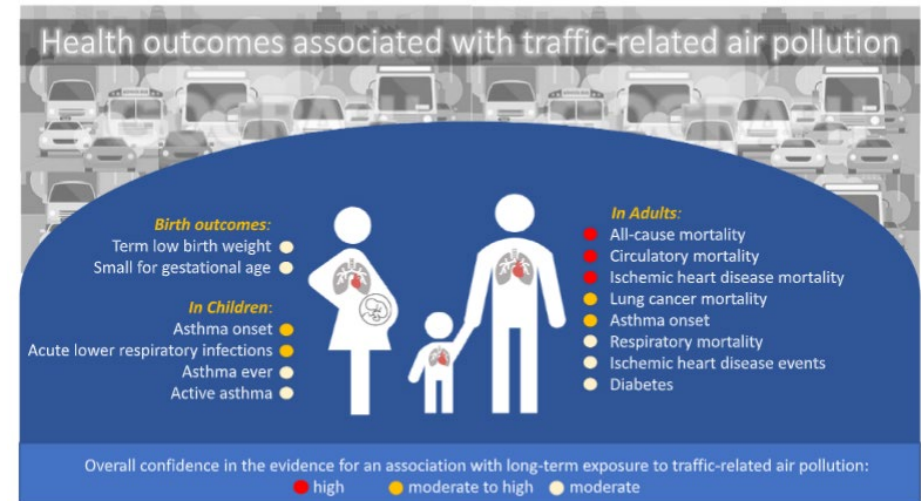
- More time outside, physically active
- Higher rates of breathing and ventilation rates relative to body size
- Narrower airways
- Ineffective airway particle filtering
- Underdeveloped detoxification systems
- Typically don't choose lifestyle and environment



<https://www.svt.se/nyheter/inrikes/avgaser-ger-barn-samre-lungor>

Exposure affects children in many ways:

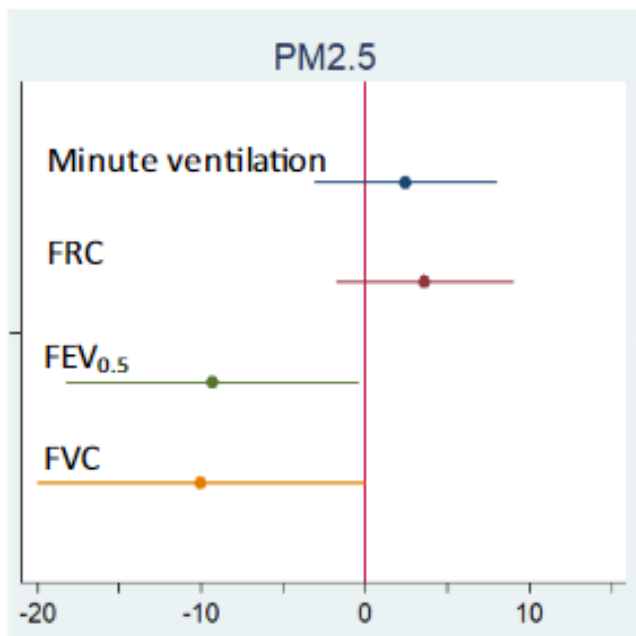
- *In utero exposure; growth impairment, preterm birth*
- *Lower respiratory infections*
- *Asthma, lung growth limitation → COPD risk*
- *Impede cognitive development*
- *Mortality (600,000 / y globally)*



Air pollution exposure impairs lung function in infants

Björn Lundberg, Olena Gruzieva, Kristina Eneroth, Erik Melén, Åsa Persson, Jenny Hallberg, Göran Pershagen

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Early life exposure and health in young adults

- **Chronic bronchitis 5,5%**
- **Irreversible airflow limitation according to COPD-criteria 2%**
- Cough, phlegm, recurrent airway infections and respiratory symptoms
- **Air pollution exposure 0-1 y strongly associated (OR 2-3)**

Wang et al, *Eur Resp J* 2021; *Thorax* 2021
Yu et al, *JAMA Open Network* 2022;
Lancet Regional Health Europe 2023

Growing evidence links air pollution exposure and covid-19 risks

By Allyson Chiu
May 13, 2022 at 8:00 a.m. EDT



How can we mitigate air pollution health effects?

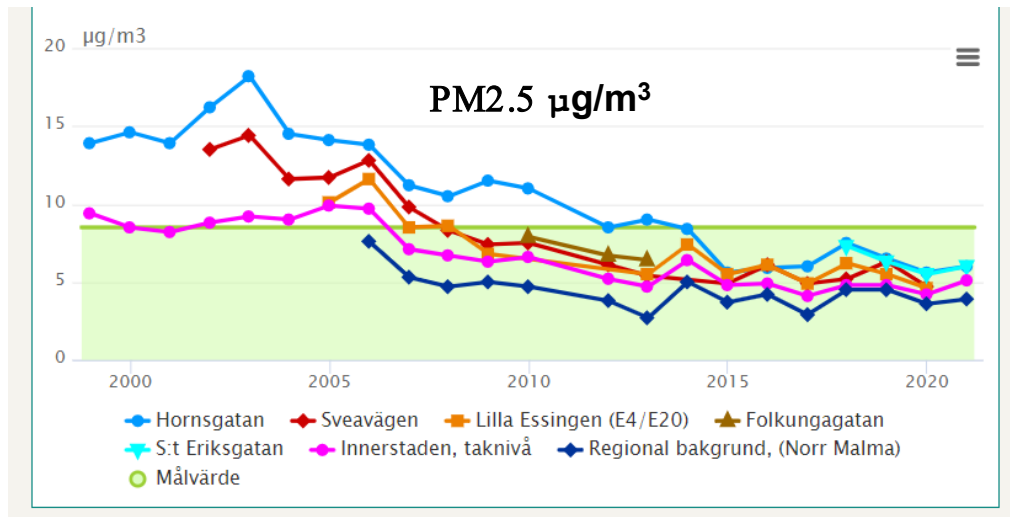


EUROPEAN RESPIRATORY JOURNAL
ORIGINAL RESEARCH ARTICLE
Z. YU ET AL.

Eur Resp J 2023

Associations of improved air quality with lung function growth from childhood to adulthood: the BAMSE study

Zhebin Yu¹, Simon Kebede Merid², Tom Bellander^{1,3}, Anna Bergström^{1,3}, Kristina Eneroth⁴, Antonios Georgelis^{1,3}, Jenny Hallberg^{2,5}, Inger Kull^{2,5}, Petter Ljungman^{1,6}, Susanna Klevebro^{2,5}, Massimo Stafoggia^{1,7}, Gang Wang^{1,2}, Göran Pershagen^{1,3}, Olena Gruzjeva^{1,3} and Erik Melén^{1,3}



Association between improvement of air quality and differences in lung function growth from age 8 to 24 years

	Unit of improvement in exposure	Raw value	
		Difference in FEV ₁ growth, mL per year (95% CI) [#]	Difference in FVC growth, mL per year (95% CI) [#]
PM _{2.5}	2.19 µg·m ⁻³	4.63 (1.64–7.61)	9.38 (4.76–14.00)
PM ₁₀	1.00 µg·m ⁻³	0.72 (–0.91–2.35)	2.77 (0.19–5.35)
BC	0.28 µg·m ⁻³	2.80 (0.66–4.93)	5.59 (2.30–8.87)
NO _x	6.17 µg·m ⁻³	1.70 (–0.16–3.57)	3.29 (0.35–6.23)

Exposure improvement associated with 22% lower risk of having low lung function at age 24 years

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Air pollution

Cutting air pollution improves children's lung development, study shows

Conclusions from long-term survey in Sweden come days after 10th anniversary of Ella Kissi-Debrah's death in London

Nicola Davis
Science correspondent

@NicolaSDavis
Thu 23 Feb 2023 16:51 GMT



The researchers said the results sent 'a strong message to policymakers and city planners'.
Photograph: Fabrizio Bensch/Reuters



Conclusions

- Better air quality – better health, bigger lungs!
- Prevention of chronic adult disease? Start early.