Long-term outdoor air pollution and cause-specific mortality in a pooled analysis of Asian cohorts

George S Downward[1], Gerard Hoek[1], Perry Hystad[2], Eiko Sato[3], Manami Inoue[3], Sarah K. Abe[3], Md. Shafiur Rahman[3], Nat Rothman[4], Qing Lan[4], Zhu Tong[5], Lutzen Portengen[1], R.C.H. Vermeulen[1]

[1]Utrecht University, Utrecht, The Netherlands; [2]Oregeon State University, Corvalis, Oregon, USA; [3]National Cancer Center, Tokyo, Japan; [4]National Cancer Institute, Bethesda, Maryland, USA; [5] Peking University, Beijing, China

Universiteit Utrecht

Background

- Ambient air pollution is a major cause of death and disability.
- The bulk of studies are performed in North America and Europe.
- The largest impacts likely occur in Asia, where levels are higher.
- It is unknown whether the N. America/Europe findings extend to Asia.
- Cultural and socio-economic differences further compound this knowledge gap.

Objectives

- Evaluate the association between long-term exposure to ambient $PM_{2.5}$ and NO_2 and all-cause and cause-specific mortality in a pooled analysis of Asian cohorts
- Explore risk heterogeneity in the context of cultural, social, economic, or infrastructural differences.

Pollution predictions

- Addresses converted to GPS co-ordinates
- Co-ordinates merged with global maps of $PM_{2.5}$ and NO_2 (Figure 2)

Figure 1. Illustration of cohorts contributing to ACC. Map adapted from ACC AGM 2018

Asia Cohort Consortium

- Multicenter consortium representing multiple cohorts across Asia (Figure 1)
- Cohorts are invited to contribute:
  - Address information
  - Covariates

Statistical analysis

- Cox regression models between exposure and mortality outcomes
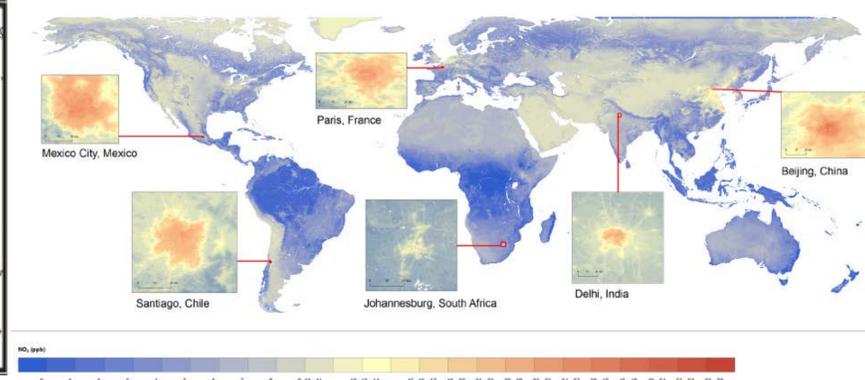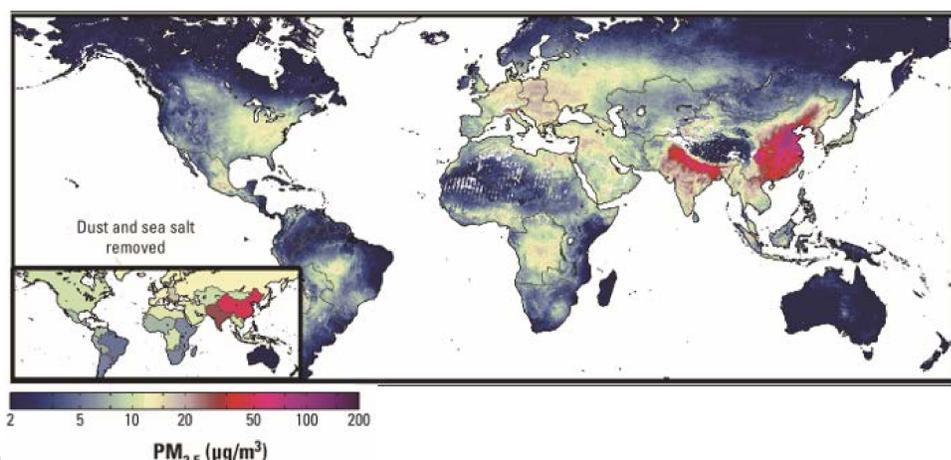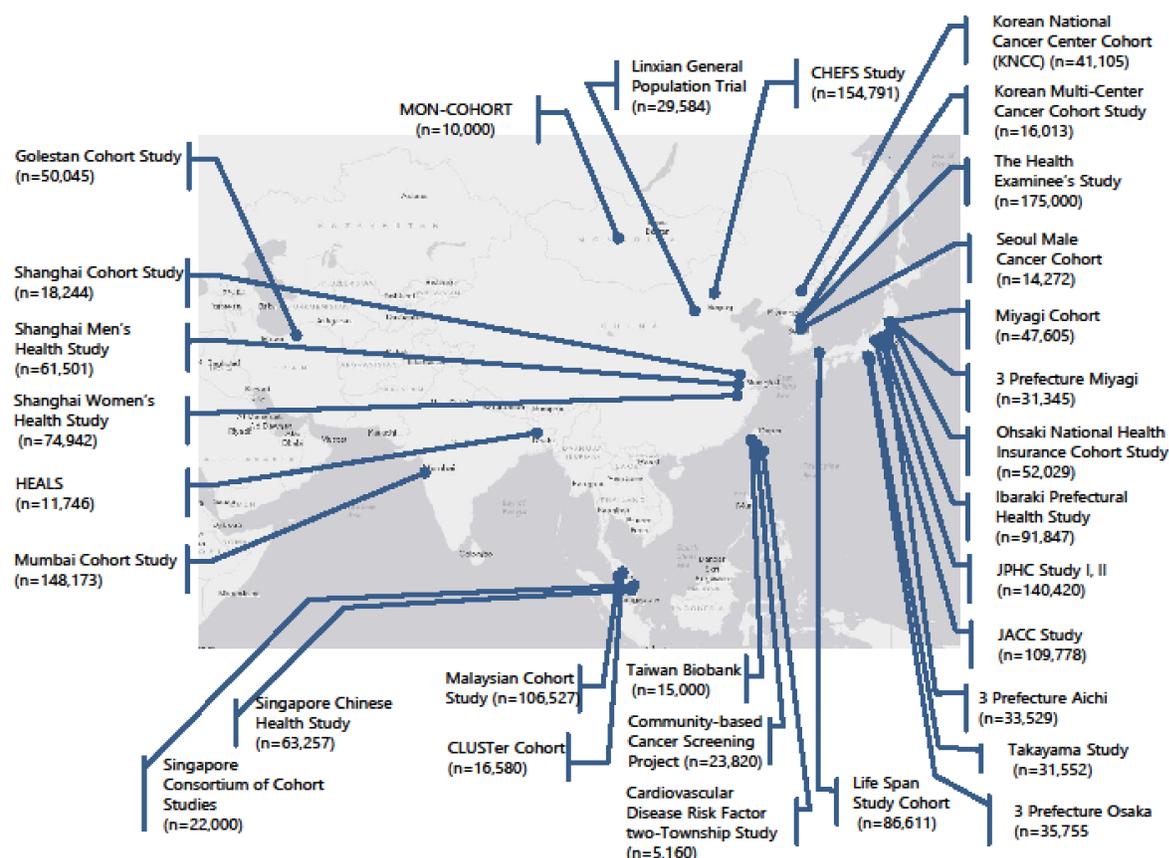- Pooled data and cohort specific meta-analysis

Figure 2. Global maps showing satellite derived predictions of $PM_{2.5}$ (left) and NO_2 (right). Maps adapted from van Donkelar et.al 2016 and Larkin et.al. 2017

Institute for Risk Assessment Sciences / Division Environmental Epidemiology