# ELECTRIC VEHICLE (EV) FIRES AND CANCER

This factsheet was developed by the International Association of Fire Fighters and the Firefighter Cancer Support Network.

EV fires are not just vehicle fires – they're hybrid fire/HazMat events with elevated exposure risk.

Responding to an electric vehicle (EV) fire introduces a multifaceted hazard environment. Lithium-ion battery packs store large amounts of energy; when they fail or are compromised (e.g., collision, overheat, submersion), they may enter thermal runaway, releasing intense heat, flammable gases, toxic vapors, and heavy metal contaminants. Unlike conventional vehicle fires, EV incidents often demand prolonged injury control, cooling, HazMat mitigation, and post-incident monitoring due to delayed reignition risks.[1]

**EV FIRE DYNAMICS**

*Battery Pack*
↓
*Thermal Runaway*
↓
*Off-Gassing*
↓
*Reignition*

## EXPOSURE ELEMENTS & HEALTH RISKS

EV fire exposures extend beyond flame – they include electrical, chemical, and environmental contamination hazards linked to long-term health outcomes.

Research indicates EV fires release heavy metals and other carcinogenic agents via battery combustion, off-gassing, and runoff into environment. For example, heavy metals in EV battery fires (e.g., arsenic, cadmium, lead) are known carcinogens associated with lung, bladder, skin, and liver cancers.[2]

A staged EV fire study in Florida found more than 100 chemicals released during the incident, including heavy metals, hydrogen cyanide, and CO.[3] Given the intensity and duration of EV fire incident exposures, responders face elevated hazard potential for inhalation, dermal contact, and contaminated water/soil migration.

## OPERATIONAL RESPONSE & MITIGATION

Treat EV incidents as extended events – suppression may end flames, but exposure and hazard events live on.

- Size-up must include battery-pack location, charging status, submersion history (salt water), and proximity to other vehicles/structures. Establish hot/warm/cold zones; use SCBA for smoke/off-gassing.
- Suppression should focus on large-volume cooling of battery modules.
- Post-fire, isolate the vehicle outdoors, monitor with thermal imaging, and treat it as a potential delayed hazard for hours or days. Extend scene control into staging, recovery, and storage to prevent secondary exposures to crews or other assets.

1 Cancer Health. "Electric Vehicle Fires Raise Cancer Risk for Firefighters and Communities." 2025. cancerhealth.com.

2 South Florida Hospital News. "Heavy Metals in EV Batteries Are Known Carcinogens, Pose Greater Cancer Risk for Firefighters." 2025. South Florida Hospital News.

3 University of Miami News. "Electric Vehicle Fire Staged to Study Environmental, Health Ramifications." 2024. InventUM.

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## DECONTAMINATION, PPE & STATION PRACTICES

The gear you wear during an EV fire may carry exposure risk well after the flames are out – cleaning must match the hazard level.

Due to possible heavy-metal contamination, acids, and persistent chemicals, gear and apparatus require rigorous cleaning. On-scene gross decon (soap/water), skin wipes, gear bagging, and station separation of contaminated/uncontaminated zones apply. Apparatus surfaces, tools, and measurement devices may have residual contamination and must be cleaned before reuse.

Post-incident, ensure separate laundering of gear (reference NFPA 1851) and encourage post-shift health monitoring due to the possibility of chemical absorption or dermal uptake.

## ADVERSE HEALTH OUTCOMES & CANCER RISK SUMMARY

Although research on EV-fire-specific cancer outcomes remains emerging, the presence of known carcinogens (e.g., heavy metals, acid gases, persistent chemical residues) means long-term health risk cannot be ignored.

Key points:

- Heavy-metal exposure (e.g., arsenic, cadmium, lead) from battery fires is associated with cancers of lung, bladder, skin, and liver.[2]
- The larger fire-scene duration, off-gassing phases, water-runoff contamination, and proximity to other assets increase cumulative exposure risk for crews.
- Fire department exposure studies  are beginning to incorporate battery/electric-fire scenarios into biomarker monitoring to detect early carcinogenic pathway changes.[4]

EV fire incidents may produce unique and elevated long-term health risks – fire departments must treat them with the same rigor used for hazardous materials incidents.

**LONG-TERM HEALTH RISK FRAMEWORK FOR EV FIRE RESPONDERS**

*Exposure*

↓

*Biological Change*

↓

*Latency*

↓

*Outcome*

4 Fire Fighter Cancer Cohort Study (FFCCS). "Electric Battery Fire Study." 2024–25. Fire Fighter Cancer Cohort Study (FFCCS)