LONDONASSEMBLY

November 2025

Fire Committee

This document contains the written evidence received by the Committee in response to its Call for Evidence, which formed part of its investigation into the risk of firefighters' exposure to contaminants and its impact on their health and wellbeing.

Calls for Evidence are open to anyone to respond to. In September 2025 the Committee published a number of questions related to its investigation, which can be found on page 2. The Call for Evidence was open from 17 September 2025 to 31 October 2025.

The Committee also wrote to London Fire Brigade (LFB) and the Health and Safety Executive (HSE) with additional specific questions relevant to those organisations.

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Questions asked by the Committee

1. How well understood are the health risks associated with exposure to contaminants (e.g., carcinogens, particulates, toxic gases) faced by firefighters during operational duties?
    a. What gaps remain in scientific knowledge or monitoring that affect risk assessment and management?
    b. Are there unique environmental, operational, or demographic factors in London that influence the nature or level of firefighters' exposure to contaminants compared to other parts of the UK?

2. What should be prioritised in assessing and reducing contaminant exposure risks specifically within LFB?
    a. What should LFB be doing to mitigate these risks?
    b. What support do individual firefighters need?
    c. What can individual firefighters do to reduce risks, and improve health outcomes?

3. What barriers are there to providing more effective control of contaminant exposure within the firefighting community in London?

4. Are there national or international examples that have demonstrably reduced firefighters' exposure to contaminants LFB could learn from?

5. How effective are LFB's current PPE standards, decontamination protocols, and post-incident procedures in mitigating exposure risks?

    a. How could it be improved?

6. What improvements or updates are needed in existing industry guidance, health and safety regulations, or national standards to better manage firefighter exposure risks?
    a. Should there be specific London requirements beyond UK-wide frameworks?

7. Are there any other issues, concerns, or recommendations regarding firefighter contaminant exposure that should be brought to the Committee's attention?

Simtrainer UK LTD/ Ref No. CON001

Submission to London Assembly
October 2025

Who Am I

John Lord
Managing Director Simtrainer UK ltd.
Based in Lancashire UK.

I am the MD of the company, training fire officers across the UK and Internationally. We are a SFJ Awards accredited centre and have worked with 75 airports and 28 fire and rescue services including LFB.

I served operationally as a fire fighter for 32 years 1979-2011 with Lancashire FRS and have now been involved with fire and rescue in all arenas including industrial for approaching 47 years.
I am a member of the Worshipful Company of Firefighters.

I have organised the 2 largest conferences exploring contaminants and cancer, of which LFB attended and been a key part of 5 seminars at other sites.

I have personally conducted to date 94 talks since March 2024directly to fire fighters and officers across the UK and as far away as other Seychelles and Singapore and driven a campaign of change across all sectors.

I have been to parliament twice this year and currently working with my MP to improve the use of SNOMED codes.

I have also conducted talks to senior management teams, Exec boards and am booked in for talks with Cumbria FRS, West Yorkshire FRS, Lancashire FRS, Devon and Somerset FRS, Royal Air Force.

I am a cancer survivor, 11 operations to date as is my wife, between us we have had 11 tumours so its lived experience I speak from, and this is my motive for my voluntary work in this field.

[Redacted personal information] of LFB is aware of who I am.

I submit the following statement and am, happy to talk to LFB in person should that be wished for.
My statement is based on 3 anonymous survey I have run, nearly 800 responses and the above talks directly to nearly 2000 firefighters.

These views are my own but reflect what I have heard directly in many discussions.

1. How well understood are the health risks associated with exposure to contaminants (e.g., carcinogens, particulates, toxic gases) faced by firefighters during operational duties?

a) What gaps remain in scientific knowledge or monitoring that affect risk assessment and management?

The Risks on contaminants are known but not well enough and more needs to be done, science in the UK supported better, we are a long way from where we need to be.

Your statement about IARC for example is incorrect as the meeting was in June 2022, not June 2023, that was when the report was published.

Most do not know the details, know nothing of the monographs and what was discussed, so they are doing contaminants without really know why, and that is right up to Chief Fire Officers.

Every single Dr or Professor of Toxicology I have met and worked with says and evidences the same points and I am connected to many in Europe and in the USA.

b) Are there unique environmental, operational, or demographic factors in London that influence nature or level of firefighters' exposure to contaminants compared to other parts of the UK?

No many areas of the UK including airports and industrial sites face the same risks, in fact areas with significant wildfire risk face additional exposures not to be found in LFB.

Risk assessment and reduction strategies.
It must be accepted we can only reduce, we cannot remove the risk, but training need not be reckless in its endeavours.

2. What should be prioritised in assessing and reducing contaminant exposure risks specifically within LFB?

a) **What should LFB be doing to mitigate these risks?**

b) **What support do individual firefighters need?**

They need professional prostate screening at age 40 for males, 30 for females for breast cancer and education of other cancer risks like bladder and testicular cancer.

All need Mental Health support if diagnosed and that needs to include Family and retired members.

c) **What can individual firefighters do to reduce risks, and improve health outcomes**

Follow the work the FBU did on DECON and in addition log exposures, most important is believe the science and medical facts and action their behaviours to that.

3. What barriers are there to providing more effective control of contaminant exposure within the firefighting community in London?

None that are any different to other parts of the country, all areas have varied amounts of calls and fires.

4. Are there national or international examples that have demonstrably reduced firefighters' exposure to contaminants LFB could learn from?

The airports I have worked with have all moved on substantially in their efforts and sadly, the NFCC and FBU are still in my mind working in silo, reach out, go and look and talk, see what is being done.

5. How effective are LFB's current PPE standards, decontamination protocols, and post-incident procedures in mitigating exposure risks?

a) **How could it be improved?**

6. What improvements or updates are needed in existing industry guidance, health and safety regulations, or national standards to better manage firefighter exposure risks?

National recognition of firefighter and other responder exposures and support by the NHS

a) **Should there be specific London requirements beyond UK-wide frameworks?**

In my opinion No, the whole of the UK needs to work to the same standards and levels, break out of any silo for the greater good, London does not lead the way, no one does yet.

7. Are there any other issues, concerns, or recommendations regarding firefighter contaminant exposure that should be brought to the Committee's attention?

I can list many issues that need to be improved.

Mental Health provision.

Personal logging of exposures with the correct detail collected and greater understanding of the risk and exposures of female firefighters.

True use and understanding of gas detection to support firefighter health and well-being on incidents

Well-funded, timely screening, this will support recruitment and retention and ultimately save the country a huge amount of money.

Costs for care at stage 1 discovery are some 6 times more at stage 4.

Support for all retired firefighters and the family of firefighters diagnosed.

Data collection of actual on station risk through air monitoring like Surrey FRS did with INBIOT systems

Use technology to make the workspace safer and ensure clothing meets internationally tested and certificated standards.

Fire station design needs to be improved to ensure cleaning provision matches the risk, we should have no staff taking ANY dirty clothes or kit home, exposing the family to risk.

Lastly, we must acknowledge the skills and mindset of our eminent toxicologist who are working within the UK.

I can be contacted on [redacted personal information] or via our website www.simtrainer.uk

Our previous surveys and nomination form for the 2026 invisible risk awards.
We launched the awards in 2025 to provide a conduit of sharing best practice.

Fire Rescue Victoria/ Ref. CON002

I am Assistant Chief Fire Officer Michael Tisbury currently the ACFO of Fire Rescue Victoria's Advocacy Department and have been an operational firefighter for 37 years.

In July 2020, Fire Rescue Victoria (FRV) was formed with professional career firefighters from the Country Fire Authority (CFA) and former Melbourne Metropolitan Fire Brigade (MFB). This presented FRV with the unique opportunity to create a contemporary fire service which meets the needs and expectations of the Victorian community. Victoria is a state in Australia. FRV's emergency response area is 4344 square kms and our average annual number of emergency response calls is 65,000. We have 85 fully crewed 24/7 fire stations and employ over 3600 firefighters.

FRV places the safety of their firefighters, staff and community as their highest priority. We work closely with all emergency sector partners to share our knowledge, experience and learnings.

The most important assets any fire service has are their firefighters. Firefighters forego both quality and quantity of life to serve their communities and it is incumbent on all fire services to provide the safest systems of work and support to their firefighters. An injured, sick or dead firefighter is no good to anyone.

FRV have implemented numerous firefighter health initiatives and safe work practices to make an inherently dangerous profession a safer one. This is not only a moral decision, it also makes financial sense in the long run as considerable financial resources are required to train a firefighter with all the extensive skill sets over the course of their career. Some of these initiatives include the implementation of the following:

- FRV Health Monitoring
- PFAS Blood Testing
- Cancer Screening
- Presumptive Legislation
- FRV DEBRiS on scene decon.
- Medical IMT
- FRV Safe reporting system
- PFAS Mitigation Initiatives
- Fire Station Design Guidelines
- Strict Hygiene procedures.
- Asbestos procedures
- Sufficient PPC and PPE
- Purpose built training academy
- Extensive training on safety culture
- Ongoing skills acquisition and maintenance training

Fire Rescue Victoria recognises that poly- and perfluoroalkyl substances (PFAS) is a key organisational risk and strategic priority and endorses the precautionary approach to PFAS, based on the increasing significant body of evidence demonstrating PFAS having adverse effects on health, due to PFAS contamination of groundwater, soil and human blood. High levels of PFAS compounds have been found in FRV firefighters.

FRV are industry leaders in the successful implementation of measurable PFAS remediation work. Many national and international Fire Agencies approach FRV requesting support and information on PFAS remediation processes and applied safe threshold limits.

This summary document outlines some of the key initiatives that the FRV PFAS Remediation team have done to address the impacts from PFAS.

What is PFAS

Per- and polyfluoroalkyl substances (PFAS) are a diverse group of compounds resistant to heat, water, and oil. PFAS are man-made substances that are:

1. *Extremely persistent environmental contaminants, that are mobile, bio accumulative and toxic*
2. *In the environment and are described as 'forever chemicals'. There are over 4,600 different types on PFAS and they have been used in hundreds of industrial applications and consumer products such as carpeting, apparel, upholstery, food paper wrappings, fire-fighting foams and metal coatings*

FRV previously used PFAS containing Aqueous film forming foams (AFFF) as firefighting foam, based on 3M's earlier recommendation of it being safe. The use of fluorinated (PFAS) firefighting foam accounts for about a third of the total global PFAS production [1].
Firefighters have been exposed to a number of chemicals during the course of their training and emergency response. There is an increasing body of evidence demonstrating PFAS having adverse effects on health.

FRV PFAS Remediation initiatives

Below are some of the key FRV PFAS Remediation initiatives.

1. **FRV PFAS Remediation Team**

FRV established a dedicated PFAS Project Team, that address' PFAS remediation.

2. **FRV's setting of safe PFAS Threshold Exposure Limits**

1 THE GLOBAL PFAS PROBLEM: FLUORINE-FREE ALTERNATIVES AS SOLUTIONS FIREFIGHTING FOAMS AND OTHER SOURCES — GOING FLUORINE-FREE IPEN Expert Panel Stockholm Convention 9th Conference of the Parties (COP9) April-May 2019 (page 10) https://ipen.org/sites/default/files/documents/the_global_pfas_problem-v1_5_final_18_april.pdf

FRV have formally endorsed drinking water guidelines specifying the acceptable level of the combined concentrations of PFOS and PFHxS at 70ppt (parts per trillion), plus PFOA at 70ppt at its VEMTC facility to ensure safe systems of work for VEMTC attendees.
This occurred after independent National Association of Testing Authorities (NATA) accredited testing confirmed the contamination results. Safe PFAS Threshold Exposure Limits were established for both firefighting water as well as firefighting training water. These thresholds were established after rigorous, peer reviewed, and independent analysis of human health risk assessments. These threshold limits were further validated by independent analysis from Dr Roger Klein (Cambridge, UK) and Nigel Holmes (Queensland Department of Environment & Heritage).

The process involved subject matter experts from the (United Firefighters Union Australia (UFUA), FRV, CFA, GHD environmental scientists, EPA Victoria and WorkSafe Victoria. All parties have endorsed the document.

3. **FRV 'Operational Use of Firefighting Foam Policy'**

FRV acknowledge there is no Victorian State Government or Federal legislation banning or restricting the use of PFAS containing firefighting foam, despite Australia being a signatory to the United Nations Stockholm Convention. However, to mitigate against the further contamination of sites, FRV has released its policy around the use of Non FRV approved foam concentrate in its appliances.
In 2007, the FRV made a decision to replace existing firefighting foam with fluorine free firefighting foam. This decision was due to the concerns over firefighter health and environmental issues. FRV then phased out the use of persistent PFAS containing firefighting foams across their operations.
During 2011, based on independent scientific studies into PFAS, that identified links to various cancers and other health concerns, FRV extensively trialled and evaluated various fluorine free firefighting foam in hot fire, flammable liquid, B Class fire scenarios.
FRV found that the fluorine free foam consistently performed well in extinguishing B Class fires and provided FRV firefighters with a proven 'safer' alternative extinguishing medium, to utilise in emergencies on any sites requiring the use of B Class firefighting foam.
This work provided FRV with an operational firefighting foam solution that could be effectively used on all flammable liquid fires. This enables FRV to meet its obligations for the delivery of emergency response capabilities to the Victorian community utilising firefighting foam that does not contain PFAS.
By 2014, all FRV firefighting appliances had been converted to only carry fluorine free B Class foam in their foam tanks.
This policy is titled the 'Operational Use of Firefighting Foam Policy',(See attached Schedule 1).
This policy was also formally endorsed by the Victorian Environmental Protection Authority (Vic EPA), the Victorian WorkSafe and the Victorian Country Fire Authority (CFA).

FRV consider this necessary for the protection of emergency responders, industry and community members and the environment.
Furthermore, FRV also developed and endorsed the following FRV Fire Safety Guidelines; "GL-11 Foam-Water Fire Protection Systems and Foam Concentrate Storage Provisions" (See attached Schedule 2), and "GL-12 Considerations for Fire Water Run-Off at Dangerous Goods Sites" (See attached Schedule 3), that outline some of MFB's expectations regarding foam and firewater run-off.
2017 test results about Large Atmospheric Storage Tank Fires (LASTFIRE) Foam Summit conference held in conjunction with an International Industrial Fire Chiefs Conference, confirmed that fluorine free B Class foam is just as effective as a firefighting medium for B Class fires, without the inherent long-term health and environmental risks.
Refer: http://www.lastfire.co.uk/refmatpapers.aspx?id=12

4. **FRV Appliance PFAS Decontamination processes**

Following on from the establishment of the safe fire appliance PFAS thresholds, FRV embarked on a process to test and decontaminate the FRV firefighting appliance fleet. FRV arranged for the testing of FRV's firefighting appliance fleet, which identified that the majority of the fleet were still heavily contaminated with PFAS, due to persistent residues from the previous foam concentrates. FRV have then gone on to develop a successful process to 'decontaminate' its appliances of PFAS.
The appliance PFAS decontamination process is overseen by independent environmental consulting firms, in additional to being peer reviewed. As of August 2020, all FRV appliances and over 350kms of firefighting hose have been decontaminated to below the accepted PFAS thresholds and returned back into commission for operational use.

5. **FRV Health Monitoring.**

FRV's comprehensive health monitoring program has been purposely designed for early detection of health impacts specific to firefighter work-related risks and exposures. Firefighter Health Monitoring includes a range of screening tests and development of a clinical management plan which includes referrals to the firefighter's Doctor. The range and depth of assessments have been developed to offer a more comprehensive screening for firefighters than a standard medical consultation. Included in the health monitoring program, which can be accessed every 12 months are the following:

- Medical and occupational history questionnaire.
- Pathology screens and monitoring-FBE,UECs,LFTs,Lipids,HbA1c,Hep B serology, Hep C Serology, HIV serology, MMR serology, VZV serology, PFAS Blood Testing.
- Radiology tests and monitoring-Imaging :Xray Chest.
- Visual Accuity and colour perception, Spirometry, Pure Tone Audiometry, ECG, Urine dipstick.

- Body anthropometrics-Ht, Wt, WC
- Vitals-BP, HR, RR, O2 Sats
- Skin cancer risk rating using Fitzpatrick Scale
- Evaluation of results, medical assessment, creation of clinical management plan.

This program is voluntary and is designed to support and improve firefighter health outcomes and is not punitive.

6. **FRV's testing of PFAS levels of FRV operational firefighters and mechanical workshops staff**

FRV implemented key recommendations from the Fiskville Inquiry relating to blood testing for fire fighters. This has included:

- Testing of PFAS levels of FRV operational firefighters and mechanical workshops staff. This includes ongoing provision of health monitoring and services available through FRV's Employee Support Program, and
- Commissioned a comprehensive PFAS Clinical Research on FRV Fire Fighter Blood Study, with Macquarie University (Faculty of Medicine & Health Sciences), to undertake a study considering the impact and reduction of PFAS levels in the blood of FRV Fire Fighters.

In 2016 FRV have offered voluntary PFAS blood testing for FRV employees. Since blood screening began over 640 FRV employees have been tested. FRV have determined that early blood testing provides.

- Early identification
- Early monitoring
- Early intervention
- Early recovery

The screening has indicated that FRV employees have, on average, significantly higher PFAS readings in blood serum than the average Australian population. The results also confirmed that this exposure to PFAS is most likely due being employed by the FRV.
As part of FRV's Employee Health and Wellbeing programs, FRV's voluntary employee blood testing provides for increased employee physical, mental and emotional health.

7. **FRV Safety Cell. DEBRiS and Medical Incident Management Team**

FRV have developed an on-scene appliance, firefighter and equipment decontamination process that is scalable depending on the size of the incident. This includes the establishment of a Medical Incident Management Team (MIMT) that deals with the health risks of on scene firefighter and conduct immediate medical advice to the Incident Controller.
The advice is based on chemical analysis of smoke, fire water runoff and potential exposures taken by FRV's Hazmat Technicians and Scientific Officers. This allows real time referrals for pathological screening to take within a 24 hour period.

8. **FRV Safe**

FRV Safe is a computer database that all FRV can access to report any workplace injury, exposure or near miss. This data is confidentially stored on personal files and is accessible by individuals involved. Reports are generated and distributed to responsible managers and health and safety representatives for investigation and action if required. This reporting system assists in FRV identifying any trends and areas for improvement, and also acts an historical record database.

9. **Protective Personal Clothing and Equipment, allocation and decontamination procedures.**

FRV firefighters on successful completion of the Recruit Course are issued with 3 full sets of Structural Turn out gear, 2 sets of Wildfire Gear and 2 sets of specialist overalls, to enable protection for emergency response. There is also pool gear available 24/7 if allocated PPC is unavailable due to contamination. After every fire, firefighters are expected to complete on scene decontamination and upon return to their fire station, the dirty PPC is to be sent for specialist dry cleaning by external contractors. The fire appliance is placed out of commission until all firefighters have replaced dirty PPC and redressed the appliance.

10. **Macquarie University / FRV Firefighter PFAS Blood/Plasma Research Study.**

In 2019 FRV partnered with the Macquarie University, Faculty of Medicine to conduct research considering:

- Does regular blood and/or plasma donation reduce PFAS levels in the blood of firefighters?

This research study has around 285 FRV current and former firefighters in a randomized interventional study to compare a number of intervention groups blood/plasma donation and a control group where there was no intervention. The outcome of the study is to identified a relationship between the interventions and reduced levels of PFAS after 16 months (baseline +12 months intervention period).

Macquarie University provided the clinical coordination of the study, clinical and academic expertise, statistical analysis and report and manuscript for publication in a peer reviewed journal, the FRV PFAS Remediation Team is heavily engaged providing both expert advice, issue resolution, worksite liaison, and project management oversight. Please see below link for published results:

https://protect-au.mimecast.com/s/2UbHCzv3mzHQ0Q1T40jVT?domain=jamanetwork.com

11. **Victorian Emergency Management Training Complex (VEMTC)**

The Fiskville Inquiry findings have accelerated FRV's PFAS mitigation work. Particularly around the construction, use and monitoring of the VEMTC facility.

The Victorian Emergency Management Training Complex (VEMTC) is a 19 hectare, $109 million, world-class training facility. This facility provides training not only for FRV (previously MFB) firefighters, but also for thousands of emergency services personnel from the CFA, Victoria Police, Ambulance Victoria, DELWP and the State Emergency Service (SES). The facility

incorporates state-of-the-art realistic emergency scenarios tailored to Melbourne's unique urban landscape, including laneways, rail tunnels residential and high-rise structures.

This is all serviced by a reticulated ring main, supplied by a recycled potable water treatment plant. In the advent of PFAS detection this potable water treatment plant, is isolated and the water supply reverts to the town's main supply. Additionally, there is a petrol chemical prop at this facility and it is the only area where foam training occurs. This is serviced by a separate water treatment plant where the water is not reused, but after treatment, diverted to trade waste. FRV's PFAS mitigation work around VEMTC included researching and setting PFAS threshold limits in conjunction with the Victorian Environmental Protection Authority (Vic EPA), the CFA and the Victorian WorkSafe.

12. **PFAS testing (fruit/vegetable/soil/water), and site remediation at selected FRV Fire Stations**

FRV have engaged a range of expert independent environmental consultants and accredited laboratory testing providers to measure PFAS levels in fruit, vegetables and soil at all FRV fire stations.
These preliminary test results guide any further testing and site remediation at each FRV Fire Station.
This has now resulted in a 'Risk Ranking Priority Report' for all FRV Fire Stations which prioritises station remediation and identified the order in which remediation will proceed.

13. **PFAS testing (fruit/vegetable/soil/water), and site remediation at selected neighbouring properties of some FRV Fire Stations**

Where required, FRV engage a range of expert independent environmental consultants and accredited laboratory testing providers to measure PFAS levels in fruit, vegetables and soil at selected neighbouring properties.
These preliminary test results guide any further testing and site remediation at applicable neighbouring properties.

14. **FRV Firefighting PPC PFAS Testing**

FRV have engaged independent accredited laboratory testing provider to measure PFAS levels in current and proposed FRV moisture barriers and external linings of firefighting PPE. Furthermore, comprehensive testing is being done to verify preliminary test results. The results of this testing of current and former structural firefighting gear confirms the presence of PFAS, however further studies are being developed to determine leachability, exposure pathways, dermal absorption and risk levels in an operational scenario. Currently FRV have partnered Associate Professor Luana Main from Deakin University to determine the scope of the study required to assess the above.

15. **FRV Fire Station Dust Safe Initiative**

FRV engaged Macquarie University to measure and report on PFAS, diesel particulates and asbestos levels in dust from FRV fire stations and compare this to dust in the average Melbourne household.

16. **PFAS Advocacy**

Part of FRV PFAS Remediation Team's work includes providing advocacy, executive briefs, submission writing and representations to Federal and State Governments as well as sharing experiences and expertise in PFAS mitigation and strategies with international fire services, defence forces and forums. Some of these engagements include;

- ACT Fire Rescue Service – Advice on using of the FRV appliance decontamination processes for the ACT FRS appliances;
- South Australia Metropolitan Fire Service – Advice and review on SAMFS fire station PFAS contamination issues;
- Royal Canadian Air Force – Advice on FRV appliance decontamination processes.
- UK Government – FRV PFAS Blood Reduction Study now implemented in the Jersey Islands
- The Artic Council - Advice on FRV PFAS mitigation initiatives
- The Finland Government - Advice on FRV PFAS mitigation initiatives
- Israel Government and Department of Defence - Advice on FRV PFAS mitigation initiatives
- New Zealand EPA - Advice on FRV PFAS mitigation initiatives
- Advice & Presentations to Doctor Lori Moore, US Fire Administrator in US Dept of Homeland Security
- New Zealand Fire & Rescue Service – Advice on FRV PFAS mitigation initiatives.
- Tasmanian Fire Rescue Service – The use of the FRV appliance PFAS decontamination processes for Tasmanian appliances
- NSW Fire & Rescue Service – Advise and review of the NSW Fire & Rescue Fire Fighting Foam Policy.
- Submission to the Federal Department of Health's Expert Panel for PFAS.
- The Joint Standing Committee on Foreign Affairs, Defence and Trades (Committee), Inquiry into the management of per- and polyfluoroalkyl substances (PFAS) contamination in and around Defence bases.
- Developed proposals relating to Firefighter Health Study to address the Fiskville Inquiry recommendations,
- Developed draft 'Operational Use of Firefighting Foam Policy' in consultation with the Country Fire Authority, Victorian EPA and WorkSafe Victoria,
- Proposed Victoria PFAS Taskforce (Draft Ministerial paper)
- Proposed Victoria Government litigation against PFAS manufactures
- United Nations Stockholm Convention Persistent Organic Pollutants (COP9) – Firefighter PFAS exposure presentations2, (Geneva 29 April – 10 May 2019).

[2] https://vimeo.com/333226212

- IPEN White Paper, 'The Global PFAS Problem: Fluorine-Free Alternatives as Solutions', UN Stockholm Convention Persistent Organic Pollutants (COP9) (Geneva 29 April – 10 May 2019) 3.
- UN Stockholm Convention Persistent Organic Pollutants Review Committee (Rome October 2019).
- IPEN White Paper, 'Continuing Environmental Contamination with PFAS', 'The Case for No Exemptions or Acceptable Uses'. 14th Stockholm Convention Persistent Organic Pollutants Review Committee (Rome October 2019). 4
- IPEN F3 Panel, 9th Stockholm Convention of the Parties (COP9): 'A Doubtful Future for Short-Chain PFAS' white paper.
- IAFF Redmond's Symposium (Nashville USA, August 2019)
- European Chemicals Agency ('ECHA') PFASs in firefighting foams assessment research paper.
- AFAC 2019 Conference (Melbourne August 2019)
- UN Stockholm Convention Persistent Organic Pollutants Review Committee (Rome, May 2022)
- International Firefighters Cancer Symposium (Miami USA, February 2023)
- UN Stockholm Convention (Geneva, May 2023)
- IAFF Redmond's Symposium (New York USA, August 2023)
- Fire Rescue Victoria PFAS Information Seminars (USA, June 2024
- UN Stockholm Convention Persistent Organic Pollutants Review Committee (Rome, September 2024)
- Fire Rescue Victoria Submission the Senate Select Committee on PFAS, November 2024

Why is the FRV implementing measurable PFAS remediation initiatives?

FRV recognise PFAS as a key organisational risk and strategic priority and endorse the precautionary approach. Below are some of the reasons why FRV do this work.

Background

17. **PFAS adverse health impacts**

FRV endorse the precautionary principal approach to PFAS, based on the increasing body of evidence that demonstrates PFAS has adverse effects on health, due to PFAS contamination of groundwater, soil and human blood.

Supporting evidence and positions includes.

- The Stockholm Convention ratification of a range of PFAS as a Persistent Organic Pollutant (2001, 2017, 2019, 2022, 2023) 5;
- The United States Environment Protection Authority (US EPA), listing of PFOA and PFOS as chemicals known to cause reproductive toxicity. In 2000 the US EPA notified the Australian Government about PFOS being a "persistent, bio accumulative and toxic

[3] https://ipen.org/documents/global-pfas-problem-fluorine-free-alternatives-solutions
[4] https://ipen.org/sites/default/files/documents/the_global_pfas_problem-v1_5_final_18_april.pdf
[5] For the text of the Convention, see http://chm.pops.int/TheConvention/Overview/TextoftheConvention/tabid/2232/Default.aspx

chemical". The US EPA advised that 3M (the US manufacturer of PFOS) supplied it with data which indicated that PFOS chemicals are "very persistent in the environment, have a strong tendency to accumulate in human and animal tissues and, based on recent information, could potentially pose a risk to human health and the environment over the long term." PFOS "appears to combine Persistence, Bioaccumulation and Toxicity properties to an extraordinary degree."

- The European Union banning PFOS since 2011 and committing to the disposal of the existing stock by high temperature incineration,
- The Madrid Statement: This is a statement of widespread scientific consensus regarding the persistence and potential for harm of PFASs, and that lays out a roadmap to gather needed information and prevent further harm. http://greensciencepolicy.org/
- 3M's (PFAS manufacturer), research that concluded there is a "probable link" from PFAS exposure to six disease categories, (high cholesterol, ulcerative colitis, thyroid disease, testicular cancer, kidney cancer, and pregnancy induced hypertension). And that 3M acknowledged that "probable link" means "more likely than not".

18. **Fiskville Inquiry**

In 2015, the Victorian Parliament established a parliamentary inquiry into the Victorian Country Fire Authority (CFA), fire training ground at Fiskville. The inquiry was established as a result of media reports and concerns amongst firefighters about a cancer cluster and other health related concerns regarding trainees and staff who had attended the Fiskville facility.

High levels of PFAS contamination were a major consideration in CFA's decision to permanently shut down the Fiskville training ground.

The Fiskville Inquiry found that the CFA had known about the possible health risks of PFAS at Fiskville since the 1990's. Furthermore, the Inquiry found that regulators in Victoria have demonstrated poor governance by consulting with a narrow group of experts and relying on the opinion of experts commissioned by the polluter. As of September 2024, there is still no legislation in Victoria or Fedually restricting the use of PFAS containing firefighting foam, despite the United Nations Stockholm Convention enacting legislation in 2017.

The findings and recommendations outlined in both the interim and final Fiskville reports, prompted FRV to provide PFAS blood tests to all FRV operational firefighters as well as mechanical workshops staff.

19. **2018 PFAS National Environmental Management Plan**

FRV concur with the emphasis in the 2018 PFAS National Environmental Management Plan, that was designed to achieve a clear, effective coherent and nationally consistent approach to the environmental regulation of PFAS.

FRV recognise the important role of Australia's health-based guidance on PFAS and the requirement ongoing research to better understand the human health effects. Since these chemicals remain in humans and the environment for many years, it is recommended that as a precaution, human exposure to PFAS be minimised.
This verifies FRV's "As Low As Reasonable Practical" (ALARP) / precautionary principle in the development of policy and procedures, as being most appropriate.
https://www.epa.vic.gov.au/your-environment/land-and-groundwater/pfas-in-victoria/pfas-national-environmental-management-plan.

20. **Awards and Recognition**

- Australian Fire Services Medal (AFSM) 2019 – ACFO Michael Tisbury
- MFB Board Citation of Service 2020 – ACFO Michael Tisbury
- Premier's Sustainability Awards 2022 (Victorian)
    - Health & Fair Society – Industry Leader
- 34th Annual National Banksia Sustainability Awards (2023)
    - Health and Well Being Award
- ACFO Michael Tisbury was nominated as a Victorian finalist for the Australian of the Year Award 2024.

Professor Andrew Watterson and Professor Rory O'Neill / Ref No. CON003

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and
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We have been investigating occupational health and safety issues for many years, including firefighter health and safety. We have worked on a range of national and international occupational health studies including cancer epidemiology studies, the role of primary care and regulators in occupational health, and risk assessments in the UK fire services. These studies and projects have been funded by agencies including United Nation's bodies the World Health Organisation (WHO) and the International Labour Organisation (ILO). We have published widely on these topics in peer reviewed journals including the BMJ, Lancet, Occupational & Environmental Medicine, Journal of Epidemiology and Community Health, Environmental Health, Toxicology Letters and Annals of New York Academy of Sciences. We also have extensive past experience of collecting occupational health data in primary care settings in England linked to under-reporting of occupational diseases and examining barriers that GPs face in recognising and dealing with occupational disease cases.

We welcome the decision of the London Assembly to investigate firefighter exposures and health effects with a view to making recommendations on screening and related matters. We wish to submit the following observations regarding these topics.

Assessing firefighter risks can identify exposure to known harmful substances; it can enhance health and medical surveillance for known or suspected health effects and enable early treatment; and it can identify new, emerging or neglected risks by correlating exposures with patterns of sickness absence and ill-health. A holistic approach is needed, drawing on a range of scientific disciplines capable of identifying biological mechanisms of action of substances and processes and their effects; toxicology, chemistry, exposure assessments through occupational hygiene studies, and epidemiology. The limits and dangers of epidemiology alone being used to recognise occupational diseases needs to be factored into disease prescription policy and disease compensation. Epidemiologists themselves recognise their limits.

There is a clear need for vigilance. Firefighters are exposed to predictable and novel substances, depending on the nature of the fire and the substances involved. The impact of firefighter exposures requires active surveillance, both for the expected and the unexpected. UNEP warned about the potential adverse health consequences of a dramatic escalation in chemical

production (UNEP 2019) with as a consequence more, more varied and more complex exposures for firefighters. To address these risks, comprehensive surveillance with a preventive focus is required. Some jurisdictions have looked to novel methods to determine risks to firefighters, including silicone bracelets to determine exposures to organic chemicals including fire retardants (Santiago et al 2018). The broadest range of available tools should be considered to better establish exposures and their consequences.

Summary

The UK occupational disease surveillance and recognition system currently fails firefighters because the approach is premised on reducing liability and expense instead of on prevention. A range of occupational diseases including cancers (see Appendix) in firefighters across the world have been identified but not recognised within the UK's prescription system. There are several reasons why this is the case. One important factor is a lack of health surveillance and screening. The diseases identified internationally include communicable and non-communicable diseases such as infections, heart and lung disease and cancers associated with exposures as a firefighter (IAFF nd). Respected UN bodies, particularly WHO's International Agency for Research on Cancer, after much research, have also recognised occupational exposure of firefighters should be classified as 'carcinogenic to humans' (Group 1). In North America, Australia and in parts of Europe, such as Poland and Denmark, this evidence has been accepted by governments as sufficient for occupational disease compensation claims to be allowed for firefighters with several types of cancer.

The UK government's advisors on industrial injuries and industrial diseases have resisted such recognition They often use an arbitrary and inappropriate 'balance of probabilities' approach to firefighters' occupational diseases based on a 'doubling of risk' criterion. This creates an unreasonably high bar which necessarily excludes many legitimate, work-related cases. IARC Group 1 carcinogen listings, for example, occur in cases that have significant increases but not a doubling of risk .

The 'double the risk' approach has many flaws, not least that a slight increase in a common cancer in a large exposure group can equate to large numbers affected and denied support. This is recognised by IARC which notes cancer hazards classified in the same group can present widely different cancer risks but they are still carcinogens. In contrast IIAC's firefighter reports for example state "'reasonable confidence' is interpreted as being based on the balance of probabilities" . " [IIAC] Council thus looks for evidence that the risk of developing the disease associated with a particular occupational exposure or circumstance is more than doubled (previous reports of the Council explain why this threshold was chosen)." (IIAC 2021 Position Paper 47)

Hence an arbitrary cut off of 'double the risk' is a cost-benefit and cost reduction tool and not a health- or risk-based assessment (vide Trotman 2023). The approach is inappropriate in health surveillance as it is not balanced in favour of identification of potential risks and

resultant preventive action, which should be the purpose of health surveillance. Further by design it fails to recognise emerging risks. The primary purpose of a 'double the relative risk' threshold is not to identify risks but to reduce associated costs. 'Double the risk' is not just a high threshold, but a corrupted threshold influenced by factors including assumptions about fairness and good science that are not fair or scientific at all (O'Neill 2015).
For lawyers, a 'doubling of risk' approach may not be about genuine evidence of risk, but about whether the risk in a case is so unlikely to be chance that it should be compensated. It is a cost-benefit cut off for liability, not causation (Goldberg 2022). In health surveillance and prevention, the calculation is not so cost based. If 50 per cent more people get cancer than expected, that is indicative of a risk to be addressed, even if any individual case couldn't conclusively be proven to be caused by the exposure.

The LFB therefore needs to abandon this sometimes flawed approach - when looking at and investigating possible occupational disease in their firefighters - on legal, scientific and social justice grounds and recognise and schedule many more occupational cancers caused by firefighting in line with the international literature. Changes should additionally include adopting appropriate, dedicated and focussed health surveillance and monitoring schemes to collect relevant data and draw on any relevant sentinel event and self-reporting data.

Introduction

The public health and individual consequences , directly and indirectly, of firefighters contracting occupational diseases are considerable. They raise major questions relating to workplace and social justice, health service provision and costs, and even community safety. Recognition of these neglected diseases in firefighters is important directly to the workers, their families and communities affected. It is also important for prevention of such diseases in the future and the avoidance of externalising social and economic costs of diseases to vulnerable workers who do not create the risks but perform essential public jobs, sometimes as volunteers. In 2018 the US Congress passed the Firefighter Cancer Registry Act and a national register was then established: the UK has lagged behind such initiatives (US NIOSH nd).

Suggestions that firefighters' health risks are mainly due to smoking and obesity are incorrect. The fitness requirements for the occupation, the demands of the job and the age profiles mean this group fall into the epidemiological category where the healthy worker effects is far more likely to apply to the working population than 'lifestyle' factors. Other suggestions that firefighters can simply seek screening from their GP who will pick up occupational cancers are ill-informed. Primary care services are over-stretched, appointments are limited and time-bound and, as was identified years ago, GP education has little content on occupational health and safety (Pickvance 1992).

So too are suggestions that there is no value in registering firefighters' cancers because it would "not help" and would be "too expensive"; this is not evidence-based.

The basis for non-recognition of a number of firefighter diseases is not grounded in either science or social justice. UK policy over decades and different administrations has failed firefighters. The Department of Works and Pensions (DWP) and the Industrial Injuries Disablement Benefit scheme (IIDB) have not recognised a wide range of occupational diseases. DWP seeks advice on which occupational diseases to recognise and prescribe from the Industrial Injuries Advisory Council (IIAC) and those commissioned to do IIAC research.

The system effectively denies and delays action for all workers affected by occupational diseases to claim and this is especially the case for firefighters. This is self-evidently the case when all the occupational disease estimates - including occupational cancers from the UK's workplace watchdog, Health and Safety Executive, which in themselves under-estimate the scale of the problem - are compared with IIDB figures of compensated cases (HSE Occupational Cancer Statistics 2024). HSE estimate 8,700 occupational cancer deaths and 18,700 occupational cancer registrations per year currently. Yet the IIDB scheme assessed on average only 2000 plus cancer cases per year and the majority of these cases over the last decade were asbestos-related. The scheme clearly fails workers.

Our submission briefly focusses firstly on existing global disease recognition for firefighters, secondly on the related issues of exposure times, thirdly on latency periods and fourthly on screening. Increasingly, recording and recognising occupational diseases in firefighters may also be important for recognising and helping to combat fire-related respiratory and other diseases that could affect other first responders regularly on scene , as well as exposed local communities . It also has some relevance to public health as climate change for example has already brought greater wildfire health risks to large populations across the globe. The latest Lancet health and climate change report indicates heat-related mortality per 100,000 increased by 23% worldwide since the 1990s and total heat-related deaths reaching an average of 546,000 annually between 2012 and 2021. Hotter and dryer conditions have also fuelled conditions for wildfires, with fine particle pollution (PM 2.5) from wildfire smoke resulting in a record 154,000 deaths in 2024 (up 36% from the 2003–2012 yearly average) (Lancet 2025). These changes highlight the growing direct and indirect risks to firefighters' occupational health.

In 2023, the Andalusia Environment and Water Agency (AMAYA) in Spain recognised wildfire smoke as carcinogenic to firefighters, permitting compensation payments to affected workers (ETUI 2023).

'New' or neglected risks to firefighter health have also emerged in the last decade. PFAS exposure in fires is now being recognised as an occupational disease risk in firefighters (see for example Glass et al 2016), primarily from firefighting foams but also from treatments applied to firefighter protective clothing. The Australian study at a County Fire Authority site in Victoria in 2015 confirmed a cancer cluster with 16 deaths among Fiskville firefighters exposed to flammable chemicals, combustion, foams and recycled firewater. There was also a higher

incidence of skin, testicular and brain cancers among the firefighters who worked and trained at the facility (Glass et al 2016) The issues surrounding the past and current use of firefighting foam illustrates both the specific and wider health issues and need for health surveillance and screening. PFAS are suspected carcinogens. There is also evidence they can cause harm to the placenta, pregnancy outcomes and child development (Szilagyi et al 2020) and trigger effects at low concentration in organs such as the liver or the immune systems (Bline et al 2024). There are additional indications PFAS are potential endocrine disruptors. However, there are insufficient data to assess the effects of most PFAS adequately quantitatively on human health and the environment (European Council 2025; European Union 2025) .

(1) Global recognition of firefighter cancers (see Appendix for details)

As the global occupational cancer toll rises (Global Burden of Disease 2016), some countries remain reluctant, resistant or hostile to recognising such cancers. Recognition is the necessary first step to compensating affected workers in often protracted claims processes. Wider disease recognition also increases pressure for and adoption of improved occupational cancer prevention strategies (Hazards nd). Many more occupational cancers in firefighters have been recognised across US states than are listed by the IIDB (see Appendix Table One). The Health and Safety Executive (HSE), Britain's workplace health and safety regulatory agency, has also generally identified more types of occupational cancers, some of which affect firefighters, than are listed by IIAC and recognised by DWPs IIDB scheme (See Appendix Table 2)

IIAC reports on firefighters in 2008, 2011 and 2021 concluded "the Council did not find consistent evidence that the risk of any type of cancer is more likely than not to be due to firefighting i.e. the risk was more than doubled" (IIAC 2021). The only firefighter occupational cancer meeting IIAC's 'double risk benchmark' is mesothelioma and that was already included in the IIDB scheme. Nowhere in IIAC, IIDB or DWP rules is there any requirement to use the 'double risk' criterion to deny prescribed industrial disease listing. The benchmark is also not used in the same way elsewhere in the world. The system as it operates now seems to prioritise a cost-benefit above a health-benefit approach, where a significant increase in risk - up to almost twice the general population risk for a range of clearly implicated cancers - would result in no IIAC recognition and no IIDB recognised cases at all.

The UK government could address firefighter occupational health gaps now :-

a. by recognising international best practice approaches as a baseline to recognising all firefighter occupational diseases
b. by reducing the weighting given to 'negative' epidemiological and asymmetrical toxicological studies because it was never fair or appropriate for occupational diseases and accepts worthy cases have been and are denied
c. by moving to a presumptive or rebuttal presumption system along North American lines and operating successfully in other jurisdictions
d. by shifting away from a system of work-caused to work-related occupational diseases. Such systems work effectively in other countries and help better recognise conditions where work may be a preventable co-factor in mortality and morbidity

e. by accepting industrial injuries benefit as necessary for health and fairness, reflecting human rights responsibilities for a remedy
f. by reinstating Reduced Earnings Allowance, with a lower disability threshold (or a new reduced income allowance)

2. Exposure times and adverse health effects

Exposure times causing adverse health effects can vary greatly but sometimes may be very short. For example studies indicate exposure to one wildfire incident alone may affect kidney function (Pinkerton et al 2025). Other studies have examined exposures to one wildfire event and found elevated levels of PAH metabolites (Esteves et al 2025). Assumptions in the past have also often been about exposure levels and risk based solely on exposures in the workplace under-estimate the total toxic load many workers experience (O'Neill et al 2007). These and other exposures also explain why having effective timely health surveillance and related health screening is so important.

The need for better and bigger exposure studies of firefighters to carcinogens in UK has only recently been widely recognized due to the work of Stec and others in identifying a range of carcinogens to which firefighters have been exposed (Stec et al 2018). However, there is evidence that despite this research, the focus remains surprisingly narrow for example with some oddly flagging asbestos exposures in the first instance as the primary target for occupational hygiene and exposure studies followed by PAHs (Rees and Griffiths 2025). Mesothelioma in firefighters was already one of the few cancers recognised by IIAC for prescribed industrial disease listing. Also civil compensation for firefighters with mesothelioma had already been won, for example in 2012 due to the work of the Fire Brigades Union and its lawyers, not epidemiologists and occupational physicians (Thompsons 2012).

By 2016, US researchers had identified not just mesothelioma as a cancer risk for Californian firefighters but also melanoma, multiple myeloma, acute myeloid leukaemia, oesophageal cancer, prostate cancer and brain and kidney cancers (Tsai et al 2016). In 2025, further research and health surveillance has found evidence for elevated risks of certain kidney diseases in full-time firefighters even with less than five years' service, especially urolithiasis (Pedersen et al 2025).

The North American systems increasingly recognise cancers affecting female firefighters, including ovarian cancer, breast cancer, cervical cancer and 'gynaecologic cancer' (IAFF nd). Similarly cancers in female firefighters are recognised in Australian presumptive legislation. Most states recognise primary breast cancer. In Queensland, for example, breast, ovarian and cervical cancers are all recognised and eligible for workers' compensation following the Queensland Parliament Act of 2024 when eleven more cancers were added to the list of presumptive firefighter illnesses, which now covers 23 types of cancer (Queensland Fire Department nd). No such recognition occurs in the UK, creating an equity, health protection and prevention shortfall for female firefighters.

The need for wider prescription of occupational diseases has been recognised previously in House of Commons reports. The Environmental Audit report on Toxic Chemicals in Everyday Life specifically recommended: "The Government should update the Social Security Regulations so that the cancers most commonly suffered by firefighters are presumed to be industrial injuries. This should be mirrored in the UK's Industrial Injuries Disablement Benefits Scheme. " (House of Commons 2019)

3.Latency periods and occupational diseases

The latency periods recognised for a range of occupational diseases cancers that may for example occur in firefighters may vary greatly from country to country whilst recognising factors such as exposure times and exposure levels will be important. HSE in the UK often made assumptions for example that occupational cancers had only long latency periods with today's cancers being the result of exposures a working generation ago. This has two damaging effects. It firstly allows HSE to assume today's cancers are the result of historic working conditions, much worse than those in workplaces today. It secondly also allows the risks facing the current working generation to be downplayed. In Germany and at the Sheffield Occupational Health Advisory Service there was early recognition that minimum latency and exposure times for occupational cancers may sometimes be much shorter than the IIDB system. This was flagged in 2007 as a problem for the GB (O'Neill et al 2007) The table below illustrates this and includes some cancers now listed as occurring in firefighters in several countries.

TABLE 1 Minimal Latencies for Occupational Cancers in the German Compensation System*

Agent	Site	Minimum Exposure Time (Years)	Minimum Latency (Years)
Chromium	Lung, nasal, upper respiratory tract	2	4
Arsenic	Lung, nasal, upper respiratory tract	0.5	3
Aromatic amines	Bladder, urinary tract	0.25	1
Halogenated hydrocarbons (VCM, etc.)	Liver, bladder, urinary tract	5	11
Benzene, benzene homologs, styrene	Leukemia	0.5	2
Halogenated alkyl, aryl or alkyl aryl oxides	Lung, urinary tract, skin, nasal, larynx, stomach, etc.	2	8
Ionizing radiation	Lung, leukemia, skin, mesothelioma	<1	10
Asbestos	Lung	<0.25	8
Asbestos	Mesothelioma	1 day	15
Nickel	Lung, nasal, upper respiratory tract	1	6
Wood dust	Nasal adenocarcinoma	5	8
Soot, crude paraffin, tar, anthracene, pitch, and related compounds	Skin cancer	3	4

*Source: Popp et al.[42]

UK researchers working on firefighter diseases have adopted latency periods that do not necessarily reflect the range that can occur. For example one recent UK commentary mentions an unreferenced figure of a bladder cancer latency period of approximately 20 years. The German study cited and referenced above has one bladder cancer minimum exposure time of 3 months and a minimum latency time of one year, and another bladder cancer minimum exposure time of five years with a minimum latency period of 11 years.

4. Health surveillance and screening for occupational diseases in firefighters

UNEP's Global Chemical Outlook II estimated chemical usage would double between 2017 and 2030 (UNEP 2019. OECD estimated it would quadruple by 2060 (ibid). The consequence of this for firefighters is that the number of exposures to potential carcinogens and other health hazards, their frequency, their combinations, new and to date unknown acute and chronic health risks associated with chemicals will increase accordingly. The risks will extend well beyond PFAS exposures. Hence the need for appropriate health surveillance and screening has become more critical not less.

Screening or medical monitoring is viewed as a form of secondary prevention to pick up disorders at an early stage so treatment and prevention will improve outcomes (Sokas et al 2018). Screening should take into account the risks and benefits of screening: for firefighters the benefits will outweigh the risks based on what we currently know. In the US, ATSDR established three decades ago the appropriateness of monitoring criteria to be used for screening that is still used by occupational physicians in the 21st century (ATSDR 1995). The outcome criteria included 'documented human health research that demonstrates a scientific basis for a reasonable association between an exposure to a hazardous substance and a specific adverse health effect (such as an illness or change in a biological marker of effect). Consideration should be given to the strength, specificity, and consistency of the association among the identified studies. The period of exposure (including the timing and duration of the exposure) and its relationship to the latency period for the disease or illness should also be examined if information is available. Consideration should be given to whether the association has demonstrated a dose-response relationship and whether the association is consistent with the existing body of knowledge. This information could include a variety of occupational, epidemiological, or other studies involving human populations'. Firefighter diseases fulfil several of these criteria.

The value of screening centrally and nationally for occupational diseases is considerable and should prove the best method for detecting occupational diseases in firefighters. If screening is spread across a range of GP practices, data collection, pooling and information dissemination may prove problematic. Speedy and efficient collection of data and application of testing protocols may prove difficult and lack consistency and there will be greater training and information issues raised if GP practices across GB take responsibility for screening.
The surveillance of the World Trade Centre cohort of first responders especially firefighters has highlighted the value of having a dedicated approach to tracking exposed workers which would be very relevant to the Grenfell firefighters in particular but also to a much wider grouping.
In recent years studies have confirmed new instances of rapid onset or progressive conditions, like accelerated silicosis, that can cause devastating and irreversible effects in months. A 2024 study of the impact of wildfires on firefighters noted that "that firefighters are exposed to extremely high concentrations of air pollutants during prescribed fires, and several exceedances of occupational exposure limit values were observed".

The study added "the conclusions of this study are extremely important, since they show that these professionals are exposed to very high levels of harmful air pollutants, also with harmful constituents, thus with potential harmful effects on their health, namely in the respiratory system. Inhaling silica dust, depending on the exposure, can cause symptoms of silicosis (such as coughing, fatigue, shortness of breath and chest pain), inflammation and lung cancer. Thus, future studies should focus on more exposure studies, ideally longitudinal and in real fire environments, but also on the evaluation of the health impacts associated with that exposure, as for example on firefighters' lung function" (Barbosa et al 2024)

Recent firefighters studies have shown the value of screening in one location for health effects including lung cancer (Shah et al 2024; Booze et al 2004) and the importance of having manageable and focussed Cancer Incidence Surveillance Systems (Olivo-Marston et al 2024). There are already well documented and successful firefighter health and medical screening schemes in operation from Australia that could well act as a template for UK fire brigades and avoid wheel re-invention. We understand you will already have received a detailed submission from Victoria Fire and Rescue Service in Australia. This highlights:-

- medical monitoring on scene
- specific blood, urine and other required testing or treatment can be arranged immediately at particular types of fire
- data gathering at scenes including air monitoring, smoke plume monitoring, chemical analysis and fire water runoff testing
- voluntary medical monitoring, inclusive of pre cancer testing, PFAS blood testing and screening
- multiple changes in gear available and cleaning arrangements

Additional information sponsored jointly by fire services and unions has flagged the value of a range of firefighter medical evaluations for identifying hazards, risks and possible adverse health outcomes. This relates not only to cardiovascular, respiratory diseases and cancers but also to haematological, dehydration, extreme temperature, metabolic, immune and endocrine, neurological, muscular and psychological threats to firefighters (Provider's Guide to Firefighter Medical Evaluations nd).

It is difficult to explain the reluctance of some fire services to adopt dedicated screening of firefighters for cancer as countries like the US have developed work and educational programmes on screening and contamination linked to research institutes and the US National +Firefighter Registry for Cancer (NIOSH nd). This work also links in to the dedicated US CDC NIOSH Center for Firefighter Safety, Health and Wellbeing (US CFSHW 2024).

5.Sentinel events and self-reporting of occupational diseases also relevant to firefighters

Sentinel events sometimes arising from self-reported data indicate such events may identify potential causal links between exposures and occupational diseases missed by epidemiologists

and clinicians in the first instance. This has long been recognised as an important tool in occupational medicine and is consistent with WHO recognition at its World Health Assembly (WHA) of the necessity to ensure the participation of workers, participatory research, and measures for early detection of disease in workers (WHA 2007).

This has been examined and supported by occupational physicians, occupational health and safety practitioners, primary care workers and policy analysts in some depth (Rutstein et al 1983, Wegman 1994; Pickvance 1999; Watterson 1999). Safety representatives for trade unions have also been recognised as a major source of information in identifying workplace hazards and their effects on the workforce. Regulators too including the HSE have encouraged employers "to involve employees and their representatives in identifying problems and seeking solutions" (Hazards 2000). Studies have also found that unionised firms with active worker participation have more effective occupational injury and disease reporting, which in turn improves workplace health and safety performance on a broad range of sectors, exposures and risks (Zoorob 2018; Dean et al 2023;Potter et al 2024; Manzo et al 2021) .

Other employment sectors recognise the importance of sentinel events and international bodies like the ILO have flagged why such events should be an integral part of data collection for both prevention and compensation purposes (ILO 2024). For the ILO " Sentinel health events [are] designed to identify high-risk jobs and activities with regard to occupational health as well as to provide pointers towards the aetiology of diseases". Examples of what might be termed 'sentinel events' have emerged following small workplace investigations of heat stress in firefighters.

Case-based surveillance is designed 'to identify sentinel events: individual cases of a diseases that signal a breakdown in prevention" (Sokas et al 2018:71). Several US states have operated case-based surveillance developed by NIOSH and dating back to the late 1980s. It is tried, tested, and maintained. Sentinel events were also already viewed as a basis for physician recognition of occupational disease by the early 1980s "Identifying sentinel health events is crucial for the prevention and treatment of occupational diseases" (Rutstein et al 1983). Other researchers have recently highlighted current data sources such as injury compensation insurance statistics were limited and recording sentinel events was needed to overcome their limitations (Lee et al 2025). In Sheffield, by the early 2000s, for example, a small project succeeded in identifying a series of bladder cancer cases where exposure to cadmium had occurred, ranging from smelters to TV repairs and cutlery work.

The presumptive compensation schemes expose the alternative UK approach to be extremely conservative because there is no equivalent system to respond to emerging evidence of risks. Instead the UK system is based on the idea that nothing exists as a risk to be addressed or compensated unless there is an absurdly high and arbitrary elevated incidence. This is driven by a cost-benefit calculation that systematically undercounts the benefits. The US and Canada in contrast has several presumptive lists of occupational cancers and other communicable and

non-communicable health conditions in firefighters identified by states or provinces which has often picked up health impacts that finally emerged as occupational elsewhere across the globe (IAFF nd). The UK lacks rebuttal presumption.

This for example means that evidence of self-reported cases, via a claims system, never enter the statistics or appear as evidence of carcinogenicity or other health associations in firefighters. Union death in service data and payments to widows provided valuable evidence in the past of conditions like bladder cancer and emphysema related to work.
To suggest that self-reporting of sentinel events through a range of health agencies is therefore unreliable and biased is contradicted by the evidence (Craver et al 2023; Wels 2024).

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Appendix. Firefighter Cancers

The UK failure to recognise the range of occupational cancers that firefighters might contract has long been flagged with little response from successive governments. A range of cancers in firefighters, including primary site brain cancer, primary site bladder cancer, primary site kidney cancer, primary non-Hodgkin's lymphoma, primary site ureter cancer, primary site colorectal cancer and primary leukaemia were identified in 2007 (O'Neill et al 2007). Firefighters in Canadian provinces such as Manitoba, Alberta, Saskatchewan, British Columbia and Nova Scotia are already entitled to compensation for work-related cancers (TUC Risks May 2007; Ontario Ministry of Labour News release May 4 2007; Watterson and O'Neill 2015). No such measures even in 2025 are on the UK horizon and there is little or no evidence that HSE is actively working to address the risks of this occupational group and recognize such cancers. The International Agency for Research on Cancer (IARC) in 2023 produced an authoritative monograph stating: " Occupational exposure as a firefighter was classified as 'carcinogenic to humans' (Group 1) based on 'sufficient' evidence for cancer in humans." IARC found sufficient evidence for mesothelioma and bladder cancer and some evidence for colon, prostate and testicular cancers, melanoma and non-Hodgkin lymphoma (IARC 2023). Some US states recognised firefighter cancers for compensation in 1987 using a rebuttal presumption system. In Louisiana, following a 2017 law, new firefighter cancers were added to the state list including prostate and testicular and "any other type of cancer … for which firefighters are determined to have a statistically significant increased risk over that of the

general population." Maryland adopted a presumption for certain cancers in firefighters from an early date and in 2012 expanded its list from four to nine types of cancer and in 2019, to 11 cancers (Maryland 2024). Oregon provides presumptions for 14 types of cancer to non-volunteer firefighters employed for five or more years (Neugent and Spindell 2023).
In Canada, British Columbia's recognised occupational cancer list in 2005 included primary site brain cancer, primary site bladder cancer, primary site kidney cancer, primary non-Hodgkin's lymphoma, primary site ureter cancer, primary site colorectal cancer and primary leukaemia associated with long-time work as a firefighter (IAFF 2024). Canada's Northwest Territories is considering expanding cancer coverage from 14 types of cancer to all forms of cancers, with only two years of service required for eligibility. Australian states officially recognised firefighting caused cancers, in some instances as early as 2015 with risks to career and volunteer firefighters. Across Australia recognition now applies to firefighters diagnosed since June 2016 with many specified types of primary cancer: brain cancer, testicular cancer, kidney cancer, non-Hodgkin lymphoma, prostate cancer, multiple myeloma, ureter cancer, colorectal cancer and oesphageal cancer (Safe Work Australia nd).
The EU has recognised firefighters are at risk of exposure to carcinogens in the course of their work (EU 20246) and workers call for more action on disease prevention and recognition of firefighter risks (EPSU nd). Poland has had presumptive occupational cancer legislation in place since 2019 for firefighters (Poland Journal of Laws 2019). Danish firefighters who contract a range of occupational cancers including bladder cancer and skin cancer are entitled to claim (Denmark 2024).

The North American and Australian systems increasingly recognise cancers affecting female firefighters, including ovarian cancer, breast cancer, cervical cancer and 'gynaecologic cancer' (IAFF nd; IAFF 2024). No such recognition occurs in the UK, creating both an equity, health protection and prevention shortfall for female firefighters.

Table One. Some Occupational Cancers in firefighters across US states: Occupational Disease Presumptions

STATE	COLON CANCER	OVARIAN CANCER	THYROID CANCER	ALL CANCERS
Alabama				X
Arizona	X			
Arkansas	Digestive tract		X	X*
California				X
Colorado	Digestive system			
Connecticut	Digestive system	Reproductive system	Endocrine system	
Delaware			X	
District of Columbia	X	X	X	
Florida	X	X	X	
Georgia	Intestinal		X	
Hawaii	Intestines			
Idaho	Colorectal			
Illinois				X
Indiana				X
Iowa	Colorectal	X		
Kansas				X
Kentucky	X			
Louisiana	X	Reproductive tract		X*
Michigan			X	
Minnesota				X
Mississippi	X	Reproductive tract		
Missouri	Digestive system			X
Montana	Colorectal			
Nebraska	Digestive system			
Nevada	X	X	X	
New Hampshire				X
New Jersey				X
New Mexico	Colorectal			
New York	Digestive system	Reproductive system		
North Carolina	Intestinal			
North Dakota				X
Ohio				X
Oklahoma				X
Oregon	X			
Pennsylvania				X
Rhode Island				X
South Carolina	Gastrointestinal		Endocrine system	
South Dakota				X
Tennessee	X			
Texas	X			
Vermont	X			
Virginia		X	X	
Washington	Colorectal			
Wisconsin	Digestive system	Reproductive system		
Wyoming				X

*Arkansas language states: cancer that has been found by research and statistics to show higher instances of occurrence in firefighters
*Louisiana language states: any other cancer for which firefighters are determined to have statistically significant increased risk over the general population

[Source: Maryland Bill Testimony and Report 2024]

Authoritative international research exists and so the UK government's current approach should not define LFB's approach to prevention for cancer or other health conditions. Even in the 1990s, lawyers pointed out "a combination of the nature of epidemiology as a science and the Council's innate conservatism result in a highly restrictive reading of the prescription test" (Watterson and O'Neill 2015). IIAC de facto has hampered and limited occupational cancer recognition and prescription by successive UK governments accept IIAC decisions.
IIAC, however, often continues to use somewhat arbitrary and at times questionable benchmarks for recognition level of proof for occupational cancers including firefighter cancers. In 2015, an IIAC position paper offered an explanation of their interpretation of those levels of proof. It stated " below the threshold of a doubling of risk only a minority of cases in an exposed population would be caused by the hazard; above it, a majority would be, allowing individual cases to be attributed to exposure on the balance of probabilities (IIAC 2015). However, the epidemiologist David Ozonoff observed "a good working definition of a catastrophe is an effect so large that even an epidemiological study can detect it" (in Wikely 1986: p88).

So applying a doubling of risk criterion would make it highly unlikely that most occupational cancers would ever be recognised.

Using this invented criterion, not based on evidence from civil damages cases nor recognised globally in peer reviewed scientific evidence, seriously skewed IIAC's prescribed disease assessments and recommendations. Yet in the same document the inconsistencies emerge and IIAC 'recommended prescription where evidence of a causal link to a given occupational exposure is sufficiently compelling to allow occupational attribution to the civil standard of proof in claimants meeting the prescription schedule's terms' (IIAC 2021). The balance of probabilities is not double the risk. There is clearly a mismatch here.
Looking at occupational cancers in general identified by HSE in 2015, it is clear IIAC have failed to recognise many. The list has changed little since 2015. Some of these cancers may be relevant to firefighters occupational exposures

Table Two

A PRESCRIPTION FOR INACTION	
HSE occupational cancer causes and associations	**Occupational cancers and causes and associations recognised by IIAC for prescription and added to the IIDB list**
Bladder aromatic amines, diesel engine exhaust, hairdressers and barbers, mineral oils, polycyclic aromatic hydrocarbons, painters	**Bladder** Various aromatic amines, coal tar pitch volatiles produced in aluminium smelting involving the Soderberg process
Bone ionising radiation	**Bone** Electromagnetic or ionising radiation
Brain inorganic lead, non-arsenical insecticides, petroleum refining	**Brain** **Nothing prescribed**
Breast flight personnel, shiftwork	**Breast** Electromagnetic or ionising radiation
Cervix tetrachloroethylene	**Cervix** **Nothing prescribed**
Kidney	**Kidney**

trichloroethylene	**Nothing prescribed**
Larynx asbestos, rubber industry, strong inorganic acid mists containing sulphuric acid	**Larynx** **Nothing prescribed**
Leukaemia benzene, 1,3-butadiene, ethylene oxide, formaldehyde, ionising radiation, non-arsenical insecticides	**Leukaemia** benzene, electromagnetic or ionising radiation
Liver ionising radiation, trichloroethylene, vinyl chloride	**Liver** vinyl chloride
Lung arsenic, asbestos, beryllium, cadmium, chromium VI, cobalt, diesel engine exhaust, environmental tobacco smoke, inorganic lead, ionising radiation, mineral oils, nickel, polycyclic aromatic hydrocarbons, painters, radon, silica, steel foundry workers, strong inorganic acid mists containing sulphuric acid, 2,3,7,8-tetrachlorodibenzodioxin (TCDD), tin miners, welders	**Lung** arsenic, asbestos, nickel, silica, tin miners, exposure to bis (chloromethyl) ether produced during the manufacture of chloromethyl methyl ether, exposure to zinc chromate, calcium chromate or strontium chromate in their pure forms, coke oven work
Lymphohaematopoietic 1,3-butadiene	**Lymphohaematopoietic** **Nothing prescribed**
Melanoma (eye) welding, ultra violet light	**Melanoma (eye)** **Nothing prescribed**
Mesothelioma asbestos	**Mesothelioma** asbestos
Multiple myeloma non-arsenical insecticides	**Multiple myeloma** **Nothing prescribed**
Nasopharynx wood dust, formaldehyde	**Nasopharynx** wood dust

Non-Hodgkin lymphoma (NHL) hairdressers and barbers, non-arsenical insecticides, TCDD, tetrachloroethylene, trichloroethylene	**Non-Hodgkin lymphoma (NHL)** **Nothing prescribed**
Non melanoma skin cancer (NMSC) solar radiation, mineral oils, polycyclic aromatic hydrocarbons (coal tars and pitches)	**Non melanoma skin cancer (NMSC)** arsenic or arsenic compounds, mineral oils, coal tar, pitch, bitumen, soot
Oesophagus soots, tetrachloroethylene	**Oesophagus** **Nothing prescribed**
Ovary hairdressers and barbers	**Ovary** **Nothing prescribed**
Pancreas acrylamide	**Pancreas** **Nothing prescribed**
Sinonasal chromium VI, formaldehyde, leather dust mineral oils, nickel, wood dust	**Sinonasal** the manufacture of inorganic chromates or work in hexavalent chrome plating, footwear made wholly or partly of leather or fibreboard, nickel
Soft tissue sarcoma (STS) TCDD	**Soft tissue sarcoma (STS)** **Nothing prescribed**
Stomach asbestos, inorganic lead, painters, rubber workers	**Stomach** **Nothing prescribed**
Testis not on HSE's list	**Testis** electromagnetic or ionising radiation
Thyroid ionising radiation	**Thyroid** electromagnetic or ionising radiation

Sources

The burden of occupational cancer in Great Britain: Overview report, RR931, HSE, 2012.
List of diseases covered by Industrial Injuries Disablement Benefit, DWP.

Fire Fighter Cancer Cohort Study (FFCCS) and Center for Firefighter Health Collaborative Research (CFHCR)/ Ref CON004

To: London Assembly Fire Committee
From: Jeff Burgess, MD, MS, MPH
Date: 28 October 2025
Subject: Fire Committee firefighters' exposure to contaminants investigation

A. About you/your organisation

Organisation names: Fire Fighter Cancer Cohort Study (FFCCS) and Center for Firefighter Health Collaborative Research (CFHCR)

What do your organisations do? The FFCCS is a prospective multicenter study of firefighter exposures and health risks involving more than 8,000 participants across 32 U.S. states. The CFHCR works collaboratively with firefighters to provide answers to their research questions. I am the Director of both organisations.

Where are you based? Tucson, Arizona, United States

B. Understanding Exposure Risks

1) How well understood are the health risks associated with exposure to contaminants (e.g., carcinogens, particulates, toxic gases) faced by firefighters during operational duties?

The International Agency for Research on Cancer (IARC) has determined that occupational exposure as a firefighter causes cancer, and that firefighters are at increased risk for multiple types of cancers (1). Furthermore, IARC determined that there was strong evidence, the highest rating assigned, for five key characteristics of carcinogens, also known as carcinogenic mechanisms, including genotoxicity, epigenetic alterations, oxidative stress, chronic inflammation, and modulation of receptor-mediated effects. We also know that all firefighters on the fireground are exposed to carcinogens in smoke and soot, including both those working outside of burning structures and those entering inside these structures (2). In addition, we have clear evidence in the U.S. that firefighters have higher levels of serum per- and polyfluoroalkyl substances (PFAS) than other workers or the general public (3-4), and PFAS exposure is associated with increased rates of multiple disease risks, including cancer (5).

a) What gaps remain in scientific knowledge or monitoring that affect risk assessment and management? While responding to fires is associated with exposure to multiple known and suspected carcinogens (1), and there are evidence based exposure reduction interventions such as increased use of self-contained breathing apparatus (SCBA), particularly for vehicle operators (6), on-scene washdown or decontamination for entry teams (6-7), and washing gear after a fire response (8), it is important for individual fire brigades to carry out exposure monitoring (such as air and urine monitoring for contaminants) to determine the effectiveness of their risk assessment and management programs. Furthermore, given toxic exposures and adverse pulmonary effects during overhaul (9), it is important to for firefighters to wear SCBA during

this operational period. Working with the U.S. prospective research study, the Fire Fighter Cancer Cohort Study, we have identified both individual and departmental risk factors for increased serum PFAS levels, as well as recommendations for actions to reduce PFAS exposures, which have been shared with participating firefighters and fire departments. The U.S. National Institute for Occupational Safety and Health has established the National Firefighter Registry for Cancer, which will provide the largest and most detailed study of cancer rates in U.S. firefighters, as previous studies have suffered from limited statistical power particularly for traditionally understudied groups (e.g. women firefighters, fire training instructors, and wildland firefighters). Similar efforts in the UK would yield information that could be used to improve risk assessment and management, and data for presumptive cancer laws that support firefighters widely in the U.S. and many other countries. Additionally, as part of the risk assessment process, clinical health monitoring of firefighters, including in the UK, should be carried out systematically to allow for health surveillance activities.

b) Are there unique environmental, operational, or demographic factors in London that influence the nature or level of firefighters' exposure to contaminants compared to other parts of the UK? I do not have sufficient information to make this determination.

C. Risk assessment and reduction strategies

2. What should be prioritised in assessing and reducing contaminant exposure risks specifically within LFB?

It will be important to evaluate the extent to which London firefighters have sufficient contaminant risk reduction protocols and are following best practices such as use of SCBA during overhaul, on-scene washdown of turnout gear for entry teams prior to doffing, and washing of gear after fire responses.

a) What should LFB be doing to mitigate these risks?

Please see the response above.

b) What support do individual firefighters need?

Individual firefighters need to be trained in the management and reduction of contaminant exposure and provided the necessary resources (e.g. on-scene decontamination supplies) and equipment (e.g. station washers) to be able to carry out these actions.

c) What can individual firefighters do to reduce risks, and improve health outcomes?

Individual firefighters can follow contamination reduction procedures established by the brigades. In addition, for PFAS exposure they can engage in additional actions such as plasma donation which has been shown to markedly reduce serum PFAS levels (10).

3. What barriers are there to providing more effective control of contaminant exposure within the firefighting community in London?

I do not have sufficient information to make this determination.

4. Are there national or international examples that have demonstrably reduced firefighters' exposure to contaminants LFB could learn from?

The Tucson (Arizona, U.S.) Fire Department has carried out contaminant reduction research and instituted evidence-based interventions including improved use of SCBA, including vehicle operations and fire cause investigators, on-scene washdown and showering on return to the station, clean cab, a hood exchange program, and providing firefighters a second set of gear. In addition, they have been essential in the evaluation of interventions to reduce firefighter exposures to PFAS.

D. Guidance, standards, and regulation and LFB policies

5. How effective are LFB's current PPE standards, decontamination protocols, and post-incident procedures in mitigating exposure risks?

I do not have sufficient information to make this determination.

a) How could it be improved?
I do not have sufficient information to make this determination.

6. What improvements or updates are needed in existing industry guidance, health and safety regulations, or national standards to better manage firefighter exposure risks?

I recommend development of a contaminant reduction risk assessment/risk management framework for the UK fire service.

a) Should there be specific London requirements beyond UK-wide frameworks?
I do not have sufficient information to make this determination.

7. Are there any other issues, concerns, or recommendations regarding firefighter contaminant exposure that should be brought to the Committee's attention?

Information on firefighters' increased cancer risk should be provided to their medical care providers so that they can be provided appropriate screening tests. For example, in the U.S. firefighters are often screened for colorectal cancer at earlier ages than are typical for the general population. On a separate topic, funding by the U.S. Federal Emergency Management Agency (FEMA) and other government agencies has resulted in great advances in firefighter health through establishing evidence-based exposure reduction practices. Additional funding from the UK government for firefighter exposure reduction research would yield similar improvements.

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The Cancer Prevention & Education Society / Ref No. CON005

Response of the Cancer Prevention & Education Society
15th October 2025

We are a Health Charity registered in England and Wales working to reduce human exposure to harmful, persistent, and bio-accumulative chemicals.

We are a member of a BSI Committee working on fire standards for furniture and were on the Advisory Board of the Environment Agency involved in a report on flame retardants.

We have watched the video of the meeting of experts held at the London Assembly in September 2025 https://www.youtube.com/watch?v=GhU1Ce8RoP0

We have the following points to make in response to the London Assembly's *Call for Evidence: The risk of firefighters' exposure to contaminants and its impact on their health wellbeing (September 2025)*:

- The 2023 IARC report *Occupational Exposure as a Firefighter* Volume 132 concluded, '***On the basis of the available evidence, the Group 1 evaluation for occupational exposure as a firefighter should be presumed to apply to all categories and types of firefighter, and to men and women. Group 1 evaluation means the agent is carcinogenic to humans.'***

- In 2024, the European Parliament, under Directive 2004/37/EC (on the protection of workers from the risks related to exposure to carcinogens, mutagens, or reprotoxic substances at work), approved the World Health Organization's classification of occupational exposure among firefighters as carcinogenic stating ***'It is therefore important that the employers of firefighters and emergency services personnel assess, in accordance with Directive 2004/37/EC, the risk of exposure to carcinogens, mutagens and reprotoxic substances and that they take the necessary measures to protect the health and safety of those workers'.***

- According to the 2025 study Occupation as a firefighter and cancer mortality in a population-based cohort in the United States , 'Occupation as a firefighter compared to career professional was associated with most cancers, but strongest for skin (HR = 1.72, 95% CI: 1.14-2.60) and kidney (HR = 1.39, 95% CI: 0.92-2.09) cancer mortality. Suggestive increases in prostate and colorectal cancer mortality were observed with more years as a firefighter. An association with lung cancer was only apparent after three decades of follow-up. Most associations attenuated with control for confounders and changes in referent group to include all nonfirefighter occupations, ***but associations with skin and kidney cancers persisted. These results support additional associations for occupation as a firefighter and cancer mortality beyond those reported in the most recent IARC evaluation.'***

- A recently published 2025 review Assessing carcinogenic and mutagenic hazards in firefighting: a comprehensive review stated that 'Firefighting is widely recognized as a high-risk occupation due to repeated exposure to hazardous substances, including polycyclic

aromatic hydrocarbons (PAHs) and other combustion by-products. An extensive review of empirical studies, meta-analyses, and institutional reports was conducted, considering not only direct fireground exposure but also risks arising from contaminated personal protective equipment (PPE) and indoor air pollution within fire stations. The findings establish a consistent link between firefighting and elevated risks of multiple cancers and chronic diseases. The complexity of modern firefighting environments, amplified by evolving materials, under-ventilated fires, and inadequate decontamination practices, further intensifies these risks. The review highlights the urgent need for advanced protective gear, standardized decontamination protocols, routine health surveillance, and policy reforms. It underscores the importance of multidisciplinary collaboration in developing effective strategies to safeguard the health of firefighters, who play a vital role in ensuring public safety.'

- Firefighters are professionally exposed to toxic/carcinogenic chemicals and best efforts should be made to minimise their exposure particularly in relation to using clean clothing and equipment in addition to using breathing protection.

- We therefore endorse long-term health monitoring (including biomonitoring) of firefighters.

- A US National Toxicology program study published in 2023 found that the a high-volume flame retardant tris(1-chloro-2-propyl) phosphate, TCPP, caused cancer in mice: https://www.ncbi.nlm.nih.gov/books/NBK592940/

- We recommend that firefighters, and their clothing & equipment are monitored for exposure to not only fire derived chemicals (released in fires), but also to chemicals such as gas phase halogenated flame retardants[6] and per- and polyfluoroalkyl substances[7].

[6] https://www.sciencedirect.com/science/article/pii/S0160412020303640?via%3Dihub
[7] https://www.frontiersin.org/journals/materials/articles/10.3389/fmats.2023.1143411/full

Fidra / Ref No.CON006

Key questions

A. About you/your organisation

- **Organisation name**
  Fidra

- **What does your organisation do?**
  Fidra is an SCIO and Scottish registered charity (SC043895) working towards a vision of sustainable societies and healthy ecosystems. Fidra achieves solutions to environmental issues using the best available science by working collaboratively with governments, industry and the public. www.fidra.org.uk

- **Where are you based (if applicable)?**

  Fidra,
  25 Westgate,
  North Berwick
  East Lothian
  EH39 4AG

B. Understanding Exposure Risks

1. **How well understood are the health risks associated with exposure to contaminants (e.g., carcinogens, particulates, toxic gases) faced by firefighters during operational duties?**

The health risks associated with chemical flame retardants (CFRs) and their use in building materials, textiles and consumer products such as furniture and furnishings, plastics and electronics, is well established. Both in relation to the CFRs and their exacerbating effect toward fire smoke toxicity and smoke production in the event of fire[1–3]. Flame retardants are substances added to a range of products, including upholstered furniture, in order to prevent or delay the growth of fire. The UK's Furniture and Furnishings (Fire) (Safety) regulations (FFRs) introduced in 1988 are some of the most prescriptive in the world[4]. Although the regulations do not mandate the use of flame retardants, they represent the most cost-effective way to comply with the current FFRs. As a consequence, many furniture and mattress manufacturers rely on the use of high levels of flame retardants to meet these regulatory requirements. This has resulted in CFRs accounting for up to 18% of the weight of polyurethane foam used in furniture, and has contributed to the UK using CFRs in products at some of the highest levels in the world, with annual total consumption up to 820,000 tonnes [5, 6].

A large and growing body of evidence has identified the detrimental impacts of exposure to certain CFRs on human and environmental health, including endocrine disruption, neurotoxic effects and reproductive impacts, with some CFRs identified as being carcinogenic[7, 8]. Many previously commonly used CFRs have been classified as persistent organic pollutants (POPs) under the Stockholm convention (e.g. polybrominated diphenyl ethers such as decabromodiphenyl ether, hexabromocyclododecane, short and medium chained chlorinated paraffins), with more expected to receive POPs classifications in the future[9, 10].

Most UK furniture uses gas-phase flame quenchers based on organohalogens (bromine & chlorine) or organophosphorus compounds, some of which are halogen free. When furniture containing gas-phase flame retardants burn, the flame retardants present interfere with the fire chemistry, slowing burning of the material. This interference and slowing results in incomplete combustion, and leads to higher yields of all products of incomplete combustion, including: carbon monoxide (CO), hydrogen cyanide (HCN), oxygenated organics (including organoirritants, such as acrolein and formaldehyde), polycyclic aromatic hydrocarbons (PAHs) and soot particulates[2, 3, 11]. Evidence also indicates potential for firefighters to be exposed to harmful classes of CFRs when responding to residential fires[12–14].

Incomplete combustion due to the presence of flame retardants in furniture exacerbates fire smoke toxicity and smoke production, increasing exposure of fire victims and firefighters to toxic substances and fire smoke as a result[2, 15]. Dwelling fires account for the majority of UK fire deaths, with most dwelling fire fatalities occur in living/dining rooms and bedrooms, rooms commonly containing flame retardant treated furniture[1, 16]. Asphyxiation due to inhalation of toxic smoke is the leading cause of fire deaths and injury in the UK. Production of the major asphyxiants carbon monoxide (CO) and hydrogen cyanide (HCN) during fires, is exacerbated by the presence of CFRs in furniture, increasing risks of injury or death to fire victims and firefighters[2, 17]. The presence of CFRs also results in increased production of dense opaque smoke during the burning of flame retardant treated furniture. This increased smoke production can further reduce visibility, impeding victims escape and hindering firefighters efforts to evacuate victims, and extinguish a fire[3].

The long-term health impacts on firefighters exposed to toxic fire smoke is of great concern. Firefighters suffer from elevated rates of cancers, with the cancer rates reported to be up to 323% higher in 35-39 year olds than rates found in the general population, and US firefighters suffering up to twice the line-of-duty death rate due to cancer than the general population [17, 18]. The long-term impact of exposure to harmful toxic smoke substances, including polycyclic aromatic hydrocarbons (PAHs), the production of which is exacerbated by the presence of CFRs, is of major concern in relation to firefighters' health[3, 19, 20]. Toxic smoke products including PAHs can also contaminate firefighting equipment and be carried back to fire stations, resulting in the further spread of contaminants after an incident has concluded[17, 20].

a. What gaps remain in scientific knowledge or monitoring that affect risk assessment and management?

More firefighter monitoring studies and research into long-term health effects on UK firefighters, with robust internationally agreed methodologies, is required to ensure that firefighters are adequately protected. The precautionary approach should also be applied to the use of halogenated CFRs in consumer products, for example where there is a perceived absence of evidence of harm to human health from smoke toxicity during fires or uncertainty over the safety of certain chemicals that public are exposed to[21]. The UK's chemical restrictions (UK REACH) must keep pace to address the ongoing failure to protect UK public from exposure to toxic and persistent CFRs used in consumer products.

b. **Are there unique environmental, operational, or demographic factors in London that influence the nature or level of firefighters' exposure to contaminants compared to other parts of the UK?**
No Comment

C. Risk assessment and reduction strategies

2. **What should be prioritised in assessing and reducing contaminant exposure risks specifically within LFB?**

In order to reduce exposure of firefighters and fire victims to toxic smoke substances, we urge the LBF to support the revision and ongoing changes to the existing UK Furniture and Furnishings (Fire) (Safety) regulations 1988 in order to reduce the use of CFRs in furniture products, promote safe, sustainable and innovative fire safety design, and bring smoke toxicity within scope of the regulations 'essential safety requirements'.

a. **What should LFB be doing to mitigate these risks?** No Comment
b. **What support do individual firefighters need?** No Comment
c. **What can individual firefighters do to reduce risks, and improve health outcomes?** No Comment

3. **What barriers are there to providing more effective control of contaminant exposure within the firefighting community in London**

As mentioned above, the current UK Furniture and Furnishings (Fire) (Safety) regulations (FFRs) 1988 are some of the most prescriptive in the world[4]. The existing UK FFRs pose a barrier to effectively reducing the exposure of London and UK firefighters to toxic smoke, including: carbon monoxide (CO), hydrogen cyanide (HCN) and PAHs, whose production is greatly exacerbated by the presence of CFRs in furniture products. Existing evidence shows the connection between smoke toxicity, fire fatalities and long-term detrimental health impacts[1, 3].

There is no conclusive evidence to demonstrate a clear and causal link between fire fatality rates and furniture flammability testing requirements of the current UK FFRs. Robust research has shown that UK fire deaths have remained comparable with multiple other countries, including European nations and New Zealand, all of which have less stringent or no regulation relating to furniture flammability testing and have seen fire deaths fall at a similar rate as the UK between 1990 and 2019[2, 16]. Furthermore, multiple case studies have demonstrated countries achieving effective fire safety using alternative approaches[16]. This comparable reduction in fire death rates over time has been attributed to factors, such as changing smoking habits, increased fire safety awareness and smoke detector installation, rather than flame retardant use[2]. It seems likely that the higher toxicity of smoke from UK furniture counteracts any benefits of the UK's FFR[1].

The 2019 House of Commons Environmental Audit Committee's report 'Toxic Chemicals in Everyday life', highlighted the risks posed from the use of flame retardants and noted that once ignition occurs flame retardants have little impact on reducing fire growth rate while having an adverse effect on smoke toxicity[17]. Evidence of the effectiveness of flame retardants has also

been investigated by the French Agency for Food, Environmental and Occupation Health & Safety (ANSES), who concluded there was insufficient data to demonstrate effectiveness in reducing domestic fires and recommended other safety fire safety measures to be adopted over flame retardants; while the 2023 Fire Brigades Union conference agenda stated "There is further gathering of evidence that CFRs provide negligible delay to fire ignition, worsen fire conditions, and therefore will increase dangers to firefighter safety and welfare.".[22, 23] Due to the long life span of furniture products, it is likely furniture containing CFRs will be present in UK homes for years to come. However, if policy makers address the unnecessary use of CFRs in furniture and other consumer products now, it is possible to phase out exposure to harmful CFRs in the future.

The UK FFRs are currently under review by the Office for Product Safety and Standards. We urge support for meaningful revisions to reduce the use of CFRs, promote safe, sustainable and innovative fire safety design and less toxic alternatives. We also urge policy makers to include smoke toxicity within the scope of the regulations 'essential safety requirements' to avoid ongoing harm to firefighters and fire victims.

4. **Are there national or international examples that have demonstrably reduced firefighters' exposure to contaminants LFB could learn from?**

A successful international example of reducing and in some cases eliminating the use of harmful CFRs in furniture products can be seen in the USA. The introduction of the California furniture flammability standard - Technical Bulletin 117 (TB 117) in 1975 led to the use of high levels of CFRs in products across the USA[24]. Subsequent scientific research found that the implementation of these flammability standards resulted in increased CFR exposure to harmful CFRs with detrimental impacts to human and environmental health, and no measurable benefit to fire safety[25]. Following scientific evidence and advocacy, in 2015 California implemented revised standards (TB 117-2013) which enabled manufacturers to comply to furniture fire safety standards without the use of harmful CFRs. This positive regulatory change led to the development of chemical-free furniture design solutions such as the use of fire barrier materials across the USA. A further ban on the sale of a number of products, including upholstered furniture containing harmful flame retardant chemicals above a certain threshold level was implemented in California in 2020.

D. Guidance, standards, and regulation and LFB policies

How effective are LFB's current PPE standards, decontamination protocols, and post-incident procedures in mitigating exposure risks?
How could it be improved? – No Comment

What improvements or updates are needed in existing industry guidance, health and safety regulations, or national standards to better manage firefighter exposure risks?
As mentioned above, the outdated UK FFRs 1988 have resulted in the excessive use of CFRs in order to meet furniture flammability testing requirements. This includes prescribing excessive 'open flame tests' which do not reflect modern real-world scenarios, omitting smoke toxicity

from scope of the regulations and not accounting for innovations in fire safety and design. The UK FFRs are currently under review by the Office for Product Safety and Standards.

To protect human and environmental health, including fire victim and firefighters from exposure to CFRs, Fidra recommend the UK government **1)** takes immediate action and revises the outdated UK Furniture and Furnishings (Fire) (Safety) Regulations (FFRs) 1988 to modernise regulations and reduce reliance on CFRs. **2)** Bring smoke toxicity within scope of the FFRs 'essential safety requirements'. **3)** Uses the ongoing FFRs review as an opportunity to move away from current prescriptive flammability testing standards and exclude unrealistic flaming ignition sources to enable sustainable fire safety without the use of CFRs. **4)** Mandate chemical labelling and sound chemical management practices, ensuring that consumers, manufacturers, retailers, recyclers and waste operators have information on CFRs when still used in furniture products and materials. **5)** Drive innovation towards safe and sustainable furniture product design that does not rely on harmful chemicals.

Fidra also encourage revisions to the building construction materials regulations and research and innovation that reduces the use of harmful CFRs in building materials. The use of materials such as highly flammable polyurethane foam in modern buildings (and furniture) is a key contributor to fire incidents and fire smoke toxicity (exacerbated further through the addition of CFRs). A study of insulation materials found that polyisocyanurate and polyurethane foams doubled hydrogen cyanide production during fires[26]. The government must support the production of innovative construction materials that utilise more natural building materials like hempcrete and facilitate their use in mainstream building construction[27].

Should there be specific London requirements beyond UK-wide frameworks?

Fidra recommends that any measures taken in London to protect firefighters from contaminant exposure should also be applied equally across the UK. The improvements to regulatory requirements presented above for furniture fire safety, building construction materials and chemical restrictions (UK REACH) will be enforced across the UK as they are applicable to all UK stakeholders. Governments from all nations are urged to encourage measures to protect the health of public, workers (firefighters and other workers affected by occupational exposure to CFRs) including wildlife and the wider environment.

5. **Are there any other issues, concerns, or recommendations regarding firefighter contaminant exposure that should be brought to the Committee's attention?**

PFAS (per- and polyfluroalkyl substances) are a group of over 10,000 human made chemicals linked to a growing number of environmental and human health impacts[28] . They are widely used for their water, heat, and stain-resistant properties in a multitude of products including firefighting foams and firefighting turnout gear[29]. Some PFAS have been connected with

serious health impacts including, cancers, immune system disorders, and fertility issues in humans[30–32].

Due to these harmful impacts, the UK government launched a public consultation in August 2025 on a proposed restriction of PFAS in firefighting foams. The restriction dossier proposes banning all PFAS as a group in these foams[29]. Fidra supports this group-wide restriction, as firefighting foams are a major source of PFAS pollution in the UK environment and a potential route of exposure for firefighters. The restriction dossier estimates that approximately 48 tonnes of PFAS from firefighting foams are released into the UK environment each year[29]. Additionally, firefighting has been identified as one of the occupations with the highest risk of exposure to hazardous substances, with sufficient evidence linking it to certain cancers[33]. Studies have also found elevated concentrations of perfluorooctane sulfonate (PFOS) and perfluorohexane sulfonate (PFHxS) in the blood of firefighters, further highlighting the urgent need for regulatory action[34].

The restriction of PFAS in firefighting foams is a crucial step toward reducing firefighter exposure to PFAS, with growing evidence showing that firefighters' serum PFAS levels can decline over time following the transition to PFAS-free alternatives[35].

However, firefighting foams aren't the only route of exposure to PFAS for fire fighters. Firefighters can be exposure to PFAS via the textiles used in firefighter turnout gear. Turnout gear has been shown to contain high levels of fluorine (up to 2%), and many different types of PFAS have been identified and measured in both new and used turnout gear[29]. Fortunately, there are viable alternatives that exist to using PFAS in turnout gear which are just as effective. For example, firefighting groups in California have fully transitioned to PFAS free gear[36].

This evidence supports adopting the proposed restriction of PFAS in firefighting foams and should be part of wider efforts to move towards a PFAS-free economy in the UK. Fidra, alongside other environmental NGOs and academics, are calling on the UK government to align with EU chemical regulations, including the EU's proposed universal PFAS restriction, to protect our health and natural resources from these chemicals[28]. The EU has identified technical textiles as a relevant source of PFAS as part of this process, underscoring the importance of addressing all major exposure pathways.

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HSE/ Ref No.CON007

1. **What research has HSE undertaken around Firefighters' exposure to contaminants?**

Response:

HSE has completed a literature review of published papers relating to international washing and decontamination processes for soft structural firefighting Personal Protective Equipment (PPE). Additionally we have undertaken an experiment that compared the efficacy of airing kit vs washing kit in removing fire-derived carcinogenic contaminants from firefighters soft PPE namely jackets and trousers. Volatile Organic Compounds (VOCs) and Polycyclic Aromatic Hydrocarbons (PAH) compounds were used as measures of fire-derived contamination.

   a. **Do you have any upcoming campaigns to address the risk of exposure to contaminants for firefighters'?**

HSE will commence its inspection campaign of Fire and Rescue Services (FRS) in quarter 4 (January to March) of the 2025-2026 work year. The inspections will target cleaning and decontamination arrangements following exposure to combustion products during fire.

2. **What work has HSE undertaken since IARC's work on occupational exposure as a firefighter being defined as Group one (carcinogenic to humans)?**

HSE has tracked the removal of British Standard BS 8617:2019 – Personal Protective Equipment for Firefighters and the introduction of BS ISO 23616:2024.

HSE has shared with the Ministry for Housing Communities and Local Government (MHCLG), National Fire Chiefs Council (NFCC) and Fire Brigades Union (FBU) its inspection plans.

In addition to the research above, HSE has withdrawn the exemption for Face Fit Testing (FFT) of Self Contained Breathing Apparatus. All Fire Rescue Service Chief Officers in GB were notified on 18 June 2025 that the exemption will cease on 1 January 2026. The Fire Chiefs were informed they must comply with the FFT methods as required in the Control of Substances Hazardous to Health Regulations 2002 (COSHH) (as amended) and associated HSE guidance e.g. INDG479, Guidance on respiratory protective equipment (RPE) fit testing - HSE.

HSE has shared the letter removing the exemption with Health and Safety regulators in Northern Ireland, Jersey, Guernsey and Isle of Man

3. **Since IARC's work on occupational exposure as a firefighter, how has this increased expectations on Fire and Rescue Services?**

HSE believes the existing regulatory framework is sufficient to reflect the classification of the firefighting occupation as carcinogenic without change. The Health and Safety at Work etc., Act 1974 requires FRS to ensure, so far as is reasonably practicable the health, safety and welfare at work of all their firefighters.

Additionally the Control of Substances Hazardous to Health Regulations 2002 (COSHH) (as amended) requires FRS to ensure exposure of firefighters to carcinogenic substances is controlled to as low as is reasonably practicable levels. The Workplace (Health, Safety and Welfare) Regulations 1992 requires FRS to provide suitable and sufficient washing facilities, including showers at readily accessible places.

4. **What work has been done on updating inspections to include a focus on the risk of firefighters' exposure to contaminants?**

HSE will ensure Inspectors receive specific training and briefing on benchmark standards for decontamination arrangements in the fire sector before the inspection campaign commences in Q4 2025/26.

   a. **How are you working to enforce inspections?**

HSE Inspectors will make enforcement decisions that are consistent with HSE's Enforcement Policy Statement and Enforcement Management Model.
https://www.hse.gov.uk/pubns/hse41.pdf
https://www.hse.gov.uk/enforce/assets/docs/emm.pdf

   b. **Do you anticipate any challenges around adherence to the standards?**

IARC classified the firefighting occupation as carcinogenic in June 2022.
The regulatory framework in GB has been in place for a minimum of 20 years. HSE has engaged with FRS, NFCC and MHCLG since 2022 and informed of the inspection campaign.

However, depending on where FRSs are in their funding cycle may affect their capital expenditure.

5. **Following the withdrawal of the DCOL process by FRS from 1 January 2026, what will HSE be focusing on from this point onwards?**

Face Fit Testing of Breathing Apparatus is one of the measures required to reduce exposure to carcinogenic substances to as low as is reasonably practicable. This and other control measures, including doffing technics, cleaning of soft PPE, segregation of contaminants, personal decontamination and cross contamination, are equally important and will form part of the inspection campaign starting in Q4 2025/26.

6. **How are you working together with academics, NFCC and MHLCG to collaborate on this matter?**

HSE officials sit on Standards committee's, are engaged with NFCC Health and Safety Chair, NFCC Contaminants group lead and with MHCLG

The Committee would welcome a response to these questions and the call for evidence by **31st October**.

Professor Johanna Feary/ Ref No.CON008

Please may I therefore just highlight the following papers:

Recent paper
Preventing cancer in firefighters: lessons from the Grenfell Tower fire - PubMed (nih.gov)

Papers comparing cancer risk in firefighters to other emergency workers and military personnel:
Cancer Risks among Emergency Medical Services Workers in Ontario, Canada - PubMed (nih.gov)
Cancer risk among firefighters and police in the Ontario workforce | Occupational & Environmental Medicine (bmj.com)
Long-term follow-up for cancer incidence in a cohort of Danish firefighters - PubMed (nih.gov)

LONDONASSEMBLY
November 2025

London Fire Brigade / Ref No.CON009

Briefing note for the London Assembly Fire Committee on contaminants and firefighter health

Introduction

London Fire Brigade (LFB) recognises the significant health risks posed by exposure to fire contaminants (the toxic biproducts of combustion), particularly in relation to long-term illnesses such as cancer. Whilst the exact nature and scale of UK firefighter exposure and resultant health effects are yet to be fully established, it is imperative that risks are mitigated and that firefighter health continues to be actively monitored to further build understanding and enhance protective measures.

To this end, LFB has implemented comprehensive contaminants mitigation activity aligned with national and international best practice and guidance. This briefing will outline this activity, the current research used to inform it, as well as where additional research and funding is necessary to make further progress.

Key points

- Evidence examining the relationship between contaminant exposure and firefighter health is concerning but remains limited, particularly in a UK context.
- Further UK-specific research is needed to better understand the issue, as well as inform further preventative and mitigative strategies.
- Despite this, knowing the nature of how firefighters are exposed to contaminants means that many effective preventive mitigations are already in place.
- Given the financial context Fire and Rescue Services (FRSs) are operating under and the significant cost of mitigation beyond what LFB currently delivers, additional capital funding ringfenced for this issue will be key to making further progress.
- Despite this financial challenge, LFB and other UK FRSs are investing in Personal Protective Equipment (PPE) and upgraded facilities to limit firefighter exposure to contaminants, as well as adopting the most up-to-date risk mitigation policies.

Current evidence

The nature of the firefighting profession means that firefighters are very likely to be exposed to the toxic products of combustion, which commonly include polycyclic aromatic hydrocarbons (PAHs), Volatile Organic Compounds (VOCs), flame retardants and asbestos; all of which can have negative effects on health. This exposure can take place through various routes, including breathing, dermal absorption and ingestion.

What is less clear are the causational links between contaminants exposure and negative health consequences for firefighters – both the types of health consequences and their likelihood. Quality research, especially in a specifically UK context, remains limited.

Much of the best available research focuses on cancer. The most comprehensive assessment of relative risk of cancer development for firefighters compared with the general population is the World Health Organisation's (WHO) International Agency for Research on Cancer's (IARC) publication 'Occupational Exposure as a Firefighter.' This found that there was sufficient evidence that occupational exposure as a firefighter was carcinogenic for two specific cancer types: mesothelioma and bladder cancer.

In addition, positive associations were identified for cancers of the colon, prostate and testis, as well as melanoma and non-Hodgkin lymphoma. However, these (including Bladder Cancer) did not fit the criteria to be considered as definitely causational and were labelled as limited. For all other cancers, the IARC found that current evidence was inadequate to demonstrate a causational link.

UK specific evidence

Many recent UK studies have been led by the Fire Brigades Union (FBU) and the University of Central Lancashire (UCLan). A 2020 FBU-commissioned report on 'Minimising Firefighters' Exposure to Toxic Fire Effluents' highlighted some of the common risks and best practices for minimising exposure, and for decontaminating personnel and equipment. UCLan's research has also reported links between length of service and cancer incidence rates, with firefighters with more than 15 years of service being diagnosed with cancer at 1.7 times the rate as firefighters with fewer than 15, though this may be partially affected by cancer incidence rates increasing with age.

Others include the 2023 'Cancer incidence amongst UK firefighters' study, which used data collected from the UK Firefighter Contamination Survey. This found that cancer incidence rates were between 2.93 and 4.23 times higher in male firefighters aged 30 to 49 than the same male age groups in the general population in England in 2017. However, the same research *also* found that the average incidence rate across all age groups was lower in firefighters, at only 0.83 times the rate found in the male population in England and 0.12 in the female population. Inconsistencies such as this further highlights the limited UK-specific evidence base currently and the need for additional research.

In 2025, a report by Imperial College on 'cancer biomarkers' was released based on a pilot study for 261 firefighters who were part of the wider Grenfell Firefighter Study. This exploratory report found no conclusive evidence that there is an increase in cancer risk for those firefighters whose blood was tested, but the numbers tested were small. The

report does, however, lay a foundation for cancer risk assessment in smoke-exposed urban firefighters and it is proposed that any further research carried out as part of the Grenfell Firefighter Study will now be applied to its entire study population of 685 firefighters. This includes planned research into the relative risk to firefighters from cancer when compared to the general population, and the publication of a second academic report on the respiratory health effects of smoke exposure in firefighters.

The Industrial Injuries Advisory Council (IIAC), the UK's independent statutory body that is responsible for establishing whether occupational exposures are linked to specific diseases, did not find consistent evidence that the risk of any type of cancer is more likely than not to be due to firefighting i.e. the risk was more than doubled. The exception was mesothelioma which is already covered by the scheme.

LFB response

London Fire Brigade has an extensive range of activities underway to reduce contaminant risk for firefighters. The below section is not exhaustive and shows some of the most important current work.

Operational controls

- Working with the Fire Brigades Union (FBU), in 2022 LFB implemented Policy Note 1000 (PN1000) which consists of policy information, training content and assurance for firefighters on how to reduce the risk of contaminants. It provides comprehensive guidance on contamination routes, PPE use, zonal systems, hygiene, and decontamination.
- PN1000 is based on national and international research and best practice and is complimentary to additional, in-person, training which incorporates information about contaminants. PN1000 is mandatory for operational staff and the policy is reviewed regularly to ensure it remains up to date, with the last such review taking place in September 2025.
- Brigade policy 466, 'Respiratory Protective Equipment – Breathing apparatus (BA) – Operational procedures' mandates safe systems of work for donning, starting, and closing down BA, including contamination control during doffing.
- All fire appliance pump bays have soap and hand sanitiser available for hand hygiene. Also, hand washing facilities have been introduced to the Salvation Army van so staff can wash their hands before eating/drinking.
- A "shower within an hour" policy is in place, supported by station routines and real fire training protocols.

- Training and competency requirements for BA wearers, Entry Control Officers (ECO), and team leaders are detailed, supporting PN1000's emphasis on embedding knowledge.

Health monitoring

- The Brigade has in place routine periodic medicals (RPMs) every 3 years, which include general monitoring of respiratory health and a specific asbestos component.
- The efficacy of multi-cancer detection (MCD) testing is kept under review. Currently, no such test is approved by the National Institute for Clinical Excellence (NICE) for public or operational use, with existing tests for the types of cancer proven to have a link with firefighting being largely ineffective due to the long latency period of these cancers.
- LFB has improved its holistic health promotion offer regarding relevant lifestyle factors which are known to impact firefighter health outside of contact with contaminants, e.g. smoking cessation, improved diet, sleep hygiene, alcohol behaviours.
- LFB has also promoted cancer awareness in staff, including relevant self-check techniques and promoted use of existing NHS screening programmes.
- In addition, health and wellbeing has been formally added to the responsibilities of the Assistant Director of Health and Safety.

Management controls

- The Brigade has moved to PFAS-free firefighting foams; PFAS are known carcinogens.
- A Fire Contaminants Working Group (CWG) has been established at LFB with cross-departmental representation to monitor contaminants risks and control measures.
- LFB participates in the National Fire Chief's Council (NFCC) PPE Working Group and has influenced national procurement frameworks.
- A Level 2 Business Assurance Thematic Review on fire contaminants was conducted in Q2 2025/26, with findings informing policy updates and training. Finalised report in Q3 2025/26.
- A thematic review by the Operations Review Team (ORT) is being completed in Q3 2025/26 to assess compliance and cultural embedding of Policy1000 on the incident ground.

Additional activity

- LFB has ringfenced funding of £100,000 for contaminants work in recognition of its importance even in a time of financial constraint.
- The Brigade is exploring the potential for monitoring and recording individual exposure to fire contaminants at incidents through MSA systems.
- A review of the Brigade's policy and guidance relating to fires involving asbestos is underway.

Conclusions

LFB and other FRSs in the UK are already delivering a significant amount of activity to reduce the risks of contaminant exposure for firefighters, recognising the importance of this issue. The steps needed to go further are not well understood, potentially costly and will require contributions from a wide range of stakeholders across FRSs, government and academia. FRSs will not be able to deliver this on their own.

Though progress has been made, further UK-specific research is needed to understand the relationship between contaminants and firefighter health, which would then inform further improved protection and mitigation activities. The most compelling areas for further research include: longitudinal, UK-specific, studies with larger cohorts and control groups; analysis of the effectiveness of control measures in reducing contaminant exposure, and better understanding of suitable cleanliness standards for PPE.

In addition, given the significant costs associated with implementing further mitigation measures, capital funding specifically designated to contaminant issues is vital given the financial position of UK FRSs. The efficacy of further mitigations are not yet well understood in a UK context and consequently, it is difficult for FRSs to justify significant investment over other critical priorities in a challenging financial environment.

We would welcome the Fire Committee's support to continue raising this issue with government and other stakeholders, especially given the challenges around research, the efficacy of mitigations and funding.

Response to requests for evidence from the London Assembly Fire Committee regarding contaminants and firefighter health

Introduction

The Chair of the London Assembly Fire Committee wrote to the London Fire Commissioner on 24 September regarding its ongoing investigation into fire contaminants and firefighter health. As part of this, the Committee requested evidence from London Fire Brigade (LFB) in order to help inform their investigation and answer a number of specific questions.

The Brigade's response to these requests can be found below and should be seen in conjunction with its wider briefing note on the topic submitted with it. The Brigade welcomes the opportunity to discuss this important subject further at the Fire Committee meeting on 2 December.

Topic: Personal Protective Equipment (PPE)

Request: Numbers of reports received from firefighters of inadequate PPE (include demographic characteristics of those reporting).

LFB has a managed service with Bristol MSA which ensures PPE is stringently examined by the supplier to ensure it is fit for purpose. If PPE is found not to be, it will be taken out of circulation. The below tables show the reports received since 2023, along with the reason code provided, for both male and female firefighters:

Male	Reason Codes											
	A No Stock in SRS Locker	**B** FF Changed size without informing Bristol	**C** FF Showing as based at a different fire station	**D** FF On standby from different fire station, didn't have 2nd tunic or leggings	**E** FF On standby from different fire station, didn't have personal issue	**F** FF lost 2nd hoods/gloves	**G** Not showing as booked PPE out since last delivery	**H** Not showing as booked tunic & leggings correctly for training course	**I** Used both personal issue items - Operational	**J** Used both personal issue items - training	**K** Requested kit was in the SRS locker	**L** Short notice posting to station - no laundry run available
2023 no. reports	64	67	27	27	14	8	104	35	217	72	38	-
%	1.51	1.58	0.64	0.64	0.33	0.19	2.45	0.82	5.11	1.69	0.89	
2024 no. reports	46	175	25	25	9	3	257	23	414	31	101	5
%	1.08	4.13	0.59	0.59	0.21	0.07	6.06	0.54	9.76	0.73	2.38	0.12
2025 no. reports	27	262	120	40	8	4	1353	9	1314	31	43	
%	0.64	6.18	2.83	0.94	0.19	0.09	31.91	0.21	30.99	0.73	1.01	

Female	Reason Codes											
	A No Stock in SRS Locker	**B** FF Changed size without informing Bristol	**C** FF Showing as based at a different fire station	**D** FF On standby from different fire station, didn't have 2nd tunic/leggings	**E** FF On standby from different fire station, didn't have personal issue	**F** FF lost 2nd hoods/gloves	**G** Not showing as booked PPE out since last delivery	**H** Not showing as booked tunic & leggings correctly for training course	**I** Used both personal issue items - Operational	**J** Used both personal issue items - training	**K** Requested kit was in the SRS locker	**L** Short notice posting to station - no laundry run available
2023 no. reports	25	12	8	12	3	1	25	13	29	13	13	
%	5.04	2.42	1.61	2.42	0.60	0.20	5.04	2.62	5.85	2.62	2.62	
2024 no. reports	1	2		1			4	1	5	1	4	
%	0.20	0.40	0.00	0.20	0.00	0.00	0.81	0.20	1.01	0.20	0.81	
2025 no. reports	57	35	30	11	1	0	148	33	141	8	13	
%	11.49	7.06	6.05	2.22	0.20	0.00	29.84	6.65	28.43	1.61	2.62	

Request: Update on the performance of new breathing apparatus (e.g., number of reports of faulty sets).

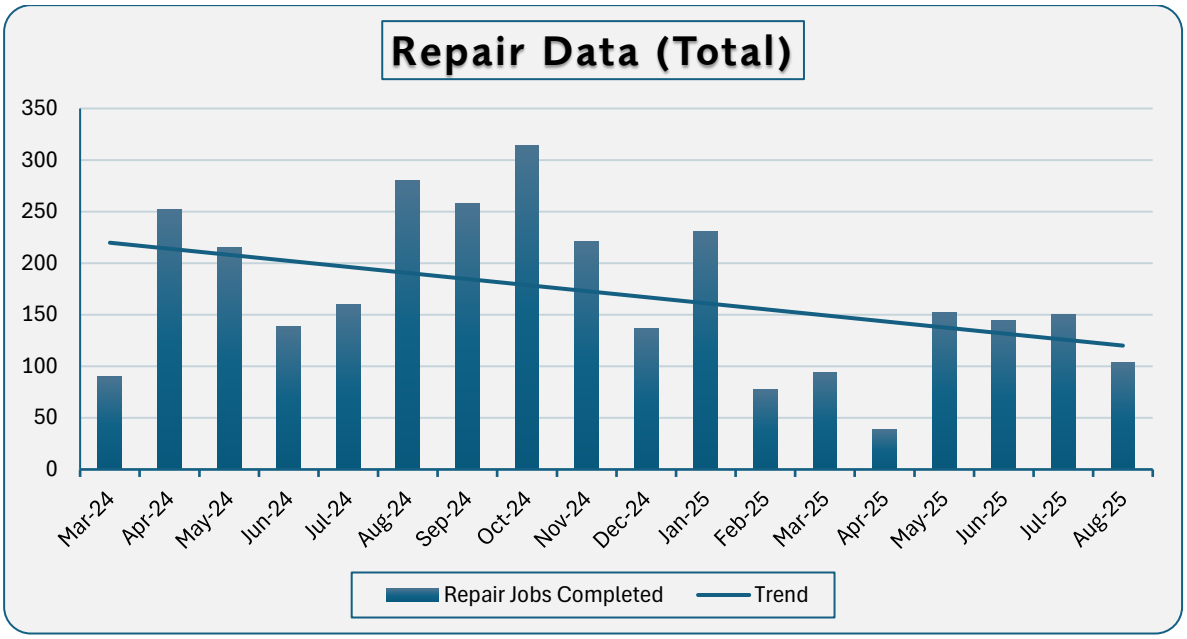
The MSA M1 Breathing Apparatus (BA) sets were introduced by LFB operationally in March 2024, representing a significant advancement in firefighter safety, offering improved functionality and ergonomics, and enabling fire crews to operate more confidently and efficiently in high-risk environments. Since introduction, the new BA sets have been deployed at over 1,400 operational incidents across London.

Throughout the introduction, roll out and adoption of MSA BA systems, LFB maintained safe systems of work and the business-as-usual service to the public.

During the rollout phase and subsequent months, working with trade unions, LFB introduced additional control measures (safety checks) in response to identified manufacturing faults. Several categories of fault were reported and jointly addressed by LFB and MSA. The response to all issues raised remains a critical priority for LFB and MSA to ensure that firefighters maintain confidence in their risk critical equipment. Whilst faults are now considered resolved, LFB remains vigilant to reports of equipment not working as expected and has introduced a dedicated contract manager to oversee safe and expedient resolutions going forward. The table below outlines these faults and primary mitigation:

Fault	**Mitigation**
Contamination within reducer piston chambers.	Emphasis on adherence to the cleaning and maintenance guidance provided by the Operational Support Group (OSG).
LGDV pistons and springs: Some sets failed SmartCheck tests.	Replacement of full piston assembly (piston, spring, and guide).
Failed leak tests at stations.	Update to the control modules is expected to address the majority of these failures (typically identified as a 10-bar pressure drop over 30 seconds).
Alpha Click cylinder connectors on reducers. Occasional detachment of the centre pin within the connector has been observed.	Replacement of the affected connection.
Error codes on control modules.	Replacement under warranty in accordance with manufacturer guidance.
Cracks in control module casings.	Design improvements implemented by MSA have significantly reduced the frequency of this issue.

Repair data covering March 2024 to August 2025 indicates a marked decline in the number of sets requiring repair — from a peak of over 300 in October 2024 to approximately 100 in August 2025. This downward trend demonstrates improved reliability and reflects progress in both manufacturing quality and operational handling and is outlined in the below table:



Request: What internal inspection / spot checks does LFB carry out of post-incident procedures? How many inspections have found firefighters not following processes?

Following an incident, LFB policy is for equipment and inventory to be checked and for fire kit suspected of contamination to be bagged up safely on location. Clean fire kit should then be obtained upon return to the station. This is in line with the Brigade's contaminants policies as outlined in the next response.

When a watch commences its shift at a roll call, firefighters are checked and briefed, with an element of this being assurance that PPE is clean and free from contamination. In addition, an inventory of appliances to ensure availability and condition is conducted. These checks should be conducted at every change of shift at every station in line with LFB policy. This equates to twice during a 24-hour period. Any issues identified are resolved at the time.

Compliance with the Brigade's policies is monitored at local level by watch officers and assured by station commanders. The Brigade's Health and Safety (H&S) department completes separate audits of fire stations where observations of PPE and equipment are noted. Any concerns are recorded on the internal H&S recording system (Sphera Portal) and then signposted to the Hazmat team within Operations Policy & Assurance.

In addition, the Fire Station Assurance team have designed an assurance process for firefighters and watch officers to assure the fire kit contaminant element of these checks.

Request: What processes does LFB have in place to ensure PPE and operational equipment are effectively cleaned to minimise exposure to contaminants? How is compliance with these processes monitored?

The main processes in this area are held in:

- **Policy Note (PN) 693: Structural Firefighting (PPE).** This policy provides instruction on using PPE and how equipment is serviced per the terms of LFB's contract with Bristol MSA.
- **PN1000: Fire Contaminants.** This consists of policy information, training content and assurance activities on how to reduce the risk to firefighters of contaminants, including: contaminant routes, PPE use, zonal systems, and hygiene.

As set out above, compliance of these policies is currently monitored at local level by watch officers and assured by station commanders. The Brigade's H&S department completes audits of fire stations where observations of PPE and equipment are noted, with concerns recorded and then signposted to LFB's Hazmat team.

Request: What is the expected lifespan of different types of PPE used by LFB, and how is this monitored or reviewed in practice?

The expected lifespan for the PPE tunics and trousers used by LFB firefighters are either 50 wash cycles, or when these items are beyond economical repair due to wear and tear. For hoods and gloves, there is no set limit; these are assessed for their condition each time they are sent to the Bristol MSA Service Centre. Boots and helmets are assessed for wear and tear via annual visits to fire stations as part of service-wide audits conducted by Bristol MSA. Wearers can request for their boots and fire helmets to be assessed at any point during its service life.

Request: Can LFB provide details of its current cleaning contract for PPE and equipment, including the scope of services, performance standards, and any recent issues or reviews?

The current PPE contract is provided by Bristol MSA who deliver a fully managed service which includes designing, measuring, providing, maintaining and end of life disposal of PPE. The contract includes 10 key performance indicators (KPIs) which are reviewed monthly and include financial penalties if the supplier doesn't meet the required performance KPIs across each of these areas. LFB and MSA Bristol work collaboratively on the continuous improvement of the service.

There was a backlog providing PPE due to various reasons such as washing machine breakage at the service centre, and increased callouts in June and July 2025, and warehouse requests. However, much of this has now been addressed and resolved, and we are continuing to ensure that MSA Bristol are using contingencies to ensure this is prevented in future. The main KPIs within the contract linked specifically to operational performance include the Availability of PPE (including emergency call out turnaround within 2 hours), health & safety issues, and the cleaning of items. Performance continues to be monitored and managed regularly as a high priority between both parties across a range of oversight forums and organisational levels.

Topic: Data on incident response

Request: Number of incidents attended by LFB (and what type) where risk assessment includes contaminant exposure.

LFB does not record which risks were identified at any given incident. This is not common practice among fire and rescue services (FRS) and is not within procedures set out under National Operational Guidance (NOG). However, at every operational incident, a dynamic risk assessment is undertaken by the Incident Commander or a designated officer. This assessment must consider hazards arising from combustion products and evaluate the potential for contamination exposure. LFB's approach is to risk assess foreseeable activities and create operational procedures in line with NOG. Policy PN1000, the Brigade's contaminants policy, includes risk assessment and control measures for foreseeable incidents.

Request: Number of firefighters removed from incident response duties due to contaminant risk (e.g. those with certain medical conditions or pregnant women).

Staff would not normally be removed from incident response duties solely because of any risk from contaminants. This would include pregnant staff who may be removed from operational duties, but for a range of health/safety reasons, not specifically for contaminants risk to them, or their baby.

Topic: Awareness campaigns

Request: How has LFB communicated its new decontamination policy to operational staff? What steps have been taken to ensure understanding and compliance across the workforce?

Answered in conjunction with

Request: What awareness-raising campaigns has LFB undertaken to promote safe practices around contamination and decontamination? How has the effectiveness of these campaigns been evaluated?

LFB has well established procedures that are clearly set out in policy PN1000 on fire contaminants. The policy details cleaning and control measures for PPE and Respiratory Protection Equipment (RPE), operational equipment, the clean cab policy position and contaminated equipment exchange.

All of the above procedures are embedded in station routines and are part of normal working practises for the daily function of an operational fire station. Correct adherence to procedures is subject to officer in charge supervision and scrutiny. Under the safe person concept, any member of staff can decide to undertake decontamination and/or

cleaning of operational equipment and station premises. Localised decisions are overseen by supervisory officers and/or the officer in charge. Lockers and equipment are directed to be cleaned as part of regular station routines and before and after incidents.

Fire stations are afforded time following an incident to decontaminate, change equipment and PPE, and to shower within one hour of returning to a station. Clear directions for the laundering of workwear are present in PN1000 and PPE is inspected by the officer in charge at the commencement of every shift.

All LFB operational staff are qualified Firefighters and are trained in decontamination as part of their basic training before taking up operational duties as Firefighters under development (FFD).

Competency is maintained through LFB's continuous professional development for core skills through the DAMOP computer-based training. DAMOP training supports local drilling and exercise sessions where donning and doffing procedures and decontamination drills are rehearsed as part of the maintenance of competencies.

Additionally, LFB has undertaken varied and sustained awareness campaigns with operational staff on the risks posed and harm caused by contaminants and the control measures to be adopted to minimise these risks. Face-to-face activity regarding contaminants was delivered to all watch officers as part of the regular Area Watch Leadership Programme from June – September 2024, along with an Operational News (Contaminants) Special in July 2024 with associated mandatory training packages.

Four online briefings and question and answer sessions took place in October 2024 for all firefighters and officers on this topic. The Brigade also continues to work closely with key stakeholders such as Fire Brigades Union (FBU) and University of Lancashire to support awareness campaigns, for example the FBU DECON campaign, and further available academic research in this area, for example the support of LFB staff to take part in academic medical studies.

To provide assurance on engagement with communication on contaminants, we monitor views of the materials on the Brigade's internal Hotwire page, as well as tracking attendance at briefings and views of recordings of those briefings and inviting and monitoring feedback from briefings. Based on evidence from this monitoring, it is known that both the posted materials and the watch-by-watch briefings are successful in engaging colleagues widely, supplementing and consolidating operational training.

Topic: How the issue is being considered at HQ level

Request: Minutes and papers of the joint LFB/FBU health and safety committee where contaminant exposure was discussed.

Please find these attached to the covering email for this document. This document is the minutes from the last Brigade Joint Committee for Health, Safety and Welfare (BJCHSW) in respect of discussions relating to contaminants. This meeting was held on 09 September 2025 and was the last meeting, as the next monthly BJCHSW scheduled on 16 October 2025 was postponed on request of the FBU.

Request: The work plan of the Independent Operational Assurance Adviser (IOAA), and any recent papers from the IOAA that covered contaminant exposure.

There are no recent papers from the IOAA that cover contaminant exposure.

The current Independent Operational Assurance Adviser was appointed in March 2025. He is undertaking an independent strategic review of LFB's DAMOP system – the core platform used to maintain and monitor the operational maintenance of competence of firefighters, officers and specialist staff.

Request: The work plan of LFB's in-house assurance team, and any recent papers from the team that covered contaminant exposure.

A Level 2 Business Assurance Thematic Review on fire contaminants was conducted in Q2 2025/26, with findings informing policy updates and training. Finalised report in Q3 2025/26.

Request: Recent internal audit reports that covered contaminant exposure.

The Directorate of Audit, Risk and Assurance Internal Audit report on Fire Contaminants is in the process of being reviewed.

A thematic review by the Operations Review Team (ORT) is being completed in Q3 2025/26 to assess compliance and cultural embedding of Policy1000 on the incident ground.

Request: Papers and minutes of Commissioner's Board and Deputy Mayor's Fire Board meetings where contaminant exposure was discussed.

An Item - Introduction of the Fire Contaminants policy - LFC-0716" - was brought to Commissioner's Board on 8 June 2022. The minutes of the discussion on this item are provided below:

"The Assistant Commissioner, Service Delivery Assurance, introduced the report which detailed the need for a new policy regarding fire contaminants and the key changes that it introduced on the incident ground and in the workplace.

The changes outlined were designed to reduce the exposure risk to staff from fire contaminants and the subsequent potential illness. It also reduced the risk to communities and the families of staff by preventing cross-contamination into fire stations, workplaces and homes. The Board noted the pivotal role that the FBU had played in this work.

The Board noted there would be a change in response behaviour at incidents as a result of the policy, and that a communications and go-live plan was being produced in association with the policy. Control were also being informed of potential increases in make ups and earlier reliefs.

The Commissioner asked that a full costs review be undertaken as early as possible. The Commissioner's Board agreed to recommend that the London Fire Commissioner approve the introduction of the Fire Contaminants Policy."

LONDON FIRE COMMISIONER

LONDON FIRE BRIGADE
BRIGADE JOINT COMMITTEE FOR HEALTH AND SAFETY AT WORK

Minutes for meeting held on 18.09.2025 at 11:00 hours

PRESENT:

Brigade:
Paul McCourt (Jt Sec Management)
Daniel Jones (Observer)
Alan Taylor (Observer)

Staff Side
Gareth Beeton (Joint Sec FBU)
Karl Smith (Dep Joint Sec FBU)
Chris Mills (FBU North West)
Andre Vanderwater (FBU North East)
Andy Wilks (FBU South East)
Sam Trowsdale (FBU North West)
Les Speller (FBU South West)
Tommy Lewis (FBU)

Health & Safety Advisor
Adrian Bevan

Chair:
Dan Kipling

Minutes:
Carolyn Cook

1. APOLOGIES FOR ABSENCE

Mark Davidson (Dep. Joint Sec Management)
Matt Brown (Central Operations)
Drew Stephens (Unison)
Micky Bhasin (FBU SMA)
Kate Doyle (Health and Safety)
Toby Walsh (FBU SMA)

7.5 Contamination Working Group

Confirmed that the Contamination working group met and was chaired by DAC Kavanagh. Terms of reference have been circulated. **Management** stated there had been a contaminants assurance review which was yet to report. There will also be a thematic review by ORT. **Staff side** raised ongoing contaminants concerns regarding the Launders Lane waste site and requested to see what actions were being taken on this. Management confirmed there had been a recent meeting on this and actions will be shared

Action: Launders Lane to be discussed at next Joint Secretaries meeting.

AOB

Out of London deployment (Contamination) (Staff Side)

Staff Side expressed concern over social media posts showing firefighters covered in contaminants. **Management** stated this had been noticed and raised internally. **Staff side** stated that appliances had come back dirty after they had been assured they would be cleaned before they returned. Staff side asked for this item to be added to the agenda for next month, where they expect a further update.

Action: Staff side to email issues (with pictures)
Management to provide update (add as an agenda item)

Date, time, and venue of next meeting: 16th October at 11am HQ