JANUARY Is Fire Fighter Cancer Awareness Month

IARC Firefighting Exposure Reclassification

After thoroughly reviewing the available scientific literature, the International Agency for Cancer (IARC) Working Group classified the occupation of firefighting as carcinogenic to humans (Group 1), IARC's highest carcinogenic hazard classification. This is supported by epidemiological studies and mechanistic evidence. Fire fighter exposures are definitively linked to five main characteristics of carcinogenesis:

- · Genotoxicity: DNA damage, gene mutation, etc.
- Induced epigenetic alterations: DNA methylation, microRNA expression
- · Induced oxidative stress: oxidative damage to macromolecules
- · Induced chronic inflammation: altered cytokine/chemokine production, elevated white blood cells
- Modulates receptor-medicated effects: receptor in/activation (e.g., aryl hydrocarbon receptor and related enzyme P450 cytochrome)

tional Agency for Research on Cancer

World Health Organization

Previously, IARC had classified fire fighter occupational exposure as Group 2B, possibly carcinogenic to humans. The new classification as Group 1 puts firefighting on par with tobacco and benzene as *carcinogenic to humans*.

There are four different categories classified by the IARC monographs:

Group 1: The agent is *carcinogenic to humans*. This category is used when there is *sufficient* evidence for cancer in humans. In other words, there is convincing evidence that the agent causes cancer in humans.

Group 2A: This category includes agents with a range of evidence regarding cancer in humans and in experimental animals. At one extreme of the range are agents with positive but not conclusive evidence regarding cancer in humans. The agent is *probably carcinogenic to humans*.

Group 2B: The agent *is possibly carcinogenic to humans.*

This category is used when there is *limited* evidence for cancer in humans and less-than-sufficient evidence for cancer in experimental animals. It may also be used when the evidence regarding cancer in humans does not permit a conclusion to be drawn.

Strong mechanistic evidence in exposed firefighters Occupational exposure as a firefighter is carcinogenic to humans (Group 1) on the basis of sufficient evidence for cancer in hun ographs classification indicates The IARC Mo Exposures of firefighters the level of certainty that an agent car lude combustion produc diesel exhaust, building cause cancer (hazard identification) materials, asbestos, Higher level of certainty Lower level of certainty chemicals, shift work ultraviolet radiation Cancer types with sufficient evidence for cance in humans: Firefighters respond to various types of fire cer types with limited eviden er in humane . Melanoma of the skin Ivr

IARC MONOGRAPHS VOL. 132: OCCUPATIONAL EXPOSURE AS A FIREFIGHTER

Group 3: The agent is not classifiable as to its carcinogenicity to humans.

The IARC working group, made up of 25 international experts, found that "occupational exposure as a fire fighter causes cancer." The IARC found sufficient evidence for cancer in humans for mesothelioma and bladder cancer, and limited evidence for several other cancers, including colon and prostate cancer.

The classification, announced in Lyon, France, on July 1, marks a dramatic shift in IARC's position on fire fighter occupational cancer. This designation will likely have a major impact on the fight against cancer in the fire service, from ongoing medical research to presumptive laws.

Sources:

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- Carcinogenicity of occupational exposure as a firefighter
- Lancet Oncol, Published online 30 June 2022; https://doi.org/10.1016/S1470-2045(22)00390-4

