

# Worker-Informed Science and the IARC Monographs

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# What is the IARC Monographs Programme?

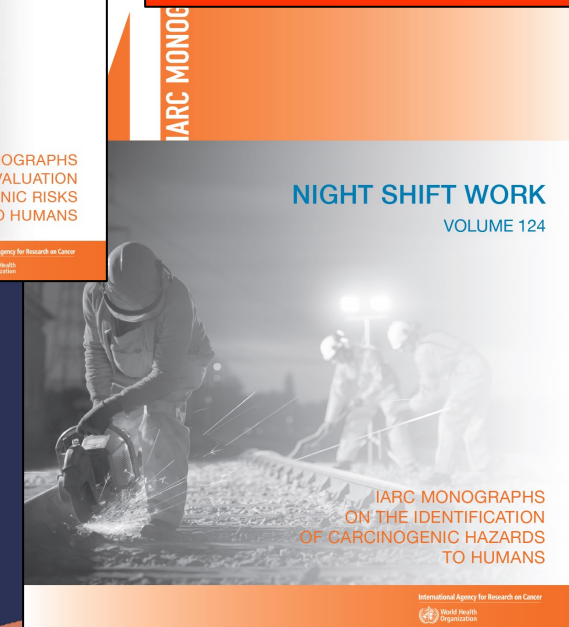
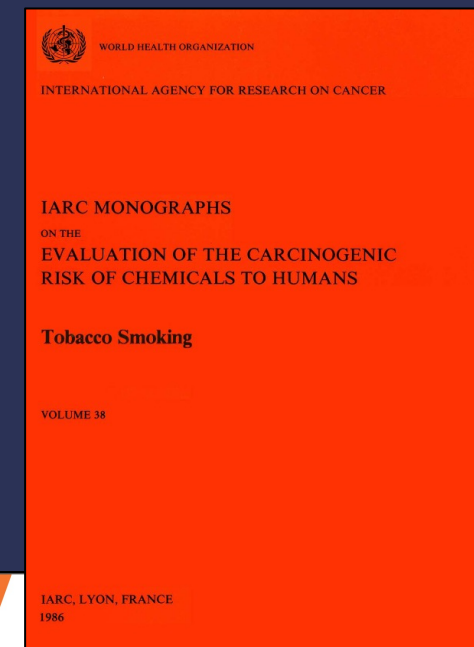
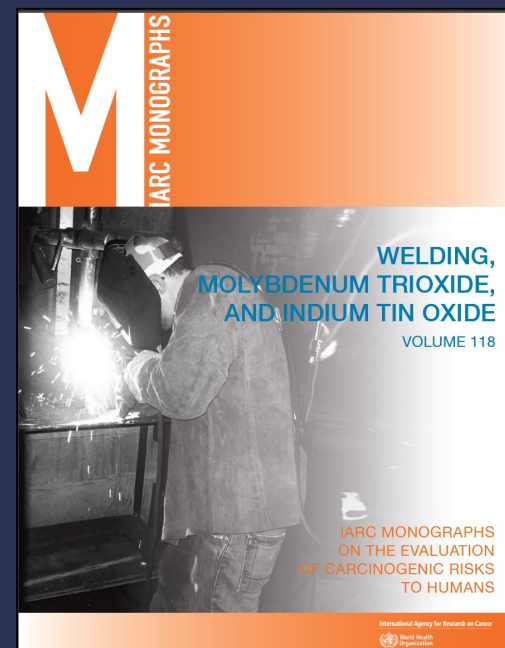
- WHO programme to identify carcinogenic hazards to humans in Lyon, France
- Working group of scientists review all evidence of carcinogenicity on a given agent
- Produce a 'monograph' book compiling the evidence with an evaluation of carcinogenicity



Vol. 132 Monographs meeting

# Over 1,000 agents evaluated in 50 years

- Includes chemical, physical, biological agents, pharmaceuticals, and dietary, lifestyle, and occupational exposures
- Occupational exposures frequently evaluated
- Studies of cancer in exposed workers are often critical to evaluations

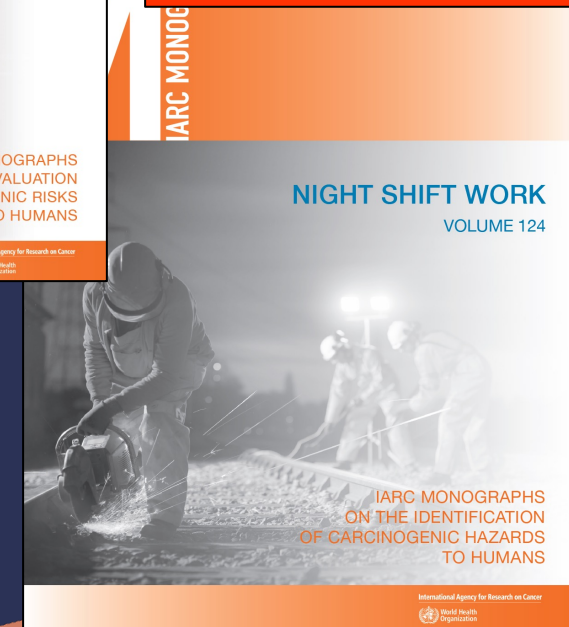
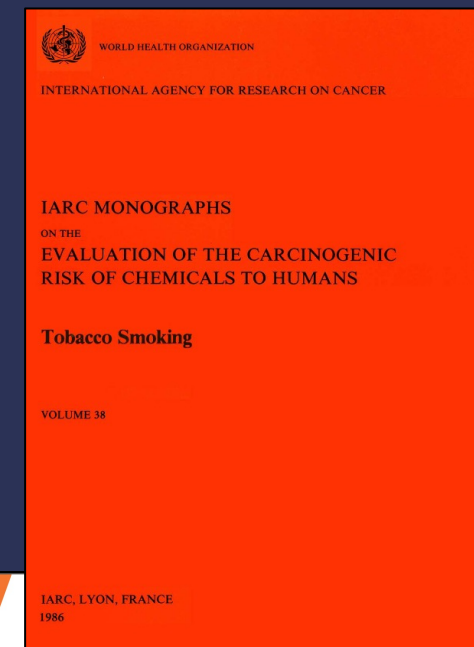
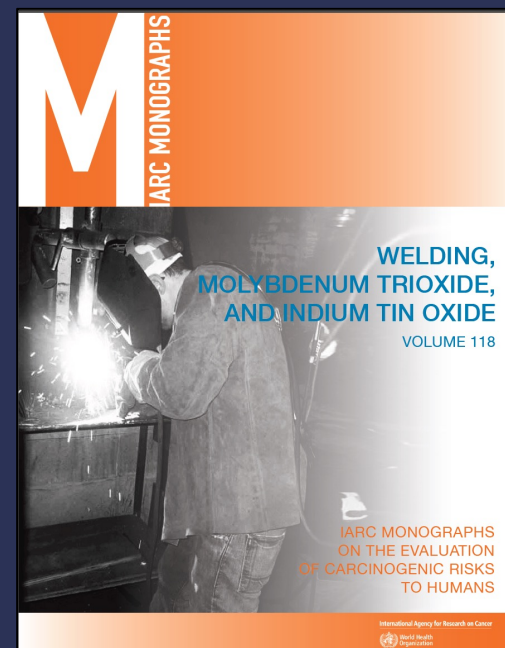




# Over 1,000 agents evaluated in 50 years

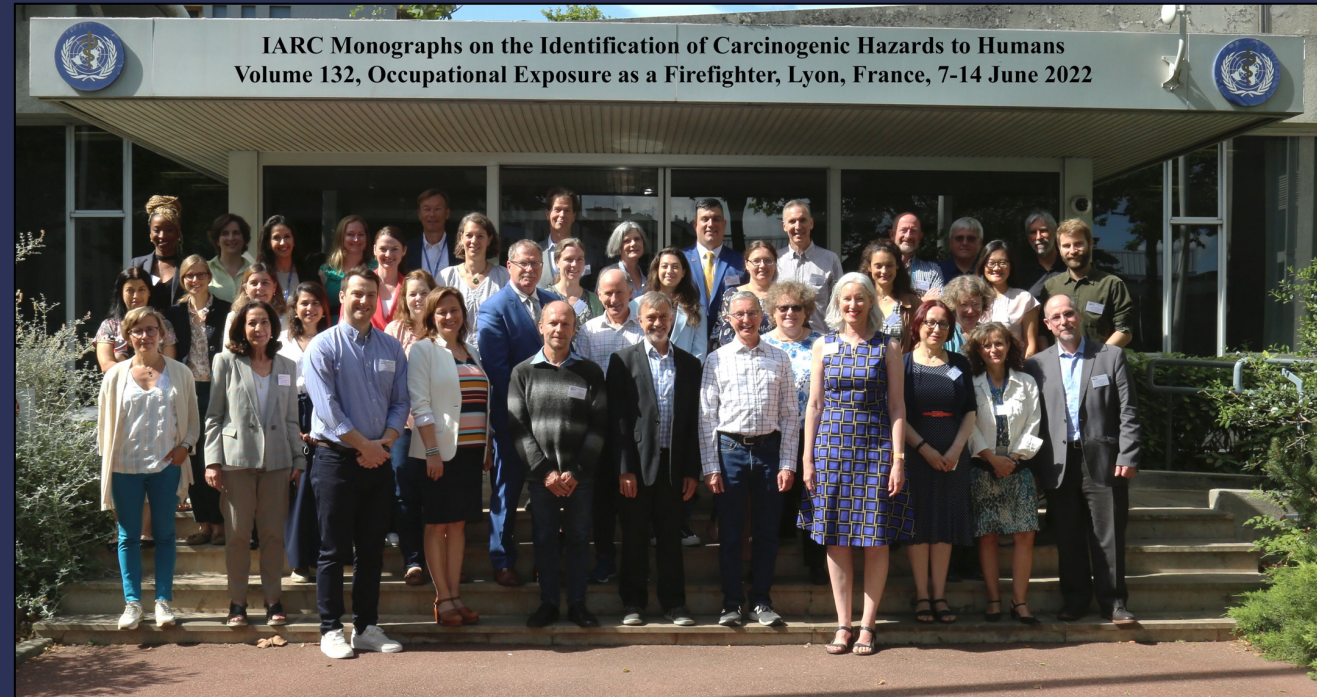
## Number of agents evaluated by classification, June 2022

- **Group 1**      *Carcinogenic to humans (n=122)*
- **Group 2A**    *Probably carcinogenic to humans (n=93)*
- **Group 2B**    *Possibly carcinogenic to humans (n=320)*
- **Group 3**      *Not classifiable (n=501)*



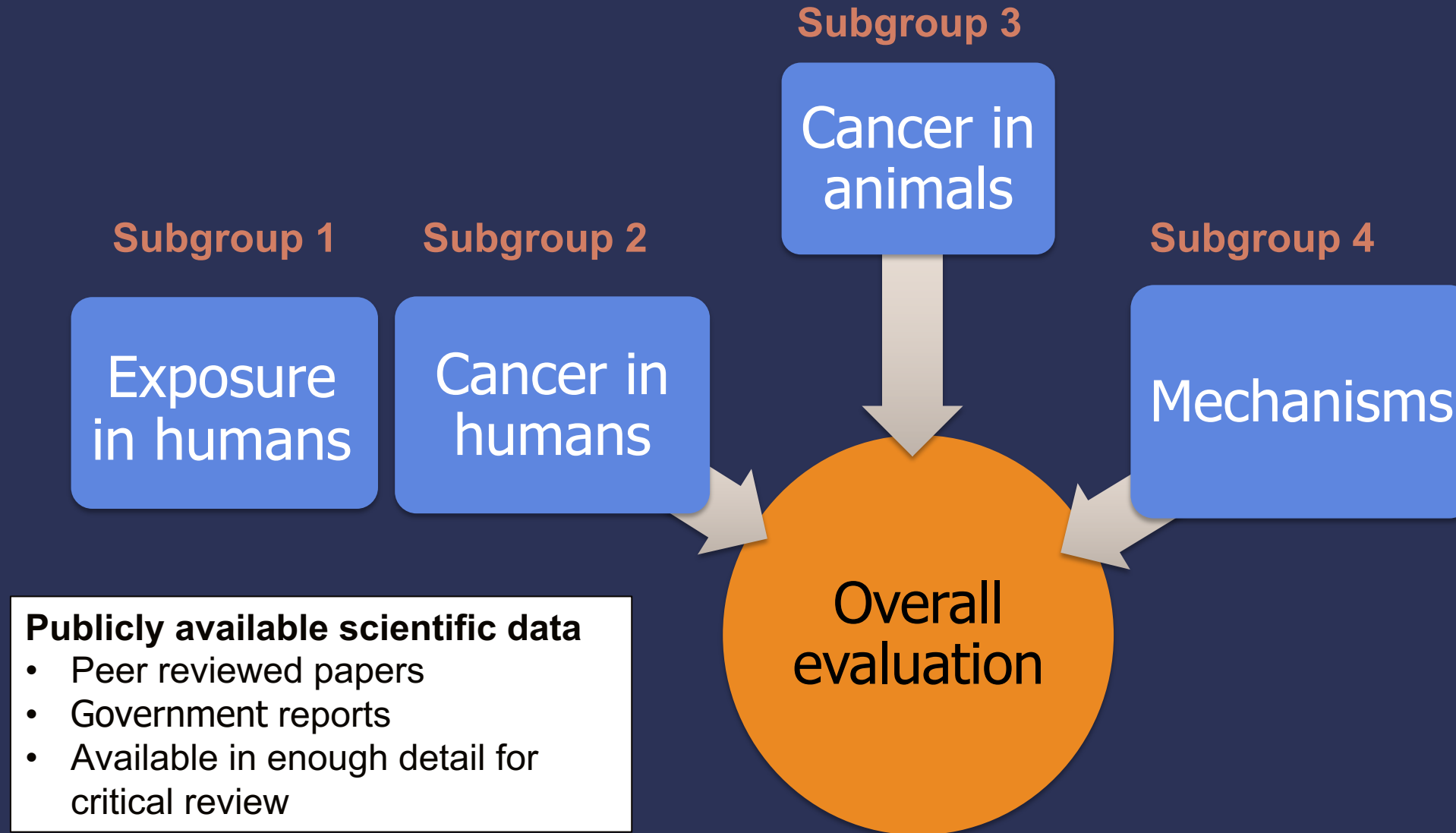
# Vol. 132: Occupational Exposure as a Firefighter

- The carcinogenicity of **‘Occupational Exposure as a Firefighter’** evaluated in June 2022
- 25 Working Group members from 8 countries reviewed hundreds of studies of firefighting and cancer



Vol. 132 Working Group

# Three evidence streams



# How is evidence evaluated?

**Cancer in humans**  
— Preamble Part B, Section 6(a)

**Cancer in experimental animals**

**Mechanistic evidence**

## *Sufficient*

- Causal relationship has been **established**
- Chance, bias, confounding could be **ruled out with reasonable confidence**

## *Limited*

- Causal interpretation is **credible**
- Chance, bias, confounding **could not be ruled out with reasonable confidence**

## *Inadequate*

- Studies permit **no conclusion** about a causal association, or
- **No data** were available

## ESLC

- High-quality studies covering the full range of exposure are consistent in not showing a positive association at any level of exposure

Evidence of Cancer in Humans	Evidence of Cancer in Experimental Animals	Mechanistic Evidence	Overall Evaluation
Sufficient			Carcinogenic (Group 1)
	Sufficient	Strong (exposed humans)	
Limited	Sufficient		Probably carcinogenic (Group 2A)
Limited		Strong	
	Sufficient	Strong (human cells or tissues)	
		Strong (mechanistic class)	Possibly carcinogenic (Group 2B)
Limited			
	Sufficient		
		Strong	Not classifiable (Group 3)
	Sufficient	Strong (does not operate in humans)	
All other situations not listed above			



Evidence of Cancer in Humans	Evidence of Cancer in Experimental Animals	Mechanistic Evidence	Overall Evaluation
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Limited		Strong	
	Sufficient	Strong (human cells or tissues)	
		Strong (mechanistic class)	Possibly carcinogenic (Group 2B)
Limited			
	Sufficient		
		Strong	Not classifiable (Group 3)
	Sufficient	Strong (does not operate in humans)	
All other situations not listed above			

# Final Evaluation

Occupational exposure as a firefighter is  
*carcinogenic to humans* (Group 1)  
on the basis of  
*sufficient evidence* for cancer in humans



The *IARC Monographs* classification indicates  
the level of certainty that an agent can  
cause cancer (*hazard identification*)

Higher level of certainty

Lower level of certainty



Cancer types with *sufficient evidence* for cancer  
in humans:



Mesothelioma    Bladder cancer

Cancer types with *limited evidence* for cancer in humans:



Colon  
cancer

Prostate  
cancer

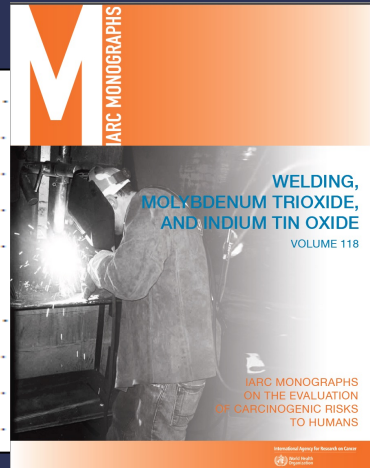
Testicular  
cancer

Melanoma  
of the skin

Non-Hodgkin  
lymphoma

# Summaries and Evaluations

5. Summary of Data Reported .....
5.1 Exposure data .....
5.2 Human carcinogenicity data .....
5.3 Animal carcinogenicity data .....
5.4 Mechanistic and other relevant data .....
6. Evaluation .....
6.1 Cancer in humans .....
6.2 Cancer in experimental animals .....
6.3 Overall evaluation .....



## 5. SUMMARY OF DATA REPORTED

### 5.1 Exposure data

Welding is a broad term for the process of joining metals through coalescence. Approximately 11 million people worldwide are estimated to have the occupational title of welder, and

enclosure, and use of personal protection are the major determinants of exposure. Concentrations of welding fumes in western Europe declined during 1983–2003 by 4% per annum. FCA welding generates the highest concentration of welding fumes, followed by GMA and MMA

## 6. EVALUATION

### 6.1 Cancer in humans

There is *sufficient evidence* in humans for the carcinogenicity of welding fumes. Welding fumes cause cancer of the lung. Positive associations have been observed with cancer of the kidney.

There is *sufficient evidence* in humans for the carcinogenicity of ultraviolet radiation from welding. Ultraviolet radiation from welding causes ocular melanoma.

### 6.2 Cancer in experimental animals

There is *limited evidence* in experimental animals for the carcinogenicity of gas metal arc stainless steel welding fumes.

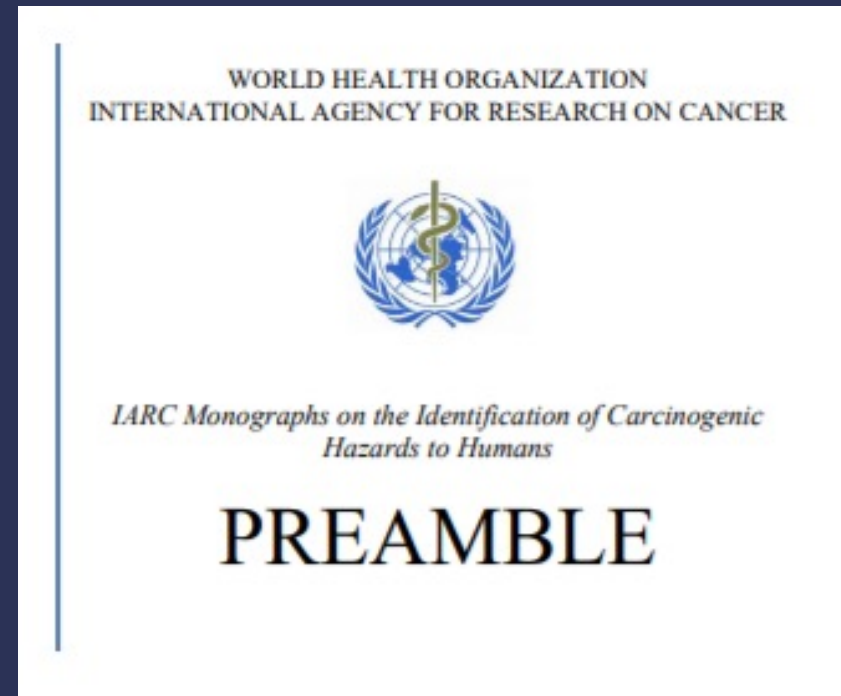
### 6.3 Overall evaluation

Welding fumes are *carcinogenic to humans* (Group 1).

Ultraviolet radiation from welding is *carcinogenic to humans* (Group 1).

# How are the IARC Monograph evaluations conducted?

- Procedural guidelines for participant selection, conflict of interest, stakeholder involvement & meeting conduct
- Review criteria for human, animal and mechanistic evidence
- Decision process for overall evaluations



<https://monographs.iarc.who.int>



# What agents will be evaluated in the future?

International Agency for Research on Cancer



*IARC Monographs on the Identification of  
Carcinogenic Hazards to Humans*

Report of the Advisory  
Group to Recommend  
Priorities for the  
*IARC Monographs* during  
2020–2024

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# How can I nominate agents for evaluation?

## International Agency for Research on Cancer



### World Health Organization

[Returning?](#)

AAA



### Nomination of Agents for Future IARC Monographs

IARC encourages the general public, the scientific community, national health agencies, and other organizations to nominate agents for review in future IARC Monographs. Nominations may include chemicals, mixtures, occupations, physical agents, biological agents, lifestyle factors, and anything else suspected of causing cancer in humans. Agents will be selected for review based on: (a) evidence of human exposure; and (b) evidence or suspicion of carcinogenicity.

To nominate an agent for review, please complete the following form and upload the Declaration of Interest at the end.

Thank you.

**Your name**  
\* must provide value

**Your principal affiliation**  
\* must provide value

# Thank you

Contact:  
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