

NIOSH & USFA Fire Fighter Cancer Study

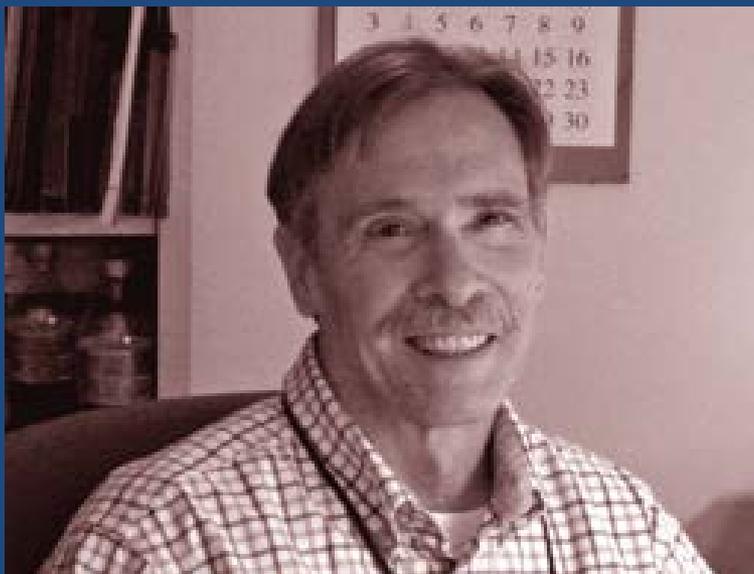
IAB NFPA
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NIOSH Team

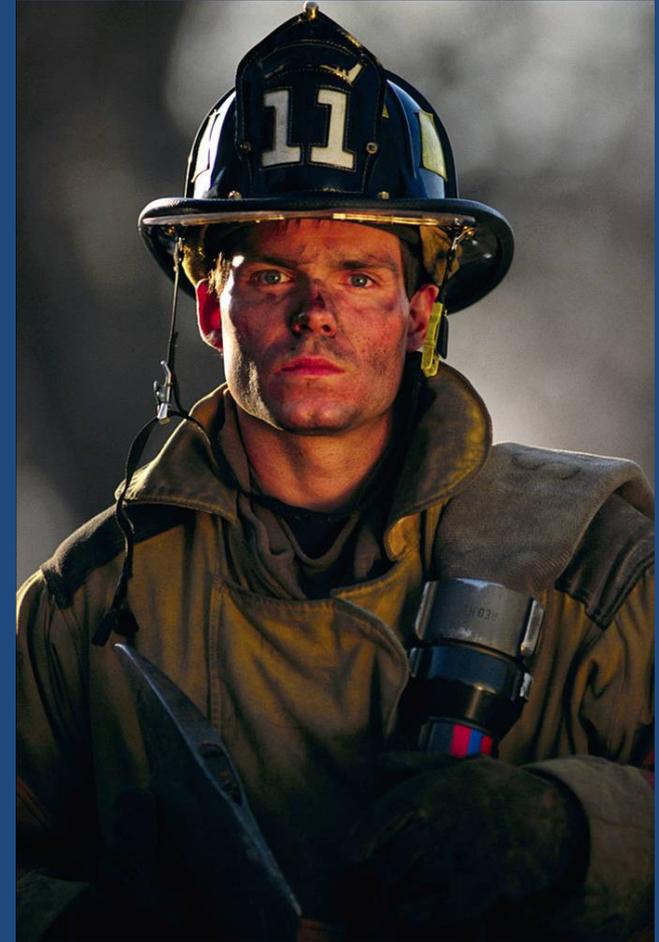


Principal Investigator



Outline

- **NIOSH FF Cancer Study**
 - Who
 - What
 - Why
 - How
 - When



Who is Requesting/Supporting

Requesting

- Fire Service (IAFF, IAFC, FCSN)
- IARC
- U.S. Congress
- NLC



Supporting

- NIOSH (1° funding)
- USFA (2° funding)
- Nat. Cancer Institute (data)



What is being Requested?

- Large Epi Study
- Clarify association b/t fire fighting and cancer



Why Conduct the Study

- Exposure
- Outcome Data



Exposures

Fire Smoke – IARC

- 10 “Group 1” Substances
[arsenic, asbestos, benzene, Benzo[a]pyrene, 1,3-butadiene, cadmium, formaldehyde, diesel exhaust, silica, radioactivity (α, β, γ)]
- 3 “Group 2a” Substances
- 21 “Group 2b” Substances

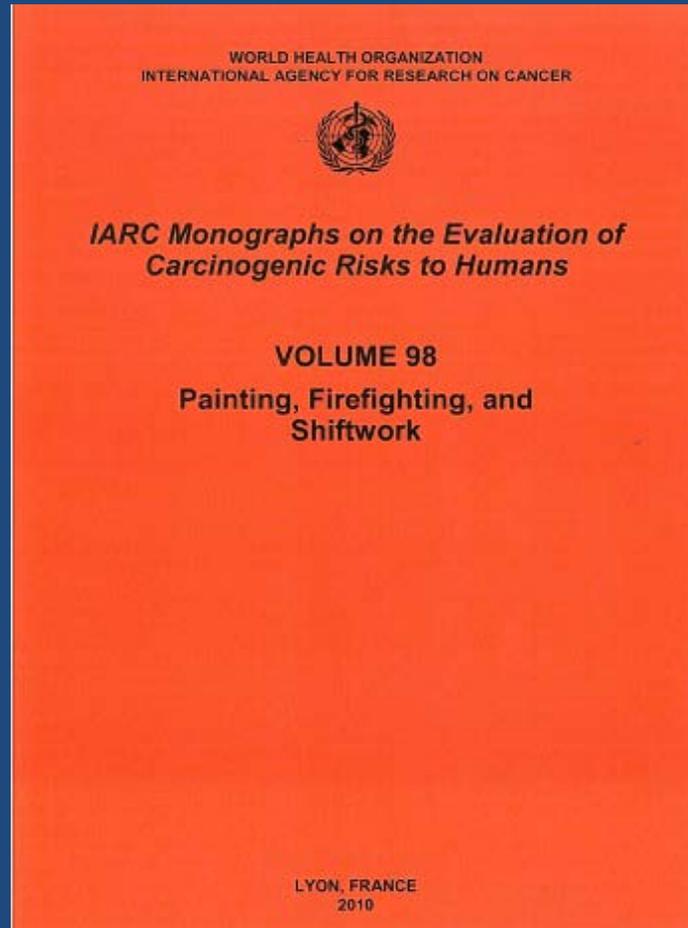


Exposure confounders

- SCBA - Protection Factor
Use during OH, ventilation
- OEL — rarely individually exceeded
- Non-respiratory exposure - Skin
- Other — diesel exhaust, $PM_{<2.5}$, asbestos
contaminated turnout gear



FF Exposure Review



Why – Outcomes

- 19 Cohort Studies
- 11 Case-Control Studies
- 14 Other designs



Mixed results

Outcomes – Meta Analysis

1990 Howe & Burch

2005 Samet

2006 LeMasters (32 studies)

Probable: 4

Prostate, Testicular,
HNL, Mult Myeloma

Possible: 8

2010 IARC (42 studies: 19 cohort, 11 CC)

Probable: Testicular, Prostate, NHL



Previous Studies Limitations

- 1) No vital status past 1989
- 2) Limited data on minorities
- 3) Small studies
- 4) Few incident studies
- 5) Limited exposures assessments
- 6) Few compared FF to FF (controlling for the HWE)



How: 2010

Selected 3 cities:

SF

Philadelphia

Chicago

Protocol Development

HSRB approval

Funding – October 2010



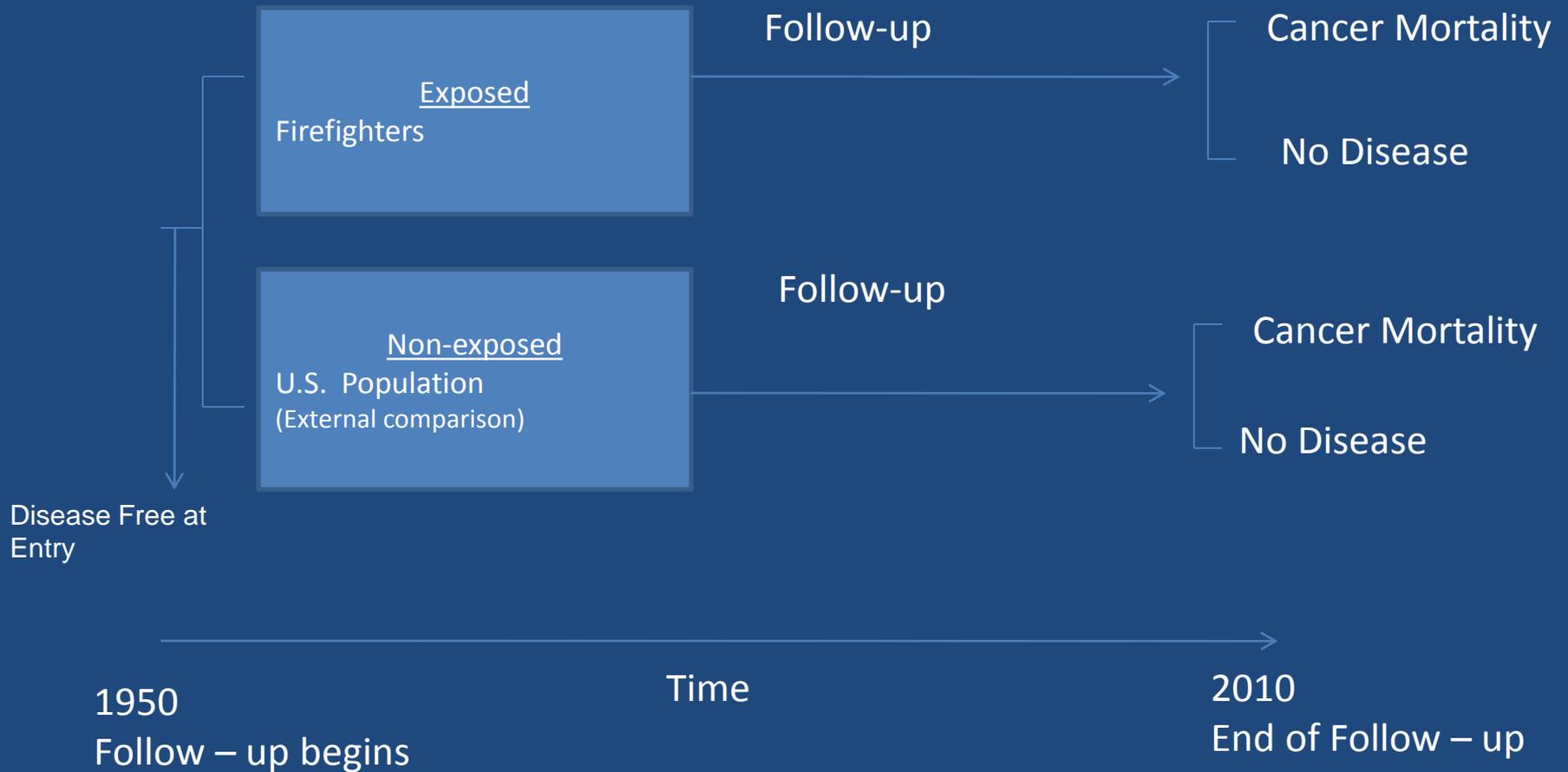
Study Design

Retrospective cohort study

- 1) Mortality: SMR
- 2) Incidence: SIR
- 3) Internal Comparison: SRR



Historic Cohort Study Design: SMR



Finding the Cohort

Develop Roster

- ID all FF's employed from 1/1/1950 to 12/31/2010 (payroll, personnel, retirement)
 - Name, SSN, DOB
 - Gender, Race



Cancers Mortality Status

Assess Vital Status via

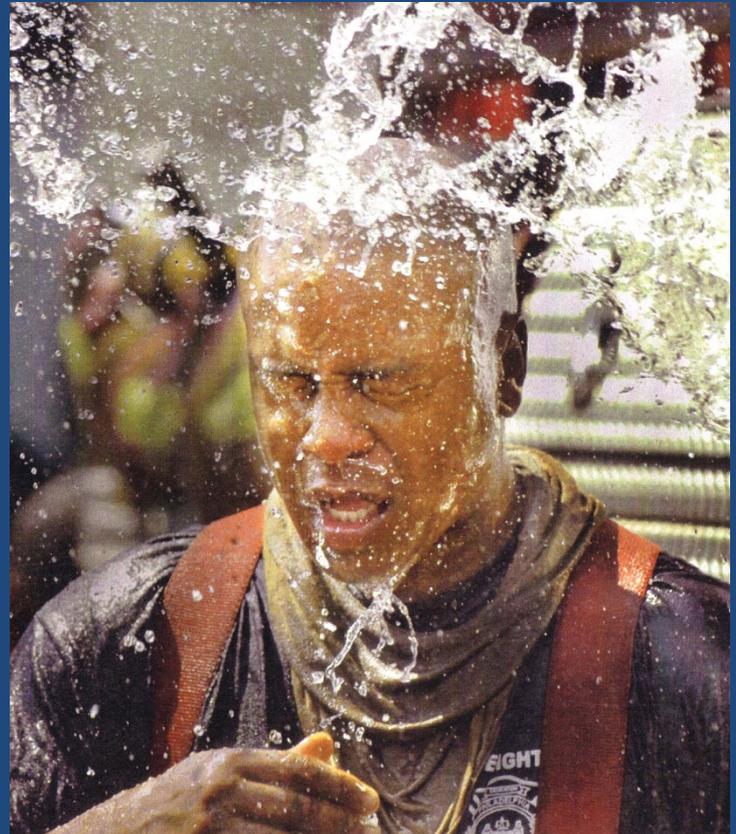
- National Death Index (NDI)
- SSA-Death Master file (SSA-MDF)
- Check with SSA “living” file
- IRS file
- Underlying and Contributing COD from NDI-Plus
- Deaths prior to 1979 match with individual State Death Certificates



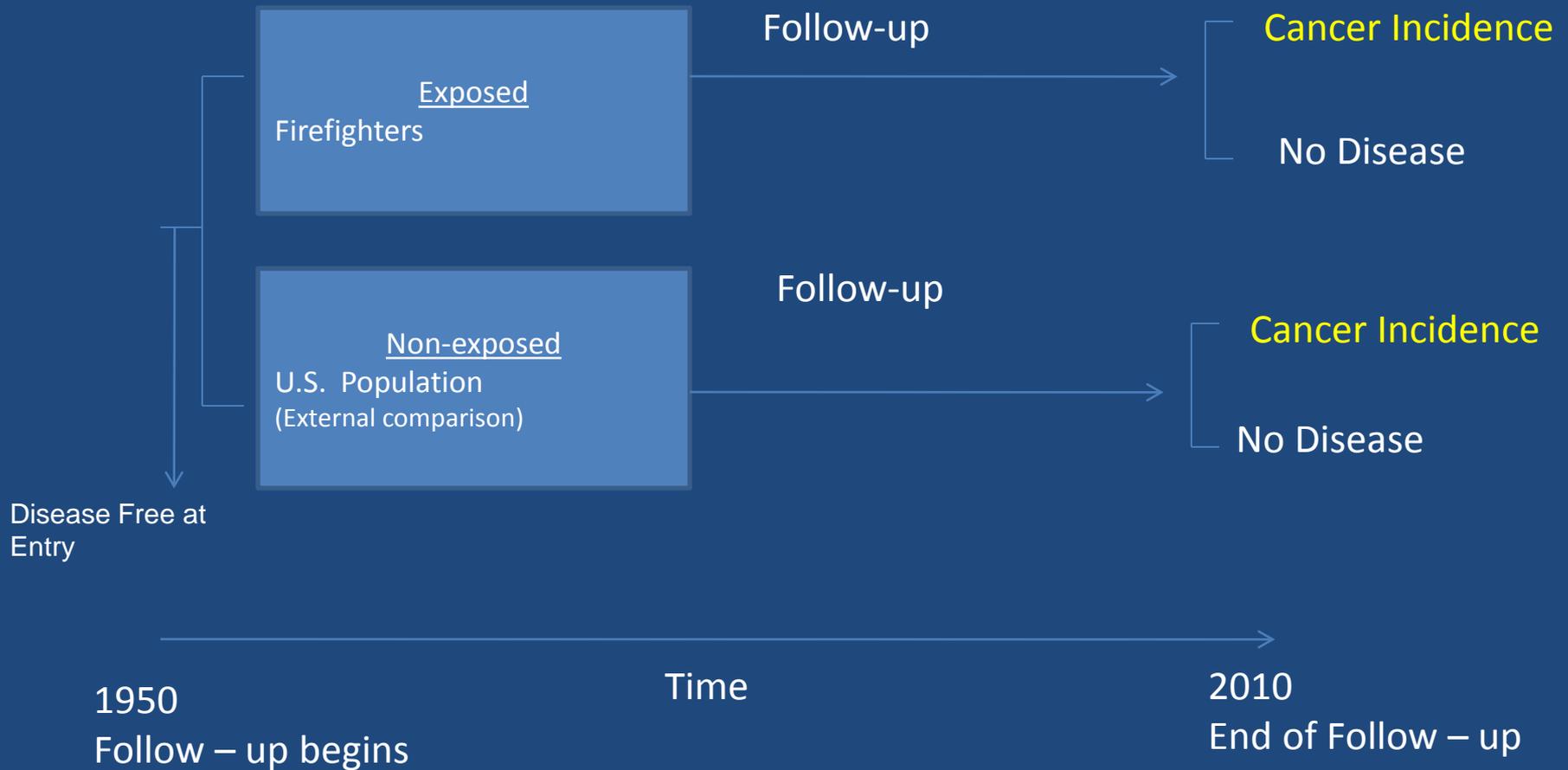
SMR Statistical Analysis

- Observed vs Expected
- Observed – NIOSH Study
- Expected – SEER data
 - Mortality = SMR
 - All cause, All CA, Specific CA

Using NIOSH LTAS-net



Historic Cohort Study Design: SIR



Cancer Incidence

- Match roster with individual State Tumor Registries

- SF



CA

- Chicago



IL

- Philly



PA

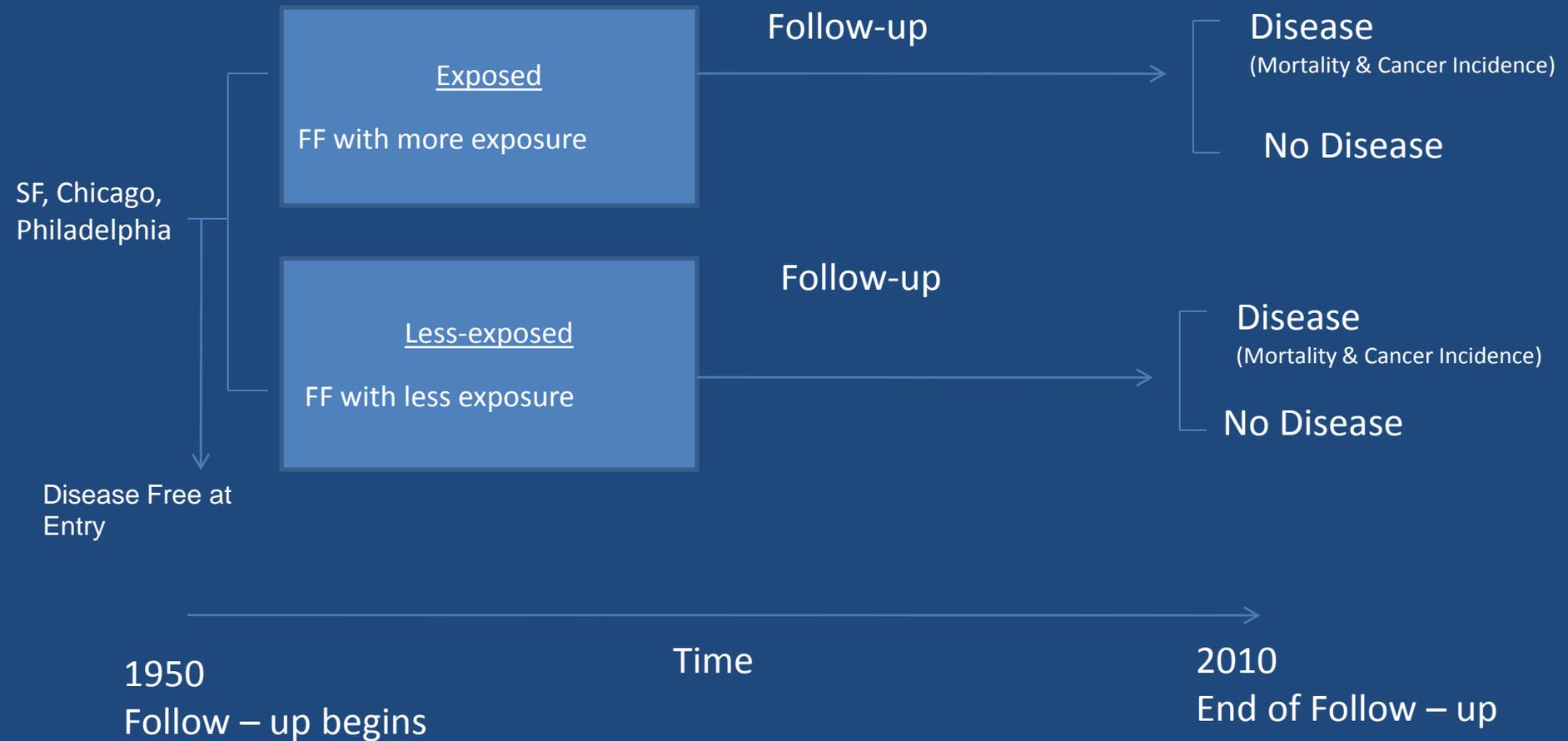
- Retirement States:

- AZ, WA, OR, NV, WI, MI, IN, NJ

- Same statistical analysis: O/E by NIOSH LTAS



How: Historic Cohort Design: **SRR**



Internal Comparison by Exposure

Duration of Employment

PPE use

Diesel exhaust containment

Runs: - total

- Fire

- 2nd alarm fire



SF FD Work Hx Card

| REPORTED | AGE | NATIVITY | OCCUPATION |
|---|-------|--------------|------------|
| July 5, 1927 | | | Machinist |
| ASSIGNMENTS, TRANSFERS, PROMOTIONS, ETC. | | RESIDENCE | |
| Appointed probationary member to take effect July 6, 1927 | | | |
| Assigned Hoseman Eng. 48, Aug. 15, 1927 | | | |
| Permanent Hoseman Eng. 48, Jan. 3, 1928 | | | |
| Trans. Hoseman Eng. 11, July 1, 1928 | | | |
| Trans. Hoseman Eng. 27, July 27, 1933 | | | |
| Trans. Driver, Eng. 27, Nov. 14, 1934 | | | |
| Trans. Driver, Chem. 7, 8/24/38 | | | |
| Apptd. temp. NCS Lieut., 90 d. fr. 4/2/47 | | | |
| Apptd. temp. NCS Lieut., 90 d. fr. 9/1/47 | | | |
| Apptd. prob. Lieutenant, eff. 9/25/47 | | | |
| Lieutenant, Engine Co. 6, 11/19/47 | | | |
| Apptd. perm. Lieutenant, eff. 3/25/48 | | | |
| Lieutenant Engine Co. 32 - 2/1/50 | | | |
| Lieutenant, ENG. Co. 13, eff. 8/1/63 | | | |
| NAME | Badge | ELIGIBLE NO. | FILE NO. |

Died

Assignment Date

Age

Date of Death

Job History; Assignments and Effective Dates

Name, Badge and File Number

| REPORTED | AGE | NATIVITY | OCCUPATION |
|---|-----|-----------|------------|
| ASSIGNMENTS, TRANSFERS, PROMOTIONS, ETC. | | RESIDENCE | |
| Lieutenant, Eng. Co. 32, eff. 8/1/63 (original assignment cancelled) | | | |
| RETIRED | | | |
| / EFF. SEPT. 12, 1966. | | | |

Retirement Date

Work History cards



Work History cards



SRR Statistical Analysis

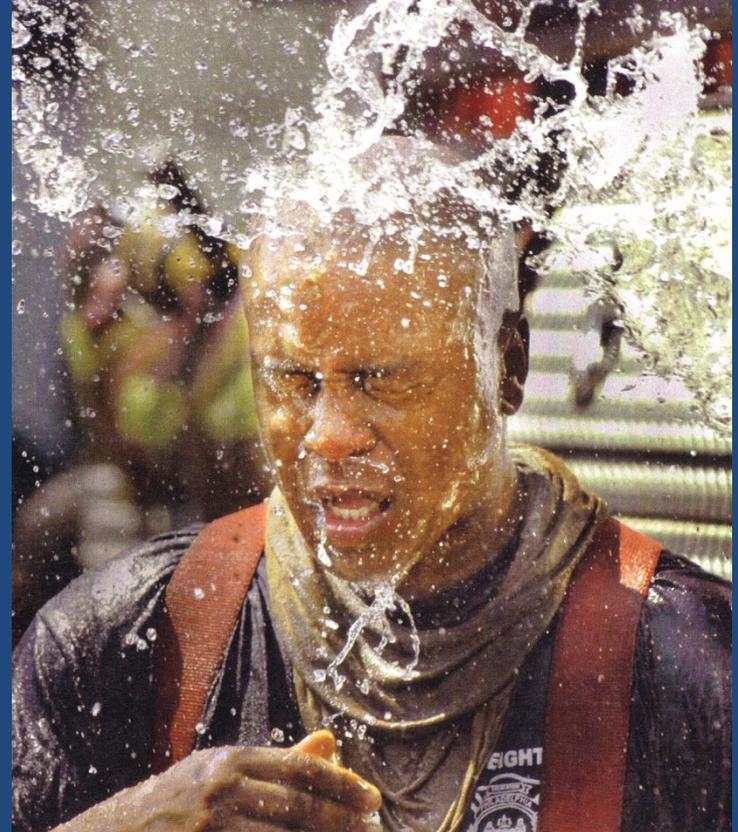
Observed in Exposed

- Mortality and Incidence

Observed in Less Exposed

- Mortality and Incidence

NIOSH LTAS-net



Progress

2010: Funded and 3 FD Selected

2011: Rosters Built (~30,000 FF)

- SF 5000; Philly 10,000; Chicago 15,000
- 95% Male, ~ 82% white

To NDI and States for COD
Work History cards scanned

2012 –

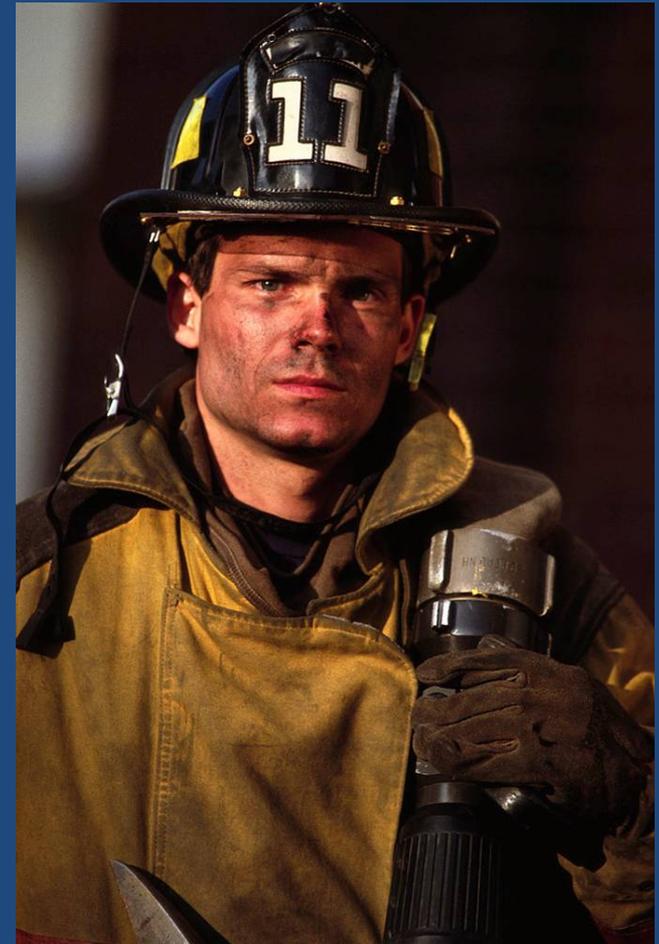
Deaths: 12,000 total, 3,200 cancer

Work Hx coded

2013 – SMR Analysis – Spring

SIR Analysis - Fall

SRR Analysis - Winter



Thank you

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