An Occupational Health Investigation of Cancers Among Fire Fighters in Anne Arundel County, Maryland

Jonathan Samet, MD, MS
Professor and Chair
Department of Epidemiology
Johns Hopkins University
Bloomberg School of Public Health

Supported by the Department of Health and Mental Hygiene, State of Maryland
Cancer Clusters

Definition:
“…greater than expected number of cancer cases that occurs within a group of people in a geographic area over a period of time.”

Identification:
Suspected when statistics show or people report that several family members, friends, neighbors, or coworkers, have been diagnosed with the same or related cancer(s).

(http://www.cdc.gov/nceh/clusters/default.htm)
Why clusters occur

• Common causes
  – Example: Asbestos, Vinyl Chloride

• Chance
  – Some clusters would be expected just by chance grouping.
Why concern for clusters of cancer in fire fighters?

Cancers can be caused by exposure to chemicals and toxic agents.

• Fire fighters, by the nature of their occupation, are exposed to chemical compounds generated by fires, which can include toxins and carcinogens.
  – Benzene
  – Carbon monoxide
  – PAHs
  – Particles
  – Plastics and combustion products
How researchers investigate clusters

• Gather information
  – How many cases and what types of cancer?
  – What is common about the cases?
  – What are the common exposures?

• Compare observed rates to expected rates from the same area

• Carry out more detailed studies:
  – Cohort studies or Case-control studies
How researchers find causes of cancer

• To find what might have caused the cancers, researchers will first ask fire fighters, particularly those with cancer, for more details about their past exposures.

• A follow-up study could be done if necessary

• Two main types of follow-up studies:
  – Cohort studies
    • Example: Follow a group of fire fighters for 10 years to see who develops brain cancer.
  – Case-control studies
    • Example: Ask fire fighters with brain cancer and controls without brain cancer about exposures.
Scope of Current Investigation

• Review published scientific studies
  – Search databases that contain peer-reviewed articles
  – Search Criteria
    • Cancer risk in fire fighters
    • Cancer risk associated with polychlorinated biphenyls (PCBs)
    • Brain cancer and occupation
  – Summarize findings in evidence tables and graphs.
Studies have shown fire fighters have higher mortality rates than the general population for certain conditions.

Example table of studies reporting risk estimates for cancers of the brain and nervous system

<table>
<thead>
<tr>
<th>Study</th>
<th>Population</th>
<th>Obs. # cases</th>
<th>Risk estimate</th>
<th>95% CI</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baris et al. 2001</td>
<td>7789 Philly FF employed b/w 1925-1986</td>
<td>Brain mortality= 8</td>
<td>SMR= 61</td>
<td>31-122</td>
<td>Relative to US white males</td>
</tr>
<tr>
<td>Grimes et al. 1991</td>
<td>205 male FF from Honolulu</td>
<td>Brain and other CNS= 3</td>
<td>Risk Ratio= 3.78</td>
<td>1.22-11.71</td>
<td>Relative to other males from Hawaii</td>
</tr>
<tr>
<td>Caucasian FF</td>
<td>Brain and other CNS= 2</td>
<td>Risk Ratio= 4.15</td>
<td>1.04-16.51</td>
<td>Relative to other males from Hawaii</td>
<td></td>
</tr>
<tr>
<td>Hawaiian FF</td>
<td>Brain and other CNS= 1</td>
<td>Risk Ratio= 3.60</td>
<td>0.49-26.46</td>
<td>Relative to other males from Hawaii</td>
<td></td>
</tr>
</tbody>
</table>
Current Investigation

• By pooling data, we can evaluate the data on increased mortality rates from multiple studies.

• Plots are created to graphically display individual studies and pooled data.
Pooled Data for Brain Cancer

Pooled estimate = 1.30 (CI: 1.10-1.51)
Pooled Data for Lung Cancer

Pooled estimate = 1.04 (CI: .99-1.09)
Current Investigation

• Gather information on cases
  – Speak with fire fighters and families to obtain information on past exposures and the development of cancer.

• Look at specific chemicals that the fire fighters were exposed to
  – Example: PCBs

Feasibility and need for follow-up investigations
Timeline of Cancer Cluster Investigation

- **7/04**: JHU contracted
- **8/04**: JHU meets with AAFD & Union Reps
- **10/04**: Town Hall Meeting
- **11/04**: Interviews with FF & families
- **12/04 - 3/05**: Analyze data and assess feasibility of more in depth investigation
- **3/05**: Final Report
  - JHU/MDHMH contract ends
Additional Information

- http://cis.nci.nih.gov/fact/3_58.htm
- http://www.cdc.gov/nceh/clusters/
- http://www.cdc.gov/niosh/topics/cancer/
Contact Information

Jonathan Samet, MD, MS
Professor and Chair, Department of Epidemiology
Johns Hopkins University Bloomberg School of Public Health
615 North Wolfe Street / Suite W6041
Baltimore, MD 21205
410-955-3286

Nrupen Bhavsar, MPH
Senior Research Assistant
Johns Hopkins University Bloomberg School of Public Health
615 North Wolfe Street / Suite W6033
Baltimore, MD 21205
410-614-4962