

# Cancer risk among firefighters in the Norwegian Fire Departments Cohort

Niki Marjerrison, PhD student

OCRC seminar

December 10, 2021

# Background

# Background

**2007:** IARC classified firefighting as «**possibly carcinogenic**»

**2014:** «**Norwegian firefighters fighting cancer**» formed

**2017:** «**Cancer risk among firefighters**» project with the Cancer Registry and the National Institute of Occupational Health began

Part of the project «**Health risks and health effects of firefighter work**»  
led by Sintef Digital

# Exposures

Firefighters are exposed to many known and potential carcinogens through their work

## Main sources:

- At the fire scene
- Diesel and gasoline exhaust
- Contaminated equipment

## Main routes for exposure:

- Inhalation
- Dermal absorption



# Carcinogens (Group 1)

Exposure	Cancer site
Arsenic	Skin, lung, liver
Asbestos	Lung, mesothelioma, larynx, gastrointestinal tract
Benzene	Leukemia
Benzo[a]pyrene	Lung, bladder, skin
1,3-Butadiene	Lympho-hematopoietic
Cadmium	Lung
Polychlorinated biphenyls (PCBs)	Skin (possibly non-Hodgkin's lymphoma, breast)
Radioactivity ( $\gamma$ -activity)	All sites combined
Radionuclides ( $\alpha$ - og $\beta$ -particle-emitting)	All sites combined
Silica (crystalline)	Lung
2,3,7,8-tetrachloro dibenzo-para-dioxin	All sites combined, lung, non-Hodgkin's lymphoma

# Previous findings

Earlier studies have found elevated risk of several cancers among firefighters

- **Meta-analyses/reviews:** LeMasters et al (2006), IARC (2010), Sritharan et al (2017), Jalilian et al (2019), Casjens et al (2020), Laroche et al (2021)
  - Cancer of the stomach, colon, rectum, prostate, testis, kidney, bladder, thyroid, and non-Hodgkin lymphoma, multiple myeloma, mesothelioma and cutaneous melanoma
- Heterogeneous findings

# Previous findings

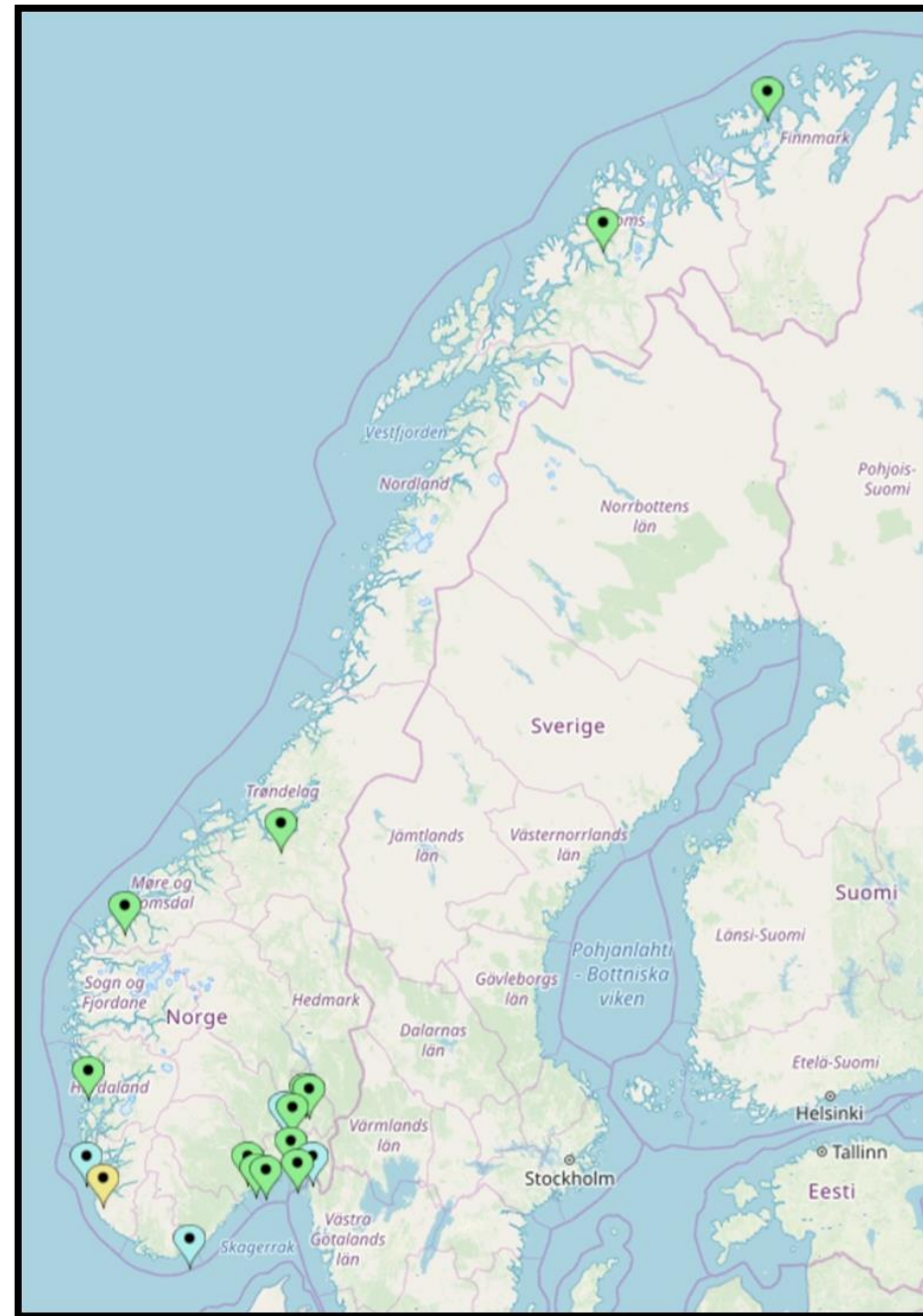
Study (Year)	Pukkala et al (2014)	Daniels et al (2014)	Glass et al (2016a)	Harris et al (2018)
Region	5 Nordic countries	3 U.S. cities	Australia	Canada
Follow-up	1960–2003/5	1979/1995–2009	1998/2000–2010	1992–2010
N	16 422	24 453	17 394	4535
Person-years	412 991	403 152	247 469	81 390
Findings	Lung adenocarcinoma Prostate Melanoma Non-melanoma skin All sites combined	Oesophagus Intestine Large intestine Lung Kidney Bladder Mesothelioma Buccal & pharynx All sites combined	Melanoma Prostate All sites combined	Prostate Melanoma Hodgkin's lymphoma

# The Norwegian Fire Departments Cohort

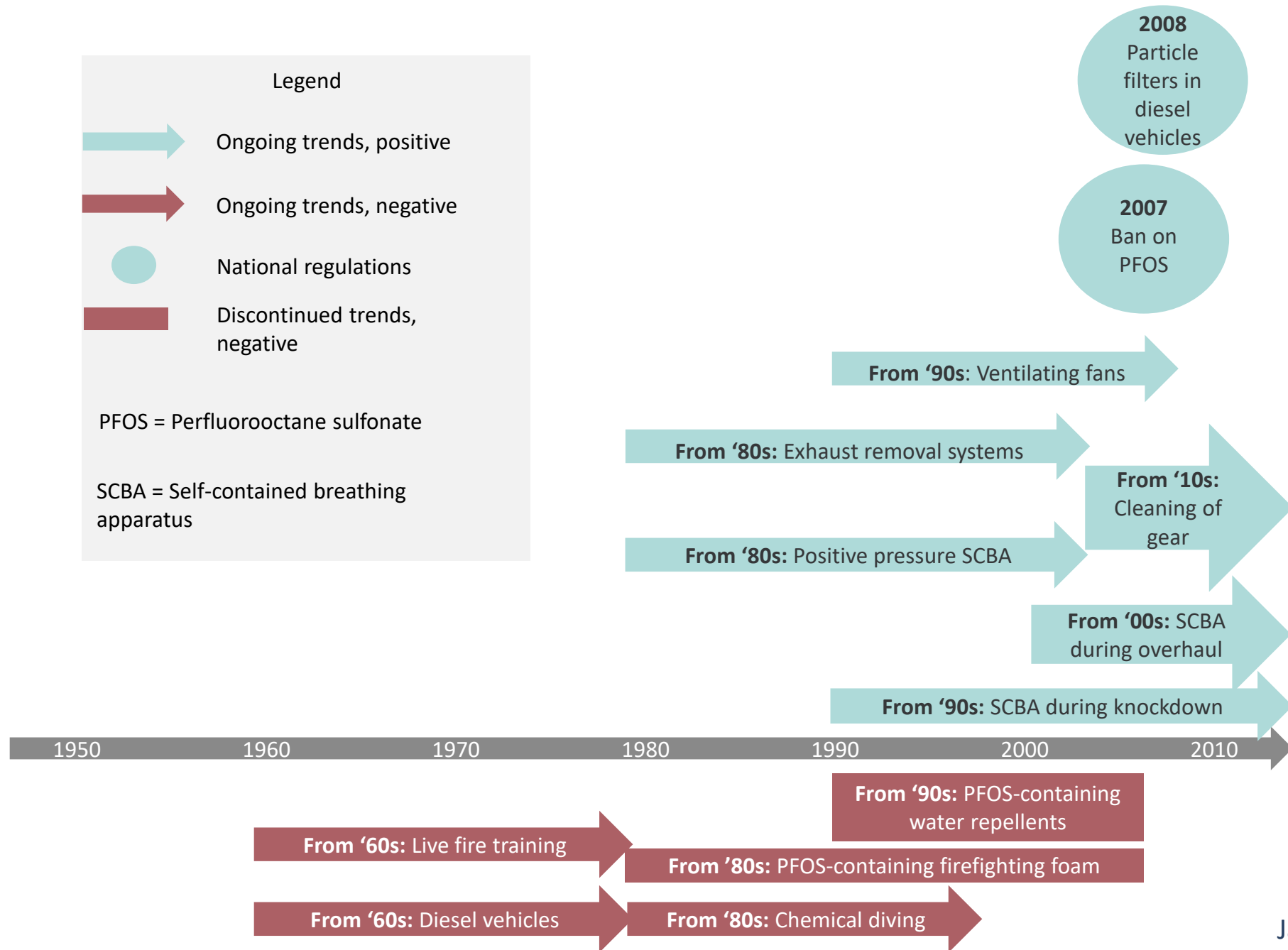


# Cohort

- 15 fire departments
- 1950–2018
- 4627 in the Norwegian Fire Departments Cohort
- 3881 firefighters



# Timeline summarizing changes occurring in Norwegian fire departments' work conditions from 1950 until today



# **Cancer incidence in sites potentially related to occupational exposures: 58 years of follow-up of firefighters in the Norwegian Fire Departments Cohort**

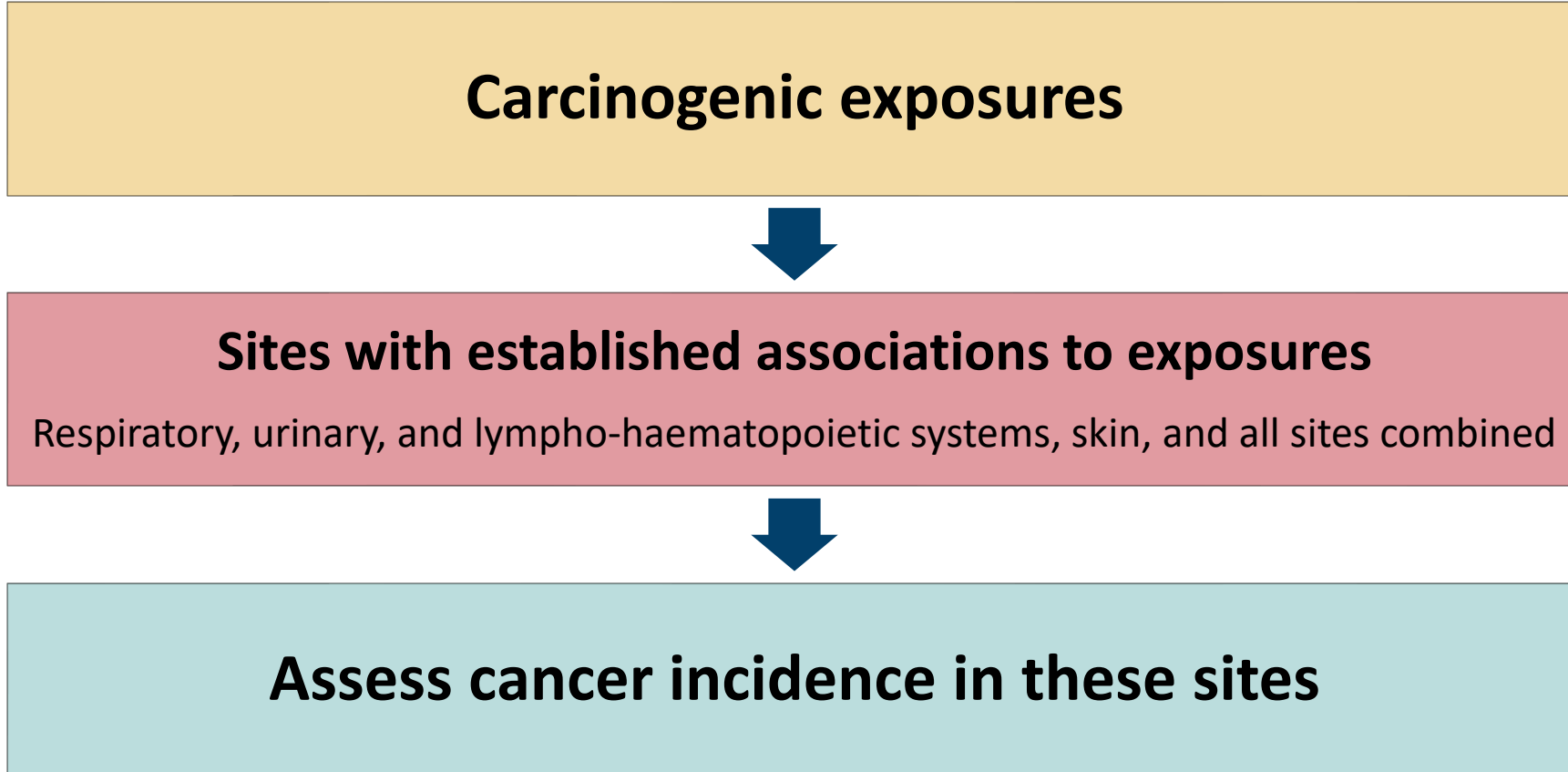
Niki Marjerrison, Jarle Jakobsen, Tom K. Grimsrud, Johnni Hansen, Jan Ivar Martinsen, Karl-Christian Nordby, Marit B. Veierød, Kristina Kjærheim

# Article 1: SIR *á*-priori

## *AIM:*

To assess cancer incidence in sites of *á*-priori interest based on established associations with carcinogenic exposures normally encountered during firefighting, by linking firefighters in the newly established Norwegian Fire Departments Cohort to outcome registries

# Article 1: SIR á-priori



# Methods

- 3881 firefighters
- Linkage to the Cancer Registry of Norway (1960–2018)
- Standardized incidence ratios (SIR)
  - Reference: Norwegian male population
  - Adjusted for age and calendar year
- Stratified SIR
  - Period of first employment ( $\leq 1949$ , 1950–1969,  $\geq 1970$ )
  - Duration of employment ( $\leq 9$ , 10–19, 20–29,  $\geq 30$  years)
  - Time since first employment ( $\leq 19$ , 20–39,  $\geq 40$  years)

# Research team & collaborators

Kristina Kjærheim

Tom K. Grimsrud

Jarle Jakobsen

Jan Ivar Martinsen

Johnni Hansen

Karl-Christian Nordby

Raymond Olsen

Marit B. Veierød



Danish Cancer Society



UiO : **University of Oslo**

# Thank you

**Project:** <https://www.kreftregisteret.no/Forskning/Prosjekter/brannmenn-og-kreft/>

**Contact:** Niki Marjerrison  
niki.marjerrison@kreftregisteret.no