

A young man with light brown hair, wearing a blue t-shirt, is leaning forward and drinking water from a public tap fountain. A stream of water is falling directly into his open mouth. The background is slightly blurred, showing what appears to be a public building or park setting.

Register-based Studies on Drinking Water Related Health Effects in Sweden

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Creating a register-based cohort

Exposure databases

- Drinking water exposure data

National health care registers

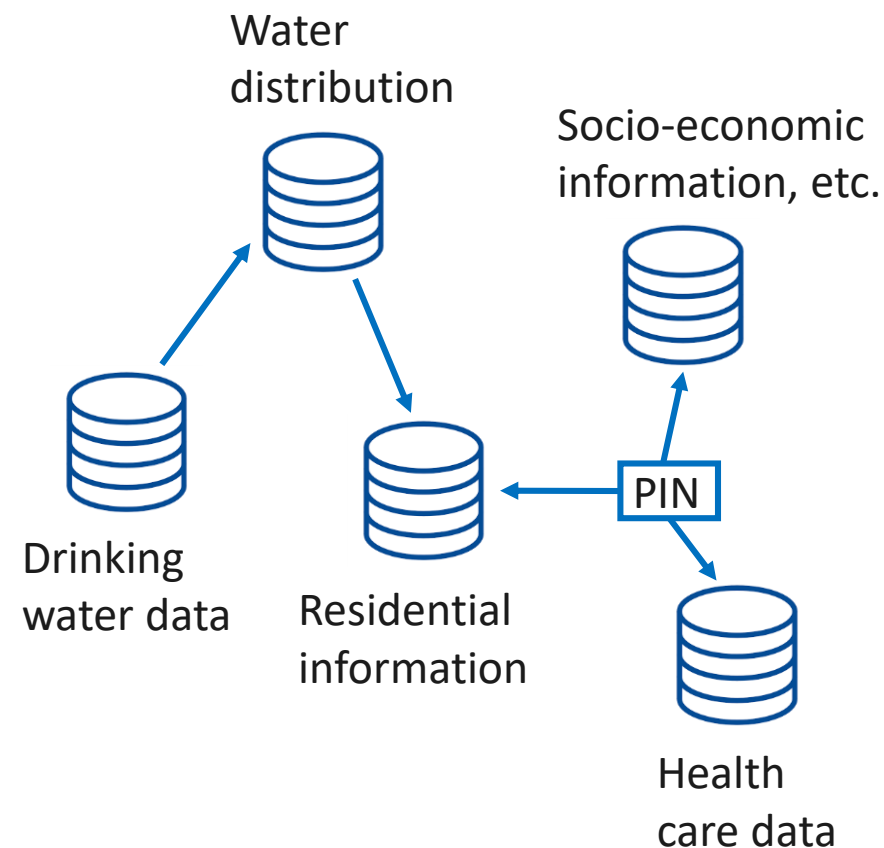
- Medical Birth register, Cancer Register, etc.

National administrative registers

- Longitudinal integrated database for health insurance and labour market studies (LISA), National Register for Regional Divisions Based on Real Estate, etc.



PIN 19920101-xxxx



Register based Swedish cohort

Chlorination by-products and fetal development (published)

Study aim

Assess if exposure to trihalomethanes (THM), during gestation is associated with risk of small-for-gestational-age, preterm delivery and congenital malformations, and if the association is dependent on the chlorination treatment (hypochlorite or chloramine)



Register based Swedish cohort

Chlorination by-products and fetal development (published)



Methods

- **Exposure:** THM in municipal drinking water
- **Study area:** large Swedish localities (>10 000 inh.)
- **Study population:** births during 2005-2015 among mothers living within the study area
- **Stratified by:** chlorination treatment

Register based Swedish cohort

Chlorination by-products and fetal development (published)



Methods

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- **Stratified by:** chlorination treatment

→ *600 000 newborns included*

Register based Swedish cohort

Chlorination by-products and fetal development (published)



Results – localities with hypochlorite

Increased risk of **small-for-gestational-age** (**aOR=1.20; 95% CI: 1.08, 1.33**) comparing >15 µg THM/L to non-chlorinated areas

Register based Swedish cohort

Chlorination by-products and fetal development (published)



Results – localities with chloramine

Increased risk of **malformation of the**

- **nervous system (aOR=1.82; 95% CI: 1.07, 3.12)**
- **urinary system (aOR=2.06; 95% CI: 1.53, 2.78)**
- **genitals (aOR=1.77; 95% CI: 1.38, 2.26)**
- **limbs (aOR=1.34; 95% CI: 1.10, 1.64)**

comparing >15 µg THM/L to non-chlorinated areas

Creating a register-based cohort

Existing cohort

Exposure databases

- Drinking water exposure data

National health care registers

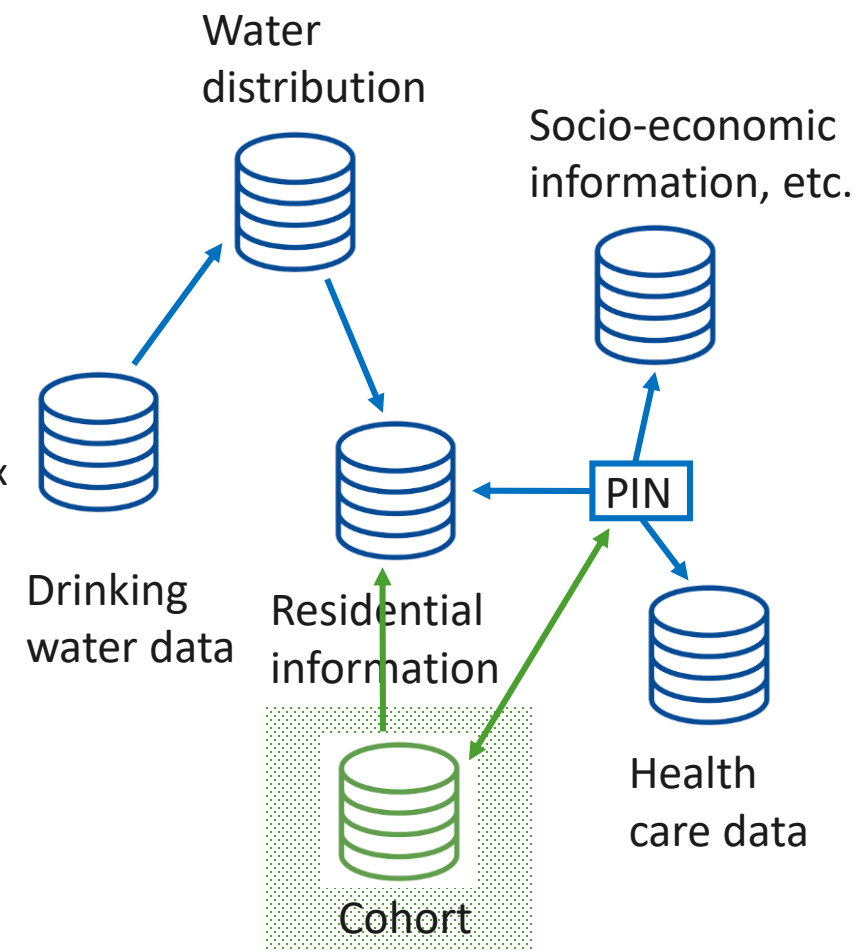
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National administrative registers

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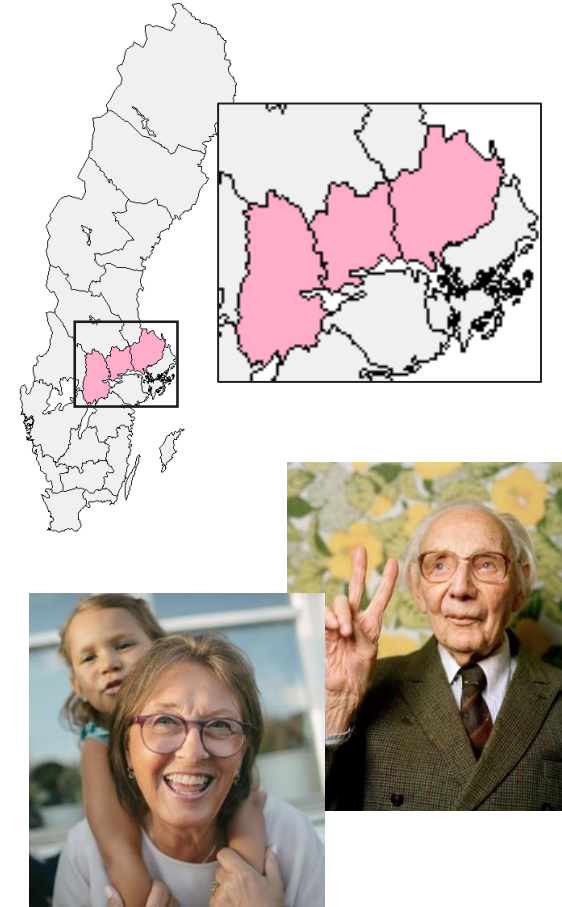


Existing cohort + register data

Chlorination by-products and bladder-cancer (published)

Study aim

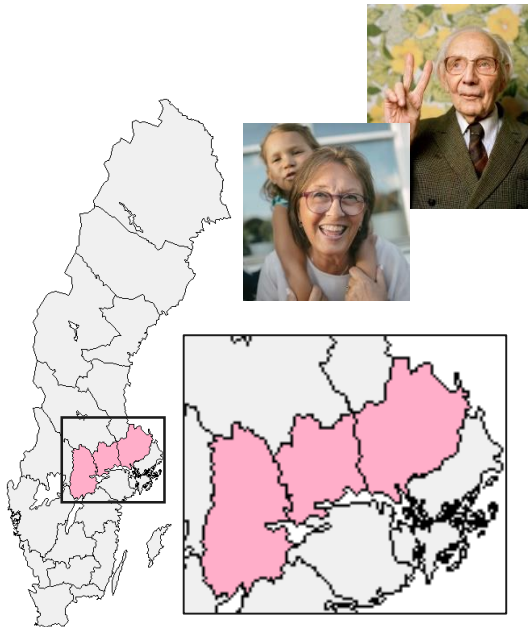
Assess the association between exposure to THMs in drinking water and incidence on bladder cancer among middle aged to elderly men and women in Sweden.



Helte, et al., 2022. Water Research, Volume 214, 2022, 118202

Existing cohort + register data

Chlorination by-products and bladder-cancer (published)



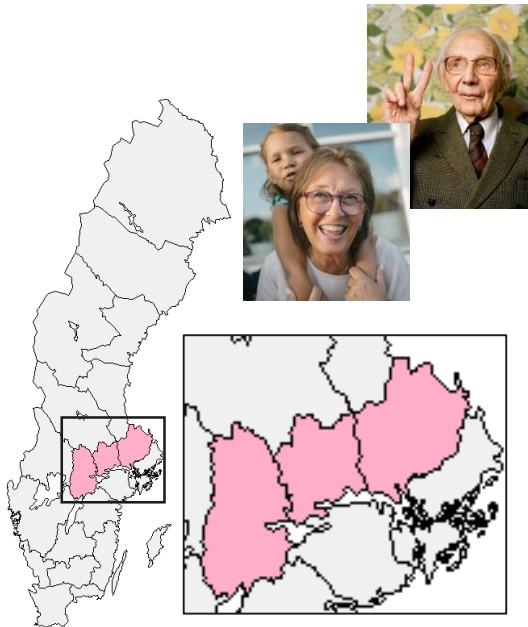
Methods

- **Study population:** two population-based cohorts, parts of the Swedish Infrastructure for Medical Population-Based Life-Course and Environmental Research (SIMPLER).
- **Exposure:** THM in municipal drinking water
- **Study area:** localities ($\geq 1\ 000$ inh.) in three Swedish counties

Helte, et al., 2022. Water Research, Volume 214, 2022, 118202

Existing cohort + register data

Chlorination by-products and bladder-cancer (published)



Methods

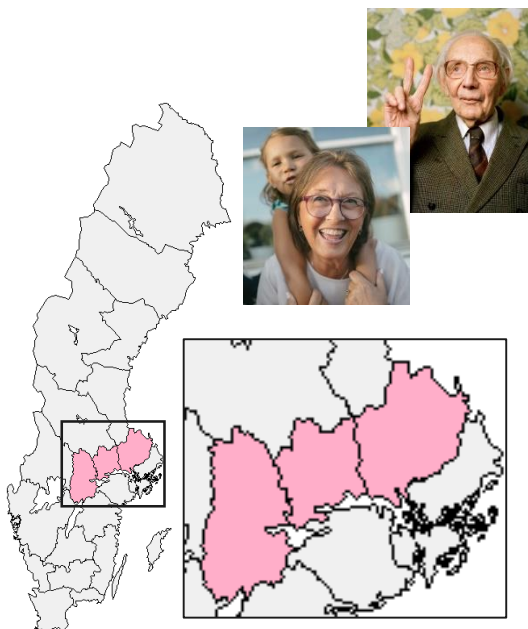
- **Study population:** two population-based cohorts, parts of the Swedish Infrastructure for Medical Population-Based Life-Course and Environmental Research (SIMPLER).
- **Exposure:** THM in municipal drinking water
- **Study area:** localities ($\geq 1\,000$ inh.) in three Swedish counties

→ 50 000 middle aged to elderly men and women, 16 years of follow-up (965,590 person-years)

Helte, et al., 2022. Water Research, Volume 214, 2022, 118202

Cohort: questionnaire data + register data

Chorination by-products and bladder-cancer (published)



Results

No association for **bladder cancer**, aHR 0.90 (95% confidence interval: 0.73 – 1.11) comparing >15 µg THM/L to non-chlorinated areas.

Strengths, limitations and reflections for the future

- Inevitable risk of exposure misclassification
- Data originate from medically confirmed cases or validated administrative data, although, some data is self-reported (smoking, etc.)
- Large databases and endless possibilities to link registers → great possibilities, but also responsibilities

Reflections for the future:

- New hazards → registers comes with great possibilities
- Change in the security policy landscape → introduces limitations

Thank you for your attention!

Thanks to the project team!

Funding:

Swedish Research Council Formas
Swedish Cancer Society



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**Karolinska
Institutet**