

Recent Firefighter Cancer Epidemiology and Evidence Gaps

A Scoping Review of Registry, Cohort & Case-Control Evidence, 2019–2026

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Background

- Occupational exposure as a firefighter is classified by IARC (2022) as **carcinogenic to humans** (Group 1), with sufficient evidence for mesothelioma and bladder cancer.
- Prior meta-analyses have pooled site-specific risk.
- The consequential questions concern study design—how firefighter populations are defined, how cancer is ascertained, which comparators are used, and which subgroups are reported.
- Evidence remains dominated by male career cohorts; volunteers are largely unstudied.

Objective

- Map recent firefighter cancer registry, cohort, and case-control evidence (2019–2026); identify which populations, outcomes, comparators, and demographic subgroups are represented; and clarify the resulting evidence gaps.

Methods

Design

- Scoping review (JBI guidance); reported per PRISMA-ScR.

Sources & window

- PubMed, Embase, Web of Science, [Citation Searching](#)
- Jan 2019 to Aug 2026, English.

Eligibility

- Registry-linkage, cohort, or firefighter-specific case-control designs with quantitative cancer incidence, mortality, stage, survival, or comparative risk. WTC-disaster cohorts excluded.

Screening

- Two independent reviewers; senior-reviewer adjudication.

Population–Concept–Context

Population	Career & volunteer; all sexes & race/ethnicity
Concept	Cancer incidence, mortality, stage, survival
Context	Routine fire service; WTC excluded

Study Selection (PRISMA-ScR)

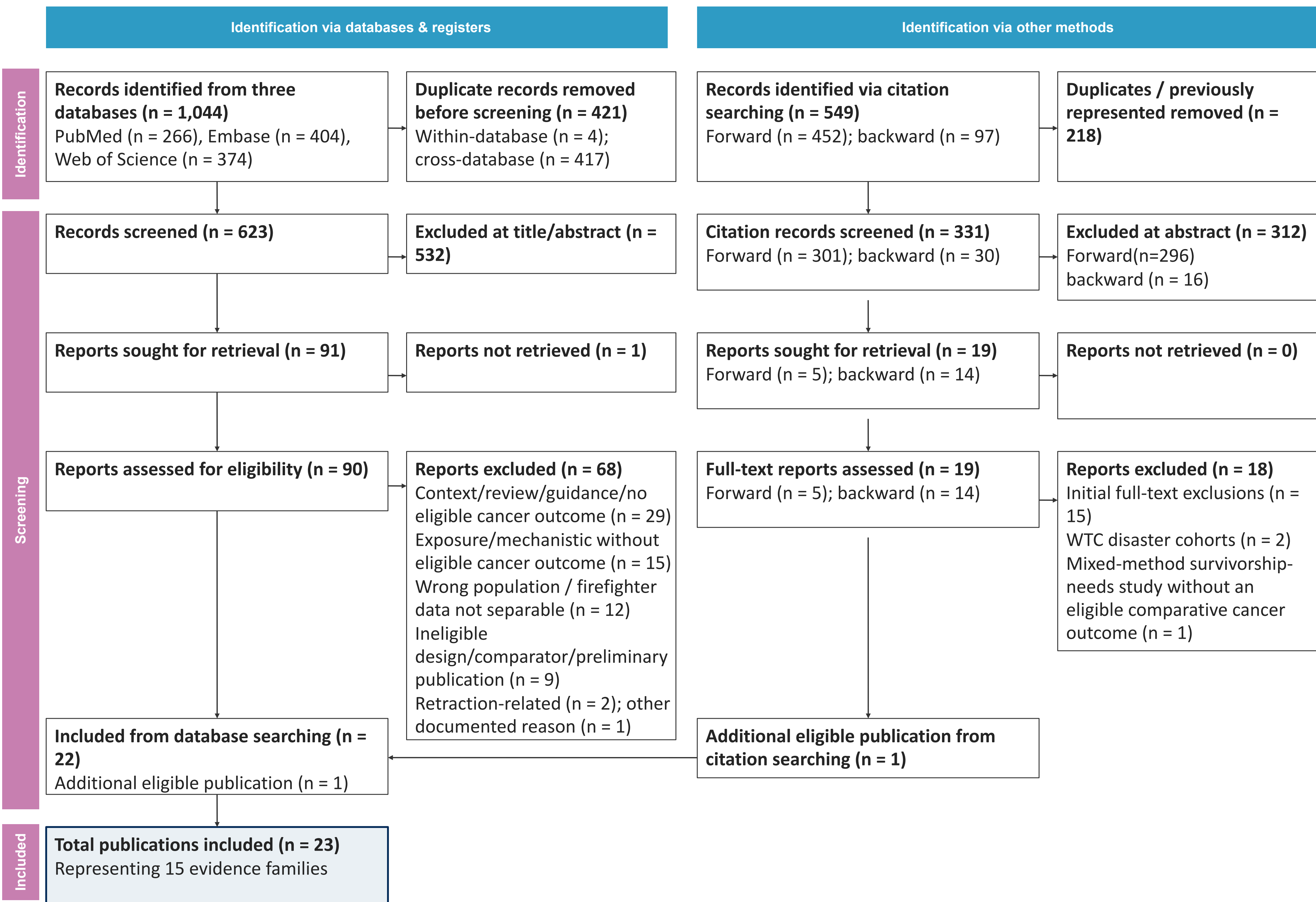


Figure 1. PRISMA-ScR flow diagram — database & citation-search arms (counts in Table S1).

Results — Cancer Outcomes

No uniform all-cancer excess. All-cancer estimates differ by cohort and comparator; site-specific signals are more informative.

All-cancer, by cohort

Sweden (NOCCA) SIR 1.03 (0.97–1.09)	Norway (dept.) SIR 1.15 (1.08–1.23) · SMR 1.08	NIOSH 3-city (US) SMR 1.12 (1.08–1.16)
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Site-specific findings (selected)

Prostate

Ontario HR 1.43 (1.31–1.57) vs. other workers; Florida career aOR 1.36 (1.27–1.46). Norway incidence ↑ (SIR 1.18, 1.03–1.34) but mortality ≈ expected (SMR 1.01) — detection contribution.

Melanoma / skin

Ontario HR 2.38 (1.99–2.84); Denmark full-time SIR 1.30 (1.02–1.66); Sweden non-melanoma skin SIR 1.48 (1.20–1.80); Florida career aOR 1.56 (1.39–1.76).

Mesothelioma

Norway SIR 2.59 (1.12–5.11); NIOSH SMR 1.86 (1.10–2.94). IARC sufficient-evidence site; elevated in long-latency strata.

Colon / other

Colon HR 1.39 (1.19–1.63, Ontario). Thyroid aOR 2.17 (1.78–2.66) & NHL SMR 1.21 among men; wide CIs for rarer sites.

Results — Stage, Survival & Subgroups

Incidence ≠ mortality / stage

- Higher incidence did not track with worse prognosis. Prostate: localized-disease aHR 0.53 (0.34–0.82) but age ≥65 with regional/distant disease aHR 1.84 (1.18–2.86). Firefighters diagnosed ~4.3 yr younger; survival advantage attenuated after age adjustment.

Career vs. volunteer

- Florida lung cancer: 5-yr survival 30.3% (career) vs 27.4% (volunteer); adjusted HR 1.14 (0.93–1.39) — no clear difference. Male volunteers: prostate aOR 1.26 (1.10–1.44).

Sex

- Female evidence limited to Florida & Australia. Women: kidney aOR 2.51 (1.29–4.91); brain 2.54 (1.19–5.42); thyroid 2.42 — all small-count. Australian volunteer women ≈ population incidence.

Race / ethnicity

- No Hispanic/Latino-specific comparative estimate in any included study. Only broad White / non-White strata reported (non-White all-cancer SMR 0.79, 0.68–0.93).

Evidence Gaps

- Evidence concentrated in male career, non-U.S. cohorts (Florida 6, Norway 4, Ontario 2, Nordic, Australia, NIOSH).
- Volunteers, women, and racial/ethnic subgroups understudied; Hispanic/Latino estimates absent.
- Comparator choice drives estimates — general-population vs. worker vs. case-case answer different questions.
- Incidence must be read alongside stage, mortality, and survival, not an all-cancer measure alone.

Conclusions

- Recent firefighter cancer epidemiology shows site-specific associations - melanoma, prostate, mesothelioma, colon - alongside gaps in population coverage and subgroup analysis.
- Future studies should strengthen inclusion of women and volunteers, report race/ethnicity consistently, and distinguish incidence from stage, mortality, and survival.

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