



Interim ATSDR Cancer Risk Evaluation Guidance Value for Inhalation Exposures to Naphthalene Effective Date: June 6, 2022

Citation:

[ATSDR] Agency for Toxic Substances and Disease Registry. 2022. Interim ATSDR Cancer Risk Evaluation Guidance Value for Inhalation Exposures to Naphthalene. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

ATSDR has evaluated naphthalene air exposures at several sites for both noncancer and cancer risk (ATSDR 2014, ATSDR 2019). At these sites, ATSDR used the California EPA (CalEPA) inhalation unit risk (IUR) to determine site-specific cancer risk. Currently, ATSDR has air noncancer comparison values (CVs) for naphthalene. However, ATSDR has no air, water, or soil cancer risk evaluation guides (CREGs) for naphthalene. ATSDR usually derives its cancer based CREGs by using cancer potency values from the U.S. Environmental Protection Agency's (EPA) Integrated Risk Information System (IRIS) database. EPA has not developed cancer potency factors for either inhalation or oral routes for naphthalene (last evaluated in 1998, [Naphthalene \(CASRN 91-20-3\) | IRIS | US EPA](#)). However, EPA has adopted CalEPA's IUR and oral cancer slope factor (CSF) to calculate media-specific screening values for cancer risks for their Regional Screening Level tables ([Regional Screening Levels \(RSLs\) - Generic Tables | US EPA](#)). For these reasons, ATSDR determine that, on an interim basis, the CalEPA's IUR should be used for calculating an ATSDR CREG for inhalation exposure. ATSDR is not recommending developing a CREG for soil or water as the evidence for the carcinogenicity of naphthalene via the oral route is limited (ATSDR 2022).

Basis for Interim CREG for Inhalation Exposure to Naphthalene

Naphthalene is a common air pollutant classified as a polycyclic aromatic hydrocarbon (PAH). It is an industrial intermediate, a component of some petroleum fuels, and a product from combustion of organic matter. A study (NTP, 2000) in rats found clear evidence of a carcinogenic effect, resolving the previous uncertainties and upgrading the body of data available to a level that allows satisfactory cancer risk assessment. In 2002, the International Agency for Research on Cancer classified naphthalene as possibly carcinogenic to humans (IARC, 2002). The National Toxicology Program determined that naphthalene is reasonably anticipated to be a human carcinogen (NTP, 2021). Accordingly, and in view of the importance of naphthalene as

an air pollutant, CalEPA developed a cancer unit risk value for use in several programs ([Adoption of a Unit Risk Value for Naphthalene - OEHHA \(ca.gov\)](#)).

ATSDR has derived its interim air CREG based on the CalEPA IUR and will use the IUR value to calculate site-specific cancer risks. The table below summarizes the interim IUR and CVs that health assessors should use as they evaluate naphthalene in air.

Interim Inhalation Unit Risk (IUR) and ATSDR Air Comparison Value		Intended Use
Interim IUR ¹	$3.4 \times 10^{-5} (\mu\text{g}/\text{m}^3)^{-1}$ or $1.8 \times 10^{-4} (\text{ppb})^{-1}$	For calculating an air CREG and site-specific cancer risks
ATSDR Air CREG ²	0.029 $\mu\text{g}/\text{m}^3$ or 0.0056 ppb	Screening phase to select contaminants for further evaluation

$\mu\text{g}/\text{m}^3$: micrograms per meter cubed; ppb: parts per billion

1. Interim IUR developed by CalEPA

2. Air CREG (non-mutagen) ($\mu\text{g}/\text{m}^3$ or ppb) = $0.000001 / (\text{IUR} (\mu\text{g}/\text{m}^3 \text{ or ppb})^{-1}) / 78 * (78)$

Unlike some other PAHs, naphthalene is not mutagenic and does not require the use of age dependent adjustment factors (ADAFs) to derive CREGs or to estimate site-specific cancer risk. Furthermore, there is abundant toxicological data on naphthalene (ATSDR, 2021). Therefore, it can be evaluated on its own without estimating its relative potency to benzo(a)pyrene (ATSDR, 2022).

This interim guidance represents the best currently available science on cancer potency. If EPA reassesses the carcinogenic effects of naphthalene and derives an IUR, ATSDR will review and update the interim CREGs as needed.

If you have questions about how to apply this guidance at a site, please contact the OCHHA ADS Office.

References

[ATSDR] Agency for Toxic Substances and Disease Registry, 2014. Radiac Abrasives, Inc. Letter Health Consultation [accessed 2022 April 15]. Available at [https://www.atsdr.cdc.gov/HAC/pha/RadiacAbrasives/Radiac%20Abrasives,%20Inc.%20%20LHC%20\(Final\)%20%2003-24-2014%20\(2\)_508.pdf](https://www.atsdr.cdc.gov/HAC/pha/RadiacAbrasives/Radiac%20Abrasives,%20Inc.%20%20LHC%20(Final)%20%2003-24-2014%20(2)_508.pdf)

[ATSDR] Agency for Toxic Substances and Disease Registry, 2019. Quanta Resources Inc. Public Health Implications of Ambient Naphthalene Exposures Health Consultation. Prepared by the New Jersey Department of Health under cooperative agreement with ATSDR [accessed 2022 April 15]. Available at https://www.atsdr.cdc.gov/HAC/pha/QuantaResources/Quanta_Resources_HC_508.pdf

[ATSDR] Agency for Toxic Substances and Disease Registry, 2021. Toxicological profile for Perfluoroalkyls. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service. DOI: 10.15620/cdc:59198

[ATSDR] Agency for Toxic Substances and Disease Registry. 2022. Guidance for Calculating Benzo(a)pyrene Equivalents for Cancer Evaluations of Polycyclic Aromatic Hydrocarbons. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service. Available at <https://www.atsdr.cdc.gov/pha-guidance/resources/ATSDR-PAH-Guidance-508.pdf>

[IARC] International Agency for Research on Cancer. IARC Monographs on the Evaluation of Carcinogenic Risk to Humans. Some Traditional Herbal Medicines, Some Mycotoxins, Naphthalene and Styrene. World Health Organization. Volume 82. Available at <https://monographs.iarc.who.int/wp-content/uploads/2018/06/mono82.pdf>

[NTP] National Toxicology Program. 2000. NTP Technical Report on the Toxicology and Carcinogenesis Studies of Naphthalene in F344/N Rats (Inhalation Studies). U.S. Department of Health and Human Services, Public Health Service. NTP RE 500, NIH Publication No. 01-4434. Research Triangle Park, North Carolina. Accessed at: [TR-500: Naphthalene \(CASRN 91-20-3\) in F344/N Rats \(Inhalation Studies\) \(nih.gov\)](#)

[NTP] National Toxicology Program. 2021. Report on Carcinogens, Fifteenth Edition.; Research Triangle Park, NC: U.S. Department of Health and Human Services, Public Health Service. <https://ntp.niehs.nih.gov/go/roc15> (EndNote XML)
DOI: <https://doi.org/10.22427/NTP-OTHER-1003>