



CONTAMINATION CONTROL CAMPAIGN




## Interactive Research/Literature Database

Presenters:  
Jeffrey O. Stull, Int'l Personnel Protection, Inc.  
Casey C. Grant, Research Foundation

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## Literature and Sources

- Variety of publications address different aspects of contamination control
  - Short articles (e.g., trade publications)
  - Academic publications
  - Government and industry reports
- Sources
  - On line
  - Existing general databases (PubMed, Google Scholar)
  - For fee publications

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## Literature Database Questions

- LIT1** – Have you previously conducted an online literature search related to contamination or other fire service safety and health issues?
- LIT2** – Were your previous searches effective/helpful?
- New** – What methods or sources did you use?


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## Example 1 – Academic Article

- Key study that provided updated results of increased incidence of specific cancers associated with firefighting
- 10 pages
- Freely distributed online



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## Daniels et al. Key Findings

Table 2. Standardized mortality and morbidity ratios by firefighter for cancer incidence compared to results from a recent meta-analysis.


Standardized mortality ratio (SMR)	Standardized morbidity ratio (SMR)		95% CI	p-value	Reference	95% CI	p-value
	SMR	95% CI					
All cancer (1980-2009)	1.08	1.02-1.14	0.002	0.0001	1.08	1.02-1.14	0.002
Leukemia (1980-2009)	1.19	1.05-1.33	0.006	0.0001	1.19	1.05-1.33	0.006
Multiple myeloma (1980-2009)	1.30	1.05-1.55	0.009	0.0001	1.30	1.05-1.55	0.009
Non-Hodgkin lymphoma (1980-2009)	1.12	1.02-1.22	0.01	0.0001	1.12	1.02-1.22	0.01
Prostate cancer (1980-2009)	1.12	1.02-1.22	0.01	0.0001	1.12	1.02-1.22	0.01
Bladder cancer (1980-2009)	1.12	1.02-1.22	0.01	0.0001	1.12	1.02-1.22	0.01
Testicular cancer (1980-2009)	1.12	1.02-1.22	0.01	0.0001	1.12	1.02-1.22	0.01
Non-melanoma skin cancer (1980-2009)	1.12	1.02-1.22	0.01	0.0001	1.12	1.02-1.22	0.01
Melanoma (1980-2009)	1.12	1.02-1.22	0.01	0.0001	1.12	1.02-1.22	0.01
Myeloid leukemia (1980-2009)	1.12	1.02-1.22	0.01	0.0001	1.12	1.02-1.22	0.01
Lymphoid leukemia (1980-2009)	1.12	1.02-1.22	0.01	0.0001	1.12	1.02-1.22	0.01
Multiple myeloma (1980-2009)	1.12	1.02-1.22	0.01	0.0001	1.12	1.02-1.22	0.01
Non-Hodgkin lymphoma (1980-2009)	1.12	1.02-1.22	0.01	0.0001	1.12	1.02-1.22	0.01
Hodgkin lymphoma (1980-2009)	1.12	1.02-1.22	0.01	0.0001	1.12	1.02-1.22	0.01
Prostate cancer (1980-2009)	1.12	1.02-1.22	0.01	0.0001	1.12	1.02-1.22	0.01
Bladder cancer (1980-2009)	1.12	1.02-1.22	0.01	0.0001	1.12	1.02-1.22	0.01
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Melanoma (1980-2009)	1.12	1.02-1.22	0.01	0.0001	1.12	1.02-1.22	0.01

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### Example 2 – Research Report

- Project final report produced at conclusion of comprehensive study of firefighter smoke particulate study
  - Key findings associated with firefighter contamination
- 390 pages (incl. 132 pages of appendices)
- Free online report



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### Fabian et al. Glove Contamination

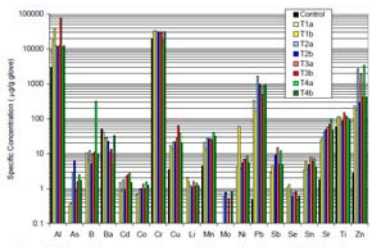


Figure 6-9: Toxic element concentrations measured in exposed and unexposed firefighter gloves.

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### Fabian et al. Glove Contamination

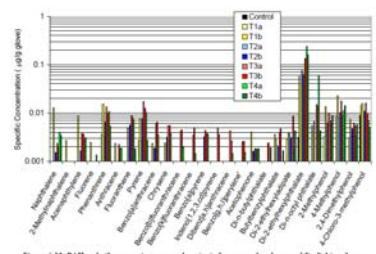



Figure 6-13: PAH and other organic compound content of unexposed and exposed firefighter gloves.

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### Example 3 – Government Report

- Special report on research undertaken to highlight specific safety and health concern by NIOSH
  - Showed elevated firefighter exposures to benzene/PAHs
- 90 pages
- Specific fire service recommendations
- Available on line through CDC/NIOSH




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### Fent et al. Key Takeaway

- RECOMMENDATION:** Study the effect of turnout hood designs and materials on dermal exposure and absorption of combustion products. The neck was the **only skin site** where we measured **elevated levels of PAHs** that were statistically significant (for round 1) and was also a possible site for dermal absorption of aromatic hydrocarbons (e.g., benzene). **Providing better protection to the neck could reduce dermal absorption of combustion products.**

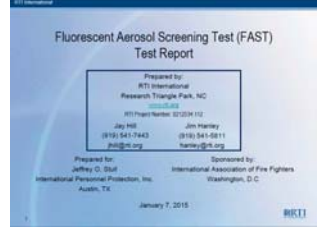


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### Example 4 – Unpublished Research

- IAFF study originally intended to support proposal effort
  - Visually showed contamination pathways through turnout gear
- Provided as PowerPoint slides



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### RTI Study Visualization

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### Example 5 - On Line Research

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### Kier et al. Methodology

Beginning of Shift	During fire Event	Post-fire
<ul style="list-style-type: none"> <li>Urine Sample</li> <li>Skin wipes</li> <li>PPE wipes</li> <li>Under gear wipes</li> </ul>	<ul style="list-style-type: none"> <li>Personal air sampling</li> </ul>	<ul style="list-style-type: none"> <li>18 hr integrated urine sample</li> <li>Skin wipes</li> <li>PPE wipes</li> <li>Under gear wipes</li> <li>Post fire-event questionnaire</li> </ul>

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### Example - Trade Publication

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### Literature Database Questions

- LIT3** – Do you think there is value in having an online literature and research database that focuses specifically on fire service contamination issues?
- LIT4** – Which groups or potential users do you think the literature and research database should be designed for?
- LIT5** – Do you think the database should be limited to research papers and formal reports?

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### Captured Literature Database

- Publications, reports, and articles specific to contamination control
- To be formatted as separate database allowing
  - Specific searches
  - Synopsized content
  - Categorization
  - Some level of review for inclusion

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#### Literature Database Concept

- Primary author
- Secondary authors
- Title
- Source
- Citation information
- DOI number (if applicable)
- Year of publication
- Principal category
- Related category 1
- Related category 2
- Key words
- Short abstract
- Flag for key document
- Other notes

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#### Homogenization of Abstracts

**Full Abstract**

There is a high incidence of cardiovascular disease and certain cancers in firefighters that may be related to their occupational exposure to hazardous substances. Exposure may result from contaminated personal protective gear, as well as from direct exposure of fire scenes. This study compares flame-retardant chemicals found on firefighter personal protective clothing to assess exposure of firefighters to these chemicals. Samples from used and unused firefighter protective clothing, including gloves, hoods and a coat wristlet, were extracted with methylene chloride and analyzed by EPA method 8270D Specific Ion Method (SIM) for polybrominated diphenyl ethers (PBDEs). Limit recovery. Analyses were done on the most common flame-retardant chemicals used in the US. Fifteen of the seventeen PBDEs for which analysis was performed were found on all local one-cooling assets. Every clothing sample, including an unused hood and all three layers of an issued glove, had a detectable concentration of at least one PBDE. These findings, along with previous research, suggest that firefighters are exposed to PBDEs. PBDEs are found widely dispersed in the environment and still furnishings. Firefighter exposure to flame retardants therefore merits further study. **{203 words}**

**Shortened Abstract**

The finding of polybrominated diphenyl ethers (PBDEs) on all samples from used and unused firefighter protective clothing that had been extracted with methylene chloride and analyzed by EPA method 8270D Specific Ion Method (SIM) suggests that firefighters' exposure to PBDE flame retardants is much higher than the general public and warrants further study. **{53 words}**

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#### Organization & Structure

Author	Secondary Authors	Title	Publication	Year	Volume/Pages	Category	Notes	Published Abstract
Aronson, KJ	Tomlinson, GA, Smith, L	<a href="#">Mortality Among Fire Fighters in Metropolitan Toronto</a>	American Journal of Industrial Medicine, Jul 1994	1994	26 (1):89-101	P	Fire fighters, Cancer, Heart diseases, Causes (Investigations), Fire departments, Fatalities	Firefighters are exposed to substances which are recognized or suspected causal agents in cancer or heart disease. The purpose of this study was to determine...
Austin, CC	Dassault, G; Ecobichon, DJ	<a href="#">Municipal firefighter exposure groups, time spent at fires and use of self-contained breathing apparatus</a>	American Journal of Industrial Medicine	2001	40/683-692	P	Self-contained breathing apparatus, Structure fires, Exposure to hazards, Fire fighters, Fire incidents, Fire fighting, Containers (HazMat)	Previous studies have found significant associations between firefighting and cancer. METHODS: Fires, vehicle accidents, and firefighter job assignment were determined, and storage and distribution of self...

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### CONTAMINATION CONTROL CAMPAIGN

#### Basic Information

Author	Secondary Authors	Title	Publication	Year	Volume/Pages
Aronson, KJ	Tomlinson, GA, Smith, L	<a href="#">Mortality Among Fire Fighters in Metropolitan Toronto</a>	American Journal of Industrial Medicine, Jul 1994	1994	26 (1):89-101
Austin, CC	Dassault, G; Ecobichon, DJ	<a href="#">Municipal firefighter exposure groups, time spent at fires and use of self-contained breathing apparatus</a>	American Journal of Industrial Medicine	2001	40/683-692

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#### Added Content

Category	Taxonomy Tagging	Notes	Published Abstract
P	Fire fighters, Cancer, Heart diseases, Causes (Investigations), Fire departments, Fatalities	A retrospective cohort study of 5,995 Toronto fire fighters from 1950 through 1989, showing that fire fighters have an increased risk for certain types of cancer and heart disease.	Fire fighters are exposed to substances which are recognized or suspected causal agents in cancer or heart disease. The purpose of this study was to determine...
P	Self-contained breathing apparatus, Structure fires, Exposure to hazards, Fire fighters, Fire incidents, Fire fighting, Containers (HazMat)	Study done with the Montreal FD and estimates the proportion of FD personnel actually exposed to smoke, time spent at scene of fires, the # of structural fires attended, # of SCBA cylinders used, and percentage of time spent at fires that respiratory protection is used.	BACKGROUND: Previous studies have found significant associations between firefighting and cancer. METHODS: Fires, vehicle accidents, and firefighter job assignment were determined, and storage and distribution of self...

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#### Categories

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Category	Taxonomy Tagging	Notes	Published Abstract
P	Fire fighters, Cancer, Heart diseases, Causes (Investigations), Fire departments, Fatalities	A retrospective cohort study of 5,995 Toronto fire fighters from 1950 through 1989, showing that fire fighters have an increased risk for certain types of cancer and heart disease.	Fire fighters are exposed to substances which are recognized or suspected causal agents in cancer or heart disease. The purpose of this study was to determine whether or not fire fighters experience increased risk for any specific cause of death. A retrospective cohort study was conducted, with 5,995 subjects recruited from all six fire departments within Metropolitan Toronto. The mortality experience of the cohort was ascertained through computerized record linkage and compared to that of the male Ontario population specific to cause, age, and calendar period from 1950 through 1989. Average duration of follow-up was 21 years, and there were 777 deaths among the 5,414 males included in the analysis, giving an all-cause standardized mortality ratio of 95 (95% confidence interval: 88-102). Three specific causes of death exhibit statistically significant excesses (brain tumors, "other" malignant neoplasms, and aortic aneurysms). There are also slight increases in risk for some other sites of cancer, and for various diseases of the respiratory, circulatory, and digestive systems. This study is consistent with others in demonstrating that fire fighters experience increased risk of death from cancer of the brain, and in suggesting increased risk for various other causes of death.
P	Fire fighters, Controllers (HazMat), Cancer, Fire fighting, Records	A review of records for all male cancers registered in California from 1988 to 2003 confirms certain earlier studies that indicate possible elevated cancer risks to	BACKGROUND: There is no consensus whether firefighters are at increased cancer risk for particular cancers. Previous studies have
TEP	Respirators, Carbon monoxide, Flammable gases, Respiratory	Evaluates presence of harmful airborne gases/ particles/ chemicals during overhaul, gives sampling methods for future data collection, reports	Previous studies have characterized firefighter exposures during fire suppression. However, minimal information is

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## Taxonomy and Tagging

Taxonomy: Way to categorize things, with Broader/Narrower "Is-A" or "Has-A" relationships.

Animals  
...Mammals  
...Deer  
...Non-typical trophy whitetail buck



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## Broadly, why do we need taxonomy and tagging?

- Shared meaning creates the ability to act purposefully towards a shared goal.
- Communication involves both sending & receiving messages
- ...but
- The same word can mean multiple things
  - Fire, Smoke, Code (noun/verb); Range (cooking / wildland)
- Multiple words can mean the same thing
  - Wildfire, Wild-fire, wild-land fire, brush fire → Wildland fire incident

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## What will Taxonomy Do?

- Will help improve internal site searches (nfpa.org)
- Pulls out more accurate relevant keywords (i.e. fire based, contamination based)

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Taxonomy Tagging	Notes	Published Abstract
Fire fighters, Cancer, Heart diseases, Causes (Investigations), Fire departments, Fatalities	A retrospective cohort study of 5,995 Toronto fire fighters from 1950 through 1989, showing that fire fighters have an increased risk for certain types of cancer and heart disease.	Fire fighters are exposed to substances which are recognized or suspected causal agents in cancer or heart disease. The purpose of this study was to determine whether or not fire fighters experience increased risk for any specific cause of death. A retrospective cohort study was conducted, with 5,995 subjects recruited from all six fire departments within Metropolitan Toronto. The mortality experience of the cohort was ascertained through computerized record linkage and compared to that of the male Ontario population specific to cause, age, and calendar period from 1950 through 1989. Average duration of follow-up was 21 years, and there were 777 deaths among the 5,414 males included in the analysis, giving an all-cause standardized mortality ratio of 95 (95% confidence interval: 88-102). Three specific causes of death exhibit statistically significant excesses (brain tumors, "other" malignant neoplasms, and aortic aneurysms). There are also slight increases in risk for some other sites of cancer, and for various diseases of the respiratory, circulatory, and digestive systems. This study is consistent with others in demonstrating that fire fighters experience increased risk of death from cancer of the brain, and in suggesting increased risk for various other causes of death.

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## Notes

Notes	Published Abstract
A retrospective cohort study of 5,995 Toronto fire fighters from 1950 through 1989, showing that fire fighters have an increased risk for certain types of cancer and heart disease.	Fire fighters are exposed to substances which are recognized or suspected causal agents in cancer or heart disease. The purpose of this study was to determine whether or not fire fighters experience increased risk for any specific cause of death. A retrospective cohort study was conducted, with 5,995 subjects recruited from all six fire departments within Metropolitan Toronto. The mortality experience of the cohort was ascertained through computerized record linkage and compared to that of the male Ontario population specific to cause, age, and calendar period from 1950 through 1989. Average duration of follow-up was 21 years, and there were 777 deaths among the 5,414 males included in the analysis, giving an all-cause standardized mortality ratio of 95 (95% confidence interval: 88-102). Three specific causes of death exhibit statistically significant excesses (brain tumors, "other" malignant neoplasms, and aortic aneurysms). There are also slight increases in risk for some other sites of cancer, and for various diseases of the respiratory, circulatory, and digestive systems. This study is consistent with others in demonstrating that fire fighters experience increased risk of death from cancer of the brain, and in suggesting increased risk for various other causes of death.

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### Database Maintenance

- The eventual goal is to have this database maintained and updated by the NFPA library
- New sources going in (monthly? quarterly? yearly?)
- Possible approaches for vetting literature or reports to be included

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### Literature Database Questions

- **LIT6** – What fields do you think need to be added to database to make it useful to you
- **LIT7** – If abstracts are written differently between publications, do you believe that an abbreviated version should be created for consistency among listed documents?
- **LIT8** – Does the fact that some full articles may require purchase affect the usefulness of the database?

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### Literature Database Questions

- **LIT9** – Should the database have a feature that allows people to contribute to the database or recommend documents to add to the database?
- **LIT10 – CHANGED** – Should a tutorial be provided for conducting a search?
- **LIT11** – Should the tutorial be available on the website and if so in what form?

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